Appendix C: Mount Vernon Road and Womack road at Vermack Road Proofs of Concept

INTRODUCTION

As part of the 2017 CTP Update for the City of Dunwoody, the Public Works department tasked Pond with investigating two projects identified in the 2011 CTP. The intent was to provide a proof of concept/peer review of these two projects. Those projects are:

- Turn Lanes/Center Turn Lane Concept on Mount Vernon Road between Ashmont Circle/Wickford Way and Saffron Drive (Project 22a & 22b)
- Intersection Improvement at Womack Road and Vermack Road (Project 8)

This technical memorandum presents the data collected for each project's evaluation, a discussion of the analysis or techniques used, and results, recommendations and comments on project concepts for each of these two projects.

MOUNT VERNON ROAD PROOF OF CONCEPT

The specific scope of this proof of concept was to investigate the unsignalized intersections along the corridor with respect to turning movement counts and crash history and to identify any correctable trends that could be mitigated by adding left turn lanes. Georgia Department of Transportation (GDOT) left turn volume thresholds for turn bays were also referenced, as found in the most recent publication of the Regulations for Driveway and Encroachment Control.

Turning movement counts and bi-directional daily traffic information was collected at the following locations:

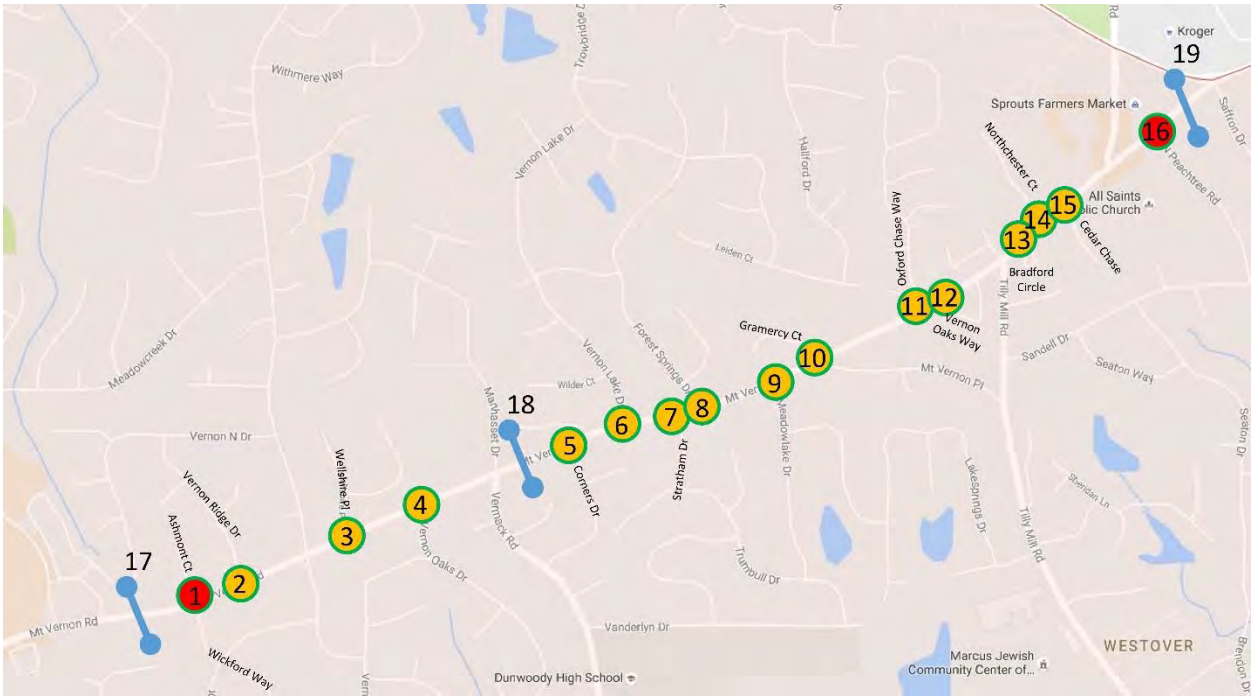
<u>Peak Hour Turning Movement Count Locations</u>

1. Ashmont Court/Wickford Way
2. Vernon Ridge Drive
3. Wellshire Place
4. Vernon Oaks Drive
5. Corners Drive
6. Vernon Lake Drive
7. Stratham Drive
8. Forest Springs Drive
9. Meadowlake Drive
10. Mt. Vernon Place/Gramercy Court
11. Oxford Chase Way
12. Vernon Oaks Way
13. Bradford Circle
14. Northchester Court
15. Cedar Chase
16. North Peachtree Road/Sprouts Market Driveway

<u>Bi-Directional Daily Traffic Count Locations</u>

17. Mt. Vernon Road west of Ashmont Court
18. Mt. Vernon Road east of Vermack Road
19. Mt. Vernon Road east of N. Peachtree Road

The figure below illustrates the location of the turning movement counts along the corridor.



