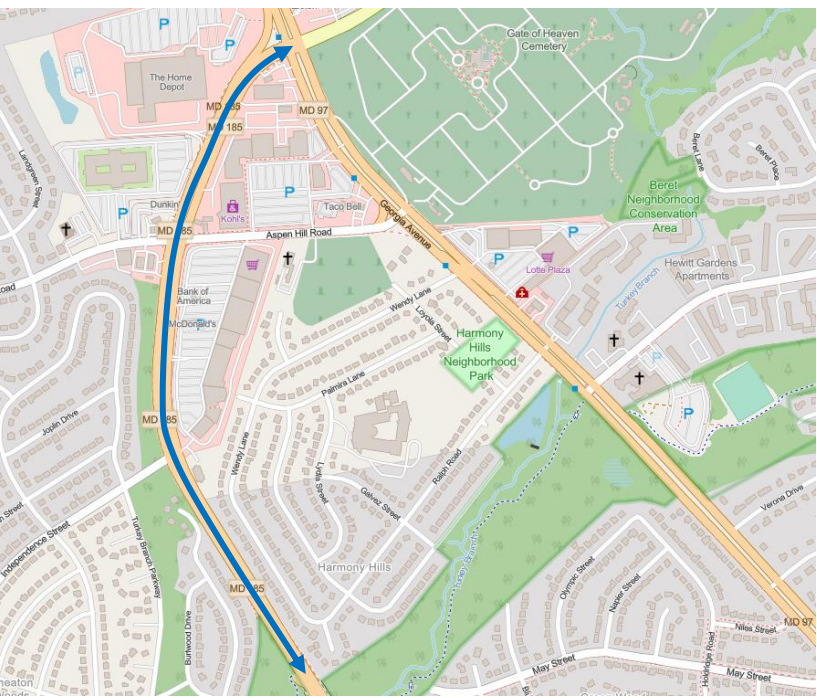




# MD 185 (Connecticut Avenue)

## High Injury Network Analysis & Report

### Matthew Henson Trail to MD 97 (Georgia Avenue)



Prepared By:



August 2022

## Table of Contents

1.	INTRODUCTION .....	1
2.	BACKGROUND .....	1
	Study Area .....	1
	Intersections .....	4
	Pedestrian Level of Comfort .....	5
	Traffic Data .....	8
	Speed Data .....	12
	Public Transit and Ridership .....	13
	Land Use .....	17
	Other Corridor Studies, Plans, and Redevelopment .....	17
3.	CRASH DATA SUMMARY .....	19
	Crash Severity .....	21
	Crash Type .....	22
	Crashes by Time of Day .....	23
	Crashes by Lighting Condition .....	23
	Crashes by Weather and Surface Conditions .....	24
	Pedestrian and Bicyclist Involved Crashes .....	25
4.	FIELD REVIEW AND OBSERVATIONS .....	26
	Pavement Conditions and Markings .....	26
	Roadway Signing .....	26
	Sidewalk Conditions .....	27
	Signalization .....	27
	Sight Distance .....	27
	Lighting .....	28
	Roadway Operations .....	29
5.	SUMMARY OF RECOMMENDED IMPROVEMENTS .....	30

## List of Figures

Figure 1: MD 185 (Connecticut Avenue) Study Limits .....	3
Figure 2: Existing Lane Use and Traffic Control .....	6
Figure 3: Pedestrian Level of Comfort Map .....	7
Figure 4: Existing AM and PM Peak Hour Volumes .....	9
Figure 5: Existing Pedestrian Volumes .....	10
Figure 6: Existing Bicyclist Volumes.....	11
Figure 7: Study Area Bus Stop Locations and Daily Ridership .....	16
Figure 8: 2015-2021 Crash Locations, Types, and Severities .....	20
Figure 9: Overall Crash Frequency (Fatal, Serious, and Minor Injury Crashes) by Year (2015-2021) .....	21
Figure 10: Serious Injury Crash Frequency by Year (2015-2021) .....	22
Figure 11: Minor Injury Crash Frequency by Year (2015-2021) .....	22
Figure 12: Crashes by Surface Conditions .....	25

## List of Tables

Table 1: MD 185 (Connecticut Avenue) AADT Data.....	8
Table 2: MD 185 (Connecticut Avenue) Speed Data .....	12
Table 3: MD 185 (Connecticut Avenue) Bus Stop Daily Ridership .....	15
Table 4: Crash Types by Severity (2015-2021).....	23
Table 5: Crash Time of Day by Severity (2015-2021).....	23
Table 6: Crash Lighting Condition by Severity (2015-2021).....	24
Table 7: Crashes Weather Conditions by Severity (2015-2021) .....	24
Table 8: Pedestrian and Bicyclist Involved Crashes by Severity (2015-2021) .....	25
Table 9: Summary of Recommended Improvements .....	31

## List of Appendices

Appendix A:	Traffic Count Materials
Appendix B:	Speed Data Materials
Appendix C:	USLIMITS2 Outputs
Appendix D:	HIN Fatal, Serious Injury, and Minor Injury Crash Data Materials
Appendix E:	Photographs
Appendix F:	MD 97 (Georgia Avenue) and MD 185 (Connecticut Avenue) HIN Study Support – Operational Analysis

## **1. INTRODUCTION**

Montgomery County’s Vision Zero Two Year Action Plan, dated November 2017, established a goal of reaching zero fatal and serious injury crashes on roadways in Montgomery County by the year 2030. To help achieve this goal, the County identified roadway segments where fatal and serious injury crashes were concentrated. These roadway segments comprise the County’s *High Injury Network (HIN)*, where roadway safety improvement efforts were prioritized.

Subsequent Vision Zero Plans (including the 2020 Action Plan, 2030 Action Plan, and FY 22-23 Work Plan) expand on the work from the 2017 Two Year Action Plan by implementing recommendations from completed studies, advancing on-going initiatives, completing open action items, and identifying priority action items to assist with future budgeting and implementation decisions. In particular, the 2030 Action Plan and FY 22-23 Work Plan group all action items into one of three pillars to highlight the primary role roadway design and operation has on reducing traffic deaths. These three pillars include Complete Streets, Multimodal Future, and Culture of Safety. One priority action item under the Complete Streets pillar, labeled as “S-1: High Injury Network Projects”, calls for implementing safety countermeasures on identified high-risk road segments and intersections (i.e., HIN roadways).

The 1-mile segment of MD 185 (Connecticut Avenue) between the Matthew Henson Trail and MD 97 (Georgia Avenue), located in Aspen Hill, was identified as an HIN roadway based on its crash history. This study includes the analysis of fatal, serious injury, and minor injury crashes, along with recommended improvements to increase safety for all roadway users in the MD 185 (Connecticut Avenue) corridor.

## **2. BACKGROUND**

### ***Study Area***

The audit study limits include MD 185 (Connecticut Avenue) from the Matthew Henson Trail to MD 97 (Georgia Avenue) in Aspen Hill, Maryland (see **Figure 1**). MD 185 (Connecticut Avenue) is classified as a Boulevard from the Matthew Henson Trail to Independence Street, and as a Town Center Boulevard from Independence Street to MD 97 (Georgia Avenue), according to Montgomery County’s *Complete Streets Design Guide*. MD 185 (Connecticut Avenue) is assumed to run in a north-south direction. It consists of six lanes (three in each direction), a wide grass median, and turn bays at each intersection. The posted speed limit is 35 MPH between MD 97 (Georgia Avenue) and approximately 400 feet south of Independence Street, which was reduced from 45 MPH in Summer 2021 (the posted speed limit is 45 MPH for the short remainder of the corridor). There are several driveway entrances/access points to multiple shopping centers and commercial properties throughout the corridor.

Concrete sidewalks are present along northbound (NB) and southbound (SB) MD 185 (Connecticut Avenue), though grass buffers only exist along NB Connecticut Avenue from the southern unsignalized entrance to the Aspen Hill Shopping Center to MD 97 (Georgia Avenue). There are no bicycle facilities provided along the corridor. Ride On and WMATA bus service is provided along the corridor, as shown in **Figure 1**.

The MD 185 (Connecticut Avenue) study corridor includes the following intersections:

- MD 185 (Connecticut Avenue) at MD 97 (Georgia Avenue) – signalized
- MD 185 (Connecticut Avenue) at Home Depot driveway – unsignalized
- MD 185 (Connecticut Avenue) at Aspen Hill Road – signalized
- MD 185 (Connecticut Avenue) at Independence Street – signalized



Figure 1: MD 185 (Connecticut Avenue) Study Limits

### *Intersections*

#### **MD 185 (Connecticut Avenue) at MD 97 (Georgia Avenue)**

##### *Vehicular Facilities*

MD 185 (Connecticut Avenue) at MD 97 (Georgia Avenue) is a four-legged intersection with a full-color traffic signal, with mast arm structures and roadway luminaires. The eastbound (EB) and westbound (WB) left turn movements on MD 97 (Georgia Avenue) operate with exclusive-permissive and exclusive signal phasing, respectively, while NB and SB MD 185 (Connecticut Avenue) operates with split phasing (Georgia Avenue is assumed to run in an east-west direction for the purposes of this report). The right turn movement from EB MD 97 (Georgia Avenue) consists of two channelized lanes that are not controlled by the signal.

##### *Pedestrian / Bicyclist / Transit Facilities*

Accessible pedestrian signals and countdown pedestrian signals (APS/CPS) are provided for all approaches, excluding the EB channelized right turn lanes. Crosswalks with transverse pavement markings are provided across all approaches. Sidewalk facilities are provided along MD 185 (Connecticut Avenue) and MD 97 (Georgia Avenue) at this intersection with the exception of the portion of the channelizing island along MD 185 (Connecticut Avenue) in the southwest (SW) corner of the intersection. Ride On bus Routes 26, 34, and 41 and WMATA bus Routes Y2, Y7, Y8, and L8 service bus stops at this intersection.

#### **MD 185 (Connecticut Avenue) at The Home Depot Driveway**

##### *Vehicular Facilities*

MD 185 (Connecticut Avenue) at the Home Depot Driveway is a three-legged intersection with stop control provided for the eastbound Home Depot Driveway approach. Channelizing islands exist for south- and eastbound right turns, as well as a storage bay for NB left turns and a full length turn lane for SB right turns.

##### *Pedestrian / Bicyclist / Transit Facilities*

Pedestrian and bicyclist facilities are not provided at this intersection, though there is a post-mounted sign along the eastbound driveway approach informing motorists to yield to pedestrians. Ride on bus Routes 26, 34, and 41 and WMATA bus Route L8 service a bus stop along NB MD 185 (Connecticut Avenue) just south of the Home Depot Driveway.

#### **MD 185 (Connecticut Avenue) at Aspen Hill Road**

##### *Vehicular Facilities*

MD 185 (Connecticut Avenue) at Aspen Hill Road is a four-legged intersection with a full-color traffic signal, with mast arm structures and roadway luminaires. The NB and SB left turn movements on MD 185 (Connecticut Avenue) operate with exclusive left turn phasing, while the EB and WB left turn movements on Aspen Hill Road operate with exclusive-permissive signal phasing.

*Pedestrian / Bicyclist / Transit Facilities*

Accessible pedestrian signals and countdown pedestrian signals (APS/CPS) are provided for all approaches. Crosswalks with transverse pavement markings are provided across all approaches, and a pedestrian refuge median exists for the north leg crossing. Sidewalk facilities are provided along MD 185 (Connecticut Avenue) and Aspen Hill Road at this intersection. Ride On bus Routes 26, 34, and 41 and WMATA bus Route L8 service bus stops at this intersection.

**MD 185 (Connecticut Avenue) at Independence Street**

*Vehicular Facilities*

MD 185 (Connecticut Avenue) at Independence Street is a four-legged intersection with a full-color traffic signal, with mast arm structures and roadway luminaires. The east leg of the intersection provides access to the Aspen Hill Shopping Center. The NB and SB left turn movements on MD 185 (Connecticut Avenue) operate with exclusive left turn phasing, while the EB and WB left turn movements on Independence Street operate with permissive signal phasing.

*Pedestrian / Bicyclist / Transit Facilities*

Accessible pedestrian signals and countdown pedestrian signals (APS/CPS) are provided for the north and west leg crosswalks, which are the only legs where marked crosswalks are present. Transverse pavement markings are provided for these crossings. Sidewalk facilities are provided along MD 185 (Connecticut Avenue) and Independence Street, with the exception of the south side of the east leg. Ride On bus Routes 34 and 41 and WMATA bus Route L8 service bus stops at this intersection.

**Figure 2** shows the existing lane use and traffic control at all the study intersections within the corridor.

***Pedestrian Level of Comfort***

Pedestrian Level of Comfort (PLOC) is a metric used to identify how comfortable it is to walk under various conditions and was used to evaluate the study corridor roadway. The four primary ratings for PLOC include “Undesirable”, “Uncomfortable”, “Somewhat Comfortable”, and “Very Comfortable”. **Figure 3** summarizes the PLOC scores obtained from the Maryland-National Capital Park and Planning Commission’s (M-NCPPC) MCAAtlas online database and confirmed during the field inventory. The roadways that have been identified with PLOC scores of “Uncomfortable” or “Undesirable” include MD 185 (Connecticut Avenue), MD 97 (Georgia Avenue), and sections of Aspen Hill Road.



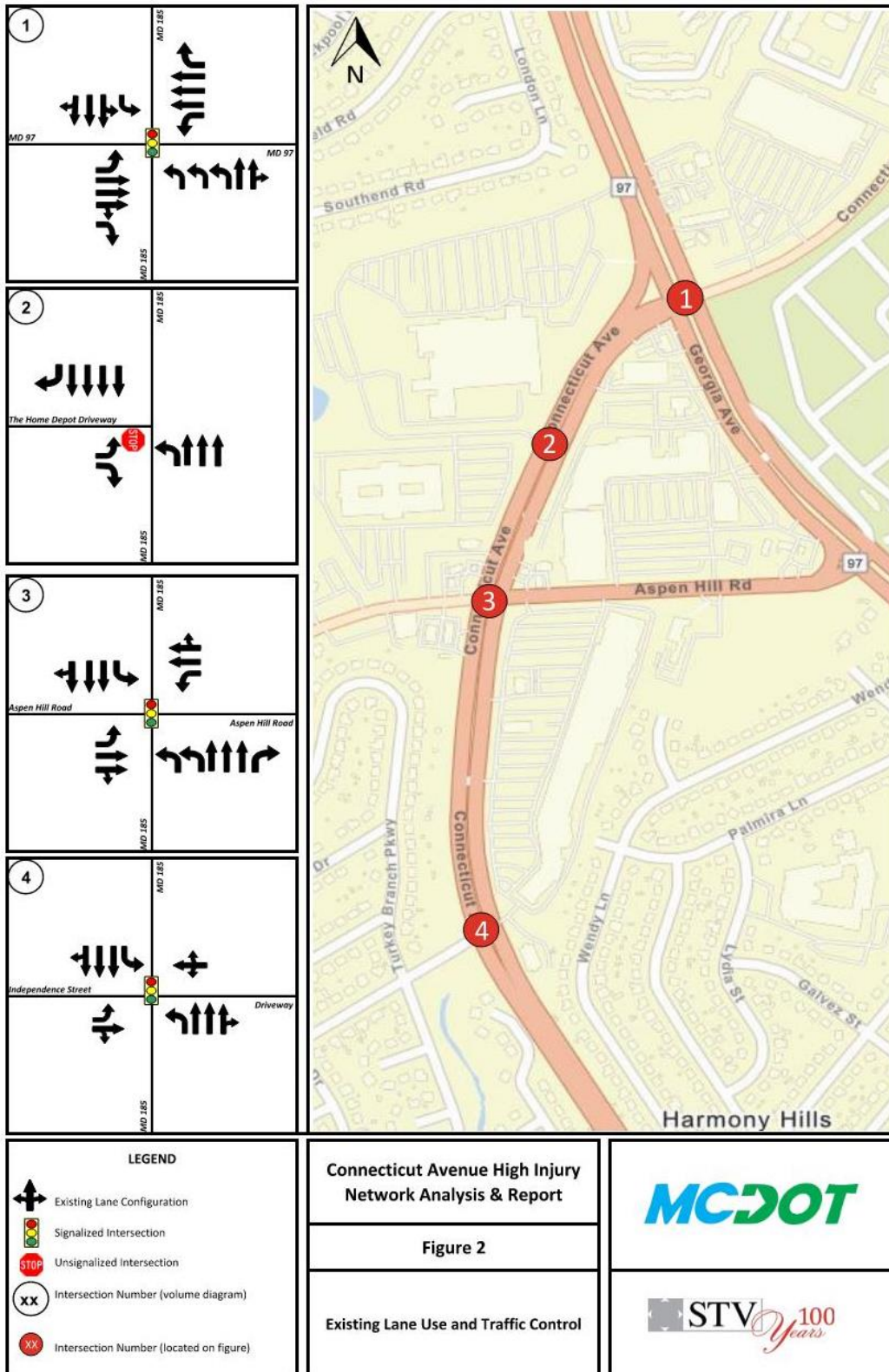


Figure 2: Existing Lane Use and Traffic Control

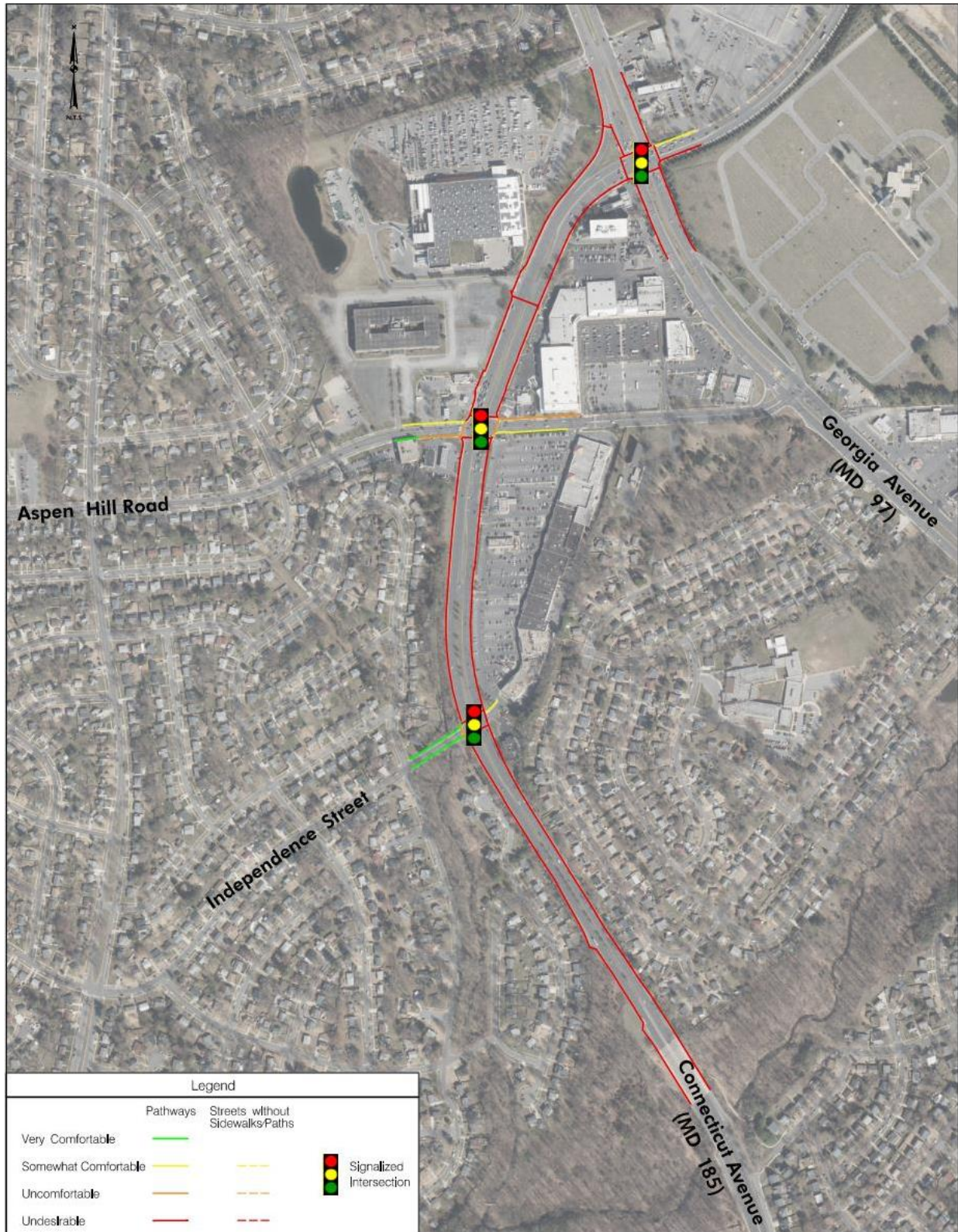


Figure 3: Pedestrian Level of Comfort Map

**Traffic Data**

MCDOT determined Annual Average Daily Traffic (AADT) volumes for the study area, measured in vehicles per day (vpd), based on available traffic counts from MDOT SHA’s Internet Traffic Monitoring System (I-TMS). Traffic counts used were collected on Tuesday, May 21, 2019, and Wednesday, May 22, 2019. The AADT volume data is shown in **Table 1**. AM and PM peak hour turning movement volumes, measured in vehicles per hour (vph), were also determined for each study intersection within the corridor. These turning movement volumes were based on traffic counts collected in December 2018 and November 2019 as part of the December 2019 *Kaiser Aspen Hill Local Transportation Area Review*, counts from I-TMS in 2017 through 2019, and an MCDOT count collected on Wednesday, September 21, 2021. The volumes were balanced throughout the network consistent with the operational analysis performed for the MD 97 (Georgia Avenue) and Connecticut Avenue HIN studies, and the resultant existing peak hour volumes are shown in **Figure 4**. Pedestrian and bicyclist volumes are included in **Error! Reference source not found.** and **Figure 6**, respectively.

