

# TRAFFIC STUDY & ROUNDBABOUT ANALYSIS

Harkrider St at Old Morrilton Hwy  
Donaghey Ave at Old Morrilton Hwy

Conway, Arkansas



**CITY OF CONWAY**

**March 2021**

**MCE** McCLELLAND  
CONSULTING  
DESIGNED TO SERVE ENGINEERS, INC.

1580 East Stearns Street  
Fayetteville, AR 72703

[mce.us.com](http://mce.us.com)

P: (479) 443.2377 | F: (479) 443.9241

# Executive Summary

## Existing site

Old Morrilton Hwy at Harkrider St- Harkrider St has six lanes on the north leg and five lanes south leg of the intersection. Old Morrilton Hwy on the west leg of the intersection has 5 lanes, while the east leg serves as an entrance to the Walmart Supercenter with four lanes. Buildings are set back far enough to not interfere with a roundabout footprint. Two driveways on the west side of the roundabout and one driveway on the northeast corner would need to be adjusted, but alternatives exist to limit the impact to the respective businesses.

Old Morrilton Hwy at Donaghey Ave- Old Morrilton Hwy approaches the intersection from the east and north with five lanes in each direction. Donaghey Ave approaches the intersection with four lanes from the west and south. The business setbacks are sufficient to prevent conflict with a roundabout footprint and the driveways are located far enough from the intersection to be of no concern.

## Traffic data

Turning movement volumes for the morning and evening peak hours were collected in the fall of 2019 for both intersections.

### Old Morrilton Hwy & Harkrider St Conway Arkansas Wednesday, September 18, 2019

Time	Southbound					Westbound					Northbound					Eastbound					VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
11:00 AM	0	20	68	62	0	0	12	15	23	0	0	59	82	5	0	0	91	29	67	0	533
11:15 AM	0	16	76	67	0	0	26	24	34	0	0	47	75	11	0	0	82	14	69	1	541
11:30 AM	0	16	68	83	2	0	19	21	27	0	0	70	78	12	0	0	88	28	67	1	577
11:45 AM	0	28	81	73	1	0	28	27	25	0	0	70	103	3	0	0	84	22	58	0	692
Peak Hour Total	0	80	293	285	3	0	85	87	109	0	0	246	338	31	0	0	345	93	251	2	2253
PHF	0.000	0.714	0.904	0.858	0.375	0.000	0.759	0.806	0.801	0.000	0.000	0.879	0.820	0.646	0.000	0.000	0.948	0.802	0.946	0.500	0.936
Heavy Vehicle %	0.00%	1.25%	2.73%	1.75%	0.00%	0.00%	1.18%	0.00%	2.75%	0.00%	0.00%	4.88%	3.25%	0.00%	0.00%	0.00%	1.16%	1.08%	3.07%	0.00%	2.40%

Time	Southbound					Westbound					Northbound					Eastbound					VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
4:30 PM	0	22	82	85	0	0	18	28	18	0	0	89	152	11	1	0	114	19	59	0	697
4:45 PM	0	17	72	109	0	0	25	25	37	0	0	77	114	7	0	0	109	24	66	0	682
5:00 PM	0	21	95	123	0	0	15	26	22	0	0	77	165	7	3	0	122	26	68	0	767
5:15 PM	0	31	87	131	0	0	29	32	39	0	0	72	149	8	0	0	77	30	51	0	746
Peak Hour Total	0	91	346	448	0	0	87	111	116	0	0	315	590	33	4	0	422	99	244	0	2892
PHF	0.000	0.734	0.892	0.855	0.000	0.000	0.750	0.867	0.744	0.000	0.000	0.885	0.879	0.750	0.333	0.000	0.865	0.825	0.897	0.000	0.943
Heavy Vehicle %	0.00%	2.20%	0.58%	0.67%	0.00%	0.00%	0.00%	0.00%	0.86%	0.00%	0.00%	1.59%	0.34%	0.00%	0.00%	0.00%	1.42%	1.01%	1.23%	0.00%	0.86%

**Old Morrilton Hwy & Donaghey Ave  
Conway Arkansas  
Thursday, October 10, 2019**

Time	Southbound					Westbound					Northbound					Eastbound					VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
11:00 AM	0	55	23	16	0	0	18	84	35	0	0	27	24	27	0	0	19	85	2	0	415
11:15 AM	0	57	23	4	0	0	15	60	62	0	0	7	18	30	0	0	25	83	4	0	388
11:30 AM	0	60	25	19	0	0	13	82	61	0	0	13	12	28	0	0	11	81	10	0	415
11:45 AM	0	65	12	15	0	0	14	86	61	0	0	10	17	22	0	0	16	79	9	0	406
Peak Hour Total	0	237	83	54	0	0	60	312	219	0	0	57	71	107	0	0	71	328	25	0	1624
PHF	0.000	0.912	0.830	0.711	0.000	0.000	0.833	0.907	0.883	0.000	0.000	0.528	0.740	0.892	0.000	0.000	0.710	0.965	0.625	0.000	0.978
Heavy Vehicle %	0.00%	2.53%	1.20%	3.70%	0.00%	0.00%	0.00%	1.28%	7.31%	0.00%	0.00%	1.75%	0.00%	0.00%	0.00%	0.00%	0.00%	2.74%	0.00%	0.00%	2.40%

Time	Southbound					Westbound					Northbound					Eastbound					VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
4:15 PM	0	57	28	20	0	0	24	124	95	0	0	10	32	31	0	0	33	109	8	0	571
4:30 PM	0	58	26	23	0	0	15	98	93	0	0	21	54	29	0	0	26	105	6	0	554
4:45 PM	0	59	23	25	0	0	17	133	95	0	0	15	42	34	0	0	27	89	9	0	588
5:00 PM	0	55	13	21	0	0	16	133	109	0	0	14	56	26	0	0	36	117	4	0	600
Peak Hour Total	0	229	90	89	0	0	72	488	392	0	0	60	184	120	0	0	122	420	27	0	2293
PHF	0.000	0.970	0.804	0.890	0.000	0.000	0.750	0.917	0.899	0.000	0.000	0.714	0.821	0.882	0.000	0.000	0.847	0.897	0.750	0.000	0.955
Heavy Vehicle %	0.00%	2.18%	0.00%	2.25%	0.00%	0.00%	1.39%	0.81%	2.81%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.82%	0.00%	0.00%	0.00%	1.00%

A 1.5% growth rate was assumed for the traffic growth for ten-year and twenty-year projections.

### Capacity Analysis

The ratio of demand flow to capacity, which is called the Degree of Saturation, for the worst leg of each intersection is shown in the following tables. The degree of saturation for each lane is available in the appendix.

#### *ROUNDAABOUT-HCM 6<sup>TH</sup> Degree of Saturation, v/c- Old Morrilton Hwy and Harkrider St*

YEAR	CURRENT	10 YEAR	20 YEAR
AM PEAK HOUR	0.443	0.544	0.658
PM PEAK HOUR	0.682	0.859	1.063

#### *ROUNDAABOUT-HCM 6<sup>TH</sup> Degree of Saturation, v/c- Old Morrilton Hwy and Donaghey Ave*

YEAR	CURRENT	10 YEAR	20 YEAR
AM PEAK HOUR	0.531	0.652	0.786
PM PEAK HOUR	0.721	0.887	1.072

### Level of Service

The Level of Service for the intersections is shown in the following tables. The LOS for each lane is available in the appendix.

#### *ROUNDABOUT-HCM 6<sup>TH</sup> CONTROL DELAY, s/veh- Old Morrilton Hwy and Harkrider St*

YEAR	CURRENT	10 YEAR	20 YEAR
AM PEAK HOUR	8.0 (A)	10.1 (B)	13.5 (B)
PM PEAK HOUR	12.3 (B)	20.3 (C)	41.4 (D)

#### *ROUNDABOUT-HCM 6<sup>TH</sup> CONTROL DELAY, s/veh- Old Morrilton Hwy and Donaghey Ave*

YEAR	CURRENT	10 YEAR	20 YEAR
AM PEAK HOUR	6.9 (A)	8.8 (A)	12.0 (B)
PM PEAK HOUR	10.9 (B)	17.5(B)	34.3 (C)

### Queue Length Threshold

The distance to the back of queue (in feet) for the worst leg of each intersection by average and 95% are shown in the following tables. The queue tables for each leg of each intersection and the an exhibit for each roundabout showing the average length to the back of queue for the 10 year PM peak hour are in the appendix.

YEAR	CURRENT	10 YEAR	20 YEAR
AM PEAK HOUR	25.8 (64.2)	40.3 (100.1)	60.7 (150.9)
PM PEAK HOUR	65.5 (162.8)	126.0 (313.2)	330.1 (820.4)

#### *ROUNDABOUT-HCM 6<sup>TH</sup> Back of Queue, ft- Old Morrilton Hwy and Donaghey Ave*

YEAR	CURRENT	10 YEAR	20 YEAR
AM PEAK HOUR	43.1 (107.2)	70.5 (175.3)	115.9 (288.0)
PM PEAK HOUR	101.9 (253.2)	201.2 (500.2)	449.4 (1,116.9)



## Introduction

The City of Conway secured the services of McClelland Consulting Engineers, Inc. to determine the feasibility of a roundabout at the intersection Old Morrilton Hwy and Harkrider St., as well as, the intersection of Old Morrilton Hwy and Donaghey Ave. Roundabouts are known to increase the capacity and safety of an intersection, the City of Conway, a state leader in roundabout implementation, knows these facts well.

This report outlines the study completed by comparing the existing traffic data modeled as an optimized signalized intersection in Synchro 10 and as a roundabout intersection with the HCM and Rodel. The capacity and level of service analysis has been completed for current year, 10-year, and 20-year design periods. A conceptual design was completed for each intersection to better understand potential impacts to the surrounding area.

## Methodology

The traffic at each intersection was recorded and counted to find the morning and afternoon peak-hour counts. The traffic counts were categorized as left-turn, through, and right-turns. A 1.5% growth rate was assumed for modeling the 10-year and 20-year projected traffic growth. An accepted parameter used to determine how well an intersection performs is the control delay. The control delay is how long, in seconds per vehicle, a driver spends getting through the intersection that is attributed to the intersection's method of control. For signalized intersections, it is how long a driver is delayed by slowing down to enter a queue, stopped at a red light, and the time it takes to accelerate through the intersection. For a roundabout, the control delay is the time a vehicle spends slowing down due to getting into the queue, the time in the queue, the time waiting on a gap to enter the circulatory roadway, and negotiating the roundabout. Since a roundabout does not yet have its own level of service thresholds based on control delay, the HCM used the threshold for a stop control intersection. The table below shows the LOS based on control delay for stop control intersection.

Control Delay (s/veh)	Level of Service by Volume-to-Capacity Ratio*	
	v/c ≤ 1.0	v/c >1.0
0-10	A	F
>10-15	B	F
>15-25	C	F
>25-35	D	F
>35-50	E	F
>50	F	F

\* For approaches and intersection-wide assessment, LOS is defined solely by control delay.

Table 1- Level of Service Threshold for a Stop Control Intersection per the HCM

However, the purpose of this report is to compare existing signalized intersection with a proposed roundabout. In an effort to make the best comparison, the same signalized intersection thresholds are used for both signalized intersection and roundabouts. The following table shows the thresholds used for LOS assignment.

LOS	CONTROL DELAY PER VEHICLE (sec/veh)
A	≤10
B	>10-20
C	> 20-35
D	> 35-55
E	> 55-80
F	≥80

Table 2- Level of Service Threshold for a Signalized intersection per the HCM

Synchro 10 was used to model both intersections with the AM and PM peak hour traffic volumes operating as a signalized intersection. The traffic signals for both locations were modeled as operating under optimal conditions for a baseline comparison. Synchro 10 uses the Highway Capacity Manual 6<sup>th</sup> edition (HCM 6<sup>th</sup>) to determine the Level-of Service (LOS), capacity, and delay measures. The two intersections were analyzed as traffic signals with current year, 10-year, and 20-year traffic projections.

The HCM 6<sup>th</sup> edition was utilized through the SIDRA software to give a starting point on the needed lane configuration based on an expectable LOS. The AM and PM peak hour traffic volume data was entered into the software and analyzed under current year, 10-year, and 20-year design traffic projections.

A conceptual layout was created to show the potential impact a roundabout with the required configuration would have on the surrounding area. The Rodel software was then used to analyze the potential roundabout to determine the feasibility of the intersection improvement.

## Existing Site Conditions



Figure 1- Existing Layout of the Harkrider St/Old Morrilton Hwy Intersection

The existing intersection has two through-lanes for the northbound and southbound traffic with each approach providing a single left-turn lane, as well. The northern approach offers a free right-turn bypass lane. The eastern and western legs have yield control right turn bypass lanes. The western leg also has a single left-turn only lane with a through/left-turn lane. The eastern leg additionally has a through-lane and left-turn only lane.

A narrow, local road, Ridge Road, is located to the north of the intersection. Ridge Rd provides additional access to a handful of business, but does not appear to be a vital access point for any locations on the east end of the street. The conceptual layout for the Harkrider St and Old Morrilton Hwy provided in this study accommodates Ridge Road, however, if it is possible closing the east side of Ridge Road may be the better alternative.





Figure 2- Existing Layout of the Donaghey Ave/Old Morrilton Hwy intersection

The intersection is currently signalized with free right-turn bypass lanes on the southern, eastern, and northern approaches. The west approach has a yield control right-turn bypass lane. Each approach offers a single through-lane and a left-turn only lane.

A conceptual layout for improving the intersection to a roundabout is provided in this report. The right-turn bypass lane on the eastern leg is part of a major truck route, so it was important to provide similar accommodations in the proposed layout design.

## Traffic Volumes

The City provided the traffic data for the intersections of Harkrider St at Old Morrilton Hwy and Donaghey Ave at Old Morrilton Hwy to be analyzed. The morning and evening peak hour volumes counts as well as the percent of trucks were the basis of the models. The “peak hour” is the 60 min period where the most cars pass through the intersection. By using the peak volumes, the models are designed to handle the typical worst-case scenario on a given day. If a model is shown to have a level-of-service F, then the model is showing the intersection to fail only at the peak hour. It is generally considered good practice to design an intersection to perform with a LOS of “B” or better for current traffic, a LOS of “C” for 10-year projected traffic, and a LOS of “D” for 20-year traffic. Designing an intersection to operate at a LOS of “A” in 20-years is considered over designing the intersection.

### Old Morrilton Hwy & Harkrider St Conway Arkansas

Wednesday, September 18, 2019

Time	Southbound					Westbound					Northbound					Eastbound					VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
11:00 AM	0	20	68	62	0	0	12	15	23	0	0	59	82	5	0	0	91	29	67	0	533
11:15 AM	0	16	76	67	0	0	26	24	34	0	0	47	75	11	0	0	82	14	69	1	541
11:30 AM	0	16	68	83	2	0	19	21	27	0	0	70	78	12	0	0	88	28	67	1	577
11:45 AM	0	28	81	73	1	0	28	27	25	0	0	70	103	3	0	0	84	22	58	0	602
Peak Hour Total	0	80	293	285	3	0	85	87	109	0	0	246	338	31	0	0	345	93	261	2	2253
PHF	0.000	0.714	0.904	0.858	0.375	0.000	0.759	0.806	0.801	0.000	0.000	0.879	0.820	0.646	0.000	0.000	0.948	0.802	0.946	0.500	0.936
Heavy Vehicle %	0.00%	1.25%	2.73%	1.75%	0.00%	0.00%	1.16%	0.00%	2.75%	0.00%	0.00%	4.88%	3.25%	0.00%	0.00%	0.00%	1.16%	1.08%	3.07%	0.00%	2.40%

Time	Southbound					Westbound					Northbound					Eastbound					VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
4:30 PM	0	22	82	85	0	0	18	28	18	0	0	89	152	11	1	0	114	19	59	0	697
4:45 PM	0	17	72	109	0	0	25	25	37	0	0	77	114	7	0	0	109	24	66	0	682
5:00 PM	0	21	95	123	0	0	15	26	22	0	0	77	165	7	3	0	122	26	68	0	767
5:15 PM	0	31	97	131	0	0	29	32	39	0	0	72	149	8	0	0	77	30	51	0	746
Peak Hour Total	0	91	346	448	0	0	87	111	116	0	0	315	580	33	4	0	422	99	244	0	2892
PHF	0.000	0.734	0.892	0.855	0.000	0.000	0.750	0.867	0.744	0.000	0.000	0.885	0.879	0.750	0.333	0.000	0.865	0.625	0.897	0.000	0.943
Heavy Vehicle %	0.00%	2.20%	0.58%	0.67%	0.00%	0.00%	0.00%	0.00%	0.86%	0.00%	0.00%	1.59%	0.34%	0.00%	0.00%	0.00%	1.42%	1.01%	1.23%	0.00%	0.86%

Table 3- Turning movement volumes for the AM and PM Peak hours

### Old Morrilton Hwy & Donaghey Ave Conway Arkansas

Thursday, October 10, 2019

Time	Southbound					Westbound					Northbound					Eastbound					VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
11:00 AM	0	55	23	16	0	0	18	84	35	0	0	27	24	27	0	0	19	85	2	0	415
11:15 AM	0	57	23	4	0	0	15	60	62	0	0	7	18	30	0	0	25	83	4	0	388
11:30 AM	0	60	25	19	0	0	13	82	61	0	0	13	12	28	0	0	11	81	10	0	415
11:45 AM	0	66	12	15	0	0	14	86	51	0	0	10	17	29	0	0	16	79	9	0	486
Peak Hour Total	0	237	83	54	0	0	60	312	219	0	0	57	71	107	0	0	71	328	25	0	1624
PHF	0.000	0.912	0.830	0.711	0.000	0.000	0.833	0.907	0.883	0.000	0.000	0.528	0.740	0.892	0.000	0.000	0.710	0.965	0.625	0.000	0.978
Heavy Vehicle %	0.00%	2.53%	1.20%	3.70%	0.00%	0.00%	0.00%	1.28%	7.31%	0.00%	0.00%	1.75%	0.00%	0.00%	0.00%	0.00%	0.00%	2.74%	0.00%	0.00%	2.40%

Time	Southbound					Westbound					Northbound					Eastbound					VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
4:15 PM	0	57	28	20	0	0	24	124	95	0	0	10	32	31	0	0	33	109	8	0	571
4:30 PM	0	58	26	23	0	0	15	98	93	0	0	21	54	29	0	0	26	105	6	0	554
4:45 PM	0	59	23	25	0	0	17	133	95	0	0	15	42	34	0	0	27	89	9	0	568
5:00 PM	0	55	13	21	0	0	16	133	109	0	0	14	56	26	0	0	36	117	4	0	600
Peak Hour Total	0	229	90	89	0	0	72	488	392	0	0	60	184	120	0	0	122	420	27	0	2293
PHF	0.000	0.970	0.804	0.890	0.000	0.000	0.750	0.917	0.899	0.000	0.000	0.714	0.821	0.882	0.000	0.000	0.847	0.897	0.750	0.000	0.955
Heavy Vehicle %	0.00%	2.18%	0.00%	2.25%	0.00%	0.00%	1.39%	0.61%	2.81%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.82%	0.00%	0.00%	0.00%	1.00%

Table 4- Turning movement volumes for the AM and PM Peak hours

## Synchro Analysis- Signalized Operation

### Old Morrilton Hwy & Harkrider St Intersection

The traffic counts and current signal timing plan for Old Morrilton Hwy and Harkrider St were entered into the Synchro 10 software and analyzed. The analysis of the signalized intersection served as a base line to compare against a roundabout intersection. The intersection of Old Morrilton Hwy and Harkrider St has a current LOS of D with 43.0 seconds of delay per vehicle. The table below shows the AM and PM peak hour delay for the current observed traffic, as well as, the 10-year and 20-year projected traffic.

While the AM peak hour does not project to overload the signal, the PM peak hour does. The model projects the signal to operate at an unsatisfactory level of service by year 10.

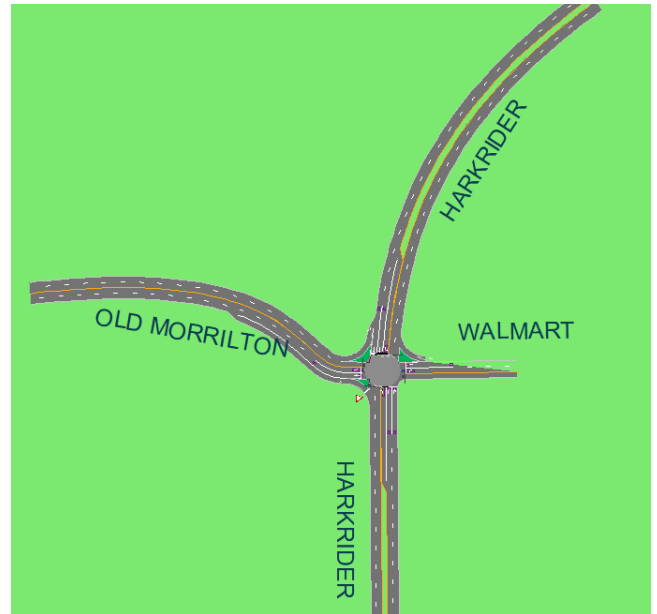


Figure 3- Image of the intersection of Old Morrilton Hwy and Harkrider St model in Synchro 10

#### *SYNCHRO- HCM 6<sup>TH</sup> CONTROL DELAY, s/veh-Old Morrilton Hwy and Harkrider St*

	YEAR	CURRENT	10 YEAR	20 YEAR
AM PEAK HOUR		37.4 (D)	39.9 (D)	44.1 (D)
PM PEAK HOUR		43.0 (D)	63.0 (E)	87.9 (F)

Table 5

### Donaghey Ave & Old Morrilton Hwy Intersection

The traffic volumes for the intersection of Donaghey Ave and Old Morrilton Hwy were analyzed in Synchro 10 using the HCM 6<sup>th</sup> method. As the table below show, this intersection is operating slightly better than the intersection of Old Morrilton Hwy and Harkrider St. The LOS of the intersection is expected to operate with an acceptable amount of delay through 10 years of traffic growth during the PM Peak. Similar to the Harkrider St and Old Morrilton Hwy intersection, the morning delay does not increase at the rate the evening delay does. Unlike, the previous intersection, the signal at Old Morrilton Hwy and Donaghey Ave is projected to still operate at an acceptable LOS through the 10-year growth.



Figure 4- Sncro 10 layout for the intersection of Donaghey Ave and Old Morrilton Hwy

### *SYNCHRO- HCM 6<sup>TH</sup> CONTROL DELAY, s/veh-Donaghey Ave and Old Morrilton Hwy*

YEAR	CURRENT	10 YEAR	20 YEAR
AM PEAK HOUR	22.7 (C)	25.8 (C)	30.4 (C)
PM PEAK HOUR	33.4 (C)	50.5 (D)	82.1 (F)

Table 6



## HCM 6<sup>th</sup> Analysis- Roundabout Operation

### Old Morrilton Hwy & Harkrider St Intersection

Using the Highway Capacity Manuel's 6th edition (HCM 6th), the current traffic volumes were used to model how each intersection would fare operating as a roundabout. Fig. 5 shows the intersection of Harkrider St and Old Morrilton Hwy's LOS as a roundabout. The model shows the eastern approach to be the worst performing. While the eastern leg shows to be the worst performing, it continues to operate at a satisfactory level.

LOS	Approaches				Intersection
	South	East	North	Northwest	
	B	C	A	B	B

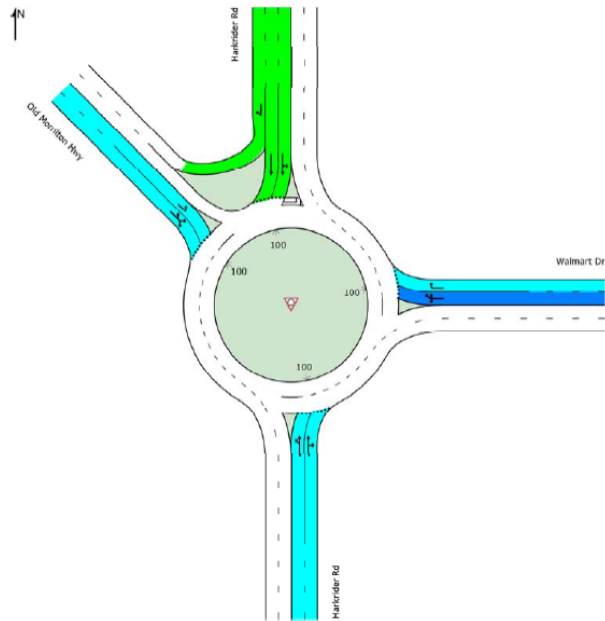


Figure 5- Current year LOS for each leg of the roundabout during the PM Peak Hour

### *ROUNDBABOUT-HCM 6<sup>TH</sup> CONTROL DELAY, s/veh- Roundabout 1*

YEAR	CURRENT	10 YEAR	20 YEAR
AM PEAK HOUR	8.0 (A)	10.1 (B)	13.5 (B)
PM PEAK HOUR	12.3 (B)	20.3 (C)	41.4 (D)

Table 7

Donaghey Ave & Old Morrilton Hwy  
Intersection

The level of service of each leg and as a whole of the intersection of Donaghey Ave and Old Morrilton Hwy is shown graphically to the right as Fig. 6. This depiction is for the current year traffic and models traffic operating smoothly. The HCM 6th shows the intersection to operate at a LOS of C during the PM peak hour.

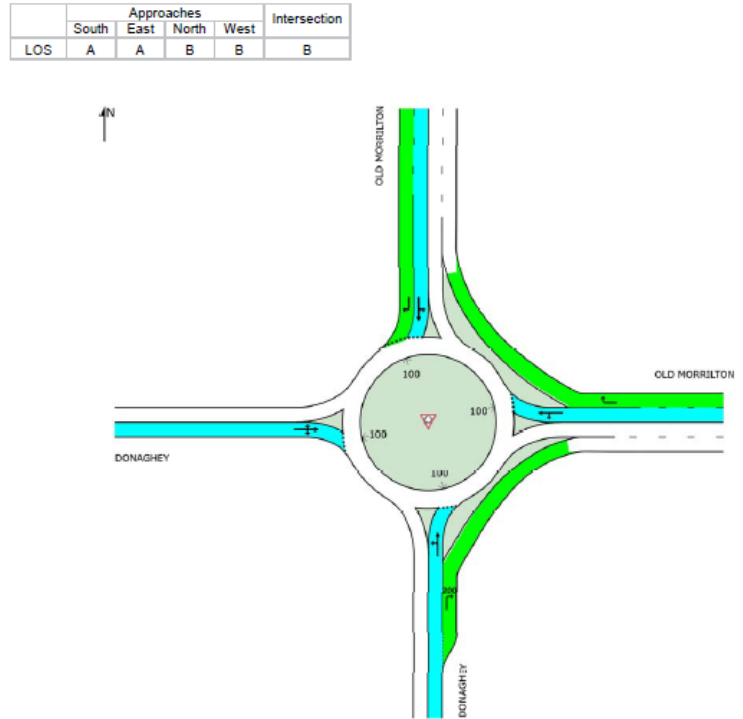


Figure 6-Lane LOS for intersection of Donaghey Ave and Old Morrilton Hwy

**ROUNDABOUT-HCM 6<sup>TH</sup> CONTROL DELAY, s/veh- Roundabout 2**

YEAR	CURRENT	10 YEAR	20 YEAR
AM PEAK HOUR	6.9 (A)	8.8 (A)	12.0 (B)
PM PEAK HOUR	10.9 (B)	17.5(B)	34.3 (C)

Table 8

## Conceptual Design

Given that the traffic models for the two intersections indicated a roundabout would improve the flow of traffic by reducing the amount of delay for drivers as well as improve the safety of the intersection, a conceptual design was created to determine if a roundabout would fit within the intersection layout without adversely impacting the surrounding area.

The conceptual design for the Harkrider St (Hwy 65) and Old Morrilton Hwy (Hwy 64) is shown in Exhibit 1. The multi-lane roundabout offers two through-lanes for the northbound and southbound traffic. The northern leg provides a right-turn bypass lane for two reasons: the southbound right-turn traffic is a heavy movement and it was determined to be the safest way to maintain access to Ridge Road. Ridge Road is shown to be accessed as right-in, right-out and all businesses that are on Ridge Road have their main access on either Old Morrilton Hwy or Harkrider St. The existing right-turn bypass lane on the western leg is not needed in the roundabout configuration. Existing access to the two businesses on the west side of the roundabout are greatly impacted by the new configuration. Access to the Sonic is not shown off of Old Morrilton Hwy because it is recommended that it be removed, but a right-in, right-out driveway could be accommodated. The northern entrance to IHOP will need to be closed off. Ideally, IHOP would be able to acquire a shared access agreement with the lot to the west for additional access, much like the Sonic has. The property on the northeast corner currently has driveway access on the west from Harkrider St and from the eastern parking lot. It is also recommended that a driveway access would not be allowed on an exit leg, if other access points are available.

The conceptual design for the Donaghey Ave and Old Morrilton Hwy (Hwy 64) is shown in Exhibit 2. The long, sweeping right-turn bypass lane is maintained for eastern leg to accommodate the truck traffic. The right-turn bypass lane on the southern leg is sharper than ideal, but is similar to the existing layout. While technically the existing right-turn bypass lane is a free movement on the north leg, the lane it is fed into ends abruptly and traffic is forced to merge. The proposed, yield control movement should not hinder traffic and operate in a safer

manner due to the right-turners being able to see conflicting traffic at a more reasonable 45 degrees instead of having to look over their shoulder. The right turn bypass lane on the west leg of the intersection does not carry over to the roundabout design, as the traffic does not warrant it.

After each of the conceptual roundabout layouts were considered in conjunction with the Synchro and HCM capacity models, the intersection of Harkrider St and Old Morrilton Hwy was deemed to make the more compelling case for retrofitting with a roundabout. The reduction in delay and increased safety offered by a roundabout prove further consideration is required.







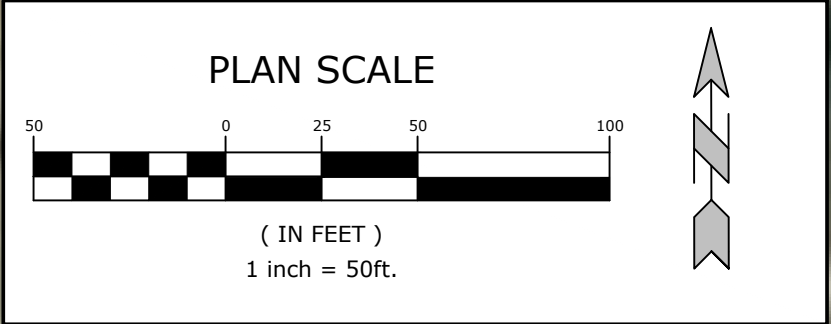
# EXHIBIT 2

OLD MORRILTON HWY

DONAGHEY AVE

OLD MORRILTON HWY

DONAGHEY AVE



REV	DATE	DESCRIPTION

DONAGHEY  
AVE AT HWY  
64

DESIGNED BY:	JTB
DATE:	2/10/2021
SCALE:	50 SCALE
DRAWN BY:	JTB
REVISION:	CONCEPTUAL
JOB NUMBER:	19-2181
SCALE:	1

WA\2019\19-2182 - Donaghey Ave Hwy 64 Intersection Evaluation\Design Drawings\Final Design - dl Exhibit 1.28.2021.dwg, PRINTED ON: February 10, 2021 @ 3:51 PM

## RODEL Analysis- Roundabout Operation

The Rodel Roundabout software has the capability to be geometrically sensitive. After the synchro and HCM models were created and a roundabout was shown to improve traffic operation at the intersection, then the conceptual layout was designed. The existing traffic volumes and the conceptual design were modeled using the Rodel software to ensure the roundabout concept as configured would remain viable. The table below shows the LOS and control delay expected to result from the proposed roundabout configuration. The confidence level for this model was set to 85. An 85 CL corresponds to an 85% probability that the estimated roundabout capacity will not be breached. The higher CL is a more conservative capacity estimate.

Rodel's user guide states that *"If the CL is set to 50% the mean capacity is estimated. Higher CL gives a more pessimistic capacity estimate.... The CL is very useful for testing designs to assess the risk of large queues and delays. A design that has acceptable queues and delays at 50% CL may be fine at 85% also or may have one leg where the queues and delays have greatly increased. This informs the designer that there is a risk with this leg while the others are robust. This encourages some minor redesign to achieve acceptable queues and delays at 85% CL resulting in a far more robust design with greatly reduced risk of failure."*

*When the CL is reset to 50% the queues and delays will appear little different than the original. If comparison is to be made with other models or any type of evaluation the CL should be set at 50%."*

However, as this intersection is an important truck route and access point for the city, the CL remained at 85 to be sure that the model reflected adequate capacity projections.

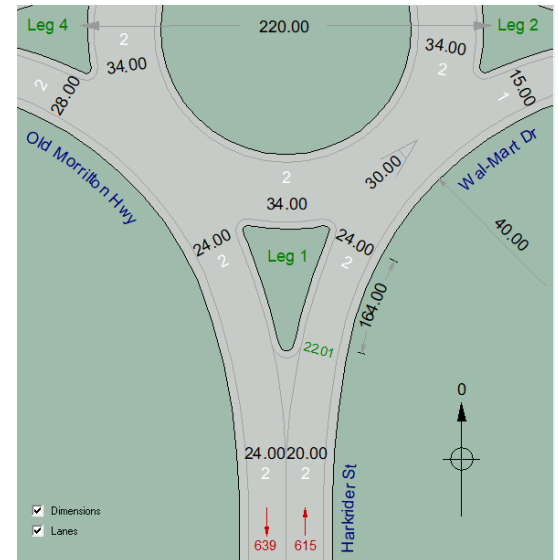


Figure 7- Display from the Rodel program for Harkrider St/ Old Morrilton Hwy

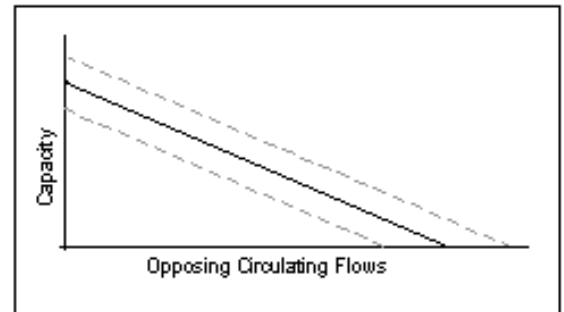


Figure 8-Chart showing a roundabout's capacity decreasing as opposing circulation increases

### RODEL- CONTROL DELAY, s/veh

YEAR	CURRENT	10 YEAR	20 YEAR
AM PEAK HOUR	2.9 (A)	3.8 (A)	5.5 (A)
PM PEAK HOUR	4.6 (A)	7.5 (A)	18.9 (C)

Table 9

## Conclusions

While both intersections would benefit from the reduction in control delay and increased safety that a roundabout would offer, the cost associated with constructing both roundabouts is significant. The signal model shows the Donaghey Ave and Old Morrilton Hwy intersection to continue to operate at an acceptable LOS through the 10-year projected traffic growth, while the Harkrider St and Old Morrilton Hwy intersection is currently strained and getting worse by the day. However, what makes the more compelling case for improving the Harkrider St and Old Morrilton Hwy intersection first is there are twice as many left-turn movements at this intersection compared to the other. The potential safety benefits that will be realized along with the drastic reduction in delay for drivers leads to the recommendation that the City proceed with design to retrofit the existing signalized intersection of Harkrider St and Old Morrilton Hwy with a roundabout.



# **APPENDIX**

## Analysis Results

# **OLD MORRILTON HWY AT HARKRIDER ST**

Synchro Analysis Results

HCM 6th Signalized Intersection Summary  
 3: HARKRIDER & HWY 64/WALMART

01/19/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	345	93	261	85	87	109	246	338	31	80	293	285
Future Volume (veh/h)	345	93	261	85	87	109	246	338	31	80	293	285
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	238	293	0	92	95	0	267	367	34	87	318	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	455	477		130	137		651	860	79	608	929	
Arrive On Green	0.26	0.26	0.00	0.07	0.07	0.00	0.22	0.26	0.26	0.21	0.26	0.00
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	3290	303	1781	3554	1585
Grp Volume(v), veh/h	238	293	0	92	95	0	267	197	204	87	318	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1777	1816	1781	1777	1585
Q Serve(g_s), s	13.2	15.9	0.0	5.8	5.7	0.0	10.5	10.6	10.7	3.1	8.3	0.0
Cycle Q Clear(g_c), s	13.2	15.9	0.0	5.8	5.7	0.0	10.5	10.6	10.7	3.1	8.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.17	1.00		1.00
Lane Grp Cap(c), veh/h	455	477		130	137		651	464	475	608	929	
V/C Ratio(X)	0.52	0.61		0.71	0.69		0.41	0.42	0.43	0.14	0.34	
Avail Cap(c_a), veh/h	455	477		374	393		651	464	475	608	929	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	36.7	37.8	0.0	52.0	51.9	0.0	18.7	35.2	35.3	17.2	34.4	0.0
Incr Delay (d2), s/veh	4.3	5.8	0.0	6.8	6.2	0.0	1.9	2.8	2.8	0.5	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.3	8.0	0.0	2.8	2.9	0.0	4.7	5.0	5.1	1.3	3.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.0	43.6	0.0	58.8	58.1	0.0	20.6	38.1	38.1	17.7	35.4	0.0
LnGrp LOS	D	D		E	E		C	D	D	B	D	
Approach Vol, veh/h		531	A		187	A		668			405	A
Approach Delay, s/veh		42.4			58.5			31.1			31.6	
Approach LOS		D			E			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	30.0	35.5		35.0	30.0	35.5		14.3				
Change Period (Y+Rc), s	5.0	* 5.5		* 5.7	5.5	* 5.5		5.9				
Max Green Setting (Gmax), s	25.0	* 30		* 29	24.5	* 30		24.1				
Max Q Clear Time (g_c+I1), s	12.5	10.3		17.9	5.1	12.7		7.8				
Green Ext Time (p_c), s	0.6	1.9		1.9	0.2	2.2		0.6				

Intersection Summary

HCM 6th Ctrl Delay	37.4
HCM 6th LOS	D

























Notes

User approved volume balancing among the lanes for turning movement.  
 \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.  
 Unsignalized Delay for [EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

# HCM 6th Signalized Intersection Capacity Analysis

## 3: HARKRIDER & HWY 64/WALMART

01/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	345	93	261	85	87	109	246	338	31	80	293	285
Future Volume (veh/h)	345	93	261	85	87	109	246	338	31	80	293	285
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	276	340	0	107	110	0	310	426	39	101	369	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	450	473		146	154		621	852	78	576	920	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.25	0.25	0.00	0.08	0.08	0.00	0.22	0.26	0.26	0.21	0.26	0.00
Unsig. Movement Delay												
Ln Grp Delay, s/veh	44.4	48.7	0.0	58.8	58.0	0.0	22.8	40.4	40.4	18.7	36.8	0.0
Ln Grp LOS	D	D		E	E		C	D	D	B	D	
Approach Vol, veh/h		616			217			775			470	
Approach Delay, s/veh		46.8			58.4			33.4			32.9	
Approach LOS		D			E			C			C	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		1	2	8	4	5	6					
Case No		1.1	3.0	9.0	9.0	1.1	4.0					
Phs Duration (G+Y+Rc), s		30.0	35.5	15.4	35.0	30.0	35.5					
Change Period (Y+Rc), s		5.0	* 5.5	5.9	* 5.7	5.5	* 5.5					
Max Green (Gmax), s		25.0	* 30	24.1	* 29	24.5	* 30					
Max Allow Headway (MAH), s		3.8	5.2	4.5	4.6	3.8	5.3					
Max Q Clear (g_c+I1), s		14.8	12.0	8.8	21.2	5.7	14.8					
Green Ext Time (g_e), s		0.7	2.2	0.7	1.9	0.2	2.4					
Prob of Phs Call (p_c)		1.00	1.00	1.00	1.00	1.00	1.00					
Prob of Max Out (p_x)		0.00	0.00	0.00	0.00	0.00	0.00					
<b>Left-Turn Movement Data</b>												
Assigned Mvmt		1		3	7	5						
Mvmt Sat Flow, veh/h		1781		1781	1781	1781						
<b>Through Movement Data</b>												
Assigned Mvmt			2	8	4		6					
Mvmt Sat Flow, veh/h			3554	1870	1870		3293					
<b>Right-Turn Movement Data</b>												
Assigned Mvmt			12	18	14		16					
Mvmt Sat Flow, veh/h			1585	1585	1585		300					
<b>Left Lane Group Data</b>												
Assigned Mvmt		1	0	3	7	5	0	0	0			
Lane Assignment		L (Pr/Pm)		L	LL (Pr/Pm)							

HCM 6th Signalized Intersection Capacity Analysis  
 3: HARKRIDER & HWY 64/WALMART

01/21/2021

Lanes in Grp	1	0	1	1	1	0	0	0
Grp Vol (v), veh/h	310	0	107	276	101	0	0	0
Grp Sat Flow (s), veh/h/ln	1781	0	1781	1781	1781	0	0	0
Q Serve Time (g_s), s	12.8	0.0	6.8	15.9	3.7	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	12.8	0.0	6.8	15.9	3.7	0.0	0.0	0.0
Perm LT Sat Flow (s_l), veh/h/ln	1013	0	1781	1781	928	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	30.0	0.0	0.0	0.0	30.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	20.0	0.0	0.0	0.0	17.2	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	4.4	0.0	0.0	0.0	1.6	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	1.00	1.00	0.00	0.00	0.00
Lane Grp Cap (c), veh/h	621	0	146	450	576	0	0	0
V/C Ratio (X)	0.50	0.00	0.73	0.61	0.18	0.00	0.00	0.00
Avail Cap (c_a), veh/h	621	0	370	450	576	0	0	0
Upstream Filter (I)	1.00	0.00	1.00	1.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	20.0	0.0	51.9	38.3	18.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	2.8	0.0	6.8	6.1	0.7	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	22.8	0.0	58.8	44.4	18.7	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	5.3	0.0	3.0	6.9	1.5	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.5	0.0	0.3	0.8	0.1	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	1.00	1.00	0.00	0.00	0.00
%ile Back of Q (50%), veh/ln	5.8	0.0	3.3	7.7	1.6	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.73	0.00	0.36	0.26	0.21	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Mvmt	0	2	8	4	0	6	0	0
Lane Assignment		T	T	T		T		
Lanes in Grp	0	2	1	1	0	1	0	0
Grp Vol (v), veh/h	0	369	110	340	0	229	0	0
Grp Sat Flow (s), veh/h/ln	0	1777	1870	1870	0	1777	0	0
Q Serve Time (g_s), s	0.0	10.0	6.6	19.2	0.0	12.7	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	10.0	6.6	19.2	0.0	12.7	0.0	0.0
Lane Grp Cap (c), veh/h	0	920	154	473	0	460	0	0
V/C Ratio (X)	0.00	0.40	0.72	0.72	0.00	0.50	0.00	0.00
Avail Cap (c_a), veh/h	0	920	389	473	0	460	0	0
Upstream Filter (I)	0.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	35.5	51.9	39.6	0.0	36.6	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.3	6.1	9.1	0.0	3.8	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	36.8	58.0	48.7	0.0	40.4	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	4.3	3.1	8.8	0.0	5.5	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.2	0.3	1.2	0.0	0.5	0.0	0.0

# HCM 6th Signalized Intersection Capacity Analysis

## 3: HARKRIDER & HWY 64/WALMART

01/21/2021

3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00
%ile Back of Q (50%), veh/ln	0.0	4.5	3.4	10.0	0.0	6.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.13	0.36	0.34	0.00	0.20	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

### Right Lane Group Data

Assigned Mvmt	0	12	18	14	0	16	0	0
Lane Assignment		R	R	R		T+R		
Lanes in Grp	0	1	1	1	0	1	0	0
Grp Vol (v), veh/h	0	0	0	0	0	236	0	0
Grp Sat Flow (s), veh/h/ln	0	1585	1585	1585	0	1816	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	12.8	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	12.8	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	1.00	1.00	0.00	0.17	0.00	0.00
Lane Grp Cap (c), veh/h	0	410	130	401	0	470	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00
Avail Cap (c_a), veh/h	0	410	330	401	0	470	0	0
Upstream Filter (I)	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	36.6	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	40.4	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	5.7	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	0.0	0.0	6.2	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

### Intersection Summary

HCM 6th Ctrl Delay	39.9
HCM 6th LOS	D

### Notes

User approved volume balancing among the lanes for turning movement.

\* HCM 6th Edition computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

# HCM 6th Signalized Intersection Summary

## 3: HARKRIDER & OLD MORRIOTON/WALMART

01/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	345	93	261	85	87	109	246	338	31	80	293	285
Future Volume (veh/h)	345	93	261	85	87	109	246	338	31	80	293	285
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1870	1856	1870	1870	1870	1856	1856	1870	1870	1856	1856
Adj Flow Rate, veh/h	321	395	0	125	128	0	361	496	45	117	430	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	2	3	2	2	2	3	3	2	2	3	3
Cap, veh/h	442	467		165	173		583	836	76	539	902	
Arrive On Green	0.25	0.25	0.00	0.09	0.09	0.00	0.21	0.26	0.26	0.21	0.26	0.00
Sat Flow, veh/h	1767	1870	1572	1781	1870	1585	1767	3269	296	1781	3526	1572
Grp Volume(v), veh/h	321	395	0	125	128	0	361	267	274	117	430	0
Grp Sat Flow(s),veh/h/ln	1767	1870	1572	1781	1870	1585	1767	1763	1802	1781	1763	1572
Q Serve(g_s), s	19.5	23.6	0.0	8.0	7.8	0.0	16.0	15.6	15.7	4.4	12.1	0.0
Cycle Q Clear(g_c), s	19.5	23.6	0.0	8.0	7.8	0.0	16.0	15.6	15.7	4.4	12.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.16	1.00		1.00
Lane Grp Cap(c), veh/h	442	467		165	173		583	451	461	539	902	
V/C Ratio(X)	0.73	0.85		0.76	0.74		0.62	0.59	0.59	0.22	0.48	
Avail Cap(c_a), veh/h	442	467		366	384		583	451	461	539	902	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	40.3	41.8	0.0	51.9	51.8	0.0	21.8	38.3	38.3	19.2	37.0	0.0
Incr Delay (d2), s/veh	10.0	16.9	0.0	6.9	6.0	0.0	4.9	5.6	5.6	0.9	1.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.7	13.0	0.0	3.9	4.0	0.0	7.3	7.4	7.6	2.0	5.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.4	58.8	0.0	58.8	57.8	0.0	26.7	43.9	43.9	20.1	38.8	0.0
LnGrp LOS	D	E		E	E		C	D	D	C	D	
Approach Vol, veh/h		716	A		253	A		902			547	A
Approach Delay, s/veh		55.0			58.3			37.0			34.8	
Approach LOS		D			E			D			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	30.0	35.5		35.0	30.0	35.5		16.8				
Change Period (Y+Rc), s	5.0	* 5.5		* 5.7	5.5	* 5.5		5.9				
Max Green Setting (Gmax), s	25.0	* 30		* 29	24.5	* 30		24.1				
Max Q Clear Time (g_c+I1), s	18.0	14.1		25.6	6.4	17.7		10.0				
Green Ext Time (p_c), s	0.7	2.5		1.3	0.3	2.6		0.9				

### Intersection Summary

HCM 6th Ctrl Delay	44.1
HCM 6th LOS	D

### Notes

User approved volume balancing among the lanes for turning movement.