Daily Traffic Counts

The daily traffic counts are summarized in **Table 1** below. Traffic on Mt. Vernon Road does reach the average two-lane road capacity of around 20,000 vehicles per day (VPD) towards the western end of the studied segment. This can also help define, in general terms, what volume of traffic on Mt. Vernon Road is through traffic versus what volume of traffic has a trip end in a neighborhood or shopping center along Mt. Vernon Road.

Table 1: 2016 Bi-Directional Volume Information on Mt. Vernon Road

Count Location	AM Peak (7:00)			PM Peak (5:00)			Daily		
	EB	WB	Total	EB	WB	Total	EB	WB	Total
#17	434	1,172	1,606	1,017	643	1,660	10,687	11,040	21,727
#18	366	914	1,280	1,108	539	1,647	10,260	9,247	19,507
#19	156	697	853	831	314	1,145	6,807	6,166	12,973

The information found in **Table 1** suggests that there's likely around 13,000 vehicles per day that are traveling through the corridor and another 8,000-9,000 vehicles that use Mt. Vernon to reach either a neighborhood, shopping centers on the east end of the segment, or one of the side street collector roads (Vermack Road, Tilly Mill Road, and Jett Ferry Road).

Peak Hour Turning Movement Counts

The AM and PM peak hour turning movement counts, respectively, are displayed graphically in **Table 2** and **Table 3** below. The eastbound and westbound movements are for Mount Vernon Road.

Table 2: 2016 AM Peak Hour Turning Movement Counts

1							6							11						
		SB RT	SB TH	SB LT					SB RT	SB TH	SB LT					SB RT	SB TH	SB LT		
		5	1	2					69	0	37					61	0	35		
EB LT	0	Ashmont Ct./ Wickford Way			3	WB RT	EB LT	15	Vernon Lake Drive			4	WB RT	EB LT	18	Oxford Chase			11	WB RT
EB TH	417				1112	WB TH	EB TH	345				837	WB TH	EB TH	198				768	WB TH
EB RT	6				5	WB LT	EB RT	0				0	WB LT	EB RT	0				0	WB LT
		20	2	13					0	0	0					0	0	0		
		NB LT	NB TH	NB RT					NB LT	NB TH	NB RT					NB LT	NB TH	NB RT		
2		SB RT	SB TH	SB LT			7		SB RT	SB TH	SB LT			12		SB RT	SB TH	SB LT		
		108	0	1					0	0	0					0	0	0		
EB LT	7	Vernon Ridge Drive			1	WB RT	EB LT	0	Stratham Drive			0	WB RT	EB LT	0	Vernon Oaks Way			0	WB RT
EB TH	4290				1013	WB TH	EB TH	295				814	WB TH	EB TH	230				772	WB TH
EB RT	0				0	WB LT	EB RT	93				78	WB LT	EB RT	4				2	WB LT
		1	0	0					34	0	46					10	0	0		
		NB LT	NB TH	NB RT					NB LT	NB TH	NB RT					NB LT	NB TH	NB RT		
3		SB RT	SB TH	SB LT			8		SB RT	SB TH	SB LT			13		SB RT	SB TH	SB LT		
		14	0	13					105	0	22					0	0	0		
EB LT	2	Wellshire Place			5	WB RT	EB LT	36	Forest Springs Drive			13	WB RT	EB LT	0	Bradford Circle			0	WB RT
EB TH	457				943	WB TH	EB TH	303				789	WB TH	EB TH	353				963	WB TH
EB RT	1				0	WB LT	EB RT	0				0	WB LT	EB RT	0				0	WB LT
		0	0	0					1	0	0					3	0	0		
		NB LT	NB TH	NB RT					NB LT	NB TH	NB RT					NB LT	NB TH	NB RT		
4		SB RT	SB TH	SB LT			9		SB RT	SB TH	SB LT			14		SB RT	SB TH	SB LT		
		0	0	0					0	0	0					10	0	2		
EB LT	0	Vernon Oaks Drive			0	WB RT	EB LT	0	Meadowlake Drive			0	WB RT	EB LT	2	Northchester Court			1	WB RT
EB TH	465				932	WB TH	EB TH	312				796	WB TH	EB TH	351				953	WB TH
EB RT	5				21	WB LT	EB RT	11				97	WB LT	EB RT	0				0	WB LT
		9	0	49					15	0	77					0	0	0		
		NB LT	NB TH	NB RT					NB LT	NB TH	NB RT					NB LT	NB TH	NB RT		
5		SB RT	SB TH	SB LT			10		SB RT	SB TH	SB LT			15		SB RT	SB TH	SB LT		
		0	0	0					1	1	0					0	0	0		
EB LT	0	Corners Drive			0	WB RT	EB LT	0	Mt. Vernon Place/ Gramercy Drive			1	WB RT	EB LT	0	Cedar Chase			0	WB RT
EB TH	358				899	WB TH	EB TH	206				813	WB TH	EB TH	351				947	WB TH
EB RT	4				0	WB LT	EB RT	180				3	WB LT	EB RT	2				0	WB LT
		0	0	0					88	1	11					5	0	5		
		NB LT	NB TH	NB RT					NB LT	NB TH	NB RT					NB LT	NB TH	NB RT		
														16						
																SB RT	SB TH	SB LT		
																7	6	0		
														EB LT	8	N. Peachtree Road/ Sprouts Driveway			3	WB RT
														EB TH	110				662	WB TH
														EB RT	35				86	WB LT
																24	2	39		
																NB LT	NB TH	NB RT		