Please note that due to the COVID-19 pandemic and its effect on traffic volumes, AADT and peak hour turning movement counts from 2018 and 2019 were used as a basis for this study (counts from September 2021 were used as a supplemental data resource). These pre-COVID counts were used in an effort to analyze a more conservative scenario that does not reflect traffic conditions impacted by the pandemic, which have been more variable, but are largely rebounding toward pre-COVID levels. Traffic count data is provided in **Appendix A**.

**Table 1: MD 185 (Connecticut Avenue) AADT Data**

Road	Segment	Count Year	AADT (vpd)
MD 185 (Connecticut Avenue)	Between MD 97 (Georgia Avenue) and Matthew Henson Trail	2019	42,260

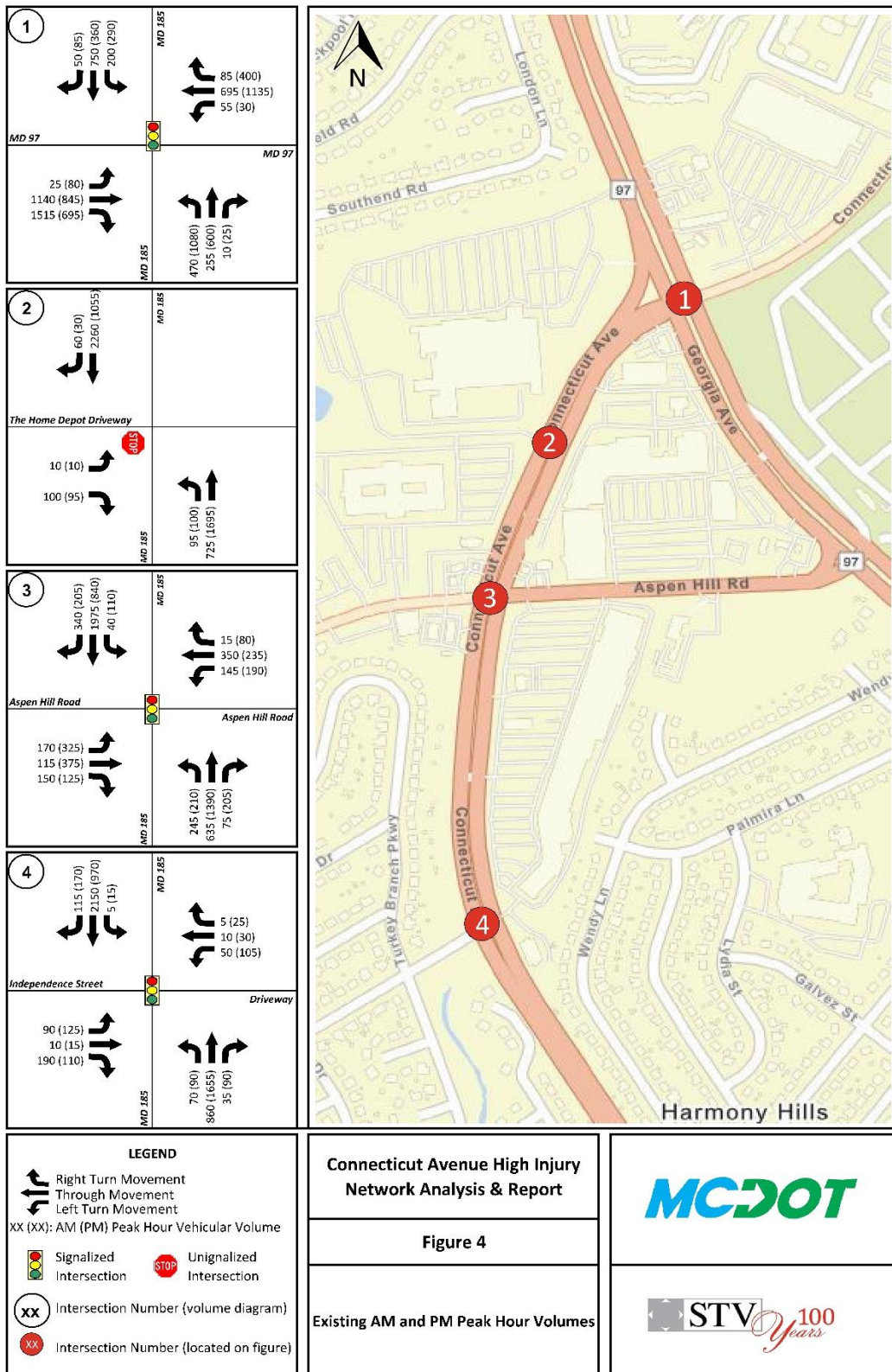


Figure 4: Existing AM and PM Peak Hour Volumes

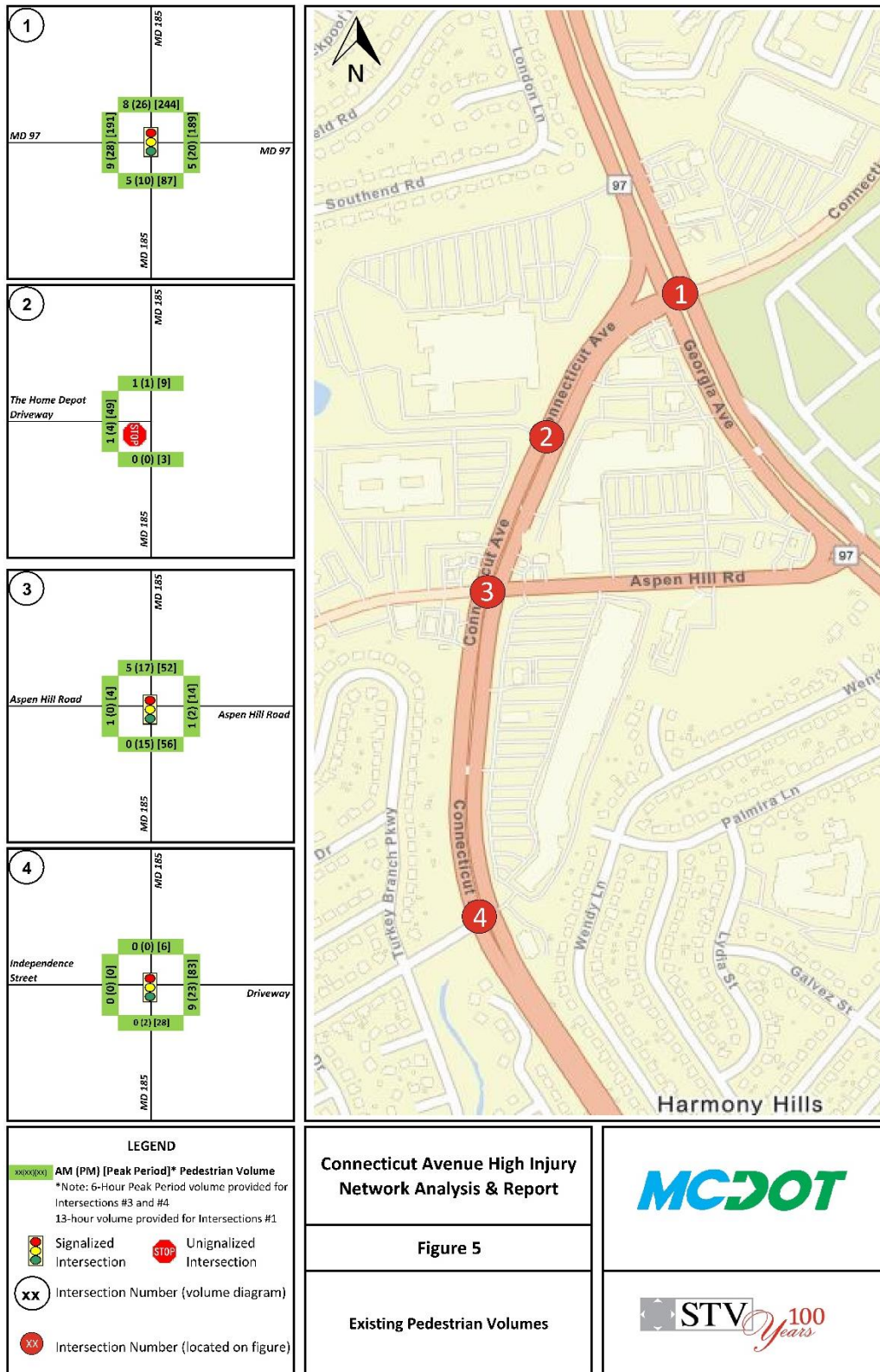


Figure 5: Existing Pedestrian Volumes

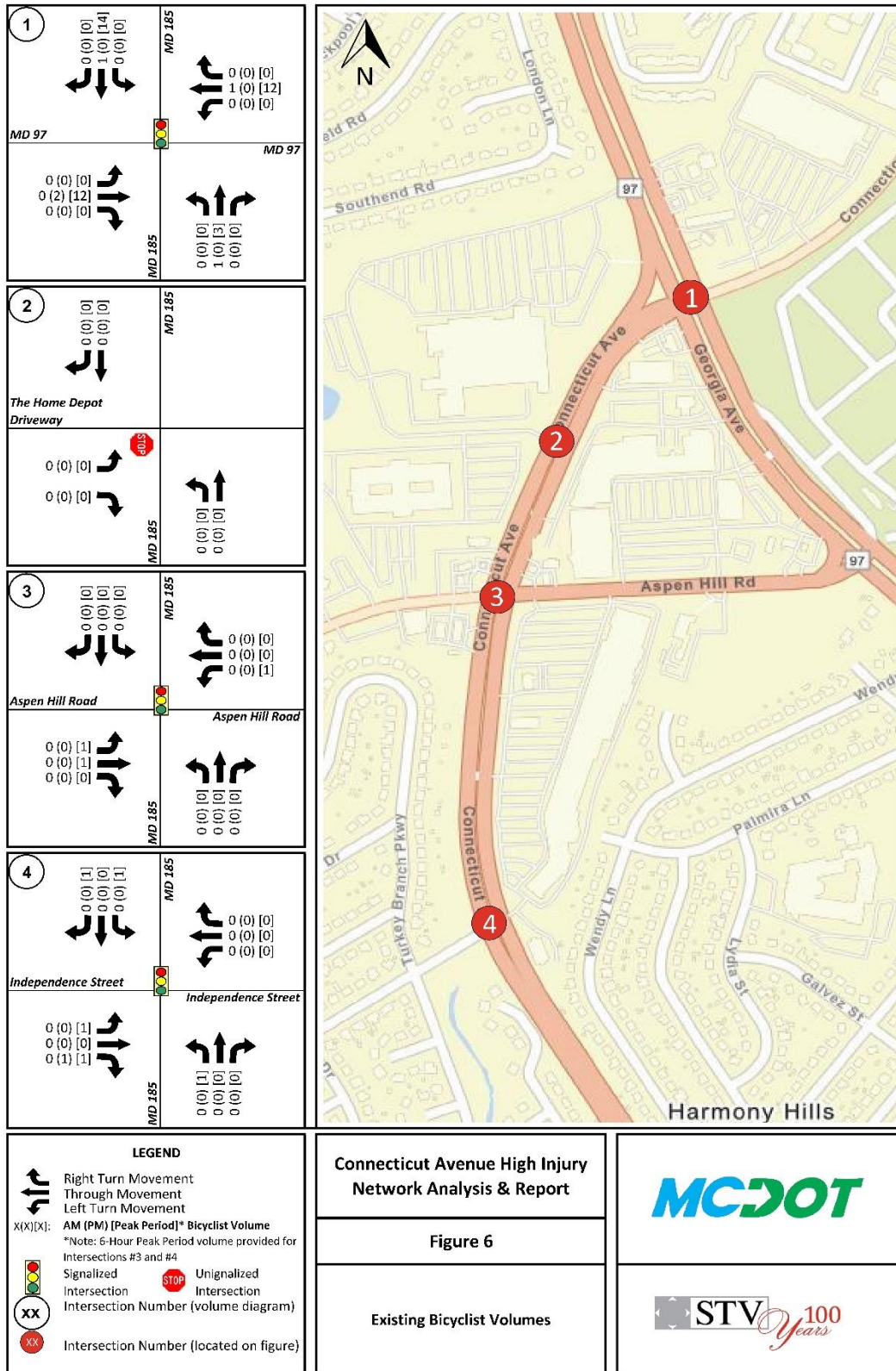


Figure 6: Existing Bicyclist Volumes

*Speed Data*

MCDOT collected speed data over a 48-hour period from Tuesday March 1, 2022 through Wednesday, March 2, 2022 for the following locations:

- Along the free-flow channelized right turn lanes from eastbound MD 97 (Georgia Avenue) to SB MD 185 (Connecticut Avenue)
- Along MD 185 (Connecticut Avenue) between MD 97 (Georgia Avenue) and Aspen Hill Road (NB and SB directions)

This data was compared to other available speed data collected for SB MD 185 (Connecticut Avenue) between MD 97 (Georgia Avenue) and Aspen Hill Road on October 6, 2011. Prior to Summer 2021, the posted speed limit within the HIN study corridor was 45 mph (it was lowered to 35 MPH in Summer 2021 by the Maryland Department of Transportation State Highway Administration [MDOT SHA] between Georgia Avenue [MD 97] and 400 feet south of Independence Street).

A summary of the speed data is provided in **Table 2**. Detailed speed reports can be found in **Appendix B**.

**Table 2: MD 185 (Connecticut Avenue) Speed Data**

Location	Direction of Travel	Posted Speed Limit (mph)	Average Speed (mph)	85 <sup>th</sup> Percentile Speed (mph)	12-mph Pace Speed (mph)
Channelized Right Turn Lanes from EB MD 97 (Georgia Avenue) to SB MD 185 (Connecticut Avenue)	SB	45	33	37	26-38
MD 185 (Connecticut Avenue), between MD 97 (Georgia Avenue) and Aspen Hill Road	NB	35	32	39	26-38
MD 185 (Connecticut Avenue), between MD 97 (Georgia Avenue) and Aspen Hill Road	SB	35	32	41	28-40
MD 185 (Connecticut Avenue), between MD 97 (Georgia Avenue) and Aspen Hill Road*	SB	45	41	46	35-46

\*The posted speed limit along Connecticut Avenue in the HIN study corridor was 45 mph prior to Summer 2021.

The 2022 speed data shows that for the channelized right turn lanes from EB MD 97 (Georgia Avenue) onto SB MD 185 (Connecticut Avenue), average and 85th percentile speeds are 33 and 37 MPH, respectively. Between MD 97 (Georgia Avenue) and Aspen Hill Road, average and 85th percentile speeds are 32 and 39 MPH in the NB direction and 32 and 41 MPH in the SB direction, respectively. 85<sup>th</sup> percentile speeds are approximately two (2) to six (6) MPH over the posted speed limit of 35 MPH.

The 2011 speed data indicates that the 85<sup>th</sup> percentile and average speeds along SB MD 185 (Connecticut Avenue) between MD 97 (Georgia Avenue) and Aspen Hill Road were 41 and 46 MPH, respectively. The

85<sup>th</sup> percentile speed was approximately one (1) MPH over the posted speed limit of 45 MPH, while the average speed was approximately four (4) MPH under the posted speed.

The speed data summarized above was used to help determine the appropriate speed limit for MD 185 (Connecticut Avenue) utilizing the Federal Highway Administration’s USLIMITS2 tool, which is a web based tool used to assist in setting reasonable, safe, and consistent speed limits for specific segments of roads. The USLIMITS2 tool considers roadway characteristics including, but not limited to, AADT, operating speeds, geometric conditions, crash and injury rates, and pedestrian and bicyclist activity. It should be noted, however, that the speed limit analysis required a summary of injury and non-injury crashes. Since the crash analysis for this study only captured minor injury, serious injury, and fatal crashes, data for all crash types including injury and property damage only crashes were obtained from the dataMontgomery website for the January 2015 – December 2021 study period. Since the speed data between 2011 and 2022 was somewhat different, it became necessary to determine the appropriate speed values to use in the USLIMITS2 software. Since the crash period reviewed covered 2015 through 2021, the vast majority of crashes occurred while the posted speed limit was 45 mph. As a result, the 2011 speed data was used for the analysis, as it better represents existing speed limit conditions within the crash review period. The results of the speed limit analysis indicate that the recommended speed limit for MD 185 (Connecticut Avenue) is 40 MPH. Outputs from the USLIMITS2 analysis are provided in **Appendix C**. Since MDOT SHA lowered the posted speed limit to 35 MPH in Summer 2021, no posted speed limit change is recommended at this time.

### ***Public Transit and Ridership***

Available public transit within the study limits includes Montgomery County Ride On bus Routes 26, 34, and 41, and WMATA bus Routes L8, Y2, Y7, and Y8. Within the study limits, there are four NB and four SB bus stops along MD 185 (Connecticut Avenue). There are also bus stops in both directions just north of MD 97 (Georgia Avenue) and on MD 97 (Georgia Avenue) that were considered for this study given their proximity to the MD 185 (Connecticut Avenue) at MD 97 (Georgia Avenue) study intersection.

