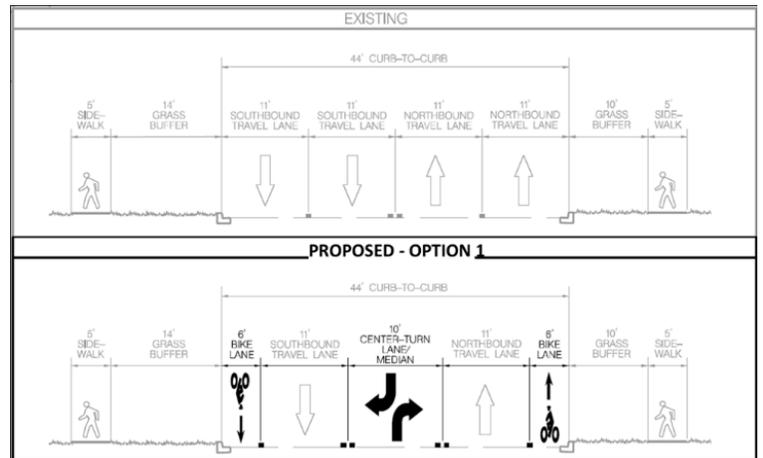


Complete Streets Feasibility Study and 10% Design Plan for Oakland Mills Road



June 2020

Table of Contents

1	Introduction.....	3
1.1	Project Purpose and Goals.....	3
1.2	Methodology.....	3
1.3	Study Area	4
2	Existing Conditions.....	4
2.1	Roadway Characteristics and Typical Section	4
2.2	Crash Data	5
2.3	Existing Pedestrian and Bicycle Infrastructure	8
2.4	Capacity Analysis	9
2.5	On-street Parking	13
2.6	Community Feedback prior to Concept Development.....	13
3	Road Diet Alternative.....	13
3.1	Alternatives Development and Preferred Option Design Elements	13
3.1.1	Intersections with Signals and Turn Pockets	16
3.1.2	New Sidewalk.....	18
3.1.3	Proposed Pedestrian Crossings and Refuge Medians.....	18
3.1.4	Design Elements at the Southern Project Limits	20
3.2	Traffic Analysis of Preferred Option	20
3.3	Community Feedback.....	24
4	Summary of Findings and Recommendations for Final Design.....	24

Table of Figures

Figure 1:	Study area	4
Figure 2:	Existing typical section for Oakland Mills Road	5
Figure 3:	Location and number of crashes within the study area, 2013 - 2017.....	6
Figure 4:	Breakdown of crashes at select locations	7
Figure 5:	Breakdown of crashes at select locations	7
Figure 6:	Locations of sidewalk and trails within the study area	8
Figure 7:	Existing conditions meeting	13
Figure 8:	Proposed typical cross-section for Oakland Mills Road – Option A	14
Figure 9:	Proposed typical cross-section for Oakland Mills Road – Option B	15
Figure 10:	Rendering of concept options	15
Figure 11:	Examples of vertical buffers for vehicle/bike lane separation	16
Figure 12:	Intersection of Oakland Mills Road at Kilimanjaro Road, under Option 1 scenario	17
Figure 13:	Intersection of Oakland Mills Rd at Kilimanjaro Rd, under Option 2 scenario	17

Figure 14: Sidewalk expansion along the west side of Oakland Mills Road	18
Figure 15: New crossing proposed at Oakland Mills Road at Farewell Road	19
Figure 16: Proposed pedestrian refuge and marked crossing at Malindy Circle (north).....	19
Figure 17: Proposed elements in the southern project limits	20

Table of Tables

Table 1: Speed and ADT Data along the Oakland Mills Road Corridor	5
Table 2: Crash Data Summary	6
Table 3: Intersection Level of Service Delay Ranges	10
Table 4: Existing Conditions Capacity Analysis Summary (delay in seconds).....	11
Table 5: Existing Conditions Queuing Analysis Summary	12
Table 6: Build Condition Capacity Analysis Summary (delay in seconds)	22
Table 7: Build Condition Queuing Summary	23

Appendices

- Appendix A: ADT, Speed, and Class Data
- Appendix B: Turn Movement Count Data
- Appendix C: HCM and Queuing Reports for the Existing Condition
- Appendix D: HCM and Queuing Reports for the Build Condition
- Appendix E: Conceptual Design Plans for the Recommended Concept

1 Introduction

The purpose of this feasibility study is to determine how to implement a *Complete Streets* design for Oakland Mills Road in Columbia, in order to provide greater pedestrian and bike safety and accessibility while addressing speed, parking, and congestion issues for vehicles, where needed.

Designing for Complete Streets means creating streets that are safe and accessible for all users, including pedestrians, bicyclists, motorists and transit riders of all ages and abilities. In 2019, Howard County passed a Complete Streets Resolution, CR120-2019:

To ensure that Howard County is a place for individuals of all backgrounds to live and travel freely, safely, and comfortably, public and private roadways in Howard County shall be safe and convenient for residents of all ages and abilities who travel by foot, bicycle, public transportation or automobile, ensuring sustainable communities Countywide.

For the purpose of focusing the numerous possible options for redesigning Oakland Mills Road, the assumption was made by the County that the curb-to-curb dimensions would generally remain the same, and that proposed modifications will occur within the roadbed or behind the fixed curbs. This assumption was due to the substantial capital costs associated with altering the width of the roadbed.

1.1 Project Purpose and Goals

The purpose of the feasibility study is to develop conceptual improvements for Oakland Mills Road, coordinate with and obtain “buy-in” from the local community, and develop 10% design plans, with all design assumptions documented for the Final Design phase.

The project evaluated safety, parking needs, vehicle speed, and pedestrian and bike accessibility/connectivity along Oakland Mills Road. Primary objectives for this feasibility study include:

1. Identifying community needs and vision for Oakland Mills Road, in accordance with community goals and the guidance of *PlanHoward*, *BikeHoward*, and *WalkHoward*.
2. Conducting traffic counts, speed data, traffic operations, and reviewing crash data.
3. Quantifying safety and operational impacts of possible improvements.
4. Develop cost-effective planning-level concepts for improvements to address community concerns and implementing Complete Streets guidelines.
5. Obtain community concurrence with conceptual plans and develop 10% design drawings, with design assumption documented.

1.2 Methodology

To achieve the project’s objectives, the following steps were conducted and are documented herein:

1. Collect traffic data at select intersections and roadway segments.
2. Evaluate existing traffic operations, parking occupancy, vehicle speeds, and crash data.
3. Obtain community input prior to and after developing planning level improvements.
4. Analyze planning level improvements for their impacts on safety, congestion, and accessibility.
5. Develop 10% Conceptual Designs and cost estimates, and document design assumptions.

This Technical Memorandum is the summary of the data collection efforts, community input, conceptual design, and design assumptions.

1.3 Study Area

Oakland Mills Road is classified as a major collector for the Owen Brown neighborhood of Columbia. It generally parallels MD 175 and provides access to two Intermediate Arterials - MD 175 and Snowden River Parkway. As shown in Figure 1, the study area limits represent a 2 mile segment of Oakland Mills Road from Old Columbia Road in the north to Deer Pasture Drive, just north of Snowden River Parkway.

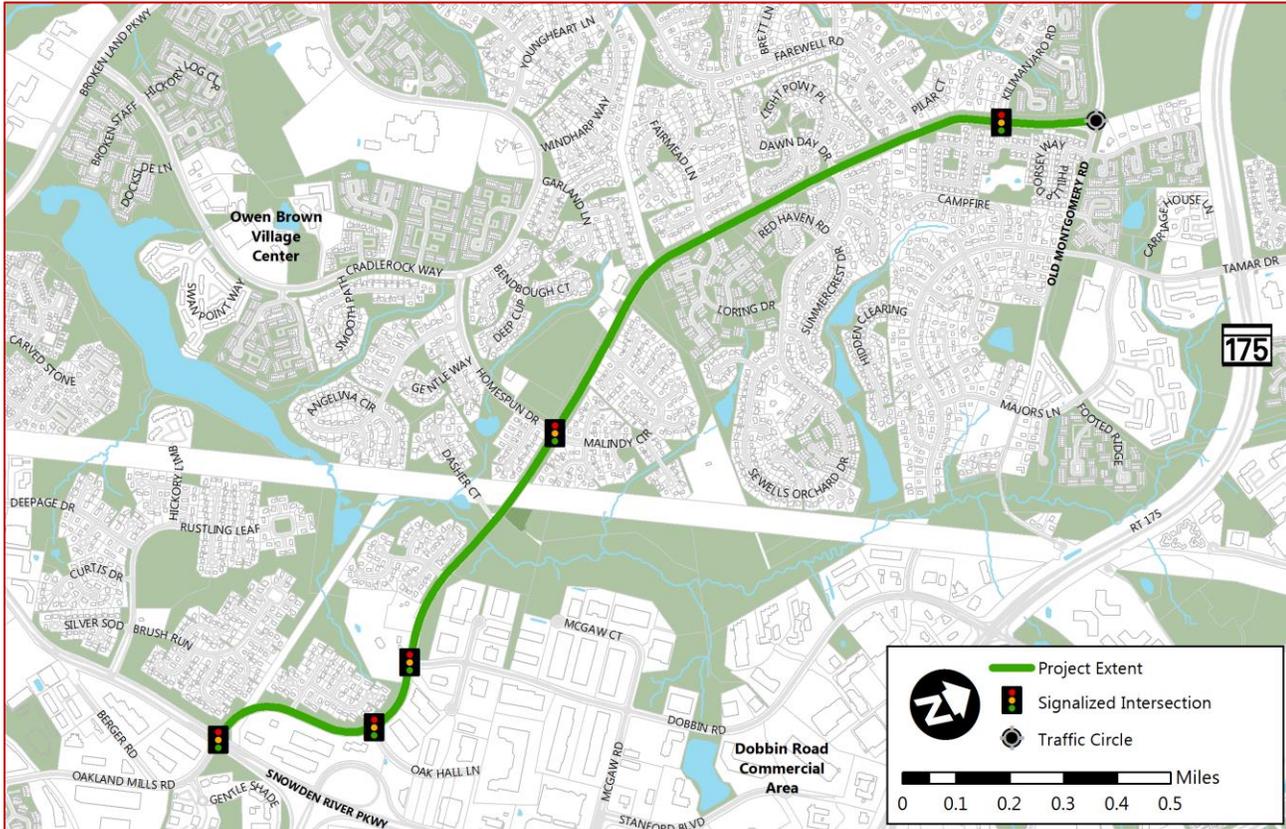


Figure 1: Study area

2 Existing Conditions

2.1 Roadway Characteristics and Typical Section

Oakland Mills Road is a closed-section (i.e., curbed) major collector that is 44 feet wide curb-to-curb, with sidewalks on both sides (except for a few locations) that is separated by a grass buffer for lighting, trees, and signs. Each direction of the roadway has two general-purpose travel lanes. The roadway widens at some intersections to accommodate an additional turn lane. The roadway’s typical section is shown in Figure 2.

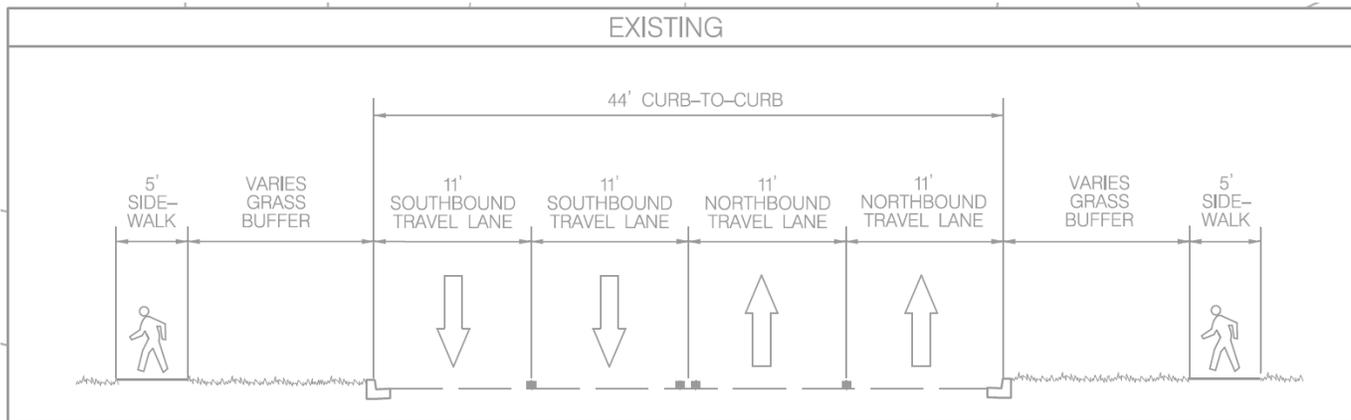


Figure 2: Existing typical section for Oakland Mills Road

The speed limit for the roadway is predominantly 35 mph, with a short segment posted for 30 mph on the approach leg to the roundabout at Old Montgomery Road, due to horizontal roadway curvature there. Speed data was collected during a typical day when County schools were in session. The speed data, as well as overall average daily traffic (ADT) data, is summarized in the following table. Raw Speed data and graphs for 48 successive hours can be found in Appendix A.