Table 3: 2016 PM Peak Hour Turning Movement Counts

1		SB RT	SB TH	SB LT		
		2	0	0		
EB LT	3	Ashmont Ct./ Wickford Way			1	WB RT
EB TH	942				579	WB TH
EB RT	34				7	WB LT
		57	0	12		
		NB LT	NB TH	NB RT		

2		SB RT	SB TH	SB LT		
		18	0	2		
EB LT	27	Vernon Ridge Drive			3	WB RT
EB TH	918				574	WB TH
EB RT	0				1	WB LT
		0	0	1		
		NB LT	NB TH	NB RT		

3		SB RT	SB TH	SB LT		
		8	0	5		
EB LT	4	Wellshire Place			8	WB RT
EB TH	947				532	WB TH
EB RT	2				1	WB LT
		0	0	0		
		NB LT	NB TH	NB RT		

4		SB RT	SB TH	SB LT		
		0	0	0		
EB LT	0	Vernon Oaks Drive			0	WB RT
EB TH	942				531	WB TH
EB RT	6				0	WB LT
		1	0	125		
		NB LT	NB TH	NB RT		

5		SB RT	SB TH	SB LT		
		0	0	0		
EB LT	0	Corners Drive			0	WB RT
EB TH	1108				533	WB TH
EB RT	6				0	WB LT
		0	0	0		
		NB LT	NB TH	NB RT		

6		SB RT	SB TH	SB LT		
		61	0	9		
EB LT	67	Vernon Lake Drive			10	WB RT
EB TH	1048				466	WB TH
EB RT	0				0	WB LT
		0	0	0		
		NB LT	NB TH	NB RT		

7		SB RT	SB TH	SB LT		
		0	0	0		
EB LT	0	Stratham Drive			0	WB RT
EB TH	1038				476	WB TH
EB RT	15				20	WB LT
		5	0	21		
		NB LT	NB TH	NB RT		

8		SB RT	SB TH	SB LT		
		28	0	21		
EB LT	41	Forest Springs Drive			38	WB RT
EB TH	1019				466	WB TH
EB RT	0				0	WB LT
		0	0	0		
		NB LT	NB TH	NB RT		

9		SB RT	SB TH	SB LT		
		0	0	0		
EB LT	0	Meadowlake Drive			0	WB RT
EB TH	1028				492	WB TH
EB RT	13				25	WB LT
		10	0	44		
		NB LT	NB TH	NB RT		

10		SB RT	SB TH	SB LT		
		2	1	0		
EB LT	0	Mt. Vernon Place/ Gramercy Drive			5	WB RT
EB TH	849				420	WB TH
EB RT	215				6	WB LT
		95	0	10		
		NB LT	NB TH	NB RT		

11		SB RT	SB TH	SB LT		
		27	0	10		
EB LT	32	Oxford Chase			31	WB RT
EB TH	831				411	WB TH
EB RT	0				0	WB LT
		0	0	0		
		NB LT	NB TH	NB RT		

