

Analysis of Locust Hill Community Option
Widening Northbound MD 355, South of North Wood Road
SHA – Travel Forecasting & Analysis Division
By: Matt Snare
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This brief memo outlines the results of traffic analyses performed by the Travel Forecasting and Analysis Division (TFAD) to test the operational benefits of widening northbound MD 355, south of the North Wood Road intersection. The Locust Hill community had requested that SHA study this option as an alternative to the Phase 4 improvements proposed at the intersection of MD 355 at Cedar Lane, which would involve widening northbound MD 355 north of Cedar Lane.

Operational analyses were conducted using traffic simulation models of the MD 355 corridor that had been developed by SHA using Synchro software, Version 7, and its companion microsimulation software, SimTraffic. Only PM peak hour operations were studied, because the PM peak is the critical period for northbound traffic. The analyses assumed that the existing signal at North Wood Road would remain operational during the PM peak and that the proposed Phase 1 through Phase 3 improvements at the intersection of MD 355 at Cedar Lane would be constructed as the base condition. Operational analyses were conducted by SHA using two different volume sets: 1) the 2011 BRAC forecasts developed by SHA, and 2) the 2012 traffic count volumes collected by SHA in the spring. To date, SHA has preferred to use the 2011 BRAC forecasts when conducting analyses, because SHA feels these forecasts better reflect the actual traffic demand in the study area, while the 2012 counts may be constrained by several factors, including peak hour spreading and vehicle diversions. However, the Locust Hill community has requested that SHA also consider the 2012 count volumes to better capture certain traffic patterns.

SHA examined several measures of effectiveness, including travel time, queue lengths, and delay, to compare the option of widening south of North Wood Road versus constructing Phase 4. SHA also examined the option of providing *both* Phase 4 and the widening south of North Wood Road, for comparison. The results are summarized in the tables on the following page. The results indicate that widening MD 355 south of North Wood Road would be expected to provide **only minor improvements** to northbound delay and queuing approaching North Wood Road, and would be expected to provide **virtually no benefit to corridor travel times**. Since the major bottleneck along the corridor is at Cedar Lane, improvements upstream do not provide significant benefits to the system compared to capacity enhancements at the Cedar Lane intersection itself. Using the 2012 traffic count volumes, the simulation model projects that the option to widen south of North Wood Road would not provide any travel time savings along the corridor during the PM peak hour, with or without Phase 4. Using the 2011 BRAC forecast volumes, the simulation model projects minor travel time savings for the option to widen south of North Wood Road (less than 30 seconds per vehicle). However, this savings is significantly less than the travel time savings the simulation model projects for Phase 4 (over 80 seconds per vehicle).

Based on these findings, SHA TFAD concludes that the option of widening south of North Wood Road is not a viable substitute for the proposed Phase 4 improvements from an operational standpoint.

**Table 1. MD 355 at North Wood Road
Synchro / SimTraffic Analysis Results
Using 2011 BRAC Forecast Volumes**

Conditions	NB Travel Time - Wilson Drive to Alta Vista Road	MD 355 NB Queue at N. Wood Road	MD 355 NB Delay at N. Wood Road
Base Condition (MD 355/Cedar Lane Phase 3)	256.1 sec	925 ft	15.8 sec/veh
Base Condition <i>Plus</i> Widening South of North Wood Road	227.6 sec	510 ft	9.9 sec/veh
Build Phase 4 (MD 355 at Cedar Lane)	174.4 sec	925 ft	15.8 sec/veh
Build Phase 4 <i>Plus</i> Widening South of North Wood Road	175.9 sec	510 ft	9.9 sec/veh

**Table 2. MD 355 at North Wood Road
Synchro / SimTraffic Analysis Results
Using 2012 Count Volumes**

Conditions	NB Travel Time - Wilson Drive to Alta Vista Road	MD 355 NB Queue at N. Wood Road	MD 355 NB Delay at N. Wood Road
Base Condition (MD 355/Cedar Lane Phase 3)	137.6 sec	825 ft	23.1 sec/veh
Base Condition <i>Plus</i> Widening South of North Wood Road	137.7 sec	525 ft	17.9 sec/veh
Build Phase 4 (MD 355 at Cedar Lane)	135.8 sec	825 ft	23.1 sec/veh
Build Phase 4 <i>Plus</i> Widening South of North Wood Road	139.4 sec	525 ft	17.9 sec/veh

Arterial Level of Service
PM Peak Hour

1/4/2013

Arterial Level of Service: NB MD 355

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
North Wood Rd	4	59.0	75.3	0.2	10
Cedar La	61	114.9	128.1	0.2	8
	12	10.9	52.7	0.3	23
Total		184.8	256.1	0.7	13