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

























Unsignalized Delay for [EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



# HCM 6th Signalized Intersection Summary

3:

01/19/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	422	99	244	87	111	116	315	580	33	91	346	448
Future Volume (veh/h)	422	99	244	87	111	116	315	580	33	91	346	448
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	284	354	0	95	121	0	342	630	36	99	376	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	406	426		150	158		652	1134	65	537	1179	
Arrive On Green	0.23	0.23	0.00	0.08	0.08	0.00	0.19	0.33	0.33	0.19	0.33	0.00
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	3417	195	1781	3554	1585
Grp Volume(v), veh/h	284	354	0	95	121	0	342	327	339	99	376	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1777	1835	1781	1777	1585
Q Serve(g_s), s	19.0	23.4	0.0	6.7	8.2	0.0	14.7	19.6	19.7	3.6	10.3	0.0
Cycle Q Clear(g_c), s	19.0	23.4	0.0	6.7	8.2	0.0	14.7	19.6	19.7	3.6	10.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	406	426		150	158		652	590	609	537	1179	
V/C Ratio(X)	0.70	0.83		0.63	0.77		0.52	0.56	0.56	0.18	0.32	
Avail Cap(c_a), veh/h	406	426		337	354		652	590	609	537	1179	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	46.1	47.8	0.0	57.6	58.3	0.0	18.8	35.6	35.6	17.3	32.5	0.0
Incr Delay (d2), s/veh	9.7	17.0	0.0	4.3	7.6	0.0	3.0	3.7	3.6	0.8	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.5	12.9	0.0	3.2	4.2	0.0	6.6	9.1	9.4	1.6	4.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.8	64.8	0.0	61.9	65.8	0.0	21.8	39.3	39.2	18.0	33.2	0.0
LnGrp LOS	E	E		E	E		C	D	D	B	C	
Approach Vol, veh/h		638	A		216	A		1008			475	A
Approach Delay, s/veh		60.8			64.1			33.4			30.0	
Approach LOS		E			E			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	30.0	48.6		35.0	30.0	48.6		16.4				
Change Period (Y+Rc), s	5.0	* 5.5		5.4	5.0	* 5.5		5.4				
Max Green Setting (Gmax), s	25.0	* 30		29.6	25.0	* 30		24.6				
Max Q Clear Time (g_c+I1), s	16.7	12.3		25.4	5.6	21.7		10.2				
Green Ext Time (p_c), s	0.7	2.2		1.2	0.2	2.5		0.7				

## Intersection Summary

HCM 6th Ctrl Delay	43.0
HCM 6th LOS	D

## Notes

User approved volume balancing among the lanes for turning movement.

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

# HCM 6th Signalized Intersection Capacity Analysis

## 3: HARKRIDER & HWY 64/WALMART

01/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	422	99	244	87	111	116	315	580	33	91	346	448
Future Volume (veh/h)	422	99	244	87	111	116	315	580	33	91	346	448
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	328	410	0	110	140	0	397	731	42	115	436	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	406	426		337	354		511	775	45	409	806	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.23	0.23	0.00	0.19	0.19	0.00	0.19	0.23	0.23	0.19	0.23	0.00
Unsig. Movement Delay												
Ln Grp Delay, s/veh	63.4	84.9	0.0	48.1	49.5	0.0	40.6	81.9	81.4	28.4	46.9	0.0
Ln Grp LOS	E	F		D	D		D	F	F	C	D	
Approach Vol, veh/h		738			250			1170			551	
Approach Delay, s/veh		75.3			48.9			67.7			43.0	
Approach LOS		E			D			E			D	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		1	2	8	4	5	6					
Case No		1.1	3.0	9.0	9.0	1.1	4.0					
Phs Duration (G+Y+Rc), s		30.0	35.0	30.0	35.0	30.0	35.0					
Change Period (Y+Rc), s		5.0	* 5.5	5.4	5.4	5.0	* 5.5					
Max Green (Gmax), s		25.0	* 30	24.6	29.6	25.0	* 30					
Max Allow Headway (MAH), s		3.8	5.2	4.6	4.6	3.8	5.3					
Max Q Clear (g_c+I1), s		23.7	16.1	10.5	30.2	7.2	29.4					
Green Ext Time (g_e), s		0.2	2.4	0.9	0.0	0.2	0.1					
Prob of Phs Call (p_c)		1.00	1.00	1.00	1.00	1.00	1.00					
Prob of Max Out (p_x)		0.00	0.00	0.00	0.00	0.00	0.00					
<b>Left-Turn Movement Data</b>												
Assigned Mvmt		1		3	7	5						
Mvmt Sat Flow, veh/h		1781		1781	1781	1781						
<b>Through Movement Data</b>												
Assigned Mvmt			2	8	4		6					
Mvmt Sat Flow, veh/h			3554	1870	1870		3416					
<b>Right-Turn Movement Data</b>												
Assigned Mvmt			12	18	14		16					
Mvmt Sat Flow, veh/h			1585	1585	1585		196					
<b>Left Lane Group Data</b>												
Assigned Mvmt		1	0	3	7	5	0	0	0			
Lane Assignment		L (Pr/Pm)		L	LL (Pr/Pm)							

### HCM 6th Signalized Intersection Capacity Analysis 3: HARKRIDER & HWY 64/WALMART

01/21/2021

Lanes in Grp	1	0	1	1	1	0	0	0
Grp Vol (v), veh/h	397	0	110	328	115	0	0	0
Grp Sat Flow (s), veh/h/ln	1781	0	1781	1781	1781	0	0	0
Q Serve Time (g_s), s	21.7	0.0	6.9	22.7	5.2	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	21.7	0.0	6.9	22.7	5.2	0.0	0.0	0.0
Perm LT Sat Flow (s_l), veh/h/ln	953	0	1781	1781	697	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	29.5	0.0	0.0	0.0	29.5	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	15.4	0.0	0.0	0.0	2.1	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	10.0	0.0	0.0	0.0	2.1	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	1.00	1.00	0.00	0.00	0.00
Lane Grp Cap (c), veh/h	511	0	337	406	409	0	0	0
V/C Ratio (X)	0.78	0.00	0.33	0.81	0.28	0.00	0.00	0.00
Avail Cap (c_a), veh/h	511	0	337	406	409	0	0	0
Upstream Filter (I)	1.00	0.00	1.00	1.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	29.5	0.0	45.5	47.5	26.7	0.0	0.0	0.0
Incr Delay (d2), s/veh	11.0	0.0	2.6	15.8	1.7	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	40.6	0.0	48.1	63.4	28.4	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	9.2	0.0	3.1	10.0	2.2	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	1.6	0.0	0.2	1.8	0.2	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	1.00	1.00	0.00	0.00	0.00
%ile Back of Q (50%), veh/ln	10.8	0.0	3.3	11.8	2.4	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	1.37	0.00	0.35	0.67	0.31	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Mvmt	0	2	8	4	0	6	0	0
Lane Assignment		T	T	T		T		
Lanes in Grp	0	2	1	1	0	1	0	0
Grp Vol (v), veh/h	0	436	140	410	0	380	0	0
Grp Sat Flow (s), veh/h/ln	0	1777	1870	1870	0	1777	0	0
Q Serve Time (g_s), s	0.0	14.1	8.5	28.2	0.0	27.4	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	14.1	8.5	28.2	0.0	27.4	0.0	0.0
Lane Grp Cap (c), veh/h	0	806	354	426	0	403	0	0
V/C Ratio (X)	0.00	0.54	0.40	0.96	0.00	0.94	0.00	0.00
Avail Cap (c_a), veh/h	0	806	354	426	0	403	0	0
Upstream Filter (I)	0.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	44.3	46.2	49.7	0.0	49.4	0.0	0.0
Incr Delay (d2), s/veh	0.0	2.6	3.3	35.2	0.0	32.5	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	46.9	49.5	84.9	0.0	81.9	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	6.2	4.0	13.1	0.0	12.1	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.3	0.3	4.2	0.0	3.6	0.0	0.0

# HCM 6th Signalized Intersection Capacity Analysis

## 3: HARKRIDER & HWY 64/WALMART

01/21/2021

3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00
%ile Back of Q (50%), veh/ln	0.0	6.5	4.3	17.3	0.0	15.7	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.16	0.46	0.98	0.00	0.51	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

### Right Lane Group Data

Assigned Mvmt	0	12	18	14	0	16	0	0
Lane Assignment		R	R	R		T+R		
Lanes in Grp	0	1	1	1	0	1	0	0
Grp Vol (v), veh/h	0	0	0	0	0	393	0	0
Grp Sat Flow (s), veh/h/ln	0	1585	1585	1585	0	1835	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	27.4	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	27.4	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	1.00	1.00	0.00	0.11	0.00	0.00
Lane Grp Cap (c), veh/h	0	360	300	361	0	416	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.00	0.00	0.94	0.00	0.00
Avail Cap (c_a), veh/h	0	360	300	361	0	416	0	0
Upstream Filter (I)	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	49.4	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	32.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	81.4	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	12.5	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	0.0	0.0	16.2	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.53	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

### Intersection Summary

HCM 6th Ctrl Delay	63.0
HCM 6th LOS	E

### Notes

User approved volume balancing among the lanes for turning movement.

\* HCM 6th Edition computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

# HCM 6th Signalized Intersection Capacity Analysis

## 3: HARKRIDER & HWY 64/WALMART

01/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	422	99	244	87	111	116	315	580	33	91	346	448
Future Volume (veh/h)	422	99	244	87	111	116	315	580	33	91	346	448
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	382	477	0	128	163	0	462	851	48	134	508	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	406	426		337	354		485	776	44	398	806	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.23	0.23	0.00	0.19	0.19	0.00	0.19	0.23	0.23	0.19	0.23	0.00
Unsig. Movement Delay												
Ln Grp Delay, s/veh	81.6	130.7	0.0	49.3	51.1	0.0	63.2	123.7	123.1	29.3	49.0	0.0
Ln Grp LOS	F	F		D	D		E	F	F	C	D	
Approach Vol, veh/h		859			291			1361			642	
Approach Delay, s/veh		108.8			50.3			102.9			44.9	
Approach LOS		F			D			F			D	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		1	2	8	4	5	6					
Case No		1.1	3.0	9.0	9.0	1.1	4.0					
Phs Duration (G+Y+Rc), s		30.0	35.0	30.0	35.0	30.0	35.0					
Change Period (Y+Rc), s		5.0	* 5.5	5.4	5.4	5.0	* 5.5					
Max Green (Gmax), s		25.0	* 30	24.6	29.6	25.0	* 30					
Max Allow Headway (MAH), s		3.8	5.2	4.6	4.6	3.8	5.3					
Max Q Clear (g_c+I1), s		27.0	18.8	12.1	31.6	8.1	31.5					
Green Ext Time (g_e), s		0.0	2.5	1.0	0.0	0.3	0.0					
Prob of Phs Call (p_c)		1.00	1.00	1.00	1.00	1.00	1.00					
Prob of Max Out (p_x)		0.00	0.00	0.00	0.00	0.00	0.00					
<b>Left-Turn Movement Data</b>												
Assigned Mvmt		1		3	7	5						
Mvmt Sat Flow, veh/h		1781		1781	1781	1781						
<b>Through Movement Data</b>												
Assigned Mvmt			2	8	4		6					
Mvmt Sat Flow, veh/h			3554	1870	1870		3420					
<b>Right-Turn Movement Data</b>												
Assigned Mvmt			12	18	14		16					
Mvmt Sat Flow, veh/h			1585	1585	1585		193					
<b>Left Lane Group Data</b>												
Assigned Mvmt		1	0	3	7	5	0	0	0			
Lane Assignment		L (Pr/Pm)		L	LL (Pr/Pm)							

# HCM 6th Signalized Intersection Capacity Analysis

## 3: HARKRIDER & HWY 64/WALMART

01/21/2021

Lanes in Grp	1	0	1	1	1	0	0	0
Grp Vol (v), veh/h	462	0	128	382	134	0	0	0
Grp Sat Flow (s), veh/h/ln	1781	0	1781	1781	1781	0	0	0
Q Serve Time (g_s), s	25.0	0.0	8.2	27.4	6.1	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	25.0	0.0	8.2	27.4	6.1	0.0	0.0	0.0
Perm LT Sat Flow (s_l), veh/h/ln	891	0	1781	1781	619	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	29.5	0.0	0.0	0.0	29.5	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	12.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	12.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	1.00	1.00	0.00	0.00	0.00
Lane Grp Cap (c), veh/h	485	0	337	406	398	0	0	0
V/C Ratio (X)	0.95	0.00	0.38	0.94	0.34	0.00	0.00	0.00
Avail Cap (c_a), veh/h	485	0	337	406	398	0	0	0
Upstream Filter (I)	1.00	0.00	1.00	1.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	32.7	0.0	46.0	49.4	27.1	0.0	0.0	0.0
Incr Delay (d2), s/veh	30.5	0.0	3.2	32.2	2.3	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	63.2	0.0	49.3	81.6	29.3	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	11.3	0.0	3.6	12.1	2.6	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	4.1	0.0	0.3	3.6	0.3	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	1.00	1.00	0.00	0.00	0.00
%ile Back of Q (50%), veh/ln	15.4	0.0	3.9	15.8	2.9	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	1.95	0.00	0.42	0.90	0.36	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Mvmt	0	2	8	4	0	6	0	0
Lane Assignment		T	T	T		T		
Lanes in Grp	0	2	1	1	0	1	0	0
Grp Vol (v), veh/h	0	508	163	477	0	442	0	0
Grp Sat Flow (s), veh/h/ln	0	1777	1870	1870	0	1777	0	0
Q Serve Time (g_s), s	0.0	16.8	10.1	29.6	0.0	29.5	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	16.8	10.1	29.6	0.0	29.5	0.0	0.0
Lane Grp Cap (c), veh/h	0	806	354	426	0	403	0	0
V/C Ratio (X)	0.00	0.63	0.46	1.12	0.00	1.10	0.00	0.00
Avail Cap (c_a), veh/h	0	806	354	426	0	403	0	0
Upstream Filter (I)	0.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	45.3	46.8	50.2	0.0	50.2	0.0	0.0
Incr Delay (d2), s/veh	0.0	3.7	4.3	80.5	0.0	73.5	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	49.0	51.1	130.7	0.0	123.7	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	7.4	4.7	13.8	0.0	13.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.4	0.4	9.5	0.0	8.2	0.0	0.0



# HCM 6th Signalized Intersection Capacity Analysis

## 3: HARKRIDER & HWY 64/WALMART

01/21/2021

3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00
%ile Back of Q (50%), veh/ln	0.0	7.8	5.1	23.3	0.0	21.3	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.19	0.55	1.32	0.00	0.69	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	12.8	0.0	9.7	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.3	0.0	0.3	0.0	0.0

### Right Lane Group Data

Assigned Mvmt	0	12	18	14	0	16	0	0
Lane Assignment		R	R	R		T+R		
Lanes in Grp	0	1	1	1	0	1	0	0
Grp Vol (v), veh/h	0	0	0	0	0	457	0	0
Grp Sat Flow (s), veh/h/ln	0	1585	1585	1585	0	1836	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	29.5	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	29.5	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	1.00	1.00	0.00	0.11	0.00	0.00
Lane Grp Cap (c), veh/h	0	360	300	361	0	417	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.00	0.00	1.10	0.00	0.00
Avail Cap (c_a), veh/h	0	360	300	361	0	417	0	0
Upstream Filter (I)	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	50.3	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	72.8	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	123.1	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	13.5	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	8.4	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	0.0	0.0	21.9	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.71	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	10.1	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0

### Intersection Summary

HCM 6th Ctrl Delay	87.9
HCM 6th LOS	F

### Notes

User approved volume balancing among the lanes for turning movement.

\* HCM 6th Edition computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

# **OLD MORRILTON HWY AT HARKRIDER ST**

Control Delay and Level of Service Analysis Results

# DELAY (CONTROL)

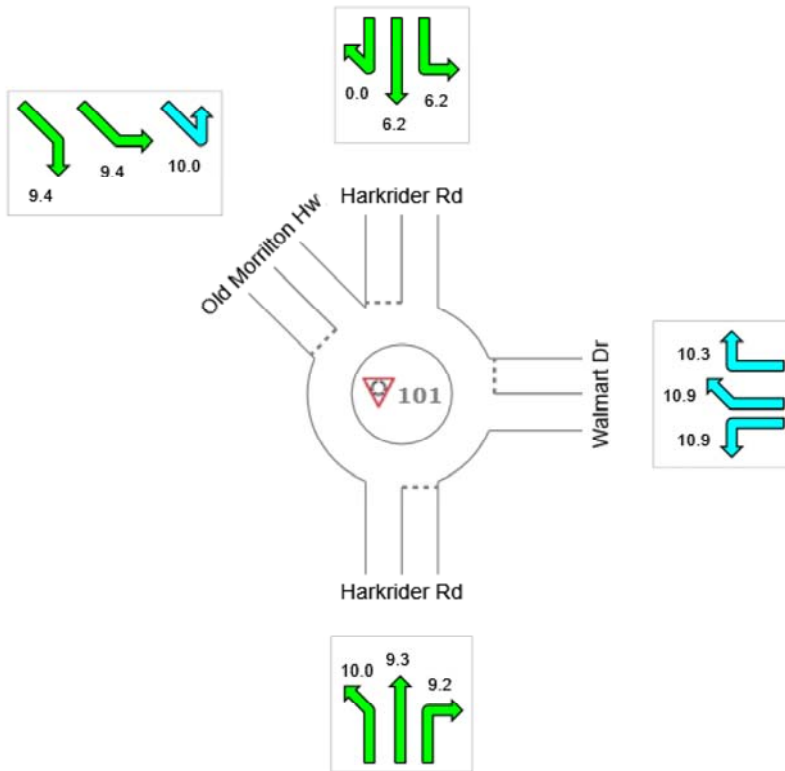
Average control delay per vehicle, or average pedestrian delay (seconds)

 **Site: 101 [Harkrider Rd at Old Morrilton Hwy-AM Peak- 0 year]**

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)  
 Site Category: Roundabout- HCM 6th  
 Roundabout

## All Movement Classes

	Approaches				Intersection
	South	East	North	Northwest	
Delay (Control)	9.6	10.7	3.5	9.7	8.0
LOS	A	B	A	A	A



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Signalised Intersections

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

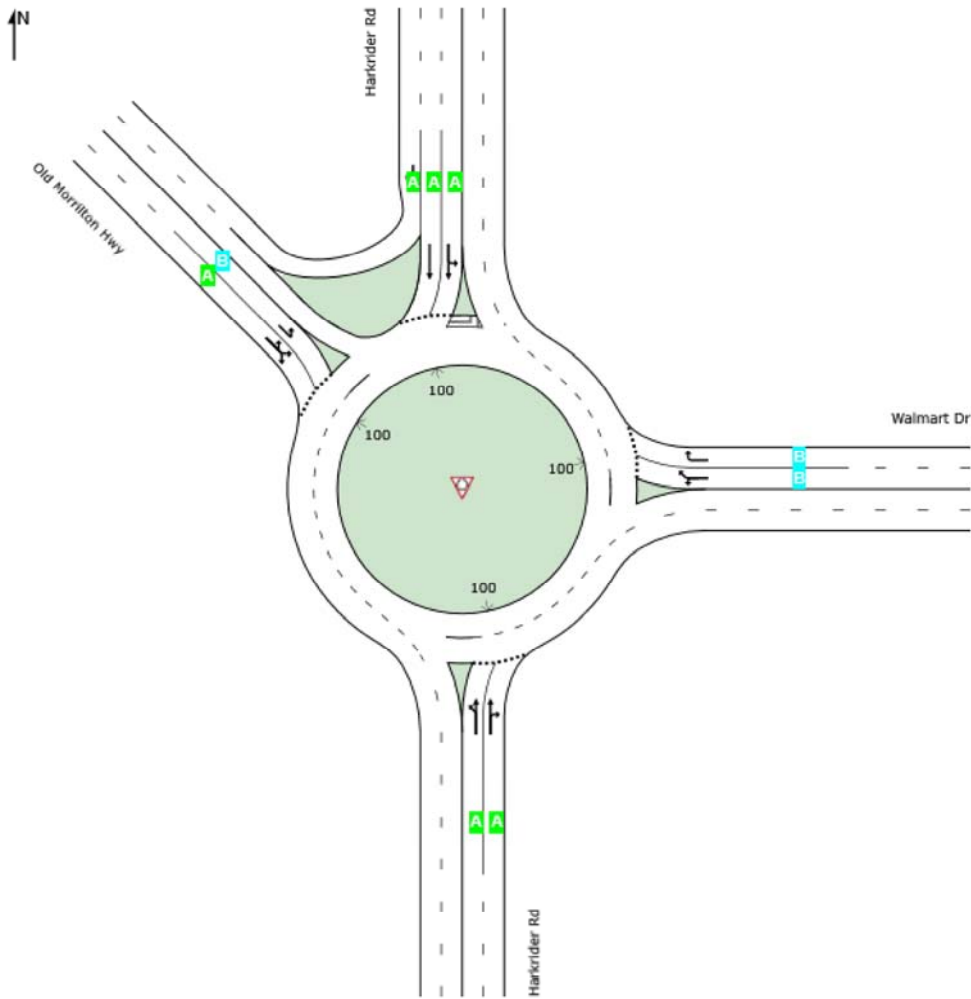
# LANE LEVEL OF SERVICE

## Lane Level of Service

 **Site: 101 [Harkrider Rd at Old Morrilton Hwy-AM Peak- 0 year]**

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)  
 Site Category: Roundabout- HCM 6th  
 Roundabout

	Approaches				Intersection
	South	East	North	Northwest	
LOS	A	B	A	A	A



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if  $v/c > 1$  irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

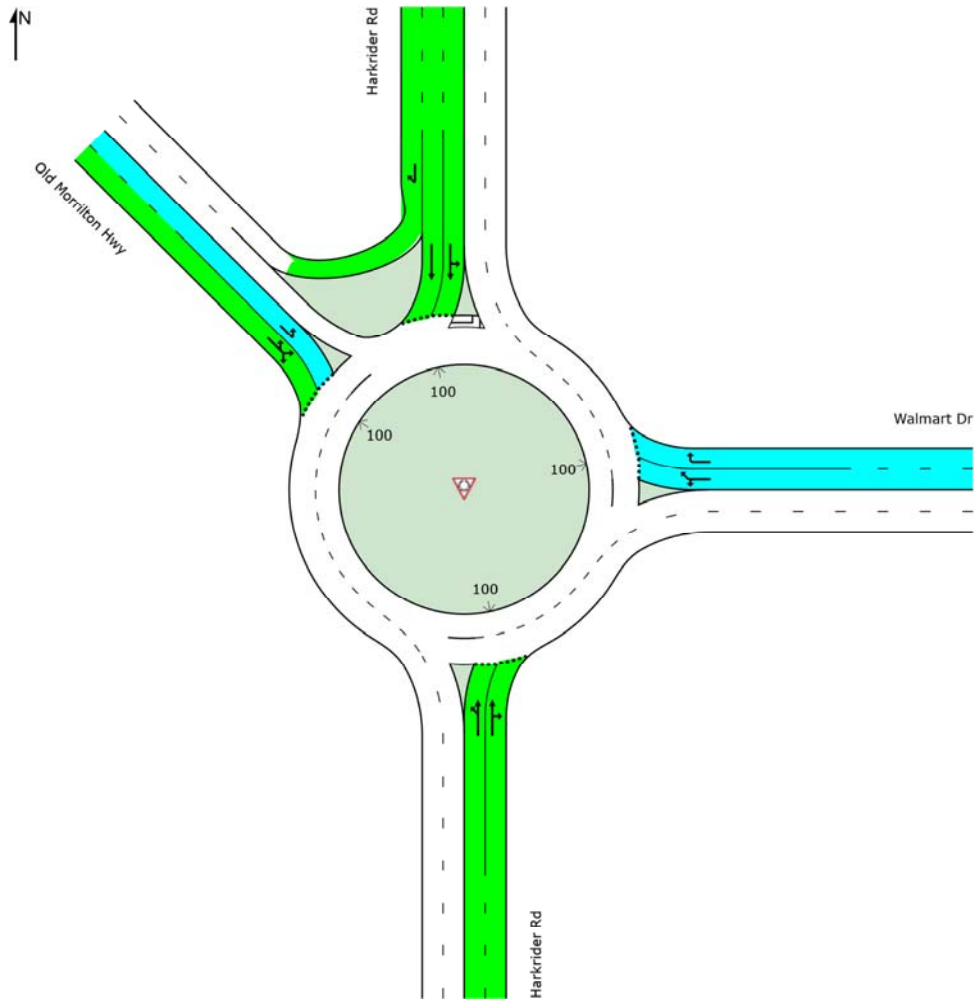
# LANE LEVEL OF SERVICE

## Lane Level of Service

 **Site: 101 [Harkrider Rd at Old Morrilton Hwy-AM Peak- 0 year]**

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)  
 Site Category: Roundabout- HCM 6th  
 Roundabout

	Approaches				Intersection
	South	East	North	Northwest	
LOS	A	B	A	A	A



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 LOS F will result if  $v/c > 1$  irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Signalised Intersections

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

# DELAY (CONTROL)

Average control delay per vehicle, or average pedestrian delay (seconds)

 **Site: 101 [Harkrider Rd at Old Morrilton Hwy-AM Peak- 10 year ]**

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)

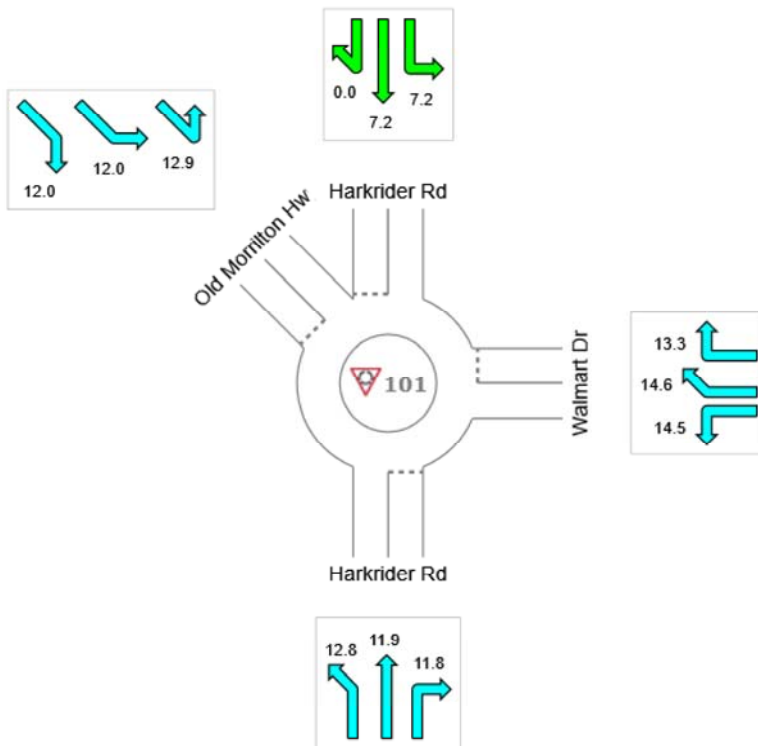
Site Category: Roundabout- HCM 6th

Roundabout

Design Life Analysis (Final Year): Results for 10 years

## All Movement Classes

	Approaches				Intersection
	South	East	North	Northwest	
Delay (Control)	12.3	14.0	4.1	12.4	10.1
LOS	B	B	A	B	B



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

LOS F will result if  $v/c > 1$  irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Signalised Intersections

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.



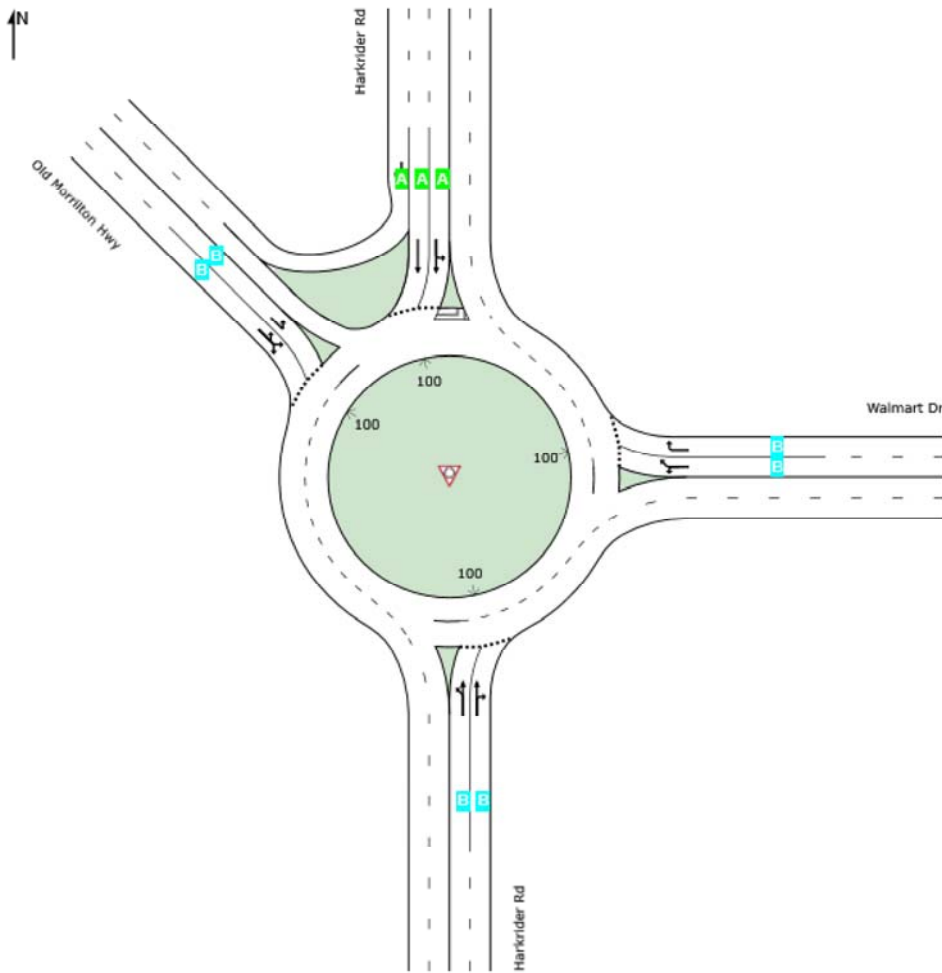
# LANE LEVEL OF SERVICE

## Lane Level of Service

**Site: 101 [Harkrider Rd at Old Morrilton Hwy-AM Peak- 10 year ]**

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)  
 Site Category: Roundabout- HCM 6th  
 Roundabout  
 Design Life Analysis (Final Year): Results for 10 years

	Approaches				Intersection
	South	East	North	Northwest	
LOS	B	B	A	B	B



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if  $v/c > 1$  irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

# LANE LEVEL OF SERVICE

## Lane Level of Service

### Site: 101 [Harkrider Rd at Old Morrilton Hwy-AM Peak- 10 year ]

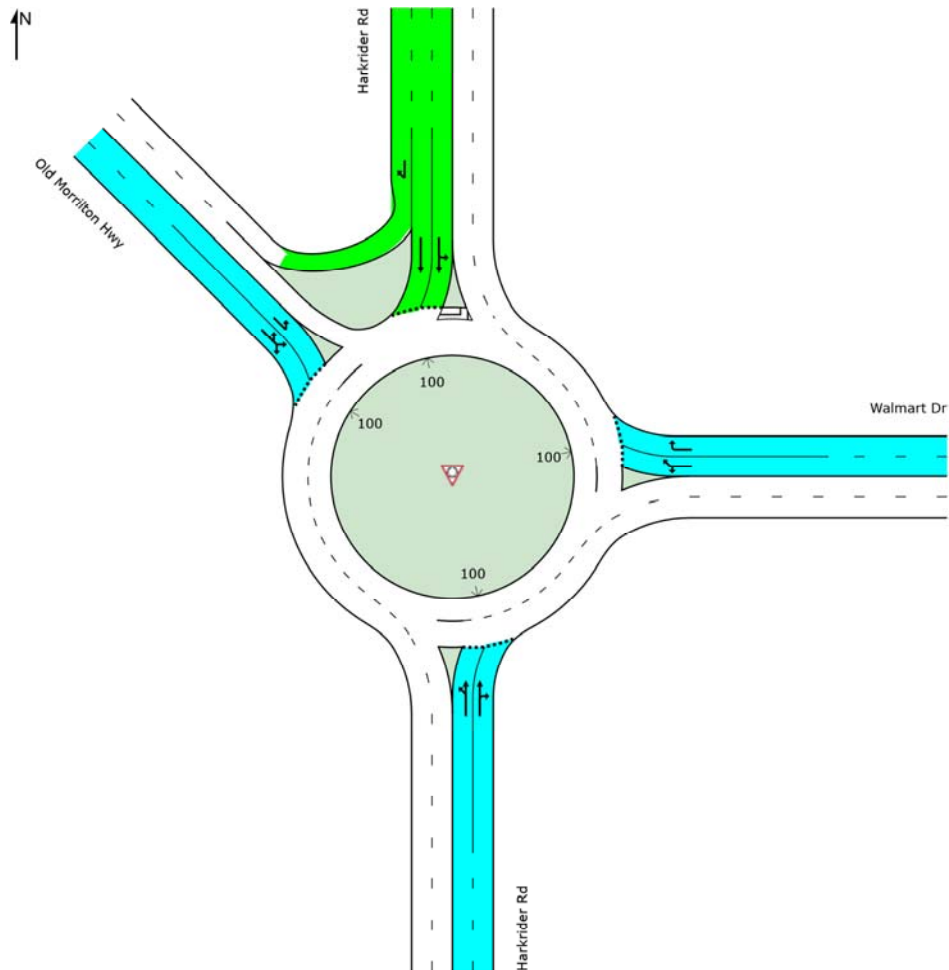
Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)

Site Category: Roundabout- HCM 6th

Roundabout

Design Life Analysis (Final Year): Results for 10 years

LOS	Approaches				Intersection
	South	East	North	Northwest	
LOS	B	B	A	B	B



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

LOS F will result if  $v/c > 1$  irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Signalised Intersections

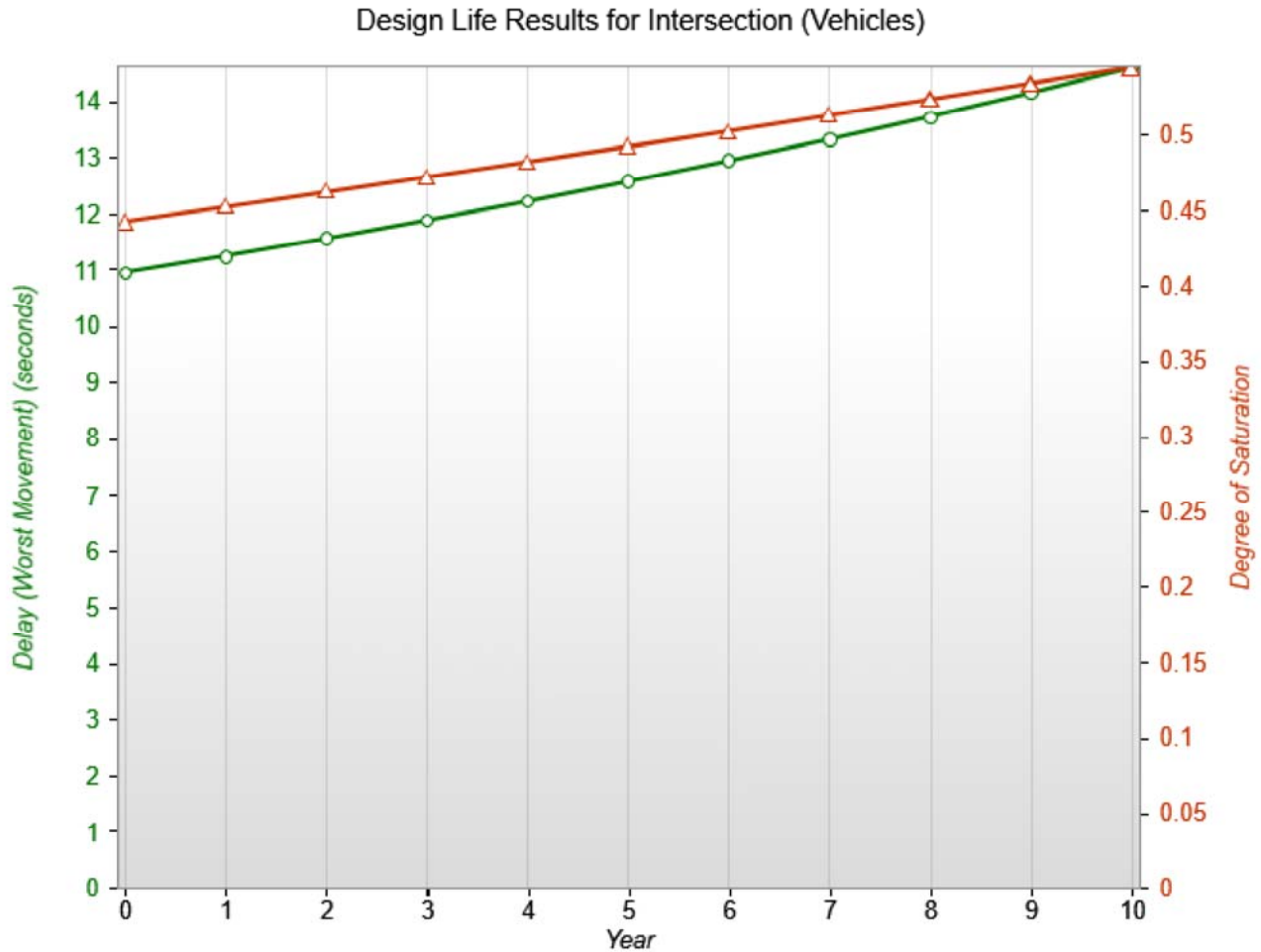
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

# SITE GRAPHS - Demand (Design Life) Analysis

Average control delay per vehicle for the worst vehicle movement (seconds) and Highest degree of saturation in any lane

Site: 101 [Harkrider Rd at Old Morrilton Hwy-AM Peak- 10 year ]

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)  
Site Category: Roundabout- HCM 6th  
Roundabout  
Design Life Analysis (Final Year): Results for 10 years



# DELAY (CONTROL)

Average control delay per vehicle, or average pedestrian delay (seconds)

 **Site: 101 [Harkrider Rd at Old Morrilton Hwy-AM Peak- 20 year ]**

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)

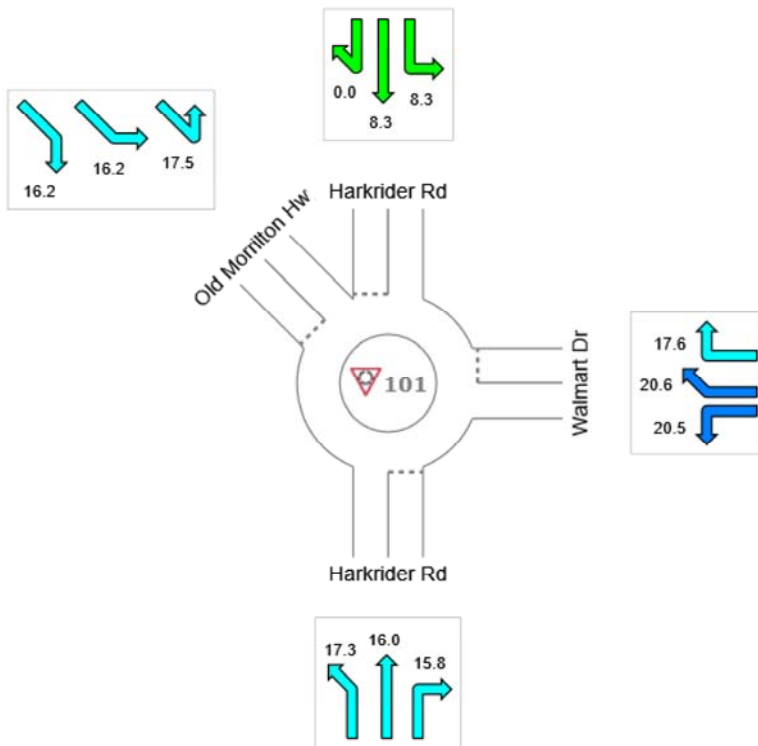
Site Category: Roundabout- HCM 6th

Roundabout

Design Life Analysis (Final Year): Results for 20 years

## All Movement Classes

	Approaches				Intersection
	South	East	North	Northwest	
Delay (Control)	16.5	19.4	4.7	16.8	13.5
LOS	B	B	A	B	B



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Signalised Intersections

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

# LANE LEVEL OF SERVICE

## Lane Level of Service

 **Site: 101 [Harkrider Rd at Old Morrilton Hwy-AM Peak- 20 year ]**

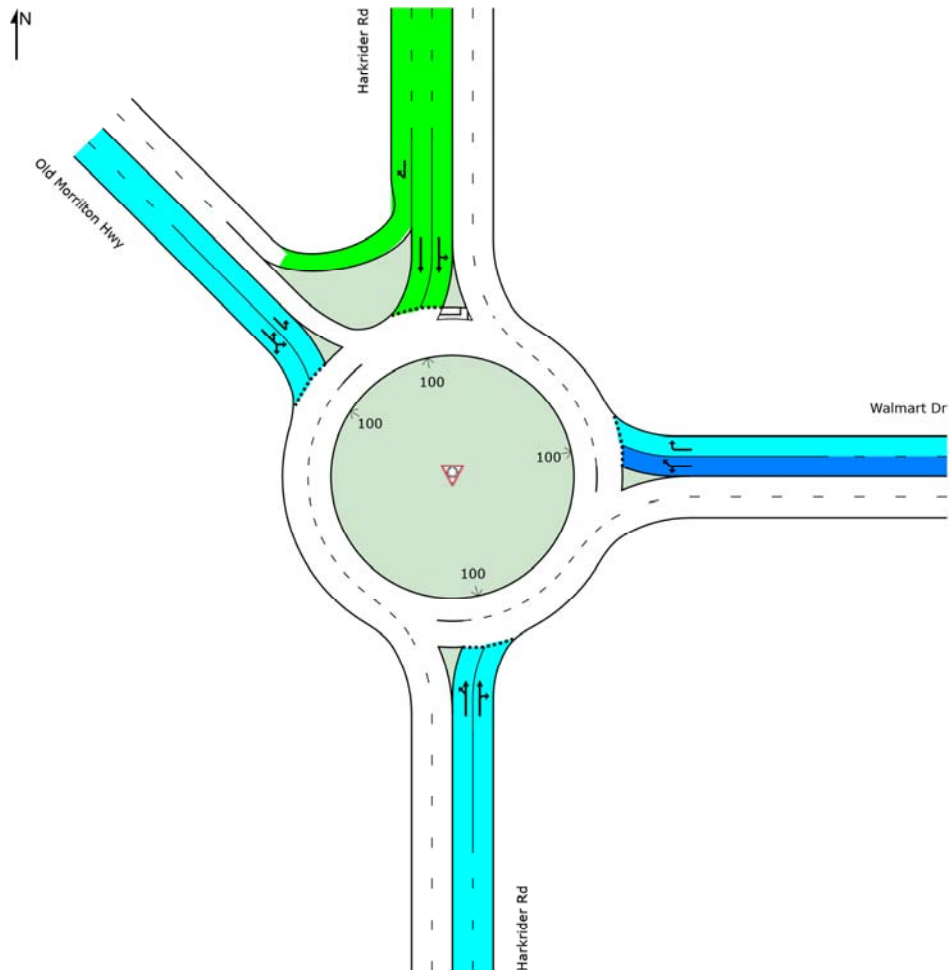
Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)

Site Category: Roundabout- HCM 6th

Roundabout

Design Life Analysis (Final Year): Results for 20 years

LOS	Approaches				Intersection
	South	East	North	Northwest	
LOS	B	B	A	B	B



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

LOS F will result if  $v/c > 1$  irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Signalised Intersections

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

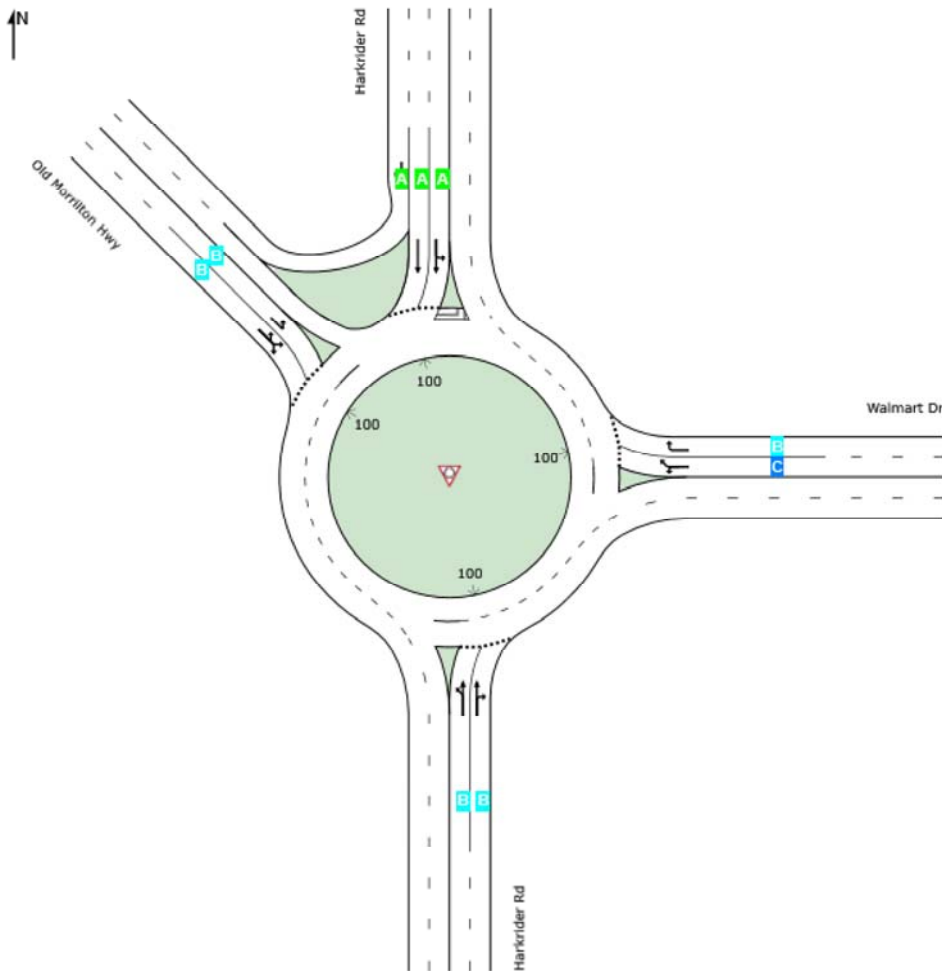
# LANE LEVEL OF SERVICE

## Lane Level of Service

**Site: 101 [Harkrider Rd at Old Morrilton Hwy-AM Peak- 20 year ]**

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)  
 Site Category: Roundabout- HCM 6th  
 Roundabout  
 Design Life Analysis (Final Year): Results for 20 years

	Approaches				Intersection
	South	East	North	Northwest	
LOS	B	B	A	B	B



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if  $v/c > 1$  irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