12		SB RT	SB TH	SB LT		
		0	0	0		
EB LT	0	Vernon Oaks Way			0	WB RT
EB TH	835				436	WB TH
EB RT	8				3	WB LT
		5	0	3		
		NB LT	NB TH	NB RT		

13		SB RT	SB TH	SB LT		
		0	0	0		
EB LT	0	Bradford Circle			0	WB RT
EB TH	1210				541	WB TH
EB RT	1				2	WB LT
		1	0	1		
		NB LT	NB TH	NB RT		

14		SB RT	SB TH	SB LT		
		2	0	3		
EB LT	9	Northchester Court			1	WB RT
EB TH	1201				541	WB TH
EB RT	0				0	WB LT
		0	0	0		
		NB LT	NB TH	NB RT		

15		SB RT	SB TH	SB LT		
		0	0	0		
EB LT	0	Cedar Chase			0	WB RT
EB TH	1202				544	WB TH
EB RT	3				1	WB LT
		1	0	4		
		NB LT	NB TH	NB RT		

16		SB RT	SB TH	SB LT		
		35	20	8		
EB LT	46	N. Peachtree Road/ Sprouts Driveway			1	WB RT
EB TH	733				252	WB TH
EB RT	69				68	WB LT
		23	10	114		
		NB LT	NB TH	NB RT		

Turn Lane Evaluation Criteria

Two primary criteria were used to evaluate the potential need for left turn lanes along the corridor. One of those criteria was daily left turn volumes, per the GDOT Regulations for Driveway and Encroachment Control and the other criteria was crash frequency/crash trends.

GDOT recommends use of a left turn bay at intersections and driveways where the daily left turn volume meets or exceeds 200 vehicles. Daily turning movement volumes were not taken as part of this proof of concept, however, projected daily volumes can be estimated based on an assumption that the peak hour traffic contributes to approximately 9% of the total daily traffic. Estimates based on the peak hour turning movements from the major street onto each side street can be made to determine the anticipated daily volume of traffic turning left at any given intersection. The collected data and projected turning movements, based on this assumptions, are shown in **Table 4**

Table 4: GDOT LTV Thresholds for Left Turn Bays, and Estimated Daily Left Turn Volumes at Side Streets

Side Street	Max AM Peak Hr. LTV	Max PM Peak Hr. LTV	Calc. Daily LTV	Meets GDOT 200 LTV?
Wickford Way/Ashmont Court	5	7	67	N
Vernon Ridge Drive	7	27	189	N
Wellshire Place	2	4	33	N
Vernon Oaks Drive	21	0	117	N
Corners Drive	0	0	0	N
Vernon Lake Drive	15	67	456	Y
Stratham Drive	78	20	544	Y
Forest Springs Drive	36	41	428	Y
Meadowlake Drive	97	25	678	Y
Gramercy Court/Mt. Vernon Place	3	6	50	N
Oxford Chase Way	18	32	278	Y
Vernon Oaks Way	2	3	28	N
Bradford Circle	0	2	11	N
Northchester Court	2	9	61	N
Cedar Chase	0	1	6	N
N. Peachtree Road/Sprouts Driveway	86	68	856	Y

The second criterion that is used is crash frequency/crash trends from the Georgia Electronic Accident Reporting System (GEARS) database. This information was pulled from crash records over a 3-year period of time that was available between the years of 2012-2014, plus the month of January, 2015. An estimated crash rate on the 1.8 mile segment, assuming an ADT of 20,000 vpd over a 3.08 year span of time, results in a crash rate of 390 crashes per 100 million vehicle miles traveled (100 MVMT). This rate is less than the statewide average, for 2014, of 608 crashes per 100 MVMT. Note that in the main body of the 2017 Dunwoody Comprehensive Transportation Plan Update, (see **Table 1**), that the crash rate reported for Mt. Vernon Road exceeds the statewide average. This is due to the inclusion of several high-volume intersections to the west that contribute to an overall elevated crash risk for the Mt. Vernon Road segment within the City of Dunwoody.

Each intersection was also individually examined for crash frequency and crash trends. The number of crashes occurring at each intersection, the number of injuries that occurred in the reported 3-year time period, and the injury rate are displayed in **Table 5**. Also noted in this table are observations pertaining to the type of crashes that have occurred, and whether these crashes could be correctable by adding dedicated turn bays. The Mt. Vernon Road corridor is partitioned into segments by the existing traffic signals on the corridor and the road's characteristics. Private driveway frequency is higher on the western end, and east of the intersection with Mt. Vernon Place the private drive frequency is zero.