Table 1: Speed and ADT Data along the Oakland Mills Road Corridor

Location	ADT	Posted Speed Limit	Average Speed	% of Traffic Exceeding Posted Speed Limit by 10+ mph
South of Fairmead Lane	9900	35 MPH	39 MPH	17% of Southbound Drivers and 10% of Northbound Drivers

Vehicle Classification data was also collected; this data showed that about 96% of all traffic to be FHWA Class 1, 2, or 3 vehicles – passenger vehicles.

2.2 Crash Data

Five years of crash data (2013 through 2017) were obtained for the study area in order to determine if there were any recurring crash types or locations with a large number of overall crashes. Figure 3 shows where along Oakland Mills Road these crashes occurred.

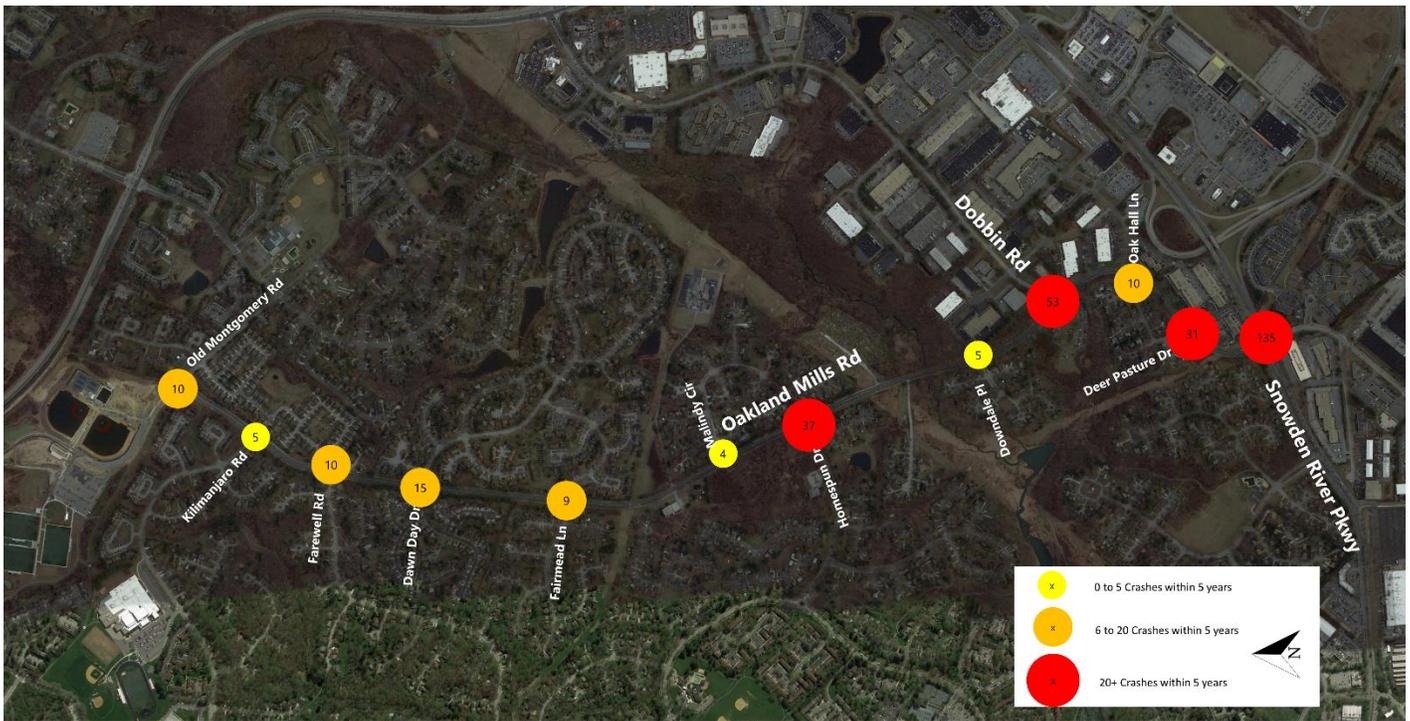


Figure 3: Location and number of crashes within the study area, 2013 - 2017.

A summary of all crashes is shown in the following table.

Table 2: Crash Data Summary

Oakland Mills Road Crash Data Summary (2013-2017)												
Cross Street	Pedestrian	Bicycle	Fatalities	Head On	Angle	Rear End	Fixed Object	Sideswipe	Other	Unknown	Total	Proportion
OLD MONTGOMERY RD	0	0	0	3	1	2	2	0	1	1	10	3%
KILIMANJARO RD	0	0	0	2	0	2	1	0	0	0	5	2%
FAREWELL RD	0	0	0	1	1	5	2	0	1	0	10	3%
DAWN DAY DR	0	0	0	4	7	2	1	0	0	1	15	5%
FAIRMEAD LN	0	0	0	4	1	0	0	3	1	0	9	3%
MALINDY CIR	0	0	0	0	1	2	0	0	0	1	4	1%
HOMESPUN DR	0	0	0	9	8	9	5	3	1	2	37	11%
DOWNDAL PL	0	0	0	1	0	2	0	1	1	0	5	2%
DOBBIN RD	0	0	0	21	5	17	1	2	2	5	53	16%
OAK HALL LN	0	0	0	0	2	4	1	3	0	0	10	3%
DEER PASTURE DR	0	0	0	2	8	5	1	3	11	1	31	10%
SNOWDEN RIVER PKWY	0	0	0	6	10	76	7	22	4	10	135	42%
Total	0	0	0	53	44	126	21	37	22	21	324	100%
Proportion	0%	0%	0%	16%	14%	39%	6%	11%	7%	6%	100%	

A summary of crash types for the higher-incident locations is shown in Figure 4 and Figure 5

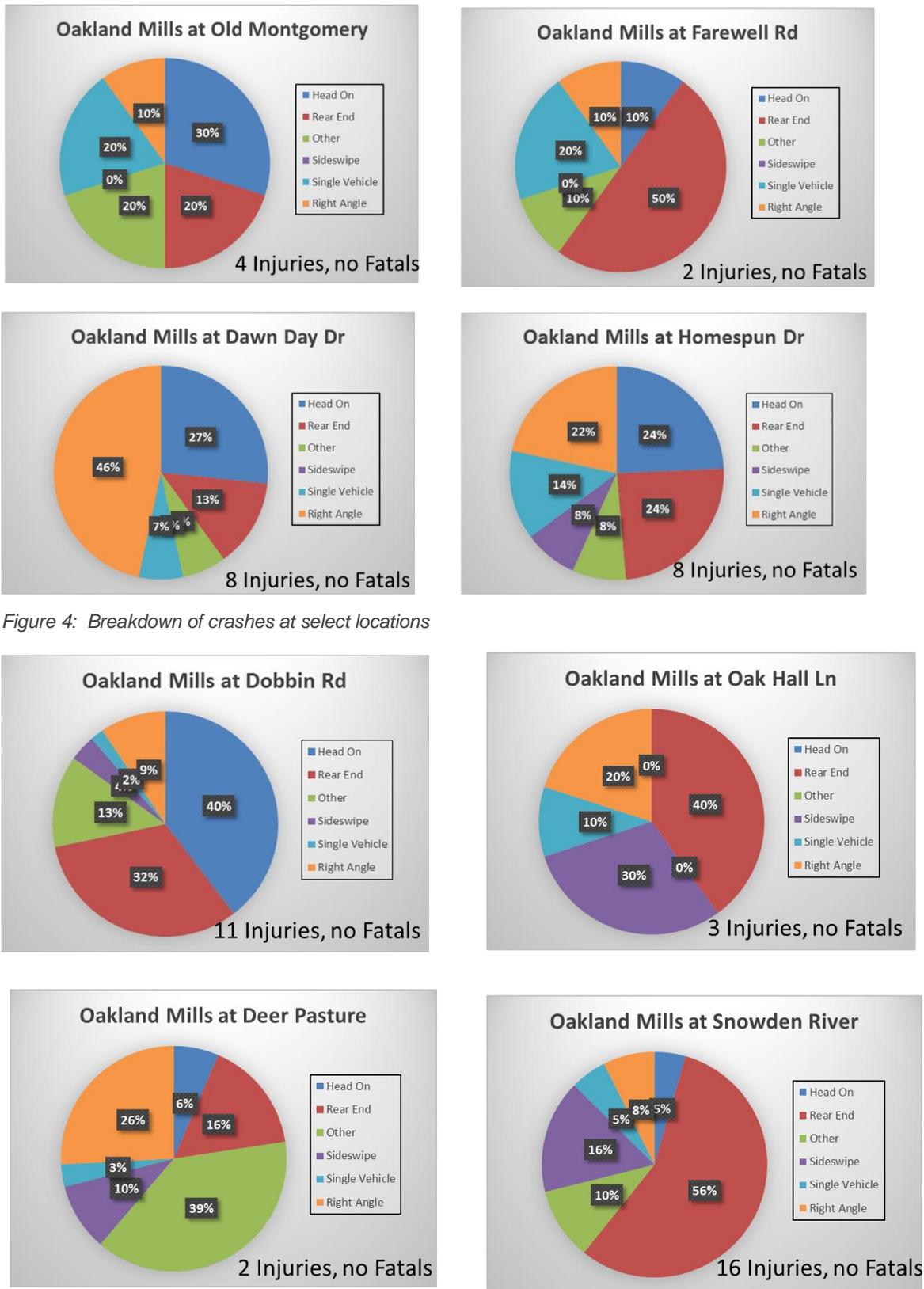


Figure 4: Breakdown of crashes at select locations

Figure 5: Breakdown of crashes at select locations

2.3 Existing Pedestrian and Bicycle Infrastructure

Oakland Mills Road has buffered sidewalks along both sides within the study area, with the exception of a couple of missing segments, as well as an integrated paved trail network, as shown in Figure 6. Cyclists may use the general-purpose travel lane; however, the prevailing vehicle speeds are typically much higher than that of casual riders. Additionally, cyclists are legally allowed to utilize sidewalks in Howard County. However, the sidewalks are not wide enough to share with pedestrians simultaneously.

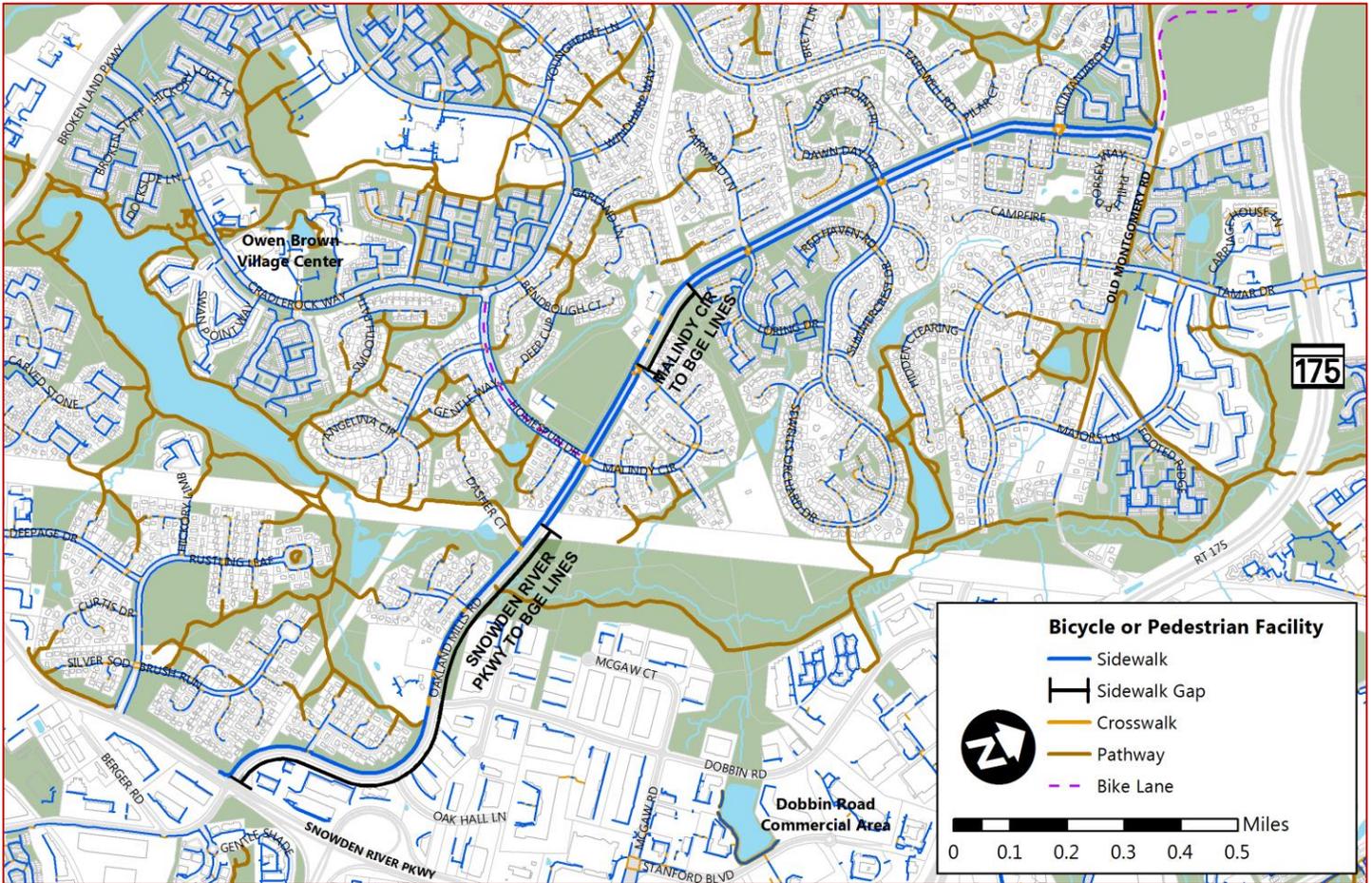


Figure 6: Locations of sidewalk and trails within the study area

Marked crosswalks to cross Oakland Mills Road are located at:

- Cloudleap Court (signalized)
- Old Dobbin Lane (signalized)

Additionally, there is a trail connection, joining an existing Columbia Association trail, under Oakland Mills Road located between Dasher Court and Downdale Place.