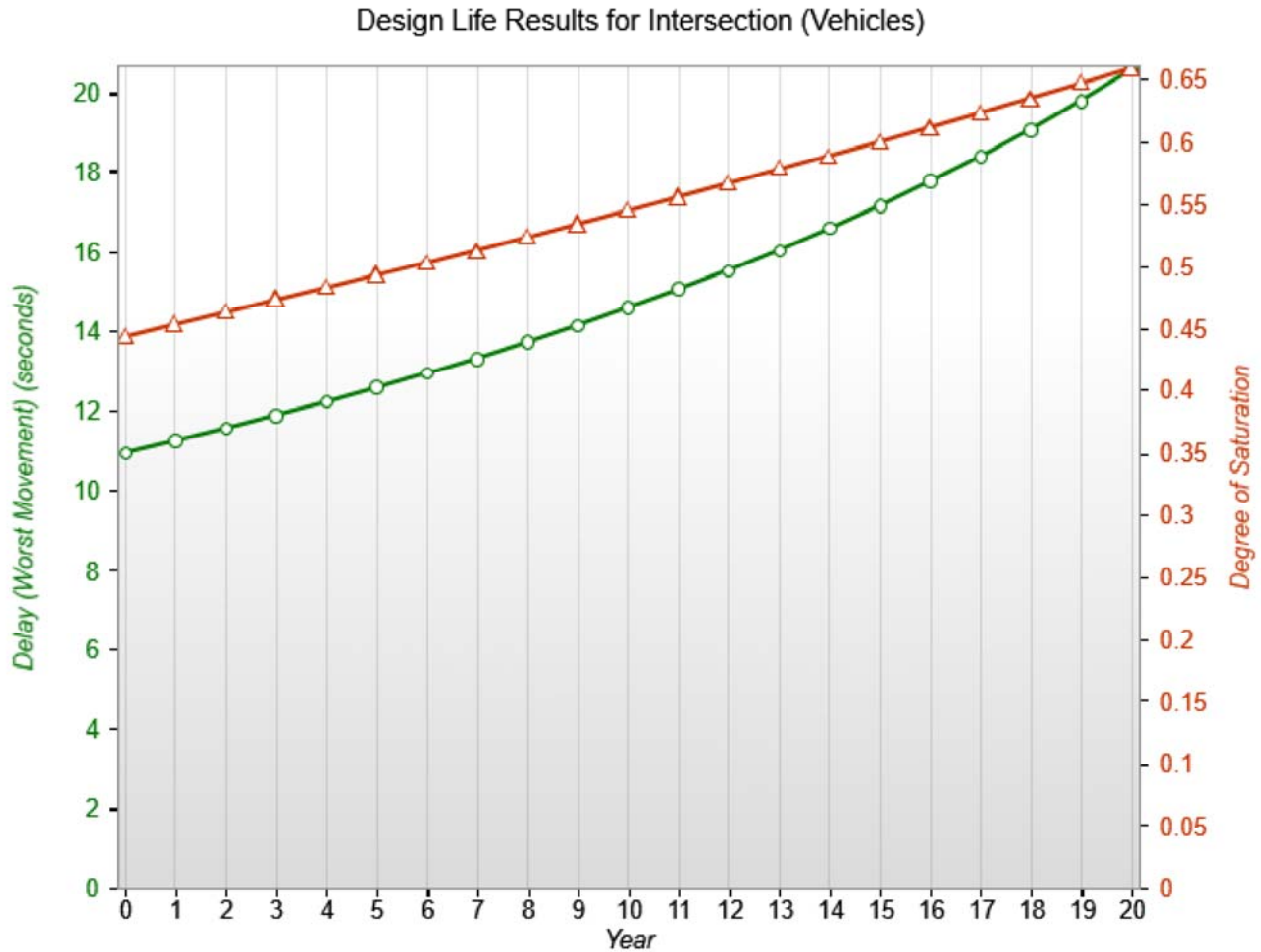
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

# SITE GRAPHS - Demand (Design Life) Analysis

Average control delay per vehicle for the worst vehicle movement (seconds) and Highest degree of saturation in any lane

Site: 101 [Harkrider Rd at Old Morrilton Hwy-AM Peak- 20 year ]

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)  
Site Category: Roundabout- HCM 6th  
Roundabout  
Design Life Analysis (Final Year): Results for 20 years





# DELAY (CONTROL)

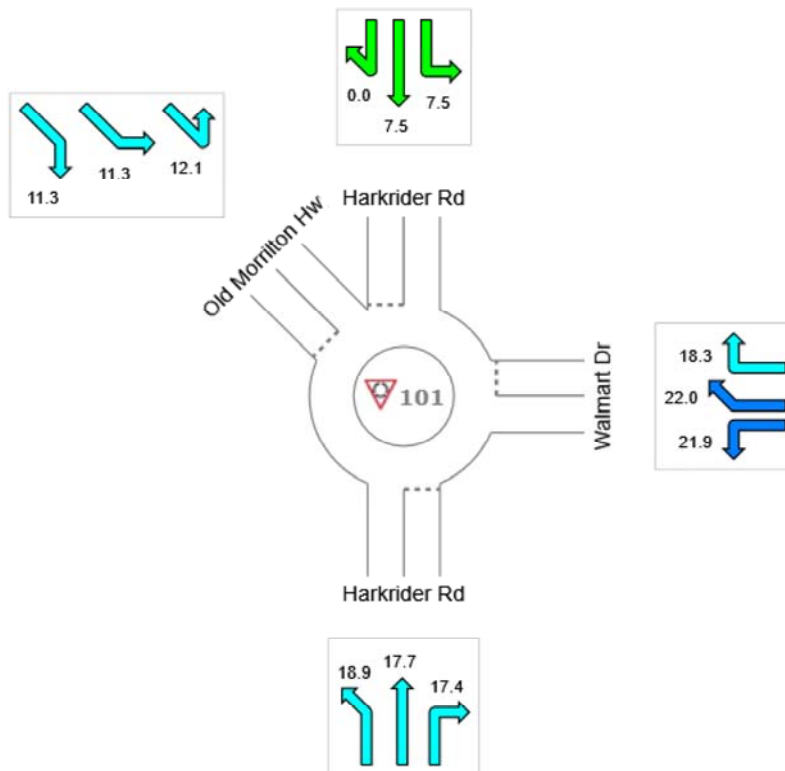
Average control delay per vehicle, or average pedestrian delay (seconds)

 **Site: 101 [PM PEAK-Harkrider Rd at Old Morrilton Hwy- 0 year ]**

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)  
 Site Category: Roundabout- HCM 6th  
 Roundabout

## All Movement Classes

	Approaches				Intersection
	South	East	North	Northwest	
Delay (Control)	18.1	20.6	3.7	11.7	12.3
LOS	B	C	A	B	B



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Signalised Intersections

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

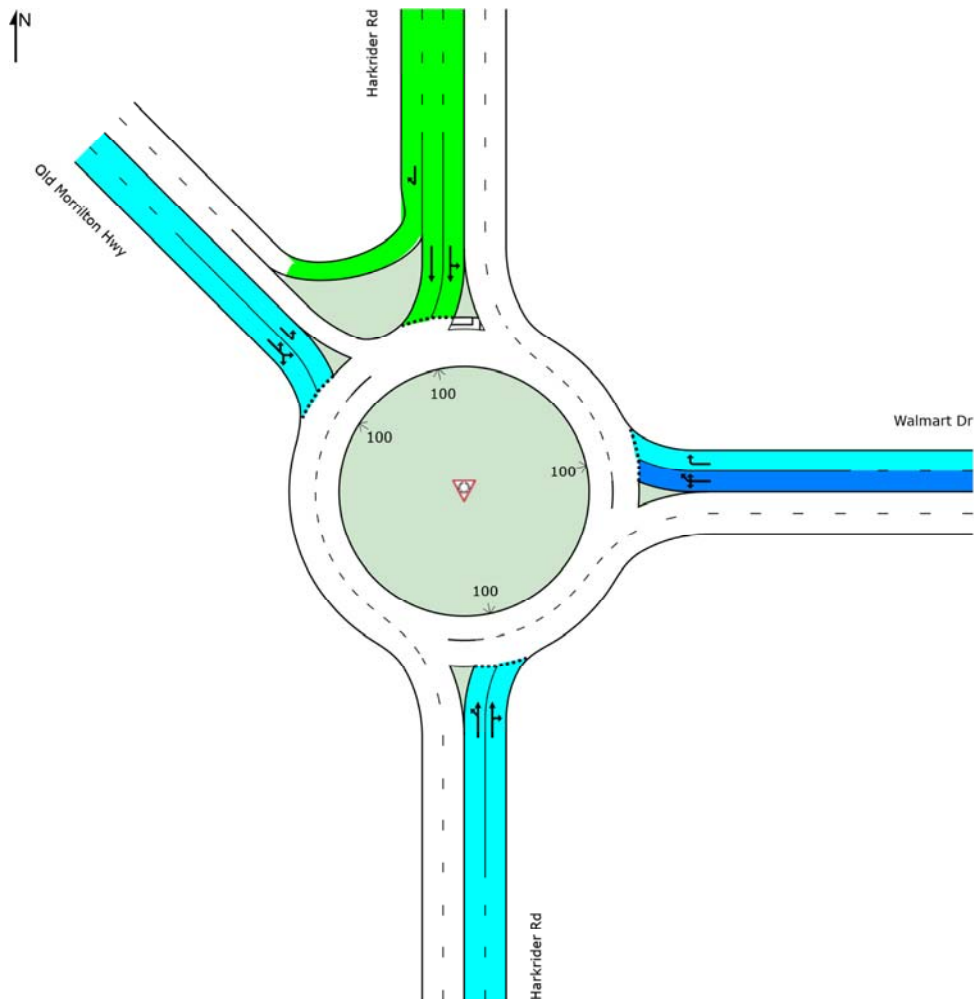
# LANE LEVEL OF SERVICE

## Lane Level of Service

 **Site: 101 [PM PEAK-Harkrider Rd at Old Morrilton Hwy- 0 year ]**

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)  
 Site Category: Roundabout- HCM 6th  
 Roundabout

	Approaches				Intersection
	South	East	North	Northwest	
LOS	B	C	A	B	B



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 LOS F will result if  $v/c > 1$  irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Signalised Intersections

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

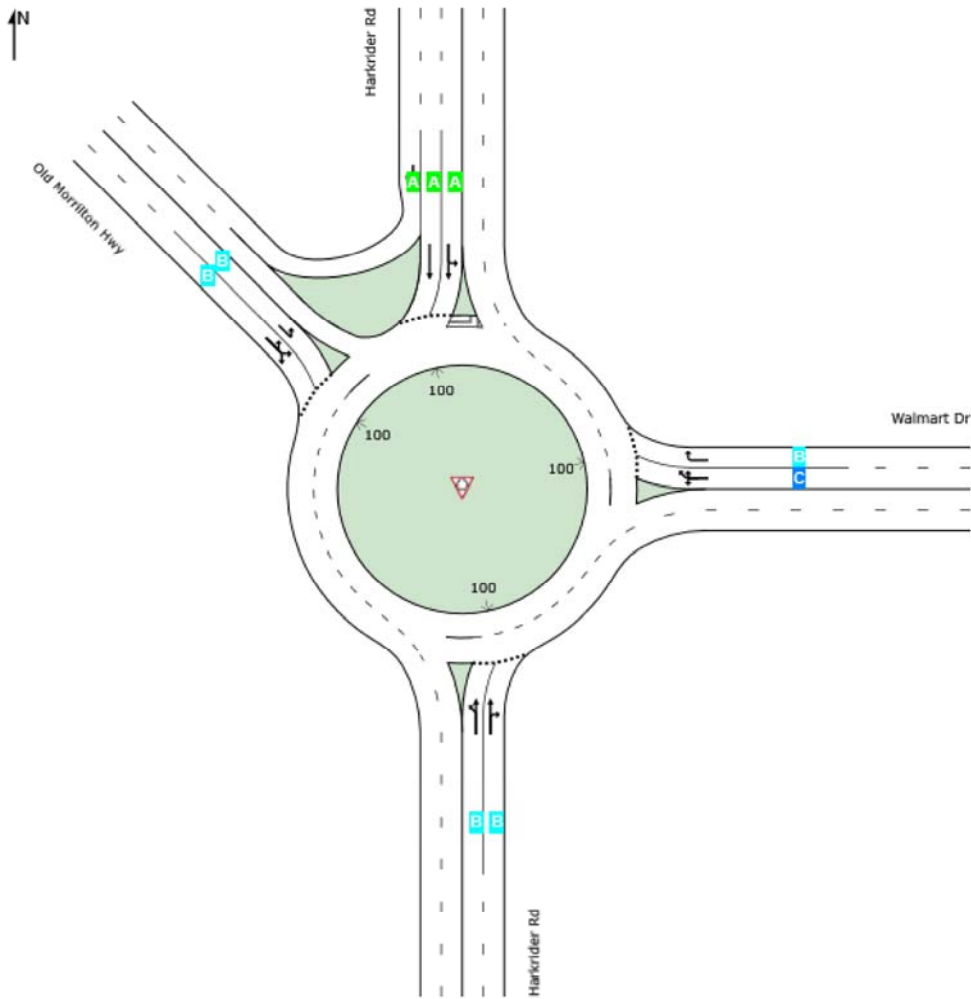
# LANE LEVEL OF SERVICE

## Lane Level of Service

 **Site: 101 [PM PEAK-Harkrider Rd at Old Morrilton Hwy- 0 year ]**

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)  
 Site Category: Roundabout- HCM 6th  
 Roundabout

	Approaches				Intersection
	South	East	North	Northwest	
LOS	B	C	A	B	B



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if  $v/c > 1$  irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

# DELAY (CONTROL)

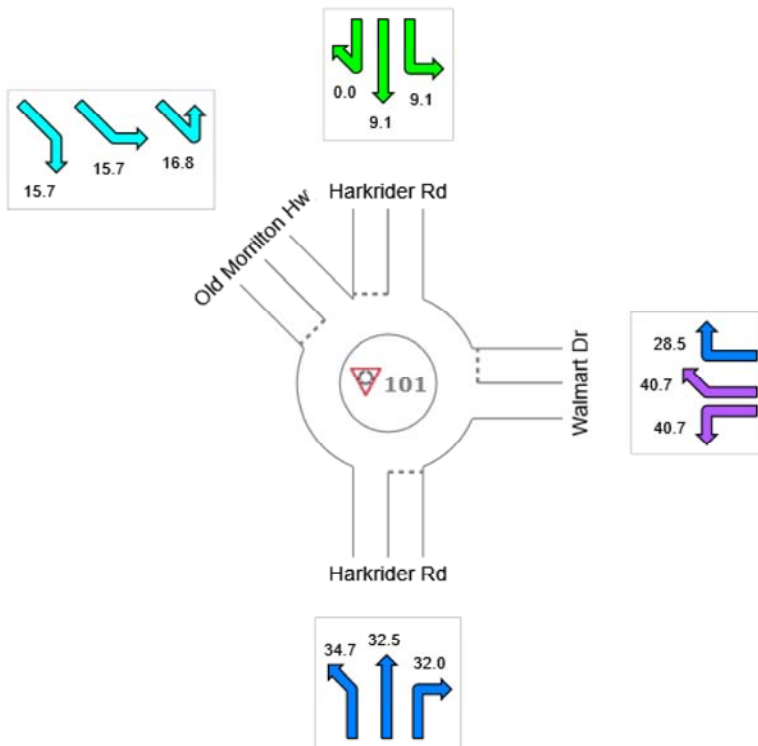
Average control delay per vehicle, or average pedestrian delay (seconds)

 **Site: 101 [PM PEAK-Harkrider Rd at Old Morrilton Hwy- 10 year ]**

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)  
 Site Category: Roundabout- HCM 6th  
 Roundabout  
 Design Life Analysis (Final Year): Results for 10 years

## All Movement Classes

	Approaches				Intersection
	South	East	North	Northwest	
Delay (Control)	33.3	36.2	4.5	16.3	20.3
LOS	C	D	A	B	C



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Signalised Intersections

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

# LANE LEVEL OF SERVICE

## Lane Level of Service

 **Site: 101 [PM PEAK-Harkrider Rd at Old Morrilton Hwy- 10 year ]**

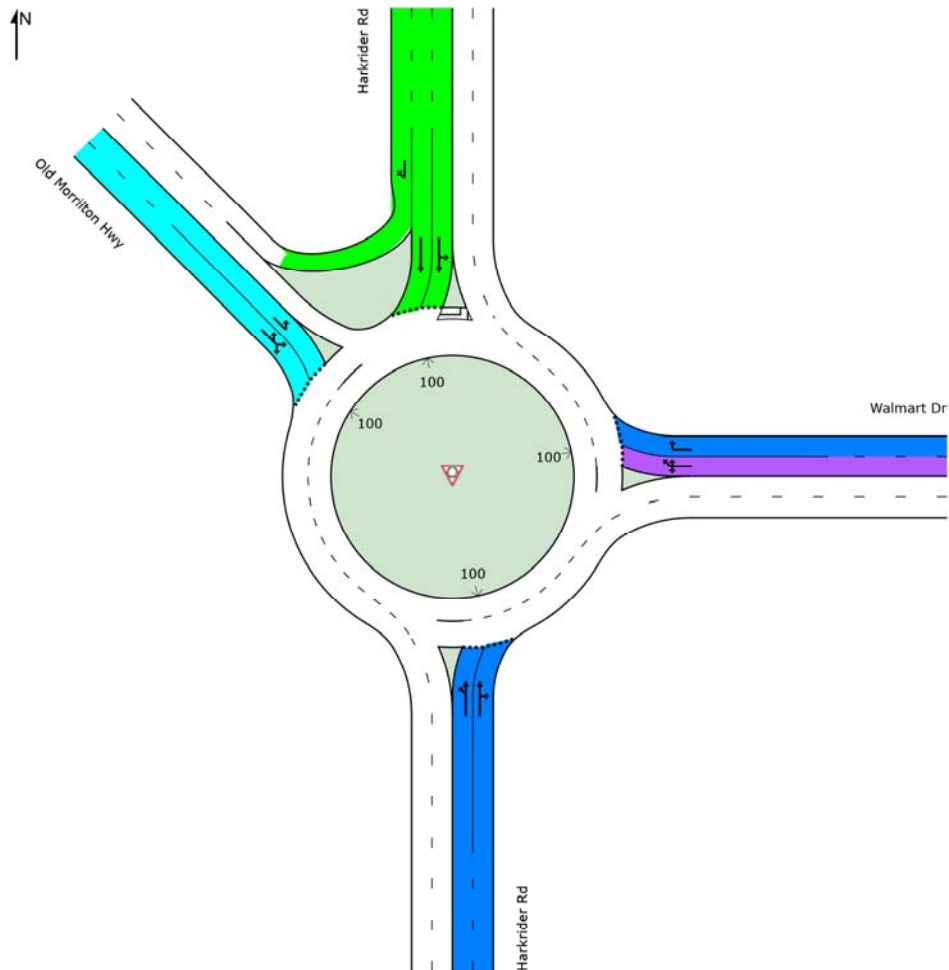
Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)

Site Category: Roundabout- HCM 6th

Roundabout

Design Life Analysis (Final Year): Results for 10 years

LOS	Approaches				Intersection
	South	East	North	Northwest	
LOS	C	D	A	B	C



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

LOS F will result if  $v/c > 1$  irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Signalised Intersections

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Organisation: MCCLELLAND CONSULTING ENGINEERS, INC | Processed: Thursday, January 21, 2021 3:39:15 PM  
Project: W:\2019\19-2181 - Harkrider St (65B) Hwy (64) Intersection Evaluation\Calculations and Reports\Calculations\AM- Harkrider.Old Morrilton intersection.sip8

# LANE LEVEL OF SERVICE

## Lane Level of Service

**Site: 101 [PM PEAK-Harkrider Rd at Old Morrilton Hwy- 10 year ]**

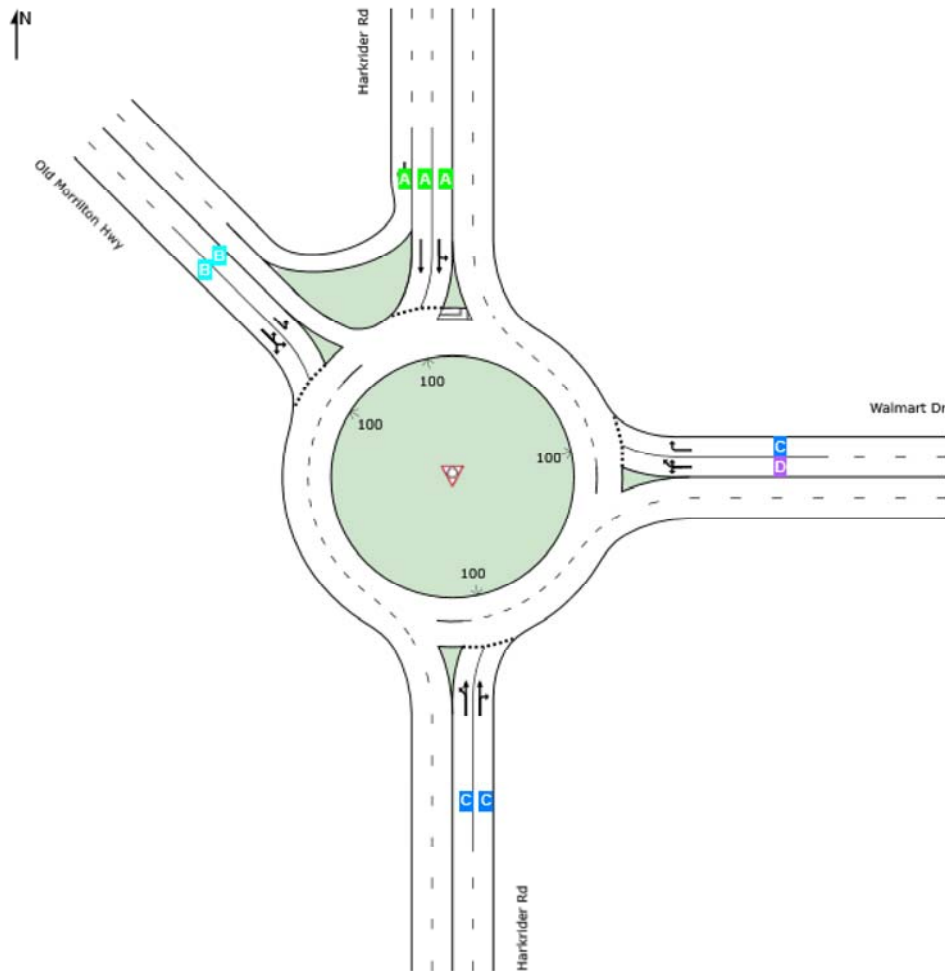
Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)

Site Category: Roundabout- HCM 6th

Roundabout

Design Life Analysis (Final Year): Results for 10 years

	Approaches				Intersection
	South	East	North	Northwest	
LOS	C	D	A	B	C



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if  $v/c > 1$  irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

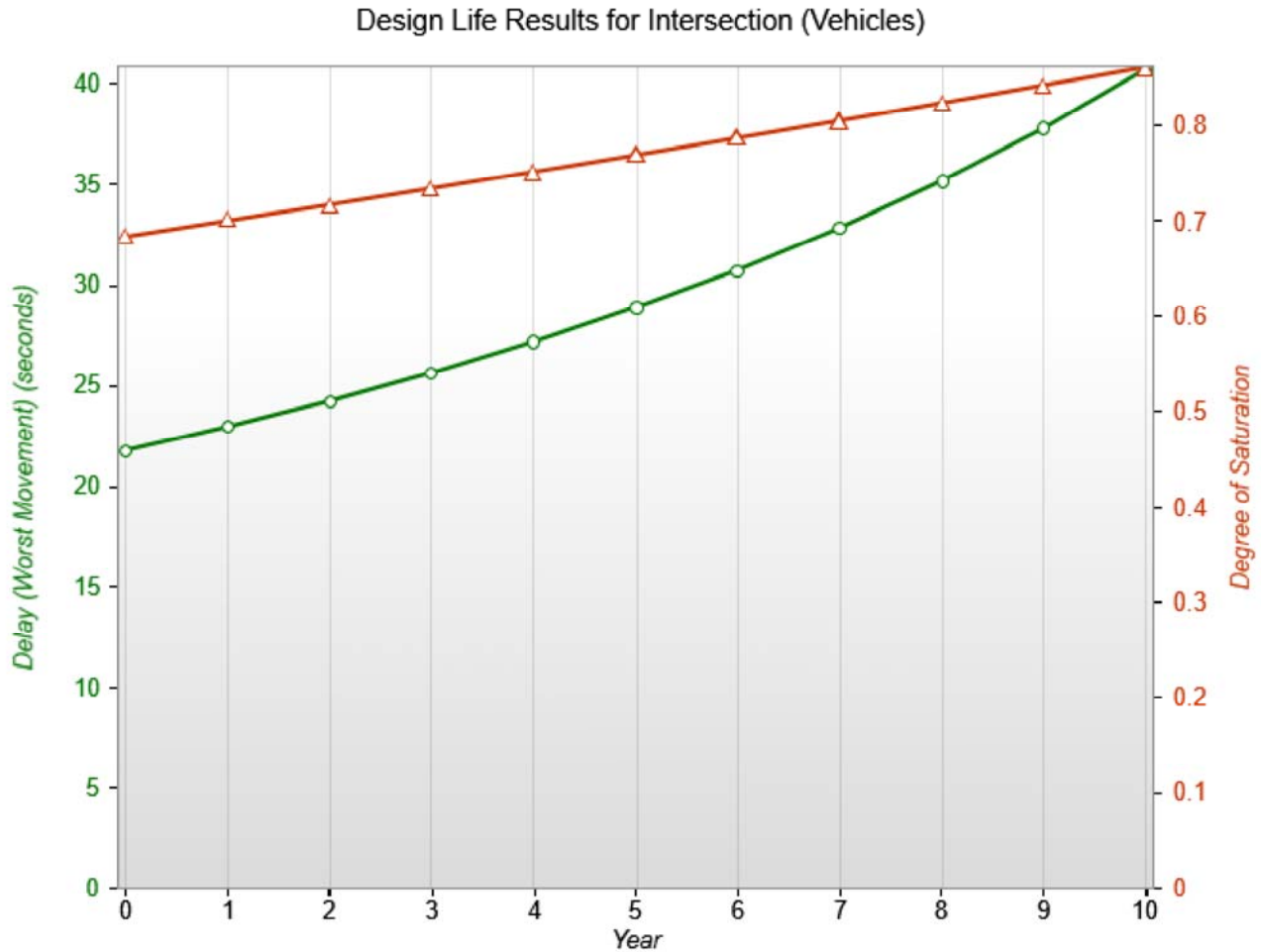
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

# SITE GRAPHS - Demand (Design Life) Analysis

Average control delay per vehicle for the worst vehicle movement (seconds) and Highest degree of saturation in any lane

Site: 101 [PM PEAK-Harkrider Rd at Old Morrilton Hwy- 10 year ]

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)  
Site Category: Roundabout- HCM 6th  
Roundabout  
Design Life Analysis (Final Year): Results for 10 years





# DELAY (CONTROL)

Average control delay per vehicle, or average pedestrian delay (seconds)

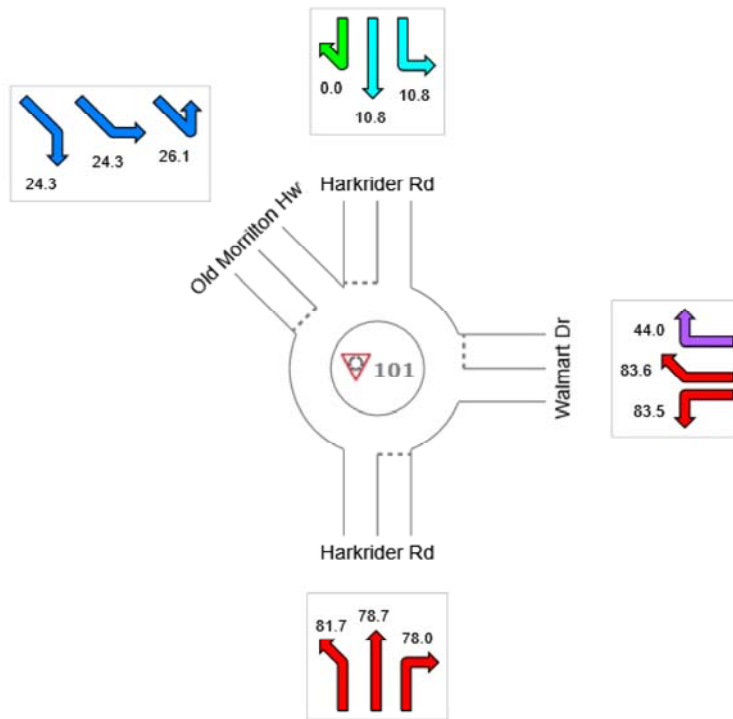
 **Site: 101 [PM PEAK-Harkrider Rd at Old Morrilton Hwy- 20 year]**

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)  
 Site Category: Roundabout- HCM 6th  
 Roundabout  
 Design Life Analysis (Final Year): Results for 20 years

## All Movement Classes

	Approaches				Intersection
	South	East	North	Northwest	
Delay (Control)	79.7	69.0	5.4	25.3	41.4
LOS	E <sup>11</sup>	E <sup>11</sup>	A	C	D

<sup>11</sup> Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Signalised Intersections

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

# LANE LEVEL OF SERVICE

## Lane Level of Service

**Site: 101 [PM PEAK-Harkrider Rd at Old Morrilton Hwy- 20 year]**

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)

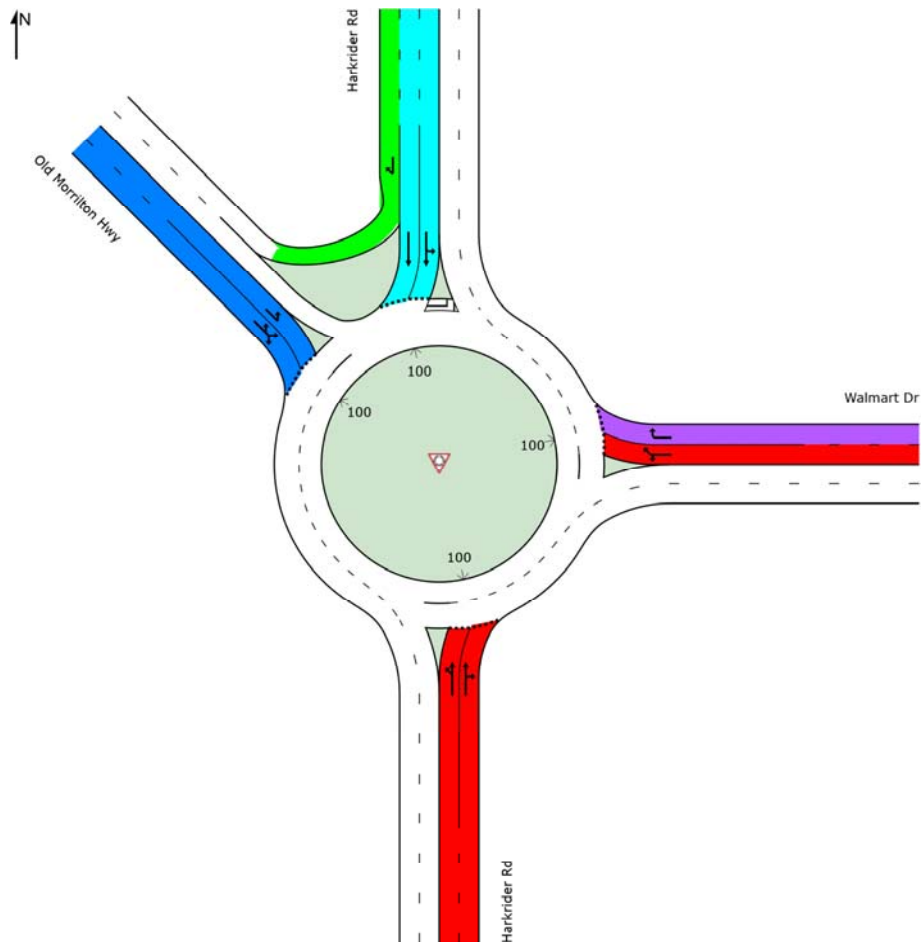
Site Category: Roundabout- HCM 6th

Roundabout

Design Life Analysis (Final Year): Results for 20 years

	Approaches				Intersection
	South	East	North	Northwest	
LOS	E <sup>11</sup>	E <sup>11</sup>	A	C	D

<sup>11</sup> Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

LOS F will result if  $v/c > 1$  irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Signalised Intersections

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

# LANE LEVEL OF SERVICE

## Lane Level of Service

**Site: 101 [PM PEAK-Harkrider Rd at Old Morrilton Hwy- 20 year]**

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)

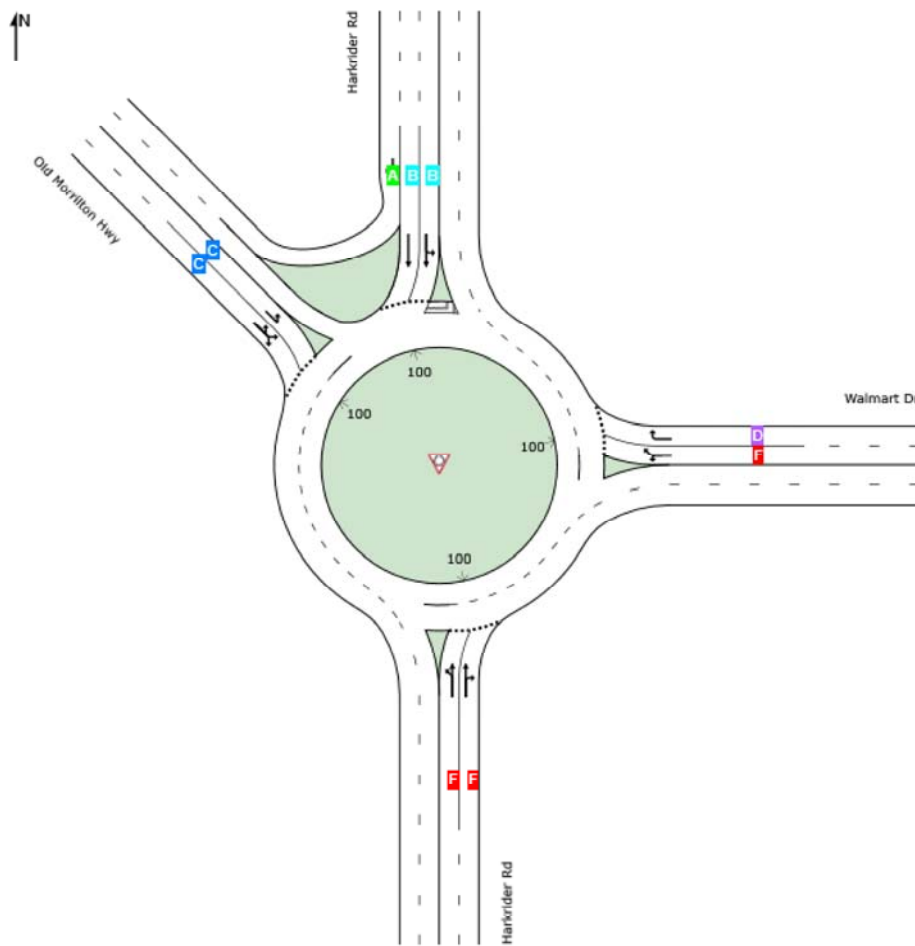
Site Category: Roundabout- HCM 6th

Roundabout

Design Life Analysis (Final Year): Results for 20 years

	Approaches				Intersection
	South	East	North	Northwest	
LOS	E <sup>11</sup>	E <sup>11</sup>	A	C	D

<sup>11</sup> Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

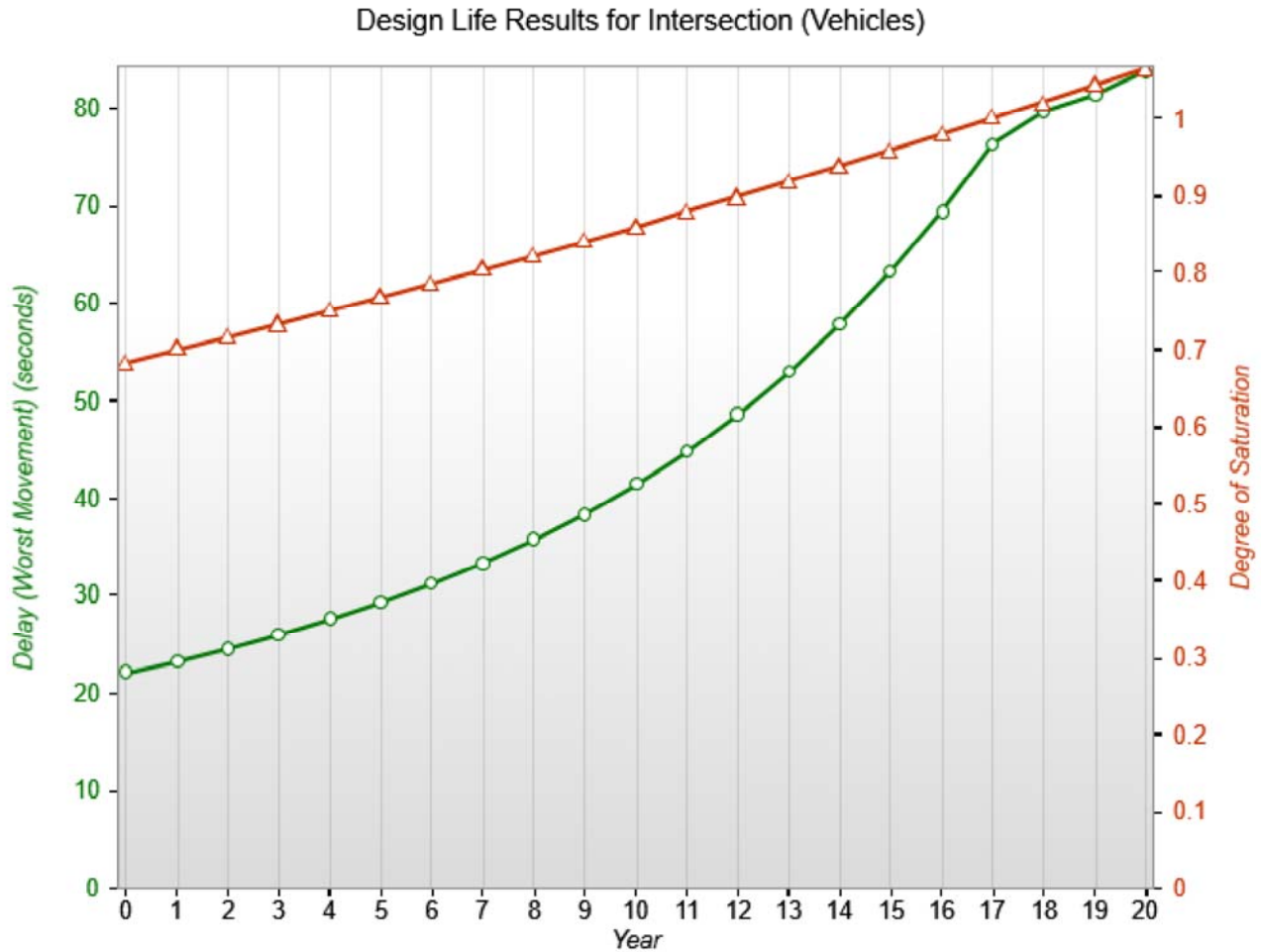
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

# SITE GRAPHS - Demand (Design Life) Analysis

Average control delay per vehicle for the worst vehicle movement (seconds) and Highest degree of saturation in any lane

Site: 101 [PM PEAK-Harkrider Rd at Old Morrilton Hwy- 20 year]

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)  
Site Category: Roundabout- HCM 6th  
Roundabout  
Design Life Analysis (Final Year): Results for 20 years



SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: MCCLELLAND CONSULTING ENGINEERS, INC | Processed: Thursday, January 21, 2021 3:31:22 PM

Project: W:\2019\19-2181 - Harkrider St (65B) Hwy (64) Intersection Evaluation\Calculations and Reports\Calculations\AM- Harkrider.Old Morrilton intersection.sip8

# **OLD MORRILTON HWY AT HARKRIDER ST**

RODEL Analysis Results

## Scheme Summary

### Control Data

#### Control Data and Model Parameters

Harkrider/Old Morrilton	2021 Synthetic Flow Profile (veh)
AM Volumes	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
AM Peak Hour	Peak 60 min Results
Full Geometry	Output flows: Vehicles
English Units (ft)	50% Confidence Level

#### Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	Yes
Bypass Calibration	No
Global Results	Yes

## Operational Data

### Main Geometry (ft)

#### Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Harkrider St	0	0	20.00	2	24.00	2	164.00	40.00	30.00
2	Wal-Mart Dr	90	0	20.00	2	24.00	2	164.00	90.00	30.00
3	Harkrider St	164	0	20.00	2	24.00	2	164.00	120.00	30.00
4	Old Morrilton Hwy	229	0	20.00	2	28.00	2	164.00	300.00	30.00

#### Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Harkrider St	220.00	34.00	2	24.00	2	24.00	2
2	Wal-Mart Dr	220.00	34.00	2	15.00	1	15.00	1
3	Harkrider St	220.00	34.00	2	24.00	2	24.00	2
4	Old Morrilton Hwy	220.00	34.00	2	15.00	1	15.00	1

#### Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	Harkrider St	0	1.000	0	1.000	20.00	2987	0	24.00	3584	0
2	Wal-Mart Dr	0	1.000	0	1.000	20.00	2987	0	15.00	2240	0
3	Harkrider St	0	1.000	0	1.000	20.00	2987	0	24.00	3584	0
4	Old Morrilton Hwy	0	1.000	0	1.000	20.00	2987	0	15.00	2240	0

## Bypass Geometry

### Bypass Approach Geometry (ft)

Leg	Leg Names	Bypass Type	Bypass Flows	V	nv	Vb	nvb	Vt	nvt
3	Harkrider St	Free	285	20	2	12	1	20	2

### Bypass Entry and Exit Geometry (ft)

Leg	Leg Names	Entry Geometry						Leg	Leg Names	Exit Lanes	
		Eb	neb	Lb	Lt	Rb	Phib			nex	Nmx
3	Harkrider St	12	1	0	130	66.00005 914	30	4	Old Morrilton Hwy	1	2

### Bypass Entry Capacity Modifiers and Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Calibration	
		Capacity + or -	Cross Walk Factor	Intercept + or -	Slope Factor
3	Harkrider St	0	1.000	0	1.000



## Traffic Flow Data (veh/hr)

### 2021 AM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers	
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor
1	Harkrider St	0	246	338	31	0	3.0	1.00
2	Wal-Mart Dr	0	85	87	109	0	2.0	1.00
3	Harkrider St	0	80	293	0	285	3.0	1.00
4	Old Morrilton Hwy	0	345	93	261	0	3.0	1.00

### 2021 AM Peak Synthetic Flow Profile - Timeslice 7.5 mins

Leg	Leg Names	Flow Ratios			Flow Times		
		Ratio 1	Ratio 2	Ratio 3	Time 1	Time 2	Time 3
1	Harkrider St	0.750	1.125	0.750	0	30	60
2	Wal-Mart Dr	0.750	1.125	0.750	0	30	60
3	Harkrider St	0.750	1.125	0.750	0	30	60
4	Old Morrilton Hwy	0.750	1.125	0.750	0	30	60

## Operational Results

### 2021 AM Peak - 60 minutes

#### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Harkrider St	None	615		518		639	1709		0.3598	
2	Wal-Mart Dr	None	281		929		204	1576		0.1783	
3	Harkrider St	Free	373	285	418	0	792	1864	1288	0.2001	0.2212
4	Old Morrilton Hwy	None	699		458		618	2135		0.3275	

#### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Harkrider St	None	5.28		5.28	2.85		A		A
2	Wal-Mart Dr	None	4.44		4.44	1.10		A		A
3	Harkrider St	Free	2.97	0.00	1.68	0.95	0.00	A	A	A
4	Old Morrilton Hwy	None	4.76		4.76	2.88		A		A

## 2021 AM Peak - 15 minutes

### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Harkrider St	None	693		584		720	1672		0.4148	
2	Wal-Mart Dr	None	317		1047		230	1505		0.2105	
3	Harkrider St	Free	421	321	471	0	893	1832	1288	0.2295	0.2495
4	Old Morrilton Hwy	None	788		516		697	2097		0.3759	

### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Harkrider St	None	5.61		5.61	2.85		A		A
2	Wal-Mart Dr	None	4.66		4.66	1.10		A		A
3	Harkrider St	Free	3.05	0.00	1.73	0.95	0.00	A	A	A
4	Old Morrilton Hwy	None	5.01		5.01	2.88		A		A

## Approach Flow Profile

### 2021 AM Peak - Approach Flows (Veh / Hour)

Time Slice	Harkrider St	Wal-Mart Dr	Harkrider St	Old Morrilton Hwy
0.0 - 7.5	63.96	29.22	68.43	72.69
7.5 - 15.0	74.46	34.02	79.66	84.63
15.0 - 22.5	82.40	37.65	88.16	93.66
22.5 - 30.0	86.69	39.61	92.75	98.53
30.0 - 37.5	86.69	39.61	92.75	98.53
37.5 - 45.0	82.40	37.65	88.16	93.66
45.0 - 52.5	74.46	34.02	79.66	84.63
52.5 - 60.0	63.96	29.22	68.43	72.69
Peak 15 min	86.69	39.61	92.75	98.53
Peak 60 min	76.87	35.13	82.25	87.37

## Exit Flow Profile

### 2021 AM Peak - Exit Flows (Veh / Hour)

Time Slice	Harkrider St	Wal-Mart Dr	Harkrider St	Old Morrilton Hwy
0.0 - 7.5	66.42	21.20	82.31	64.25
7.5 - 15.0	77.30	24.68	95.78	74.77
15.0 - 22.5	85.56	27.31	106.02	82.76
22.5 - 30.0	90.03	28.74	111.57	87.08
30.0 - 37.5	90.07	28.75	111.63	87.11
37.5 - 45.0	85.64	27.34	106.16	82.82
45.0 - 52.5	77.42	24.72	95.99	74.87
52.5 - 60.0	66.52	21.24	82.48	64.32
0-60	639	204	792	618
%Trucks	2.87	3.00	2.86	2.74

## Time Sliced Results 2021 AM Peak

### Time Sliced Results Leg 1 - Harkrider St

Time Slices	Arrival Flows (veh/hr)	Oppose Flows (veh/hr)	Entry Capacity (veh/hr)	Exit Flow (veh/hr)	Volume Capacity Ratios	Average Delay (sec)	Start Queue (veh)	End Queue (veh)	95% End Queue (veh)
0.0 - 7.5	511.64	430.71	1758.21	531.36	0.2825	4.26	0.56	0.65	1.68
7.5 - 15.0	595.66	501.21	1718.52	618.39	0.3365	4.48	0.65	0.83	2.15
15.0 - 22.5	659.21	554.80	1688.35	684.48	0.3791	5.01	0.83	1.00	2.57
22.5 - 30.0	693.48	583.84	1672.01	720.28	0.4027	5.46	1.00	1.10	2.83
30.0 - 37.5	693.48	584.08	1671.87	720.53	0.4027	5.76	1.10	1.11	2.85
37.5 - 45.0	659.21	555.44	1687.99	685.15	0.3792	5.87	1.11	1.04	2.66
45.0 - 52.5	595.66	502.17	1717.98	619.38	0.3366	5.73	1.04	0.86	2.22
52.5 - 60.0	511.64	431.47	1757.79	532.15	0.2826	5.37	0.86	0.67	1.73
Peak 15	693.48	583.96	1671.94	720.40	0.4148	5.61			
Peak 60	615.00	517.96	1709.09	638.96	0.3598	5.28			