Table 5: 2012-Jan 2015 Crash Frequency, Injury Rate, and Observations at Side Streets

Side Street	No. of Crashes	No. of Injuries	Crashes/ Injury	Crash Notes and Observations
Wickford Way/Ashmont Court	11	2	5.50	Mt. Vernon rear end risk (5 total) and side street angle crash risk (3 total) could likely be reduced w/ a center turn lane/turn bay
Vernon Ridge Drive	6	1	6.00	A center left turn lane/turn bay would likely reduce eastbound rear end crashes (5 total)
Mt. Vernon Way	8	3	2.67	signalized - crash information is only used to determine the average crash rate per intersection on the corridor
Wellshire Place	7	3	2.33	A center left turn lane/turn bay would likely reduce eastbound rear end crashes (5 total)
Vernon Oaks Drive	8	4	2.00	A center left turn lane/turn bay would likely reduce westbound rear end crashes (3 total)
Vermack Road/Manhassett Drive	27	5	5.40	signalized - crash information is only used to determine the average crash rate per intersection on the corridor
Corners Drive	1	0	-	Corners Dr. is one way (southbound) and only right turns in are allowed
Vernon Lake Drive	9	6	1.50	Mt. Vernon rear end risk (3 total) and angle crash risk (2 total) could likely be reduced w/ an EB left turn/center lane
Stratham Drive	2	0	-	High traffic due to school - consider eastbound RT decel lane and westbound left turn lane – this would require moving the mid-block crosswalk to west side of Stratham Drive and adding a refuge island
Forest Springs Drive	6	1	6.00	resurface 3-lane section to include center left turn lane - remove right turn only lane
Meadowlake Drive	2	2	1.00	High traffic due to school - dedicated WB left turn lane here instead of generic center turn lane
Gramercy Court/Mt. Vernon Place	7	1	7.00	A right turn decel lane may provide the most benefit to crash reduction, given the volume of eastbound right turns that take place here
Oxford Chase Way	4	1	4.00	A center left turn lane/turn bay would likely reduce eastbound rear end crashes (3 total)
Vernon Oaks Way (both drives)	1	0	-	No immediate crash risk
Tilly Mill/Wellesley Lane	19	9	2.11	signalized - crash information is only used to determine the average crash rate per intersection on the corridor
Bradford Circle	1	0	-	No immediate crash risk
Northchester Court	2	0	-	No immediate crash risk
Cedar Chase	1	0	-	No immediate crash risk. The pavement width is marginally sufficient to serve as a turn lane here.
Jett Ferry Road	17	4	4.25	signalized - crash information is only used to determine the average crash rate per intersection on the corridor
N. Peachtree Road/Sprouts Driveway	15	7	2.14	Left turn lanes can help reduce eastbound rear-end crashes here (3 total) and the second driveway into the Sprouts shopping center should be converted to right-in/right-out
Total	154	49		
Average	7.3		3.7	

Highlighted intersections indicate isolated locations where crash frequency is higher than the average for the 1.8 mile segment, or where the number of crashes relative to the number of injuries reported is less than the segment average. This value essentially represents how frequently an injury is recorded. For instance, at Vernon Lake Drive, over the 3-year period of reported crashes, there has been one injury for every 1.50 crashes. The corridor saw one injury reported for every 3-4 crashes during the same time period.

As seen in these two previous tables, most of the need for left turn lanes occurs on the western part of the study segment. Between the intersection with Wickford Way/Ashmont Court and Corners Drive, the turning volumes are not typically high enough to justify a turn bay by GDOT criteria, although the crash frequency at these intersections is elevated above the corridor average at 2 of the 5 unsignalized intersections.

- Ashmont Court/Wickford Way
- Vernon Oaks Drive

In this same segment, crash severity is higher than average at 2 of the 5 unsignalized intersections.

- Wellshire Place
- Vernon Oaks Drive

At Vernon Lake Drive, the turning volumes increase to levels that would be justified as having turn bays per the GDOT criteria. The neighborhoods are large, and there are several schools that attract trips throughout the day. Between Vernon Lake Drive and Mount Vernon Place/Gramercy Drive, 4 out of 5 side streets would benefit by having a dedicated left turn lane.