2.4 Capacity Analysis

The following twelve study area intersections were identified to study potential capacity constraints:

1. Oakland Mills Road at Old Montgomery Road
2. Oakland Mills Road at Kilimanjaro Road
3. Oakland Mills Road at Farewell Road
4. Oakland Mills Road at Dawn Day Drive
5. Oakland Mills Road at Fairmead Lane
6. Oakland Mills Road at Malindy Circle (north)
7. Oakland Mills Road at Homespun Drive
8. Oakland Mills Road at DOWDale Place
9. Oakland Mills Road at Dobbin Road
10. Oakland Mills Road at Oak Hall Lane
11. Oakland Mills Road at Deer Pasture Drive
12. Oakland Mills Road at Snowden River Pkwy

Turning movement counts were conducted in January 2019 for these sixteen intersections; cyclists, pedestrians, and vehicle were all counted during the AM and PM peak commuting periods. The raw count data can be found in Appendix B.

All study intersections were coded into a Synchro network to perform capacity analysis. Synchro is a deterministic and macroscopic intersection analysis computer software program that models street networks and traffic signal systems. Geometric data such as number of lanes, lane configuration, storage lengths, tapers, and distances between intersections were inputted into Synchro. Existing signal timings and phasing were obtained from the Maryland Department of Transportation State Highway Administration and Howard County Department of Public Works and coded into the Synchro traffic model along with existing traffic volumes.

The Synchro model representing *Existing Conditions* was validated via field observations. Modifications to parameters such as link speeds and headway factors were made, where necessary, to ensure the model represented field-observed delays and queue lengths.

Signal operations during the AM and PM peak period are summarized below:

- Oakland Mills Road at Kilimanjaro Road
 - AM & PM – Free with a maximum cycle length of 137 seconds
- Oakland Mills Road at Homespun Drive
 - AM & PM – Free with a maximum cycle length of 105 seconds
- Oakland Mills Road at Dobbin Road
 - AM & PM – Free with a maximum cycle length of 95 seconds
- Oakland Mills Road at Oak Hill Lane
 - AM & PM – Free with a maximum cycle length of 98 seconds
- Oakland Mills Road at Snowden River Parkway
 - AM & PM – Coordinated with a cycle length of 150 seconds

Intersection capacity analyses were performed using the industry standard National Academy of Sciences Transportation Research Board's Highway Capacity Manual (HCM) methodology for all study intersections.

Performance measures of effectiveness include level of service (LOS), volume-to-capacity (v/c) ratio, and average vehicle delay. Key performance measures are defined as follows:

Level of Service (LOS) is a qualitative measure describing vehicle traffic conditions of an intersection or any other transportation facility. At intersections, LOS is a letter designation that corresponds to a certain range of average vehicle delay caused by the traffic control device or conflicting traffic movements. The LOS range from 'A' to 'F', with 'A' indicating limited average delay for vehicles at an intersection and 'F' indicating significant delay. Table 3 shows each Level of Service and their corresponding delay values, as measured in seconds of wait time, for signalized and unsignalized intersections. LOS is typically calculated for peak commuting hours in the AM and PM. Different approaches to an intersection can have different wait times to clear it. The overall intersection LOS is a weighted average, by traffic volume, of each approach's delay.

Table 3: Intersection Level of Service Delay Ranges

Level of Service	Delay Range (sec)	
	Signalized intersections	Unsignalized intersections
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

Synchro implements Highway Capacity Manual 2000 (HCM) methods of analysis to determine LOS.

Delay (Control delay) is the portion of delay attributed to traffic signal operation for signalized intersections. Control delay (overall delay) can be categorized into deceleration delay, stopped delay, and acceleration delay.

The *volume-to-capacity ratio (v/c ratio)* is the ratio of current flow rate to the capacity of the intersection. This ratio is often used to determine how sufficient capacity is on a given roadway. Generally, a ratio of 1.0 indicates that the roadway is operating at capacity. A ratio of greater than 1.0 indicates that the facility is operating above capacity as the number of vehicles exceeds the roadway capacity.

Table 4 summarizes the HCM analysis performed under existing traffic conditions.

The results of the static *existing conditions* capacity analysis indicate that all intersections within the study area operate with acceptable levels of service except the following during the PM peak hour only:

- Oakland Mills Road at Deer Pasture Drive
 - Westbound Left-Right
- Oakland Mills Road at Snowden River Parkway
 - Westbound Left
 - Northbound Right
 - Southbound Left
 - Southbound Left-Through

Detailed HCM reports are in Appendix C.

In addition to capacity analysis, queuing was assessed using SimTraffic, Synchro's companion software. Estimated queue 95th % queue lengths were based on the average of five 60-minute model runs in SimTraffic. Estimated queue lengths are shown in Table 5.

As shown in the table, 95th percentile queue lengths do not exceed 150 feet or approximately five vehicle lengths at any unsignalized intersection. Detailed queuing reports are in Appendix C.

Table 4: Existing Conditions Capacity Analysis Summary (delay in seconds)

Intersection	Approach	Movement	Existing Conditions			
			AM (PM)			
			Delay	LOS	V/C	
Oakland Mills Road at Old Montgomery Road	Control Type		Roundabout			
	Overall		4.4 (5.7)	A (A)	- (-)	
	Eastbound	Overall	4.1 (5.0)	A (A)	0.11 (0.17)	
		through-right	4.1 (5.0)	A (A)	0.11 (0.17)	
	Westbound	Overall	4.1 (4.9)	A (A)	0.15 (0.22)	
		left-through	4.1 (4.9)	A (A)	0.15 (0.22)	
	Northbound	Overall	4.6 (6.3)	A (A)	0.23 (0.38)	
left-right		4.6 (6.3)	A (A)	0.23 (0.38)		
Oakland Mills Road & Homespun Drive/Malindy Circle (south)	Control Type		Signal			
	Overall		17.1 (17.3)	B (B)	0.35 (0.45)	
	Eastbound	Overall	26.8 (29.9)	C (C)	0.33 (0.46)	
		left-through	27.7 (31.0)	C (C)	0.33 (0.46)	
		right	26.1 (27.9)	C (C)	0.08 (0.04)	
	Westbound	Overall	33.1 (36.8)	C (D)	0.33 (0.20)	
		left-through-right	33.1 (36.8)	C (D)	0.33 (0.20)	
	Northbound	Overall	9.6 (10.5)	A (B)	0.14 (0.24)	
		left	7.4 (8.1)	A (A)	0.13 (0.24)	
		through	10.3 (11.3)	B (B)	0.14 (0.24)	
		right	9.5 (9.8)	A (A)	0.00 (0.01)	
Southbound	Overall	16.1 (19.9)	B (B)	0.40 (0.52)		
	left	34.3 (39.7)	C (D)	0.07 (0.31)		
	through-right	15.9 (19.1)	B (B)	0.40 (0.52)		
	through	- (-)	- (-)	- (-)		
Oakland Mills Road & Kilmanjaro Road/Helen Dorsey Way	Control Type		Stop (T Int)			
	Overall		12.4 (15.7)	B (C)	0.16 (0.30)	
	Eastbound	left-right	12.4 (15.7)	B (C)	0.16 (0.30)	
		Overall	1.9 (1.4)	A (A)	0.11 (0.22)	
	Northbound	left-through	3.9 (3.2)	A (A)	0.06 (0.08)	
		left	- (-)	- (-)	- (-)	
		through	- (-)	- (-)	- (-)	
	Southbound	Overall	0.0 (0.0)	A (A)	0.14 (0.15)	
		through-right	0.0 (0.0)	A (A)	0.14 (0.15)	
	Oakland Mills Road & Dobbins Road	Control Type		Signal		
		Overall		6.7 (12.0)	A (B)	0.46 (0.67)
Westbound		Overall	14.9 (17.3)	B (B)	0.33 (0.60)	
		left	15.5 (18.8)	B (B)	0.33 (0.60)	
		through-right	14.2 (16.2)	B (B)	0.08 (0.37)	
Northbound		Overall	3.9 (8.1)	A (A)	0.12 (0.33)	
		left-through	3.8 (8.3)	A (A)	0.07 (0.33)	
		right	4.0 (7.8)	A (A)	0.12 (0.22)	
		left	- (-)	- (-)	- (-)	
Southbound		through	- (-)	- (-)	- (-)	
		Overall	5.3 (11.1)	A (B)	0.44 (0.61)	
Southbound	left-through-right	5.3 (11.1)	A (B)	0.44 (0.61)		
	left	- (-)	- (-)	- (-)		
	through-right	- (-)	- (-)	- (-)		
Oakland Mills Road & Farewell Drive	Control Type		Stop (2-Way)			
	Overall		16.3 (18.1)	C (C)	0.21 (0.08)	
	Eastbound	Overall	16.3 (18.1)	C (C)	0.21 (0.08)	
		left-through-right	11.0 (14.8)	B (B)	0.18 (0.15)	
	Westbound	Overall	11.0 (14.8)	B (B)	0.18 (0.15)	
		left-through-right	11.0 (14.8)	B (B)	0.18 (0.15)	
		Overall	0.4 (0.6)	A (A)	0.06 (0.17)	
	Northbound	left-through-right	0.7 (1.1)	A (A)	0.01 (0.03)	
		left	- (-)	- (-)	- (-)	
		through-right	- (-)	- (-)	- (-)	
	Southbound	Overall	0.6 (1.9)	A (A)	0.12 (0.11)	
left-through-right		1.2 (3.4)	A (A)	0.02 (0.08)		
Southbound	left	- (-)	- (-)	- (-)		
	through-right	- (-)	- (-)	- (-)		
	through-right	- (-)	- (-)	- (-)		
Oakland Mills Road & Dawnday Drive/Sewells Oyster Drive	Control Type		Stop (2-Way)			
	Overall		12.1 (12.9)	B (B)	0.07 (0.07)	
	Eastbound	Overall	12.1 (12.9)	B (B)	0.07 (0.07)	
		left-right	12.1 (12.9)	B (B)	0.07 (0.07)	
	Westbound	Overall	12.4 (22.3)	B (C)	0.17 (0.20)	
		left-right	12.4 (22.3)	B (C)	0.17 (0.20)	
	Northbound	Overall	0.3 (0.4)	A (A)	0.06 (0.24)	
		left-through-right	0.6 (1.0)	A (A)	0.01 (0.02)	
		left	- (-)	- (-)	- (-)	
	Southbound	through-right	- (-)	- (-)	- (-)	
		Overall	0.1 (0.6)	A (A)	0.13 (0.11)	
left-through-right		0.2 (1.3)	A (A)	0.00 (0.02)		
Southbound	left	- (-)	- (-)	- (-)		
	through-right	- (-)	- (-)	- (-)		
	through-right	- (-)	- (-)	- (-)		
Oakland Mills Road & Snowden River Parkway	Control Type		Signal			
	Overall		49.4 (91.9)	D (F)	0.70 (1.06)	
	Eastbound	Overall	35.9 (55.6)	D (E)	0.63 (0.92)	
		left	66.9 (70.8)	E (E)	0.56 (0.72)	
		through	32.1 (55.2)	C (E)	0.63 (0.92)	
	Westbound	right	22.6 (29.4)	C (C)	0.08 (0.09)	
		Overall	35.2 (51.3)	D (D)	0.67 (0.93)	
	Northbound	left	66.6 (87.8)	E (F)	0.67 (0.93)	
		through	23.7 (44.0)	C (D)	0.34 (0.83)	
		right	20.2 (30.9)	C (C)	0.08 (0.35)	
	Southbound	Overall	78.3 (232.6)	E (F)	0.89 (1.61)	
left-through		57.3 (66.0)	E (E)	0.47 (0.77)		
Southbound	right	89.9 (>300)	F (F)	0.89 (1.61)		
	Overall	70.3 (83.7)	E (F)	0.77 (0.95)		
	left	76.0 (96.4)	E (F)	0.77 (0.91)		
Southbound	left-through	76.1 (104.7)	E (F)	0.77 (0.95)		
	right	56.4 (56.7)	E (E)	0.10 (0.18)		