Bus stops are marked by Ride On and/or WMATA signs, with route information provided on each sign. The stops are not consistently located on either the near side or far side of the intersections within the MD 185 (Connecticut Avenue) corridor. The bus stops in the vicinity of Turkey Branch Parkway and the NB bus stop near the Home Depot driveway are more than 500 feet from a protected, signalized crossing of MD 185 (Connecticut Avenue). All other bus stops are located within approximately 300 feet of a protected, signalized crossing of MD 185 (Connecticut Avenue). Bus stop shelters are provided at the following locations:

- NB MD 185 (Connecticut Avenue) at Independence Street – near side (Ride On Stop ID 21324/WMATA Stop ID 2001281)
- NB MD 185 (Connecticut Avenue) at Northgate Shopping Center – near side (Ride On Stop ID 21328/WMATA Stop ID 2000869)
- NB MD 185 (Connecticut Avenue) at MD 97 (Georgia Avenue) – far side (Ride On Stop ID 21330/WMATA Stop ID 2000882)
- SB MD 185 (Connecticut Avenue) at MD 97 (Georgia Avenue) – near side (Ride On Stop ID 21344/WMATA Stop ID 2000885)
- SB MD 185 (Connecticut Avenue) at Aspen Hill Road – near side (Ride On Stop ID 21346/WMATA Stop ID 2000862)
- SB MD 185 (Connecticut Avenue) at Aspen Hill Road – far side (Ride On Stop ID 21348/WMATA Stop ID 2000856)



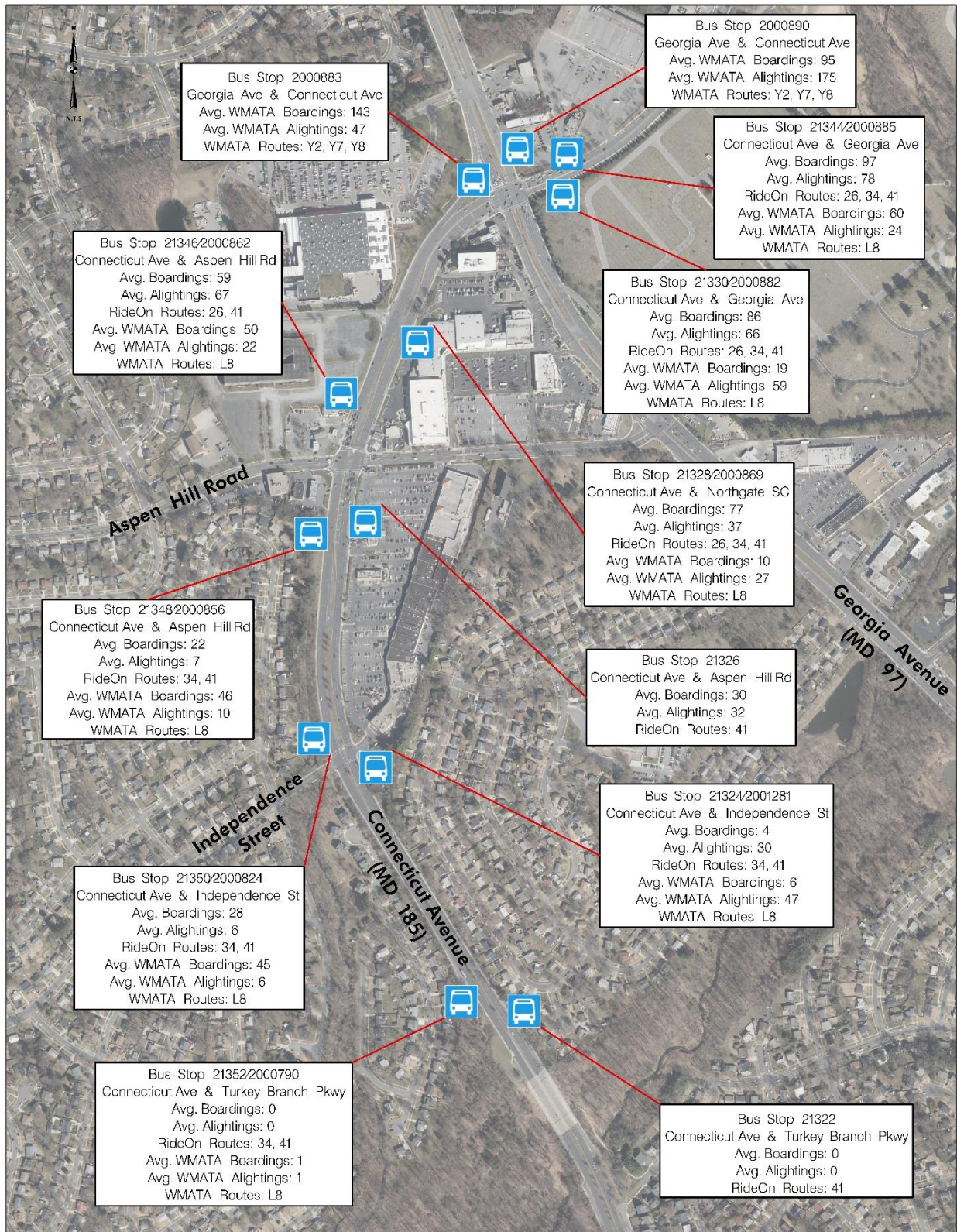
- SB MD 185 (Connecticut Avenue) at Independence Street – near side (Ride On Stop ID 21350/WMATA Stop ID 2000824)
- EB MD 97 (Georgia Avenue) at MD 185 (Connecticut Avenue) – near side (WMATA Stop ID 2000883)

Recent average daily bus ridership data was provided by MCDOT’s Division of Transit Services and WMATA’s Office of Bus Planning in August 2022, with ridership data from 2019. A review of the data indicated that daily boardings and alightings by stop varied widely throughout the study area, as shown in **Table 3**, with the highest total ridership occurring at the bus stops in both directions at MD 97 (Georgia Avenue). The bus stops that have particularly low average ridership include the bus stops in both directions at Turkey Branch Parkway (at the southern end of the corridor).

**Table 3: MD 185 (Connecticut Avenue) Bus Stop Daily Ridership**

Location	Stop ID	Bus Routes	Average Boardings	Average Alightings
NB Connecticut Avenue at MD 97 (Georgia Avenue) – Far Side	Ride On: 21330	26, 34, 41	86	66
	WMATA: 2000882	L8	19	59
	<b>Total:</b>		<b>105</b>	<b>125</b>
SB Connecticut Avenue at MD 97 (Georgia Avenue) – Near Side	Ride On: 21344	26, 34, 41	97	78
	WMATA: 2000885	L8	60	24
	<b>Total:</b>		<b>157</b>	<b>102</b>
EB MD 97 (Georgia Avenue) at MD 185 (Connecticut Avenue) – Near Side	Ride On: n/a	-	-	-
	WMATA: 2000883	Y2, Y7, Y8	143	47
	<b>Total:</b>		<b>143</b>	<b>47</b>
WB MD 97 (Georgia Avenue) at MD 185 (Connecticut Avenue)	Ride On: n/a	-	-	-
	WMATA: 2000890	Y2, Y7, Y8	95	175
	<b>Total:</b>		<b>95</b>	<b>175</b>
NB MD 185 (Connecticut Avenue) at Northgate Shopping Center	Ride On: 21328	26, 34, 41	77	37
	WMATA: 2000869	L8	10	27
	<b>Total:</b>		<b>87</b>	<b>64</b>
SB MD 185 (Connecticut Avenue) at Aspen Hill Road - Near Side	Ride On: 21346	26, 41	59	67
	WMATA: 2000862	L8	50	22
	<b>Total:</b>		<b>109</b>	<b>89</b>
NB MD 185 (Connecticut Avenue) at Aspen Hill Road - Near Side	Ride On: 21326	41	30	32
	WMATA: n/a	L8	-	-
	<b>Total:</b>		<b>30</b>	<b>32</b>
SB MD 185 (Connecticut Avenue) at Aspen Hill Road - Far Side	Ride On: 21348	34, 41	22	7
	WMATA: 2000856	L8	46	10
	<b>Total:</b>		<b>68</b>	<b>17</b>
NB MD 185 (Connecticut Avenue) at Independence Street – Near Side	Ride On: 21324	34, 41	4	30
	WMATA: 2001281	L8	6	47
	<b>Total:</b>		<b>10</b>	<b>77</b>
SB MD 185 (Connecticut Avenue) at Independence Street – Near Side	Ride On: 21350	34, 41	28	6
	WMATA: 2000824	L8	45	6
	<b>Total:</b>		<b>73</b>	<b>12</b>
NB MD 185 (Connecticut Avenue) at Turkey Branch Parkway	Ride On: 21322	41	0	0
	WMATA: n/a	-	-	-
	<b>Total:</b>		<b>0</b>	<b>0</b>
SB MD 185 (Connecticut Avenue) at Turkey Branch Parkway	Ride On: 21352	34, 41	0	0
	WMATA: 2000790	L8	1	1
	<b>Total:</b>		<b>1</b>	<b>1</b>

Figure 7 shows the locations of all bus stops within the study corridor, the WMATA and/or Ride On bus stop ID numbers at each stop, and the daily person ridership at each stop (i.e. daily boardings and alightings).



**Figure 7: Study Area Bus Stop Locations and Daily Ridership**

### *Land Use*

The MD 185 (Connecticut Avenue) study area is classified as being within a “Suburban Activity Center” (Zone C) context zone, according to MDOT SHA’s 2019 *Context Driven* guide ([Context Driven Resources](#)). A Suburban Activity Center, as defined in the *Context Driven* guide, is typically found along major arterials and features a medium diversity of uses, along with a much lower density than that found in an urban core, urban center, and traditional town center. It typically consists of detached low-rise structures with a range of setbacks, with off-street parking typically being present between the structures and roadway. These areas often serve a variety of modes and trip types and require a balanced approach between access and mobility. The actual roadway and land use characteristics of the MD 185 (Connecticut Avenue) study area largely reflect the description of “Suburban Activity Center.”

### *Other Corridor Studies, Plans, and Redevelopment*

This MD 185 (Connecticut Avenue) HIN study involved the review of several previous studies, plans, and redevelopment documents that overlapped in full or in part with the limits of this study area. Previous roadway safety/recommendations/upgrades served as a resource and were considered when developing the roadway safety recommendations tables found later in this report. The studies, plans, and redevelopment documents considered are summarized below.

### **2019 Aspen Hill Vision Zero Study**

The Aspen Hill Vision Zero Study identifies strategies to improve safety for all people walking, biking, rolling, driving, and using transit in Aspen Hill. The entirety of the Connecticut Avenue (MD 185) HIN corridor lies within the Aspen Hill Vision Zero Study area boundaries. The study states that proposed short- and long-term measures prioritize access and safety improvements, focusing on people, how and where they travel, and their comfort traveling in their neighborhood. Measures identified in the study included traffic signal timing and phasing improvements, high visibility crosswalk installations, median refuge island installations, removal of channelized right-turn lanes, right turn on red restrictions, bus stop improvements/upgrades, providing a buffer between pedestrians and moving vehicles, new traffic signals, vehicle speed reduction strategies, and providing unobstructed sidewalks, among others.

### **MD 185 (Connecticut Avenue) Pedestrian Road Safety Audit (PRSA)**

The Connecticut Ave PRSA was conducted in 2011 by MCDOT, with the intent of identifying existing pedestrian- and bicyclist-related safety issues and developing recommendations to improve pedestrian and bicyclist safety. The PRSA study limits included the MD 185 (Connecticut Avenue) corridor from Independence Street to MD 97 (Georgia Avenue) in Aspen Hill. The PRSA overlaps with the MD 97 (Georgia Avenue) HIN study at the intersection of MD 185 (Connecticut Avenue) and MD 97 (Georgia Avenue). General recommendations from the MD 185 (Connecticut Avenue) PRSA at/near the MD 185 (Connecticut Avenue)/MD 97 (Georgia Avenue) intersection are provided below.

- Install pedestrian warning signs, high visibility crosswalk, and advance stop bar along the double channelized right turn from EB MD 97 (Georgia Avenue) to SB MD 185 (Connecticut Avenue).
- Implement pavement markings, geometric changes, and/or signalized treatments to slow the speed of vehicles in the channelized right turn lanes.
- Install continental style crosswalks (also referred to as high visibility crosswalks) on all approaches.

- Improve/upgrade pedestrian signal timings and pedestrian facilities (e.g. APS/CPS, median refuge islands).
- Implement improvements to increase the sight distance between WB MD 97 right turning vehicles to NB MD 185 (Connecticut Avenue) and pedestrians crossing MD 185 (Connecticut Avenue) in the NE corner of the intersection, and/or to alert drivers to yield to pedestrians at this location.
- Relocate the far side bus stop along SB MD 185 (Connecticut Avenue), south of Aspen Hill Road, to the nearside bus stop along SB MD 185 (Connecticut Avenue), north of Aspen Hill Road. This is intended reduce the likelihood of pedestrian midblock crossings of MD 185 (Connecticut Avenue) to/from the far side bus stop.
- Consolidate access points to reduce pedestrian exposure to turning vehicles.
- Evaluate the need for a traffic signal at the MD 97 (Georgia Avenue)/Home Depot Driveway intersection.
- Implement speed limit reductions in the corridor.

### **MDOT SHA Improvements**

MDOT SHA has implemented several improvements along the study area, listed below:

- Installed “Stop Here For Peds” sign with stop bar along the double channelized right-turn from EB MD 97 to SB MD 185.
- Speed limit reductions along MD 185 from 45 mph to 35 mph through the limits of the study area.

### **MDOT SHA MD 97 (Georgia Avenue) Road Diet Study**

MDOT SHA is conducting a comprehensive road diet study to analyze the operational impacts of removing/repurposing one general purpose travel lane along EB and WB MD 97 (Georgia Avenue) between Bel Pre Road and Randolph Road in Aspen Hill and Glenmont. It should be noted that since the study release date and its recommendations are to be determined, this MD 185 (Connecticut Avenue) HIN study (with study limits that intersection Georgia Avenue) developed safety recommendations that were considered independently from (but did not preclude) a road diet on MD 97 (Georgia Avenue). It is understood that specific recommendations from this HIN study may need additional coordination between MCDOT and MDOT SHA to determine their appropriateness or feasibility if a road diet is ultimately pursued.

### **Montgomery County Humane Society Campus - 13730 MD 97 (Georgia Avenue) Development**

The Montgomery County Humane Society Campus is a proposed 16,000 SF office, veterinary clinic, education, and animal service space to be located on the SW corner of the MD 97 (Georgia Avenue) /Aspen Hill Road intersection. Preliminary Site Plan approval was given for this development by Maryland-National Capital Park and Planning Commission (MNCPPC) on October 15, 2020, with proposed improvements to include a widened grass-buffered sidewalk along EB Aspen Hill Road along the approximate 500-foot property frontage extending westerly from MD 97 (Georgia Avenue), and a new grass-buffered shared use path along EB MD 97 (Georgia Avenue) between Aspen Hill Road and Wendy Lane.

### Kaiser Permanente Aspen Hill Development

Kaiser Permanente Aspen Hill is a proposed 180,000 SF medical office building to be located along Aspen Hill Road, approximately 250 feet west of MD 185 (Connecticut Avenue), but with a main access driveway to be collocated with the existing Home Depot access driveway on MD 185 (Connecticut Avenue), approximately 750 feet south of MD 97 (Georgia Avenue). The proposed site is expected to generate more than 350 and 600 person trips in the AM and PM peak hours, respectively. Preliminary Site Plan approval was given for this development by Maryland-National Capital Park and Planning Commission (MNCPPC) on June 24, 2021, with proposed improvements to include a full traffic signal at the MD 185 (Connecticut Avenue)/Home Depot Driveway intersection (which will be a shared site access for the Home Depot and Kaiser Aspen Hill properties), and a grass-buffered shared use path along SB MD 185 (Connecticut Avenue) from the Home Depot Driveway to Aspen Hill Road for approximately 600 feet, and along WB Aspen Hill Road, extending westerly from MD 185 (Connecticut Avenue) for approximately 400 feet (both to tie into the existing sidewalk network).

### 3. CRASH DATA SUMMARY

The following is a summary of the corridor-wide police-reported crash history from January 2015 through December 2021, for the fatal, serious injury, and minor injury crashes in the MD 185 (Connecticut Avenue) study corridor. The crash data was acquired through the Montgomery County open data portal. This crash data was reviewed to evaluate patterns and trends to assist in determining appropriate safety recommendations for the corridor. There were six (6) serious injury crashes, 51 minor injury crashes, and no fatal crashes over the study period. While there were additional no apparent injury and property damage only crashes, those were not included for the purposes of this study. These crashes were not included due to the Vision Zero goal of focusing on serious and fatal crashes, with minor injury crashes serving as a supplementary data source.

Forty-one of the 57 police-reported crashes were listed as driveway, crossover, or intersection related crashes. The crash locations are shown in **Figure 8** and crash data is provided in **Appendix D**. Please note that the locations shown are approximate and may have positions that are slightly altered to display the data more clearly and accurately.