- Vernon Lake Drive
- Stratham Drive
- Forest Springs Drive
- Meadowlake Drive

In the segment of road from Vernon Lake Drive to Mount Vernon Place/Gramercy Drive, it should be noted that 1 of the 5 unsignalized intersections exhibited an elevated crash frequency, higher than the corridor average.

- Vernon Lake Drive

Additionally, crash severity was observed to show above-average trends at 2 of the 5 unsignalized intersections.

- Vernon Lake Drive
- Meadowlake Drive

A project to improve the signalized intersection at Tilly Mill Road is currently underway, and will incorporate turn lanes as appropriate between Mt Vernon Place and Cedar Chase. Beyond the traffic signal at Tilly Mill Road, crash frequency drops to below-average levels, and turns from Mount Vernon Road also drop, until reaching the intersection at N. Peachtree Road. This intersection would benefit with left turn lanes in both directions. Additionally, the secondary driveway into the Sprouts parking lot, between N. Peachtree Road and Dunwoody Club Drive, should be converted into a right-in/right-out

driveway. These improvements may be able to be accommodated through restriping and maybe incorporated into the overall Tilly Mill intersection improvement project.

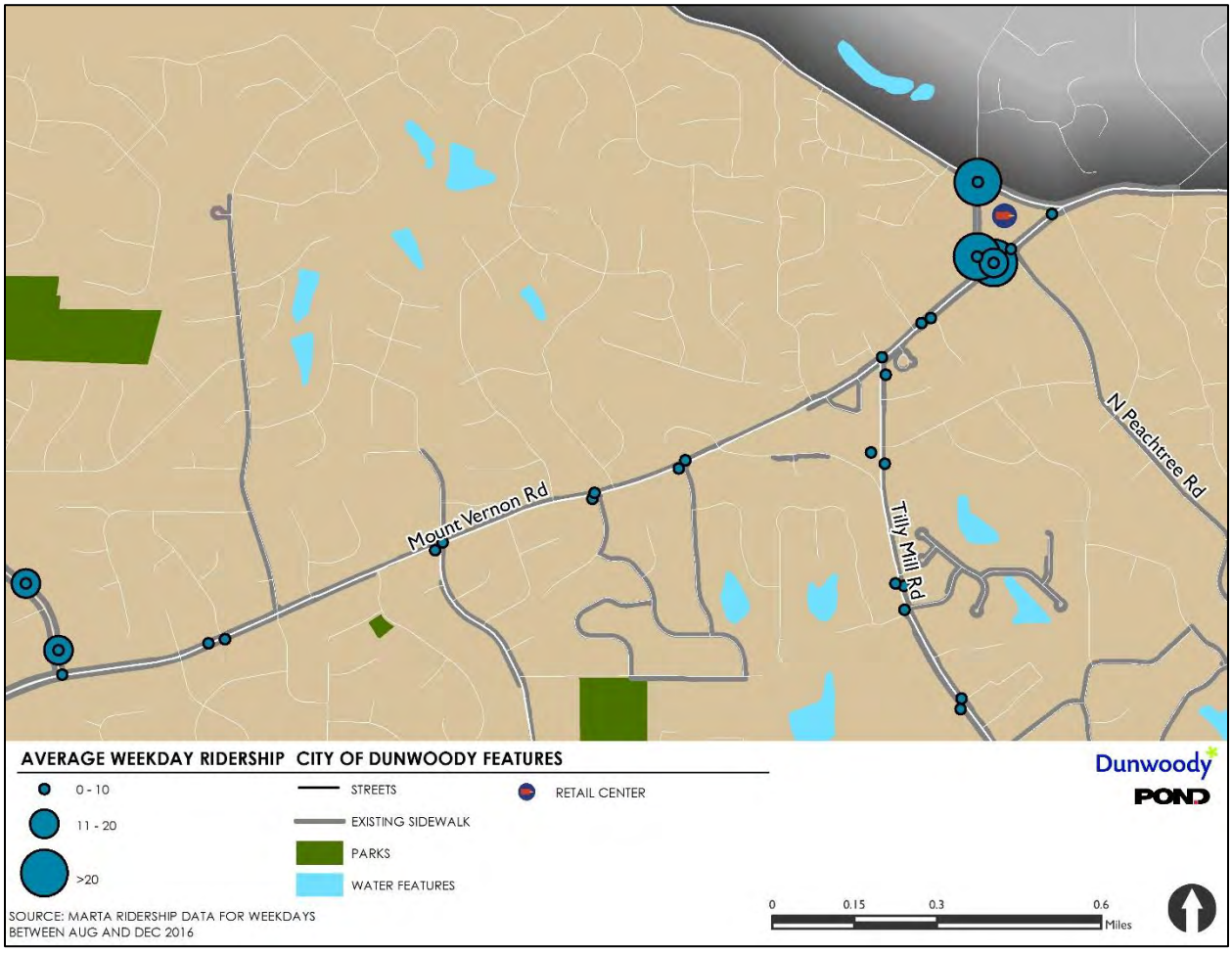
It should be noted that while the unsignalized side-street intersections were evaluated in this proof of concept, there are numerous single-family driveways along Mount Vernon Road for much of this 1.8 mile segment. Each driveway represents a possible conflict point for through vehicles if someone is turning left into their property. A continuous center two-way left turn lane can provide a refuge space for all residents living on Mt. Vernon Road that access their driveway directly from the minor arterial.