Table 5: Existing Conditions Queueing Analysis Summary

Oakland Mills Road, 95th % Queue Length (ft) - AM (PM)			
Cross-Street	Approach	Movement	Existing Conditions
Old Montgomery Road	Eastbound	TR	50 (50)
	Westbound	LT	50 (50)
	Northbound	LR	25 (50)
Kilimanjaro Road/ Helen Dorsey Road	Eastbound	LT	100 (125)
		R	75 (50)
	Westbound	LTR	50 (50)
	Northbound	L	50 (75)
		T	75 (125)
		R	0 (0)
	Southbound	TR	- (-)
		L	25 (50)
		TR	125 (125)
		T	- (-)
Farewell Drive	Eastbound	LR	75 (75)
		TL	50 (75)
	Northbound	L	- (-)
	Southbound	TR	0 (25)
Dawn Day Drive/ Sewells Oyster Drive	Eastbound	LTR	75 (50)
	Westbound	LTR	75 (75)
	Northbound	LTR	25 (50)
		L	- (-)
	Southbound	LTR	25 (50)
L	- (-)		
Fairmead Lane/ Loring Drive	Eastbound	LTR	50 (50)
	Westbound	LTR	50 (50)
	Northbound	LTR	25 (50)
		L	- (-)
	Southbound	L	- (-)
LTR		25 (25)	
Malindy Circle (north)	Westbound	LR	50 (25)
	Northbound	TR	0 (0)
	Southbound	L	- (-)
LT		25 (25)	

Oakland Mills Road, 95th % Queue Length (ft) - AM (PM)			
Cross-Street	Approach	Movement	Existing
Homespun Drive/ Malindy Circle	Eastbound	L	100 (175)
		TR	150 (175)
	Westbound	LTR	75 (50)
	Northbound	L	100 (300)
		TR	75 (175)
	Southbound	L	25 (25)
		T	- (-)
		R	- (-)
Downdale Place	Eastbound	LR	50 (50)
	Northbound	LT	25 (50)
		L	- (-)
Southbound	TR	0 (25)	
Dobbin Road	Westbound	L	100 (200)
		TR	50 (175)
	Northbound	LT	50 (200)
		L	- (-)
		T	- (-)
		R	25 (75)
	Southbound	L	- (-)
		TR	- (-)
		LTR	150 (350)
		L	- (-)
Oak Hall Lane	Westbound	L	75 (150)
		R	50 (100)
	Northbound	T	- (-)
		TR	125 (200)
	Southbound	L	- (-)
T	- (-)		
Deer Pasture Drive	Eastbound	LTR	50 (50)
	Westbound	LTR	50 (125)
	Northbound	LT	- (-)
		TR	- (-)
	Southbound	LTR	25 (50)
		LT	- (-)
		TR	- (-)
Snowden River Parkway	Eastbound	L	300 (375)
		T	425 (725)
		R	75 (75)
	Westbound	L	225 (375)
		T	225 (825)
		R	75 (225)
	Northbound	LT	225 (275)
		R	0 (0)
	Southbound	L	200 (300)
		LT	275 (425)
R		75 (325)	

2.5 On-street Parking

Generally, on-street parking is not allowed along Oakland Mills Road.

2.6 Community Feedback prior to Concept Development

A public meeting was conducted on January 9, 2019 to discuss the project goals and solicit feedback from the community on specific transportation-related needs. A summary of the comments received include:

- The new roundabout at Oakland Mills Road and Old Montgomery Road is not well lit.
- Crossing Dawn Day Drive on foot is difficult due to the vehicle speeds in conjunction with sight distance limitations.
- On-road cycling is difficult due to high vehicle speeds.
- Entering Oakland Mills Road from a side street is sometimes difficult due to speeding and limited sight distance.
- There is discontinuous sidewalk along the east side of Oakland Mills Road.
- The intersection of Snowden River Parkway at Oakland Mills is congested.
- Turning Left from Oakland Mills Road onto Dobbin is difficult, particularly when there is an opposing vehicle also turning left.
- Egress from westbound Deer Pasture Drive is very difficult.



Figure 7: Existing conditions meeting

3 Road Diet Alternative

A road diet involves reducing the number of general travel lanes along a roadway segment through the use of re-striping – often when it gets re-surfaced. Common road diets involve reducing a four-lane roadway to a three-lane roadway, with the remaining space repurposed for parking or bike lanes. Road diets provide traffic calming on streets that have extra vehicle capacity. This extra capacity often results in aggressive driving and speeding. Road diets can also reduce the crossing distance for pedestrians and provide opportunity for midblock pedestrian refuge island that break up a crossing for added safety.

For more information, see https://safety.fhwa.dot.gov/road_diets/.

3.1 Alternatives Development and Preferred Option Design Elements

Based on the infrastructure needs and community responses, the following specific objectives were incorporated into the conceptual design:

- Address crashes – particularly head-on crashes.
- Increase pedestrian crossings across Oakland Mills Road.
- Provide dedicated on-road bike facilities.
- Calm traffic along Oakland Mills Road .
- Address ability to cross existing crossings, by addressing speed reduction and/or horizontal and vertical curve constraints.

Two preliminary cross sections were discussed internally among Planning and Engineering Staff, shown in Figure 8 and Figure 9:

- A. Option A: Re-striping Oakland Mills Road for a 6' southbound bike lane, 11' southbound travel lane, 10' center-turn lane, 11' northbound travel lane, and a 6' northbound bike lane.
- B. Option B: Re-striping Oakland Mills Road for a 11' southbound travel lane, 10' center-turn lane, 11' northbound travel lane, and a 8' two-way cycle track against the northbound curb and protected by a 4' buffer that includes vertical protective elements.

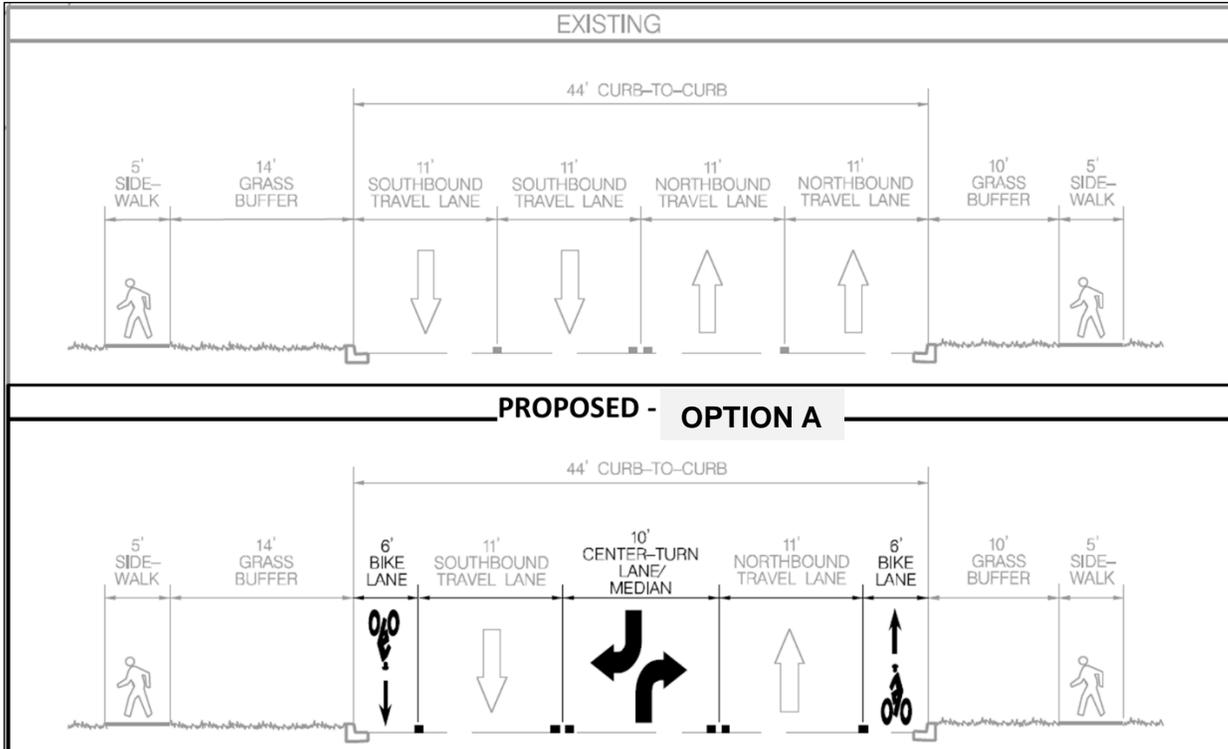


Figure 8: Proposed typical cross-section for Oakland Mills Road – Option A

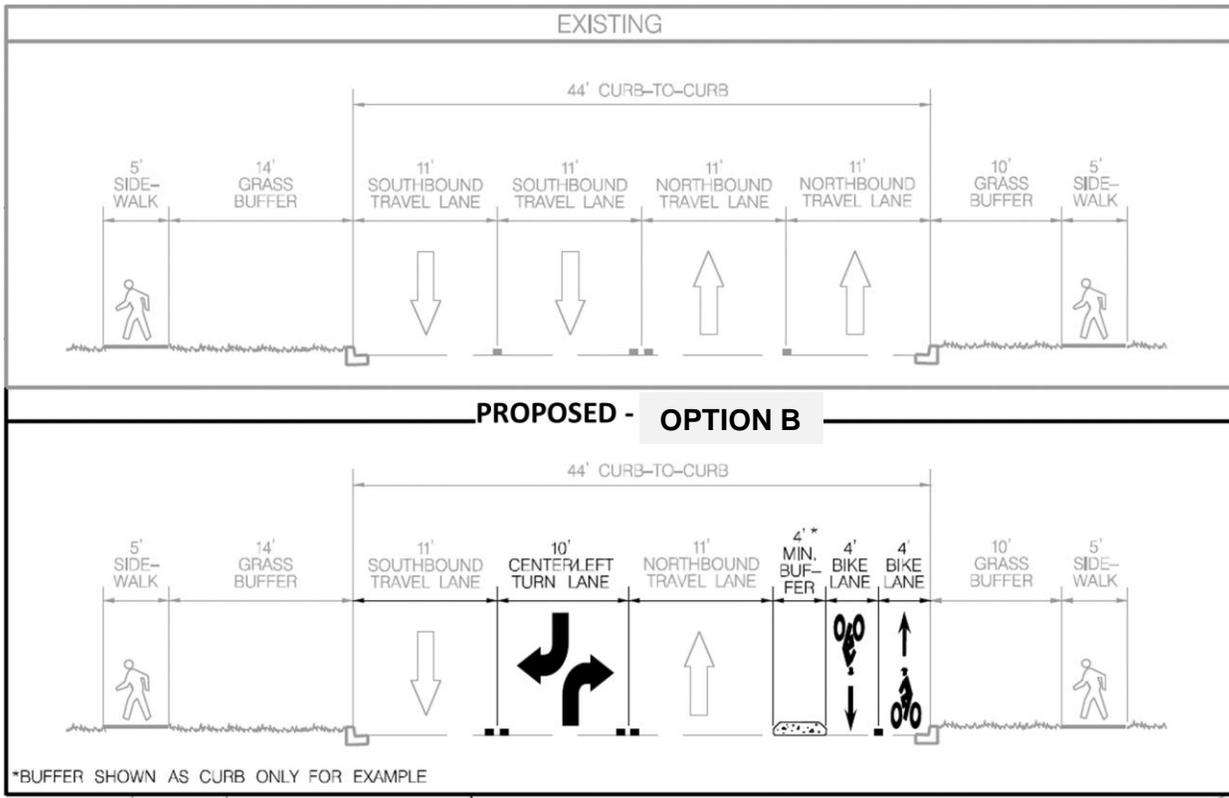


Figure 9: Proposed typical cross-section for Oakland Mills Road – Option B

A rendering of each typical section is shown in Figure 10.



Figure 10: Rendering of concept options

Note that the buffer for the two-way cycle track is shown as a pre-cast concrete curb for rendering purposes only. Other commercially-available vertical buffer examples are shown in Figure 11.