The crashes occurred at or in the vicinity of the following locations:

- MD 185 (Connecticut Avenue) at MD 97 (Georgia Avenue) – **21 crashes**
- MD 185 (Connecticut Avenue) between MD 97 (Georgia Avenue) and the Home Depot Driveway– **one (1) crash**
- MD 185 (Connecticut Avenue) at the Home Depot Driveway – **six (6) crashes**
- MD 185 (Connecticut Avenue) between the Home Depot Driveway and Aspen Hill Road– **two (2) crashes**
- MD 185 (Connecticut Avenue) at Aspen Hill Road – **12 crashes**
- MD 185 (Connecticut Avenue) between Aspen Hill Road and Independence Street (Aspen Hill Shopping Center Driveway) – **nine (9) crashes**
- MD 185 (Connecticut Avenue) at Independence Street – **four (4) crashes**
- MD 185 (Connecticut Avenue) between Independence Street and Matthew Henson Trail– **two (2) crashes**

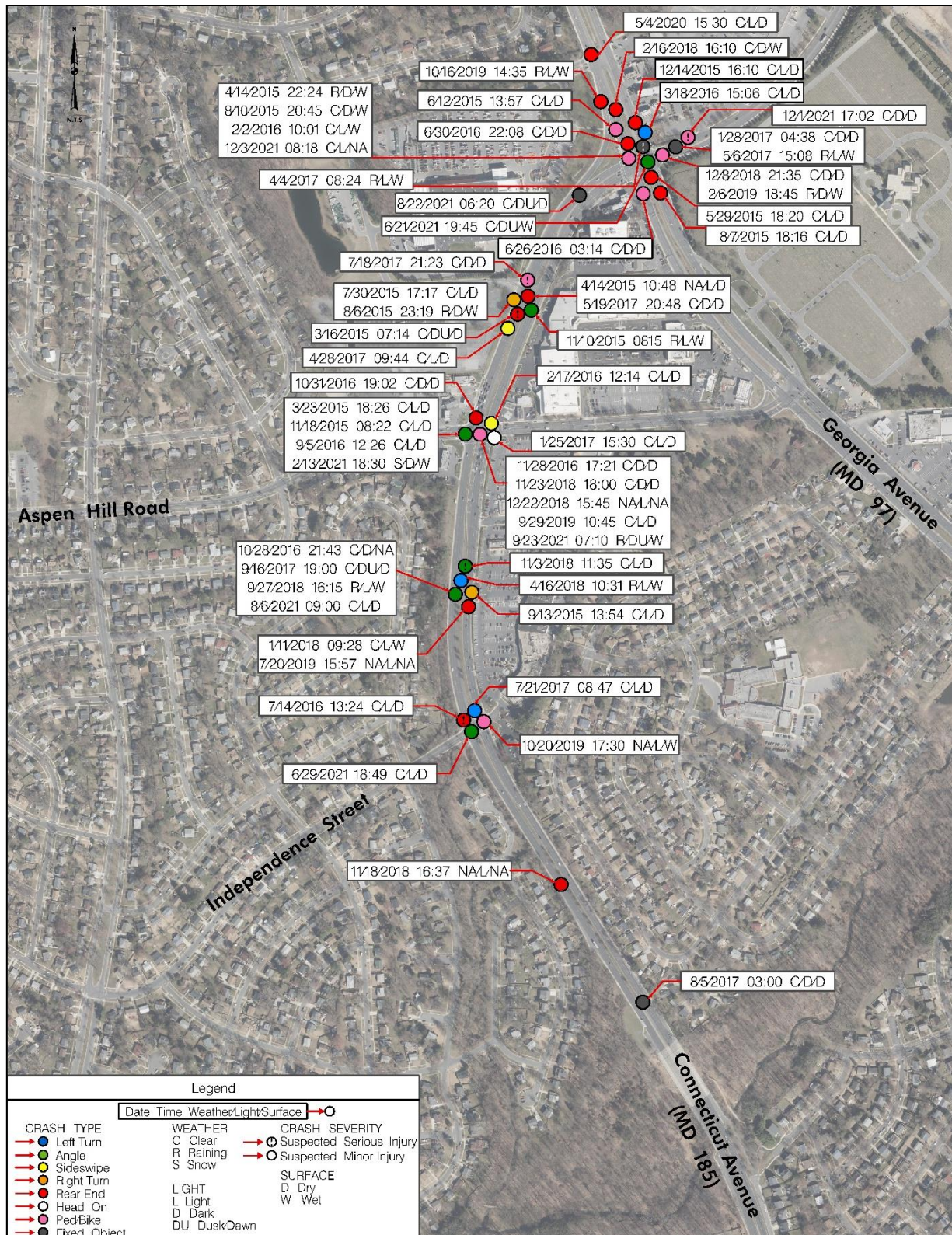


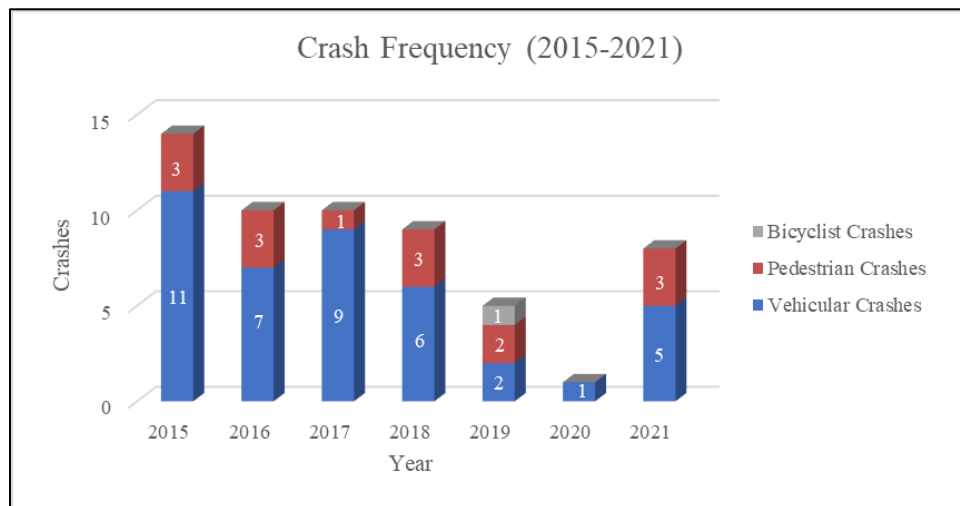
Figure 8: 2015-2021 Crash Locations, Types, and Severities

The following sections discuss crash trends along the corridor.

**Crash Severity**

**Figure 8** above shows the locations of each crash by severity, **Figure 9** displays overall crash frequency (the sum of fatal + serious injury + and minor injury crashes) by year, and **Figures 10**, and **11** show crash frequencies for serious injury and minor injury crashes, respectively, by year.

Of the six (6) serious injury crashes over the study period occurring throughout the corridor, two (2) involved pedestrians. The remaining serious injury crashes involved two (2) rear end crashes, one (1) angle crash, and one (1) fixed object crash.



**Figure 9: Overall Crash Frequency (Fatal, Serious, and Minor Injury Crashes) by Year (2015-2021)**

As shown above, vehicular crashes that resulted in minor or serious injuries occurred most frequently during 2015. The number of pedestrian and bicyclist crashes remained fairly consistent over the study period with the exception of the number of pedestrian crashes in 2017 and 2020, where one (1) and zero (0) pedestrian crashes were reported, respectively. It should be noted, however, that vehicular, pedestrian, and bicyclist crashes were much lower in 2020, which can likely be attributed to the change of traffic patterns caused by the COVID-19 pandemic.



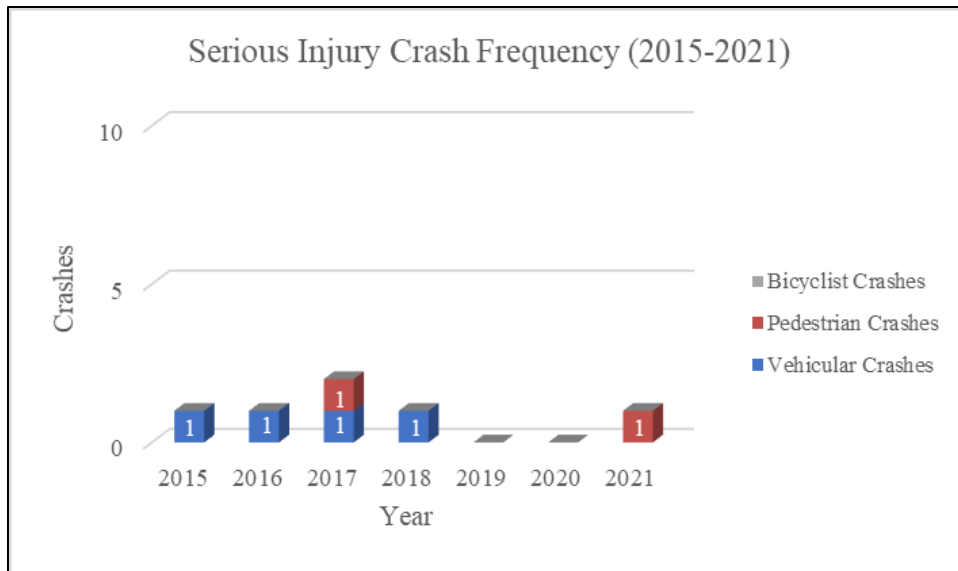


Figure 10: Serious Injury Crash Frequency by Year (2015-2021)

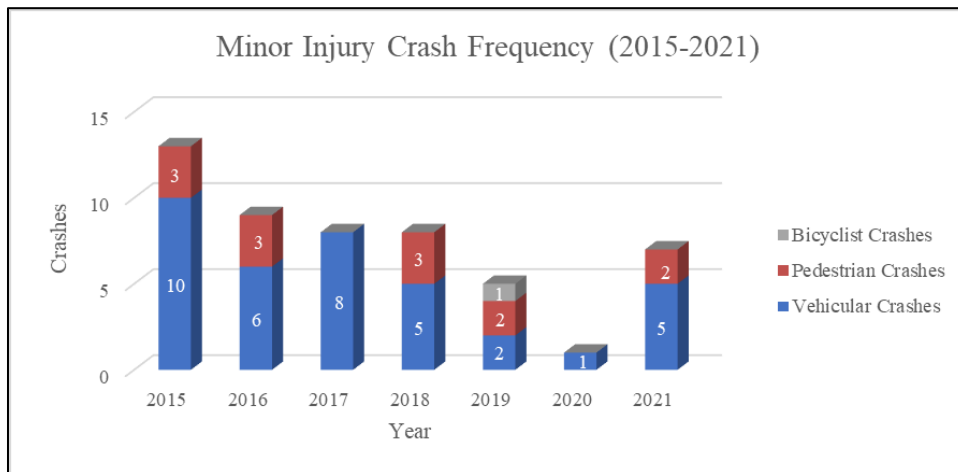


Figure 11: Minor Injury Crash Frequency by Year (2015-2021)

**Crash Type**

Table 4 presents the summary of the total number of crashes distributed by crash type from 2015 through 2021. As shown, the highest number of injury crashes were pedestrian/bicyclist crashes, resulting in 16 reported crashes (28%) during the study period. Of the 16 reported pedestrian/bicyclist crashes, two (2) were identified as serious injury crashes while the remaining 14 crashes were identified as minor injury crashes. Nine (9) of the 16 pedestrian/bicyclist crashes occurred at the intersection of MD 185 (Connecticut Avenue) at MD 97 (Georgia Avenue), five (5) occurred at the intersection of MD 185 (Connecticut Avenue) at Aspen Hill Road, and one (1) crash occurred at both the Home Depot Driveway and Independence Street intersections. Other predominant crash types include rear end (26%) and angle (21%). Figure 8 above shows the locations of each crash by type within the corridor.

**Table 4: Crash Types by Severity (2015-2021)**

Type of Crash	Total Crashes	Fatal Crashes	Serious Injury Crashes	Minor Injury Crashes
Ped/Bicyclist	16 (28%)	0	2	14
Rear End	15 (26%)	0	2	13
Angle	12 (21%)	0	1	11
Single Vehicle	5 (9%)	0	1	4
Right Turn	3 (5%)	0	0	3
Left Turn	3 (5%)	0	0	3
Sideswipe	2 (4%)	0	0	2
Head On	1 (2%)	0	0	1
<b>Total</b>	<b>57 (100%)</b>	<b>0</b>	<b>6</b>	<b>51</b>

*Crashes by Time of Day*

Table 5 summarizes the relationship between vehicular peak hours and injury severity crashes.

**Table 5: Crash Time of Day by Severity (2015-2021)**

Time of Day	Total Crashes	Fatal Crashes	Serious Injury Crashes	Minor Injury Crashes
Pre-AM Peak (12-6AM)	3 (5%)	0	0	3
AM Peak (6-9AM)	9 (16%)	0	2	7
Midday (9AM – 4PM)	19 (33%)	0	2	17
PM Peak (4-7PM)	16 (28%)	0	1	15
Post-PM Peak (7PM – 12AM)	10 (18%)	0	1	9
<b>Total</b>	<b>57 (100%)</b>	<b>0</b>	<b>6</b>	<b>51</b>

As shown above, the greatest number of injury crashes occurred during the midday peak period with 19 crashes (33%). During the AM and PM peak periods, nine (16%) and 16 (28%) crashes were reported, respectively.

*Crashes by Lighting Condition*

The summary of crashes based on roadway lighting conditions is presented in Table 6. 32 of the 57 reported injury crashes (59%) occurred under daylight conditions. 18 injury crashes (32%) occurred during dark conditions (17 with lights on and one with unknown lighting), while five (5) crashes (9%) occurred during dusk or dawn. There is continuous street lighting along the corridor and crash reports indicate that “no defects” were found for the roadway at the time of the crashes.

**Table 6: Crash Lighting Condition by Severity (2015-2021)**

Lighting Condition	Total Crashes	Fatal Crashes	Serious Injury Crashes	Minor Injury Crashes
Daylight	34 (59%)	0	3	31
Dawn	2 (4%)	0	0	2
Dusk	3 (5%)	0	1	2
Dark (Lights on)	17 (30%)	0	2	15
Dark Unknown Lighting	1 (2%)	0	0	1
<b>Total</b>	<b>57 (100%)</b>	<b>0</b>	<b>6</b>	<b>51</b>

*Crashes by Weather and Surface Conditions*

The summary of weather-related crashes by severity is presented in **Table 7**. Based on the crash data, most of the serious injury crashes (70%) occurred in non-adverse weather conditions. 11 crashes of any severity (21%) occurred in rainy or wintry mix conditions; six (6) of those 11 crashes occurred in daylight, one (1) occurred at dawn, and four (4) occurred at night with streetlights on.

**Table 7: Crashes Weather Conditions by Severity (2015-2021)**

Weather Condition	Total Crashes	Fatal Crashes	Serious Injury Crashes	Minor Injury Crashes
Clear	35 (61%)	0	3	32
Cloudy	6 (10%)	0	2	4
Raining	10 (18%)	0	1	9
Wintry Mix	1 (2%)	0	0	1
N/A	5 (9%)	0	0	5
<b>Total</b>	<b>57 (100%)</b>	<b>0</b>	<b>6</b>	<b>51</b>

The summary of crashes by roadway surface condition is presented in **Figure 12**. Most of the crashes (61%) occurred on dry pavement conditions. Of the 17 crashes that occurred on wet pavement, nine (9) occurred in daylight, six (6) at night with streetlights on, one (1) at dusk, and one (1) at dawn. Of the same 17 crashes, six (6) were pedestrian crashes, four (4) were angle crashes, three (3) were rear end crashes, two (2) were single vehicle crashes, one (1) was a left turn crash, and one (1) was a right turn crash.

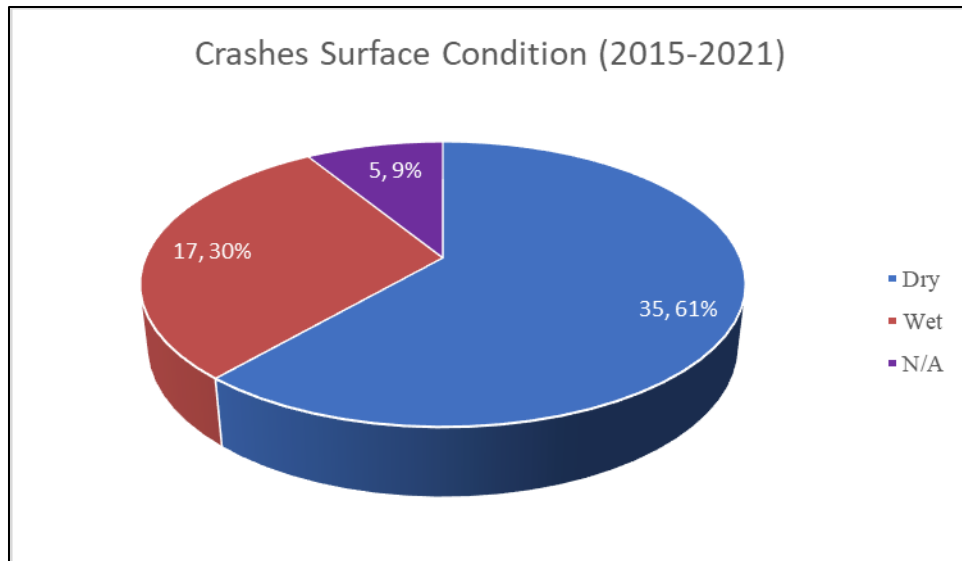


Figure 12: Crashes by Surface Conditions

**Pedestrian and Bicyclist Involved Crashes**

Table 8 presents the summary of pedestrian and bicyclist involved crashes. Of the 16 pedestrian and bicyclist related crashes, 14 occurred at signalized intersections or were intersection related. Pedestrians were involved in two (2) of the serious injury crashes – one (1) at the signalized intersection of MD 185 (Connecticut Avenue) at MD 97 (Georgia Avenue) and one (1) near the unsignalized the Home Depot driveway intersection. Both of the serious pedestrian crashes occurred under dark conditions with lights on. For the crash at the MD 185 (Connecticut Avenue) at MD 97 (Georgia Avenue) intersection, the pedestrian was crossing the street at a crosswalk, though it is unknown if they were crossing with the pedestrian signal. For the crash near the Home Depot driveway intersection, the pedestrian was in the roadway, not at a marked crosswalk (there are no marked crosswalks in the immediate vicinity of the Home Depot driveway intersection with Connecticut Avenue).

Pedestrians and bicyclists were involved in 14 minor injury crashes, nine (9) of which occurred at night. Four (4) of these nine (9) crashes occurred at the intersection of MD 185 (Connecticut Avenue) at MD 97 (Georgia Avenue), where visual inspection indicated that lighting levels may not be adequate for the south and east legs.

Table 8: Pedestrian and Bicyclist Involved Crashes by Severity (2015-2021)

Type of Crash	Total Crashes	Fatal Crashes	Serious Injury Crashes	Minor Injury Crashes
Pedestrian Involved	15 (94%)	0	2	13
Bicyclist Involved	1 (6%)	0	0	1
<b>Total</b>	<b>16 (100%)</b>	<b>0</b>	<b>2</b>	<b>14</b>

#### 4. FIELD REVIEW AND OBSERVATIONS

Field observations were collected during weekday morning peak, evening peak, and nighttime periods for the MD 185 (Connecticut Avenue) study corridor on March 15, 2022. The assessment reviewed pavement conditions and markings, roadway signing, sidewalk conditions, signalization, sight distance (visual review), Americans with Disabilities Act (ADA) compliance (visual review), intersection and roadway configurations, and travel behavior by various travel modes. The following section summarizes the field observations, relates the observations to the crash data shown in **Figure 7** where applicable, and identifies potential areas for improvement. **Appendix E** provides photographs of the issues identified in the field review.

##### *Pavement Conditions and Markings*

Based on visual inspection, the roadway pavement and pavement markings along the study segment are generally in good condition. The following intersections have pedestrian ramps but no marked crosswalk present:

- MD 185 (Connecticut Avenue) at Independence Street (no marked crosswalk for the east leg, crossing the Aspen Hill Shopping Center driveway)

Marked crosswalks are provided on all intersection legs and across the channelized right turn lanes of the MD 185 (Connecticut Avenue) at MD 97 (Georgia Avenue) intersection; on all intersection legs of the MD 185 (Connecticut Avenue) at Aspen Hill Road intersection; and on the north and west legs of the MD 185 (Connecticut Avenue) at Independence Street intersection, but are faded and/or not high visibility continental style crosswalks. A marked crosswalk is not present along the south leg of the MD 185 (Connecticut Avenue) at Independence Street intersection; however, pedestrians were observed crossing at this location. Marked crosswalks are also present across the Aspen Hill Shopping Center driveways, which are concrete commercial driveway entrances and would not typically have marked crosswalks.

##### *Roadway Signing*

Based on visual inspection, signs within the study area are generally in good condition. However, proper maintenance must be practiced in spring/summer months to ensure that signs are not obscured by overgrown vegetation. The following are specific observations regarding roadway signing:

- Pedestrian warning signs in the vicinity of the MD 97 (Georgia Avenue) intersection are missing or damaged.
- Object markers are missing in several locations.
- At the Aspen Hill Road intersection, EB and WB left turns run concurrently with the north and south leg crosswalks, creating pedestrian/vehicular conflicts. There are no “Left Turn Yield to Pedestrians” (R10-15) signs to warn drivers of the potential for pedestrians.
- Intersection warning signs (W2-1) south of the Aspen Hill Shopping Center driveway (along NB Connecticut Avenue) that do not match the configuration of the unsignalized intersection (they show a four-leg intersection ahead, whereas the Aspen Hill Shopping Center Driveways are part of three-leg intersections).