### Time Sliced Results Leg 2 - Wal-Mart Dr

Time Slices	Arrival Flows (veh/hr)	Oppose Flows (veh/hr)	Entry Capacity (veh/hr)	Exit Flow (veh/hr)	Volume Capacity Ratios	Average Delay (sec)	Start Queue (veh)	End Queue (veh)	95% End Queue (veh)
0.0 - 7.5	233.78	772.38	1670.19	169.63	0.1372	3.71	0.22	0.26	0.67
7.5 - 15.0	272.17	898.73	1594.32	197.41	0.1674	3.84	0.26	0.32	0.85
15.0 - 22.5	301.20	994.83	1536.61	218.51	0.1922	4.22	0.32	0.38	1.00
22.5 - 30.0	316.86	1046.97	1505.31	229.94	0.2064	4.55	0.38	0.42	1.09
30.0 - 37.5	316.86	1047.50	1504.99	230.03	0.2064	4.77	0.42	0.42	1.10
37.5 - 45.0	301.20	996.23	1535.77	218.74	0.1923	4.86	0.42	0.39	1.03
45.0 - 52.5	272.17	900.79	1593.08	197.75	0.1675	4.78	0.39	0.33	0.87
52.5 - 60.0	233.78	773.98	1669.23	169.90	0.1373	4.57	0.33	0.26	0.69
Peak 15	316.86	1047.23	1505.15	229.98	0.2105	4.66			
Peak 60	281.00	928.93	1576.19	203.99	0.1783	4.44			

### Time Sliced Results Leg 3 - Harkrider St

Time Slices	Arrival Flows (veh/hr)	Oppose Flows (veh/hr)	Entry Capacity (veh/hr)	Exit Flow (veh/hr)	Volume Capacity Ratios	Average Delay (sec)	Start Queue (veh)	End Queue (veh)	95% End Queue (veh)
0.0 - 7.5	310.31	347.54	1905.54	658.49	0.1581	2.60	0.21	0.24	0.63
7.5 - 15.0	361.27	404.40	1871.90	766.23	0.1874	2.64	0.24	0.29	0.77
15.0 - 22.5	399.81	447.64	1846.32	848.16	0.2102	2.83	0.29	0.34	0.88
22.5 - 30.0	420.60	471.09	1832.44	892.59	0.2228	2.99	0.34	0.36	0.95
30.0 - 37.5	420.60	471.32	1832.30	893.03	0.2229	3.11	0.36	0.36	0.95

**Time Sliced Results Leg 3 - Harkrider St**

Time Slices	Arrival Flows (veh/hr)	Oppose Flows (veh/hr)	Entry Capacity (veh/hr)	Exit Flow (veh/hr)	Volume Capacity Ratios	Average Delay (sec)	Start Queue (veh)	End Queue (veh)	95% End Queue (veh)
37.5 - 45.0	399.81	448.24	1845.96	849.30	0.2103	3.18	0.36	0.34	0.90
45.0 - 52.5	361.27	405.29	1871.37	767.91	0.1874	3.18	0.34	0.30	0.78
52.5 - 60.0	310.31	348.23	1905.13	659.80	0.1581	3.12	0.30	0.24	0.63
Peak 15	420.60	471.20	1832.37	892.81	0.2295	3.05			
Peak 60	373.00	417.97	1863.87	791.94	0.2001	2.97			

**Time Sliced Results Leg 4 - Old Morrilton Hwy**

Time Slices	Arrival Flows (veh/hr)	Oppose Flows (veh/hr)	Entry Capacity (veh/hr)	Exit Flow (veh/hr)	Volume Capacity Ratios	Average Delay (sec)	Start Queue (veh)	End Queue (veh)	95% End Queue (veh)
0.0 - 7.5	581.53	380.88	2184.68	276.86	0.2584	3.95	0.60	0.68	1.77
7.5 - 15.0	677.02	443.30	2144.10	322.15	0.3066	4.10	0.68	0.86	2.22
15.0 - 22.5	749.25	490.67	2113.31	356.60	0.3442	4.53	0.86	1.02	2.62
22.5 - 30.0	788.20	516.30	2096.65	375.28	0.3650	4.89	1.02	1.12	2.86
30.0 - 37.5	788.20	516.44	2096.56	375.48	0.3650	5.13	1.12	1.13	2.88
37.5 - 45.0	749.25	491.05	2113.06	357.10	0.3443	5.24	1.13	1.05	2.70
45.0 - 52.5	677.02	443.86	2143.74	322.89	0.3066	5.16	1.05	0.89	2.28
52.5 - 60.0	581.53	381.33	2184.39	277.43	0.2585	4.90	0.89	0.70	1.81
Peak 15	788.20	516.37	2096.60	375.38	0.3759	5.01			
Peak 60	699.00	457.98	2134.56	332.97	0.3275	4.76			

**Bypass - Time Sliced Results Leg 3 - Harkrider St**

Time Slices	Arrival Flows (veh/hr)	Oppose Flows (veh/hr)	Entry Capacity (veh/hr)	Exit Flow (veh/hr)	Volume Capacity Ratios	Average Delay (sec)	Start Queue (veh)	End Queue (veh)	95% End Queue (veh)
0.0 - 7.5	237.10	0.00	1288.25	0.00	0.1841	0.00	0.00	0.00	0.00
7.5 - 15.0	276.04	0.00	1288.25	0.00	0.2143	0.00	0.00	0.00	0.00
15.0 - 22.5	305.49	0.00	1288.25	0.00	0.2371	0.00	0.00	0.00	0.00
22.5 - 30.0	321.37	0.00	1288.25	0.00	0.2495	0.00	0.00	0.00	0.00
30.0 - 37.5	321.37	0.00	1288.25	0.00	0.2495	0.00	0.00	0.00	0.00
37.5 - 45.0	305.49	0.00	1288.25	0.00	0.2371	0.00	0.00	0.00	0.00
45.0 - 52.5	276.04	0.00	1288.25	0.00	0.2143	0.00	0.00	0.00	0.00
52.5 - 60.0	237.10	0.00	1288.25	0.00	0.1841	0.00	0.00	0.00	0.00
Peak 15	321.37	0.00	1288.25	0.00	0.2495	0.00			
Peak 60	285.00	0.00	1288.25	0.00	0.2212	0.00			



## Economics

### Economic Input Data

#### 2021 - Vehicle Delay Parameters

Peaks	Peak / Day	Days / Year	Delay Cost (\$ / hour)
AM Peak	1	325	15.00
OFF Peak	14	325	15.00
PM Peak	1	325	15.00

#### 2021 - Accident Severity Proportions and Costs

Accident Type	Proportion (%)	Cost (\$)
Fatal Vehicle Accident	0.3	0
Incapacitating Vehicle Accident	17.7	0
Non-incapacitating Vehicle Accident	82	0
Damage Only Vehicle Accident	100	0
Pedestrian Injury Accident	100	0

## Economics - Results Data

#### 2021 Delay and Accident Costs

Peak	Delay Costs		Accident Costs			Total Costs	
	Delays Veh.hrs	Costs (\$)	Accident Types	Annual Accidents	Accident Costs	Cost Type	Costs (\$/year)
AM	805.87	12088	Vehicles Injury	0.00	0	Vehicle Delay Cost	12088
OFF	0.00	0	Vehicles DO	0.00	0	Vehicle Injury Acc Cost	0
PM	0.00	0	Pedestrians	0.00	0	Vehicle DO Acc Cost	0
						Pedestrian Accident Cost	0
						Total Accident Cost	0
Total	805.87	12088	Totals	0.00	0	TOTAL COST	12088

## Global Results

### Performance and Accidents

#### 2021 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	1968	285	2253
Capacity	veh/hr	7284	1288	8572
Average Delay	sec/veh	4.54	0.00	3.96
L.O.S. (Signal)	A – F	A	A	A
L.O.S. (Unsig)	A – F	A	A	A
Total Delay	veh.hrs	2.48	0.00	2.48

## Scheme Summary

### Control Data

#### Control Data and Model Parameters

Harkrider/Old Morrilton	2021 Synthetic Flow Profile (veh)
AM Volumes	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
AM Peak Hour	Peak 60 min Results
Full Geometry	Output flows: Vehicles
English Units (ft)	50% Confidence Level

#### Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	Yes
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	Yes
Bypass Calibration	No
Global Results	Yes

## Operational Data

### Main Geometry (ft)

#### Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Harkrider St	0	0	20.00	2	24.00	2	164.00	40.00	30.00
2	Wal-Mart Dr	90	0	20.00	2	24.00	2	164.00	90.00	30.00
3	Harkrider St	164	0	20.00	2	24.00	2	164.00	120.00	30.00
4	Old Morrilton Hwy	229	0	20.00	2	28.00	2	164.00	300.00	30.00

#### Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Harkrider St	220.00	34.00	2	24.00	2	24.00	2
2	Wal-Mart Dr	220.00	34.00	2	15.00	1	15.00	1
3	Harkrider St	220.00	34.00	2	24.00	2	24.00	2
4	Old Morrilton Hwy	220.00	34.00	2	15.00	1	15.00	1

#### Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	Harkrider St	0	1.000	0	1.000	20.00	2987	0	24.00	3584	0
2	Wal-Mart Dr	0	1.000	0	1.000	20.00	2987	0	15.00	2240	0
3	Harkrider St	0	1.000	0	1.000	20.00	2987	0	24.00	3584	0
4	Old Morrilton Hwy	0	1.000	0	1.000	20.00	2987	0	15.00	2240	0

## Bypass Geometry

### Bypass Approach Geometry (ft)

Leg	Leg Names	Bypass Type	Bypass Flows	V	nv	Vb	nvb	Vt	nvt
3	Harkrider St	Free	285	20	2	12	1	20	2

### Bypass Entry and Exit Geometry (ft)

Leg	Leg Names	Entry Geometry						Leg	Leg Names	Exit Lanes	
		Eb	neb	Lb	Lt	Rb	Phib			nex	Nmx
3	Harkrider St	12	1	0	130	66.00005 069	30	4	Old Morrilton Hwy	1	2

### Bypass Entry Capacity Modifiers and Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Calibration	
		Capacity + or -	Cross Walk Factor	Intercept + or -	Slope Factor
3	Harkrider St	0	1.000	0	1.000

## Traffic Flow Data (veh/hr)

### 2021 AM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers	
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor
1	Harkrider St	0	246	338	31	0	3.0	1.16
2	Wal-Mart Dr	0	85	87	109	0	2.0	1.16
3	Harkrider St	0	80	293	0	285	3.0	1.16
4	Old Morrilton Hwy	0	345	93	261	0	3.0	1.16

### 2021 AM Peak Synthetic Flow Profile - Timeslice 7.5 mins

Leg	Leg Names	Flow Ratios			Flow Times		
		Ratio 1	Ratio 2	Ratio 3	Time 1	Time 2	Time 3
1	Harkrider St	0.750	1.125	0.750	0	30	60
2	Wal-Mart Dr	0.750	1.125	0.750	0	30	60
3	Harkrider St	0.750	1.125	0.750	0	30	60
4	Old Morrilton Hwy	0.750	1.125	0.750	0	30	60



## Operational Results

### 2021 AM Peak - 60 minutes

#### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Harkrider St	None	713		601		741	1662		0.4291	
2	Wal-Mart Dr	None	326		1078		237	1487		0.2192	
3	Harkrider St	Free	433	331	485	0	919	1824	1288	0.2372	0.2566
4	Old Morrilton Hwy	None	811		531		717	2087		0.3885	

#### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Harkrider St	None	6.09		6.09	3.88		A		A
2	Wal-Mart Dr	None	4.98		4.98	1.46		A		A
3	Harkrider St	Free	3.17	0.00	1.80	1.19	0.00	A	A	A
4	Old Morrilton Hwy	None	5.35		5.35	3.79		A		A

## 2021 AM Peak - 15 minutes

### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Harkrider St	None	804		677		836	1619		0.4968	
2	Wal-Mart Dr	None	368		1215		267	1405		0.2617	
3	Harkrider St	Free	488	373	547	0	1036	1788	1288	0.2729	0.2894
4	Old Morrilton Hwy	None	914		599		808	2043		0.4476	

### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Harkrider St	None	6.62		6.62	3.88		A		A
2	Wal-Mart Dr	None	5.32		5.32	1.46		A		A
3	Harkrider St	Free	3.29	0.00	1.87	1.19	0.00	A	A	A
4	Old Morrilton Hwy	None	5.72		5.72	3.79		A		A

## Approach Flow Profile

### 2021 AM Peak - Approach Flows (Veh / Hour)

Time Slice	Harkrider St	Wal-Mart Dr	Harkrider St	Old Morrilton Hwy
0.0 - 7.5	63.96	29.22	68.43	72.69
7.5 - 15.0	74.46	34.02	79.66	84.63
15.0 - 22.5	82.40	37.65	88.16	93.66
22.5 - 30.0	86.69	39.61	92.75	98.53
30.0 - 37.5	86.69	39.61	92.75	98.53
37.5 - 45.0	82.40	37.65	88.16	93.66
45.0 - 52.5	74.46	34.02	79.66	84.63
52.5 - 60.0	63.96	29.22	68.43	72.69
Peak 15 min	86.69	39.61	92.75	98.53
Peak 60 min	76.87	35.13	82.25	87.37

## Exit Flow Profile

### 2021 AM Peak - Exit Flows (Veh / Hour)

Time Slice	Harkrider St	Wal-Mart Dr	Harkrider St	Old Morrilton Hwy
0.0 - 7.5	77.04	24.59	95.47	74.52
7.5 - 15.0	89.65	28.62	111.08	86.72
15.0 - 22.5	99.24	31.68	122.95	95.99
22.5 - 30.0	104.43	33.34	129.40	101.00
30.0 - 37.5	104.48	33.35	129.49	101.04
37.5 - 45.0	99.35	31.72	123.16	96.08
45.0 - 52.5	89.83	28.68	111.38	86.86
52.5 - 60.0	77.18	24.64	95.70	74.62
0-60	741	237	919	717
%Trucks	2.87	3.00	2.86	2.74

## Economics

### Economic Input Data

#### 2021 - Vehicle Delay Parameters

Peaks	Peak / Day	Days / Year	Delay Cost (\$ / hour)
AM Peak	1	325	15.00
OFF Peak	14	325	15.00
PM Peak	1	325	15.00

#### 2021 - Accident Severity Proportions and Costs

Accident Type	Proportion (%)	Cost (\$)
Fatal Vehicle Accident	0.3	0
Incapacitating Vehicle Accident	17.7	0
Non-incapacitating Vehicle Accident	82	0
Damage Only Vehicle Accident	100	0
Pedestrian Injury Accident	100	0

## Economics - Results Data

#### 2021 Delay and Accident Costs

Peak	Delay Costs		Accident Costs			Total Costs	
	Delays Veh.hrs	Costs (\$)	Accident Types	Annual Accidents	Accident Costs	Cost Type	Costs (\$/year)
AM	1053.77	15807	Vehicles Injury	0.00	0	Vehicle Delay Cost	15807
OFF	0.00	0	Vehicles DO	0.00	0	Vehicle Injury Acc Cost	0
PM	0.00	0	Pedestrians	0.00	0	Vehicle DO Acc Cost	0
						Pedestrian Accident Cost	0
						Total Accident Cost	0
Total	1053.77	15807	Totals	0.00	0	TOTAL COST	15807

## Global Results

### Performance and Accidents

#### 2021 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	2283	331	2613
Capacity	veh/hr	7061	1288	8349
Average Delay	sec/veh	5.11	0.00	4.47
L.O.S. (Signal)	A – F	A	A	A
L.O.S. (Unsig)	A – F	A	A	A
Total Delay	veh.hrs	3.24	0.00	3.24

## Scheme Summary

### Control Data

#### Control Data and Model Parameters

Harkrider/Old Morrilton	2021 Synthetic Flow Profile (veh)
AM Volumes	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
AM Peak Hour	Peak 60 min Results
Full Geometry	Output flows: Vehicles
English Units (ft)	50% Confidence Level

#### Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	Yes
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	Yes
Bypass Calibration	No
Global Results	Yes

## Operational Data

### Main Geometry (ft)

#### Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Harkrider St	0	0	20.00	2	24.00	2	164.00	40.00	30.00
2	Wal-Mart Dr	90	0	20.00	2	24.00	2	164.00	90.00	30.00
3	Harkrider St	164	0	20.00	2	24.00	2	164.00	120.00	30.00
4	Old Morrilton Hwy	229	0	20.00	2	28.00	2	164.00	300.00	30.00

#### Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Harkrider St	220.00	34.00	2	24.00	2	24.00	2
2	Wal-Mart Dr	220.00	34.00	2	15.00	1	15.00	1
3	Harkrider St	220.00	34.00	2	24.00	2	24.00	2
4	Old Morrilton Hwy	220.00	34.00	2	15.00	1	15.00	1

#### Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	Harkrider St	0	1.000	0	1.000	20.00	2987	0	24.00	3584	0
2	Wal-Mart Dr	0	1.000	0	1.000	20.00	2987	0	15.00	2240	0
3	Harkrider St	0	1.000	0	1.000	20.00	2987	0	24.00	3584	0
4	Old Morrilton Hwy	0	1.000	0	1.000	20.00	2987	0	15.00	2240	0



## Bypass Geometry

### Bypass Approach Geometry (ft)

Leg	Leg Names	Bypass Type	Bypass Flows	V	nv	Vb	nvb	Vt	nvt
3	Harkrider St	Free	285	20	2	12	1	20	2

### Bypass Entry and Exit Geometry (ft)

Leg	Leg Names	Entry Geometry						Leg	Leg Names	Exit Lanes	
		Eb	neb	Lb	Lt	Rb	Phib			nex	Nmx
3	Harkrider St	12	1	0	130	66.00005 491	30	4	Old Morrilton Hwy	1	2

### Bypass Entry Capacity Modifiers and Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Calibration	
		Capacity + or -	Cross Walk Factor	Intercept + or -	Slope Factor
3	Harkrider St	0	1.000	0	1.000

## Traffic Flow Data (veh/hr)

### 2021 AM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers	
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor
1	Harkrider St	0	246	338	31	0	3.0	1.35
2	Wal-Mart Dr	0	85	87	109	0	2.0	1.35
3	Harkrider St	0	80	293	0	285	3.0	1.35
4	Old Morrilton Hwy	0	345	93	261	0	3.0	1.35

### 2021 AM Peak Synthetic Flow Profile - Timeslice 7.5 mins

Leg	Leg Names	Flow Ratios			Flow Times		
		Ratio 1	Ratio 2	Ratio 3	Time 1	Time 2	Time 3
1	Harkrider St	0.750	1.125	0.750	0	30	60
2	Wal-Mart Dr	0.750	1.125	0.750	0	30	60
3	Harkrider St	0.750	1.125	0.750	0	30	60
4	Old Morrilton Hwy	0.750	1.125	0.750	0	30	60

## Operational Results

### 2021 AM Peak - 60 minutes

#### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Harkrider St	None	830		699		863	1607		0.5166	
2	Wal-Mart Dr	None	379		1254		275	1381		0.2747	
3	Harkrider St	Free	504	385	564	0	1069	1777	1288	0.2833	0.2987
4	Old Morrilton Hwy	None	944		618		834	2030		0.4648	

#### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Harkrider St	None	7.47		7.47	5.67		A		A
2	Wal-Mart Dr	None	5.80		5.80	2.02		A		A
3	Harkrider St	Free	3.47	0.00	1.97	1.53	0.00	A	A	A
4	Old Morrilton Hwy	None	6.30		6.30	5.28		A		A

## 2021 AM Peak - 15 minutes

### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Harkrider St	None	936		788		972	1557		0.6013	
2	Wal-Mart Dr	None	428		1413		310	1285		0.3328	
3	Harkrider St	Free	568	434	636	0	1205	1735	1288	0.3273	0.3368
4	Old Morrilton Hwy	None	1064		697		940	1979		0.5376	

### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Harkrider St	None	8.39		8.39	5.67		A		A
2	Wal-Mart Dr	None	6.35		6.35	2.02		A		A
3	Harkrider St	Free	3.65	0.00	2.07	1.53	0.00	A	A	A
4	Old Morrilton Hwy	None	6.91		6.91	5.28		A		A

## Approach Flow Profile

### 2021 AM Peak - Approach Flows (Veh / Hour)

Time Slice	Harkrider St	Wal-Mart Dr	Harkrider St	Old Morrilton Hwy
0.0 - 7.5	63.96	29.22	68.43	72.69
7.5 - 15.0	74.46	34.02	79.66	84.63
15.0 - 22.5	82.40	37.65	88.16	93.66
22.5 - 30.0	86.69	39.61	92.75	98.53
30.0 - 37.5	86.69	39.61	92.75	98.53
37.5 - 45.0	82.40	37.65	88.16	93.66
45.0 - 52.5	74.46	34.02	79.66	84.63
52.5 - 60.0	63.96	29.22	68.43	72.69
Peak 15 min	86.69	39.61	92.75	98.53
Peak 60 min	76.87	35.13	82.25	87.37

## Exit Flow Profile

### 2021 AM Peak - Exit Flows (Veh / Hour)

Time Slice	Harkrider St	Wal-Mart Dr	Harkrider St	Old Morrilton Hwy
0.0 - 7.5	89.65	28.62	111.09	86.72
7.5 - 15.0	104.31	33.30	129.21	100.90
15.0 - 22.5	115.46	36.86	143.02	111.68
22.5 - 30.0	121.51	38.79	150.54	117.52
30.0 - 37.5	121.58	38.82	150.69	117.59
37.5 - 45.0	115.64	36.92	143.37	111.84
45.0 - 52.5	104.57	33.39	129.71	101.13
52.5 - 60.0	89.84	28.69	111.44	86.87
0-60	863	275	1069	834
%Trucks	2.87	3.00	2.86	2.74

## Economics

### Economic Input Data

#### 2021 - Vehicle Delay Parameters

Peaks	Peak / Day	Days / Year	Delay Cost (\$ / hour)
AM Peak	1	325	15.00
OFF Peak	14	325	15.00
PM Peak	1	325	15.00

#### 2021 - Accident Severity Proportions and Costs

Accident Type	Proportion (%)	Cost (\$)
Fatal Vehicle Accident	0.3	0
Incapacitating Vehicle Accident	17.7	0
Non-incapacitating Vehicle Accident	82	0
Damage Only Vehicle Accident	100	0
Pedestrian Injury Accident	100	0

## Economics - Results Data

#### 2021 Delay and Accident Costs

Peak	Delay Costs		Accident Costs			Total Costs	
	Delays Veh.hrs	Costs (\$)	Accident Types	Annual Accidents	Accident Costs	Cost Type	Costs (\$/year)
AM	1452.98	21795	Vehicles Injury	0.00	0	Vehicle Delay Cost	21795
OFF	0.00	0	Vehicles DO	0.00	0	Vehicle Injury Acc Cost	0
PM	0.00	0	Pedestrians	0.00	0	Vehicle DO Acc Cost	0
						Pedestrian Accident Cost	0
						Total Accident Cost	0
Total	1452.98	21795	Totals	0.00	0	TOTAL COST	21795

## Global Results

### Performance and Accidents

#### 2021 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	2657	385	3042
Capacity	veh/hr	6796	1288	8084
Average Delay	sec/veh	6.06	0.00	5.29
L.O.S. (Signal)	A – F	A	A	A
L.O.S. (Unsig)	A – F	A	A	A
Total Delay	veh.hrs	4.47	0.00	4.47



## Scheme Summary

### Control Data

#### Control Data and Model Parameters

Harkrider/Old Morrilton	2021 Synthetic Flow Profile (veh)
PM Volumes	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
PM Peak Hour	Peak 60 min Results
Full Geometry	Output flows: Vehicles
English Units (ft)	50% Confidence Level

#### Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	Yes
Bypass Calibration	No
Global Results	Yes

## Operational Data

### Main Geometry (ft)

#### Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Harkrider St	0	0	20.00	2	24.00	2	164.00	40.00	30.00
2	Wal-Mart Dr	90	0	20.00	2	24.00	2	164.00	90.00	30.00
3	Harkrider St	164	0	20.00	2	24.00	2	164.00	120.00	30.00
4	Old Morrilton Hwy	229	0	20.00	2	28.00	2	164.00	300.00	30.00

#### Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Harkrider St	220.00	34.00	2	24.00	2	24.00	2
2	Wal-Mart Dr	220.00	34.00	2	15.00	1	15.00	1
3	Harkrider St	220.00	34.00	2	24.00	2	24.00	2
4	Old Morrilton Hwy	220.00	34.00	2	15.00	1	15.00	1

#### Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	Harkrider St	0	1.000	0	1.000	20.00	2987	0	24.00	3584	0
2	Wal-Mart Dr	0	1.000	0	1.000	20.00	2987	0	15.00	2240	0
3	Harkrider St	0	1.000	0	1.000	20.00	2987	0	24.00	3584	0
4	Old Morrilton Hwy	0	1.000	0	1.000	20.00	2987	0	15.00	2240	0

## Bypass Geometry

### Bypass Approach Geometry (ft)

Leg	Leg Names	Bypass Type	Bypass Flows	V	nv	Vb	nvb	Vt	nvt
3	Harkrider St	Free	448	20	2	12	1	20	2

### Bypass Entry and Exit Geometry (ft)

Leg	Leg Names	Entry Geometry						Leg	Leg Names	Exit Lanes	
		Eb	neb	Lb	Lt	Rb	Phib			nex	Nmx
3	Harkrider St	12	1	0	130	66.00003 379	30	4	Old Morrilton Hwy	1	2

### Bypass Entry Capacity Modifiers and Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Calibration	
		Capacity + or -	Cross Walk Factor	Intercept + or -	Slope Factor
3	Harkrider St	0	1.000	0	1.000

## Traffic Flow Data (veh/hr)

### 2021 PM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers	
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor
1	Harkrider St	0	315	580	33	0	3.0	1.00
2	Wal-Mart Dr	0	87	111	116	0	2.0	1.00
3	Harkrider St	0	91	346	0	448	3.0	1.00
4	Old Morrilton Hwy	0	422	99	244	0	3.0	1.00

### 2021 PM Peak Synthetic Flow Profile - Timeslice 7.5 mins

Leg	Leg Names	Flow Ratios			Flow Times		
		Ratio 1	Ratio 2	Ratio 3	Time 1	Time 2	Time 3
1	Harkrider St	0.750	1.125	0.750	0	30	60
2	Wal-Mart Dr	0.750	1.125	0.750	0	30	60
3	Harkrider St	0.750	1.125	0.750	0	30	60
4	Old Morrilton Hwy	0.750	1.125	0.750	0	30	60

## Operational Results

### 2021 PM Peak - 60 minutes

#### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Harkrider St	None	928		612		677	1656		0.5603	
2	Wal-Mart Dr	None	314		1317		223	1343		0.2338	
3	Harkrider St	Free	437	448	513	0	1118	1808	1288	0.2418	0.3478
4	Old Morrilton Hwy	None	765		524		874	2092		0.3657	

#### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Harkrider St	None	7.24		7.24	6.20		A		A
2	Wal-Mart Dr	None	5.49		5.49	1.58		A		A
3	Harkrider St	Free	3.20	0.00	1.58	1.22	0.00	A	A	A
4	Old Morrilton Hwy	None	4.72		4.72	3.16		A		A

## 2021 PM Peak - 15 minutes

### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Harkrider St	None	1046		690		763	1612		0.6490	
2	Wal-Mart Dr	None	354		1484		251	1243		0.2849	
3	Harkrider St	Free	493	505	578	0	1260	1769	1288	0.2786	0.3921
4	Old Morrilton Hwy	None	863		591		985	2048		0.4212	

### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Harkrider St	None	8.24		8.24	6.20		A		A
2	Wal-Mart Dr	None	5.99		5.99	1.58		A		A
3	Harkrider St	Free	3.33	0.00	1.64	1.22	0.00	A	A	A
4	Old Morrilton Hwy	None	5.03		5.03	3.16		A		A

## Approach Flow Profile

### 2021 PM Peak - Approach Flows (Veh / Hour)

Time Slice	Harkrider St	Wal-Mart Dr	Harkrider St	Old Morrilton Hwy
0.0 - 7.5	96.51	32.65	92.03	79.55
7.5 - 15.0	112.35	38.02	107.15	92.62
15.0 - 22.5	124.34	42.07	118.58	102.50
22.5 - 30.0	130.80	44.26	124.74	107.83
30.0 - 37.5	130.80	44.26	124.74	107.83
37.5 - 45.0	124.34	42.07	118.58	102.50
45.0 - 52.5	112.35	38.02	107.15	92.62
52.5 - 60.0	96.51	32.65	92.03	79.55
Peak 15 min	130.80	44.26	124.74	107.83
Peak 60 min	116.00	39.25	110.63	95.63

## Exit Flow Profile

### 2021 PM Peak - Exit Flows (Veh / Hour)

Time Slice	Harkrider St	Wal-Mart Dr	Harkrider St	Old Morrilton Hwy
0.0 - 7.5	70.37	23.18	116.17	90.85
7.5 - 15.0	81.89	26.97	135.13	105.72
15.0 - 22.5	90.64	29.85	149.57	117.00
22.5 - 30.0	95.38	31.41	157.43	123.12
30.0 - 37.5	95.42	31.43	157.57	123.18
37.5 - 45.0	90.74	29.89	149.91	117.16
45.0 - 52.5	82.04	27.03	135.60	105.93
52.5 - 60.0	70.48	23.22	116.50	91.00
0-60	677	223	1118	874
%Trucks	2.87	3.00	2.90	2.74



## Economics

### Economic Input Data

#### 2021 - Vehicle Delay Parameters

Peaks	Peak / Day	Days / Year	Delay Cost (\$ / hour)
AM Peak	1	325	15.00
OFF Peak	14	325	15.00
PM Peak	1	325	15.00

#### 2021 - Accident Severity Proportions and Costs

Accident Type	Proportion (%)	Cost (\$)
Fatal Vehicle Accident	0.3	0
Incapacitating Vehicle Accident	17.7	0
Non-incapacitating Vehicle Accident	82	0
Damage Only Vehicle Accident	100	0
Pedestrian Injury Accident	100	0

## Economics - Results Data

#### 2021 Delay and Accident Costs

Peak	Delay Costs		Accident Costs			Total Costs	
	Delays Veh.hrs	Costs (\$)	Accident Types	Annual Accidents	Accident Costs	Cost Type	Costs (\$/year)
AM	0.00	0	Vehicles Injury	0.00	0	Vehicle Delay Cost	18224
OFF	0.00	0	Vehicles DO	0.00	0	Vehicle Injury Acc Cost	0
PM	1214.96	18224	Pedestrians	0.00	0	Vehicle DO Acc Cost	0
						Pedestrian Accident Cost	0
						Total Accident Cost	0
Total	1214.96	18224	Totals	0.00	0	TOTAL COST	18224

## Global Results

### Performance and Accidents

#### 2021 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	2444	448	2892
Capacity	veh/hr	6899	1288	8187
Average Delay	sec/veh	5.51	0.00	4.65
L.O.S. (Signal)	A – F	A	A	A
L.O.S. (Unsig)	A – F	A	A	A
Total Delay	veh.hrs	3.74	0.00	3.74

## Scheme Summary

### Control Data

#### Control Data and Model Parameters

Harkrider/Old Morrilton	2031 Synthetic Flow Profile (veh)
PM Volumes	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
PM Peak Hour	Peak 60 min Results
Full Geometry	Output flows: Vehicles
English Units (ft)	50% Confidence Level

#### Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	Yes
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	Yes
Bypass Calibration	No
Global Results	Yes

## Operational Data

### Main Geometry (ft)

#### Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Harkrider St	0	0	20.00	2	24.00	2	164.00	40.00	30.00
2	Wal-Mart Dr	90	0	20.00	2	24.00	2	164.00	90.00	30.00
3	Harkrider St	164	0	20.00	2	24.00	2	164.00	120.00	30.00
4	Old Morrilton Hwy	229	0	20.00	2	28.00	2	164.00	300.00	30.00

#### Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Harkrider St	220.00	34.00	2	24.00	2	24.00	2
2	Wal-Mart Dr	220.00	34.00	2	15.00	1	15.00	1
3	Harkrider St	220.00	34.00	2	24.00	2	24.00	2
4	Old Morrilton Hwy	220.00	34.00	2	15.00	1	15.00	1

#### Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	Harkrider St	0	1.000	0	1.000	20.00	2987	0	24.00	3584	0
2	Wal-Mart Dr	0	1.000	0	1.000	20.00	2987	0	15.00	2240	0
3	Harkrider St	0	1.000	0	1.000	20.00	2987	0	24.00	3584	0
4	Old Morrilton Hwy	0	1.000	0	1.000	20.00	2987	0	15.00	2240	0

## Bypass Geometry

### Bypass Approach Geometry (ft)

Leg	Leg Names	Bypass Type	Bypass Flows	V	nv	Vb	nvb	Vt	nvt
3	Harkrider St	Free	448	20	2	12	1	20	2

### Bypass Entry and Exit Geometry (ft)

Leg	Leg Names	Entry Geometry						Leg	Leg Names	Exit Lanes	
		Eb	neb	Lb	Lt	Rb	Phib			nex	Nmx
3	Harkrider St	12	1	0	130	66.00002 112	30	4	Old Morrilton Hwy	1	2

### Bypass Entry Capacity Modifiers and Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Calibration	
		Capacity + or -	Cross Walk Factor	Intercept + or -	Slope Factor
3	Harkrider St	0	1.000	0	1.000

## Traffic Flow Data (veh/hr)

### 2031 PM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers	
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor
1	Harkrider St	0	315	580	33	0	3.0	1.16
2	Wal-Mart Dr	0	87	111	116	0	2.0	1.16
3	Harkrider St	0	91	346	0	448	3.0	1.16
4	Old Morrilton Hwy	0	422	99	244	0	3.0	1.16

### 2031 PM Peak Synthetic Flow Profile - Timeslice 7.5 mins

Leg	Leg Names	Flow Ratios			Flow Times		
		Ratio 1	Ratio 2	Ratio 3	Time 1	Time 2	Time 3
1	Harkrider St	0.750	1.125	0.750	0	30	60
2	Wal-Mart Dr	0.750	1.125	0.750	0	30	60
3	Harkrider St	0.750	1.125	0.750	0	30	60
4	Old Morrilton Hwy	0.750	1.125	0.750	0	30	60

## Operational Results

### 2031 PM Peak - 60 minutes

#### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Harkrider St	None	1076		710		785	1601		0.6724	
2	Wal-Mart Dr	None	364		1527		259	1217		0.2994	
3	Harkrider St	Free	507	520	595	0	1297	1759	1288	0.2882	0.4034
4	Old Morrilton Hwy	None	887		608		1014	2037		0.4356	

#### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Harkrider St	None	10.28		10.28	10.67		B		B
2	Wal-Mart Dr	None	6.71		6.71	2.33		A		A
3	Harkrider St	Free	3.50	0.00	1.73	1.56	0.00	A	A	A
4	Old Morrilton Hwy	None	5.46		5.46	4.31		A		A

## 2031 PM Peak - 15 minutes

### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Harkrider St	None	1214		800		885	1550		0.7830	
2	Wal-Mart Dr	None	411		1720		292	1101		0.3731	
3	Harkrider St	Free	572	586	670	0	1461	1715	1288	0.3334	0.4549
4	Old Morrilton Hwy	None	1001		685		1142	1987		0.5037	

### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Harkrider St	None	12.44		12.44	10.67		B		B
2	Wal-Mart Dr	None	7.58		7.58	2.33		A		A
3	Harkrider St	Free	3.68	0.00	1.82	1.56	0.00	A	A	A
4	Old Morrilton Hwy	None	5.94		5.94	4.31		A		A



## Approach Flow Profile

### 2031 PM Peak - Approach Flows (Veh / Hour)

Time Slice	Harkrider St	Wal-Mart Dr	Harkrider St	Old Morrilton Hwy
0.0 - 7.5	96.51	32.65	92.03	79.55
7.5 - 15.0	112.35	38.02	107.15	92.62
15.0 - 22.5	124.34	42.07	118.58	102.50
22.5 - 30.0	130.80	44.26	124.74	107.83
30.0 - 37.5	130.80	44.26	124.74	107.83
37.5 - 45.0	124.34	42.07	118.58	102.50
45.0 - 52.5	112.35	38.02	107.15	92.62
52.5 - 60.0	96.51	32.65	92.03	79.55
Peak 15 min	130.80	44.26	124.74	107.83
Peak 60 min	116.00	39.25	110.63	95.63

## Exit Flow Profile

### 2031 PM Peak - Exit Flows (Veh / Hour)

Time Slice	Harkrider St	Wal-Mart Dr	Harkrider St	Old Morrilton Hwy
0.0 - 7.5	81.62	26.88	134.72	105.37
7.5 - 15.0	94.97	31.27	156.64	122.58
15.0 - 22.5	105.12	34.61	173.32	135.63
22.5 - 30.0	110.62	36.43	182.44	142.73
30.0 - 37.5	110.69	36.46	182.74	142.87
37.5 - 45.0	105.27	34.68	173.99	135.95
45.0 - 52.5	95.19	31.37	157.54	123.00
52.5 - 60.0	81.78	26.95	135.29	105.63
0-60	785	259	1297	1014
%Trucks	2.87	3.00	2.90	2.74

## Economics

### Economic Input Data

#### 2031 - Vehicle Delay Parameters

Peaks	Peak / Day	Days / Year	Delay Cost (\$ / hour)
AM Peak	1	325	15.00
OFF Peak	14	325	15.00
PM Peak	1	325	15.00

#### 2031 - Accident Severity Proportions and Costs

Accident Type	Proportion (%)	Cost (\$)
Fatal Vehicle Accident	0.3	0
Incapacitating Vehicle Accident	17.7	0
Non-incapacitating Vehicle Accident	82	0
Damage Only Vehicle Accident	100	0
Pedestrian Injury Accident	100	0

## Economics - Results Data

#### 2031 Delay and Accident Costs

Peak	Delay Costs		Accident Costs			Total Costs	
	Delays Veh.hrs	Costs (\$)	Accident Types	Annual Accidents	Accident Costs	Cost Type	Costs (\$/year)
AM	0.00	0	Vehicles Injury	0.00	0	Vehicle Delay Cost	27258
OFF	0.00	0	Vehicles DO	0.00	0	Vehicle Injury Acc Cost	0
PM	1817.20	27258	Pedestrians	0.00	0	Vehicle DO Acc Cost	0
						Pedestrian Accident Cost	0
						Total Accident Cost	0
Total	1817.20	27258	Totals	0.00	0	TOTAL COST	27258

## Global Results

### Performance and Accidents

#### 2031 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	2835	520	3355
Capacity	veh/hr	6614	1288	7902
Average Delay	sec/veh	7.10	0.00	6.00
L.O.S. (Signal)	A – F	A	A	A
L.O.S. (Unsig)	A – F	A	A	A
Total Delay	veh.hrs	5.59	0.00	5.59

## Scheme Summary

### Control Data

#### Control Data and Model Parameters

Harkrider/Old Morrilton	2041 Synthetic Flow Profile (veh)
PM Volumes	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
PM Peak Hour	Peak 60 min Results
Full Geometry	Output flows: Vehicles
English Units (ft)	50% Confidence Level

#### Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	Yes
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	Yes
Bypass Calibration	No
Global Results	Yes

## Operational Data

### Main Geometry (ft)

#### Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Harkrider St	0	0	20.00	2	24.00	2	164.00	40.00	30.00
2	Wal-Mart Dr	90	0	20.00	2	24.00	2	164.00	90.00	30.00
3	Harkrider St	164	0	20.00	2	24.00	2	164.00	120.00	30.00
4	Old Morrilton Hwy	229	0	20.00	2	28.00	2	164.00	300.00	30.00

#### Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Harkrider St	220.00	34.00	2	24.00	2	24.00	2
2	Wal-Mart Dr	220.00	34.00	2	15.00	1	15.00	1
3	Harkrider St	220.00	34.00	2	24.00	2	24.00	2
4	Old Morrilton Hwy	220.00	34.00	2	15.00	1	15.00	1

#### Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	Harkrider St	0	1.000	0	1.000	20.00	2987	0	24.00	3584	0
2	Wal-Mart Dr	0	1.000	0	1.000	20.00	2987	0	15.00	2240	0
3	Harkrider St	0	1.000	0	1.000	20.00	2987	0	24.00	3584	0
4	Old Morrilton Hwy	0	1.000	0	1.000	20.00	2987	0	15.00	2240	0

## Bypass Geometry

### Bypass Approach Geometry (ft)

Leg	Leg Names	Bypass Type	Bypass Flows	V	nv	Vb	nvb	Vt	nvt
3	Harkrider St	Free	448	20	2	12	1	20	2

### Bypass Entry and Exit Geometry (ft)

Leg	Leg Names	Entry Geometry						Leg	Leg Names	Exit Lanes	
		Eb	neb	Lb	Lt	Rb	Phib			nex	Nmx
3	Harkrider St	12	1	0	130	66.00002 957	30	4	Old Morrilton Hwy	1	2

### Bypass Entry Capacity Modifiers and Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Calibration	
		Capacity + or -	Cross Walk Factor	Intercept + or -	Slope Factor
3	Harkrider St	0	1.000	0	1.000

## Traffic Flow Data (veh/hr)

### 2041 PM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers	
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor
1	Harkrider St	0	315	580	33	0	3.0	1.35
2	Wal-Mart Dr	0	87	111	116	0	2.0	1.35
3	Harkrider St	0	91	346	0	448	3.0	1.35
4	Old Morrilton Hwy	0	422	99	244	0	3.0	1.35

### 2041 PM Peak Synthetic Flow Profile - Timeslice 7.5 mins

Leg	Leg Names	Flow Ratios			Flow Times		
		Ratio 1	Ratio 2	Ratio 3	Time 1	Time 2	Time 3
1	Harkrider St	0.750	1.125	0.750	0	30	60
2	Wal-Mart Dr	0.750	1.125	0.750	0	30	60
3	Harkrider St	0.750	1.125	0.750	0	30	60
4	Old Morrilton Hwy	0.750	1.125	0.750	0	30	60

## Operational Results

### 2041 PM Peak - 60 minutes

#### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Harkrider St	None	1253		826		914	1536		0.8158	
2	Wal-Mart Dr	None	424		1776		301	1068		0.3971	
3	Harkrider St	Free	590	605	692	0	1508	1702	1288	0.3467	0.4695
4	Old Morrilton Hwy	None	1033		707		1179	1972		0.5236	

#### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Harkrider St	None	21.22		21.22	28.12		C		C
2	Wal-Mart Dr	None	9.14		9.14	3.88		A		A
3	Harkrider St	Free	3.94	0.00	1.95	2.08	0.00	A	A	A
4	Old Morrilton Hwy	None	6.73		6.73	6.31		A		A



## 2041 PM Peak - 15 minutes

### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Harkrider St	None	1413		931		1029	1477		0.9566	
2	Wal-Mart Dr	None	478		1981		338	944		0.5061	
3	Harkrider St	Free	665	682	772	0	1686	1654	1288	0.4021	0.5294
4	Old Morrilton Hwy	None	1165		797		1322	1914		0.6084	

### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Harkrider St	None	28.31		28.31	28.12		D		D
2	Wal-Mart Dr	None	10.75		10.75	3.88		B		B
3	Harkrider St	Free	4.21	0.00	2.08	2.08	0.00	A	A	A
4	Old Morrilton Hwy	None	7.57		7.57	6.31		A		A

## Approach Flow Profile

### 2041 PM Peak - Approach Flows (Veh / Hour)

Time Slice	Harkrider St	Wal-Mart Dr	Harkrider St	Old Morrilton Hwy
0.0 - 7.5	96.51	32.65	92.03	79.55
7.5 - 15.0	112.35	38.02	107.15	92.62
15.0 - 22.5	124.34	42.07	118.58	102.50
22.5 - 30.0	130.80	44.26	124.74	107.83
30.0 - 37.5	130.80	44.26	124.74	107.83
37.5 - 45.0	124.34	42.07	118.58	102.50
45.0 - 52.5	112.35	38.02	107.15	92.62
52.5 - 60.0	96.51	32.65	92.03	79.55
Peak 15 min	130.80	44.26	124.74	107.83
Peak 60 min	116.00	39.25	110.63	95.63

## Exit Flow Profile

### 2041 PM Peak - Exit Flows (Veh / Hour)

Time Slice	Harkrider St	Wal-Mart Dr	Harkrider St	Old Morrilton Hwy
0.0 - 7.5	94.97	31.28	156.71	122.59
7.5 - 15.0	110.32	36.29	181.20	142.12
15.0 - 22.5	122.11	40.13	199.76	156.85
22.5 - 30.0	128.57	42.23	209.88	164.82
30.0 - 37.5	128.79	42.36	211.53	165.66
37.5 - 45.0	122.63	40.44	203.44	158.70
45.0 - 52.5	111.03	36.78	187.26	145.21
52.5 - 60.0	95.23	31.40	158.01	123.23
0-60	914	301	1508	1179
%Trucks	2.87	3.00	2.90	2.74

## Economics

### Economic Input Data

#### 2041 - Vehicle Delay Parameters

Peaks	Peak / Day	Days / Year	Delay Cost (\$ / hour)
AM Peak	1	325	15.00
OFF Peak	14	325	15.00
PM Peak	1	325	15.00

#### 2041 - Accident Severity Proportions and Costs

Accident Type	Proportion (%)	Cost (\$)
Fatal Vehicle Accident	0.3	0
Incapacitating Vehicle Accident	17.7	0
Non-incapacitating Vehicle Accident	82	0
Damage Only Vehicle Accident	100	0
Pedestrian Injury Accident	100	0

## Economics - Results Data

#### 2041 Delay and Accident Costs

Peak	Delay Costs		Accident Costs			Total Costs	
	Delays Veh.hrs	Costs (\$)	Accident Types	Annual Accidents	Accident Costs	Cost Type	Costs (\$/year)
AM	0.00	0	Vehicles Injury	0.00	0	Vehicle Delay Cost	53800
OFF	0.00	0	Vehicles DO	0.00	0	Vehicle Injury Acc Cost	0
PM	3586.65	53800	Pedestrians	0.00	0	Vehicle DO Acc Cost	0
						Pedestrian Accident Cost	0
						Total Accident Cost	0
Total	3586.65	53800	Totals	0.00	0	TOTAL COST	53800

## Global Results

### Performance and Accidents

#### 2041 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	3299	605	3904
Capacity	veh/hr	6278	1288	7566
Average Delay	sec/veh	12.04	0.00	10.18
L.O.S. (Signal)	A – F	B	A	B
L.O.S. (Unsig)	A – F	B	A	B
Total Delay	veh.hrs	11.04	0.00	11.04

# **OLD MORRILTON HWY AT HARKRIDER ST**

Capacity and Queue Analysis Results

## LANE SUMMARY

Site: 101 [Harkrider Rd at Old Morrilton Hwy-AM Peak- 0 year  
(Site Folder: General)]

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)  
Site Category: Roundabout- HCM 6th  
Roundabout

Lane Use and Performance													
	DEMAND FLOWS		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	[ Total veh/h	HV ] %						[ Veh	Dist ] ft				
South: Harkrider Rd													
Lane 1	318	2.8	771	0.412	100	10.0	LOS A	2.1	54.7	Full	1600	0.0	0.0
Lane 2 <sup>d</sup>	351	2.0	851	0.412	100	9.2	LOS A	2.1	54.2	Full	1600	0.0	0.0
Approach	668	2.4		0.412		9.6	LOS A	2.1	54.7				
East: Walmart Dr													
Lane 1 <sup>d</sup>	187	2.5	574	0.326	100	10.9	LOS B	1.3	33.0	Full	1600	0.0	0.0
Lane 2	118	2.0	510	0.232	100	10.3	LOS B	0.8	21.0	Full	1600	0.0	0.0
Approach	305	2.3		0.326		10.7	LOS B	1.3	33.0				
North: Harkrider Rd													
Lane 1	203	2.0	910	0.223	100	6.2	LOS A	0.9	23.7	Full	1600	0.0	0.0
Lane 2 <sup>d</sup>	203	2.0	910	0.223	100	6.2	LOS A	0.9	23.7	Full	1600	0.0	0.0
Lane 3	310	3.0	1535	0.202	100	0.1	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	715	2.4		0.223		3.5	LOS A	0.9	23.7				
NorthWest: Old Morrilton Hwy													
Lane 1	364	3.0	822	0.443	100	10.0	LOS B	2.5	64.2	Full	1600	0.0	0.0
Lane 2 <sup>d</sup>	396	3.0	895	0.443	100	9.4	LOS A	2.5	63.4	Full	1600	0.0	0.0
Approach	760	3.0		0.443		9.7	LOS A	2.5	64.2				
Intersection	2449	2.6		0.443		8.0	LOS A	2.5	64.2				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Geometric Delay is not included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

<sup>d</sup> Dominant lane on roundabout approach

Approach Lane Flows (veh/h)											
South: Harkrider Rd											
Mov.	L1	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. %	Ov. Lane No.
From S To Exit:	NW	N	E								
Lane 1	267	50	-	318	2.8	771	0.412	100	NA	NA	
Lane 2	-	317	34	351	2.0	851	0.412	100	NA	NA	
Approach	267	367	34	668	2.4		0.412				
East: Walmart Dr											
Mov.	L2	R1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. %	Ov. Lane No.
From E To Exit:	S	NW	N								
Lane 1	92	95	-	187	2.5	574	0.326	100	NA	NA	
Lane 2	-	-	118	118	2.0	510	0.232	100	NA	NA	
Approach	92	95	118	305	2.3		0.326				
North: Harkrider Rd											
Mov.	L2	T1	R3	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. %	Ov. Lane No.
From N To Exit:	E	S	NW								
Lane 1	87	116	-	203	2.0	910	0.223	100	NA	NA	
Lane 2	-	203	-	203	2.0	910	0.223	100	NA	NA	
Lane 3	-	-	310	310	3.0	1535	0.202	100	NA	NA	
Approach	87	318	310	715	2.4		0.223				
NorthWest: Old Morrilton Hwy											

Mov.	L3	L1	R1	Total	%HV	Cap.	Deg.	Lane	Prob.	Ov.
From NW	N	E	S			veh/h	Satn	Util.	SL Ov.	Lane
To Exit:							v/c	%	%	No.
Lane 1	364	-	-	364	3.0	822	0.443	100	NA	NA
Lane 2	11	101	284	396	3.0	895	0.443	100	NA	NA
Approach	375	101	284	760	3.0		0.443			
Total %HV Deg.Satn (v/c)										
Intersection	2449	2.6		0.443						

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis											
	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Harkrider Rd											
Merge Type: <b>Not Applied</b>											
Full Length Lane	1		Merge Analysis not applied.								
Full Length Lane	2		Merge Analysis not applied.								
East Exit: Walmart Dr											
Merge Type: <b>Not Applied</b>											
Full Length Lane	1		Merge Analysis not applied.								
Full Length Lane	2		Merge Analysis not applied.								
North Exit: Harkrider Rd											
Merge Type: <b>Not Applied</b>											
Full Length Lane	1		Merge Analysis not applied.								
Full Length Lane	2		Merge Analysis not applied.								
NorthWest Exit: Old Morrilton Hwy											
Merge Type: <b>Not Applied</b>											
Full Length Lane	1		Merge Analysis not applied.								
Full Length Lane	2		Merge Analysis not applied.								