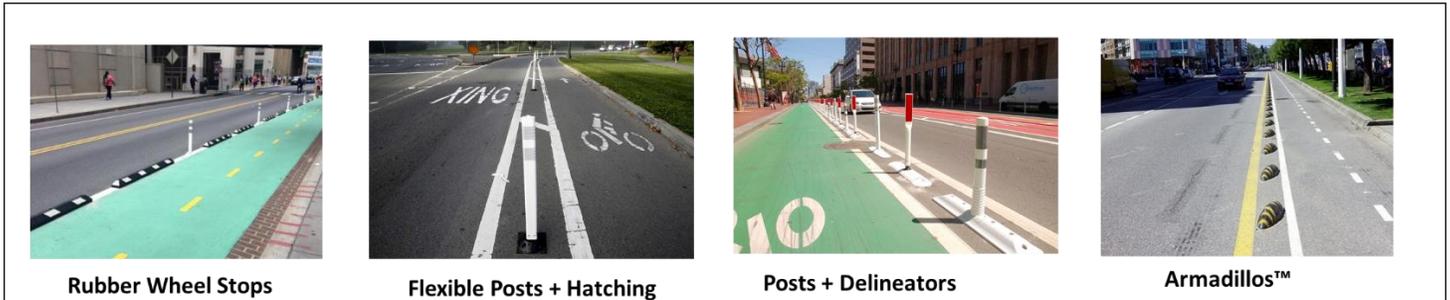


Figure 11: Examples of vertical buffers for vehicle/bike lane separation

Conceptual plans (10% Design) were developed utilizing the cross sections in.... These conceptual plans can be found in Appendix E. Additional design elements included in these conceptual plans include:

- A. Curb cuts to enter and exit bike lanes from the buffered sidewalk at the northern end of the project limits, near the roundabout at Old Montgomery Road.
- B. Green bike lane marking across select intersections, where there is a lateral shift in the bike lane to accommodate dedicated turn lanes.
- C. New sidewalk along the east side of Oakland Mills to complete the gap in pedestrian facilities, between Malindy Circle and Loring Drive.
- D. Widening the sidewalk to 8 feet south of Dasher Court, along the west side of Oakland Mills Road to the point where the Columbia Association trail connects under Oakland Mills Road via a pedestrian tunnel.
- E. Widening the sidewalk to 8 feet south of Dobbin Road, along the west side of Oakland Mills Road to the point where the Columbia Association trail connects under Oakland Mills Road via a pedestrian tunnel.
- F. Option 2 includes buffers that are designed to foster slow moving right turns across the two-way bike facility.
- G. New pedestrian crossings, with median refuge, at:
 - a. Farewell Road
 - b. Malindy Circle (north)
 - c. Dobbin Road
 - d. Oak Hall Road
- H. New sidewalk along the east side of Oakland Mills Road, between Oak Hall Lane and Dobbin Road.

Note, that the above element H and elements G.c and G.d have been incorporated into a separate design contract currently being awarded.

The following subsections of this report provide additional details and design assumptions.

3.1.1 Intersections with Signals and Turn Pockets

Figure 12 and Figure 13 show how the bike lanes would progress through a signalized intersection that has additional turn lanes, for Option 1 and Option 2, respectively. As shown in Figure 12, the left and right turn pockets are maintained, resulting in right-turning motorists having to yield to cyclists and offset bike lanes through the intersection. These are marked with green hash marks through the intersection to guide cyclists.



Figure 12: Intersection of Oakland Mills Road at Kilimanjaro Road, under Option 1 scenario

Figure 13 shows that to accommodate the buffered bike lanes, the northbound and southbound right turn lanes are removed. Additionally, the buffer is extended into the intersection with a small radius to foster slower right turns into side streets – minimizing the chance for vehicle-cyclist conflicts. Additionally, pedestrian signals are added and signage indicating that cyclists are to follow the WALK signals when proceeding through the intersection.

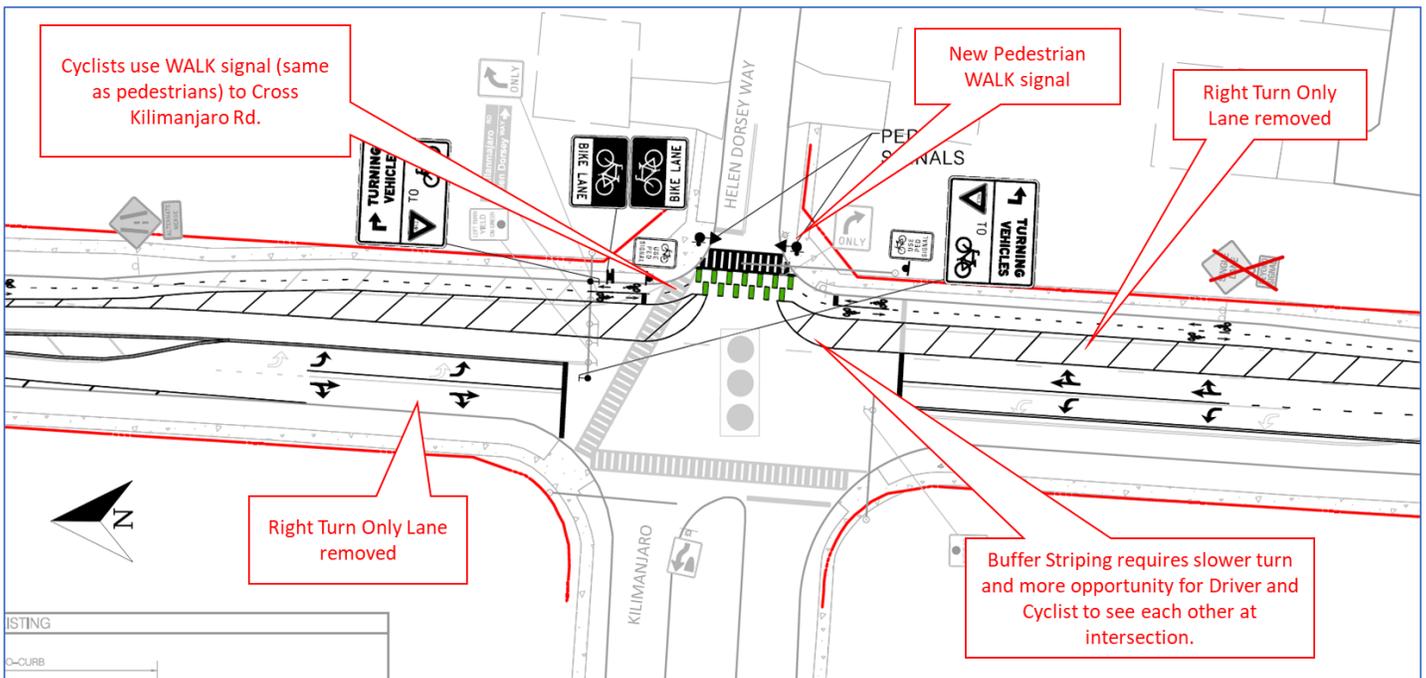


Figure 13: Intersection of Oakland Mills Rd at Kilimanjaro Rd, under Option 2 scenario

3.1.2 New Sidewalk

New sidewalk is proposed along the east side of Oakland Mills Road to complete a missing gap between Malindy Circle (north) to Loring Drive. Proposed is a standard 5-foot wide sidewalk that is buffered from the street to allow for future street trees or signage. Additionally, there is ample right of way behind the curb, so the sidewalk can be adjusted laterally to minimize impacts on utilities, poles, and mature trees.

Additionally, expansion of sidewalk is proposed south of Dasher Court to the Columbia Association trail ramp that leads to an under-pass trail and ultimately to the trails in Long Reach Village. This will provide a continuous widened trail/sidewalk from Long Reach to Owen Brown.

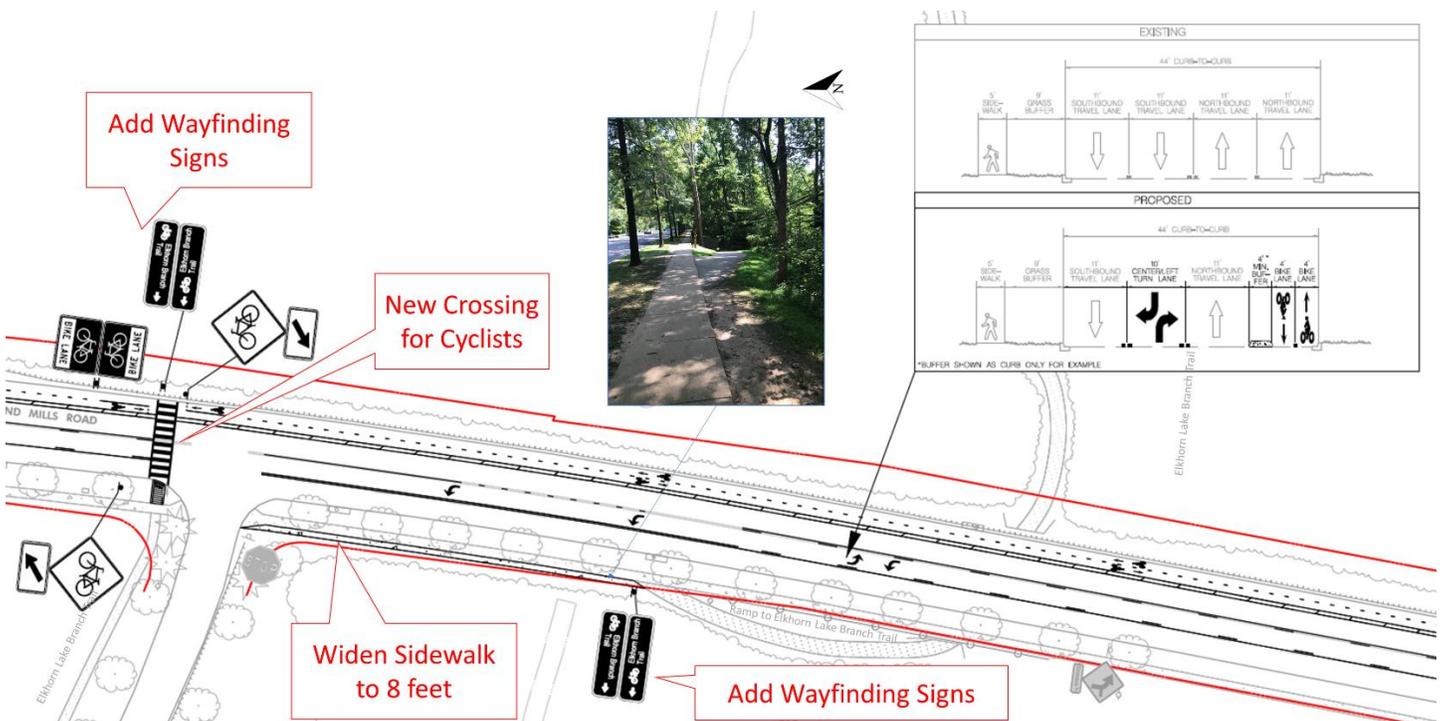


Figure 14: Sidewalk expansion along the west side of Oakland Mills Road

3.1.3 Proposed Pedestrian Crossings and Refuge Medians

In addition to the new pedestrian crossing at Dasher Court, shown in Figure 14, two other new pedestrian crossings were proposed for this corridor:

- at Malindy Circle North, (with median refuge added).
- at Farewell Road, (with median refuge added).

As shown in Figure 15, a ladder style crossing and median pedestrian refuge is proposed along the north side of the intersection of Oakland Mills Road at Farewell Road. This crossing will facilitate access to the bus stops located on each side of the intersection. As shown, buses will still pick up and drop off passengers curbside, requiring cyclists to yield. Bus headway is approximately 1 per hour during the day.

Similarly, as shown in Figure 16, a new pedestrian crossing and median refuge is proposed at the Oakland Mills Road intersection with Malindy Circle (north) along the southern leg of intersection.

During crosswalk/refuge installation, both crossings will need upgraded pedestrian ramps to comply with the Americans with Disabilities Act (ADA).