### *Sidewalk Conditions*

The following are specific observations regarding sidewalk conditions:

- Overgrown vegetation has reduced the available sidewalk width on the west side of MD 185 (Connecticut Avenue), south of Aspen Hill Road.
- There is cracked and/or uneven sidewalk in the northeast corner of the MD 185 (Connecticut Avenue) at MD 97 (Georgia Avenue) intersection (the corner nearest the Gate Of Heaven Cemetery).
- Several intersections include medians that could be extended to provide curbed pedestrian refuge areas, including both crossings across MD 97 (Georgia Avenue) at the MD 185 (Connecticut Avenue)/MD 97 (Georgia Avenue) intersection, the south leg crossing across MD 185 (Connecticut Avenue) at Aspen Hill Road, and the north leg crossing across MD 185 (Connecticut Avenue) at the intersection at Independence Street. The existing pedestrian refuge in the north leg crossing across MD 185 (Connecticut Avenue) at Aspen Hill Road could be widened to the full width of the crosswalk.
- The pedestrian ramps in the northeast (NE) and southeast (SE) corners at the intersection of MD 185 (Connecticut Avenue) at Independence Street do not provide ideal alignment for crossing across the Aspen Hill Shopping Center driveway. These ramps guide pedestrians more towards the MD 185 (Connecticut Avenue) travel lanes than across the driveway.

### *Signalization*

There are three signalized intersections on MD 185 (Connecticut Avenue) within the study limits. All signalized intersections have APS/CPS for marked crosswalks. The pedestrian push button in the SW corner of the MD 97 (Georgia Avenue) intersection was measured to be mounted higher than ADA standards state.

As part of the field review, all pedestrian push buttons were tested and pedestrian crossing times were experienced in the field. At the MD 97 (Georgia Avenue) intersection, the Flashing Don't Walk interval for crossing MD 97 (Georgia Avenue) was measured to be inadequate compared to requirements of the MdMUTCD, as well as the Flashing Don't Walk interval for the south leg of MD 185 (Connecticut Avenue).

### *Sight Distance*

Based on visual inspection, sight distance generally appeared to be adequate at all the intersections within the study area (note that a formal sight distance evaluation was not performed as part of this field review, but areas of concern have been further evaluated using aerial imagery). Locations with sight distance constraints are listed below:

- The sight line between pedestrians crossing the channelized double right turn lanes at MD 97 (Georgia Avenue) and oncoming EB MD 97 (Georgia Avenue) right turning vehicles is partially obstructed due to the horizontal curvature of the roadway and utility poles along SB MD 97. Sight distance to the crosswalk in the channelized double right turn lanes is approximately 300 feet with no visual obstruction of the crosswalk, and exceeds 500 feet if including the partial obstruction from the utility poles (most of the crosswalk remains visible with the partial obstruction). One pedestrian crash occurred at the uncontrolled crossing at the channelized double right turn.

- Along the WB MD 97 (Georgia Avenue) right turn approaching the north leg crossing of MD 185 (Connecticut Avenue), motorists have an obstructed view of a pedestrian entering the crosswalk from the east. This is due to the installed fence and grading along the Gate of Heaven Cemetery property in the NE corner of the intersection. Sight distance between motorists and pedestrians is approximately 75 feet at this location.

### ***Lighting***

Based on visual inspection, street lighting is present along the corridor and at the signalized intersections within the study area (note that light levels were not measured as part of this field review). The following are specific observations regarding roadway lighting:

- At the MD 97 (Georgia Avenue) intersection, lighting for the east and south leg crosswalks should be improved. While lighting is provided on or near each corner of the intersection and in the medians on MD 97 (Georgia Avenue), a luminaire is not positioned across the south leg (crossing Connecticut Avenue). Because of this, the south leg crosswalk is not illuminated. The luminaire in the NE corner is positioned toward the center of the intersection. While this potentially provides adequate horizontal illuminance for the east leg crosswalk (crossing Georgia Avenue), lighting may be inadequate and additional investigation should be conducted to determine where lighting needs to be installed.
  - There were nine pedestrian/bicyclist related crashes reported at the intersection of MD 97 (Georgia Avenue) at MD 185 (Connecticut Avenue), six of which occurred during dark conditions with the lights on.
- Three lights are not functioning along MD 185 (Connecticut Avenue) within the study limits.
  - Along NB MD 185 (Connecticut Avenue), south of Aspen Hill Road (utility pole #777453-080650)
  - Along NB MD 185 (Connecticut Avenue), south of the Aspen Hill Shopping Center Driveway (utility pole #777453-020130)
  - Along SB MD 185 (Connecticut Avenue), approximately 300 feet south of Independence Street (no utility pole number)
- Lighting south of Independence Street is less bright than the section of MD 185 (Connecticut Avenue) north of Independence Street. While there is less pedestrian activity south of Independence Street, a pedestrian was observed crossing MD 185 (Connecticut Avenue) midblock, south of Independence Street. It should be noted that lights along this stretch of the corridor consist of high pressure sodium (HPS) luminaires instead of LED luminaires.
- No lighting is present along the west side of MD 185 (Connecticut Avenue) beginning approximately 120 feet south of the Independence Street intersection and continuing south to the southern end of the corridor.

### ***Roadway Operations***

Road user behaviors were observed on March 15, 2022. Motorist, pedestrian, bicyclist, and bus transit, activity was observed and documented. Some of the notable observations for each mode type are listed below.

### **Motorist Behavior**

- Vehicles approached the uncontrolled crosswalk across the two right turn lanes from EB MD 97 (Georgia Avenue) to SB MD 185 (Connecticut Avenue) at higher travel speeds than would typically be expected for right turning vehicles at an intersection. This is due to wider turning radius provided for vehicles traveling from EB MD 97 (Georgia Avenue) to SB MD 185 (Connecticut Avenue). There is one recorded pedestrian/bicyclist related crash near the crosswalk and one rear end crash approaching the crosswalk. It is unknown if a pedestrian was crossing the right turn lanes when the rear end collision occurred.
  - Few pedestrians were observed crossing the channelized double right turn lane from MD 97 (Georgia Avenue) to MD 185 (Connecticut Avenue).
- There is a red light camera for the EB MD 97 (Georgia Avenue) signalized approach.

### **Pedestrian Behavior**

- At the MD 97 (Georgia Avenue)/MD 185 (Connecticut Avenue) intersection, pedestrian activity is heaviest in the vicinity of the EB and WB MD 97 (Georgia Avenue) bus stops and occurs primarily during the AM peak period. The MD 97 HIN Study noted that pedestrians were observed performing two stage crossings at this location, crossing half of Georgia Avenue against the Don't Walk signal when a gap in traffic was identified, and the second half with the Walk signal. The "Flashing Don't Walk" intervals for crossing MD 97 (Georgia Avenue) did not meet the time required based on the MdMUTCD, as well as the Flashing Don't Walk interval for the south leg of MD 185 (Connecticut Avenue).
  - There were nine pedestrian/bicyclist related crashes reported at the intersection of MD 97 (Georgia Avenue) at MD 185 (Connecticut Avenue), four of which occurred on the west leg (crossing Georgia Avenue). While not certain, providing additional clearance time for this crossing may help mitigate some of these crashes.
- There is an unimproved pedestrian path located along the eastern edge of the double right turn channelization island, indicating pedestrians crossing the channelized lanes at the merge point with SB MD 185 (Connecticut Avenue). No sidewalk or pedestrian ramps are present at this crossing.
- Pedestrian midblock crossings were observed across MD 185 (Connecticut Avenue) in the vicinity of the Home Depot driveway intersection.
  - One pedestrian/bicyclist related crash, which resulted in a serious injury, was reported during the study period. The crash occurred during dark conditions with a vehicle traveling in the SB direction.
- Vehicles making permissive left turns from EB and WB Aspen Hill Road onto MD 185 (Connecticut Avenue) were observed stopping within the middle of the intersection to allow pedestrians to finish crossing MD 185 (Connecticut Avenue) prior to completing their turn.



- The SB bus stop on MD 185 (Connecticut Avenue) south of Aspen Hill Road is located 300 feet south of the intersection and is closer to the Aspen Hill Shopping Center driveway. One midblock crosswalk was observed at this location during the AM peak period.
- At the intersection of MD 185 (Connecticut Avenue) at Independence Street, there are pedestrian ramps that guide pedestrians more toward the MD 185 (Connecticut Avenue) travel lanes than across the Aspen Hill Shopping Center driveway as intended.
- At the intersection of MD 185 (Connecticut Avenue) at Independence Street, pedestrians were observed crossing the north leg against the pedestrian signal as well as crossing the south leg of the intersection where a crosswalk is not present. Further, a pedestrian was observed crossing MD 185 (Connecticut Avenue) midblock, south of the intersection.

### **Bicyclist Behavior**

As indicated in **Figure 6**, bicyclist activity is limited within the study limits. No bicyclists were observed during the field audit.

## **5. SUMMARY OF RECOMMENDED IMPROVEMENTS**

Based on field observations and available data, several potential improvements were identified by MCDOT that could address the safety issues identified along the MD 185 (Connecticut Avenue) study corridor. These recommendations are compiled by timeframe (expected time to complete from point of project initiation), including Short-Term (0-6 months), Mid-Term (6-12 months), and Long-Term (12+ months), as well as by cost, including low (<\$100K), moderate (\$100K - \$250K), and high (>\$250K). A summary of the recommendations is provided in the tables below. Photographs of observed issues are found in **Appendix E**.

It should be noted that some potential recommendations from previous studies and from this HIN study required additional operational analysis to determine their feasibility. This operational analysis can be found in **Appendix F** along with additional detail regarding recommendations that were excluded based on operational constraints. Recommendations that were likely to be feasible from a traffic operations standpoint have been included in the tables below.

**Table 9: Summary of Recommended Improvements**

Location/ Issue No.	Observation/Issue	Recommendation (Primary Responsible Agency/Secondary Responsible Agency)	Timeframe	Relative Cost
Location 1: Throughout Corridor				
1.01	Three luminaires are not functioning along MD 185 (Connecticut Avenue) within the study limits. HPS lighting is provided at multiple locations in the study limits and appeared dimmer than the upgraded LED lighting elsewhere along the corridor.	Implement the following lighting upgrades throughout the corridor: <ul style="list-style-type: none"> <li>• Replace the non-functioning luminaires on utility poles #777453-080650 and #777453-020130.</li> <li>• Replace the non-functioning luminaire on the west side of MD 185 (Connecticut Avenue), approximately 300 feet south of Independence Street (no utility pole number).</li> <li>• Replace HPS lighting on the east side of MD 185 (Connecticut Avenue), south of Independence Street to Matthew Henson Trail with LED.</li> <li>• Replace HPS lighting in the SW corner of MD 185 (Connecticut Avenue) at Independence Street with LED. (MDOT SHA/PEPCO)</li> </ul>	Short to Mid	Low to Moderate
1.02	Midblock pedestrian crossings of MD 185 (Connecticut Avenue) were observed throughout the corridor.	Install a context sensitive, non-traversable barrier along the MD 185 (Connecticut Avenue) medians between MD 97 (Georgia Avenue) and Independence Street to deter pedestrian mid-block crossings throughout the corridor. (MDOT SHA)	Mid to Long	Moderate to High
1.03	While 85 <sup>th</sup> percentile speeds are within 6 MPH of the posted speed limit of 35 MPH on this segment of MD 185 (Connecticut Avenue), the perceived speed of vehicles is high particularly on the west side of MD 185 (Connecticut Avenue) where there are no grass buffers.	Reduce the lane widths along MD 185 (Connecticut Avenue) to 10 foot travel lanes and 11 foot curb lanes to allow for buffers along the curb lanes to provide a physical barrier between the travel lanes and adjacent sidewalks. (MDOT SHA)	Long	Low to Moderate

Location/ Issue No.	Observation/Issue	Recommendation (Primary Responsible Agency/Secondary Responsible Agency)	Timeframe	Relative Cost
Location 2: MD 185 (Connecticut Avenue) at MD 97 (Georgia Avenue)				
2.01	Transverse crosswalk markings are provided for signalized pedestrian crossings at this intersection.	Install continental crosswalk markings across all intersection legs. Restripe continental crosswalk markings across the channelized right turn lanes from EB MD 97 to SB MD 185. (MDOT SHA)	Short	Low
2.02	Pedestrian warning signs (W11-2) have been installed for the two right turn lanes from EB MD 97 (Georgia Avenue) to SB MD 185 (Connecticut Avenue), but one sign is missing.	Replace the missing pedestrian crossing sign (W11-2) at the marked crosswalk across the channelized right turn lanes from EB MD 97 (Georgia Avenue) to SB Connecticut Avenue (size 36" x 36" for the W11-2 sign). Remove and replace the other W11-2 sign with a size 36" x 36" sign. (MDOT SHA)	Short	Low
2.03	The "STOP FOR PEDESTRIANS AT ALL CROSSWALKS" sign, along NB MD 185 (Connecticut Avenue), approximately 25 feet north of the north leg crosswalk, is facing the wrong direction.	Replace or repair the damaged "STOP FOR PEDESTRIANS AT ALL CROSSWALKS" sign, along NB MD 185 (Connecticut Avenue), such that it faces oncoming NB MD 185 (Connecticut Avenue) traffic. (MDOT SHA)	Short	Low
2.04	There is some wearing of the continental crosswalk pavement markings across the right turn lanes from EB MD 97 (Georgia Avenue) to SB MD 185 (Connecticut Avenue). The previous crosswalk pavement markings were also not fully eradicated.	Remove previous and existing crosswalk pavement markings across the channelized right turn lanes from EB MD 97 (Georgia Avenue) to SB MD 185 (Connecticut Avenue) and install new continental crosswalk markings to improve visibility. (MDOT SHA)	Short	Low
2.05	Right turns on red conflict with pedestrian crossings for multiple approaches, and have limited sight distance along the WB MD 97 (Georgia Avenue) approach.	Implement No Turn On Red restrictions by installing R11-10b signing for the WB MD 97, NB MD 185, and SB MD 185 approaches. (MDOT SHA)	Short	Low
2.06	WB MD 97 (Georgia Avenue) right turn lane queue length exceeds storage if NTOR is implemented for WB MD 97 (Georgia Avenue) rights.	Provide an overlap phase for WB MD 97 right turns that runs concurrently with the SB MD 185 (Connecticut Avenue) approach phase. (MDOT SHA)	Short	Low
2.07	Pedestrian clearance times are shorter than required for 3.5 ft/sec walking speed based on crossing lengths.	Revise pedestrian clearance times for crossing the south MD 185, west MD 97, and east MD 97 intersection legs to meet appropriate flashing don't walk time for 3.5 ft/sec walking speed. (MCDOT)	Short	Low

Location/ Issue No.	Observation/Issue	Recommendation (Primary Responsible Agency/Secondary Responsible Agency)	Timeframe	Relative Cost
2.08	There are heavy WB MD 97 right turn volumes, with limited sight distance for seeing pedestrians crossing MD 185 (Connecticut Avenue).	Provide an LPI prior to the WB MD 97 phase (for crossing Connecticut Avenue). (MDOT SHA)	Short	Low
2.09	Object markers not installed for the MD 185 (Connecticut Avenue) concrete median noses.	Install OM1-3 object markers for the MD 185 (Connecticut Avenue) median noses on the north and south legs. (MDOT SHA)	Short	Low
2.10	There is limited sight distance between vehicles making a right turn from WB MD 97 (Georgia Avenue) to NB MD 185 (Connecticut Avenue), due to the hill and fence located along the Gate of Heaven Cemetery property.	Install a post-mounted "Right Turning Traffic Must Yield to Pedestrians" (R10-15R) sign along WB MD 97, on the approach to MD 185 (Connecticut Avenue). (MDOT SHA)	Short	Low
2.11	The permissive portion of the exclusive-permissive signal phase for EB MD 97 (Georgia Avenue) left turn vehicles creates potential conflicts with pedestrians and three lanes of oncoming through traffic.	Implement exclusive left turn phasing for the EB MD 97 (Georgia Avenue) left turn (to NB Connecticut Avenue) to minimize potential conflicts with pedestrians and oncoming vehicles. (MDOT SHA)	Short to Mid	Low
2.12	There are cracks in the sidewalk in the NE corner of the intersection that create a tripping hazard for pedestrians.	Repair the sidewalk in the NE corner of the intersection. (MCDOT)	Mid	Low to Moderate
2.13	Vehicles using the double channelized right turn lanes from EB MD 97 (Georgia Avenue) to SB MD 185 (Connecticut Avenue) are observed traveling at higher speeds.	Restripe narrower approach lane widths for the channelized double right turn lanes to encourage slower turning speeds (this recommendation can serve as an interim improvement for the EB MD 97 channelized right turn lanes, implemented prior to recommendation 2.18). (MDOT SHA)	Mid	Low to Moderate
2.14	The pedestrian push button in the SW corner of the intersection for the south leg crosswalk (crossing Connecticut Avenue) is mounted higher than the ADA max height of 42".	Lower the pedestrian push button in the SW corner of the intersection (for the south leg crosswalk crossing Connecticut Avenue) so that it is mounted according to ADA standards. (MCDOT)	Short	Low
2.15	Existing roadway lighting configuration does not appear to fully illuminate crosswalks spanning the east, north, and south legs.	Perform a photometric lighting analysis to determine if the east (crossing MD 97), north (crossing Connecticut Avenue), and south leg (crossing MD 185 [Connecticut Avenue]) crosswalks are lit to acceptable standards. If not, install lighting to illuminate crosswalks to acceptable standards. (MDOT SHA)	Mid	Low to Moderate

Location/ Issue No.	Observation/Issue	Recommendation (Primary Responsible Agency/Secondary Responsible Agency)	Timeframe	Relative Cost
2.16	Drivers along EB MD 97 (Georgia Avenue) were observed unexpectedly crossing over the painted gore area between the through and right turn lanes.	Install flex posts at the heads of each painted chevron pavement marking (6 total) in the painted gore area between EB MD 97 (Georgia Avenue) through lanes and the channelized right turn lanes, on the approach to MD 185 (Connecticut Avenue). (MDOT SHA)	Short	Low
2.17	A narrow shoulder requires buses to straddle the shoulder and travel lane along EB MD 97 (Georgia Avenue) when stopping at the bus stop on the near side of the MD 185 (Connecticut Avenue) intersection.	Restripe/realign the lane markings and edge lines along the EB MD 97 (Georgia Avenue) approach to MD 185 (Connecticut Avenue), from the head of the painted gore area between the through lanes and channelized right turn lanes, to the MD 185 (Connecticut Avenue) intersection (approximately 315 feet). This restripe/realignment is meant to provide an EB shoulder wide enough for WMATA buses to fully store when they service WMATA bus stop 200883. Also, ensure that any EB lane markings and edge lines are properly transitioned beyond the MD 185 (Connecticut Avenue) intersection to avoid lane shifts through the Connecticut Avenue intersection. This improvement should be implemented in conjunction with that for issue 2.18. (MDOT SHA/WMATA)	Mid to Long	Moderate
2.18	Vehicles were observed traveling at higher speeds in the double channelized right turn lanes from EB MD 97 (Georgia Avenue) to SB MD 185 (Connecticut Avenue), in the vicinity of the uncontrolled pedestrian crosswalk.	If feasible, reduce the curb radius through curb line relocation or, alternatively, implement truck aprons for the EB MD 97 channelized right turn lanes to reduce vehicle turning speeds. This recommendation should be implemented in conjunction with those for issue 2.17. (MDOT SHA)	Mid to Long	Moderate to High
2.19	Sight distance is limited between pedestrians in the NE corner crossing MD 185 (Connecticut Avenue), and WB MD 97 (Georgia Avenue) right turning vehicles.	Remove/modify the fence in the vicinity of the NE intersection corner to improve sight distance between pedestrians crossing MD 185 (Connecticut Avenue) and WB Georgia (MD 97) right turning vehicles. (MDOT SHA)	Mid to Long	Low to Moderate
2.20	Crossings of Georgia Avenue are lengthy and have insufficient pedestrian clearance intervals existing. Pedestrians arriving at the crossing after the walk phase were observed stopping in the medians.	Install pedestrian refuge islands in the medians on the east- and west legs of MD 97 (Georgia Avenue). Install APS/CPS equipment in the refuge medians. (MDOT SHA)	Long	Moderate
2.21	Many pedestrians were observed crossing high use driveways along MD 185 (Connecticut Avenue) at the Shell gas station.	If feasible, consolidate the gas station driveways in the SE corner of the intersection if/when redevelopment occurs, to reduce vehicle-vehicle and vehicle-pedestrian conflict points. (MDOT SHA)	Long	Moderate to High