Arterial Level of Service: SB MD 355

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	12	1.3	15.5	0.1	28
Cedar La	61	48.9	89.6	0.3	14
	4	3.2	17.5	0.2	31
Total		53.4	122.5	0.6	18

Arterial Level of Service
PM Peak Hour

1/4/2013

Arterial Level of Service: NB MD 355

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
North Wood Rd	4	29.3	45.7	0.2	14
Cedar La	61	116.1	129.3	0.2	8
	12	10.8	52.6	0.3	23
Total		156.1	227.6	0.7	14

Arterial Level of Service: SB MD 355

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	12	1.8	16.0	0.1	27
Cedar La	61	52.2	92.9	0.3	13
	4	3.2	17.5	0.2	31
Total		57.2	126.4	0.6	17

Arterial Level of Service: NB MD 355

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	14	13.4	25.9	0.1	19
North Wood Rd	4	11.7	15.6	0.0	10
Cedar La	61	63.7	76.6	0.2	8
	12	10.5	34.2	0.2	20
	5	3.9	22.1	0.2	25
Total		103.3	174.4	0.7	15

Arterial Level of Service: SB MD 355

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	5	0.5	14.6	0.1	30
	12	0.6	18.8	0.2	29
Cedar La	61	29.8	52.1	0.2	13
	4	3.0	17.3	0.2	32
	14	0.3	4.3	0.0	36
Total		34.2	107.0	0.7	22

Arterial Level of Service
PM Peak Hour

1/4/2013

Arterial Level of Service: NB MD 355

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	14	5.4	17.7	0.1	27
North Wood Rd	4	12.6	16.6	0.0	9
Cedar La	61	72.8	85.7	0.2	8
	12	10.3	34.0	0.2	20
	5	3.8	22.0	0.2	25
Total		104.9	175.9	0.7	15

Arterial Level of Service: SB MD 355

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	5	0.5	14.6	0.1	30
	12	0.6	18.8	0.2	29
Cedar La	61	30.0	52.4	0.2	13
	4	3.0	17.2	0.2	32
	14	0.4	4.3	0.0	36
Total		34.4	107.3	0.7	22

Arterial Level of Service: NB MD 355

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
North Wood Rd	4	21.9	38.0	0.2	16
Cedar La	61	35.1	48.2	0.2	11
	12	9.6	51.3	0.3	24
Total		66.6	137.6	0.7	17

Arterial Level of Service: SB MD 355

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	12	0.5	14.6	0.1	30
Cedar La	61	18.5	59.1	0.3	21
	4	2.6	17.4	0.2	31
Total		21.5	91.1	0.6	24

Arterial Level of Service
PM Peak Hour

1/7/2013

Arterial Level of Service: NB MD 355

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
North Wood Rd	4	16.8	32.8	0.2	19
Cedar La	61	40.9	54.0	0.2	10
	12	9.2	50.9	0.3	24
Total		66.9	137.7	0.7	17

Arterial Level of Service: SB MD 355

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	12	0.5	14.6	0.1	30
Cedar La	61	18.4	59.0	0.3	21
	4	2.5	17.4	0.2	31
Total		21.4	91.0	0.6	24

Arterial Level of Service: NB MD 355

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	14	8.2	20.5	0.1	23
North Wood Rd	4	13.7	17.6	0.0	9
Cedar La	61	32.3	45.3	0.2	12
	12	7.2	31.0	0.2	22
	5	3.2	21.4	0.2	25
Total		64.6	135.8	0.7	18

Arterial Level of Service: SB MD 355

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	5	0.4	14.6	0.1	30
	12	0.6	18.8	0.2	29
Cedar La	61	17.2	39.6	0.2	17
	4	2.7	17.6	0.2	31
	14	0.3	4.3	0.0	36
Total		21.2	94.8	0.7	25

Arterial Level of Service: NB MD 355

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	14	3.5	15.6	0.1	30
North Wood Rd	4	14.3	18.2	0.0	8
Cedar La	61	39.4	52.4	0.2	10
	12	8.1	31.9	0.2	21
	5	3.1	21.3	0.2	25
Total		68.3	139.4	0.7	17

Arterial Level of Service: SB MD 355

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	5	0.4	14.6	0.1	30
	12	0.6	18.8	0.2	29
Cedar La	61	17.2	39.6	0.2	17
	4	2.7	17.6	0.2	31
	14	0.3	4.3	0.0	36
Total		21.2	94.8	0.7	25