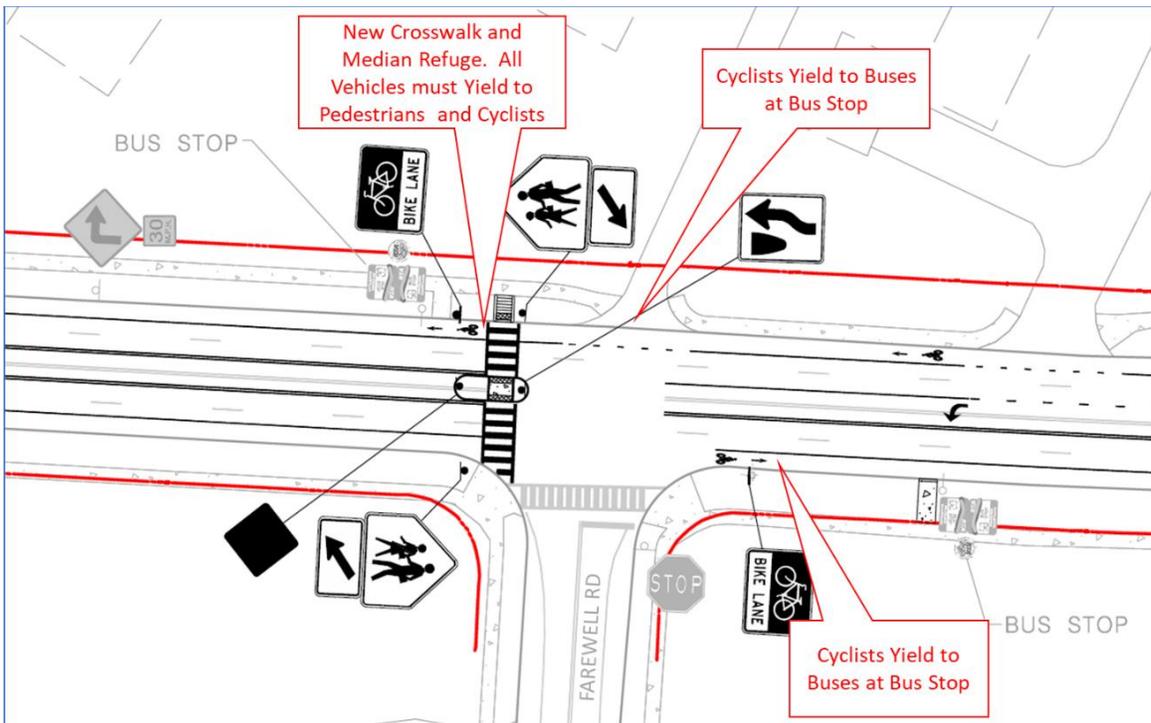


Figure 15: New crossing proposed at Oakland Mills Road at Farewell Road

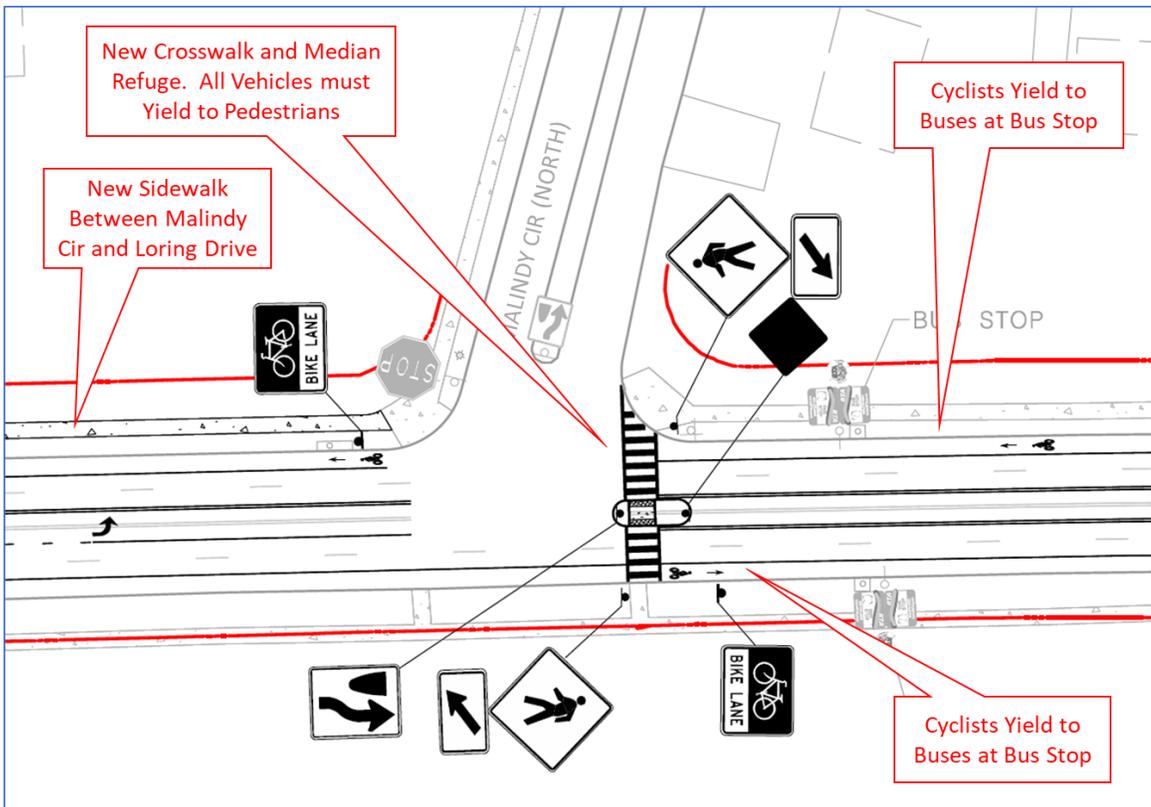


Figure 16: Proposed pedestrian refuge and marked crossing at Malindy Circle (north)

3.1.4 Design Elements at the Southern Project Limits

The southern end of Oakland Mills as it approaches Snowden River Parkway has higher traffic volumes and two signalized intersections, spaced about 700 feet apart, providing access to and from the commercial businesses along Dobbin Road and Oak Hall Lane. As shown in Figure 17, the southern portion of Oakland Mills is proposed to have the following elements:

- A. Three lane typical section with a northbound and southbound travel lane and opposing left-turn lanes.
- B. Bike lanes that terminate at Oak Hall Lane, in the southern project limits.
- C. New sidewalk along the north side of Dobbin Road.
- D. New side path along the south side of Dobbin Road.
- E. New sidewalk along the east side of Oakland Mills Road between Oak Hall Lane and Dobbin Road.
- F. Sidewalk widening along the west side of Oakland Mills Road from Dobbin Lane to the termination of the Columbia Association trail from Lake Elkhorn.
- G. New signalized pedestrian crossings across Oakland Mills Rd at Oak Hall Lane and at Dobbin Road.
- H. New signalized crossing of Dobbin Road at Oakland Mills Road.

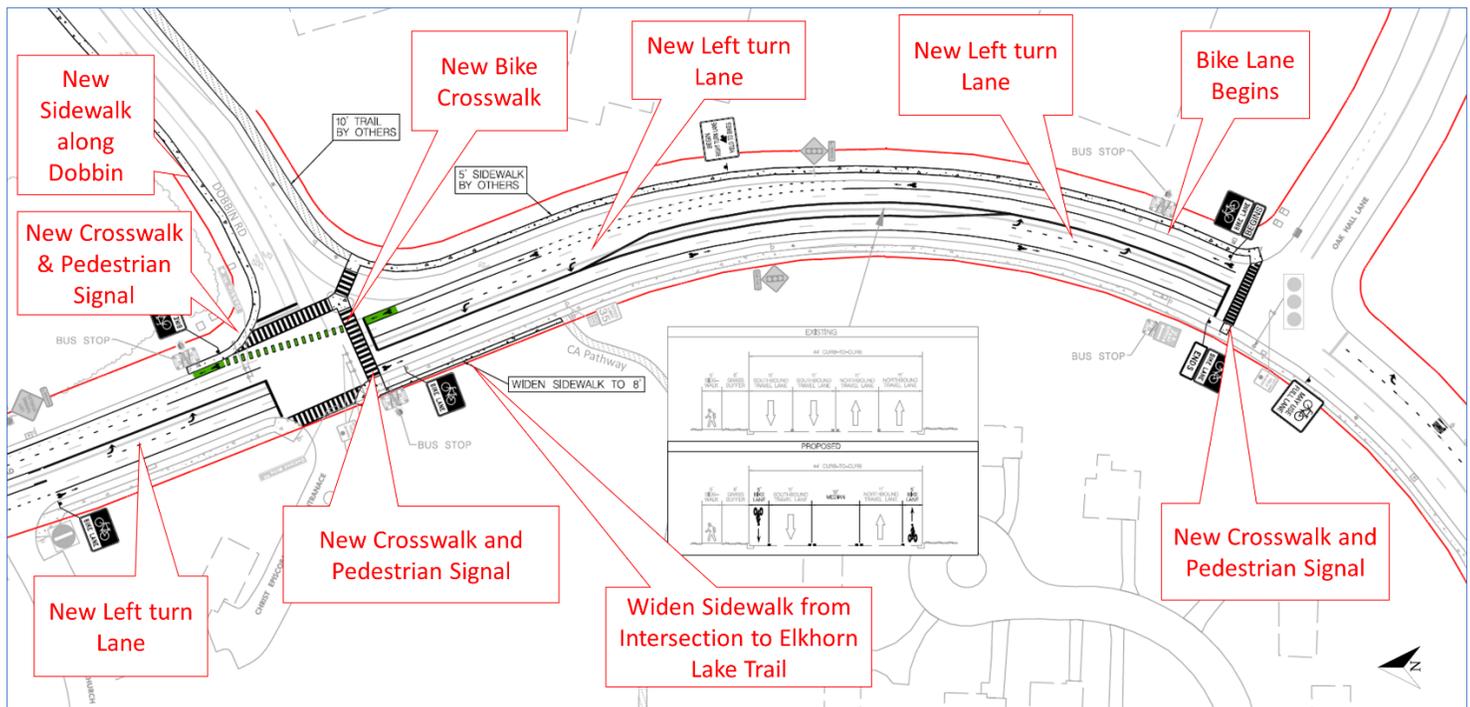


Figure 17: Proposed elements in the southern project limits

Howard County has recently issued a separate design project that covers items C through H above.

3.2 Traffic Analysis of Preferred Option

Road Diet Analysis

To perform a capacity analysis of the proposed road diet conditions, the existing AM and PM peak Synchro models were updated with the proposed geometry and lane configurations to reflect the two road diet alternatives. Because the typical section for the general-purpose travel lanes is similar in both options, traffic impacts across both are largely the same; the only differences occur at select intersections that include/omit dedicated right turn pockets. No changes to signal timing, signal phasing, or turning movement volumes were

assumed under the two “build” conditions, though there is likely to be subtle signal timing adjustments, as needed.

Table 6 compares the HCM analysis performed under existing traffic conditions to the two build conditions.

The results of the static capacity analysis reveal that operations along the corridor will remain largely unchanged under both build options A and B with the majority of study intersections operating at acceptable LOS and no further degradation of already failing movements. For example, the two intersections of Oakland Mills at Deer Pasture and Oakland Mills at Snowden River have several failing turn movements each; however, proposed road diet improvements do not impact these intersections, because the southern limit to the road diet is Oak Hall Lane.

The capacity analysis results also show that there are only marginal differences in vehicular operations between build option A and B, indicating that the inclusion or omission of right turn lanes at select location is not impactful on roadway capacity. Detailed HCM reports of the Build Condition are provided in Appendix D.

Travel time runs were conducted, by vehicle, in the AM and PM commuting hours. The vehicle runs indicated that the time to travel between Old Montgomery and Snowden River Parkway is about 4 minutes and 15 seconds for each direction. This travel time equates to about 31 mph throughout the corridor, including stopping for any red traffic signals at Oak Hall Lane, Dobbin Road, Homespun Drive, and Kilimanjaro Road.

Several factors influence travel time, including the volume vehicles on the road, the traffic control devices (e.g. the percentage of green time, within a traffic signal cycle, provided to the main road in a sign), and the availability of turn lanes to prevent left-turning vehicles from blocking through traffic along a main road. A general rule of thumb is that a two-lane suburban roadway with turn lanes can accommodate about 20,000 cars per day. This compares to the 9900 cars per day along the four lanes of Oakland Mills. Accordingly, if Oakland Mills were a two-lane roadway with turn lanes, it would still be well under capacity.

By adding left-turn lanes at intersections where there are none, less thru traffic will be delayed. While the proposed road diet will have left turn lanes at all intersections, currently there are none at:

- Farewell Road (stop-controlled)
- Dawn Day Drive (stop-controlled)
- Fairmead Lane (stop-controlled)
- Malindy Circle North (stop-controlled)
- Dasher Court (stop-controlled)
- Downdale Place (stop-controlled)
- Dobbin Road (signalized)
- Oak Hall Lane (signalized)

Finally, an estimate of the travel time was conducted based on the proposed changes, without any changes to existing traffic signal timing. The travel time for the entire corridor with the proposed road diet is expected to increase by only about 10 seconds. This is due to the fact that: 1) the roadway is currently well under capacity; 2) the left turning movements that currently block through travel lanes will be allocated a dedicated left turning lane; and 3) the major area of congestion – south of Deer Park Drive to Snowden River Parkway – is not being impacted by the proposed road diet.

Table 7 compares the existing and build condition queuing analysis results. The results of the queuing analysis indicate no major changes in queue length under the proposed road diet conditions. Detailed queuing reports for the Build Condition are in Appendix D.