Location/ Issue No.	Observation/Issue	Recommendation (Primary Responsible Agency/Secondary Responsible Agency)	Timeframe	Relative Cost
2.22	There is a goat path located along the eastern edge of the double right turn channelization island, indicating pedestrians crossing the channelized lanes at the merge point with SB MD 185 (Connecticut Avenue). No sidewalk or pedestrian ramps are present at this crossing.	Provide a sidewalk connection from the SW corner of intersection to SB MD 185 along the southern edge of the double right turn channelization island (with a buffer between new sidewalk and SB MD 185). This improvement should be implemented in conjunction with that for issues 2.17 and 2.18. (MDOT SHA)	Long	Moderate to High

Location/ Issue No.	Observation/Issue	Recommendation (Primary Responsible Agency/Secondary Responsible Agency)	Timeframe	Relative Cost
Location 3: MD 185 (Connecticut Avenue) between MD 97 (Georgia Avenue) and the Home Depot Driveway				
3.01	There is an inlet and exposed drainage structure just west of the sidewalk along SB MD 185 (Connecticut Avenue), south of MD 97 (Georgia Avenue), that creates a falling hazard to pedestrians.	Install a railing across the backside of the sidewalk on the west side of MD 185 (Connecticut Avenue) to protect pedestrians from the inlet and drainage structure. (MDOT SHA)	Mid	Low

Location/ Issue No.	Observation/Issue	Recommendation (Primary Responsible Agency/Secondary Responsible Agency)	Timeframe	Relative Cost
Location 4: MD 185 (Connecticut Avenue) at the Home Depot Driveway				
4.01	There is no marked crosswalk across the west leg (crossing the Home Depot Driveway) of the intersection.	Install high visibility continental crosswalk pavement markings on the west leg of the intersection (crossing the Home Depot Driveway) if they are not installed by the Kaiser Aspen Hill development. (MDOT SHA)	Short	Low
4.02	Vehicle conflicts exist between through traffic on MD 185 (Connecticut Avenue) and vehicles turning left into and out of the Home Depot Driveway. Vehicles turning out of the driveway occasionally stop in the crossover to complete their turn onto NB MD 185 (Connecticut Avenue).	Install a full traffic signal at the intersection of MD 185 (Connecticut Avenue) at the Home Depot Driveway a traffic control signal at the Home Depot Driveway, if not installed as part of the Kaiser Aspen Hill Development (note that a full signal installation is expected as part of the Kaiser development). Signal phasing should include exclusive only left turn signal phasing for NB MD 185 (Connecticut Avenue) lefts, and right turn overlap phasing for the EB Home Depot Driveway and SB MD 185 (Connecticut Avenue) approaches. (MDOT SHA)	Long	High
4.03	Pedestrians were observed crossing MD 185 (Connecticut Avenue) at this intersection. One pedestrian/bicyclist related crash was reported at the intersection during the study period, and the crash resulted in a serious injury.	Reconstruct the Home Depot driveway to eliminate the channelized right turn lanes into and out of the driveway, if not addressed as part of the Kaiser Aspen Hill Development (note that the channelized right turn lanes are expected to be removed as part of the Kaiser development). (MDOT SHA)	Long	Moderate

Location/ Issue No.	Observation/Issue	Recommendation (Primary Responsible Agency/Secondary Responsible Agency)	Timeframe	Relative Cost
Location 5: MD 185 (Connecticut Avenue) at Aspen Hill Road				
5.01	Crosswalk markings on all approaches are transverse style markings.	Install high visibility continental crosswalk pavement markings on all legs of the intersection.(MDOT SHA)	Short	Low
5.02	The 2019 Aspen Hill Vision Zero Study recommended implementing No Turn on Red restrictions as a mitigation measure to reduce conflicts between turning vehicles, pedestrians, and bicyclists.	Implement No Turn on Red restrictions for all approaches to minimize potential conflicts between pedestrians and turning vehicles. (MDOT SHA)	Short	Low
5.03	There are conflicts between turning vehicles and crossing pedestrians at this intersection.	Implement an LPI for the north and south leg crossings (crossing Connecticut Avenue). (MDOT SHA)	Short	Low
5.04	Vehicles making permissive left turns from Aspen Hill Road onto MD 185 (Connecticut Avenue) were observed stopping within the middle of the intersection to allow pedestrians to finish crossing MD 185 (Connecticut Avenue) prior to completing their turn.	Install a “Left Turn Yield to Pedestrians” sign (R10-15) for east- and WB left turns from Aspen Hill Road onto MD 185 (Connecticut Avenue). (MDOT SHA)	Mid	Low
5.05	Five pedestrian/bicyclist related crashes were reported at the intersection during the study period. The 2011 MD 185 PRSA indicated that two pedestrian crashes occurred involving vehicles making WB right turns, one of which was attributed to the motorist not yielding to the pedestrian in the crosswalk.	Install a “Right Turn Yield to Pedestrians” sign (R10-15) for WB right turns from Aspen Hill Road onto MD 185 (Connecticut Avenue). (MDOT SHA)	Mid	Low
5.06	The bus stop along SB MD 185 (Connecticut Avenue), south of Aspen Hill Road (bus stop 21348/2000856), is not located near a signalized intersection, which may encourage midblock crossings to get to and from Aspen Hill Shopping Center.	Coordinate with Ride On and WMATA to relocate bus stop 21348/2000856 closer to the Aspen Hill Road intersection. (MDOT SHA/[MCDOT and WMATA])	Mid to Long	Low to Moderate
5.07	The bus shelter along SB MD 185 (Connecticut Avenue), north of Aspen Hill Road (bus stop 21346/2000862), is positioned such that it creates two 90 degree turns in the sidewalk, potentially making it difficult for pedestrians with disabilities to traverse around the bus shelter.	Relocate bus stop 21346/2000862 and shelter to the MD 185 at Home Depot Driveway access point, in conjunction with the installation of a new traffic signal at this location, if not completed as part of the Kaiser Permanente Aspen Hill development roadway improvements. (MDOT SHA/[MCDOT and WMATA])	Mid	Low
5.08	Five pedestrian/bicyclist related crashes were reported at the intersection during the study period.	If feasible, reconstruct the NW and SE corners of the MD 185 (Connecticut Avenue) at Aspen Hill Road intersection to reduce turning radii to limit right turn travel speeds and pedestrian crossing distances. (MDOT SHA)	Long	High



Location/ Issue No.	Observation/Issue	Recommendation (Primary Responsible Agency/Secondary Responsible Agency)	Timeframe	Relative Cost
Location 6: MD 185 (Connecticut Avenue) between Aspen Hill Road and Independence Street				
6.01	There are two intersection warning signs along NB MD 185 (Connecticut Avenue), intended for the Aspen Hill Shopping Center Driveway entrances, that do not reflect the intersection driveway configurations.	Replace the W2-1 signs, located along NB MD 185 (Connecticut Avenue) approximately 200 feet north of Independence Street) with W2-2 signs to correctly reflect the Aspen Hill Shopping Center driveway configuration. (MDOT SHA)	Short	Low
6.02	The keep right (R4-7) sign on the south leg of the Aspen Hill Shopping Center Driveway intersection is damaged.	Replace damaged keep right (R4-7) sign. (MDOT SHA)	Short	Low
6.03	There is an exposed drainage structure east of the sidewalk along NB MD 185 (Connecticut Avenue) (approximately 650 feet north of Independence Street) that may be a tripping hazard for pedestrians.	Consider installing a railing across the backside of the sidewalk on the east side of MD 185 (Connecticut Avenue) to protect pedestrians from the exposed drainage structure. (MDOT SHA)	Mid	Low

Location/ Issue No.	Observation/Issue	Recommendation (Primary Responsible Agency/Secondary Responsible Agency)	Timeframe	Relative Cost
Location 7: MD 185 (Connecticut Avenue) at Independence Street				
7.01	Transverse crosswalk markings are provided across the north and west legs of the intersection.	Install high visibility continental crosswalk pavement markings on the north and west legs of the intersection. (MDOT SHA)	Short	Low
7.02	There is vegetation encroaching on the sidewalk on the east side of MD 185 (Connecticut Avenue), particularly north of the Independence Street intersection, narrowing effective sidewalk widths.	Clear overgrown vegetation in the sidewalk along NB MD 185 (Connecticut Avenue), north of Independence Street. (MDOT SHA)	Short	Low
7.03	The 2019 Aspen Hill Vision Zero Study recommended implementing No Turn on Red restrictions as a mitigation measure to reduce conflicts between turning vehicles, pedestrians, and bicyclists. One pedestrian/bicyclist related crash was reported at the intersection during the study period.	Implement No Turn on Red restrictions for all intersection approaches to minimize conflicts between pedestrians and vehicles. (MDOT SHA)	Short	Low
7.04	There are conflicts between turning vehicles and crossing pedestrians at this intersection.	Implement LPI for all intersection legs (note that LPI for crossing the south MD 185 (Connecticut Avenue) intersection leg should not be implemented until pedestrian ramps and a marked crosswalk are provided for this leg). (MDOT SHA)	Short to Mid	Low
7.05	There are no marked crosswalks across the east and south legs of the intersection (crossing the Aspen Hill Shopping Center Driveway and MD 185 (Connecticut Avenue), respectively).	Install high visibility continental crosswalk markings across the east and south legs of the intersection. Installation of a marked crosswalk across the south leg (crossing Connecticut Avenue) should be performed in conjunction with installation of new APS/CPS for this crossing, installation of a median refuge island on the south leg of Connecticut Avenue (with pedestrian pushbutton), and ADA compliant pedestrian ramps for this crossing in the SE and SW corners of the intersection. (MDOT SHA)	Mid	Moderate
7.06	The pedestrian ramp and Detectable Warning Surface (DWS) in the NE corner guides pedestrians more toward the Connecticut Avenue travel lanes than across the east leg of the intersection (to cross to the Aspen Hill Shopping Center Driveway).	Reconstruct the NE corner pedestrian ramp to properly align with the east leg crossing. (MDOT SHA)	Mid	Low

Location/ Issue No.	Observation/Issue	Recommendation (Primary Responsible Agency/Secondary Responsible Agency)	Timeframe	Relative Cost
Location 8: MD 185 (Connecticut Avenue) between Independence Street and Matthew Henson Trail				
8.01	Pedestrian activity is high in the vicinity of the Aspen Hill Shopping Center. One midblock pedestrian crossing was observed south of Independence Street.	Install a pedestrian warning sign (W11-2) with supplemental "NEXT XX MILE" plaque along NB MD 185 (Connecticut Avenue), south of Independence Street. (MDOT SHA)	Short	Low
8.02	The keep right sign ground mounted to the south leg median does not have an object marker sign.	Install an object marker (OM1-3) sign on the south median leg of MD 185 (Connecticut Avenue) at the median crossover, north of the Matthew Henson Trail. (MDOT SHA)	Short	Low
8.03	The sidewalk along the west side of MD 185 (Connecticut Avenue) is discontinuous approximately 425 feet north of the Matthew Henson Trail access point, requiring pedestrians to use the shoulder of MD 185 (Connecticut Avenue) to cross the approximately 25 foot gap.	Realign the sidewalk along the west side of MD 185 (Connecticut Avenue), approximately 425 feet north of the Matthew Henson Trail access point, to ensure it is continuous. Ensure drainage is properly accounted for (e.g. a drainage slot installed beneath the sidewalk). (MDOT SHA)	Mid	Low to Moderate

## APPENDIX

# A

Traffic Count Materials



**Maryland Department of Transportation**  
**State Highway Administration**  
**Data Services Division**  
**Volume Detail Report**

**Location ID:** B2799  
**Location:** MD185-.10 MI S OF MD97  
**County:** Montgomery  
**Date Range:** 05/21/2019 to 05/22/2019

**Week Of: 05/19/2019 Direction:NorthBound**

Begin Hour	05/19 Sun	05/20 Mon	05/21 Tue	05/22 Wed	05/23 Thu	05/24 Fri	05/25 Sat	DAILY AVG	WEEKDAY AVG	WEEKEND AVG
0:00	0	0	177	178	0	0	0	178	178	0
1:00	0	0	73	77	0	0	0	75	75	0
2:00	0	0	41	40	0	0	0	41	41	0
3:00	0	0	46	42	0	0	0	44	44	0
4:00	0	0	72	76	0	0	0	74	74	0
5:00	0	0	232	234	0	0	0	233	233	0
6:00	0	0	517	508	0	0	0	513	513	0
7:00	0	0	749	786	0	0	0	768	768	0
8:00	0	0	802	827	0	0	0	815	815	0
9:00	0	0	807	831	0	0	0	819	819	0
10:00	0	0	817	890	0	0	0	854	854	0
11:00	0	0	954	993	0	0	0	974	974	0
12:00	0	0	1,059	1,149	0	0	0	1,104	1,104	0
13:00	0	0	1,168	1,112	0	0	0	1,140	1,140	0
14:00	0	0	1,417	1,434	0	0	0	1,426	1,426	0
15:00	0	0	1,804	1,845	0	0	0	1,825	1,825	0
16:00	0	0	1,877	1,992	0	0	0	1,935	1,935	0
17:00	0	0	1,888	1,966	0	0	0	1,927	1,927	0
18:00	0	0	1,865	1,847	0	0	0	1,856	1,856	0
19:00	0	0	1,378	1,440	0	0	0	1,409	1,409	0
20:00	0	0	1,132	1,160	0	0	0	1,146	1,146	0
21:00	0	0	900	1,008	0	0	0	954	954	0
22:00	0	0	564	566	0	0	0	565	565	0
23:00	0	0	340	326	0	0	0	333	333	0
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>20,679</b>	<b>21,327</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>21,003</b>	<b>21,003</b>	<b>0</b>
<b>AM Peak Hour</b>	<b>0:00</b>	<b>0:00</b>	<b>12:00</b>	<b>12:00</b>	<b>0:00</b>	<b>0:00</b>	<b>0:00</b>			
<b>6PM-12PM Volume</b>	<b>0</b>	<b>0</b>	<b>1,059</b>	<b>1,149</b>	<b>0</b>	<b>0</b>	<b>0</b>			
<b>PM Peak Hour</b>	<b>0:00</b>	<b>0:00</b>	<b>17:00</b>	<b>16:00</b>	<b>0:00</b>	<b>0:00</b>	<b>0:00</b>			
<b>PM Peak Volume</b>	<b>0</b>	<b>0</b>	<b>1,888</b>	<b>1,992</b>	<b>0</b>	<b>0</b>	<b>0</b>			



**Maryland Department of Transportation**  
**State Highway Administration**  
**Data Services Division**  
**Volume Detail Report**

**Location ID:** B2799  
**Location:** MD185-.10 MI S OF MD97  
**County:** Montgomery  
**Date Range:** 05/21/2019 to 05/22/2019

**Week Of: 05/19/2019 Direction:SouthBound**

Begin Hour	05/19 Sun	05/20 Mon	05/21 Tue	05/22 Wed	05/23 Thu	05/24 Fri	05/25 Sat	DAILY AVG	WEEKDAY AVG	WEEKEND AVG
0:00	0	0	90	110	0	0	0	100	100	0
1:00	0	0	51	52	0	0	0	52	52	0
2:00	0	0	42	48	0	0	0	45	45	0
3:00	0	0	71	96	0	0	0	84	84	0
4:00	0	0	203	186	0	0	0	195	195	0
5:00	0	0	528	547	0	0	0	538	538	0
6:00	0	0	1,505	1,504	0	0	0	1,505	1,505	0
7:00	0	0	2,213	2,269	0	0	0	2,241	2,241	0
8:00	0	0	2,062	2,287	0	0	0	2,175	2,175	0
9:00	0	0	1,647	1,669	0	0	0	1,658	1,658	0
10:00	0	0	1,177	1,274	0	0	0	1,226	1,226	0
11:00	0	0	1,120	1,189	0	0	0	1,155	1,155	0
12:00	0	0	1,059	1,228	0	0	0	1,144	1,144	0
13:00	0	0	1,119	1,124	0	0	0	1,122	1,122	0
14:00	0	0	1,190	1,213	0	0	0	1,202	1,202	0
15:00	0	0	1,074	1,048	0	0	0	1,061	1,061	0
16:00	0	0	1,086	1,078	0	0	0	1,082	1,082	0
17:00	0	0	1,159	1,161	0	0	0	1,160	1,160	0
18:00	0	0	1,104	1,054	0	0	0	1,079	1,079	0
19:00	0	0	976	907	0	0	0	942	942	0
20:00	0	0	852	854	0	0	0	853	853	0
21:00	0	0	608	616	0	0	0	612	612	0
22:00	0	0	405	408	0	0	0	407	407	0
23:00	0	0	240	227	0	0	0	234	234	0
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>21,581</b>	<b>22,149</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>21,865</b>	<b>21,865</b>	<b>0</b>
<b>AM Peak Hour</b>	<b>0:00</b>	<b>0:00</b>	<b>7:00</b>	<b>8:00</b>	<b>0:00</b>	<b>0:00</b>	<b>0:00</b>			
<b>6PM-12PM Volume</b>	<b>0</b>	<b>0</b>	<b>2,213</b>	<b>2,287</b>	<b>0</b>	<b>0</b>	<b>0</b>			
<b>PM Peak Hour</b>	<b>0:00</b>	<b>0:00</b>	<b>14:00</b>	<b>12:00</b>	<b>0:00</b>	<b>0:00</b>	<b>0:00</b>			
<b>PM Peak Volume</b>	<b>0</b>	<b>0</b>	<b>1,190</b>	<b>1,228</b>	<b>0</b>	<b>0</b>	<b>0</b>			



**Maryland Department of Transportation**  
**State Highway Administration**  
**Data Services Division**  
**Volume Detail Report**

**Location ID:** B2799  
**Location:** MD185-.10 MI S OF MD97  
**County:** Montgomery  
**Date Range:** 05/21/2019 to 05/22/2019