## LANE SUMMARY

Site: 101 [Harkrider Rd at Old Morrilton Hwy-AM Peak- 10 year  
(Site Folder: General)]

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)  
Site Category: Roundabout- HCM 6th  
Roundabout  
Design Life Analysis (Final Year): Results for 10 years

Lane Use and Performance													
	DEMAND FLOWS		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	[ Total veh/h	HV %						[ Veh	Dist ] ft				
South: Harkrider Rd													
Lane 1	364	2.8	712	0.512	100	12.8	LOS B	3.2	82.3	Full	1600	0.0	0.0
Lane 2 <sup>d</sup>	405	2.0	790	0.512	100	11.8	LOS B	3.3	83.4	Full	1600	0.0	0.0
Approach	769	2.4		0.512		12.3	LOS B	3.3	83.4				
East: Walmart Dr													
Lane 1 <sup>d</sup>	215	2.5	503	0.427	100	14.5	LOS B	1.9	48.1	Full	1600	0.0	0.0
Lane 2	136	2.0	442	0.308	100	13.3	LOS B	1.2	29.6	Full	1600	0.0	0.0
Approach	351	2.3		0.427		14.0	LOS B	1.9	48.1				
North: Harkrider Rd													
Lane 1	233	2.0	854	0.273	100	7.2	LOS A	1.2	29.5	Full	1600	0.0	0.0
Lane 2 <sup>d</sup>	233	2.0	854	0.273	100	7.2	LOS A	1.2	29.5	Full	1600	0.0	0.0
Lane 3	356	3.0	1535	0.232	100	0.1	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	823	2.4		0.273		4.1	LOS A	1.2	29.5				
NorthWest: Old Morrilton Hwy													
Lane 1	417	3.0	766	0.544	100	12.9	LOS B	3.9	99.0	Full	1600	0.0	0.0
Lane 2 <sup>d</sup>	457	3.0	839	0.544	100	12.0	LOS B	3.9	100.1	Full	1600	0.0	0.0
Approach	874	3.0		0.544		12.4	LOS B	3.9	100.1				
Intersection	2816	2.6		0.544		10.1	LOS B	3.9	100.1				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Geometric Delay is not included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

<sup>d</sup> Dominant lane on roundabout approach

Approach Lane Flows (veh/h)										
South: Harkrider Rd										
Mov.	L1	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
From S To Exit:	NW	N	E							
Lane 1	308	57	-	364	2.8	712	0.512	100	NA	NA
Lane 2	-	366	39	405	2.0	790	0.512	100	NA	NA
Approach	308	423	39	769	2.4		0.512			
East: Walmart Dr										
Mov.	L2	R1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
From E To Exit:	S	NW	N							
Lane 1	106	109	-	215	2.5	503	0.427	100	NA	NA
Lane 2	-	-	136	136	2.0	442	0.308	100	NA	NA
Approach	106	109	136	351	2.3		0.427			
North: Harkrider Rd										
Mov.	L2	T1	R3	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
From N To Exit:	E	S	NW							
Lane 1	100	133	-	233	2.0	854	0.273	100	NA	NA
Lane 2	-	233	-	233	2.0	854	0.273	100	NA	NA
Lane 3	-	-	356	356	3.0	1535	0.232	100	NA	NA
Approach	100	366	356	823	2.4		0.273			
NorthWest: Old Morrilton Hwy										



Mov.	L3	L1	R1	Total	%HV	Cap.	Deg.	Lane	Prob.	Ov.
From NW	N	E	S			veh/h	Satn	Util.	SL Ov.	Lane
To Exit:							v/c	%	%	No.
Lane 1	417	-	-	417	3.0	766	0.544	100	NA	NA
Lane 2	14	116	326	457	3.0	839	0.544	100	NA	NA
Approach	431	116	326	874	3.0		0.544			
Total %HV Deg.Satn (v/c)										
Intersection	2816	2.6		0.544						

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis											
	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Harkrider Rd											
Merge Type: <b>Not Applied</b>											
Full Length Lane	1		Merge Analysis not applied.								
Full Length Lane	2		Merge Analysis not applied.								
East Exit: Walmart Dr											
Merge Type: <b>Not Applied</b>											
Full Length Lane	1		Merge Analysis not applied.								
Full Length Lane	2		Merge Analysis not applied.								
North Exit: Harkrider Rd											
Merge Type: <b>Not Applied</b>											
Full Length Lane	1		Merge Analysis not applied.								
Full Length Lane	2		Merge Analysis not applied.								
NorthWest Exit: Old Morrilton Hwy											
Merge Type: <b>Not Applied</b>											
Full Length Lane	1		Merge Analysis not applied.								
Full Length Lane	2		Merge Analysis not applied.								

## LANE SUMMARY

Site: 101 [Harkrider Rd at Old Morrilton Hwy-AM Peak- 20 year  
(Site Folder: General)]

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)  
Site Category: Roundabout- HCM 6th  
Roundabout  
Design Life Analysis (Final Year): Results for 20 years

Lane Use and Performance													
	DEMAND FLOWS		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	[ Total veh/h	HV %						[ Veh	Dist ] ft				
South: Harkrider Rd													
Lane 1	410	2.8	657	0.625	100	17.3	LOS B	4.7	119.5	Full	1600	0.0	0.0
Lane 2 <sup>d</sup>	459	2.0	734	0.625	100	15.8	LOS B	4.8	122.8	Full	1600	0.0	0.0
Approach	869	2.4		0.625		16.5	LOS B	4.8	122.8				
East: Walmart Dr													
Lane 1 <sup>d</sup>	243	2.5	441	0.551	100	20.5	LOS C	2.7	68.5	Full	1600	0.0	0.0
Lane 2	154	2.0	383	0.402	100	17.6	LOS B	1.6	41.3	Full	1600	0.0	0.0
Approach	397	2.3		0.551		19.4	LOS B	2.7	68.5				
North: Harkrider Rd													
Lane 1	264	2.0	801	0.329	100	8.3	LOS A	1.4	36.1	Full	1600	0.0	0.0
Lane 2 <sup>d</sup>	264	2.0	801	0.329	100	8.3	LOS A	1.4	36.1	Full	1600	0.0	0.0
Lane 3	403	3.0	1535	0.262	100	0.1	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	930	2.4		0.329		4.8	LOS A	1.4	36.1				
NorthWest: Old Morrilton Hwy													
Lane 1	470	3.0	714	0.658	100	17.5	LOS B	5.7	146.8	Full	1600	0.0	0.0
Lane 2 <sup>d</sup>	518	3.0	787	0.658	100	16.2	LOS B	5.9	150.9	Full	1600	0.0	0.0
Approach	988	3.0		0.658		16.8	LOS B	5.9	150.9				
Intersection	3184	2.6		0.658		13.5	LOS B	5.9	150.9				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Geometric Delay is not included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

<sup>d</sup> Dominant lane on roundabout approach

Approach Lane Flows (veh/h)										
South: Harkrider Rd										
Mov.	L1	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
From S To Exit:	NW	N	E							
Lane 1	348	63	-	410	2.8	657	0.625	100	NA	NA
Lane 2	-	415	44	459	2.0	734	0.625	100	NA	NA
Approach	348	478	44	869	2.4		0.625			
East: Walmart Dr										
Mov.	L2	R1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
From E To Exit:	S	NW	N							
Lane 1	120	123	-	243	2.5	441	0.551	100	NA	NA
Lane 2	-	-	154	154	2.0	383	0.402	100	NA	NA
Approach	120	123	154	397	2.3		0.551			
North: Harkrider Rd										
Mov.	L2	T1	R3	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
From N To Exit:	E	S	NW							
Lane 1	113	150	-	264	2.0	801	0.329	100	NA	NA
Lane 2	-	264	-	264	2.0	801	0.329	100	NA	NA
Lane 3	-	-	403	403	3.0	1535	0.262	100	NA	NA
Approach	113	414	403	930	2.4		0.329			
NorthWest: Old Morrilton Hwy										

Mov.	L3	L1	R1	Total	%HV	Cap.	Deg.	Lane	Prob.	Ov.
From NW	N	E	S			veh/h	Satn	Util.	SL Ov.	Lane
To Exit:							v/c	%	%	No.
Lane 1	470	-	-	470	3.0	714	0.658	100	NA	NA
Lane 2	18	131	369	518	3.0	787	0.658	100	NA	NA
Approach	487	131	369	988	3.0		0.658			
Total %HV Deg.Satn (v/c)										
Intersection	3184	2.6		0.658						

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis											
	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Harkrider Rd											
Merge Type: <b>Not Applied</b>											
Full Length Lane	1		Merge Analysis not applied.								
Full Length Lane	2		Merge Analysis not applied.								
East Exit: Walmart Dr											
Merge Type: <b>Not Applied</b>											
Full Length Lane	1		Merge Analysis not applied.								
Full Length Lane	2		Merge Analysis not applied.								
North Exit: Harkrider Rd											
Merge Type: <b>Not Applied</b>											
Full Length Lane	1		Merge Analysis not applied.								
Full Length Lane	2		Merge Analysis not applied.								
NorthWest Exit: Old Morrilton Hwy											
Merge Type: <b>Not Applied</b>											
Full Length Lane	1		Merge Analysis not applied.								
Full Length Lane	2		Merge Analysis not applied.								

## LANE SUMMARY

**Site: 101 [PM PEAK-Harkrider Rd at Old Morrilton Hwy- 0 year  
(Site Folder: General)]**

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)  
Site Category: Roundabout- HCM 6th  
Roundabout

Lane Use and Performance													
	DEMAND FLOWS		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	[ Total veh/h	HV ] %						[ Veh	Dist ] ft				
South: Harkrider Rd													
Lane 1	478	2.7	700	0.682	100	18.8	LOS B	6.2	157.7	Full	1600	0.0	0.0
Lane 2 <sup>d</sup>	531	2.0	778	0.682	100	17.4	LOS B	6.4	162.8	Full	1600	0.0	0.0
Approach	1009	2.3		0.682		18.1	LOS B	6.4	162.8				
East: Walmart Dr													
Lane 1 <sup>d</sup>	215	2.6	397	0.541	100	22.0	LOS C	2.5	63.4	Full	1600	0.0	0.0
Lane 2	126	2.0	343	0.368	68 <sup>5</sup>	18.3	LOS B	1.4	35.4	Full	1600	0.0	0.0
Approach	341	2.4		0.541		20.6	LOS C	2.5	63.4				
North: Harkrider Rd													
Lane 1	238	2.0	826	0.287	100	7.5	LOS A	1.2	31.0	Full	1600	0.0	0.0
Lane 2 <sup>d</sup>	238	2.0	826	0.287	100	7.5	LOS A	1.2	31.0	Full	1600	0.0	0.0
Lane 3	487	3.0	1535	0.317	100	0.1	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	962	2.5		0.317		3.8	LOS A	1.2	31.0				
NorthWest: Old Morrilton Hwy													
Lane 1	397	3.0	768	0.517	100	12.2	LOS B	3.4	88.2	Full	1600	0.0	0.0
Lane 2 <sup>d</sup>	435	3.0	841	0.517	100	11.3	LOS B	3.5	88.8	Full	1600	0.0	0.0
Approach	832	3.0		0.517		11.7	LOS B	3.5	88.8				
Intersection	3143	2.6		0.682		12.3	LOS B	6.4	162.8				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Geometric Delay is not included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)											
South: Harkrider Rd											
Mov.	L1	T1	R2	Total	%HV						
From S						Cap.	Deg.	Lane	Prob.	Ov.	
To Exit:	NW	N	E			veh/h	v/c	Util.	SL Ov.	Lane	No.
Lane 1	342	135	-	478	2.7	700	0.682	100	NA	NA	
Lane 2	-	495	36	531	2.0	778	0.682	100	NA	NA	
Approach	342	630	36	1009	2.3		0.682				
East: Walmart Dr											
Mov.	L2	R1	R2	Total	%HV						
From E						Cap.	Deg.	Lane	Prob.	Ov.	
To Exit:	S	NW	N			veh/h	v/c	Util.	SL Ov.	Lane	No.
Lane 1	95	121	-	215	2.6	397	0.541	100	NA	NA	
Lane 2	-	-	126	126	2.0	343	0.368	68 <sup>5</sup>	NA	NA	
Approach	95	121	126	341	2.4		0.541				
North: Harkrider Rd											
Mov.	L2	T1	R3	Total	%HV						
From N						Cap.	Deg.	Lane	Prob.	Ov.	
To Exit:	E	S	NW			veh/h	v/c	Util.	SL Ov.	Lane	No.
Lane 1	99	139	-	238	2.0	826	0.287	100	NA	NA	
Lane 2	-	238	-	238	2.0	826	0.287	100	NA	NA	
Lane 3	-	-	487	487	3.0	1535	0.317	100	NA	NA	
Approach	99	376	487	962	2.5		0.317				
NorthWest: Old Morrilton Hwy											

Mov.	L3	L1	R1	Total	%HV	Cap.	Deg.	Lane	Prob.	Ov.
From NW	N	E	S			veh/h	Satn	Util.	SL Ov.	Lane
To Exit:							v/c	%	%	No.
Lane 1	397	-	-	397	3.0	768	0.517	100	NA	NA
Lane 2	62	108	265	435	3.0	841	0.517	100	NA	NA
Approach	459	108	265	832	3.0		0.517			
Total %HV Deg.Satn (v/c)										
Intersection	3143	2.6		0.682						

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

5 Lane under-utilisation found by the program

Merge Analysis											
	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Harkrider Rd											
Merge Type: <b>Not Applied</b>											
	Full Length Lane	1	Merge Analysis not applied.								
	Full Length Lane	2	Merge Analysis not applied.								
East Exit: Walmart Dr											
Merge Type: <b>Not Applied</b>											
	Full Length Lane	1	Merge Analysis not applied.								
	Full Length Lane	2	Merge Analysis not applied.								
North Exit: Harkrider Rd											
Merge Type: <b>Not Applied</b>											
	Full Length Lane	1	Merge Analysis not applied.								
	Full Length Lane	2	Merge Analysis not applied.								
NorthWest Exit: Old Morrilton Hwy											
Merge Type: <b>Not Applied</b>											
	Full Length Lane	1	Merge Analysis not applied.								
	Full Length Lane	2	Merge Analysis not applied.								

## LANE SUMMARY

**Site: 101 [PM PEAK-Harkrider Rd at Old Morrilton Hwy- 10 year  
(Site Folder: General)]**

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)  
Site Category: Roundabout- HCM 6th  
Roundabout  
Design Life Analysis (Final Year): Results for 10 years

Lane Use and Performance													
	DEMAND FLOWS		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	[ Total veh/h	HV %						[ Veh	Dist ] ft				
South: Harkrider Rd													
Lane 1	547	2.7	637	0.859	100	34.7	LOS C	11.6	296.9	Full	1600	0.0	0.0
Lane 2 <sup>d</sup>	613	2.0	713	0.859	100	32.0	LOS C	12.3	313.2	Full	1600	0.0	0.0
Approach	1160	2.3		0.859		33.3	LOS C	12.3	313.2				
East: Walmart Dr													
Lane 1 <sup>d</sup>	248	2.0	331	0.747	100	40.7	LOS D	4.2	106.3	Full	1600	0.0	0.0
Lane 2	145	2.0	280	0.518	69 <sup>5</sup>	28.5	LOS C	2.1	53.6	Full	1600	0.0	0.0
Approach	393	2.0		0.747		36.2	LOS D	4.2	106.3				
North: Harkrider Rd													
Lane 1	273	2.0	765	0.357	100	9.1	LOS A	1.7	42.0	Full	1600	0.0	0.0
Lane 2 <sup>d</sup>	273	2.0	765	0.357	100	9.1	LOS A	1.7	42.0	Full	1600	0.0	0.0
Lane 3	560	3.0	1535	0.365	100	0.1	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	1106	2.5		0.365		4.6	LOS A	1.7	42.0				
NorthWest: Old Morrilton Hwy													
Lane 1	455	3.0	709	0.642	100	16.9	LOS B	5.3	136.7	Full	1600	0.0	0.0
Lane 2 <sup>d</sup>	501	3.0	781	0.642	100	15.7	LOS B	5.5	140.2	Full	1600	0.0	0.0
Approach	956	3.0		0.642		16.3	LOS B	5.5	140.2				
Intersection	3615	2.5		0.859		20.3	LOS C	12.3	313.2				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Geometric Delay is not included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

<sup>5</sup> Lane under-utilisation found by the program

<sup>d</sup> Dominant lane on roundabout approach

Approach Lane Flows (veh/h)											
South: Harkrider Rd											
Mov.	L1	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
From S To Exit:	NW	N	E								
Lane 1	394	154	-	547	2.7	637	0.859	100	NA	NA	
Lane 2	-	571	41	613	2.0	713	0.859	100	NA	NA	
Approach	394	725	41	1160	2.3		0.859				
East: Walmart Dr											
Mov.	L2	R1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
From E To Exit:	S	NW	N								
Lane 1	109	139	-	248	2.0	331	0.747	100	NA	NA	
Lane 2	-	-	145	145	2.0	280	0.518	69 <sup>5</sup>	NA	NA	
Approach	109	139	145	393	2.0		0.747				
North: Harkrider Rd											
Mov.	L2	T1	R3	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
From N To Exit:	E	S	NW								
Lane 1	114	159	-	273	2.0	765	0.357	100	NA	NA	
Lane 2	-	273	-	273	2.0	765	0.357	100	NA	NA	
Lane 3	-	-	560	560	3.0	1535	0.365	100	NA	NA	
Approach	114	432	560	1106	2.5		0.365				

NorthWest: Old Morrilton Hwy											
Mov.	L3	L1	R1	Total	%HV						
From NW						Cap.	Deg.	Lane	Prob.	Ov.	
To Exit:	N	E	S			veh/h	Satn	Util.	SL Ov.	Lane	
							v/c	%	%	No.	
Lane 1	455	-	-	455	3.0	709	0.642	100	NA	NA	
Lane 2	73	124	305	501	3.0	781	0.642	100	NA	NA	
Approach	527	124	305	956	3.0		0.642				
	Total	%HV	Deg.Satn	(v/c)							
Intersection	3615	2.5		0.859							

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

5 Lane under-utilisation found by the program

Merge Analysis											
	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Harkrider Rd											
Merge Type: <b>Not Applied</b>											
	Full Length Lane	1	Merge Analysis not applied.								
	Full Length Lane	2	Merge Analysis not applied.								
East Exit: Walmart Dr											
Merge Type: <b>Not Applied</b>											
	Full Length Lane	1	Merge Analysis not applied.								
	Full Length Lane	2	Merge Analysis not applied.								
North Exit: Harkrider Rd											
Merge Type: <b>Not Applied</b>											
	Full Length Lane	1	Merge Analysis not applied.								
	Full Length Lane	2	Merge Analysis not applied.								
NorthWest Exit: Old Morrilton Hwy											
Merge Type: <b>Not Applied</b>											
	Full Length Lane	1	Merge Analysis not applied.								
	Full Length Lane	2	Merge Analysis not applied.								

## LANE SUMMARY

**Site: 101 [PM PEAK-Harkrider Rd at Old Morrilton Hwy- 20 year  
(Site Folder: General)]**

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)  
Site Category: Roundabout- HCM 6th  
Roundabout  
Design Life Analysis (Final Year): Results for 20 years

Lane Use and Performance													
	DEMAND FLOWS		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	[ Total veh/h	HV %						[ Veh	Dist ] ft				
South: Harkrider Rd													
Lane 1	616	2.7	580	1.063	100	81.7	LOS F <sup>11</sup>	29.5	752.6	Full	1600	0.0	0.0
Lane 2 <sup>d</sup>	695	2.0	654	1.063	100	78.0	LOS F <sup>11</sup>	32.3	820.4	Full	1600	0.0	0.0
Approach	1311	2.3		1.063		79.7	LOS E <sup>11</sup>	32.3	820.4				
East: Walmart Dr													
Lane 1 <sup>d</sup>	280	2.6	289	0.966	100	83.6	LOS E <sup>11</sup>	9.2	234.0	Full	1600	0.0	0.0
Lane 2	164	2.0	243	0.674	100	44.0	LOS D	3.0	77.1	Full	1600	0.0	0.0
Approach	444	2.4		0.966		69.0	LOS E <sup>11</sup>	9.2	234.0				
North: Harkrider Rd													
Lane 1	309	2.0	722	0.427	100	10.8	LOS B	2.3	58.0	Full	1600	0.0	0.0
Lane 2 <sup>d</sup>	309	2.0	722	0.427	100	10.8	LOS B	2.3	58.0	Full	1600	0.0	0.0
Lane 3	633	3.0	1535	0.412	100	0.2	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	1251	2.5		0.427		5.4	LOS A	2.3	58.0				
NorthWest: Old Morrilton Hwy													
Lane 1	513	3.0	654	0.783	100	26.4	LOS C	8.6	219.8	Full	1600	0.0	0.0
Lane 2 <sup>d</sup>	568	3.0	726	0.783	100	24.3	LOS C	9.0	229.3	Full	1600	0.0	0.0
Approach	1081	3.0		0.783		25.3	LOS C	9.0	229.3				
Intersection	4087	2.6		1.063		41.4	LOS D	32.3	820.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Geometric Delay is not included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

<sup>11</sup> Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

<sup>d</sup> Dominant lane on roundabout approach

Approach Lane Flows (veh/h)													
South: Harkrider Rd													
Mov.	L1	T1	R2	Total	%HV								
From S						Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. %	Ov. Lane No.		
To Exit:	NW	N	E										
Lane 1	445	171	-	616	2.7	580	1.063	100	NA	NA			
Lane 2	-	648	47	695	2.0	654	1.063	100	NA	NA			
Approach	445	820	47	1311	2.3		1.063						
East: Walmart Dr													
Mov.	L2	R1	R2	Total	%HV								
From E						Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. %	Ov. Lane No.		
To Exit:	S	NW	N										
Lane 1	123	157	-	280	2.6	289	0.966	100	NA	NA			
Lane 2	-	-	164	164	2.0	243	0.674	100	NA	NA			
Approach	123	157	164	444	2.4		0.966						
North: Harkrider Rd													
Mov.	L2	T1	R3	Total	%HV								
From N						Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. %	Ov. Lane No.		
To Exit:	E	S	NW										
Lane 1	129	180	-	309	2.0	722	0.427	100	NA	NA			
Lane 2	-	309	-	309	2.0	722	0.427	100	NA	NA			
Lane 3	-	-	633	633	3.0	1535	0.412	100	NA	NA			
Approach	129	489	633	1251	2.5		0.427						



NorthWest: Old Morrilton Hwy											
Mov.	L3	L1	R1	Total	%HV	Cap.	Deg.	Lane	Prob.	Ov.	
From NW						veh/h	Satn	Util.	SL	OV.	Lane
To Exit:	N	E	S				v/c	%	%		No.
Lane 1	513	-	-	513	3.0	654	0.783	100	NA	NA	
Lane 2	84	140	345	568	3.0	726	0.783	100	NA	NA	
Approach	596	140	345	1081	3.0		0.783				
Total %HV Deg.Satn (v/c)											
Intersection	4087	2.6		1.063							

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis												
	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane	Opposing Flow Rate % veh/h	pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Harkrider Rd												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											
Full Length Lane	2											
East Exit: Walmart Dr												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											
Full Length Lane	2											
North Exit: Harkrider Rd												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											
Full Length Lane	2											
NorthWest Exit: Old Morrilton Hwy												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											
Full Length Lane	2											

## QUEUE ANALYSIS

Site: 101 [Harkrider Rd at Old Morrilton Hwy-AM Peak- 0 year  
(Site Folder: General)]

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)  
Site Category: Roundabout- HCM 6th  
Roundabout

Lane Queues (Distance)															
Lane Number	Contin. Lane	Deg. Satn	Prog. Factor (Queue)	Overflow Queue (ft)	Back of Queue (ft)		Queue at Start of Green (ft)		Cycle Average Queue (ft)		Queue Storage Ratio		Prob. Block. %	Prob. SL Ov. %	Ov. Lane No.
					Av.	95%	Av.	95%	Av.	95%	Av.	95%			
South: Harkrider Rd															
Lane 1		0.412	1.000	3.1	22.0	54.7	NA	NA	22.5	40.8	0.01	0.03	0.0	NA	NA
Lane 2		0.412	1.000	2.9	21.8	54.2	NA	NA	22.8	41.4	0.01	0.03	0.0	NA	NA
Approach		0.412			22.0	54.7	NA	NA	22.8	41.4	0.01	0.03			
East: Walmart Dr															
Lane 1		0.326	1.000	1.4	13.3	33.0	NA	NA	14.4	26.2	0.01	0.02	0.0	NA	NA
Lane 2		0.232	1.000	0.0	8.4	21.0	NA	NA	8.6	15.7	0.01	0.01	0.0	NA	NA
Approach		0.326			13.3	33.0	NA	NA	14.4	26.2	0.01	0.02			
North: Harkrider Rd															
Lane 1		0.223	1.000	0.0	9.5	23.7	NA	NA	8.9	16.1	0.01	0.01	0.0	NA	NA
Lane 2		0.223	1.000	0.0	9.5	23.7	NA	NA	8.9	16.1	0.01	0.01	0.0	NA	NA
Lane 3	Y	0.202	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	0.0	NA	NA
Approach		0.223			9.5	23.7	NA	NA	8.9	16.1	0.01	0.01			
NorthWest: Old Morrilton Hwy															
Lane 1		0.443	1.000	4.1	25.8	64.2	NA	NA	25.9	47.0	0.02	0.04	0.0	NA	NA
Lane 2		0.443	1.000	3.8	25.5	63.4	NA	NA	26.5	48.0	0.02	0.04	0.0	NA	NA
Approach		0.443			25.8	64.2	NA	NA	26.5	48.0	0.02	0.04			
Intersection		0.443			25.8	64.2	NA	NA	26.5	48.0	0.02	0.04			

Queue Model: HCM Queue Formula.  
Gap-Acceptance Capacity: Traditional M1.

Lane Queues (Vehicles)															
Lane Number	Contin. Lane	Deg. Satn	Prog. Factor (Queue)	Overflow Queue (veh)	Back of Queue (veh)		Queue at Start of Green (veh)		Cycle Average Queue (veh)		Queue Storage Ratio		Prob. Block. %	Prob. SL Ov. %	Ov. Lane No.
					Av.	95%	Av.	95%	Av.	95%	Av.	95%			
South: Harkrider Rd															
Lane 1		0.412	1.000	0.1	0.9	2.1	NA	NA	0.9	1.6	0.01	0.03	0.0	NA	NA
Lane 2		0.412	1.000	0.1	0.9	2.1	NA	NA	0.9	1.6	0.01	0.03	0.0	NA	NA
Approach		0.412			0.9	2.1	NA	NA	0.9	1.6	0.01	0.03			
East: Walmart Dr															
Lane 1		0.326	1.000	0.1	0.5	1.3	NA	NA	0.6	1.0	0.01	0.02	0.0	NA	NA
Lane 2		0.232	1.000	0.0	0.3	0.8	NA	NA	0.3	0.6	0.01	0.01	0.0	NA	NA
Approach		0.326			0.5	1.3	NA	NA	0.6	1.0	0.01	0.02			
North: Harkrider Rd															
Lane 1		0.223	1.000	0.0	0.4	0.9	NA	NA	0.3	0.6	0.01	0.01	0.0	NA	NA
Lane 2		0.223	1.000	0.0	0.4	0.9	NA	NA	0.3	0.6	0.01	0.01	0.0	NA	NA
Lane 3	Y	0.202	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	0.0	NA	NA
Approach		0.223			0.4	0.9	NA	NA	0.3	0.6	0.01	0.01			
NorthWest: Old Morrilton Hwy															
Lane 1		0.443	1.000	0.2	1.0	2.5	NA	NA	1.0	1.8	0.02	0.04	0.0	NA	NA
Lane 2		0.443	1.000	0.1	1.0	2.5	NA	NA	1.0	1.9	0.02	0.04	0.0	NA	NA
Approach		0.443			1.0	2.5	NA	NA	1.0	1.9	0.02	0.04			
Intersection		0.443			1.0	2.5	NA	NA	1.0	1.9	0.02	0.04			

Queue Model: HCM Queue Formula.  
Gap-Acceptance Capacity: Traditional M1.

Continuous Lane Performance												
Lane Number	Deg. Satn	Unint. Speed	Unint. Travel Delay	Hdwy Spacing	Aver. Vehicle Length	Occup. Time	Space Time	Space Occup. Ratio	Time Occup. Ratio	Density	LOS (Density Method)	

	v/c	mph	sec	sec	ft	ft	sec	sec	%	%	veh/mi	pc/mi	
South: Harkrider Rd													
This approach does not have any continuous lanes													
East: Walmart Dr													
This approach does not have any continuous lanes													
North: Harkrider Rd													
Lane 3	0.202	39.9	0.1	11.62	680.3	17.6	0.69	10.93	2.6	6.0	7.8	7.9	LOSA
NorthWest: Old Morrilton Hwy													
This approach does not have any continuous lanes													

Midblock Effective Detection Zone Length = 7 ft

# QUEUE ANALYSIS

Site: 101 [Harkrider Rd at Old Morrilton Hwy-AM Peak- 10 year  
(Site Folder: General)]

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)  
Site Category: Roundabout- HCM 6th  
Roundabout  
Design Life Analysis (Final Year): Results for 10 years

Lane Queues (Distance)															
Lane Number	Contn. Lane	Deg. Satn v/c	Prog. Factor (Queue)	Overflow Queue (ft)	Back of Queue (ft)		Queue at Start of Green (ft)		Cycle Average Queue (ft)		Queue Storage Ratio		Prob. Block. %	Prob. SL Ov. %	Ov. Lane No.
					Av.	95%	Av.	95%	Av.	95%	Av.	95%			
South: Harkrider Rd															
Lane 1		0.512	1.000	8.6	33.1	82.3	NA	NA	33.1	60.1	0.02	0.05	0.0	NA	NA
Lane 2		0.512	1.000	8.5	33.6	83.4	NA	NA	33.7	61.0	0.02	0.05	0.0	NA	NA
Approach		0.512			33.6	83.4	NA	NA	33.7	61.0	0.02	0.05			
East: Walmart Dr															
Lane 1		0.427	1.000	4.3	19.3	48.1	NA	NA	22.1	40.1	0.01	0.03	0.0	NA	NA
Lane 2		0.308	1.000	1.3	11.9	29.6	NA	NA	12.8	23.1	0.01	0.02	0.0	NA	NA
Approach		0.427			19.3	48.1	NA	NA	22.1	40.1	0.01	0.03			
North: Harkrider Rd															
Lane 1		0.273	1.000	0.0	11.9	29.5	NA	NA	11.8	21.4	0.01	0.02	0.0	NA	NA
Lane 2		0.273	1.000	0.0	11.9	29.5	NA	NA	11.8	21.4	0.01	0.02	0.0	NA	NA
Lane 3	Y	0.232	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	0.0	NA	NA
Approach		0.273			11.9	29.5	NA	NA	11.8	21.4	0.01	0.02			
NorthWest: Old Morrilton Hwy															
Lane 1		0.544	1.000	10.9	39.8	99.0	NA	NA	38.2	69.3	0.02	0.06	0.0	NA	NA
Lane 2		0.544	1.000	11.0	40.3	100.1	NA	NA	39.1	70.8	0.03	0.06	0.0	NA	NA
Approach		0.544			40.3	100.1	NA	NA	39.1	70.8	0.03	0.06			
Intersection		0.544			40.3	100.1	NA	NA	39.1	70.8	0.03	0.06			

Queue Model: HCM Queue Formula.  
Gap-Acceptance Capacity: Traditional M1.

Lane Queues (Vehicles)															
Lane Number	Contn. Lane	Deg. Satn v/c	Prog. Factor (Queue)	Overflow Queue (veh)	Back of Queue (veh)		Queue at Start of Green (veh)		Cycle Average Queue (veh)		Queue Storage Ratio		Prob. Block. %	Prob. SL Ov. %	Ov. Lane No.
					Av.	95%	Av.	95%	Av.	95%	Av.	95%			
South: Harkrider Rd															
Lane 1		0.512	1.000	0.3	1.3	3.2	NA	NA	1.3	2.3	0.02	0.05	0.0	NA	NA
Lane 2		0.512	1.000	0.3	1.3	3.3	NA	NA	1.3	2.4	0.02	0.05	0.0	NA	NA
Approach		0.512			1.3	3.3	NA	NA	1.3	2.4	0.02	0.05			
East: Walmart Dr															
Lane 1		0.427	1.000	0.2	0.8	1.9	NA	NA	0.9	1.6	0.01	0.03	0.0	NA	NA
Lane 2		0.308	1.000	0.0	0.5	1.2	NA	NA	0.5	0.9	0.01	0.02	0.0	NA	NA
Approach		0.427			0.8	1.9	NA	NA	0.9	1.6	0.01	0.03			
North: Harkrider Rd															
Lane 1		0.273	1.000	0.0	0.5	1.2	NA	NA	0.5	0.8	0.01	0.02	0.0	NA	NA
Lane 2		0.273	1.000	0.0	0.5	1.2	NA	NA	0.5	0.8	0.01	0.02	0.0	NA	NA
Lane 3	Y	0.232	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	0.0	NA	NA
Approach		0.273			0.5	1.2	NA	NA	0.5	0.8	0.01	0.02			
NorthWest: Old Morrilton Hwy															
Lane 1		0.544	1.000	0.4	1.6	3.9	NA	NA	1.5	2.7	0.02	0.06	0.0	NA	NA
Lane 2		0.544	1.000	0.4	1.6	3.9	NA	NA	1.5	2.8	0.03	0.06	0.0	NA	NA
Approach		0.544			1.6	3.9	NA	NA	1.5	2.8	0.03	0.06			
Intersection		0.544			1.6	3.9	NA	NA	1.5	2.8	0.03	0.06			

Queue Model: HCM Queue Formula.  
Gap-Acceptance Capacity: Traditional M1.

Continuous Lane Performance												
Lane Number	Deg. Satn	Unint. Speed	Unint. Travel	Hdwy Spacing	Aver. Vehicle	Occup. Time	Space Time	Space Occup.	Time Occup.	Density	LOS (Density)	

	v/c	mph	Delay sec	sec	Length ft	ft	sec	sec	Ratio %	Ratio %	veh/mi	pc/mi	Method)
South: Harkrider Rd													
This approach does not have any continuous lanes													
East: Walmart Dr													
This approach does not have any continuous lanes													
North: Harkrider Rd													
Lane 3	0.232	39.9	0.1	10.11	591.3	17.6	0.69	9.41	3.0	6.9	8.9	9.1	LOSA
NorthWest: Old Morrilton Hwy													
This approach does not have any continuous lanes													

Midblock Effective Detection Zone Length = 7 ft

# QUEUE ANALYSIS

Site: 101 [Harkrider Rd at Old Morrilton Hwy-AM Peak- 20 year  
(Site Folder: General)]

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)  
Site Category: Roundabout- HCM 6th  
Roundabout  
Design Life Analysis (Final Year): Results for 20 years

Lane Queues (Distance)															
Lane Number	Contn. Lane	Deg. Satn	Prog. Factor (Queue)	Overflow Queue (ft)	Back of Queue (ft)		Queue at Start of Green (ft)		Cycle Average Queue (ft)		Queue Storage Ratio		Prob. Block. %	Prob. SL Ov. %	Ov. Lane No.
					Av.	95%	Av.	95%	Av.	95%	Av.	95%			
South: Harkrider Rd															
Lane 1		0.625	1.000	16.4	48.1	119.5	NA	NA	50.4	91.4	0.03	0.07	0.0	NA	NA
Lane 2		0.625	1.000	16.7	49.4	122.8	NA	NA	51.2	92.9	0.03	0.08	0.0	NA	NA
Approach		0.625			49.4	122.8	NA	NA	51.2	92.9	0.03	0.08			
East: Walmart Dr															
Lane 1		0.551	1.000	8.7	27.6	68.5	NA	NA	35.3	64.1	0.02	0.04	0.0	NA	NA
Lane 2		0.402	1.000	3.4	16.6	41.3	NA	NA	19.1	34.7	0.01	0.03	0.0	NA	NA
Approach		0.551			27.6	68.5	NA	NA	35.3	64.1	0.02	0.04			
North: Harkrider Rd															
Lane 1		0.329	1.000	0.0	14.5	36.1	NA	NA	15.5	28.1	0.01	0.02	0.0	NA	NA
Lane 2		0.329	1.000	0.0	14.5	36.1	NA	NA	15.5	28.1	0.01	0.02	0.0	NA	NA
Lane 3	Y	0.262	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	0.0	NA	NA
Approach		0.329			14.5	36.1	NA	NA	15.5	28.1	0.01	0.02			
NorthWest: Old Morrilton Hwy															
Lane 1		0.658	1.000	21.0	59.0	146.8	NA	NA	58.5	106.1	0.04	0.09	0.0	NA	NA
Lane 2		0.658	1.000	21.5	60.7	150.9	NA	NA	59.8	108.4	0.04	0.09	0.0	NA	NA
Approach		0.658			60.7	150.9	NA	NA	59.8	108.4	0.04	0.09			
Intersection		0.658			60.7	150.9	NA	NA	59.8	108.4	0.04	0.09			

Queue Model: HCM Queue Formula.  
Gap-Acceptance Capacity: Traditional M1.

Lane Queues (Vehicles)															
Lane Number	Contn. Lane	Deg. Satn	Prog. Factor (Queue)	Overflow Queue (veh)	Back of Queue (veh)		Queue at Start of Green (veh)		Cycle Average Queue (veh)		Queue Storage Ratio		Prob. Block. %	Prob. SL Ov. %	Ov. Lane No.
					Av.	95%	Av.	95%	Av.	95%	Av.	95%			
South: Harkrider Rd															
Lane 1		0.625	1.000	0.6	1.9	4.7	NA	NA	2.0	3.6	0.03	0.07	0.0	NA	NA
Lane 2		0.625	1.000	0.7	1.9	4.8	NA	NA	2.0	3.7	0.03	0.08	0.0	NA	NA
Approach		0.625			1.9	4.8	NA	NA	2.0	3.7	0.03	0.08			
East: Walmart Dr															
Lane 1		0.551	1.000	0.3	1.1	2.7	NA	NA	1.4	2.5	0.02	0.04	0.0	NA	NA
Lane 2		0.402	1.000	0.1	0.7	1.6	NA	NA	0.8	1.4	0.01	0.03	0.0	NA	NA
Approach		0.551			1.1	2.7	NA	NA	1.4	2.5	0.02	0.04			
North: Harkrider Rd															
Lane 1		0.329	1.000	0.0	0.6	1.4	NA	NA	0.6	1.1	0.01	0.02	0.0	NA	NA
Lane 2		0.329	1.000	0.0	0.6	1.4	NA	NA	0.6	1.1	0.01	0.02	0.0	NA	NA
Lane 3	Y	0.262	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	0.0	NA	NA
Approach		0.329			0.6	1.4	NA	NA	0.6	1.1	0.01	0.02			
NorthWest: Old Morrilton Hwy															
Lane 1		0.658	1.000	0.8	2.3	5.7	NA	NA	2.3	4.1	0.04	0.09	0.0	NA	NA
Lane 2		0.658	1.000	0.8	2.4	5.9	NA	NA	2.3	4.2	0.04	0.09	0.0	NA	NA
Approach		0.658			2.4	5.9	NA	NA	2.3	4.2	0.04	0.09			
Intersection		0.658			2.4	5.9	NA	NA	2.3	4.2	0.04	0.09			

Queue Model: HCM Queue Formula.  
Gap-Acceptance Capacity: Traditional M1.

Continuous Lane Performance											
Lane Number	Deg. Satn	Unint. Speed	Unint. Travel	Hdwy Spacing	Aver. Vehicle	Occup. Time	Space Time	Space Occup.	Time Occup.	Density	LOS (Density)

	v/c	mph	Delay sec	sec	Length ft	ft	sec	sec	Ratio %	Ratio %	veh/mi	pc/mi	Method)
South: Harkrider Rd													
This approach does not have any continuous lanes													
East: Walmart Dr													
This approach does not have any continuous lanes													
North: Harkrider Rd													
Lane 3	0.262	39.9	0.1	8.94	522.9	17.6	0.69	8.25	3.4	7.8	10.1	10.3	LOSA
NorthWest: Old Morrilton Hwy													
This approach does not have any continuous lanes													

Midblock Effective Detection Zone Length = 7 ft

## QUEUE ANALYSIS

Site: 101 [PM PEAK-Harkrider Rd at Old Morrilton Hwy- 0 year  
(Site Folder: General)]

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)  
Site Category: Roundabout- HCM 6th  
Roundabout

Lane Queues (Distance)															
Lane Number	Contin. Lane	Deg. Satn	Prog. Factor (Queue)	Overflow Queue (ft)	Back of Queue (ft)		Queue at Start of Green (ft)		Cycle Average Queue (ft)		Queue Storage Ratio		Prob. Block. %	Prob. SL Ov. %	Ov. Lane No.
					Av.	95%	Av.	95%	Av.	95%	Av.	95%			
South: Harkrider Rd															
Lane 1		0.682	1.000	23.5	63.4	157.7	NA	NA	63.9	115.9	0.04	0.10	0.0	NA	NA
Lane 2		0.682	1.000	24.0	65.5	162.8	NA	NA	65.0	117.9	0.04	0.10	0.0	NA	NA
Approach		0.682			65.5	162.8	NA	NA	65.0	117.9	0.04	0.10			
East: Walmart Dr															
Lane 1		0.541	1.000	7.9	25.5	63.4	NA	NA	33.5	60.7	0.02	0.04	0.0	NA	NA
Lane 2		0.368	1.000	2.6	14.2	35.4	NA	NA	16.3	29.6	0.01	0.02	0.0	NA	NA
Approach		0.541			25.5	63.4	NA	NA	33.5	60.7	0.02	0.04			
North: Harkrider Rd															
Lane 1		0.287	1.000	0.0	12.5	31.0	NA	NA	12.6	22.9	0.01	0.02	0.0	NA	NA
Lane 2		0.287	1.000	0.0	12.5	31.0	NA	NA	12.6	22.9	0.01	0.02	0.0	NA	NA
Lane 3	Y	0.317	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	0.0	NA	NA
Approach		0.317			12.5	31.0	NA	NA	12.6	22.9	0.01	0.02			
NorthWest: Old Morrilton Hwy															
Lane 1		0.517	1.000	8.9	35.5	88.2	NA	NA	34.3	62.3	0.02	0.06	0.0	NA	NA
Lane 2		0.517	1.000	8.9	35.7	88.8	NA	NA	35.1	63.6	0.02	0.06	0.0	NA	NA
Approach		0.517			35.7	88.8	NA	NA	35.1	63.6	0.02	0.06			
Intersection		0.682			65.5	162.8	NA	NA	65.0	117.9	0.04	0.10			

Queue Model: HCM Queue Formula.  
Gap-Acceptance Capacity: Traditional M1.