Table 6: Build Condition Capacity Analysis Summary (delay in seconds)

Intersection	Approach	Movement	Existing Conditions									Option A									Option B										
			AM (PM)			AM (PM)			AM (PM)			AM (PM)			AM (PM)			AM (PM)			AM (PM)			AM (PM)							
			Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C		
Oakland Mills Road at Old Montgomery Road	Control Type	Overall	4.4 (5.7)	A (A)	- (-)	4.4 (5.7)	A (A)	- (-)	4.4 (5.7)	A (A)	- (-)	4.4 (5.7)	A (A)	- (-)	4.4 (5.7)	A (A)	- (-)	4.4 (5.7)	A (A)	- (-)	4.4 (5.7)	A (A)	- (-)	4.4 (5.7)	A (A)	- (-)	4.4 (5.7)	A (A)	- (-)		
		Eastbound	Overall	4.1 (5.0)	A (A)	0.11 (0.17)	4.1 (5.0)	A (A)	0.11 (0.17)	4.1 (5.0)	A (A)	0.11 (0.17)	4.1 (5.0)	A (A)	0.11 (0.17)	4.1 (5.0)	A (A)	0.11 (0.17)	4.1 (5.0)	A (A)	0.11 (0.17)	4.1 (5.0)	A (A)	0.11 (0.17)	4.1 (5.0)	A (A)	0.11 (0.17)	4.1 (5.0)	A (A)	0.11 (0.17)	
			through-right	4.1 (5.0)	A (A)	0.11 (0.17)	4.1 (5.0)	A (A)	0.11 (0.17)	4.1 (5.0)	A (A)	0.11 (0.17)	4.1 (5.0)	A (A)	0.11 (0.17)	4.1 (5.0)	A (A)	0.11 (0.17)	4.1 (5.0)	A (A)	0.11 (0.17)	4.1 (5.0)	A (A)	0.11 (0.17)	4.1 (5.0)	A (A)	0.11 (0.17)	4.1 (5.0)	A (A)	0.11 (0.17)	
	Westbound	Overall	4.1 (4.9)	A (A)	0.15 (0.22)	4.1 (4.9)	A (A)	0.15 (0.22)	4.1 (4.9)	A (A)	0.15 (0.22)	4.1 (4.9)	A (A)	0.15 (0.22)	4.1 (4.9)	A (A)	0.15 (0.22)	4.1 (4.9)	A (A)	0.15 (0.22)	4.1 (4.9)	A (A)	0.15 (0.22)	4.1 (4.9)	A (A)	0.15 (0.22)	4.1 (4.9)	A (A)	0.15 (0.22)		
		left-through	4.1 (4.9)	A (A)	0.15 (0.22)	4.1 (4.9)	A (A)	0.15 (0.22)	4.1 (4.9)	A (A)	0.15 (0.22)	4.1 (4.9)	A (A)	0.15 (0.22)	4.1 (4.9)	A (A)	0.15 (0.22)	4.1 (4.9)	A (A)	0.15 (0.22)	4.1 (4.9)	A (A)	0.15 (0.22)	4.1 (4.9)	A (A)	0.15 (0.22)	4.1 (4.9)	A (A)	0.15 (0.22)		
	Northbound	Overall	4.6 (6.3)	A (A)	0.23 (0.38)	4.6 (6.3)	A (A)	0.23 (0.38)	4.6 (6.3)	A (A)	0.23 (0.38)	4.6 (6.3)	A (A)	0.23 (0.38)	4.6 (6.3)	A (A)	0.23 (0.38)	4.6 (6.3)	A (A)	0.23 (0.38)	4.6 (6.3)	A (A)	0.23 (0.38)	4.6 (6.3)	A (A)	0.23 (0.38)	4.6 (6.3)	A (A)	0.23 (0.38)		
		left-right	4.6 (6.3)	A (A)	0.23 (0.38)	4.6 (6.3)	A (A)	0.23 (0.38)	4.6 (6.3)	A (A)	0.23 (0.38)	4.6 (6.3)	A (A)	0.23 (0.38)	4.6 (6.3)	A (A)	0.23 (0.38)	4.6 (6.3)	A (A)	0.23 (0.38)	4.6 (6.3)	A (A)	0.23 (0.38)	4.6 (6.3)	A (A)	0.23 (0.38)	4.6 (6.3)	A (A)	0.23 (0.38)		
	Oakland Mills Road & Homespun Drive/Malindy Circle (south)	Control Type	Overall	17.1 (17.3)	B (B)	0.35 (0.45)	15.5 (16.4)	B (B)	0.29 (0.46)	17.4 (18.5)	B (B)	0.35 (0.47)	17.1 (17.3)	B (B)	0.35 (0.45)	15.5 (16.4)	B (B)	0.29 (0.46)	17.4 (18.5)	B (B)	0.35 (0.47)	17.1 (17.3)	B (B)	0.35 (0.45)	15.5 (16.4)	B (B)	0.29 (0.46)	17.4 (18.5)	B (B)	0.35 (0.47)	
			Eastbound	Overall	26.8 (29.9)	C (C)	0.33 (0.46)	23.3 (26.1)	C (C)	0.29 (0.43)	26.8 (29.9)	C (C)	0.33 (0.46)	26.8 (29.9)	C (C)	0.33 (0.46)	23.3 (26.1)	C (C)	0.29 (0.43)	26.8 (29.9)	C (C)	0.33 (0.46)	26.8 (29.9)	C (C)	0.33 (0.46)	26.8 (29.9)	C (C)	0.33 (0.46)	23.3 (26.1)	C (C)	0.29 (0.43)
				left-through	27.7 (31.0)	C (C)	0.33 (0.46)	24.0 (27.1)	C (C)	0.29 (0.43)	27.7 (31.0)	C (C)	0.33 (0.46)	27.7 (31.0)	C (C)	0.33 (0.46)	24.0 (27.1)	C (C)	0.29 (0.43)	27.7 (31.0)	C (C)	0.33 (0.46)	27.7 (31.0)	C (C)	0.33 (0.46)	27.7 (31.0)	C (C)	0.33 (0.46)	24.0 (27.1)	C (C)	0.29 (0.43)
		Westbound	Overall	26.1 (27.9)	C (C)	0.08 (0.04)	22.7 (24.5)	C (C)	0.08 (0.04)	26.1 (27.9)	C (C)	0.08 (0.04)	26.1 (27.9)	C (C)	0.08 (0.04)	22.7 (24.5)	C (C)	0.08 (0.04)	26.1 (27.9)	C (C)	0.08 (0.04)	26.1 (27.9)	C (C)	0.08 (0.04)	26.1 (27.9)	C (C)	0.08 (0.04)	22.7 (24.5)	C (C)	0.08 (0.04)	
			left-through-right	33.1 (36.8)	C (D)	0.33 (0.20)	30.7 (40.2)	C (D)	0.30 (0.39)	33.1 (36.8)	C (D)	0.33 (0.20)	33.1 (36.8)	C (D)	0.33 (0.20)	30.7 (40.2)	C (D)	0.30 (0.39)	33.1 (36.8)	C (D)	0.33 (0.20)	33.1 (36.8)	C (D)	0.33 (0.20)	33.1 (36.8)	C (D)	0.33 (0.20)	30.7 (40.2)	C (D)	0.30 (0.39)	
Oakland Mills Road & Kilmanjoro Road/Helen Dorsey Way		Control Type	Overall	9.6 (10.5)	A (B)	0.14 (0.24)	10.4 (11.9)	B (B)	0.27 (0.46)	10.6 (13.0)	B (B)	0.27 (0.48)	9.6 (10.5)	A (B)	0.14 (0.24)	10.4 (11.9)	B (B)	0.27 (0.46)	10.6 (13.0)	B (B)	0.27 (0.48)	9.6 (10.5)	A (B)	0.14 (0.24)	10.4 (11.9)	B (B)	0.27 (0.46)	10.6 (13.0)	B (B)	0.27 (0.48)	
			Eastbound	Overall	7.4 (8.1)	A (A)	0.13 (0.24)	7.2 (7.2)	A (A)	0.12 (0.22)	7.4 (8.1)	A (A)	0.13 (0.24)	7.4 (8.1)	A (A)	0.13 (0.24)	7.2 (7.2)	A (A)	0.12 (0.22)	7.4 (8.1)	A (A)	0.13 (0.24)	7.4 (8.1)	A (A)	0.13 (0.24)	7.2 (7.2)	A (A)	0.12 (0.22)	7.4 (8.1)	A (A)	0.13 (0.24)
				left-through	10.3 (11.3)	B (B)	0.14 (0.24)	11.4 (13.4)	B (B)	0.27 (0.46)	10.3 (11.3)	B (B)	0.14 (0.24)	10.3 (11.3)	B (B)	0.14 (0.24)	11.4 (13.4)	B (B)	0.27 (0.46)	10.3 (11.3)	B (B)	0.14 (0.24)	10.3 (11.3)	B (B)	0.14 (0.24)	11.4 (13.4)	B (B)	0.27 (0.46)	10.3 (11.3)	B (B)	0.14 (0.24)
		Northbound	Overall	9.5 (9.8)	A (A)	0.00 (0.01)	9.3 (9.2)	A (A)	0.00 (0.01)	9.5 (9.8)	A (A)	0.00 (0.01)	9.5 (9.8)	A (A)	0.00 (0.01)	9.3 (9.2)	A (A)	0.00 (0.01)	9.5 (9.8)	A (A)	0.00 (0.01)	9.5 (9.8)	A (A)	0.00 (0.01)	9.5 (9.8)	A (A)	0.00 (0.01)	9.3 (9.2)	A (A)	0.00 (0.01)	
			through-right	16.1 (19.9)	B (B)	0.40 (0.52)	13.7 (17.3)	B (B)	0.33 (0.64)	16.1 (19.9)	B (B)	0.40 (0.52)	16.1 (19.9)	B (B)	0.40 (0.52)	13.7 (17.3)	B (B)	0.33 (0.64)	16.1 (19.9)	B (B)	0.40 (0.52)	16.1 (19.9)	B (B)	0.40 (0.52)	16.1 (19.9)	B (B)	0.40 (0.52)	13.7 (17.3)	B (B)	0.33 (0.64)	
		Southbound	Overall	34.3 (39.7)	C (D)	0.07 (0.31)	31.0 (78.3)	C (E)	0.06 (0.64)	34.3 (39.7)	C (D)	0.07 (0.31)	34.3 (39.7)	C (D)	0.07 (0.31)	31.0 (78.3)	C (E)	0.06 (0.64)	34.3 (39.7)	C (D)	0.07 (0.31)	34.3 (39.7)	C (D)	0.07 (0.31)	34.3 (39.7)	C (D)	0.07 (0.31)	31.0 (78.3)	C (E)	0.06 (0.64)	
			through-right	15.9 (19.1)	B (B)	0.40 (0.52)	13.8 (15.6)	B (B)	0.33 (0.37)	15.9 (19.1)	B (B)	0.40 (0.52)	15.9 (19.1)	B (B)	0.40 (0.52)	13.8 (15.6)	B (B)	0.33 (0.37)	15.9 (19.1)	B (B)	0.40 (0.52)	15.9 (19.1)	B (B)	0.40 (0.52)	15.9 (19.1)	B (B)	0.40 (0.52)	13.8 (15.6)	B (B)	0.33 (0.37)	
	Oakland Mills Road & Malindy Circle (north)	Control Type	Overall	16.1 (19.9)	B (B)	0.40 (0.52)	13.7 (17.3)	B (B)	0.33 (0.64)	16.1 (19.9)	B (B)	0.40 (0.52)	16.1 (19.9)	B (B)	0.40 (0.52)	13.7 (17.3)	B (B)	0.33 (0.64)	16.1 (19.9)	B (B)	0.40 (0.52)	16.1 (19.9)	B (B)	0.40 (0.52)	16.1 (19.9)	B (B)	0.40 (0.52)	13.7 (17.3)	B (B)	0.33 (0.64)	
			Eastbound	Overall	12.4 (15.7)	B (C)	0.16 (0.30)	11.7 (14.0)	B (B)	0.15 (0.26)	12.4 (15.7)	B (C)	0.16 (0.30)	12.4 (15.7)	B (C)	0.16 (0.30)	11.7 (14.0)	B (B)	0.15 (0.26)	12.4 (15.7)	B (C)	0.16 (0.30)	12.4 (15.7)	B (C)	0.16 (0.30)	12.4 (15.7)	B (C)	0.16 (0.30)	11.7 (14.0)	B (B)	0.15 (0.26)
				left-right	12.4 (15.7)	B (C)	0.16 (0.30)	11.7 (14.0)	B (B)	0.15 (0.26)	12.4 (15.7)	B (C)	0.16 (0.30)	12.4 (15.7)	B (C)	0.16 (0.30)	11.7 (14.0)	B (B)	0.15 (0.26)	12.4 (15.7)	B (C)	0.16 (0.30)	12.4 (15.7)	B (C)	0.16 (0.30)	12.4 (15.7)	B (C)	0.16 (0.30)	11.7 (14.0)	B (B)	0.15 (0.26)
		Northbound	Overall	1.9 (1.4)	A (A)	0.11 (0.22)	1.7 (1.2)	A (A)	0.17 (0.33)	1.7 (1.2)	A (A)	0.17 (0.33)	1.9 (1.4)	A (A)	0.11 (0.22)	1.7 (1.2)	A (A)	0.17 (0.33)	1.7 (1.2)	A (A)	0.17 (0.33)	1.9 (1.4)	A (A)	0.11 (0.22)	1.7 (1.2)	A (A)	0.17 (0.33)	1.7 (1.2)	A (A)	0.17 (0.33)	
			left-through	3.9 (3.2)	A (A)	0.06 (0.08)	- (-)	- (-)	- (-)	3.9 (3.2)	A (A)	0.06 (0.08)	3.9 (3.2)	A (A)	0.06 (0.08)	- (-)	- (-)	- (-)	3.9 (3.2)	A (A)	0.06 (0.08)	3.9 (3.2)	A (A)	0.06 (0.08)	3.9 (3.2)	A (A)	0.06 (0.08)	- (-)	- (-)	- (-)	
Oakland Mills Road & Farewell Drive		Control Type	Overall	0.0 (0.0)	A (A)	0.14 (0.15)	0.0 (0.0)	A (A)	0.23 (0.23)	0.0 (0.0)	A (A)	0.23 (0.23)	0.0 (0.0)	A (A)	0.14 (0.15)	0.0 (0.0)	A (A)	0.23 (0.23)	0.0 (0.0)	A (A)	0.23 (0.23)	0.0 (0.0)	A (A)	0.14 (0.15)	0.0 (0.0)	A (A)	0.23 (0.23)	0.0 (0.0)	A (A)	0.23 (0.23)	
			Eastbound	Overall	16.3 (18.1)	C (C)	0.21 (0.08)	13.0 (14.8)	B (B)	0.16 (0.06)	16.3 (18.1)	C (C)	0.21 (0.08)	16.3 (18.1)	C (C)	0.21 (0.08)	13.0 (14.8)	B (B)	0.16 (0.06)	16.3 (18.1)	C (C)	0.21 (0.08)	16.3 (18.1)	C (C)	0.21 (0.08)	16.3 (18.1)	C (C)	0.21 (0.08)	13.0 (14.8)	B (B)	0.16 (0.06)
				left-through-right	16.3 (18.1)	C (C)	0.21 (0.08)	13.0 (14.8)	B (B)	0.16 (0.06)	16.3 (18.1)	C (C)	0.21 (0.08)	16.3 (18.1)	C (C)	0.21 (0.08)	13.0 (14.8)	B (B)	0.16 (0.06)	16.3 (18.1)	C (C)	0.21 (0.08)	16.3 (18.1)	C (C)	0.21 (0.08)	16.3 (18.1)	C (C)	0.21 (0.08)	13.0 (14.8)	B (B)	0.16 (0.06)
		Westbound	Overall	11.0 (14.8)	B (B)	0.18 (0.15)	11.0 (13.8)	B (B)	0.18 (0.14)	11.0 (13.8)	B (B)	0.18 (0.14)	11.0 (14.8)	B (B)	0.18 (0.15)	11.0 (13.8)	B (B)	0.18 (0.14)	11.0 (13.8)	B (B)	0.18 (0.15)	11.0 (14.8)	B (B)	0.18 (0.15)	11.0 (13.8)	B (B)	0.18 (0.15)	11.0 (13.8)	B (B)	0.18 (0.14)	
			left-through-right	11.0 (14.8)	B (B)	0.18 (0.15)	11.0 (13.8)	B (B)	0.18 (0.14)	11.0 (13.8)	B (B)	0.18 (0.14)	11.0 (14.8)	B (B)	0.18 (0.15)	11.0 (13.8)	B (B)	0.18 (0.14)	11.0 (13.8)	B (B)	0.18 (0.15)	11.0 (14.8)	B (B)	0.18 (0.15)	11.0 (13.8)	B (B)	0.18 (0.15)	11.0 (13.8)	B (B)	0.18 (0.14)	
		Northbound	Overall	0.4 (0.6)	A (A)	0.06 (0.17)	0.3 (0.5)	A (A)	0.12 (0.33)	0.3 (0.5)	A (A)	0.12 (0.33)	0.4 (0.6)	A (A)	0.06 (0.17)	0.3 (0.5)	A (A)	0.12 (0.33)	0.3 (0.5)	A (A)	0.12 (0.33)	0.4 (0.6)	A (A)	0.06 (0.17)	0.3 (0.5)	A (A)	0.12 (0.33)	0.3 (0.5)	A (A)	0.12 (0.33)	
			left-through-right	0.7 (1.1)	A (A)	0.01 (0.03)	- (-)	- (-)	- (-)	0.7 (1.1)	A (A)	0.01 (0.03)	0.7 (1.1)	A (A)	0.01 (0.03)	- (-)	- (-)	- (-)	0.7 (1.1)	A (A)	0.01 (0.03)	0.7 (1.1)	A (A)	0.01 (0.03)	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	
	Southbound	Overall	0.6 (1.9)	A (A)	0.12 (0.11)	0.5 (1.6)	A (A)	0.22 (0.21)	0.5 (1.6)	A (A)	0.22 (0.21)	0.6 (1.9)	A (A)	0.12 (0.11)	0.5 (1.6)	A (A)	0.22 (0.21)	0.5 (1.6)	A (A)	0.22 (0.21)	0.6 (1.9)	A (A)	0.12 (0.11)	0.5 (1.6)	A (A)	0.22 (0.21)	0.5 (1.6)	A (A)	0.22 (0.21)		
		left-through-right	1.2 (3.4)	A (A)	0.02 (0.08)	- (-)	- (-)	- (-)	1.2 (3.4)	A (A)	0.02 (0.08)	1.2 (3.4)	A (A)	0.02 (0.08)	- (-)	- (-)	- (-)	1.2 (3.4)	A (A)	0.02 (0.08)	1.2 (3.4)	A (A)	0.02 (0.08)	- (-)	- (-)	- (-)	- (-)	- (-)			
	Oakland Mills Road & Dawnway Drive/Sewells Oyster Drive	Control Type	Overall	12.1 (12.9)	B (B)	0.07 (0.07)	11.5 (12.3)	B (B)	0.																						