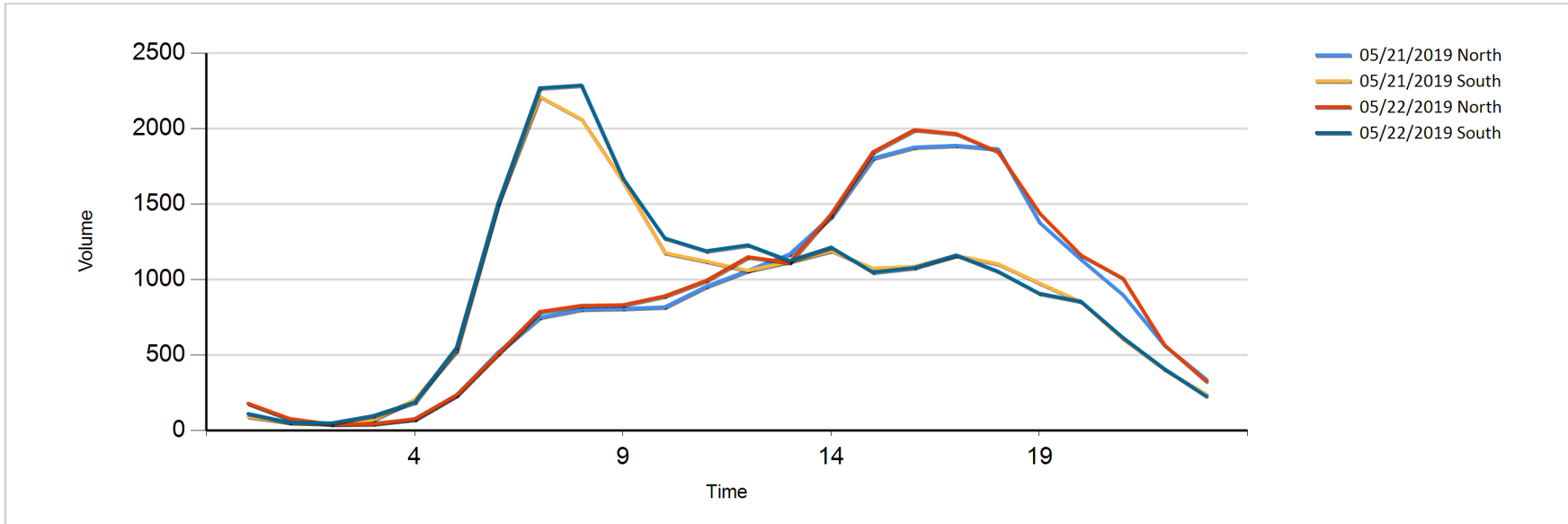
\*\*\* Summary Of Total Report \*\*\*

Begin Hour	SUN	MON	TUE	WED	THU	FRI	SAT	DAILY AVG	WEEKDAY AVG	WEEKEND AVG
0:00	0	0	267	288	0	0	0	278	278	0
1:00	0	0	124	129	0	0	0	127	127	0
2:00	0	0	83	88	0	0	0	86	86	0
3:00	0	0	117	138	0	0	0	128	128	0
4:00	0	0	275	262	0	0	0	269	269	0
5:00	0	0	760	781	0	0	0	771	771	0
6:00	0	0	2,022	2,012	0	0	0	2,017	2,017	0
7:00	0	0	2,962	3,055	0	0	0	3,009	3,009	0
8:00	0	0	2,864	3,114	0	0	0	2,989	2,989	0
9:00	0	0	2,454	2,500	0	0	0	2,477	2,477	0
10:00	0	0	1,994	2,164	0	0	0	2,079	2,079	0
11:00	0	0	2,074	2,182	0	0	0	2,128	2,128	0
12:00	0	0	2,118	2,377	0	0	0	2,248	2,248	0
13:00	0	0	2,287	2,236	0	0	0	2,262	2,262	0
14:00	0	0	2,607	2,647	0	0	0	2,627	2,627	0
15:00	0	0	2,878	2,893	0	0	0	2,886	2,886	0
16:00	0	0	2,963	3,070	0	0	0	3,017	3,017	0
17:00	0	0	3,047	3,127	0	0	0	3,087	3,087	0
18:00	0	0	2,969	2,901	0	0	0	2,935	2,935	0
19:00	0	0	2,354	2,347	0	0	0	2,351	2,351	0
20:00	0	0	1,984	2,014	0	0	0	1,999	1,999	0
21:00	0	0	1,508	1,624	0	0	0	1,566	1,566	0
22:00	0	0	969	974	0	0	0	972	972	0
23:00	0	0	580	553	0	0	0	567	567	0
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>42,260</b>	<b>43,476</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>42,868</b>	<b>42,868</b>	<b>0</b>
<b>AM Peak Hour</b>	<b>0:00</b>	<b>0:00</b>	<b>7:00</b>	<b>8:00</b>	<b>0:00</b>	<b>0:00</b>	<b>0:00</b>			
<b>6PM-12PM Volume</b>	<b>0</b>	<b>0</b>	<b>2,962</b>	<b>3,114</b>	<b>0</b>	<b>0</b>	<b>0</b>			
<b>PM Peak Hour</b>	<b>0:00</b>	<b>0:00</b>	<b>17:00</b>	<b>17:00</b>	<b>0:00</b>	<b>0:00</b>	<b>0:00</b>			
<b>PM Peak Volume</b>	<b>0</b>	<b>0</b>	<b>3,047</b>	<b>3,127</b>	<b>0</b>	<b>0</b>	<b>0</b>			



Maryland Department of Transportation  
State Highway Administration  
Data Services Division  
Volume Detail Report

Location ID: B2799  
Location: MD185-.10 MI S OF MD97  
County: Montgomery  
Date Range: 05/21/2019 to 05/22/2019





# Traffic Counts Report (15 Min Interval)

Intersection: Georgia Ave at Connecticut Ave

Count Date: Thursday, 11/8/2018

Count Source: SABRA WANG



M-NCPPC

AM Start Time	AM Peak Hour	AM Peak CLV	PM End Time	PM Peak Hour	PM Peak CLV	Is Holiday?
06:00	07:15 to 08:15	940	19:00	16:45 to 17:45	1104	No

START TIME	NORTH BOUND				SOUTH BOUND				EAST BOUND				WEST BOUND				OTHER BOUND			
	GEORGIA AVE (MD 97)				GEORGIA AVE (MD 97)				CONNECTICUT AVE (MD 185)				CONNECTICUT AVE (MD 185)							
	L	T	R	O	L	T	R	O	L	T	R	O	L	T	R	O	L	T	R	O
06:00	2	84	23	0	1	165	190	2	37	23	3	0	33	91	6	0	0	0	0	0
06:15	4	112	17	0	4	200	231	3	64	28	3	0	43	122	12	0	0	0	0	0
06:30	5	116	19	0	5	230	326	0	53	41	0	0	63	156	5	0	0	0	0	0
06:45	8	130	28	0	7	250	315	3	79	46	2	0	50	160	5	0	0	0	0	0
07:00	8	133	25	0	5	311	423	4	72	49	0	0	61	163	19	0	0	0	0	0
07:15	11	114	23	0	6	295	428	4	95	52	2	0	52	180	12	0	0	0	0	0
07:30	18	152	30	0	7	299	400	9	78	63	1	0	78	142	7	0	0	0	0	0
07:45	8	178	42	0	9	298	370	8	119	81	0	0	46	157	10	0	0	0	0	0
08:00	14	157	26	0	5	308	378	5	110	72	0	0	64	167	11	0	0	0	0	0
08:15	13	147	32	0	9	322	381	7	124	59	2	0	54	168	8	0	0	0	0	0
08:30	6	110	30	0	13	292	282	6	81	56	2	0	55	139	9	0	0	0	0	0
08:45	10	143	38	0	5	263	330	4	90	63	2	0	69	146	10	0	0	0	0	0
09:00	8	118	41	0	5	235	276	3	102	71	5	0	80	136	15	0	0	0	0	0
09:15	10	133	48	0	13	210	229	3	85	59	2	0	80	130	14	0	0	0	0	0
09:30	4	138	40	0	6	163	242	2	87	79	3	0	62	117	13	0	0	0	0	0
09:45	4	132	47	0	5	190	198	4	99	76	3	0	54	100	14	0	0	0	0	0
10:00	4	115	51	0	7	162	160	4	85	54	5	0	51	114	12	0	0	0	0	0
10:15	6	113	40	0	6	144	175	5	96	66	6	0	55	114	13	0	0	0	0	0
10:30	7	145	48	0	12	148	168	5	82	69	3	0	54	94	16	0	0	0	0	0
10:45	11	126	59	0	13	169	148	5	89	77	4	0	54	112	22	0	0	0	0	0
11:00	7	119	44	0	20	169	129	5	106	69	4	0	44	75	20	0	0	0	0	0
11:15	13	132	51	1	13	165	139	5	111	75	5	0	48	88	18	0	0	0	0	0
11:30	8	131	64	0	14	164	122	5	104	93	8	0	52	89	17	0	0	0	0	0
11:45	6	147	55	0	17	149	108	3	119	80	5	0	53	92	28	0	0	0	0	0

12:00	6	149	63	0	17	187	136	5	117	99	6	0	74	76	29	0	0	0	0	0
12:15	4	132	69	0	20	182	143	6	147	74	2	1	66	99	28	0	0	0	0	0
12:30	6	126	52	0	14	164	130	5	136	96	4	0	71	88	23	0	0	0	0	0
12:45	4	164	62	0	26	162	104	5	165	96	1	0	56	91	23	0	0	0	0	0
13:00	7	166	68	1	14	155	133	2	134	80	9	0	66	91	17	0	0	0	0	0
13:15	10	137	54	0	18	141	132	4	158	116	5	0	65	87	21	0	0	0	0	0
13:30	6	155	55	0	8	152	153	0	124	93	6	0	63	86	21	0	0	0	0	0
13:45	9	151	57	0	10	144	139	0	148	103	11	0	72	80	19	0	0	0	0	0
14:00	11	163	52	0	18	176	113	7	161	105	6	0	58	69	22	0	0	0	0	0
14:15	4	155	44	1	12	155	152	2	149	119	8	0	52	90	19	0	0	0	0	0
14:30	7	161	63	0	16	165	156	3	158	116	5	0	55	95	18	0	0	0	0	0
14:45	4	155	70	0	11	190	141	6	212	136	4	0	66	85	14	0	0	0	0	0
15:00	4	200	65	0	21	186	133	6	235	138	0	0	52	80	18	0	0	0	0	0
15:15	3	184	83	0	12	225	140	8	215	140	4	0	63	75	26	0	0	0	0	0
15:30	4	229	77	0	12	205	136	6	225	135	5	0	92	112	19	0	0	0	0	0
15:45	5	232	92	1	17	188	138	7	234	148	3	0	73	82	15	0	0	0	0	0
16:00	3	252	100	0	18	209	153	4	236	164	8	0	88	85	21	0	0	0	0	0
16:15	4	265	108	0	23	236	144	6	230	163	3	0	70	84	29	0	0	0	0	0
16:30	7	283	102	0	22	226	164	1	301	180	4	0	72	109	22	0	0	0	0	0
16:45	8	250	90	0	21	210	175	8	257	168	7	0	57	80	24	0	0	0	0	0
17:00	10	285	105	0	9	238	170	7	271	177	3	0	65	100	24	0	0	0	0	0
17:15	2	266	99	0	15	244	164	8	255	186	4	0	78	85	16	0	0	0	0	0
17:30	5	271	99	0	20	244	167	1	261	179	6	0	75	93	21	0	0	0	0	0
17:45	7	294	121	0	15	244	143	2	249	189	3	0	60	88	23	0	0	0	0	0
18:00	3	259	94	0	15	234	176	9	243	167	3	0	73	77	24	0	0	0	0	0
18:15	2	265	91	0	12	213	163	6	209	152	5	0	78	90	19	0	0	0	0	0
18:30	7	241	75	0	8	202	135	4	222	151	7	0	68	94	25	0	0	0	0	0
18:45	5	221	97	0	12	168	128	3	227	160	3	0	54	62	18	0	0	0	0	0
Total	352	8936	3128	4	643	10746	10209	235	7846	5331	205	1	3237	5485	914	0	0	0	0	0

# Bike Counts Report (15 Min Interval)

Intersection: Georgia Ave at Connecticut Ave

Count Date: Thursday, 11/8/2018

Count Source: SABRA WANG



AM Start Time	PM End Time
06:00	19:00

START TIME	NORTH BOUND				SOUTH BOUND				EAST BOUND				WEST BOUND				OTHER BOUND			
	GEORGIA AVE (MD 97)				GEORGIA AVE (MD 97)				CONNECTICUT AVE (MD 185)				CONNECTICUT AVE (MD 185)							
	L	T	R	O	L	T	R	O	L	T	R	O	L	T	R	O	L	T	R	O
06:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	NORTH BOUND				SOUTH BOUND				EAST BOUND				WEST BOUND				OTHER BOUND			
	GEORGIA AVE (MD 97)				GEORGIA AVE (MD 97)				CONNECTICUT AVE (MD 185)				CONNECTICUT AVE (MD 185)							
START TIME	L	T	R	O	L	T	R	O	L	T	R	O	L	T	R	O	L	T	R	O
13:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:45	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	2	0	2	0	1	5	1	0	0	0	0	1	0	0	0	0	0	0	0

# Pedestrian Counts Report (15 Min Interval)

Intersection: Georgia Ave at Connecticut Ave

Count Date: Thursday, 11/8/2018

Count Source: SABRA WANG



AM Start Time	PM End Time
06:00	19:00

	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND	OTHER BOUND
START TIME	GEORGIA AVE (MD 97)	GEORGIA AVE (MD 97)	CONNECTICUT AVE (MD 185)	CONNECTICUT AVE (MD 185)	
06:00	1	4	0	2	0
06:15	0	1	0	3	0
06:30	0	5	1	2	0
06:45	1	7	1	3	0
07:00	0	5	0	6	0
07:15	0	10	0	2	0
07:30	0	3	0	1	0
07:45	0	6	1	8	0
08:00	0	8	1	5	0
08:15	1	4	1	5	0
08:30	0	7	2	1	0
08:45	1	3	8	6	0
09:00	0	7	3	5	0
09:15	1	1	2	5	0
09:30	0	14	8	4	0
09:45	0	4	1	5	0
10:00	0	7	6	6	0
10:15	0	6	1	7	0
10:30	0	6	3	5	0
10:45	1	2	4	5	0
11:00	1	2	2	4	0
11:15	0	4	1	5	0
11:30	1	3	1	8	0
11:45	1	3	3	6	0
12:00	1	7	2	5	0
12:15	0	5	4	8	0
12:30	0	6	4	5	0
12:45	3	6	3	10	0
13:00	0	9	2	4	0
13:15	1	1	1	6	0
13:30	2	3	6	4	0
13:45	1	12	5	0	0
14:00	0	11	7	4	0

	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND	OTHER BOUND
START TIME	GEORGIA AVE (MD 97)	GEORGIA AVE (MD 97)	CONNECTICUT AVE (MD 185)	CONNECTICUT AVE (MD 185)	
14:15	0	6	4	6	0
14:30	0	5	2	1	0
14:45	0	4	6	11	0
15:00	1	10	4	4	0
15:15	0	3	1	4	0
15:30	0	6	0	3	0
15:45	0	10	2	4	0
16:00	1	14	1	4	0
16:15	1	6	3	7	0
16:30	0	15	5	12	0
16:45	1	14	7	6	0
17:00	1	4	6	4	0
17:15	0	13	9	3	0
17:30	0	15	5	2	0
17:45	0	5	5	4	0
18:00	0	7	2	1	0
18:15	0	4	3	1	0
18:30	0	2	2	1	0
18:45	0	2	0	0	0
Total	22	327	151	233	0

# Traffic Counts Report (15 Min Interval)

Intersection: Connecticut Ave at Aspen Hill Rd

Count Date: Thursday, 11/8/2018

Count Source: SABRA WANG



M-NCPPC

AM Start Time	AM Peak Hour	AM Peak CLV	PM End Time	PM Peak Hour	PM Peak CLV	Is Holiday?
06:00	07:00 to 08:00	1342	19:00	16:15 to 17:15	1202	No

START TIME	NORTH BOUND				SOUTH BOUND				EAST BOUND				WEST BOUND				OTHER BOUND			
	CONNECTICUT AVE (MD 185)				CONNECTICUT AVE (MD 185)				ASPEN HILL RD				ASPEN HILL RD							
	L	T	R	O	L	T	R	O	L	T	R	O	L	T	R	O	L	T	R	O
06:00	12	57	9	1	4	248	29	0	16	21	27	0	19	24	1	0	0	0	0	0
06:15	14	77	13	1	3	304	42	0	26	27	27	0	26	29	2	0	0	0	0	0
06:30	18	97	6	0	5	433	54	0	29	21	27	0	39	30	2	0	0	0	0	0
06:45	27	98	8	1	1	431	81	0	33	21	36	0	23	59	1	0	0	0	0	0
07:00	43	85	19	4	4	497	67	0	32	27	31	0	35	56	0	0	0	0	0	0
07:15	45	138	15	1	14	507	101	1	47	33	37	0	31	76	1	0	0	0	0	0
07:30	45	136	20	1	9	524	88	2	45	42	41	0	52	70	2	0	0	0	0	0
07:45	94	177	32	3	13	459	86	2	40	44	27	0	28	94	5	0	0	0	0	0
08:00	48	166	26	0	12	509	86	1	38	50	47	0	27	111	7	0	0	0	0	0
08:15	40	152	27	2	10	463	83	0	45	60	24	0	34	82	5	0	0	0	0	0
08:30	29	122	16	2	10	437	72	3	43	65	26	0	27	65	2	0	0	0	0	0
08:45	49	149	27	3	19	390	96	1	46	56	27	0	24	73	5	0	0	0	0	0
09:00	47	158	29	4	14	325	59	2	51	58	40	0	27	62	6	0	0	0	0	0
09:15	33	116	22	5	13	306	85	3	46	41	35	0	30	43	9	0	0	0	0	0
09:30	30	137	29	0	8	298	67	3	44	79	23	0	33	43	11	0	0	0	0	0
09:45	22	133	19	5	12	264	63	3	44	59	23	0	35	56	17	0	0	0	0	0
10:00	20	138	28	4	18	247	52	3	41	42	30	0	25	36	9	0	0	0	0	0
10:15	32	142	27	4	26	246	61	2	47	46	20	0	27	32	10	0	0	0	0	0
10:30	35	132	27	1	12	220	67	2	43	61	28	0	24	45	9	0	0	0	0	0
10:45	27	160	35	6	15	215	59	4	38	39	25	1	33	32	14	1	0	0	0	0
11:00	31	149	22	2	19	176	46	4	38	60	25	0	25	55	15	0	0	0	0	0
11:15	28	158	20	2	20	184	50	3	50	52	33	0	37	50	17	0	0	0	0	0
11:30	23	165	29	5	16	188	41	1	55	48	18	0	32	44	14	0	0	0	0	0
11:45	32	184	34	2	15	189	38	2	35	57	36	0	37	37	9	1	0	0	0	0

12:00	44	198	36	3	17	172	43	2	41	44	27	0	33	40	24	1	0	0	0	0
12:15	53	197	32	4	14	192	41	2	49	55	34	0	26	50	11	0	0	0	0	0
12:30	54	219	31	2	18	177	42	2	49	52	29	0	26	44	19	0	0	0	0	0
12:45	42	207	37	1	25	169	46	2	63	53	34	0	26	38	10	0	0	0	0	0
13:00	41	211	35	6	15	176	47	2	42	55	29	0	30	52	21	0	0	0	0	0
13:15	41	214	31	3	20	194	44	4	58	61	27	0	43	49	15	0	0	0	0	0
13:30	42	191	27	2	24	174	60	2	52	45	30	0	27	45	21	0	0	0	0	0
13:45	40	212	42	2	19	194	29	2	61	52	31	0	45	45	27	0	0	0	0	0
14:00	31	190	45	2	18	157	35	6	49	56	21	0	32	47	17	0	0	0	0	0
14:15	49	247	40	3	22	195	48	0	48	63	30	0	34	44	19	0	0	0	0	0
14:30	47	261	47	5	18	210	40	2	65	63	30	0	41	41	12	0	0	0	0	0
14:45	47	284	37	0	21	219	39	0	71	75	31	0	42	51	19	0	0	0	0	0
15:00	62	298	42	5	19	193	46	3	59	80	23	0	31	61	14	0	0	0	0	0
15:15	48	290	54	5	21	175	40	3	63	85	31	0	28	58	17	0	0	0	0	0
15:30	49	304	40	3	23	205	57	1	66	86	37	0	39	54	18	0	0	0	0	0
15:45	63	328	49	4	27	185	55	6	59	73	28	0	51	54	18	0	0	0	0	0
16:00	56	332	49	3	24	199	42	6	83	85	37	0	38	60	25	0	0	0	0	0
16:15	44	352	49	4	23	186	51	1	80	84	22	0	49	58	19	0	0	0	0	0
16:30	52	360	60	7	25	216	50	3	84	114	35	0	40	63	19	0	0	0	0	0
16:45	47	359	51	7	24	190	63	4	82	108	31	0	46	61	13	0	0	0	0	0
17:00	37	365	53	4	28	227	49	1	91	101	31	0	53	63	24	0	0	0	0	0
17:15	53	344	48	6	26	218	45	1	96	91	28	0	33	47	23	2	0	0	0	0
17:30	54	366	57	7	24	213	46	3	71	77	38	0	45	53	27	0	0	0	0	0
17:45	59	381	63	0	27	192	49	1	90	80	23	0	35	61	19	0	0	0	0	0
18:00	34	342	43	1	23	197	43	1	65	83	38	0	34	51	21	1	0	0	0	0
18:15	47	270	36	2	24	217	40	2	87	85	21	0	35	37	15	0	0	0	0	0
18:30	50	304	53	2	20	197	43	3	65	91	21	0	34	50	11	0	0	0	0	0
18:45	55	298	40	8	22	150	36	2	61	72	18	0	41	56	22	0	0	0	0	0
Total	2165	11150	1766	160	903	13449	2842	109	2822	3178	1528	1	1767	2737	693	6	0	0	0	0