Lane Queues (Vehicles)															
Lane Number	Contin. Lane	Deg. Satn	Prog. Factor (Queue)	Overflow Queue (veh)	Back of Queue (veh)		Queue at Start of Green (veh)		Cycle Average Queue (veh)		Queue Storage Ratio		Prob. Block. %	Prob. SL Ov. %	Ov. Lane No.
					Av.	95%	Av.	95%	Av.	95%	Av.	95%			
South: Harkrider Rd															
Lane 1		0.682	1.000	0.9	2.5	6.2	NA	NA	2.5	4.5	0.04	0.10	0.0	NA	NA
Lane 2		0.682	1.000	0.9	2.6	6.4	NA	NA	2.6	4.6	0.04	0.10	0.0	NA	NA
Approach		0.682			2.6	6.4	NA	NA	2.6	4.6	0.04	0.10			
East: Walmart Dr															
Lane 1		0.541	1.000	0.3	1.0	2.5	NA	NA	1.3	2.4	0.02	0.04	0.0	NA	NA
Lane 2		0.368	1.000	0.1	0.6	1.4	NA	NA	0.6	1.2	0.01	0.02	0.0	NA	NA
Approach		0.541			1.0	2.5	NA	NA	1.3	2.4	0.02	0.04			
North: Harkrider Rd															
Lane 1		0.287	1.000	0.0	0.5	1.2	NA	NA	0.5	0.9	0.01	0.02	0.0	NA	NA
Lane 2		0.287	1.000	0.0	0.5	1.2	NA	NA	0.5	0.9	0.01	0.02	0.0	NA	NA
Lane 3	Y	0.317	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	0.0	NA	NA
Approach		0.317			0.5	1.2	NA	NA	0.5	0.9	0.01	0.02			
NorthWest: Old Morrilton Hwy															
Lane 1		0.517	1.000	0.3	1.4	3.4	NA	NA	1.3	2.4	0.02	0.06	0.0	NA	NA
Lane 2		0.517	1.000	0.3	1.4	3.5	NA	NA	1.4	2.5	0.02	0.06	0.0	NA	NA
Approach		0.517			1.4	3.5	NA	NA	1.4	2.5	0.02	0.06			
Intersection		0.682			2.6	6.4	NA	NA	2.6	4.6	0.04	0.10			

Queue Model: HCM Queue Formula.  
Gap-Acceptance Capacity: Traditional M1.

Continuous Lane Performance												
Lane Number	Deg. Satn	Unint. Speed	Unint. Travel Delay	Hdwy Spacing	Aver. Vehicle Length	Occup. Time	Space Time	Space Occup. Ratio	Time Occup. Ratio	Density	LOS (Density Method)	



	v/c	mph	sec	sec	ft	ft	sec	sec	%	%	veh/mi	pc/mi	
South: Harkrider Rd													
This approach does not have any continuous lanes													
East: Walmart Dr													
This approach does not have any continuous lanes													
North: Harkrider Rd													
Lane 3	0.317	39.8	0.1	7.39	432.0	17.6	0.69	6.70	4.1	9.4	12.2	12.5	LOS B
NorthWest: Old Morrilton Hwy													
This approach does not have any continuous lanes													

Midblock Effective Detection Zone Length = 7 ft

# QUEUE ANALYSIS

Site: 101 [PM PEAK-Harkrider Rd at Old Morrilton Hwy- 10 year  
 (Site Folder: General)]

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)  
 Site Category: Roundabout- HCM 6th  
 Roundabout  
 Design Life Analysis (Final Year): Results for 10 years

Lane Queues (Distance)															
Lane Number	Contn. Lane	Deg. Satn	Prog. Factor (Queue)	Overflow Queue (ft)	Back of Queue (ft)		Queue at Start of Green (ft)		Cycle Average Queue (ft)		Queue Storage Ratio		Prob. Block. %	Prob. SL Ov. %	Ov. Lane No.
					Av.	95%	Av.	95%	Av.	95%	Av.	95%			
South: Harkrider Rd															
Lane 1		0.859	1.000	61.1	119.5	296.9	NA	NA	134.7	244.4	0.07	0.19	0.0	NA	NA
Lane 2		0.859	1.000	63.4	126.0	313.2	NA	NA	138.2	250.8	0.08	0.20	0.0	NA	NA
Approach		0.859			126.0	313.2	NA	NA	138.2	250.8	0.08	0.20			
East: Walmart Dr															
Lane 1		0.747	1.000	20.5	42.8	106.3	NA	NA	71.0	128.8	0.03	0.07	0.0	NA	NA
Lane 2		0.518	1.000	6.4	21.6	53.6	NA	NA	29.1	52.8	0.01	0.03	0.0	NA	NA
Approach		0.747			42.8	106.3	NA	NA	71.0	128.8	0.03	0.07			
North: Harkrider Rd															
Lane 1		0.357	1.000	1.2	16.9	42.0	NA	NA	17.5	31.7	0.01	0.03	0.0	NA	NA
Lane 2		0.357	1.000	1.2	16.9	42.0	NA	NA	17.5	31.7	0.01	0.03	0.0	NA	NA
Lane 3	Y	0.365	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	0.0	NA	NA
Approach		0.365			16.9	42.0	NA	NA	17.5	31.7	0.01	0.03			
NorthWest: Old Morrilton Hwy															
Lane 1		0.642	1.000	19.0	55.0	136.7	NA	NA	54.7	99.3	0.03	0.09	0.0	NA	NA
Lane 2		0.642	1.000	19.4	56.4	140.2	NA	NA	55.9	101.4	0.04	0.09	0.0	NA	NA
Approach		0.642			56.4	140.2	NA	NA	55.9	101.4	0.04	0.09			
Intersection		0.859			126.0	313.2	NA	NA	138.2	250.8	0.08	0.20			

Queue Model: HCM Queue Formula.  
 Gap-Acceptance Capacity: Traditional M1.

Lane Queues (Vehicles)															
Lane Number	Contn. Lane	Deg. Satn	Prog. Factor (Queue)	Overflow Queue (veh)	Back of Queue (veh)		Queue at Start of Green (veh)		Cycle Average Queue (veh)		Queue Storage Ratio		Prob. Block. %	Prob. SL Ov. %	Ov. Lane No.
					Av.	95%	Av.	95%	Av.	95%	Av.	95%			
South: Harkrider Rd															
Lane 1		0.859	1.000	2.4	4.7	11.6	NA	NA	5.3	9.6	0.07	0.19	0.0	NA	NA
Lane 2		0.859	1.000	2.5	5.0	12.3	NA	NA	5.4	9.9	0.08	0.20	0.0	NA	NA
Approach		0.859			5.0	12.3	NA	NA	5.4	9.9	0.08	0.20			
East: Walmart Dr															
Lane 1		0.747	1.000	0.8	1.7	4.2	NA	NA	2.8	5.1	0.03	0.07	0.0	NA	NA
Lane 2		0.518	1.000	0.3	0.8	2.1	NA	NA	1.1	2.1	0.01	0.03	0.0	NA	NA
Approach		0.747			1.7	4.2	NA	NA	2.8	5.1	0.03	0.07			
North: Harkrider Rd															
Lane 1		0.357	1.000	0.0	0.7	1.7	NA	NA	0.7	1.2	0.01	0.03	0.0	NA	NA
Lane 2		0.357	1.000	0.0	0.7	1.7	NA	NA	0.7	1.2	0.01	0.03	0.0	NA	NA
Lane 3	Y	0.365	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	0.0	NA	NA
Approach		0.365			0.7	1.7	NA	NA	0.7	1.2	0.01	0.03			
NorthWest: Old Morrilton Hwy															
Lane 1		0.642	1.000	0.7	2.1	5.3	NA	NA	2.1	3.9	0.03	0.09	0.0	NA	NA
Lane 2		0.642	1.000	0.8	2.2	5.5	NA	NA	2.2	4.0	0.04	0.09	0.0	NA	NA
Approach		0.642			2.2	5.5	NA	NA	2.2	4.0	0.04	0.09			
Intersection		0.859			5.0	12.3	NA	NA	5.4	9.9	0.08	0.20			

Queue Model: HCM Queue Formula.  
 Gap-Acceptance Capacity: Traditional M1.

Continuous Lane Performance											
Lane Number	Deg. Satn	Unint. Speed	Unint. Travel	Hdwy Spacing	Aver. Vehicle	Occup. Time	Space Time	Space Occup.	Time Occup.	Density	LOS (Density)

	v/c	mph	Delay sec	sec	Length ft	ft	sec	sec	Ratio %	Ratio % veh/mi	pc/mi	Method)	
South: Harkrider Rd													
This approach does not have any continuous lanes													
East: Walmart Dr													
This approach does not have any continuous lanes													
North: Harkrider Rd													
Lane 3	0.365	39.8	0.1	6.43	375.3	17.6	0.69	5.73	4.7	10.8	14.1	14.4	LOS B
NorthWest: Old Morrilton Hwy													
This approach does not have any continuous lanes													

Midblock Effective Detection Zone Length = 7 ft

# QUEUE ANALYSIS

Site: 101 [PM PEAK-Harkrider Rd at Old Morrilton Hwy- 20 year  
(Site Folder: General)]

Harkrider Rd (Hwy 65B) at Old Morrilton Hwy (Hwy 64)  
Site Category: Roundabout- HCM 6th  
Roundabout  
Design Life Analysis (Final Year): Results for 20 years

Lane Queues (Distance)															
Lane Number	Contn. Lane	Deg. Satn v/c	Prog. Factor (Queue)	Overflow Queue (ft)	Back of Queue (ft)		Queue at Start of Green (ft)		Cycle Average Queue (ft)		Queue Storage Ratio		Prob. Block. %	Prob. SL Ov. %	Ov. Lane No.
					Av.	95%	Av.	95%	Av.	95%	Av.	95%			
South: Harkrider Rd															
Lane 1		1.063	1.000	224.6	302.8	752.6	NA	NA	357.4	648.4	0.19	0.47	0.0	NA	NA
Lane 2		1.063	1.000	244.9	330.1	820.4	NA	NA	382.2	693.3	0.21	0.51	0.0	NA	NA
Approach		1.063			330.1	820.4	NA	NA	382.2	693.3	0.21	0.51			
East: Walmart Dr															
Lane 1		0.966	1.000	69.3	94.2	234.0	NA	NA	165.7	300.5	0.06	0.15	0.0	NA	NA
Lane 2		0.674	1.000	13.1	31.0	77.1	NA	NA	50.9	92.3	0.02	0.05	0.0	NA	NA
Approach		0.966			94.2	234.0	NA	NA	165.7	300.5	0.06	0.15			
North: Harkrider Rd															
Lane 1		0.427	1.000	4.2	23.3	58.0	NA	NA	23.5	42.6	0.01	0.04	0.0	NA	NA
Lane 2		0.427	1.000	4.2	23.3	58.0	NA	NA	23.5	42.6	0.01	0.04	0.0	NA	NA
Lane 3	Y	0.412	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	0.0	NA	NA
Approach		0.427			23.3	58.0	NA	NA	23.5	42.6	0.01	0.04			
NorthWest: Old Morrilton Hwy															
Lane 1		0.783	1.000	39.5	88.4	219.8	NA	NA	96.0	174.2	0.06	0.14	0.0	NA	NA
Lane 2		0.783	1.000	40.9	92.3	229.3	NA	NA	98.4	178.5	0.06	0.14	0.0	NA	NA
Approach		0.783			92.3	229.3	NA	NA	98.4	178.5	0.06	0.14			
Intersection		1.063			330.1	820.4	NA	NA	382.2	693.3	0.21	0.51			

Queue Model: HCM Queue Formula.  
Gap-Acceptance Capacity: Traditional M1.

Lane Queues (Vehicles)															
Lane Number	Contn. Lane	Deg. Satn v/c	Prog. Factor (Queue)	Overflow Queue (veh)	Back of Queue (veh)		Queue at Start of Green (veh)		Cycle Average Queue (veh)		Queue Storage Ratio		Prob. Block. %	Prob. SL Ov. %	Ov. Lane No.
					Av.	95%	Av.	95%	Av.	95%	Av.	95%			
South: Harkrider Rd															
Lane 1		1.063	1.000	8.8	11.9	29.5	NA	NA	14.0	25.4	0.19	0.47	0.0	NA	NA
Lane 2		1.063	1.000	9.6	13.0	32.3	NA	NA	15.0	27.3	0.21	0.51	0.0	NA	NA
Approach		1.063			13.0	32.3	NA	NA	15.0	27.3	0.21	0.51			
East: Walmart Dr															
Lane 1		0.966	1.000	2.7	3.7	9.2	NA	NA	6.5	11.8	0.06	0.15	0.0	NA	NA
Lane 2		0.674	1.000	0.5	1.2	3.0	NA	NA	2.0	3.6	0.02	0.05	0.0	NA	NA
Approach		0.966			3.7	9.2	NA	NA	6.5	11.8	0.06	0.15			
North: Harkrider Rd															
Lane 1		0.427	1.000	0.2	0.9	2.3	NA	NA	0.9	1.7	0.01	0.04	0.0	NA	NA
Lane 2		0.427	1.000	0.2	0.9	2.3	NA	NA	0.9	1.7	0.01	0.04	0.0	NA	NA
Lane 3	Y	0.412	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	0.0	NA	NA
Approach		0.427			0.9	2.3	NA	NA	0.9	1.7	0.01	0.04			
NorthWest: Old Morrilton Hwy															
Lane 1		0.783	1.000	1.5	3.5	8.6	NA	NA	3.8	6.8	0.06	0.14	0.0	NA	NA
Lane 2		0.783	1.000	1.6	3.6	9.0	NA	NA	3.8	7.0	0.06	0.14	0.0	NA	NA
Approach		0.783			3.6	9.0	NA	NA	3.8	7.0	0.06	0.14			
Intersection		1.063			13.0	32.3	NA	NA	15.0	27.3	0.21	0.51			

Queue Model: HCM Queue Formula.  
Gap-Acceptance Capacity: Traditional M1.

Continuous Lane Performance											
Lane Number	Deg. Satn	Unint. Speed	Unint. Travel	Hdwy Spacing	Aver. Vehicle	Occup. Time	Space Time	Space Occup.	Time Occup.	Density	LOS (Density)

	v/c	mph	Delay sec	sec	Length ft	ft	sec	sec	Ratio %	Ratio % veh/mi	pc/mi	Method)	
South: Harkrider Rd													
This approach does not have any continuous lanes													
East: Walmart Dr													
This approach does not have any continuous lanes													
North: Harkrider Rd													
Lane 3	0.412	39.8	0.2	5.69	331.6	17.6	0.70	4.99	5.3	12.2	15.9	16.3	LOS B
NorthWest: Old Morrilton Hwy													
This approach does not have any continuous lanes													

Midblock Effective Detection Zone Length = 7 ft































# **OLD MORRILTON HWY AT DONAGHEY AVE**

Synchro Analysis Results

# HCM 6th Signalized Intersection Summary

3:

06/16/2020

























												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	71	328	25	60	312	219	57	71	107	237	83	54
Future Volume (veh/h)	71	328	25	60	312	219	57	71	107	237	83	54
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	77	357	0	65	339	0	62	77	0	258	90	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	372	518		357	518		584	544		595	544	
Arrive On Green	0.08	0.28	0.00	0.08	0.28	0.00	0.08	0.29	0.00	0.08	0.29	0.00
Sat Flow, veh/h	1795	1870	1585	1781	1870	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	77	357	0	65	339	0	62	77	0	258	90	0
Grp Sat Flow(s),veh/h/ln	1795	1870	1585	1781	1870	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	1.9	11.1	0.0	1.6	10.4	0.0	1.5	2.0	0.0	5.1	2.3	0.0
Cycle Q Clear(g_c), s	1.9	11.1	0.0	1.6	10.4	0.0	1.5	2.0	0.0	5.1	2.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	372	518		357	518		584	544		595	544	
V/C Ratio(X)	0.21	0.69		0.18	0.65		0.11	0.14		0.43	0.17	
Avail Cap(c_a), veh/h	372	518		357	518		584	544		595	544	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	15.1	21.0	0.0	15.1	20.8	0.0	13.4	17.0	0.0	15.6	17.2	0.0
Incr Delay (d2), s/veh	1.3	7.3	0.0	1.1	6.3	0.0	0.4	0.5	0.0	2.3	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	5.5	0.0	0.7	5.1	0.0	0.6	0.9	0.0	3.1	1.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.3	28.3	0.0	16.2	27.1	0.0	13.8	17.6	0.0	17.9	17.8	0.0
LnGrp LOS	B	C		B	C		B	B		B	B	
Approach Vol, veh/h		434	A		404	A		139	A		348	A
Approach Delay, s/veh		26.2			25.3			15.9			17.9	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.6	23.4	9.5	22.5	9.6	23.4	9.5	22.5				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.1	18.9	5.0	18.0	5.1	18.9	5.0	18.0				
Max Q Clear Time (g_c+I1), s	7.1	4.0	3.6	13.1	3.5	4.3	3.9	12.4				
Green Ext Time (p_c), s	0.0	0.2	0.0	0.9	0.0	0.3	0.0	0.9				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay	22.7											
HCM 6th LOS	C											
<b>Notes</b>												
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.												



# HCM 6th Signalized Intersection Summary

3:

























06/28/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	71	328	25	60	312	219	57	71	107	237	83	54
Future Volume (veh/h)	71	328	25	60	312	219	57	71	107	237	83	54
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	90	414	0	76	393	0	72	90	0	299	105	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	332	518		317	518		571	532		586	544	
Arrive On Green	0.08	0.28	0.00	0.08	0.28	0.00	0.08	0.28	0.00	0.08	0.29	0.00
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	90	414	0	76	393	0	72	90	0	299	105	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	2.2	13.4	0.0	1.9	12.5	0.0	1.7	2.4	0.0	5.5	2.7	0.0
Cycle Q Clear(g_c), s	2.2	13.4	0.0	1.9	12.5	0.0	1.7	2.4	0.0	5.5	2.7	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	332	518		317	518		571	532		586	544	
V/C Ratio(X)	0.27	0.80		0.24	0.76		0.13	0.17		0.51	0.19	
Avail Cap(c_a), veh/h	332	518		317	518		571	532		586	544	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	15.6	21.8	0.0	15.7	21.5	0.0	13.8	17.5	0.0	16.4	17.3	0.0
Incr Delay (d2), s/veh	2.0	12.2	0.0	1.8	10.0	0.0	0.5	0.7	0.0	3.2	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	7.2	0.0	0.9	6.5	0.0	0.7	1.0	0.0	3.8	1.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.6	34.0	0.0	17.4	31.5	0.0	14.2	18.2	0.0	19.5	18.1	0.0
LnGrp LOS	B	C		B	C		B	B		B	B	
Approach Vol, veh/h		504	A		469	A		162	A		404	A
Approach Delay, s/veh		31.1			29.2			16.4			19.2	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	23.0	9.5	22.5	9.6	23.4	9.5	22.5				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.5	18.5	5.0	18.0	5.1	18.9	5.0	18.0				
Max Q Clear Time (g_c+I1), s	7.5	4.4	3.9	15.4	3.7	4.7	4.2	14.5				
Green Ext Time (p_c), s	0.0	0.3	0.0	0.7	0.0	0.4	0.0	0.8				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			25.8									
HCM 6th LOS			C									
<b>Notes</b>												
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

# HCM 6th Signalized Intersection Summary

## 3: Donaghey & Old Morrilton

02/10/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	71	328	25	60	312	219	57	71	107	237	83	54
Future Volume (veh/h)	71	328	25	60	312	219	57	71	107	237	83	54
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	104	481	0	88	458	0	84	104	0	348	122	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	289	548		274	548		559	534		583	572	
Arrive On Green	0.07	0.29	0.00	0.07	0.29	0.00	0.07	0.29	0.00	0.09	0.31	0.00
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	104	481	0	88	458	0	84	104	0	348	122	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	2.8	17.1	0.0	2.3	16.1	0.0	2.2	2.9	0.0	6.5	3.4	0.0
Cycle Q Clear(g_c), s	2.8	17.1	0.0	2.3	16.1	0.0	2.2	2.9	0.0	6.5	3.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	289	548		274	548		559	534		583	572	
V/C Ratio(X)	0.36	0.88		0.32	0.84		0.15	0.19		0.60	0.21	
Avail Cap(c_a), veh/h	289	548		274	548		559	534		583	572	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	17.1	23.6	0.0	17.2	23.2	0.0	15.1	18.9	0.0	18.1	18.0	0.0
Incr Delay (d2), s/veh	3.4	17.9	0.0	3.1	14.1	0.0	0.6	0.8	0.0	4.5	0.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	9.7	0.0	1.1	8.7	0.0	0.9	1.3	0.0	2.0	1.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.5	41.4	0.0	20.3	37.3	0.0	15.7	19.7	0.0	22.6	18.9	0.0
LnGrp LOS	C	D		C	D		B	B		C	B	
Approach Vol, veh/h		585	A		546	A		188	A		470	A
Approach Delay, s/veh		37.7			34.5			17.9			21.6	
Approach LOS		D			C			B			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.0	24.5	9.5	25.0	9.6	25.9	9.5	25.0				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	6.5	20.0	5.0	20.5	5.1	21.4	5.0	20.5				
Max Q Clear Time (g_c+I1), s	8.5	4.9	4.3	19.1	4.2	5.4	4.8	18.1				
Green Ext Time (p_c), s	0.0	0.4	0.0	0.4	0.0	0.5	0.0	0.7				

### Intersection Summary

HCM 6th Ctrl Delay	30.4
HCM 6th LOS	C

























### Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

# HCM 6th Signalized Intersection Summary

3:

06/28/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	122	420	27	392	488	72	60	184	120	229	90	89
Future Volume (veh/h)	122	420	27	392	488	72	60	184	120	229	90	89
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	133	457	0	426	530	0	65	200	0	249	98	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	383	530		514	804		442	426		369	455	
Arrive On Green	0.07	0.28	0.00	0.22	0.43	0.00	0.06	0.23	0.00	0.07	0.24	0.00
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	133	457	0	426	530	0	65	200	0	249	98	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	4.7	20.9	0.0	13.6	20.3	0.0	2.4	8.3	0.0	6.5	3.8	0.0
Cycle Q Clear(g_c), s	4.7	20.9	0.0	13.6	20.3	0.0	2.4	8.3	0.0	6.5	3.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	383	530		514	804		442	426		369	455	
V/C Ratio(X)	0.35	0.86		0.83	0.66		0.15	0.47		0.68	0.22	
Avail Cap(c_a), veh/h	383	530		514	804		442	426		369	455	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	20.7	30.6	0.0	17.7	20.4	0.0	23.9	30.0	0.0	29.1	27.2	0.0
Incr Delay (d2), s/veh	2.5	16.8	0.0	14.3	4.2	0.0	0.7	3.7	0.0	9.5	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	11.5	0.0	7.2	9.3	0.0	1.1	4.1	0.0	2.8	1.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.1	47.3	0.0	32.0	24.6	0.0	24.6	33.7	0.0	38.7	28.3	0.0
LnGrp LOS	C	D		C	C		C	C		D	C	
Approach Vol, veh/h		590	A		956	A		265	A		347	A
Approach Delay, s/veh		41.9			27.9			31.5			35.7	
Approach LOS		D			C			C			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.0	25.0	24.0	30.0	9.6	26.4	10.8	43.2				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	6.5	20.5	19.5	25.5	5.1	21.9	6.3	38.7				
Max Q Clear Time (g_c+I1), s	8.5	10.3	15.6	22.9	4.4	5.8	6.7	22.3				
Green Ext Time (p_c), s	0.0	0.7	0.6	0.7	0.0	0.4	0.0	3.2				

## Intersection Summary

HCM 6th Ctrl Delay	33.4
HCM 6th LOS	C

























## Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

# HCM 6th Signalized Intersection Summary

3:

























06/28/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	122	420	27	392	488	72	60	184	120	229	90	89
Future Volume (veh/h)	122	420	27	392	488	72	60	184	120	229	90	89
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	154	530	0	494	615	0	76	232	0	289	113	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	332	537		484	851		427	376		356	464	
Arrive On Green	0.06	0.29	0.00	0.23	0.46	0.00	0.06	0.20	0.00	0.10	0.25	0.00
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	154	530	0	494	615	0	76	232	0	289	113	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	6.1	28.2	0.0	22.9	26.7	0.0	3.3	11.3	0.0	10.3	4.8	0.0
Cycle Q Clear(g_c), s	6.1	28.2	0.0	22.9	26.7	0.0	3.3	11.3	0.0	10.3	4.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	332	537		484	851		427	376		356	464	
V/C Ratio(X)	0.46	0.99		1.02	0.72		0.18	0.62		0.81	0.24	
Avail Cap(c_a), veh/h	332	537		484	851		427	376		356	464	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	24.0	35.5	0.0	29.4	22.1	0.0	28.8	36.4	0.0	31.2	30.1	0.0
Incr Delay (d2), s/veh	4.6	35.9	0.0	46.0	5.3	0.0	0.9	7.4	0.0	17.9	1.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	17.8	0.0	17.7	12.5	0.0	1.5	5.9	0.0	3.6	2.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.5	71.3	0.0	75.4	27.4	0.0	29.7	43.8	0.0	49.1	31.3	0.0
LnGrp LOS	C	E		F	C		C	D		D	C	
Approach Vol, veh/h		684	A		1109	A		308	A		402	A
Approach Delay, s/veh		61.7			48.8			40.4			44.1	
Approach LOS		E			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.8	24.6	27.4	33.2	10.1	29.3	10.6	50.0				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	10.3	20.1	22.9	28.7	5.6	24.8	6.1	45.5				
Max Q Clear Time (g_c+I1), s	12.3	13.3	24.9	30.2	5.3	6.8	8.1	28.7				
Green Ext Time (p_c), s	0.0	0.7	0.0	0.0	0.0	0.5	0.0	3.9				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			50.5									
HCM 6th LOS			D									
<b>Notes</b>												
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

# HCM 6th Signalized Intersection Summary

3:

02/10/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	122	420	27	392	488	72	60	184	120	229	90	89
Future Volume (veh/h)	122	420	27	392	488	72	60	184	120	229	90	89
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	179	616	0	575	716	0	88	270	0	336	132	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	319	581		520	946		320	276		312	457	
Arrive On Green	0.07	0.31	0.00	0.26	0.51	0.00	0.05	0.15	0.00	0.14	0.25	0.00
Sat Flow, veh/h	1767	1856	1572	1767	1856	1572	1767	1856	1572	1767	1856	1572
Grp Volume(v), veh/h	179	616	0	575	716	0	88	270	0	336	132	0
Grp Sat Flow(s),veh/h/ln	1767	1856	1572	1767	1856	1572	1767	1856	1572	1767	1856	1572
Q Serve(g_s), s	9.5	43.8	0.0	37.1	43.1	0.0	5.9	20.3	0.0	20.3	8.1	0.0
Cycle Q Clear(g_c), s	9.5	43.8	0.0	37.1	43.1	0.0	5.9	20.3	0.0	20.3	8.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	319	581		520	946		320	276		312	457	
V/C Ratio(X)	0.56	1.06		1.11	0.76		0.27	0.98		1.08	0.29	
Avail Cap(c_a), veh/h	319	581		520	946		320	276		312	457	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	31.4	48.1	0.0	44.0	27.4	0.0	47.7	59.4	0.0	42.9	42.8	0.0
Incr Delay (d2), s/veh	7.0	54.6	0.0	71.9	5.6	0.0	2.1	49.2	0.0	73.4	1.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	28.9	0.0	28.4	20.3	0.0	2.8	13.3	0.0	15.4	4.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.4	102.7	0.0	115.8	33.0	0.0	49.8	108.6	0.0	116.3	44.4	0.0
LnGrp LOS	D	F		F	C		D	F		F	D	
Approach Vol, veh/h		795	A		1291	A		358	A		468	A
Approach Delay, s/veh		88.2			69.9			94.1			96.0	
Approach LOS		F			E			F			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	24.8	25.3	41.6	48.3	11.1	39.0	14.0	75.9				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	20.3	20.8	37.1	43.8	6.6	34.5	9.5	71.4				
Max Q Clear Time (g_c+I1), s	22.3	22.3	39.1	45.8	7.9	10.1	11.5	45.1				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.7	0.0	5.6				

## Intersection Summary

HCM 6th Ctrl Delay	82.1
HCM 6th LOS	F

## Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

# **OLD MORRILTON HWY AT DONAGHEY AVE**

Control Delay and Level of Service Analysis Results

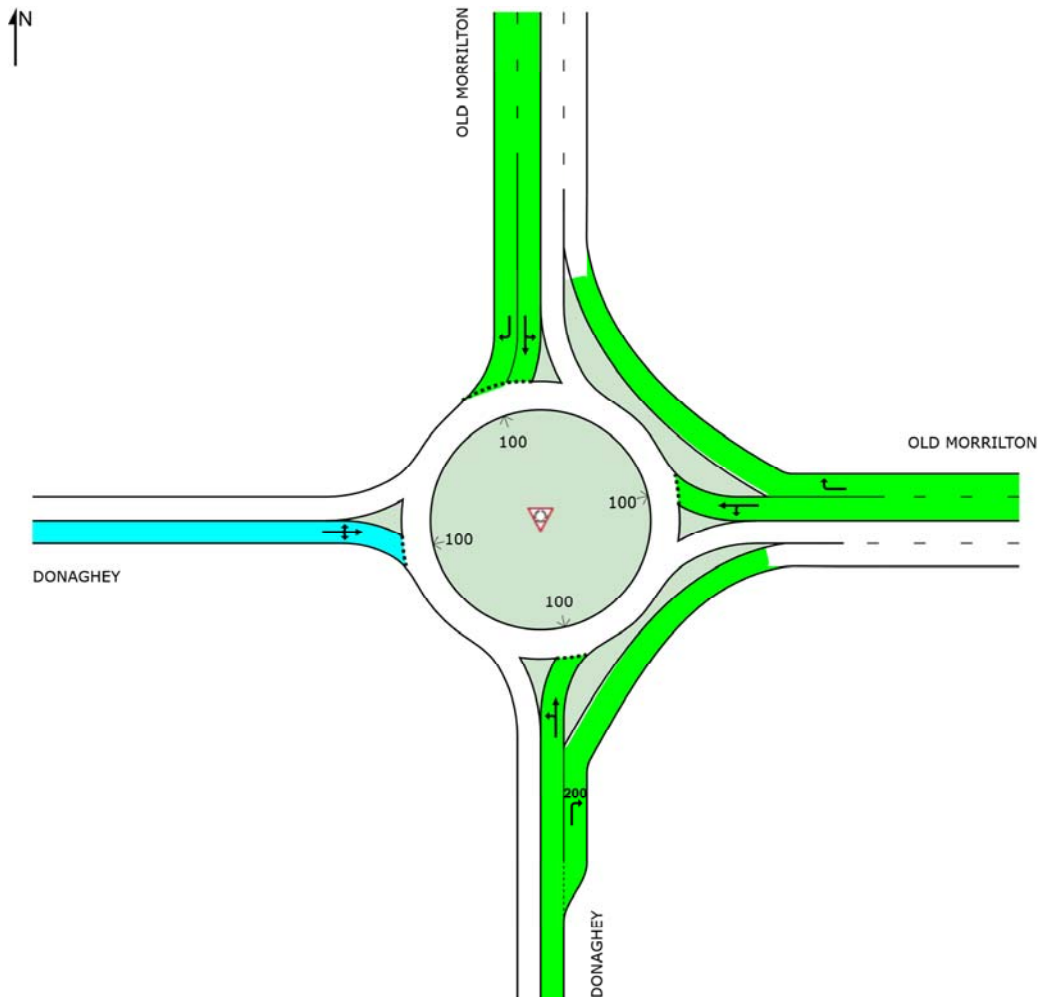
# LANE LEVEL OF SERVICE

## Lane Level of Service

 Site: 101 [AM- Donaghey.Old Morrilton-0 year ]

New Site  
 Site Category: (None)  
 Roundabout

LOS	Approaches				Intersection
	South	East	North	West	
LOS	A	A	A	B	A



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 LOS F will result if  $v/c > 1$  irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Signalised Intersections

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

# DELAY (CONTROL)

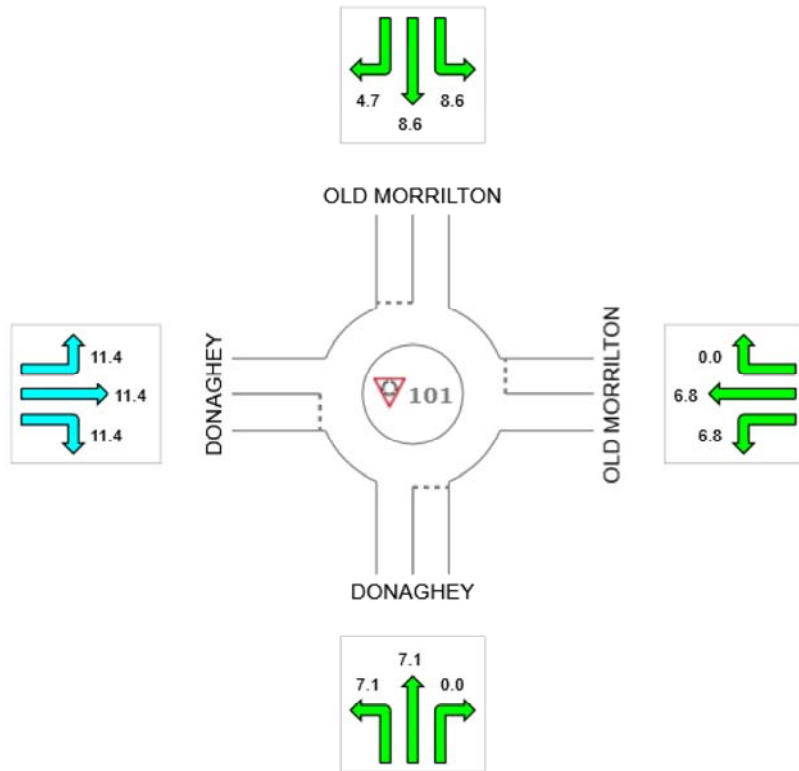
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: 101 [AM- Donaghey.Old Morrilton-0 year ]

New Site  
 Site Category: (None)  
 Roundabout

## All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	3.9	4.3	8.0	11.4	6.9
LOS	A	A	A	B	A



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Signalised Intersections

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.



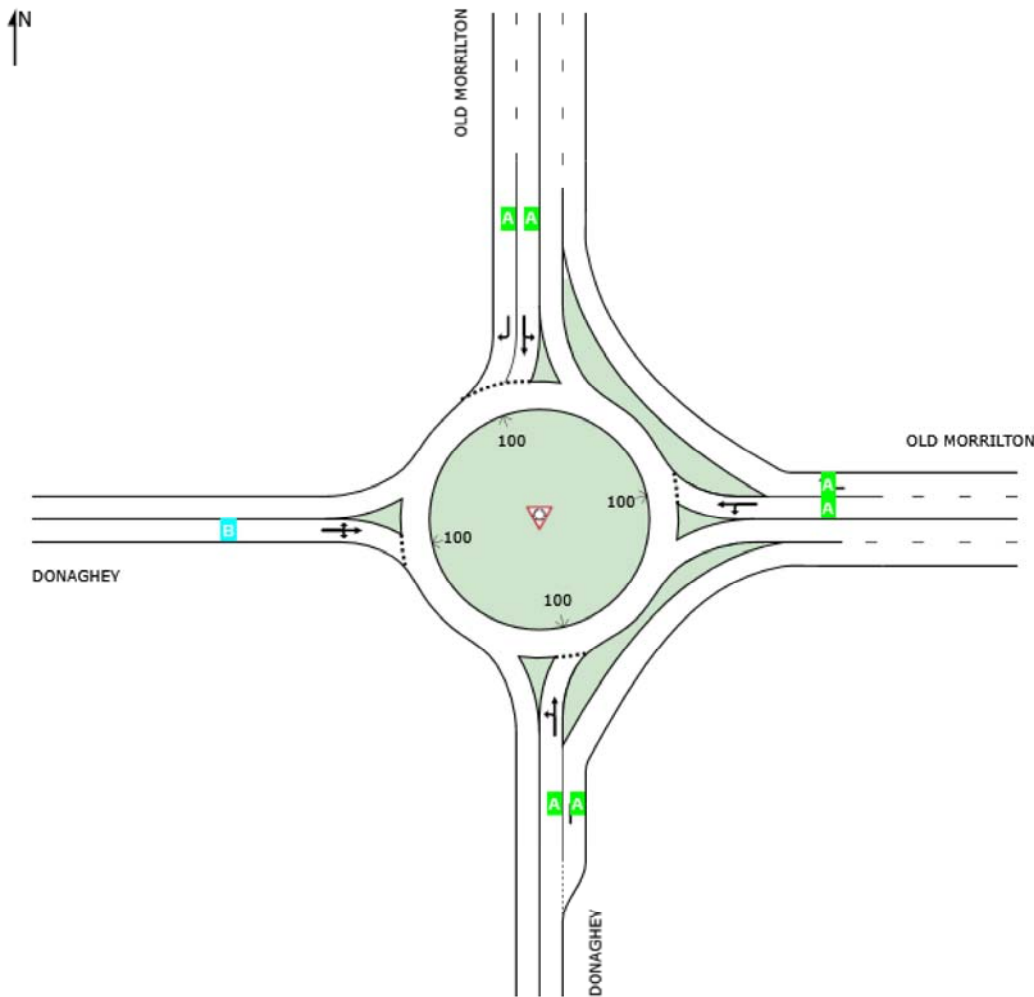
# LANE LEVEL OF SERVICE

## Lane Level of Service

 **Site: 101 [AM- Donaghey.Old Morrilton-0 year ]**

New Site  
 Site Category: (None)  
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	A	A	B	A



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if  $v/c > 1$  irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

# DELAY (CONTROL)

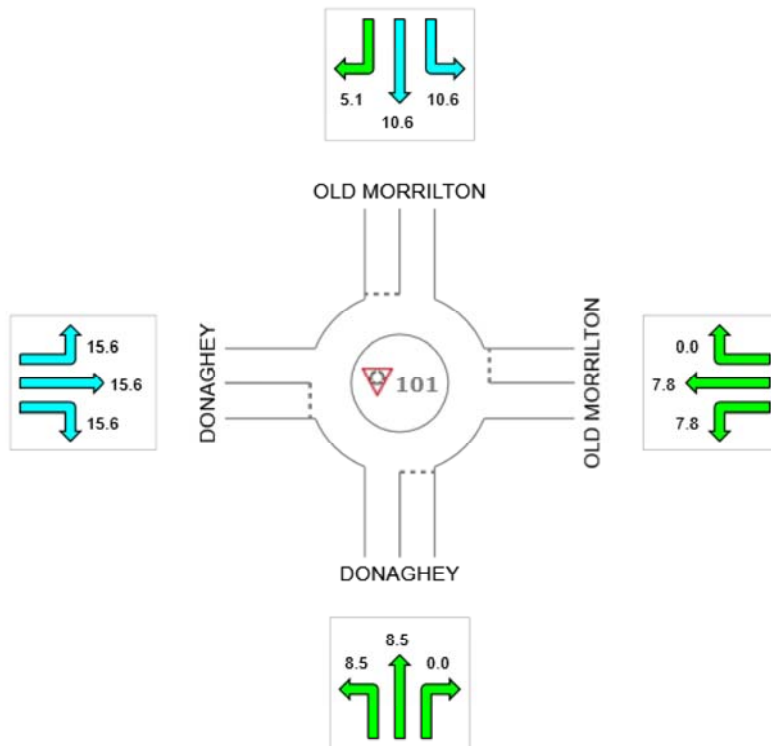
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: 101 [AM- Donaghey.Old Morrilton-10 year ]

New Site  
 Site Category: (None)  
 Roundabout  
 Design Life Analysis (Final Year): Results for 10 years

## All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	4.6	4.9	9.8	15.6	8.8
LOS	A	A	A	B	A



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Signalised Intersections

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

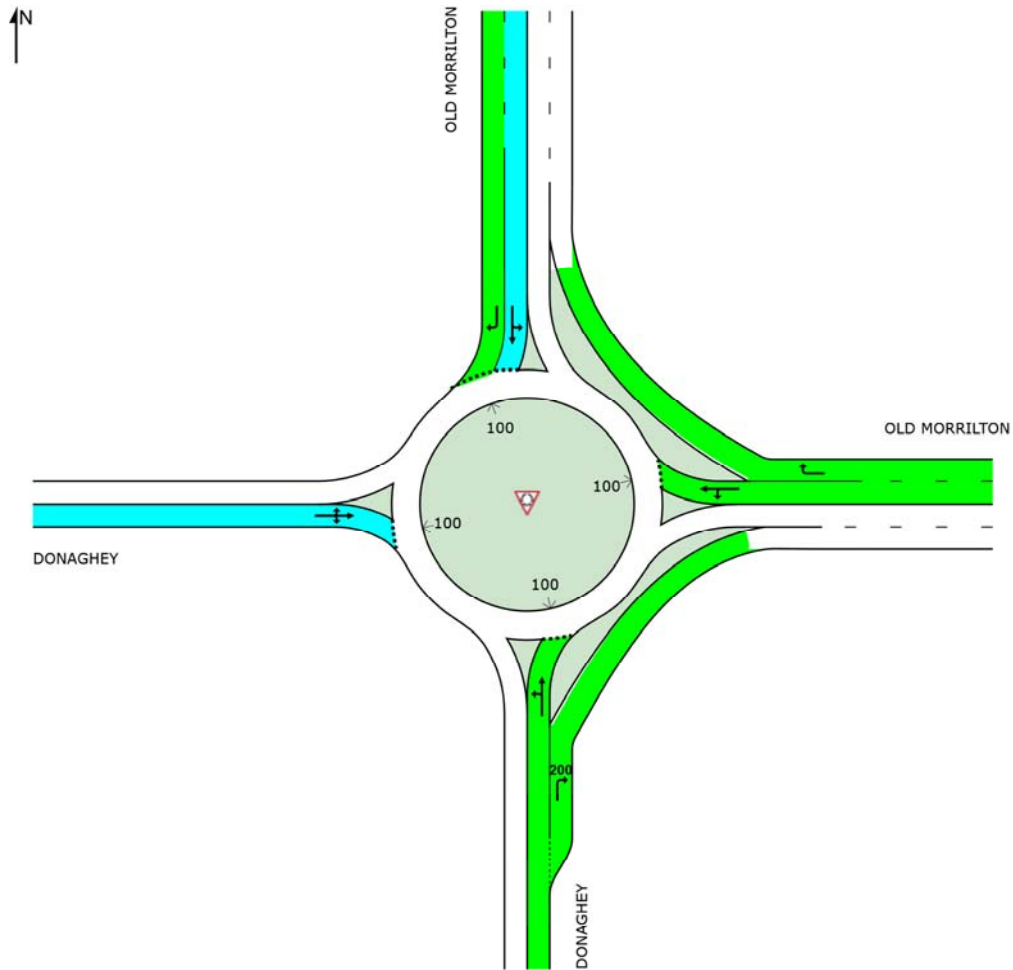
# LANE LEVEL OF SERVICE

## Lane Level of Service

 Site: 101 [AM- Donaghey.Old Morrilton-10 year ]

New Site  
 Site Category: (None)  
 Roundabout  
 Design Life Analysis (Final Year): Results for 10 years

	Approaches				Intersection
	South	East	North	West	
LOS	A	A	A	B	A



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 LOS F will result if  $v/c > 1$  irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Signalised Intersections

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

# LANE LEVEL OF SERVICE

## Lane Level of Service

 Site: 101 [AM- Donaghey.Old Morrilton-10 year ]

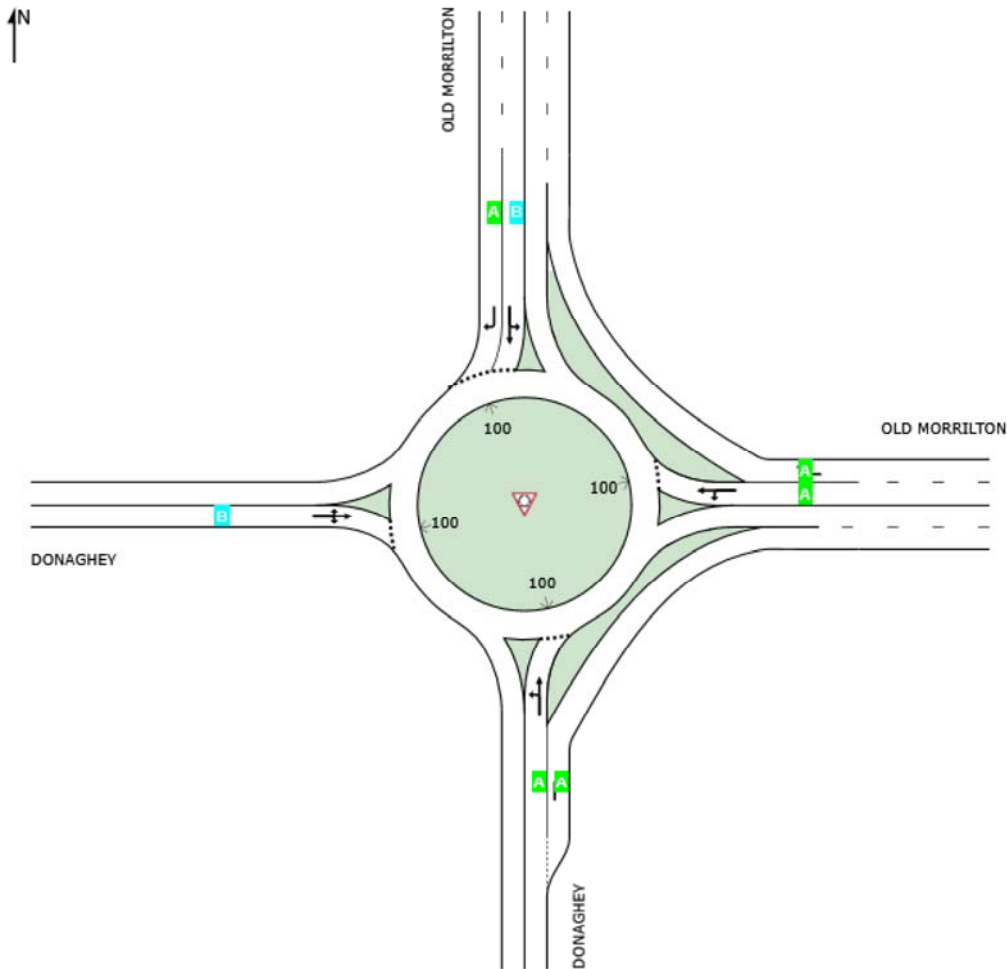
New Site

Site Category: (None)

Roundabout

Design Life Analysis (Final Year): Results for 10 years

	Approaches				Intersection
	South	East	North	West	
LOS	A	A	A	B	A



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if  $v/c > 1$  irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