Pedestrian Treatments

Sidewalk coverage is relatively thorough along this segment of Mount Vernon Road, with over 3.3 miles of existing sidewalk in place covering both sides of Mount Vernon Road. Except for one gap on the south side between Vermack Drive and Vernon Oaks Way, sidewalks are present on both sides of Mount Vernon Road. There are also mid-block crosswalks in place a several locations along the corridor:

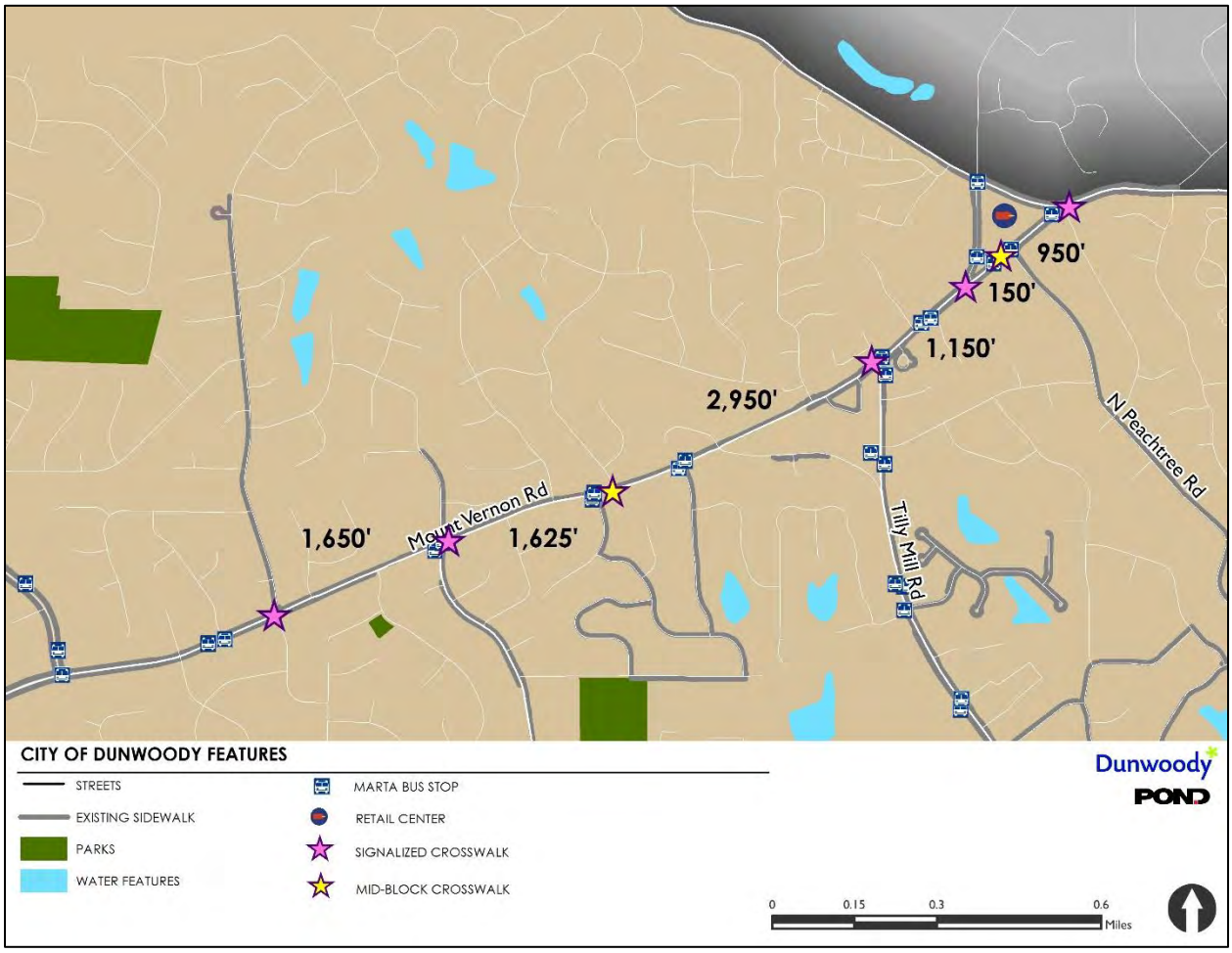
- Mid-block crossing east of Stratham Drive
- Mid-block crossing east of Jett Ferry Road