Table 7: Build Condition Queuing Summary

Oakland Mills Road, 95th % Queue Length (ft) - AM (PM)					
Cross-Street	Approach	Movement	Existing Conditions	Option A	Option B
Old Montgomery Road	Eastbound	TR	50 (50)	50 (50)	50 (50)
	Westbound	LT	50 (50)	50 (75)	50 (75)
	Northbound	LR	25 (50)	25 (50)	25 (50)
	Southbound	LR	25 (50)	25 (50)	25 (50)
Kilimanjaro Road/ Helen Dorsey Road	Eastbound	LT	100 (125)	75 (100)	75 (100)
		R	75 (50)	50 (50)	75 (50)
	Westbound	LTR	50 (50)	50 (50)	50 (50)
		L	50 (75)	50 (50)	50 (50)
	Northbound	T	75 (125)	75 (125)	- (-)
		R	0 (0)	0 (0)	- (-)
		TR	- (-)	- (-)	75 (125)
	Southbound	L	25 (50)	25 (25)	25 (50)
		TR	125 (125)	- (-)	100 (275)
		T	- (-)	100 (100)	- (-)
		R	- (-)	50 (50)	- (-)
	Farewell Drive	Eastbound	LR	75 (75)	75 (75)
Northbound		TL	50 (75)	-	- (-)
		L	- (-)	50 (50)	50 (50)
Southbound		TR	0 (25)	0 (0)	0 (0)
Dawn Day Drive/ Sewells Oyster Drive	Eastbound	LTR	75 (50)	75 (50)	75 (50)
	Westbound	LTR	75 (75)	75 (75)	75 (75)
	Northbound	LTR	25 (50)	- (-)	- (-)
		L	- (-)	25 (25)	25 (50)
	Southbound	LTR	25 (50)	- (-)	- (-)
Fairmead Lane/ Loring Drive	Eastbound	LTR	50 (50)	50 (50)	50 (50)
		LTR	50 (50)	75 (50)	75 (75)
	Northbound	LTR	25 (50)	- (-)	- (-)
		L	- (-)	25 (25)	25 (50)
	Southbound	L	- (-)	0 (25)	25 (50)
		LTR	25 (25)	- (-)	- (-)
Malindy Circle (north)	Westbound	LR	50 (25)	50 (50)	50 (25)
	Northbound	TR	0 (0)	0 (0)	0 (0)
	Southbound	L	- (-)	0 (25)	0 (25)
		LT	25 (25)	- (-)	- (-)
Homespun Drive/ Malindy Circle	Eastbound	L	100 (175)	75 (225)	75 (325)
		TR	150 (175)	125 (200)	150 (225)
	Westbound	LTR	75 (50)	50 (50)	50 (50)
		L	100 (300)	125 (300)	100 (350)
	Northbound	TR	75 (175)	75 (225)	75 (225)
		L	25 (25)	25 (25)	25 (25)
	Southbound	T	- (-)	175 (200)	- (-)
		R	- (-)	100 (100)	- (-)
		TR	125 (125)	- (-)	250 (250)

Oakland Mills Road, 95th % Queue Length (ft) - AM (PM)					
Cross-Street	Approach	Movement	Existing	Option A	Option B
Downdale Place	Eastbound	LR	50 (50)	50 (50)	50 (50)
	Northbound	LT	25 (50)	- (-)	- (-)
		L	- (-)	25 (25)	25 (50)
	Southbound	TR	0 (25)	0 (0)	0 (0)
Dobbin Road	Westbound	L	100 (200)	100 (275)	125 (250)
		TR	50 (175)	50 (250)	50 (250)
	Northbound	LT	50 (200)	- (-)	- (-)
		L	- (-)	0 (25)	0 (50)
		T	- (-)	100 (450)	100 (475)
		R	25 (75)	50 (150)	100 (125)
	Southbound	L	- (-)	105 (200)	100 (200)
		TR	- (-)	125 (200)	125 (200)
		LTR	150 (350)	- (-)	- (-)
Oak Hall Lane	Westbound	L	75 (150)	75 (150)	75 (150)
		R	50 (100)	50 (100)	50 (100)
	Northbound	T	- (-)	75 (225)	75 (225)
		TR	125 (200)	125 (225)	125 (250)
	Southbound	L	- (-)	75 (100)	75 (100)
		T	- (-)	100 (175)	100 (200)
	LT	100 (150)	- (-)	- (-)	
Deer Pasture Drive	Eastbound	LTR	50 (50)	50 (50)	50 (50)
		LTR	50 (125)	50 (125)	50 (125)
	Northbound	LT	- (-)	25 (50)	25 (75)
		TR	- (-)	0 (25)	0 (50)
	Southbound	LTR	25 (50)	- (-)	- (-)
		LT	- (-)	25 (50)	25 (50)
		TR	- (-)	0 (50)	0 (0)
		LTR	25 (50)	- (-)	- (-)
Snowden River Parkway	Eastbound	L	300 (375)	300 (375)	275 (250)
		T	425 (725)	425 (675)	400 (650)
		R	75 (75)	75 (75)	75 (75)
	Westbound	L	225 (375)	225 (375)	225 (375)
		T	225 (825)	250 (575)	225 (525)
	Northbound	R	75 (225)	75 (200)	75 (200)
		LT	225 (275)	200 (275)	200 (275)
	Southbound	R	0 (0)	0 (0)	0 (0)
		L	200 (300)	200 (400)	200 (350)
		LT	275 (425)	275 (500)	250 (450)
	R	75 (325)	100 (325)	75 (325)	

*Signalized intersection
 L-Left
 T-Through
 R-Right

3.3 Community Feedback

Proposed plans and details were presented to the community at a October 30, 2019 Public Meeting. Comments received during Proposed Conditions Meeting were generally positive toward the plans. Specific concerns were enumerated for the following locations:

- Deer Pasture at Oakland Mills:
 - Crossing Oakland Mills at Deer Pasture Drive is difficult by car and on foot
 - Getting out of the business entrance (east-side driveway) is difficult because of the traffic and blind horizontal curve. Consider closing entrance or making it right-in/right-out
- Snowden River at Oakland Mills:
 - Southbound Oakland Mills has a left only lane and a through-left lane, and is signed for this lane configuration, as well. However, some drivers use the left-only lane to go through southbound, presumably because there are two southbound receiving lanes. This scenario was also observed in the field. “Puppy track” dashed lane markings are requested to reinforce that the left turn lane is not a through lane.
- Dawn Day at Oakland Mills:
 - Turning left from Dawn Day onto northbound Oakland Mills is difficult, due largely to the crest of the hill just to the north of this intersection (in combination with higher speeds)
 - *Note: The County has evaluated signalization of this intersection previously, but warrants were not met for a traffic signal at this time.*

4 Summary of Findings and Recommendations for Final Design

Based on the County’s *Complete Streets* policy, along with input from residents, a conceptual plan of improvements was developed for Oakland Mills Road corridor in the Owen Brown neighborhood. Highlights of the Conceptual Plan – to be incorporated into Final design are summarized below:

- Conceptual Plans do not alter the curb-to-curb width.
- The preferred design is a road diet that transitions the existing four lane typical section to a three lane section, generally with one travel lane in each direction and a two-way center turn lane. Two options were developed that adhered to this proposed section:
 - Option A: a six-foot uni-directional unbuffered curb side bike lane in each direction.
 - Option B: a 12-foot buffered two-way cycle track along the east curb – 4’ buffer and 8’ two-way bike lanes.
- The road diet does not impact side-street traffic within the project limits. Turn movements that have high levels of delay – Snowden River intersection and Deer Pasture intersection – are not impacted by the road diet.
- New sidewalk is proposed along the east side between Malindy Circle (north) and Loring Drive. Additionally, sidewalk is proposed for widening along the west side of Oakland Mills Road between Dasher Court to the pedestrian underpass.
- Three new unsignalized pedestrian crossings and median refuges are proposed at: Farewell Road, Dasher Court, and Malindy Circle (north). Two new signalized pedestrian crossings are proposed at Oak Hall Lane and Dobbin Road.
- The southern project limits include new sidewalk and widened sidewalk between Oak Hall Lane and Dobbin Road. These improvements, along with signalized pedestrian crossings at Oak Hall Lane and Dobbin Road, are being bid for design at the current time, as a separate project.
- Several projects are sidewalk-oriented, behind the curb, but inside the County ROW. These projects can be funded separately as unique projects, absent the road diet.