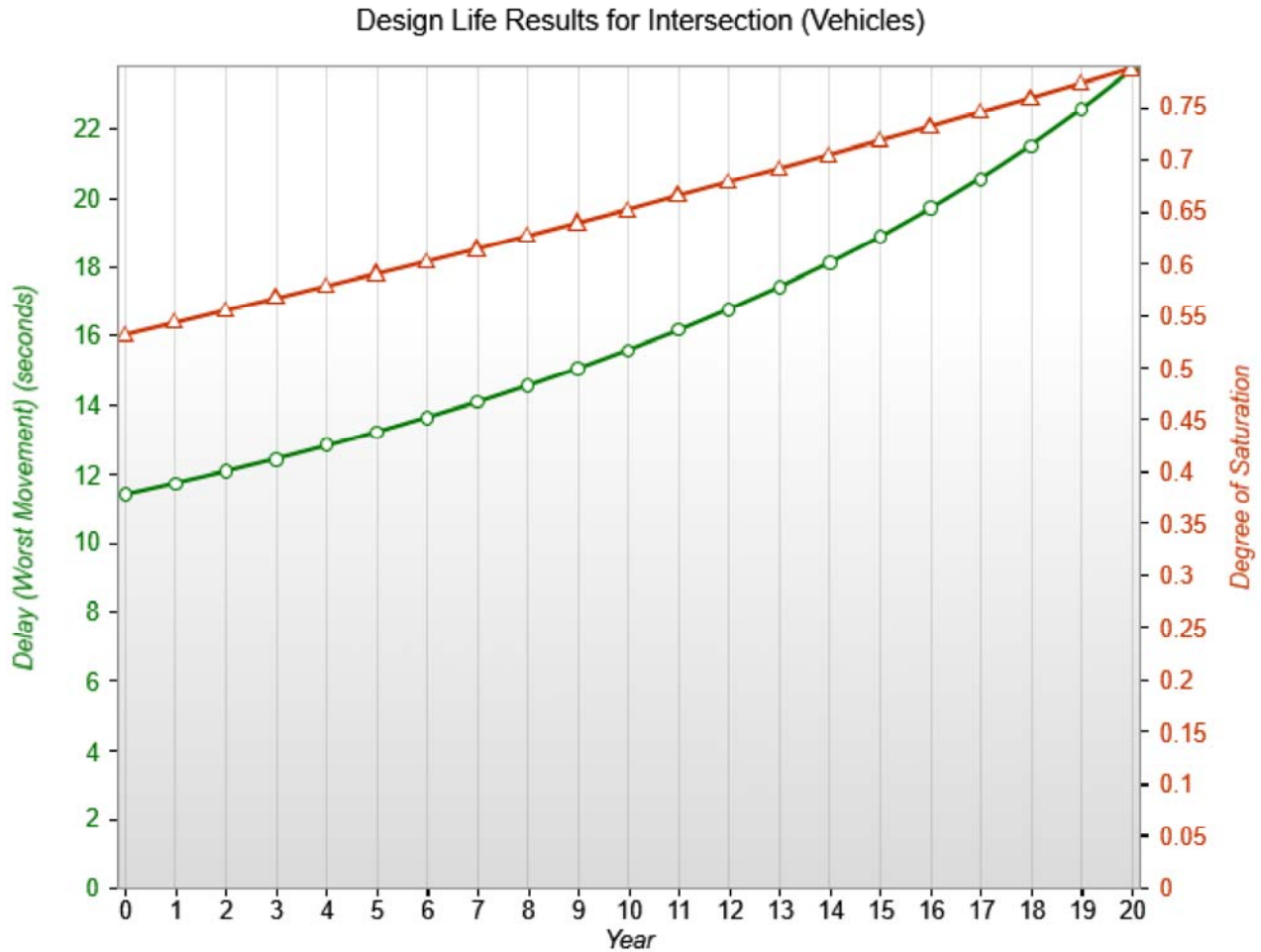
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

# SITE GRAPHS - Demand (Design Life) Analysis

Average control delay per vehicle for the worst vehicle movement (seconds) and Highest degree of saturation in any lane

Site: 101 [AM- Donaghey.Old Morrilton-20 year ]

New Site  
Site Category: (None)  
Roundabout  
Design Life Analysis (Final Year): Results for 20 years



# DELAY (CONTROL)

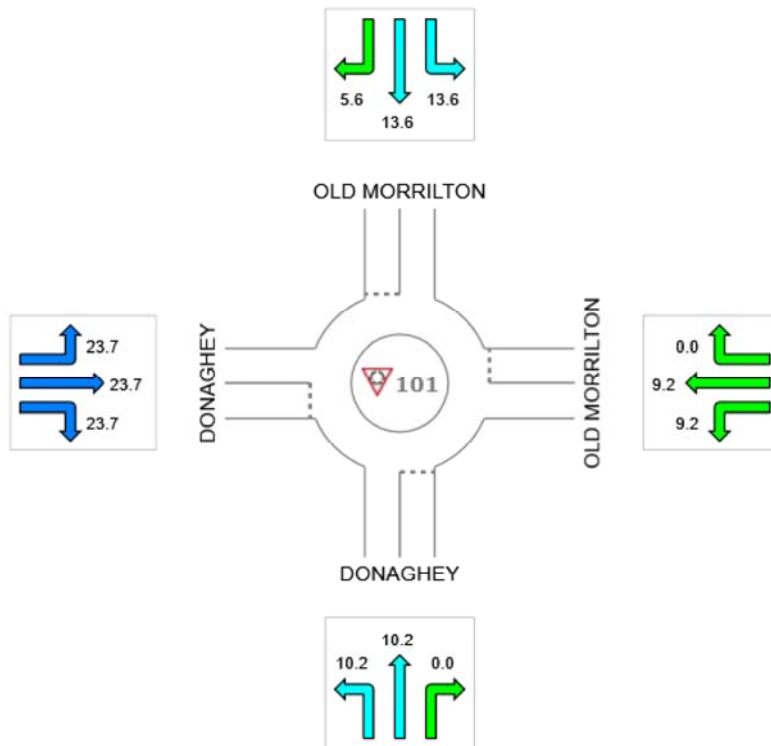
Average control delay per vehicle, or average pedestrian delay (seconds)

 **Site: 101 [AM- Donaghey.Old Morrilton-20 year ]**

New Site  
 Site Category: (None)  
 Roundabout  
 Design Life Analysis (Final Year): Results for 20 years

## All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	5.6	5.8	12.5	23.7	12.0
LOS	A	A	B	C	B



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Signalised Intersections

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

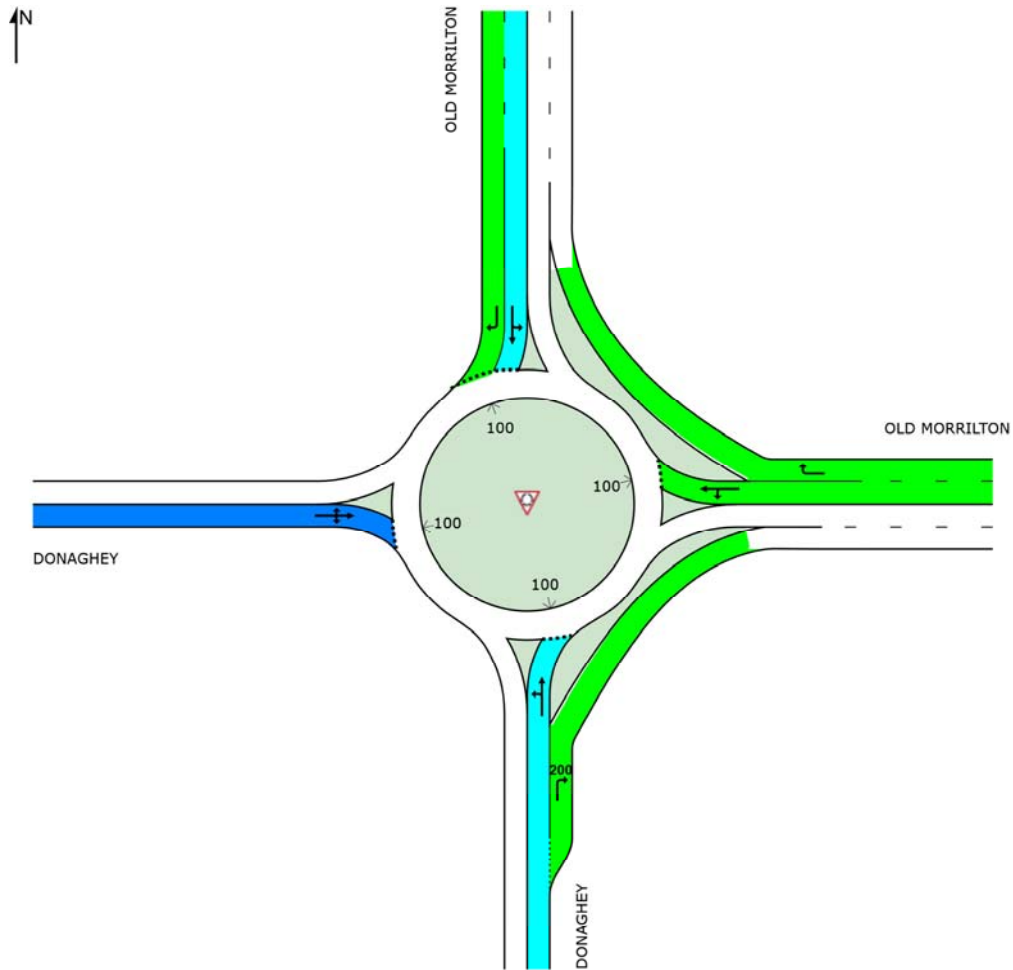
# LANE LEVEL OF SERVICE

## Lane Level of Service

 Site: 101 [AM- Donaghey.Old Morrilton-20 year ]

New Site  
 Site Category: (None)  
 Roundabout  
 Design Life Analysis (Final Year): Results for 20 years

LOS	Approaches				Intersection
	South	East	North	West	
LOS	A	A	B	C	B



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 LOS F will result if  $v/c > 1$  irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Signalised Intersections

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

# LANE LEVEL OF SERVICE

## Lane Level of Service

 Site: 101 [AM- Donaghey.Old Morrilton-20 year ]

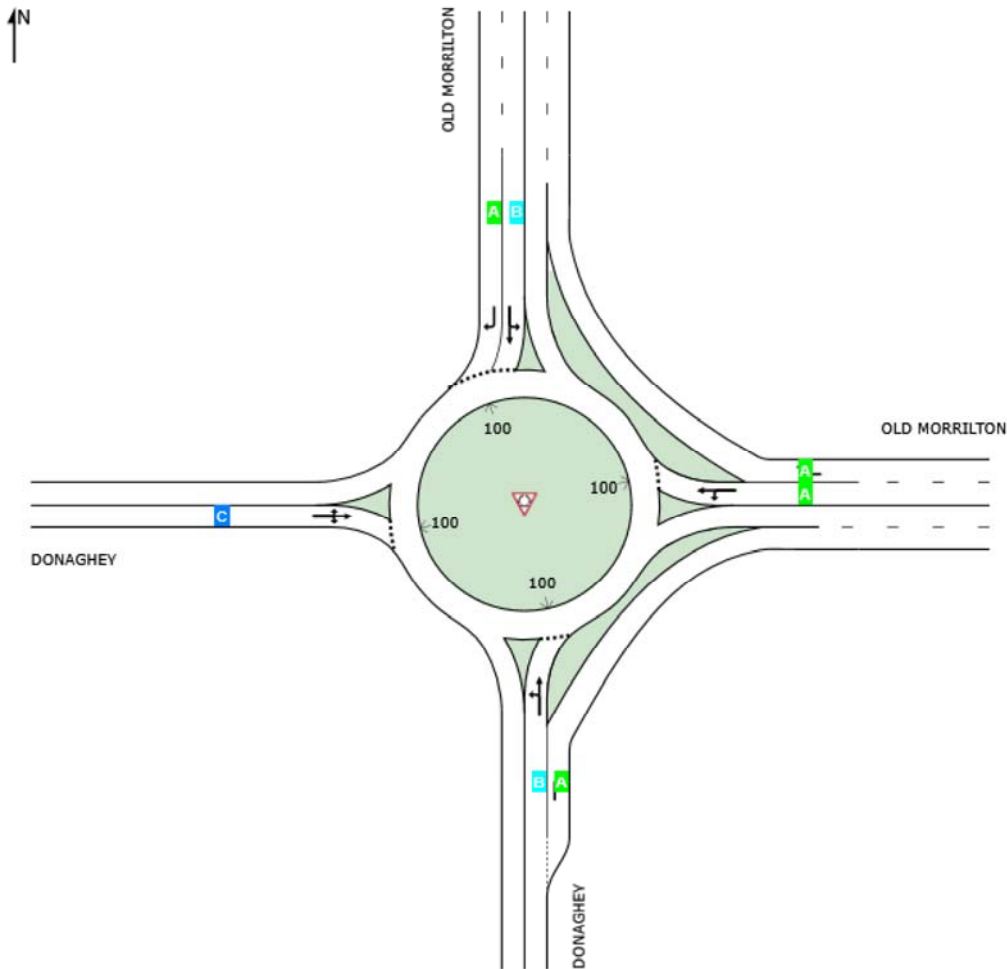
New Site

Site Category: (None)

Roundabout

Design Life Analysis (Final Year): Results for 20 years

	Approaches				Intersection
	South	East	North	West	
LOS	A	A	B	C	B



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if  $v/c > 1$  irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.



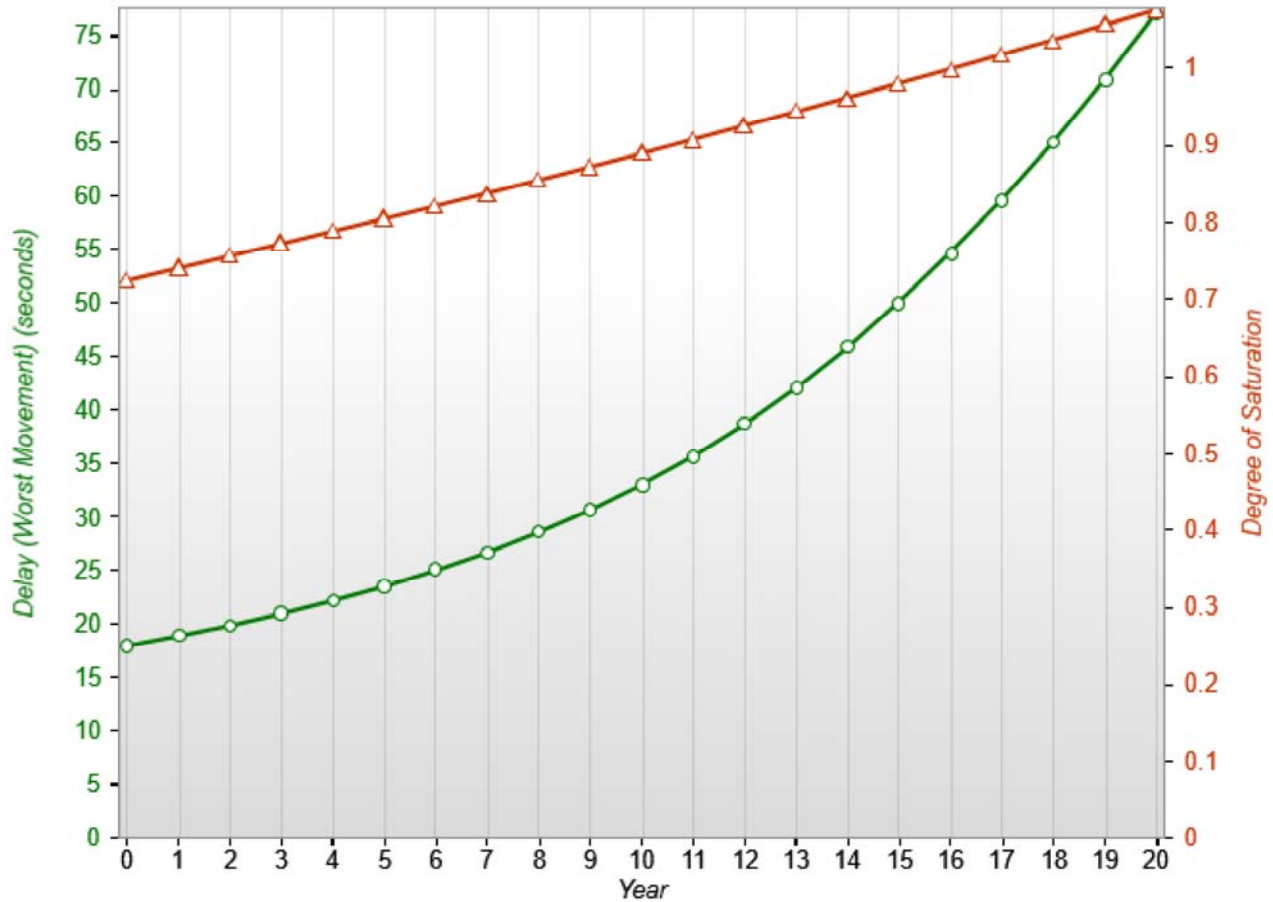
# SITE GRAPHS - Demand (Design Life) Analysis

Average control delay per vehicle for the worst vehicle movement (seconds) and Highest degree of saturation in any lane

Site: 101 [PM- Donaghey.Old Morrilton-20 year ]

New Site  
Site Category: (None)  
Roundabout  
Design Life Analysis (Final Year): Results for 20 years

Design Life Results for Intersection (Vehicles)



# DELAY (CONTROL)

Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: 101 [PM- Donaghey.Old Morrilton-10 year ]

New Site

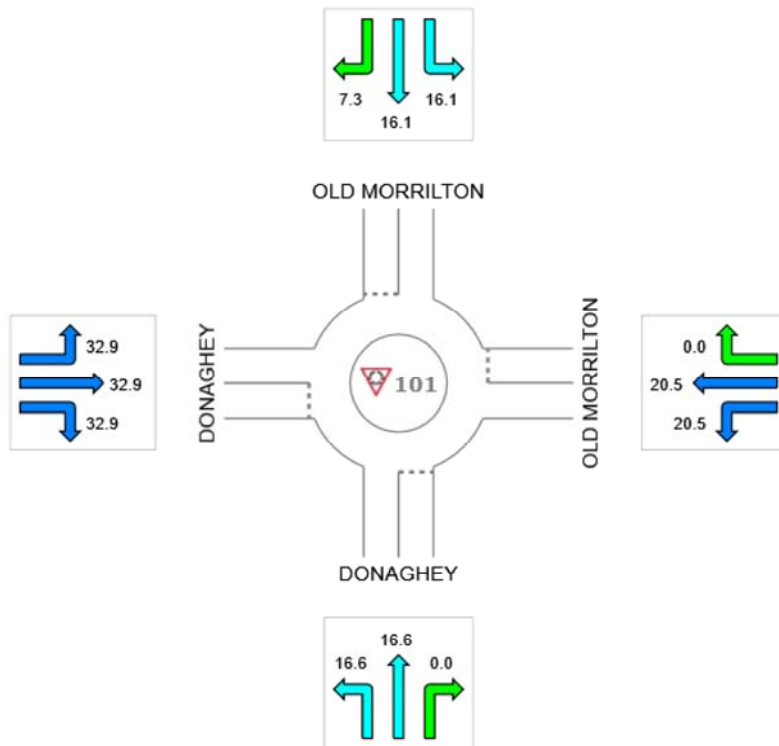
Site Category: (None)

Roundabout

Design Life Analysis (Final Year): Results for 10 years

## All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	11.2	12.1	14.2	32.9	17.5
LOS	B	B	B	C	B



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Signalised Intersections

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

# DELAY (CONTROL)

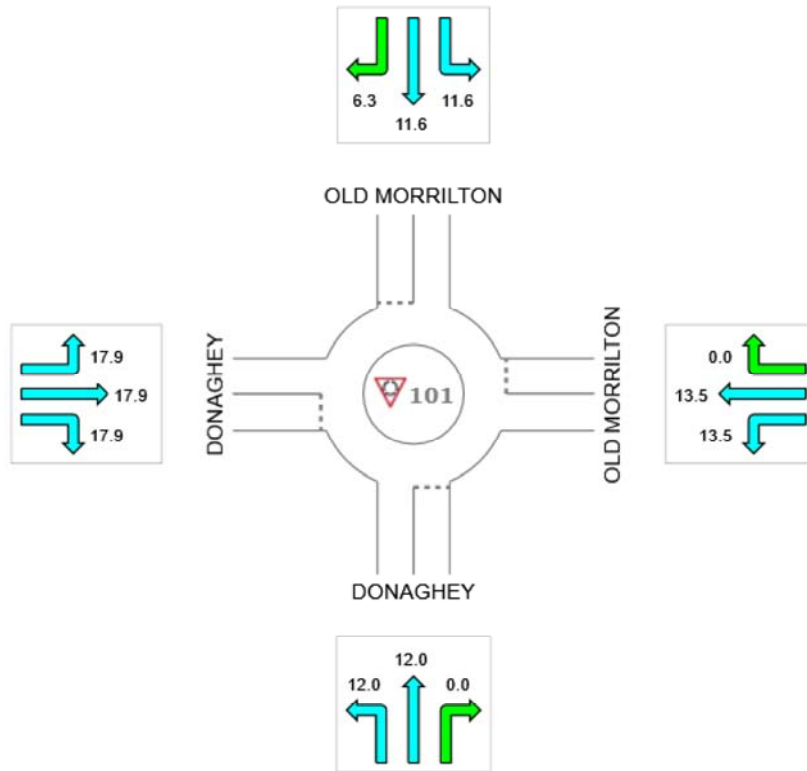
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: 101 [PM- Donaghey.Old Morrilton-0 year]

New Site  
 Site Category: (None)  
 Roundabout

## All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	8.0	8.0	10.5	17.9	10.9
LOS	A	A	B	B	B



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Signalised Intersections

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

# LANE LEVEL OF SERVICE

## Lane Level of Service

 Site: 101 [PM- Donaghey.Old Morrilton-10 year ]

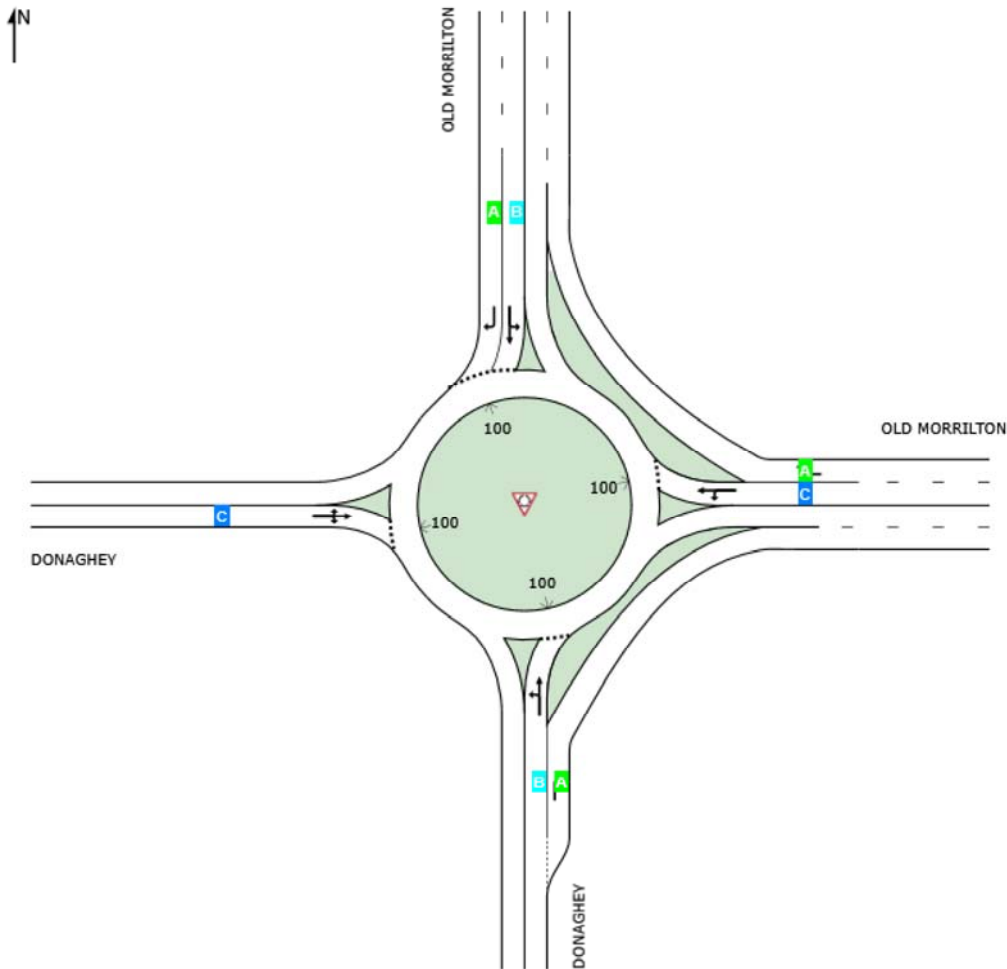
New Site

Site Category: (None)

Roundabout

Design Life Analysis (Final Year): Results for 10 years

	Approaches				Intersection
	South	East	North	West	
LOS	B	B	B	C	B



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if  $v/c > 1$  irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

# LANE LEVEL OF SERVICE

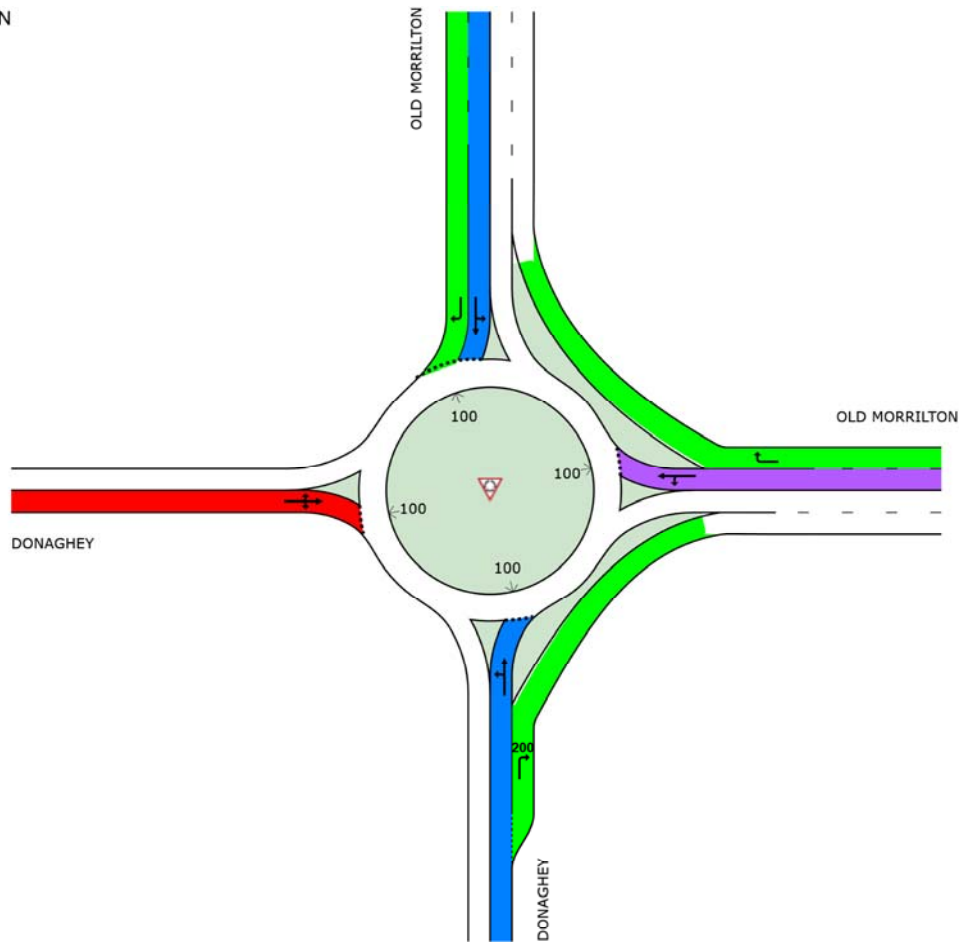
## Lane Level of Service

 **Site: 101 [PM- Donaghey.Old Morrilton-20 year ]**

New Site  
 Site Category: (None)  
 Roundabout  
 Design Life Analysis (Final Year): Results for 20 years

	Approaches				Intersection
	South	East	North	West	
LOS	B	C	C	E <sup>11</sup>	C

<sup>11</sup> Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

LOS F will result if  $v/c > 1$  irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Signalised Intersections

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

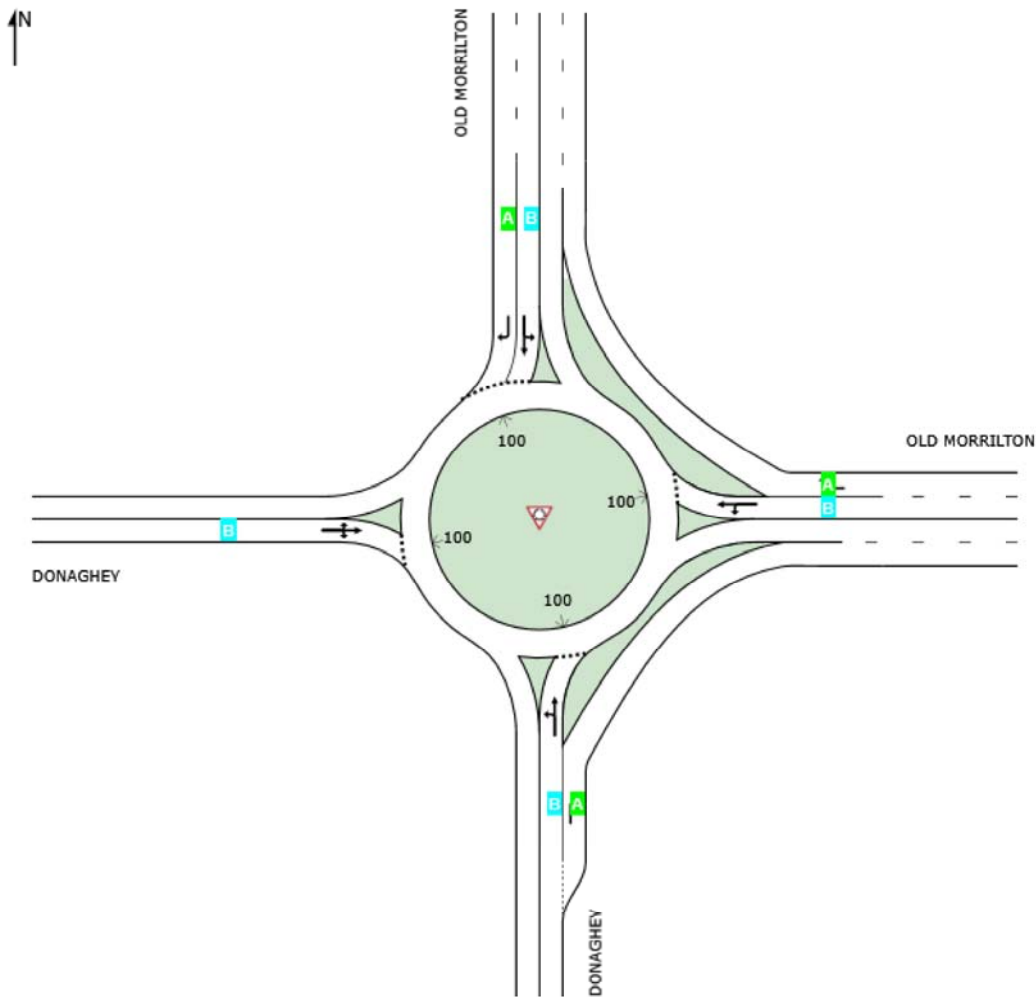
# LANE LEVEL OF SERVICE

## Lane Level of Service

 Site: 101 [PM- Donaghey.Old Morrilton-0 year]

New Site  
 Site Category: (None)  
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	A	B	B	B



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if  $v/c > 1$  irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

# LANE LEVEL OF SERVICE

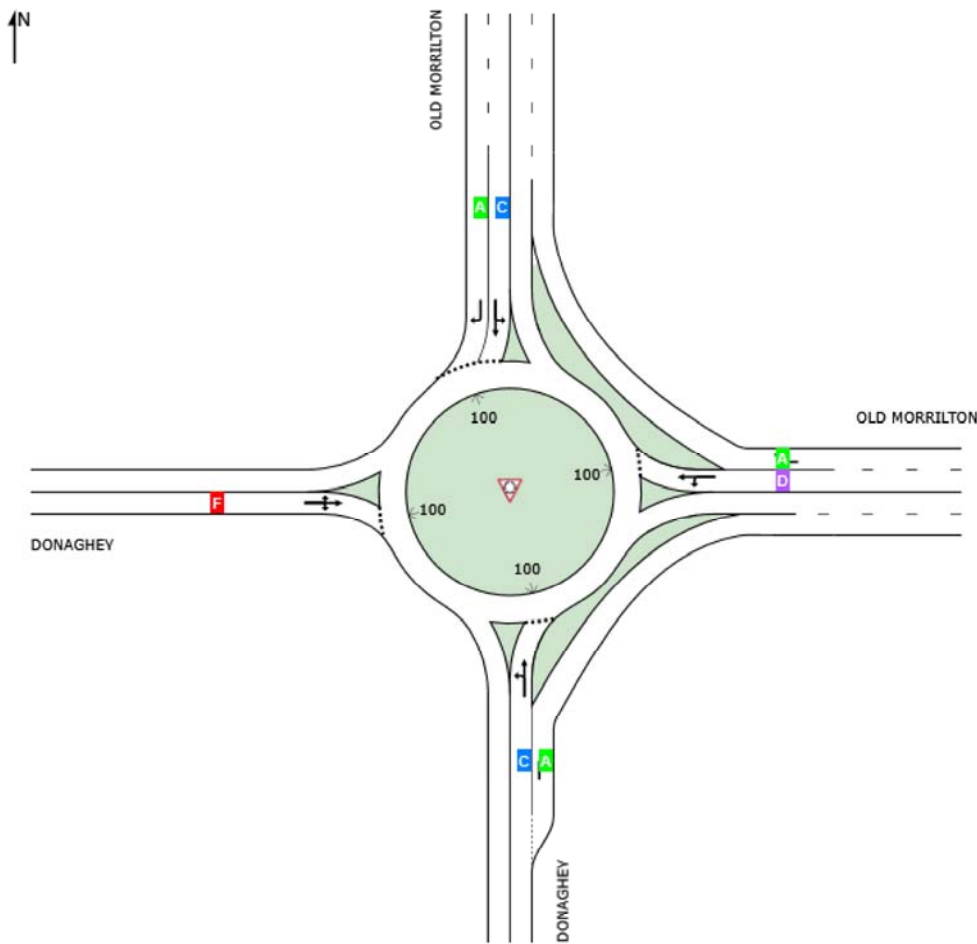
## Lane Level of Service

 **Site: 101 [PM- Donaghey.Old Morrilton-20 year ]**

New Site  
 Site Category: (None)  
 Roundabout  
 Design Life Analysis (Final Year): Results for 20 years

	Approaches				Intersection
	South	East	North	West	
LOS	B	C	C	E <sup>11</sup>	C

<sup>11</sup> Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if  $v/c > 1$  irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

# LANE LEVEL OF SERVICE

## Lane Level of Service

 **Site: 101 [PM- Donaghey.Old Morrilton-10 year ]**

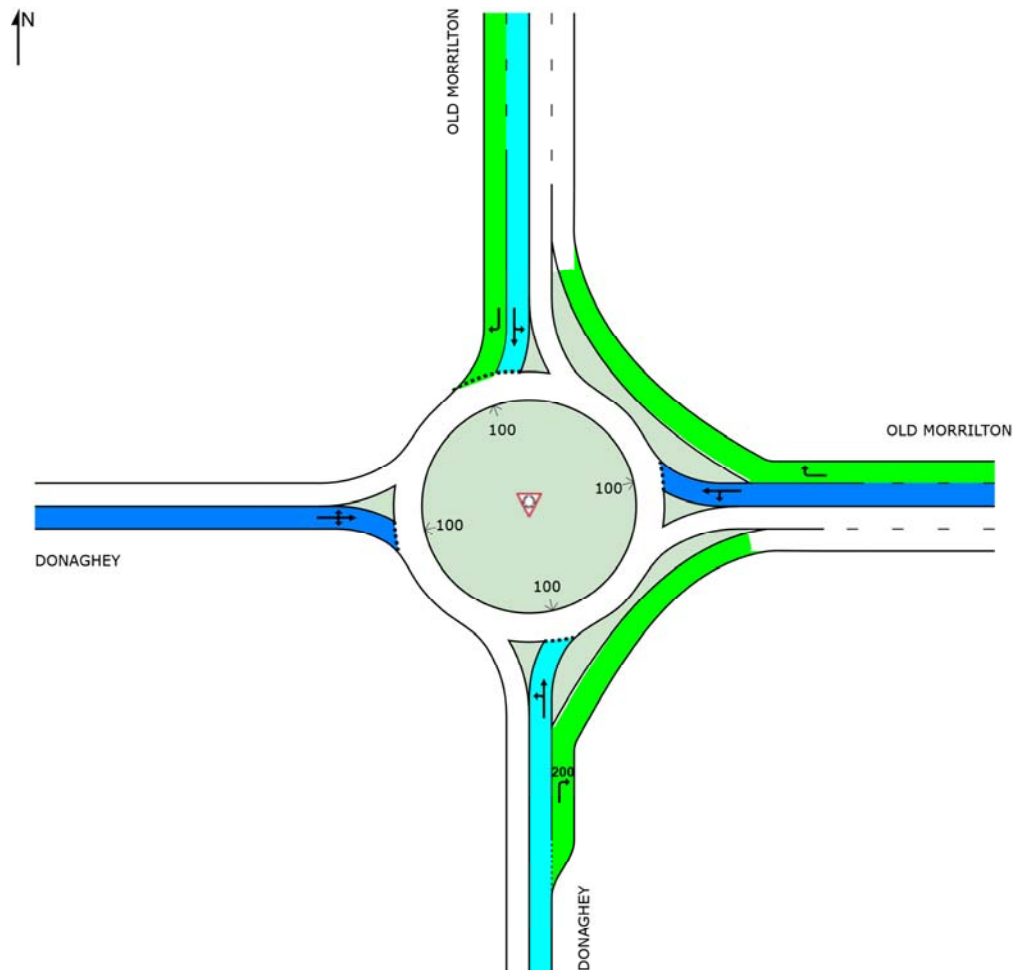
New Site

Site Category: (None)

Roundabout

Design Life Analysis (Final Year): Results for 10 years

	Approaches				Intersection
	South	East	North	West	
LOS	B	B	B	C	B



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

LOS F will result if  $v/c > 1$  irrespective of movement delay value (does not apply for approaches and intersection).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Signalised Intersections

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.



# **OLD MORRILTON HWY AT DONAGHEY AVE**

Capacity and Queue Length Analysis Results

# LANE SUMMARY

Site: 101 [AM- Donaghey.Old Morrilton-0 year (Site Folder: General)]

New Site  
 Site Category: (None)  
 Roundabout

Lane Use and Performance													
	DEMAND FLOWS		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	[ Total veh/h	[ HV ] %						[ Veh	[ Dist ] ft				
South: DONAGHEY													
Lane 1 <sup>d</sup>	139	3.0	721	0.193	100	7.1	LOS A	0.7	18.9	Full	1600	0.0	0.0
Lane 2	116	3.0	1626	0.072	100	0.0	LOS A	0.0	0.0	Short	200	0.0	NA
Approach	255	3.0		0.193		3.9	LOS A	0.7	18.9				
East: OLD MORRILTON													
Lane 1 <sup>d</sup>	404	3.0	1126	0.359	100	6.8	LOS A	1.8	47.0	Full	1600	0.0	0.0
Lane 2	238	3.0	1626	0.146	100	0.0	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	642	3.0		0.359		4.3	LOS A	1.8	47.0				
North: OLD MORRILTON													
Lane 1 <sup>d</sup>	348	3.0	891	0.391	100	8.6	LOS A	1.9	48.5	Full	1600	0.0	0.0
Lane 2	59	3.0	891	0.066	100	4.7	LOS A	0.2	6.2	Full	1600	0.0	0.0
Approach	407	3.0		0.391		8.0	LOS A	1.9	48.5				
West: DONAGHEY													
Lane 1 <sup>d</sup>	461	3.0	868	0.531	100	11.4	LOS B	4.2	107.2	Full	1600	0.0	0.0
Approach	461	3.0		0.531		11.4	LOS B	4.2	107.2				
Intersection	1765	3.0		0.531		6.9	LOS A	4.2	107.2				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Geometric Delay is not included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

<sup>d</sup> Dominant lane on roundabout approach

Approach Lane Flows (veh/h)										
South: DONAGHEY										
Mov.	L2	T1	R2	Total	%HV	Cap.	Deg.	Lane	Prob.	Ov.
From S	W	N	E			veh/h	Satn	Util.	SL	Lane
To Exit:							v/c	%	%	No.
Lane 1	62	77	-	139	3.0	721	0.193	100	NA	NA
Lane 2	-	-	116	116	3.0	1626	0.072	100	0.0	1
Approach	62	77	116	255	3.0		0.193			
East: OLD MORRILTON										
Mov.	L2	T1	R2	Total	%HV	Deg.	Lane	Prob.	Ov.	

From E To Exit:	S	W	N			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	65	339	-	404	3.0	1126	0.359	100	NA	NA
Lane 2	-	-	238	238	3.0	1626	0.146	100	NA	NA
Approach	65	339	238	642	3.0		0.359			
North: OLD MORRILTON										
Mov.	L2	T1	R2	Total	%HV					
From N To Exit:	E	S	W			Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	258	90	-	348	3.0	891	0.391	100	NA	NA
Lane 2	-	-	59	59	3.0	891	0.066	100	NA	NA
Approach	258	90	59	407	3.0		0.391			
West: DONAGHEY										
Mov.	L2	T1	R2	Total	%HV					
From W To Exit:	N	E	S			Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	77	357	27	461	3.0	868	0.531	100	NA	NA
Approach	77	357	27	461	3.0		0.531			
Total %HV Deg.Satn (v/c)										
Intersection	1765	3.0		0.531						

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis												
	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
South Exit: DONAGHEY												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											
Merge Analysis not applied.												
East Exit: OLD MORRILTON												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											
Full Length Lane	2											
Merge Analysis not applied.												
North Exit: OLD MORRILTON												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											
Full Length Lane	2											
Merge Analysis not applied.												
West Exit: DONAGHEY												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											
Merge Analysis not applied.												

## LANE SUMMARY

Site: 101 [AM- Donaghey.Old Morrilton-10 year (Site Folder: General)]

New Site

Site Category: (None)

Roundabout

Design Life Analysis (Final Year): Results for 10 years

Lane Use and Performance													
	DEMAND FLOWS		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	[ Total veh/h	[ HV ] %						[ Veh	[ Dist ] ft				
South: DONAGHEY													
Lane 1 <sup>d</sup>	160	3.0	654	0.245	100	8.5	LOS A	0.9	24.0	Full	1600	0.0	0.0
Lane 2	134	3.0	1626	0.082	100	0.0	LOS A	0.0	0.0	Short	200	0.0	NA
Approach	294	3.0		0.245		4.6	LOS A	0.9	24.0				
East: OLD MORRILTON													
Lane 1 <sup>d</sup>	465	3.0	1092	0.426	100	7.8	LOS A	2.3	59.0	Full	1600	0.0	0.0
Lane 2	274	3.0	1626	0.168	100	0.0	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	739	3.0		0.426		5.0	LOS A	2.3	59.0				
North: OLD MORRILTON													
Lane 1 <sup>d</sup>	400	3.0	834	0.480	100	10.6	LOS B	3.0	77.9	Full	1600	0.0	0.0
Lane 2	68	3.0	834	0.081	100	5.1	LOS A	0.3	7.6	Full	1600	0.0	0.0
Approach	468	3.0		0.480		9.8	LOS A	3.0	77.9				
West: DONAGHEY													
Lane 1 <sup>d</sup>	530	3.0	813	0.652	100	15.6	LOS B	6.8	175.3	Full	1600	0.0	0.0
Approach	530	3.0		0.652		15.6	LOS B	6.8	175.3				
Intersection	2030	3.0		0.652		8.8	LOS A	6.8	175.3				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Geometric Delay is not included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

<sup>d</sup> Dominant lane on roundabout approach

Approach Lane Flows (veh/h)											
South: DONAGHEY											
Mov. From S To Exit:	L2	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
	W	N	E								
Lane 1	71	89	-	160	3.0	654	0.245	100	NA	NA	
Lane 2	-	-	134	134	3.0	1626	0.082	100	0.0	1	
Approach	71	89	134	294	3.0		0.245				
East: OLD MORRILTON											

Mov. From E To Exit:	L2	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	75	390	-	465	3.0	1092	0.426	100	NA	NA
Lane 2	-	-	274	274	3.0	1626	0.168	100	NA	NA
Approach	75	390	274	739	3.0		0.426			
North: OLD MORRILTON										
Mov. From N To Exit:	L2	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	296	104	-	400	3.0	834	0.480	100	NA	NA
Lane 2	-	-	68	68	3.0	834	0.081	100	NA	NA
Approach	296	104	68	468	3.0		0.480			
West: DONAGHEY										
Mov. From W To Exit:	L2	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	89	410	31	530	3.0	813	0.652	100	NA	NA
Approach	89	410	31	530	3.0		0.652			
Total %HV Deg.Satn (v/c)										
Intersection	2030	3.0		0.652						

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis												
	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
South Exit: DONAGHEY												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											
East Exit: OLD MORRILTON												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											
Full Length Lane	2											
North Exit: OLD MORRILTON												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											
Full Length Lane	2											
West Exit: DONAGHEY												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											

# LANE SUMMARY

Site: 101 [AM- Donaghey.Old Morrilton-20 year (Site Folder: General)]

New Site  
 Site Category: (None)  
 Roundabout  
 Design Life Analysis (Final Year): Results for 20 years

Lane Use and Performance													
	DEMAND FLOWS		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	[ Total veh/h	[ HV ] %						[ Veh	[ Dist ] ft				
South: DONAGHEY													
Lane 1 <sup>d</sup>	181	3.0	594	0.305	100	10.2	LOS B	1.2	31.2	Full	1600	0.0	0.0
Lane 2	151	3.0	1626	0.093	100	0.0	LOS A	0.0	0.0	Short	200	0.0	NA
Approach	332	3.0		0.305		5.6	LOS A	1.2	31.2				
East: OLD MORRILTON													
Lane 1 <sup>d</sup>	526	3.0	1059	0.496	100	9.2	LOS A	2.9	73.5	Full	1600	0.0	0.0
Lane 2	309	3.0	1626	0.190	100	0.1	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	835	3.0		0.496		5.8	LOS A	2.9	73.5				
North: OLD MORRILTON													
Lane 1 <sup>d</sup>	452	3.0	781	0.579	100	13.6	LOS B	4.5	114.5	Full	1600	0.0	0.0
Lane 2	76	3.0	781	0.098	100	5.6	LOS A	0.4	9.2	Full	1600	0.0	0.0
Approach	528	3.0		0.579		12.5	LOS B	4.5	114.5				
West: DONAGHEY													
Lane 1 <sup>d</sup>	599	3.0	762	0.786	100	23.7	LOS C	11.3	288.0	Full	1600	0.0	0.0
Approach	599	3.0		0.786		23.7	LOS C	11.3	288.0				
Intersection	2295	3.0		0.786		12.0	LOS B	11.3	288.0				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Roundabout LOS Method: Same as Signalised Intersections.  
 Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.  
 LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).  
 Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).  
 Roundabout Capacity Model: US HCM 6.  
 Delay Model: HCM Delay Formula (Geometric Delay is not included).  
 Queue Model: HCM Queue Formula.  
 Gap-Acceptance Capacity: Traditional M1.  
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

<sup>d</sup> Dominant lane on roundabout approach

Approach Lane Flows (veh/h)										
South: DONAGHEY										
Mov.	L2	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
From S To Exit:	W	N	E							
Lane 1	81	100	-	181	3.0	594	0.305	100	NA	NA
Lane 2	-	-	151	151	3.0	1626	0.093	100	0.0	1
Approach	81	100	151	332	3.0		0.305			
East: OLD MORRILTON										

Mov. From E To Exit:	L2	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	85	441	-	526	3.0	1059	0.496	100	NA	NA
Lane 2	-	-	309	309	3.0	1626	0.190	100	NA	NA
Approach	85	441	309	835	3.0		0.496			
North: OLD MORRILTON										
Mov. From N To Exit:	L2	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	335	117	-	452	3.0	781	0.579	100	NA	NA
Lane 2	-	-	76	76	3.0	781	0.098	100	NA	NA
Approach	335	117	76	528	3.0		0.579			
West: DONAGHEY										
Mov. From W To Exit:	L2	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	100	463	35	599	3.0	762	0.786	100	NA	NA
Approach	100	463	35	599	3.0		0.786			
Total %HV Deg.Satn (v/c)										
Intersection	2295	3.0		0.786						

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis												
	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
South Exit: DONAGHEY												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											
East Exit: OLD MORRILTON												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											
Full Length Lane	2											
North Exit: OLD MORRILTON												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											
Full Length Lane	2											
West Exit: DONAGHEY												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											

# LANE SUMMARY

Site: 101 [PM- Donaghey.Old Morrilton-0 year (Site Folder: General)]

New Site  
 Site Category: (None)  
 Roundabout

Lane Use and Performance													
	DEMAND FLOWS		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	[ Total veh/h	[ HV ] %						[ Veh	[ Dist ] ft				
South: DONAGHEY													
Lane 1 <sup>d</sup>	265	3.0	629	0.422	100	12.0	LOS B	2.1	53.9	Full	1600	0.0	0.0
Lane 2	130	3.0	1626	0.080	100	0.0	LOS A	0.0	0.0	Short	200	0.0	NA
Approach	396	3.0		0.422		8.0	LOS A	2.1	53.9				
East: OLD MORRILTON													
Lane 1 <sup>d</sup>	609	3.0	950	0.641	100	13.5	LOS B	7.0	180.3	Full	1600	0.0	0.0
Lane 2	426	3.0	1626	0.262	100	0.1	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	1035	3.0		0.641		8.0	LOS A	7.0	180.3				
North: OLD MORRILTON													
Lane 1 <sup>d</sup>	347	3.0	733	0.473	100	11.6	LOS B	2.8	71.3	Full	1600	0.0	0.0
Lane 2	97	3.0	733	0.132	100	6.3	LOS A	0.5	12.5	Full	1600	0.0	0.0
Approach	443	3.0		0.473		10.5	LOS B	2.8	71.3				
West: DONAGHEY													
Lane 1 <sup>d</sup>	618	3.0	857	0.721	100	17.9	LOS B	9.9	253.2	Full	1600	0.0	0.0
Approach	618	3.0		0.721		17.9	LOS B	9.9	253.2				
Intersection	2492	3.0		0.721		10.9	LOS B	9.9	253.2				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Geometric Delay is not included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

<sup>d</sup> Dominant lane on roundabout approach

Approach Lane Flows (veh/h)											
South: DONAGHEY											
Mov. From S To Exit:	L2	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. Lane No.	Ov.
	W	N	E								
Lane 1	65	200	-	265	3.0	629	0.422	100	NA	NA	
Lane 2	-	-	130	130	3.0	1626	0.080	100	0.0	1	
Approach	65	200	130	396	3.0		0.422				
East: OLD MORRILTON											
Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.	