Also running along Mt. Vernon Road are several MARTA bus routes, 132 and 150. These stops are located on both sides of the road and ridership numbers vary from stop to stop. Weekday ridership averages are represented in the image below. Ridership is relatively low, with higher concentrations of boardings and disembarks occurring around the retail node at Jett Ferry Road.



Most of the observed pedestrian sidewalk usage and crossing demand comes from recreational users. This demand is fairly steady throughout the day. To support pedestrian activity, the distance between crossings should be optimized to limit the amount a pedestrian has to walk to reach an enhanced crossing (either through mid-block crossing improvements or at existing traffic signals). As a general rule

of thumb, a crosswalk every 1,000'-1,600' would provide desirable coverage, because this distance equates to an average walking time of 5-8 minutes. In other words, a person is more likely to walk to an enhanced crosswalk instead of crossing at an unmarked location if the distance to the crosswalk is minimal. The graphic below illustrates the existing signalized crosswalks and the mid-block crosswalks that currently exist on Mount Vernon Road, along with the distances between each crossing.



Crosswalk spacing is more desirable on the eastern segment of the corridor, which supports the higher MARTA ridership figures too. A crosswalk could be beneficial near Meadowlake Drive where two MARTA stops are located, and between Mount Vernon Place and Tilly Mill Road. Other locations for a mid-block crosswalk may be justified based on these standards between Vermack Road and Stratham Drive and between Vermack Road and Mount Vernon Way.

A continuous three-lane typical section can provide enhanced pedestrian safety by accommodating splitter islands that can double as pedestrian refuges. These islands can vary in size and can be landscaped to enhance visual appeal. They can also serve a traffic calming purpose by breaking up lengthy center turn lanes and by creating vertical obstacles at intervals that drivers must pay attention to, which has a tendency to improve driver awareness and could help with distracted driving habits.

These pedestrian refuge islands allow for an improved pedestrian environment. The use of Rectangular Rapid Flashing Beacons (RRFBs) should also be considered to further increase pedestrian safety and driver awareness.

Other Considerations

During the design process, consideration should be provided for the existing features such as available right of way, grading, trees, available pavement width, utilities, drainage, sight distance and context sensitivity (impacts on front yards vs along a back fence).

At a conceptual level, available right of way can provide a general idea of the extent of road widening that can be undertaken using city-owned property without encroaching onto privately owned property. An account of estimated right of way, along with other roadway characteristics and notes about the individual segments of Mt. Vernon Road are summarized in **Table 6**.

Table 6: Mt. Vernon Road Corridor Segments, Characteristics, and Other Notes

Segment	Characteristics			Other Notes
	ADT	Driveways	R/W	
Ashmont Ct./ Wickford Way to Corners Drive	21,700	25	80'-90'	Right of way width drops east of the signal with Vermack Road; crash frequency and severity is higher in this segment, and driveway count is highest, which suggests that extending the existing center two-way left turn lane is appropriate
Corners Drive to Mt. Vernon Place	19,500	12	40'-80'	Right of way width may constrain widening in some locations; driveway frequency is less than the western segment; turning volumes are high enough to justify some form of dedicated turning space; given the lower driveway frequency, consider dedicated turn bays instead of a center two-way left turn lane to minimize right-of-way impacts and property encroachment
Mt. Vernon Place to Dunwoody Club Drive	19,000 – 13,000	0	80'-90'	Private driveway frequency is not a factor; crash risk is lower and turning volumes are lower; turn lanes are recommended at signalized intersections, Oxford Chase, and N. Peachtree Road but a continuous left turn lane may have minimal benefits