From E To Exit:	S	W	N			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	78	530	-	609	3.0	950	0.641	100	NA	NA
Lane 2	-	-	426	426	3.0	1626	0.262	100	NA	NA
Approach	78	530	426	1035	3.0		0.641			
North: OLD MORRILTON										
Mov.	L2	T1	R2	Total	%HV					
From N To Exit:	E	S	W			Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	249	98	-	347	3.0	733	0.473	100	NA	NA
Lane 2	-	-	97	97	3.0	733	0.132	100	NA	NA
Approach	249	98	97	443	3.0		0.473			
West: DONAGHEY										
Mov.	L2	T1	R2	Total	%HV					
From W To Exit:	N	E	S			Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	133	457	29	618	3.0	857	0.721	100	NA	NA
Approach	133	457	29	618	3.0		0.721			
Total %HV Deg.Satn (v/c)										
Intersection	2492	3.0		0.721						

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis												
	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
South Exit: DONAGHEY												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											
Merge Analysis not applied.												
East Exit: OLD MORRILTON												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											
Full Length Lane	2											
Merge Analysis not applied.												
North Exit: OLD MORRILTON												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											
Full Length Lane	2											
Merge Analysis not applied.												
West Exit: DONAGHEY												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											
Merge Analysis not applied.												

# LANE SUMMARY

Site: 101 [PM- Donaghey.Old Morrilton-10 year (Site Folder: General)]

New Site  
 Site Category: (None)  
 Roundabout  
 Design Life Analysis (Final Year): Results for 10 years

Lane Use and Performance													
	DEMAND FLOWS		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	[ Total veh/h	[ HV ] %						[ Veh	Dist ] ft				
South: DONAGHEY													
Lane 1 <sup>d</sup>	305	3.0	559	0.546	100	16.6	LOS B	3.1	80.2	Full	1600	0.0	0.0
Lane 2	150	3.0	1626	0.092	100	0.0	LOS A	0.0	0.0	Short	200	0.0	NA
Approach	455	3.0		0.546		11.2	LOS B	3.1	80.2				
East: OLD MORRILTON													
Lane 1 <sup>d</sup>	700	3.0	898	0.780	100	20.5	LOS C	12.5	319.7	Full	1600	0.0	0.0
Lane 2	490	3.0	1626	0.301	100	0.1	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	1190	3.0		0.780		12.1	LOS B	12.5	319.7				
North: OLD MORRILTON													
Lane 1 <sup>d</sup>	399	3.0	667	0.598	100	16.1	LOS B	4.2	108.5	Full	1600	0.0	0.0
Lane 2	111	3.0	667	0.167	100	7.3	LOS A	0.6	15.8	Full	1600	0.0	0.0
Approach	510	3.0		0.598		14.2	LOS B	4.2	108.5				
West: DONAGHEY													
Lane 1 <sup>d</sup>	711	3.0	802	0.887	100	32.9	LOS C	19.5	500.2	Full	1600	0.0	0.0
Approach	711	3.0		0.887		32.9	LOS C	19.5	500.2				
Intersection	2866	3.0		0.887		17.5	LOS B	19.5	500.2				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Roundabout LOS Method: Same as Signalised Intersections.  
 Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.  
 LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).  
 Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).  
 Roundabout Capacity Model: US HCM 6.  
 Delay Model: HCM Delay Formula (Geometric Delay is not included).  
 Queue Model: HCM Queue Formula.  
 Gap-Acceptance Capacity: Traditional M1.  
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

<sup>d</sup> Dominant lane on roundabout approach

Approach Lane Flows (veh/h)										
South: DONAGHEY										
Mov.	L2	T1	R2	Total	%HV	Cap.	Deg.	Lane	Prob.	Ov.
From S	W	N	E			veh/h	Satn	Util.	SL	Lane
To Exit:							v/c	%	%	No.
Lane 1	75	230	-	305	3.0	559	0.546	100	NA	NA
Lane 2	-	-	150	150	3.0	1626	0.092	100	0.0	1
Approach	75	230	150	455	3.0		0.546			
East: OLD MORRILTON										

Mov. From E To Exit:	L2	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	90	610	-	700	3.0	898	0.780	100	NA	NA
Lane 2	-	-	490	490	3.0	1626	0.301	100	NA	NA
Approach	90	610	490	1190	3.0		0.780			
North: OLD MORRILTON										
Mov. From N To Exit:	L2	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	286	113	-	399	3.0	667	0.598	100	NA	NA
Lane 2	-	-	111	111	3.0	667	0.167	100	NA	NA
Approach	286	113	111	510	3.0		0.598			
West: DONAGHEY										
Mov. From W To Exit:	L2	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	153	525	34	711	3.0	802	0.887	100	NA	NA
Approach	153	525	34	711	3.0		0.887			
Total %HV Deg.Satn (v/c)										
Intersection	2866	3.0		0.887						

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis												
	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
South Exit: DONAGHEY												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											
East Exit: OLD MORRILTON												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											
Full Length Lane	2											
North Exit: OLD MORRILTON												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											
Full Length Lane	2											
West Exit: DONAGHEY												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											

# LANE SUMMARY

Site: 101 [PM- Donaghey.Old Morrilton-20 year (Site Folder: General)]

New Site  
 Site Category: (None)  
 Roundabout  
 Design Life Analysis (Final Year): Results for 20 years

Lane Use and Performance													
	DEMAND FLOWS		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
	[ Total veh/h	[ HV ] %						[ Veh	[ Dist ] ft				
South: DONAGHEY													
Lane 1 <sup>d</sup>	345	3.0	518	0.665	100	23.0	LOS C	4.4	113.2	Full	1600	0.0	0.0
Lane 2	170	3.0	1626	0.104	100	0.0	LOS A	0.0	0.0	Short	200	0.0	NA
Approach	514	3.0		0.665		15.4	LOS B	4.4	113.2				
East: OLD MORRILTON													
Lane 1 <sup>d</sup>	791	3.0	857	0.923	100	36.7	LOS D	23.7	607.4	Full	1600	0.0	0.0
Lane 2	554	3.0	1626	0.341	100	0.1	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	1345	3.0		0.923		21.7	LOS C	23.7	607.4				
North: OLD MORRILTON													
Lane 1 <sup>d</sup>	451	3.0	606	0.743	100	24.8	LOS C	6.6	169.8	Full	1600	0.0	0.0
Lane 2	126	3.0	606	0.207	100	8.5	LOS A	0.8	19.6	Full	1600	0.0	0.0
Approach	577	3.0		0.743		21.3	LOS C	6.6	169.8				
West: DONAGHEY													
Lane 1 <sup>d</sup>	804	3.0	750	1.072	100	76.9	LOS F <sup>11</sup>	43.6	1116.9	Full	1600	0.0	0.0
Approach	804	3.0		1.072		76.9	LOS E <sup>11</sup>	43.6	1116.9				
Intersection	3240	3.0		1.072		34.3	LOS C	43.6	1116.9				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Geometric Delay is not included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

<sup>11</sup> Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

<sup>d</sup> Dominant lane on roundabout approach

Approach Lane Flows (veh/h)											
South: DONAGHEY											
Mov.	L2	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
From S To Exit:	W	N	E								
Lane 1	85	260	-	345	3.0	518	0.665	100	NA	NA	
Lane 2	-	-	170	170	3.0	1626	0.104	100	0.0	1	
Approach	85	260	170	514	3.0		0.665				

East: OLD MORRILTON											
Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.	
From E						Cap.	Satn	Util.	SL	Ov.	Ov.
To Exit:	S	W	N			veh/h	v/c	%	%	%	Lane
											No.
Lane 1	102	690	-	791	3.0	857	0.923	100	NA	NA	
Lane 2	-	-	554	554	3.0	1626	0.341	100	NA	NA	
Approach	102	690	554	1345	3.0		0.923				
North: OLD MORRILTON											
Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.	
From N						Cap.	Satn	Util.	SL	Ov.	Ov.
To Exit:	E	S	W			veh/h	v/c	%	%	%	Lane
											No.
Lane 1	324	127	-	451	3.0	606	0.743	100	NA	NA	
Lane 2	-	-	126	126	3.0	606	0.207	100	NA	NA	
Approach	324	127	126	577	3.0		0.743				
West: DONAGHEY											
Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.	
From W						Cap.	Satn	Util.	SL	Ov.	Ov.
To Exit:	N	E	S			veh/h	v/c	%	%	%	Lane
											No.
Lane 1	172	593	38	804	3.0	750	1.072	100	NA	NA	
Approach	172	593	38	804	3.0		1.072				
Total %HV Deg.Satn (v/c)											
Intersection	3240	3.0					1.072				

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis												
	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
South Exit: DONAGHEY												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											
East Exit: OLD MORRILTON												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											
Full Length Lane	2											
North Exit: OLD MORRILTON												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											
Full Length Lane	2											
West Exit: DONAGHEY												
Merge Type: <b>Not Applied</b>												
Full Length Lane	1											

# QUEUE ANALYSIS

Site: 101 [AM- Donaghey.Old Morrilton-0 year (Site Folder: General)]

New Site  
 Site Category: (None)  
 Roundabout

Lane Queues (Distance)															
Lane Number	Contin. Lane	Deg. Satn v/c	Prog. Factor (Queue)	Overflow Queue (ft)	Back of Queue (ft)		Queue at Start of Green (ft)		Cycle Average Queue (ft)		Queue Storage Ratio		Prob. Block. %	Prob. SL Ov. %	Ov. Lane No.
					Av.	95%	Av.	95%	Av.	95%	Av.	95%			
South: DONAGHEY															
Lane 1		0.193	1.000	0.0	7.6	18.9	NA	NA	7.1	12.8	0.00	0.01	0.0	NA	NA
Lane 2	Y	0.072	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	NA	0.0	1
Approach		0.193			7.6	18.9	NA	NA	7.1	12.8	0.00	0.01			
East: OLD MORRILTON															
Lane 1		0.359	1.000	0.0	18.9	47.0	NA	NA	19.5	35.3	0.01	0.03	0.0	NA	NA
Lane 2	Y	0.146	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	0.0	NA	NA
Approach		0.359			18.9	47.0	NA	NA	19.5	35.3	0.01	0.03			
North: OLD MORRILTON															
Lane 1		0.391	1.000	0.6	19.5	48.5	NA	NA	21.2	38.4	0.01	0.03	0.0	NA	NA
Lane 2		0.066	1.000	0.0	2.5	6.2	NA	NA	1.9	3.5	0.00	0.00	0.0	NA	NA
Approach		0.391			19.5	48.5	NA	NA	21.2	38.4	0.01	0.03			
West: DONAGHEY															
Lane 1		0.531	1.000	9.3	43.1	107.2	NA	NA	37.3	67.7	0.03	0.07	0.0	NA	NA
Approach		0.531			43.1	107.2	NA	NA	37.3	67.7	0.03	0.07			
Intersection		0.531			43.1	107.2	NA	NA	37.3	67.7	0.03	0.07			

Queue Model: HCM Queue Formula.  
 Gap-Acceptance Capacity: Traditional M1.

Lane Queues (Vehicles)															
Lane Number	Contin. Lane	Deg. Satn v/c	Prog. Factor (Queue)	Overflow Queue (veh)	Back of Queue (veh)		Queue at Start of Green (veh)		Cycle Average Queue (veh)		Queue Storage Ratio		Prob. Block. %	Prob. SL Ov. %	Ov. Lane No.
					Av.	95%	Av.	95%	Av.	95%	Av.	95%			
South: DONAGHEY															
Lane 1		0.193	1.000	0.0	0.3	0.7	NA	NA	0.3	0.5	0.00	0.01	0.0	NA	NA
Lane 2	Y	0.072	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	NA	0.0	1
Approach		0.193			0.3	0.7	NA	NA	0.3	0.5	0.00	0.01			
East: OLD MORRILTON															
Lane 1		0.359	1.000	0.0	0.7	1.8	NA	NA	0.8	1.4	0.01	0.03	0.0	NA	NA
Lane 2	Y	0.146	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	0.0	NA	NA
Approach		0.359			0.7	1.8	NA	NA	0.8	1.4	0.01	0.03			
North: OLD MORRILTON															
Lane 1		0.391	1.000	0.0	0.8	1.9	NA	NA	0.8	1.5	0.01	0.03	0.0	NA	NA
Lane 2		0.066	1.000	0.0	0.1	0.2	NA	NA	0.1	0.1	0.00	0.00	0.0	NA	NA
Approach		0.391			0.8	1.9	NA	NA	0.8	1.5	0.01	0.03			

West: DONAGHEY														
Lane 1	0.531	1.000	0.4	1.7	4.2	NA	NA	1.5	2.6	0.03	0.07	0.0	NA	NA
Approach	0.531			1.7	4.2	NA	NA	1.5	2.6	0.03	0.07			
Intersection	0.531			1.7	4.2	NA	NA	1.5	2.6	0.03	0.07			

Queue Model: HCM Queue Formula.  
Gap-Acceptance Capacity: Traditional M1.

Continuous Lane Performance													
Lane Number	Deg. Satn	Unint. Speed	Unint. Travel Delay	Hdwy Spacing	Aver. Vehicle Length	Occup. Time	Space Time	Space Occup. Ratio	Time Occup. Ratio	Density	LOS (Density Method)		
	v/c	mph	sec	sec	ft	sec	sec	%	%	veh/mi	pc/mi		
South: DONAGHEY													
Lane 2	0.072	40.0	0.0	30.95	1814.8	17.6	0.69	30.26	1.0	2.2	2.9	3.0	LOS A
East: OLD MORRILTON													
Lane 2	0.146	39.9	0.0	15.12	886.0	17.6	0.69	14.43	2.0	4.6	6.0	6.1	LOS A
North: OLD MORRILTON													
This approach does not have any continuous lanes													
West: DONAGHEY													
This approach does not have any continuous lanes													

Midblock Effective Detection Zone Length = 7 ft

# QUEUE ANALYSIS

Site: 101 [AM- Donaghey.Old Morrilton-10 year (Site Folder: General)]

New Site  
 Site Category: (None)  
 Roundabout  
 Design Life Analysis (Final Year): Results for 10 years

Lane Queues (Distance)															
Lane Number	Contin. Lane	Deg. Satn v/c	Prog. Factor (Queue)	Overflow Queue (ft)	Back of Queue (ft)		Queue at Start of Green (ft)		Cycle Average Queue (ft)		Queue Storage Ratio		Prob. Block. %	Prob. SL Ov. %	Ov. Lane No.
					Av.	95%	Av.	95%	Av.	95%	Av.	95%			
South: DONAGHEY															
Lane 1		0.245	1.000	0.0	9.6	24.0	NA	NA	9.7	17.5	0.01	0.01	0.0	NA	NA
Lane 2	Y	0.082	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	NA	0.0	1
Approach		0.245			9.6	24.0	NA	NA	9.7	17.5	0.01	0.01			
East: OLD MORRILTON															
Lane 1		0.426	1.000	0.0	23.7	59.0	NA	NA	26.0	47.1	0.01	0.04	0.0	NA	NA
Lane 2	Y	0.168	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	0.0	NA	NA
Approach		0.426			23.7	59.0	NA	NA	26.0	47.1	0.01	0.04			
North: OLD MORRILTON															
Lane 1		0.480	1.000	6.4	31.3	77.9	NA	NA	30.2	54.8	0.02	0.05	0.0	NA	NA
Lane 2		0.081	1.000	0.0	3.1	7.6	NA	NA	2.4	4.4	0.00	0.00	0.0	NA	NA
Approach		0.480			31.3	77.9	NA	NA	30.2	54.8	0.02	0.05			
West: DONAGHEY															
Lane 1		0.652	1.000	22.7	70.5	175.3	NA	NA	58.7	106.4	0.04	0.11	0.0	NA	NA
Approach		0.652			70.5	175.3	NA	NA	58.7	106.4	0.04	0.11			
Intersection		0.652			70.5	175.3	NA	NA	58.7	106.4	0.04	0.11			

Queue Model: HCM Queue Formula.  
 Gap-Acceptance Capacity: Traditional M1.

Lane Queues (Vehicles)															
Lane Number	Contin. Lane	Deg. Satn v/c	Prog. Factor (Queue)	Overflow Queue (veh)	Back of Queue (veh)		Queue at Start of Green (veh)		Cycle Average Queue (veh)		Queue Storage Ratio		Prob. Block. %	Prob. SL Ov. %	Ov. Lane No.
					Av.	95%	Av.	95%	Av.	95%	Av.	95%			
South: DONAGHEY															
Lane 1		0.245	1.000	0.0	0.4	0.9	NA	NA	0.4	0.7	0.01	0.01	0.0	NA	NA
Lane 2	Y	0.082	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	NA	0.0	1
Approach		0.245			0.4	0.9	NA	NA	0.4	0.7	0.01	0.01			
East: OLD MORRILTON															
Lane 1		0.426	1.000	0.0	0.9	2.3	NA	NA	1.0	1.8	0.01	0.04	0.0	NA	NA
Lane 2	Y	0.168	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	0.0	NA	NA
Approach		0.426			0.9	2.3	NA	NA	1.0	1.8	0.01	0.04			
North: OLD MORRILTON															
Lane 1		0.480	1.000	0.2	1.2	3.0	NA	NA	1.2	2.1	0.02	0.05	0.0	NA	NA
Lane 2		0.081	1.000	0.0	0.1	0.3	NA	NA	0.1	0.2	0.00	0.00	0.0	NA	NA



Approach	0.480		1.2	3.0	NA	NA	1.2	2.1	0.02	0.05				
West: DONAGHEY														
Lane 1	0.652	1.000	0.9	2.8	6.8	NA	NA	2.3	4.2	0.04	0.11	0.0	NA	NA
Approach	0.652			2.8	6.8	NA	NA	2.3	4.2	0.04	0.11			
Intersection	0.652			2.8	6.8	NA	NA	2.3	4.2	0.04	0.11			

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: Traditional M1.

Continuous Lane Performance														
Lane Number	Deg. Satn	Unint. Speed	Unint. Travel Delay	Hdwy Spacing	Aver. Vehicle Length	Occup. Time	Space Time	Space Occup. Ratio	Time Occup. Ratio	Density	LOS (Density Method)			
	v/c	mph	sec	sec	ft	sec	sec	%	%	veh/mi	pc/mi			
South: DONAGHEY														
Lane 2	0.082	40.0	0.0	26.92	1577.9	17.6	0.69	26.22	1.1	2.6	3.3	3.4	LOS A	
East: OLD MORRILTON														
Lane 2	0.168	39.9	0.0	13.15	770.3	17.6	0.69	12.46	2.3	5.3	6.9	7.0	LOS A	
North: OLD MORRILTON														
This approach does not have any continuous lanes														
West: DONAGHEY														
This approach does not have any continuous lanes														

Midblock Effective Detection Zone Length = 7 ft

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: MCCLELLAND CONSULTING ENGINEERS, INC | Licence: NETWORK / 1PC | Processed: Thursday, June 3, 2021 11:23:34 AM  
Project: Not Saved

# QUEUE ANALYSIS

Site: 101 [AM- Donaghey.Old Morrilton-20 year (Site Folder: General)]

New Site  
 Site Category: (None)  
 Roundabout  
 Design Life Analysis (Final Year): Results for 20 years

Lane Queues (Distance)															
Lane Number	Contin. Lane	Deg. Satn v/c	Prog. Factor (Queue)	Overflow Queue (ft)	Back of Queue (ft)		Queue at Start of Green (ft)		Cycle Average Queue (ft)		Queue Storage Ratio		Prob. Block. %	Prob. SL Ov. %	Ov. Lane No.
					Av.	95%	Av.	95%	Av.	95%	Av.	95%			
South: DONAGHEY															
Lane 1		0.305	1.000	0.7	12.6	31.2	NA	NA	13.1	23.8	0.01	0.02	0.0	NA	NA
Lane 2	Y	0.093	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	NA	0.0	1
Approach		0.305			12.6	31.2	NA	NA	13.1	23.8	0.01	0.02			
East: OLD MORRILTON															
Lane 1		0.496	1.000	0.1	29.6	73.5	NA	NA	34.3	62.3	0.02	0.05	0.0	NA	NA
Lane 2	Y	0.190	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	0.0	NA	NA
Approach		0.496			29.6	73.5	NA	NA	34.3	62.3	0.02	0.05			
North: OLD MORRILTON															
Lane 1		0.579	1.000	13.7	46.1	114.5	NA	NA	43.9	79.6	0.03	0.07	0.0	NA	NA
Lane 2		0.098	1.000	0.0	3.7	9.2	NA	NA	3.0	5.5	0.00	0.01	0.0	NA	NA
Approach		0.579			46.1	114.5	NA	NA	43.9	79.6	0.03	0.07			
West: DONAGHEY															
Lane 1		0.786	1.000	48.2	115.9	288.0	NA	NA	100.8	182.9	0.07	0.18	0.0	NA	NA
Approach		0.786			115.9	288.0	NA	NA	100.8	182.9	0.07	0.18			
Intersection		0.786			115.9	288.0	NA	NA	100.8	182.9	0.07	0.18			

Queue Model: HCM Queue Formula.  
 Gap-Acceptance Capacity: Traditional M1.

Lane Queues (Vehicles)															
Lane Number	Contin. Lane	Deg. Satn v/c	Prog. Factor (Queue)	Overflow Queue (veh)	Back of Queue (veh)		Queue at Start of Green (veh)		Cycle Average Queue (veh)		Queue Storage Ratio		Prob. Block. %	Prob. SL Ov. %	Ov. Lane No.
					Av.	95%	Av.	95%	Av.	95%	Av.	95%			
South: DONAGHEY															
Lane 1		0.305	1.000	0.0	0.5	1.2	NA	NA	0.5	0.9	0.01	0.02	0.0	NA	NA
Lane 2	Y	0.093	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	NA	0.0	1
Approach		0.305			0.5	1.2	NA	NA	0.5	0.9	0.01	0.02			
East: OLD MORRILTON															
Lane 1		0.496	1.000	0.0	1.2	2.9	NA	NA	1.3	2.4	0.02	0.05	0.0	NA	NA
Lane 2	Y	0.190	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	0.0	NA	NA
Approach		0.496			1.2	2.9	NA	NA	1.3	2.4	0.02	0.05			
North: OLD MORRILTON															
Lane 1		0.579	1.000	0.5	1.8	4.5	NA	NA	1.7	3.1	0.03	0.07	0.0	NA	NA
Lane 2		0.098	1.000	0.0	0.1	0.4	NA	NA	0.1	0.2	0.00	0.01	0.0	NA	NA

Approach	0.579		1.8	4.5	NA	NA	1.7	3.1	0.03	0.07				
West: DONAGHEY														
Lane 1	0.786	1.000	1.9	4.5	11.3	NA	NA	3.9	7.1	0.07	0.18	0.0	NA	NA
Approach	0.786		4.5	11.3	NA	NA	3.9	7.1	0.07	0.18				
Intersection	0.786		4.5	11.3	NA	NA	3.9	7.1	0.07	0.18				

Queue Model: HCM Queue Formula.  
Gap-Acceptance Capacity: Traditional M1.

Continuous Lane Performance														
Lane Number	Deg. Satn	Unint. Speed	Unint. Travel Delay	Hdwy Spacing	Aver. Vehicle Length	Occup. Time	Space Time	Space Occup. Ratio	Time Occup. Ratio	Density	LOS (Density Method)			
	v/c	mph	sec	sec	ft	sec	sec	%	%	veh/mi	pc/mi			
South: DONAGHEY														
Lane 2	0.093	40.0	0.0	23.81	1395.7	17.6	0.69	23.12	1.3	2.9	3.8	3.9	LOS A	
East: OLD MORRILTON														
Lane 2	0.190	39.9	0.1	11.63	681.2	17.6	0.69	10.94	2.6	6.0	7.8	7.9	LOS A	
North: OLD MORRILTON														
This approach does not have any continuous lanes														
West: DONAGHEY														
This approach does not have any continuous lanes														

Midblock Effective Detection Zone Length = 7 ft

# QUEUE ANALYSIS

Site: 101 [PM- Donaghey.Old Morrilton-0 year (Site Folder: General)]

New Site  
 Site Category: (None)  
 Roundabout

Lane Queues (Distance)															
Lane Number	Contin. Lane	Deg. Satn v/c	Prog. Factor (Queue)	Overflow Queue (ft)	Back of Queue (ft)		Queue at Start of Green (ft)		Cycle Average Queue (ft)		Queue Storage Ratio		Prob. Block. %	Prob. SL Ov. %	Ov. Lane No.
					Av.	95%	Av.	95%	Av.	95%	Av.	95%			
South: DONAGHEY															
Lane 1		0.422	1.000	4.2	21.7	53.9	NA	NA	22.5	40.9	0.01	0.03	0.0	NA	NA
Lane 2	Y	0.080	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	NA	0.0	1
Approach		0.422			21.7	53.9	NA	NA	22.5	40.9	0.01	0.03			
East: OLD MORRILTON															
Lane 1		0.641	1.000	21.9	72.5	180.3	NA	NA	58.5	106.0	0.05	0.11	0.0	NA	NA
Lane 2	Y	0.262	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	0.0	NA	NA
Approach		0.641			72.5	180.3	NA	NA	58.5	106.0	0.05	0.11			
North: OLD MORRILTON															
Lane 1		0.473	1.000	6.4	28.7	71.3	NA	NA	28.6	51.9	0.02	0.04	0.0	NA	NA
Lane 2		0.132	1.000	0.0	5.0	12.5	NA	NA	4.3	7.9	0.00	0.01	0.0	NA	NA
Approach		0.473			28.7	71.3	NA	NA	28.6	51.9	0.02	0.04			
West: DONAGHEY															
Lane 1		0.721	1.000	36.1	101.9	253.2	NA	NA	78.6	142.6	0.06	0.16	0.0	NA	NA
Approach		0.721			101.9	253.2	NA	NA	78.6	142.6	0.06	0.16			
Intersection		0.721			101.9	253.2	NA	NA	78.6	142.6	0.06	0.16			

Queue Model: HCM Queue Formula.  
 Gap-Acceptance Capacity: Traditional M1.

Lane Queues (Vehicles)															
Lane Number	Contin. Lane	Deg. Satn v/c	Prog. Factor (Queue)	Overflow Queue (veh)	Back of Queue (veh)		Queue at Start of Green (veh)		Cycle Average Queue (veh)		Queue Storage Ratio		Prob. Block. %	Prob. SL Ov. %	Ov. Lane No.
					Av.	95%	Av.	95%	Av.	95%	Av.	95%			
South: DONAGHEY															
Lane 1		0.422	1.000	0.2	0.8	2.1	NA	NA	0.9	1.6	0.01	0.03	0.0	NA	NA
Lane 2	Y	0.080	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	NA	0.0	1
Approach		0.422			0.8	2.1	NA	NA	0.9	1.6	0.01	0.03			
East: OLD MORRILTON															
Lane 1		0.641	1.000	0.9	2.8	7.0	NA	NA	2.3	4.1	0.05	0.11	0.0	NA	NA
Lane 2	Y	0.262	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	0.0	NA	NA
Approach		0.641			2.8	7.0	NA	NA	2.3	4.1	0.05	0.11			
North: OLD MORRILTON															
Lane 1		0.473	1.000	0.2	1.1	2.8	NA	NA	1.1	2.0	0.02	0.04	0.0	NA	NA
Lane 2		0.132	1.000	0.0	0.2	0.5	NA	NA	0.2	0.3	0.00	0.01	0.0	NA	NA
Approach		0.473			1.1	2.8	NA	NA	1.1	2.0	0.02	0.04			

West: DONAGHEY														
Lane 1	0.721	1.000	1.4	4.0	9.9	NA	NA	3.1	5.6	0.06	0.16	0.0	NA	NA
Approach	0.721			4.0	9.9	NA	NA	3.1	5.6	0.06	0.16			
Intersection	0.721			4.0	9.9	NA	NA	3.1	5.6	0.06	0.16			

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: Traditional M1.

Continuous Lane Performance													
Lane Number	Deg. Satn	Unint. Speed	Unint. Travel Delay	Hdwy Spacing	Aver. Vehicle Length	Occup. Time	Space Time	Space Occup. Ratio	Time Occup. Ratio	Density	LOS (Density Method)		
	v/c	mph	sec	sec	ft	sec	sec	%	%	veh/mi	pc/mi		
South: DONAGHEY													
Lane 2	0.080	40.0	0.0	27.60	1618.1	17.6	0.69	26.91	1.1	2.5	3.3	3.3	LOS A
East: OLD MORRILTON													
Lane 2	0.262	39.9	0.1	8.45	494.3	17.6	0.69	7.76	3.6	8.2	10.7	10.9	LOS A
North: OLD MORRILTON													
This approach does not have any continuous lanes													
West: DONAGHEY													
This approach does not have any continuous lanes													

Midblock Effective Detection Zone Length = 7 ft

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: MCCLELLAND CONSULTING ENGINEERS, INC | Licence: NETWORK / 1PC | Processed: Thursday, June 3, 2021 11:23:30 AM

Project: Not Saved

# QUEUE ANALYSIS

Site: 101 [PM- Donaghey.Old Morrilton-10 year (Site Folder: General)]

New Site  
 Site Category: (None)  
 Roundabout  
 Design Life Analysis (Final Year): Results for 10 years

Lane Queues (Distance)															
Lane Number	Contin. Lane	Deg. Satn v/c	Prog. Factor (Queue)	Overflow Queue (ft)	Back of Queue (ft)		Queue at Start of Green (ft)		Cycle Average Queue (ft)		Queue Storage Ratio		Prob. Block. %	Prob. SL Ov. %	Ov. Lane No.
					Av.	95%	Av.	95%	Av.	95%	Av.	95%			
South: DONAGHEY															
Lane 1		0.546	1.000	9.6	32.3	80.2	NA	NA	36.1	65.5	0.02	0.05	0.0	NA	NA
Lane 2	Y	0.092	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	NA	0.0	1
Approach		0.546			32.3	80.2	NA	NA	36.1	65.5	0.02	0.05			
East: OLD MORRILTON															
Lane 1		0.780	1.000	51.0	128.6	319.7	NA	NA	102.0	185.1	0.08	0.20	0.0	NA	NA
Lane 2	Y	0.301	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	0.0	NA	NA
Approach		0.780			128.6	319.7	NA	NA	102.0	185.1	0.08	0.20			
North: OLD MORRILTON															
Lane 1		0.598	1.000	14.1	43.7	108.5	NA	NA	45.6	82.8	0.03	0.07	0.0	NA	NA
Lane 2		0.167	1.000	0.0	6.4	15.8	NA	NA	5.8	10.5	0.00	0.01	0.0	NA	NA
Approach		0.598			43.7	108.5	NA	NA	45.6	82.8	0.03	0.07			
West: DONAGHEY															
Lane 1		0.887	1.000	97.1	201.2	500.2	NA	NA	166.4	301.9	0.13	0.31	0.0	NA	NA
Approach		0.887			201.2	500.2	NA	NA	166.4	301.9	0.13	0.31			
Intersection		0.887			201.2	500.2	NA	NA	166.4	301.9	0.13	0.31			

Queue Model: HCM Queue Formula.  
 Gap-Acceptance Capacity: Traditional M1.

Lane Queues (Vehicles)															
Lane Number	Contin. Lane	Deg. Satn v/c	Prog. Factor (Queue)	Overflow Queue (veh)	Back of Queue (veh)		Queue at Start of Green (veh)		Cycle Average Queue (veh)		Queue Storage Ratio		Prob. Block. %	Prob. SL Ov. %	Ov. Lane No.
					Av.	95%	Av.	95%	Av.	95%	Av.	95%			
South: DONAGHEY															
Lane 1		0.546	1.000	0.4	1.3	3.1	NA	NA	1.4	2.6	0.02	0.05	0.0	NA	NA
Lane 2	Y	0.092	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	NA	0.0	1
Approach		0.546			1.3	3.1	NA	NA	1.4	2.6	0.02	0.05			
East: OLD MORRILTON															
Lane 1		0.780	1.000	2.0	5.0	12.5	NA	NA	4.0	7.2	0.08	0.20	0.0	NA	NA
Lane 2	Y	0.301	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	0.0	NA	NA
Approach		0.780			5.0	12.5	NA	NA	4.0	7.2	0.08	0.20			
North: OLD MORRILTON															
Lane 1		0.598	1.000	0.6	1.7	4.2	NA	NA	1.8	3.2	0.03	0.07	0.0	NA	NA
Lane 2		0.167	1.000	0.0	0.2	0.6	NA	NA	0.2	0.4	0.00	0.01	0.0	NA	NA

Approach	0.598		1.7	4.2	NA	NA	1.8	3.2	0.03	0.07				
West: DONAGHEY														
Lane 1	0.887	1.000	3.8	7.9	19.5	NA	NA	6.5	11.8	0.13	0.31	0.0	NA	NA
Approach	0.887		7.9	19.5	NA	NA	6.5	11.8	0.13	0.31				
Intersection	0.887		7.9	19.5	NA	NA	6.5	11.8	0.13	0.31				

Queue Model: HCM Queue Formula.  
Gap-Acceptance Capacity: Traditional M1.

Continuous Lane Performance														
Lane Number	Deg. Satn	Unint. Speed	Unint. Travel Delay	Hdwy Spacing	Aver. Vehicle Length	Occup. Time	Space Time	Space Occup. Ratio	Time Occup. Ratio	Density	LOS (Density Method)			
	v/c	mph	sec	sec	ft	sec	sec	%	%	veh/mi	pc/mi			
South: DONAGHEY														
Lane 2	0.092	40.0	0.0	24.00	1406.9	17.6	0.69	23.31	1.2	2.9	3.8	3.8	LOS A	
East: OLD MORRILTON														
Lane 2	0.301	39.9	0.1	7.35	429.5	17.6	0.69	6.65	4.1	9.4	12.3	12.6	LOS B	
North: OLD MORRILTON														
This approach does not have any continuous lanes														
West: DONAGHEY														
This approach does not have any continuous lanes														

Midblock Effective Detection Zone Length = 7 ft

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: MCCLELLAND CONSULTING ENGINEERS, INC | Licence: NETWORK / 1PC | Processed: Thursday, June 3, 2021 11:23:31 AM  
Project: Not Saved

# QUEUE ANALYSIS

Site: 101 [PM- Donaghey.Old Morrilton-20 year (Site Folder: General)]

New Site  
 Site Category: (None)  
 Roundabout  
 Design Life Analysis (Final Year): Results for 20 years

Lane Queues (Distance)															
Lane Number	Contin. Lane	Deg. Satn v/c	Prog. Factor (Queue)	Overflow Queue (ft)	Back of Queue (ft)		Queue at Start of Green (ft)		Cycle Average Queue (ft)		Queue Storage Ratio		Prob. Block. %	Prob. SL Ov. %	Ov. Lane No.
					Av.	95%	Av.	95%	Av.	95%	Av.	95%			
South: DONAGHEY															
Lane 1		0.665	1.000	17.5	45.5	113.2	NA	NA	56.3	102.2	0.03	0.07	0.0	NA	NA
Lane 2	Y	0.104	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	NA	0.0	1
Approach		0.665			45.5	113.2	NA	NA	56.3	102.2	0.03	0.07			
East: OLD MORRILTON															
Lane 1		0.923	1.000	126.6	244.4	607.4	NA	NA	206.7	374.9	0.15	0.38	0.0	NA	NA
Lane 2	Y	0.341	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	0.0	NA	NA
Approach		0.923			244.4	607.4	NA	NA	206.7	374.9	0.15	0.38			
North: OLD MORRILTON															
Lane 1		0.743	1.000	29.3	68.3	169.8	NA	NA	79.6	144.4	0.04	0.11	0.0	NA	NA
Lane 2		0.207	1.000	0.0	7.9	19.6	NA	NA	7.6	13.8	0.00	0.01	0.0	NA	NA
Approach		0.743			68.3	169.8	NA	NA	79.6	144.4	0.04	0.11			
West: DONAGHEY															
Lane 1		1.072	1.000	313.2	449.4	1116.9	NA	NA	439.5	797.3	0.28	0.70	0.0	NA	NA
Approach		1.072			449.4	1116.9	NA	NA	439.5	797.3	0.28	0.70			
Intersection		1.072			449.4	1116.9	NA	NA	439.5	797.3	0.28	0.70			

Queue Model: HCM Queue Formula.  
 Gap-Acceptance Capacity: Traditional M1.

Lane Queues (Vehicles)															
Lane Number	Contin. Lane	Deg. Satn v/c	Prog. Factor (Queue)	Overflow Queue (veh)	Back of Queue (veh)		Queue at Start of Green (veh)		Cycle Average Queue (veh)		Queue Storage Ratio		Prob. Block. %	Prob. SL Ov. %	Ov. Lane No.
					Av.	95%	Av.	95%	Av.	95%	Av.	95%			
South: DONAGHEY															
Lane 1		0.665	1.000	0.7	1.8	4.4	NA	NA	2.2	4.0	0.03	0.07	0.0	NA	NA
Lane 2	Y	0.104	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	NA	0.0	1
Approach		0.665			1.8	4.4	NA	NA	2.2	4.0	0.03	0.07			
East: OLD MORRILTON															
Lane 1		0.923	1.000	4.9	9.5	23.7	NA	NA	8.1	14.6	0.15	0.38	0.0	NA	NA
Lane 2	Y	0.341	1.000	0.0	0.0	0.0	NA	NA	0.0	0.0	0.00	0.00	0.0	NA	NA
Approach		0.923			9.5	23.7	NA	NA	8.1	14.6	0.15	0.38			
North: OLD MORRILTON															
Lane 1		0.743	1.000	1.1	2.7	6.6	NA	NA	3.1	5.6	0.04	0.11	0.0	NA	NA
Lane 2		0.207	1.000	0.0	0.3	0.8	NA	NA	0.3	0.5	0.00	0.01	0.0	NA	NA



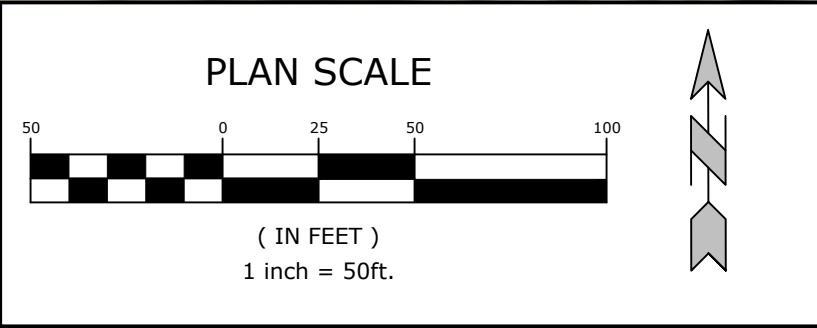
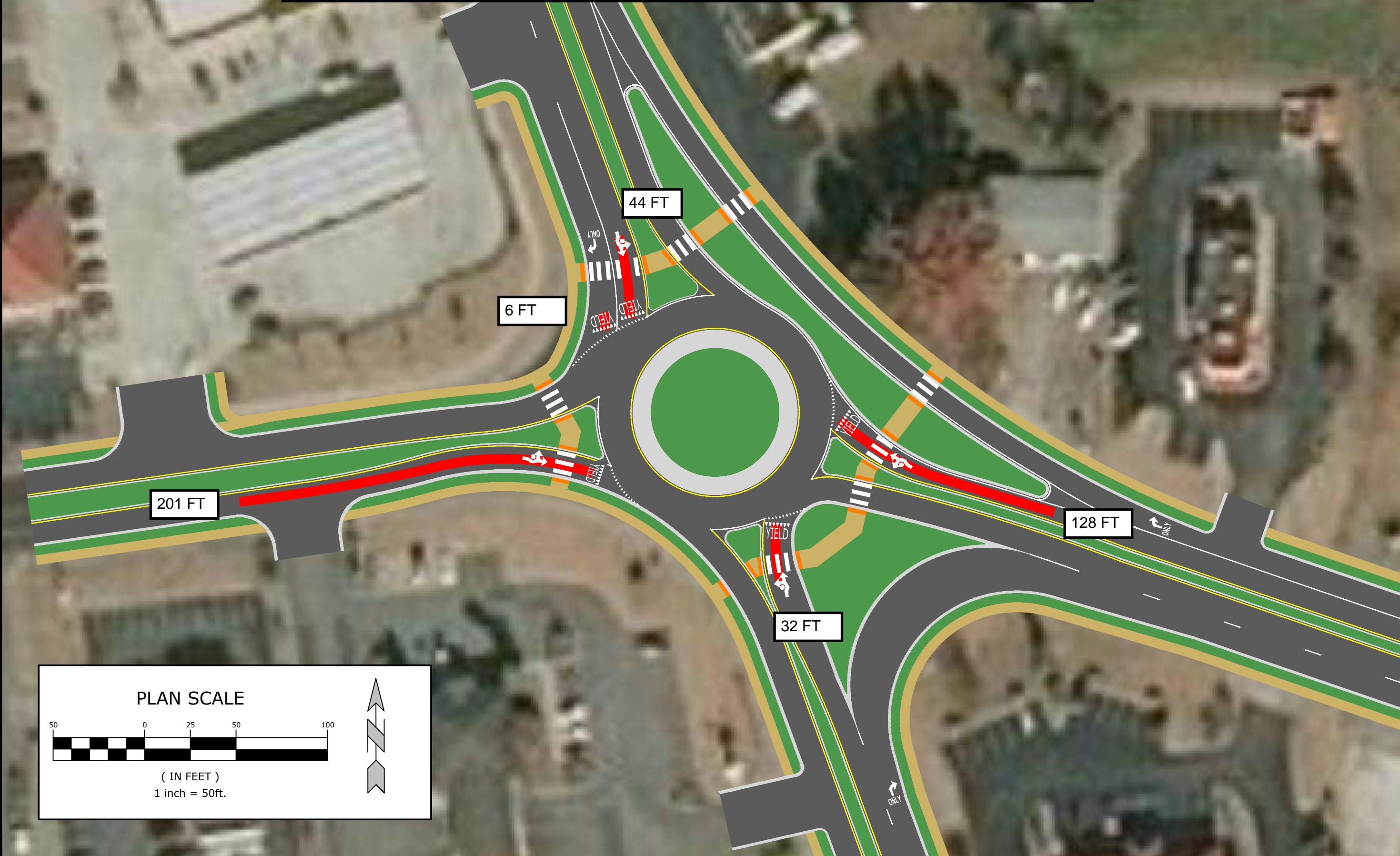
Approach	0.743		2.7	6.6	NA	NA	3.1	5.6	0.04	0.11				
West: DONAGHEY														
Lane 1	1.072	1.000	12.2	17.6	43.6	NA	NA	17.2	31.1	0.28	0.70	0.0	NA	NA
Approach	1.072			17.6	43.6	NA	NA	17.2	31.1	0.28	0.70			
Intersection	1.072			17.6	43.6	NA	NA	17.2	31.1	0.28	0.70			

Queue Model: HCM Queue Formula.  
Gap-Acceptance Capacity: Traditional M1.

Continuous Lane Performance														
Lane Number	Deg. Satn	Unint. Speed	Unint. Travel Delay	Hdwy Spacing	Aver. Vehicle Length	Occup. Time	Space Time	Space Occup. Ratio	Time Occup. Ratio	Density	LOS (Density Method)			
	v/c	mph	sec	sec	ft	sec	sec	%	%	veh/mi	pc/mi			
South: DONAGHEY														
Lane 2	0.104	40.0	0.0	21.23	1244.4	17.6	0.69	20.54	1.4	3.3	4.2	4.3	LOS A	
East: OLD MORRILTON														
Lane 2	0.341	39.8	0.1	6.50	379.7	17.6	0.69	5.81	4.6	10.7	13.9	14.2	LOS B	
North: OLD MORRILTON														
This approach does not have any continuous lanes														
West: DONAGHEY														
This approach does not have any continuous lanes														

Midblock Effective Detection Zone Length = 7 ft

# AVEGRAGE LENGTH (FT) TO BACK OF QUEUE FOR 10 YEAR PM PEAK HOUR



W:\2019\19-2182 - Donaghey Ave Hwy (64) Intersection Evaluation\Design Drawings\Final Design - dl 10.Yr Queue.dwg, PRINTED ON: June 3, 2021 @ 2:44 PM

REV	DATE	DESCRIPTION

**DONAGHEY  
AVE AT HWY  
64**

DESIGNED BY:	JTB
DATE:	6/3/2021
SCALE:	50 SCALE
DRAWN BY:	JTB
REVISION:	CONCEPTUAL
JOB NUMBER:	19-2181
SCALE:	1