# Bike Counts Report (15 Min Interval)

Intersection: Connecticut Ave at Aspen Hill Rd

Count Date: Thursday, 11/8/2018

Count Source: SABRA WANG



AM Start Time	PM End Time
06:00	19:00

START TIME	NORTH BOUND				SOUTH BOUND				EAST BOUND				WEST BOUND				OTHER BOUND			
	CONNECTICUT AVE (MD 185)				CONNECTICUT AVE (MD 185)				ASPEN HILL RD				ASPEN HILL RD							
	L	T	R	O	L	T	R	O	L	T	R	O	L	T	R	O	L	T	R	O
06:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	NORTH BOUND				SOUTH BOUND				EAST BOUND				WEST BOUND				OTHER BOUND			
	CONNECTICUT AVE (MD 185)				CONNECTICUT AVE (MD 185)				ASPEN HILL RD				ASPEN HILL RD							
START TIME	L	T	R	O	L	T	R	O	L	T	R	O	L	T	R	O	L	T	R	O
13:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
15:00	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	3	0	2	0	2	0	2	1	1	0	1	1	0	0	0	0	0	0	0

# Pedestrian Counts Report (15 Min Interval)

Intersection: Connecticut Ave at Aspen Hill Rd

Count Date: Thursday, 11/8/2018

Count Source: SABRA WANG



AM Start Time	PM End Time
06:00	19:00

	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND	OTHER BOUND
START TIME	CONNECTICUT AVE (MD 185)	CONNECTICUT AVE (MD 185)	ASPEN HILL RD	ASPEN HILL RD	
06:00	0	4	0	1	0
06:15	1	0	0	1	0
06:30	2	2	2	1	0
06:45	0	3	0	1	0
07:00	1	0	0	1	0
07:15	1	1	0	1	0
07:30	2	3	0	4	0
07:45	3	1	3	1	0
08:00	0	2	1	1	0
08:15	2	5	0	2	0
08:30	0	5	1	1	0
08:45	1	1	1	2	0
09:00	2	1	1	1	0
09:15	0	8	1	6	0
09:30	0	0	0	6	0
09:45	3	5	2	5	0
10:00	3	3	1	3	0
10:15	4	3	1	6	0
10:30	1	4	1	5	0
10:45	4	6	1	8	0
11:00	5	4	3	2	0
11:15	2	7	2	3	0
11:30	0	6	0	5	0
11:45	7	1	0	6	0
12:00	10	7	0	0	0
12:15	3	2	1	1	0
12:30	1	2	3	0	0
12:45	2	3	0	2	0
13:00	3	1	0	1	0
13:15	5	5	2	4	0
13:30	2	6	2	4	0
13:45	3	3	0	3	0
14:00	2	1	1	2	0

	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND	OTHER BOUND
START TIME	CONNECTICUT AVE (MD 185)	CONNECTICUT AVE (MD 185)	ASPEN HILL RD	ASPEN HILL RD	
14:15	4	4	3	4	0
14:30	2	5	1	2	0
14:45	6	3	0	5	0
15:00	3	1	1	1	0
15:15	7	6	2	3	0
15:30	8	4	5	0	0
15:45	13	7	2	5	0
16:00	3	3	2	0	0
16:15	5	10	3	8	0
16:30	2	7	5	2	0
16:45	6	5	0	3	0
17:00	3	4	0	2	0
17:15	4	3	0	3	0
17:30	5	1	1	0	0
17:45	5	5	1	4	0
18:00	4	1	1	0	0
18:15	0	5	1	3	0
18:30	4	1	1	1	0
18:45	0	3	0	0	0
Total	159	183	59	136	0

# Traffic Counts Report (15 Min Interval)

Intersection: Connecticut Ave at Independence St

Count Date: Thursday, 4/4/2019

Count Source: SHA



M-NCPPC

AM Start Time	AM Peak Hour	AM Peak CLV	PM End Time	PM Peak Hour	PM Peak CLV	Is Holiday?
06:00	07:30 to 08:30	1081	19:00	17:15 to 18:15	942	No

START TIME	NORTH BOUND				SOUTH BOUND				EAST BOUND				WEST BOUND				OTHER BOUND			
	CONNECTICUT AVE (MD 185)				CONNECTICUT AVE (MD 185)				INDEPENDENCE ST				ASPEN HILL SHOPPING CENTER							
	L	T	R	O	L	T	R	O	L	T	R	O	L	T	R	O	L	T	R	O
06:00	8	71	2	0	0	180	11	0	11	1	29	0	0	0	0	0	0	0	0	0
06:15	8	62	2	0	0	293	8	0	20	1	46	0	1	0	0	0	0	0	0	0
06:30	4	99	4	0	0	382	16	0	18	1	41	0	5	0	1	0	0	0	0	0
06:45	2	116	3	0	0	431	12	0	21	0	40	0	8	0	0	0	0	0	0	0
07:00	7	130	4	0	0	461	13	0	24	2	53	0	3	1	1	0	0	0	0	0
07:15	5	149	3	0	0	517	20	0	13	1	38	0	11	1	1	0	0	0	0	0
07:30	16	165	11	0	1	575	20	0	21	1	65	0	12	2	1	0	0	0	0	0
07:45	28	261	10	0	0	564	17	0	33	2	37	0	14	3	1	0	0	0	0	0
08:00	14	251	9	0	0	491	37	0	29	3	43	0	12	2	1	0	0	0	0	0
08:15	14	194	7	0	0	522	39	0	20	4	46	0	14	1	2	0	0	0	0	0
08:30	12	163	9	0	1	478	31	0	23	3	30	0	9	4	0	0	0	0	0	0
08:45	9	185	9	0	3	463	20	0	29	5	31	0	11	3	2	0	0	0	0	0
09:00	7	204	13	0	2	420	22	0	22	0	22	0	13	7	3	0	0	0	0	0
09:15	11	153	7	0	0	365	26	0	31	4	25	0	17	4	2	0	0	0	0	0
09:30	8	171	22	0	5	342	16	0	27	4	12	0	13	3	2	0	0	0	0	0
09:45	6	157	18	0	1	317	13	0	17	7	25	0	16	6	4	0	0	0	0	0
10:00	1	175	8	0	4	251	13	0	12	2	16	0	8	3	0	0	0	0	0	0
10:15	5	153	10	0	1	261	16	0	18	2	24	0	15	3	3	0	0	0	0	0
10:30	4	151	10	0	1	273	16	0	10	5	19	0	16	4	8	0	0	0	0	0
10:45	5	181	10	0	1	263	17	0	11	1	13	0	11	4	3	0	0	0	0	0
11:00	6	193	14	0	4	235	10	0	14	6	12	0	18	5	1	0	0	0	0	0
11:15	10	168	17	0	1	220	15	0	12	5	10	0	21	3	3	0	0	0	0	0
11:30	6	206	27	0	4	222	14	0	21	1	19	0	13	6	1	0	0	0	0	0
11:45	10	206	28	0	0	212	22	0	23	2	12	0	18	5	7	0	0	0	0	0

12:00	6	175	27	0	3	193	18	0	12	6	13	0	19	1	9	0	0	0	0	0
12:15	8	251	33	0	3	201	24	0	13	6	20	0	30	3	6	0	0	0	0	0
12:30	5	238	19	0	5	195	19	0	14	4	10	0	33	4	10	0	0	0	0	0
12:45	5	243	37	0	2	208	15	0	16	4	13	0	34	5	6	0	0	0	0	0
13:00	8	219	25	0	7	228	27	0	16	0	12	0	19	9	7	0	0	0	0	0
13:15	7	228	24	0	3	218	18	0	20	4	17	0	18	7	9	0	0	0	0	0
13:30	11	232	11	0	2	222	19	0	22	2	17	0	24	6	11	0	0	0	0	0
13:45	8	240	30	0	3	186	19	0	15	3	14	0	16	4	11	0	0	0	0	0
14:00	10	210	19	0	2	215	15	0	16	3	9	0	16	5	9	0	0	0	0	0
14:15	6	248	12	0	3	225	12	0	17	3	21	0	30	8	5	0	0	0	0	0
14:30	17	261	13	0	3	247	20	0	17	8	21	0	32	6	7	0	0	0	0	0
14:45	25	321	20	0	2	259	30	0	28	4	20	0	10	5	8	0	0	0	0	0
15:00	16	319	26	0	3	171	26	0	23	6	24	0	19	11	7	0	0	0	0	0
15:15	17	411	30	0	3	231	29	0	16	7	33	0	19	6	6	0	0	0	0	0
15:30	20	371	26	0	1	249	30	0	22	4	17	0	26	11	4	0	0	0	0	0
15:45	17	433	30	0	3	215	27	0	23	7	20	0	23	5	10	0	0	0	0	0
16:00	27	372	20	0	2	220	41	0	24	6	25	0	25	8	1	0	0	0	0	0
16:15	18	403	26	0	4	228	41	0	25	6	28	0	27	6	6	0	0	0	0	0
16:30	15	388	25	0	2	207	39	0	25	2	33	0	21	9	7	0	0	0	0	0
16:45	31	385	25	0	4	235	31	0	34	4	17	0	20	4	2	0	0	0	0	0
17:00	17	403	19	0	9	222	33	0	33	5	27	0	27	8	8	0	0	0	0	0
17:15	27	399	26	0	3	250	40	0	39	4	21	0	31	4	8	0	0	0	0	0
17:30	24	432	24	0	4	249	50	0	32	5	34	0	28	11	1	0	0	0	0	0
17:45	18	415	23	0	1	229	45	0	28	4	27	0	26	6	8	0	0	0	0	0
18:00	19	411	19	0	4	228	34	0	27	2	30	0	22	8	9	0	0	0	0	0
18:15	25	383	24	0	3	212	53	0	29	2	23	0	22	9	6	0	0	0	0	0
18:30	27	385	29	0	2	208	38	0	25	3	26	0	21	14	13	0	0	0	0	0
18:45	20	379	31	0	2	197	38	0	19	11	13	0	24	11	9	0	0	0	0	0
Total	660	13119	930	0	117	14886	1275	0	1110	188	1293	0	941	264	250	0	0	0	0	0

# Bike Counts Report (15 Min Interval)

Intersection: Connecticut Ave at Independence St

Count Date: Thursday, 11/8/2018

Count Source: SABRA WANG



AM Start Time	PM End Time
06:00	19:00

START TIME	NORTH BOUND				SOUTH BOUND				EAST BOUND				WEST BOUND				OTHER BOUND			
	CONNECTICUT AVE (MD 185)				CONNECTICUT AVE (MD 185)				INDEPENDENCE ST				ASPEN HILL SHOPPING CENTER							
	L	T	R	O	L	T	R	O	L	T	R	O	L	T	R	O	L	T	R	O
06:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0

	NORTH BOUND				SOUTH BOUND				EAST BOUND				WEST BOUND				OTHER BOUND				
	CONNECTICUT AVE (MD 185)				CONNECTICUT AVE (MD 185)				INDEPENDENCE ST				ASPEN HILL SHOPPING CENTER								
START TIME	L	T	R	O	L	T	R	O	L	T	R	O	L	T	R	O	L	T	R	O	
13:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00	0	4	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0
14:15	0	6	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
14:30	0	5	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45	0	2	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
18:45	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	17	1	1	1	2	2	16	1	0	1	2	1	1	3	3	0	0	0	0	0



# Pedestrian Counts Report (15 Min Interval)

Intersection: Connecticut Ave at Independence St

Count Date: Thursday, 11/8/2018

Count Source: SABRA WANG



AM Start Time	PM End Time
06:00	19:00

	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND	OTHER BOUND
START TIME	CONNECTICUT AVE (MD 185)	CONNECTICUT AVE (MD 185)	INDEPENDENCE ST	ASPEN HILL SHOPPING CENTER	
06:00	0	1	0	2	0
06:15	0	1	0	0	0
06:30	0	0	1	0	0
06:45	0	1	0	0	0
07:00	0	3	0	0	0
07:15	0	2	0	0	0
07:30	0	2	0	2	0
07:45	0	0	0	1	0
08:00	2	1	0	0	0
08:15	1	1	0	1	0
08:30	0	1	0	0	0
08:45	1	1	0	1	0
09:00	0	2	4	1	0
09:15	0	3	0	0	0
09:30	0	4	0	3	0
09:45	0	3	0	0	0
10:00	0	0	0	0	0
10:15	1	3	1	0	0
10:30	0	3	0	0	0
10:45	0	5	0	2	0
11:00	0	2	0	2	0
11:15	0	6	0	0	0
11:30	0	6	1	0	0
11:45	0	3	0	0	0
12:00	0	3	0	0	0
12:15	2	1	1	0	0
12:30	0	2	1	1	0
12:45	0	7	1	0	0
13:00	0	4	1	1	0
13:15	0	3	0	2	0
13:30	0	7	1	0	0
13:45	0	1	0	2	0
14:00	0	3	0	2	0

	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND	OTHER BOUND
START TIME	CONNECTICUT AVE (MD 185)	CONNECTICUT AVE (MD 185)	INDEPENDENCE ST	ASPEN HILL SHOPPING CENTER	
14:15	0	6	0	5	0
14:30	0	4	0	0	0
14:45	0	3	0	0	0
15:00	0	11	3	7	0
15:15	0	12	2	2	0
15:30	0	5	1	5	0
15:45	0	5	2	2	0
16:00	0	7	1	0	0
16:15	0	4	2	2	0
16:30	0	9	3	0	0
16:45	0	9	1	2	0
17:00	2	4	0	2	0
17:15	0	6	0	0	0
17:30	0	15	0	0	0
17:45	0	6	0	1	0
18:00	1	5	0	1	0
18:15	2	2	1	1	0
18:30	0	6	0	0	0
18:45	0	5	0	0	0
Total	12	209	28	53	0

Project Name: Kaiser Aspen Hill LATR

Project Number: P7716

Location: Montgomery Co., MD

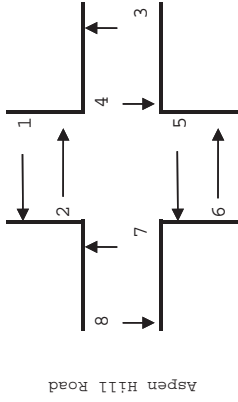
Intersection: Connecticut Ave. & Aspen Hill R

Weather: cold

Date: 11/20/2019

Surveyor: James, Inita & Ramiz

Connecticut Avenue - 185



Connecticut Avenue - 185

Hourly Pedestrian Count

Time Period	From:		To:		1	2	3	4	5	6	7	8	Total	1 & 2	3 & 4	5 & 6	7 & 8
	SE	NE	SE	NE													
<b>AM PEAK</b>																	
6:30	3	1	0	1	1	1	1	1	1	1	1	0	8	4	1	2	1
6:45	4	2	0	1	1	1	1	1	1	1	1	0	10	6	1	2	1
7:00	4	2	0	1	1	1	1	1	1	1	1	0	10	6	1	2	1
7:15	4	1	0	1	0	0	1	1	1	0	1	0	7	5	1	0	1
7:30	3	2	0	2	1	1	1	2	2	0	2	0	10	5	2	1	2
7:45	4	1	1	2	1	1	2	1	2	0	2	0	11	5	3	1	2
8:00	5	1	2	2	4	4	2	1	1	0	1	0	15	6	4	4	1
8:15	5	1	5	1	4	4	1	1	1	4	1	0	21	6	6	8	1
8:30	5	2	6	0	4	4	0	4	4	10	0	0	27	7	6	14	0
<b>PM PEAK</b>																	
16:00	10	7	1	1	5	10	1	5	10	10	0	0	34	17	2	15	0
16:15	11	6	0	0	5	10	0	5	10	10	0	0	32	17	0	15	0
16:30	10	3	0	0	7	8	0	7	8	8	0	0	28	13	0	15	0
16:45	7	3	1	0	9	6	0	9	6	6	0	0	26	10	1	15	0
17:00	7	3	1	0	10	3	0	10	3	3	0	0	24	10	1	13	0
17:15	6	1	1	0	7	1	0	7	1	1	0	0	16	7	1	8	0
17:30	6	0	1	1	5	6	1	5	6	6	1	0	20	6	2	11	1
17:45	7	2	1	1	7	7	1	7	7	6	1	0	25	9	2	13	1
18:00	5	4	1	1	5	6	1	5	6	6	1	0	23	9	2	11	1

# Wells & Associates, Inc

McLean, Virginia

**Existing Traffic Count**

PROJECT: Kaiser Aspen Hill LATR W & A JOB NO.: P7716 INTERSECTION: Connecticut Ave. & Aspen Hill Rd. LOCATION: Montgomery Co., MD	DATE: 11/20/2019 DAY: Wednesday WEATHER: cold COUNTED BY: James, Inita & Ramiz INPUT BY: agan	SOUTHBOUND ROAD: Connecticut Avenue - 185 NORTHBOUND ROAD: Connecticut Avenue - 185 WESTBOUND ROAD: Aspen Hill Road EASTBOUND ROAD: Aspen Hill Road <p style="text-align: center;"><b>BIKES</b></p>
--	---	---

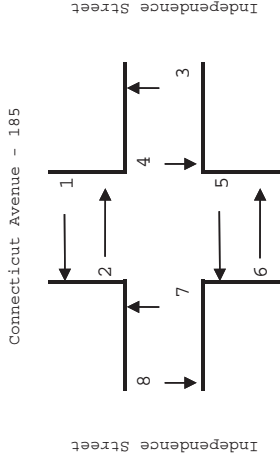
Time Period	Turning Movements																Total	PHF	Time Period								
	Southbound Connecticut Avenue - 185				Westbound Aspen Hill Road				Northbound Connecticut Avenue - 185				Eastbound Aspen Hill Road							North & South	East & West						
	1 Right	2 Thru	3 Left	Total	4 Right	5 Thru	6 Left	Total	7 Right	8 Thru	9 Left	Total	10 Right	11 Thru	12 Left	Total											
<b>AM</b>																											
6:30-6:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45-7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	1
7:00-7:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15-7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30-7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45-8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00-8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15-8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30-8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45-9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00-9:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15-9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>3 Hour Totals</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	1
<b>1 Hour Totals</b>																											
6:30-7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	1
6:45-7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	1
7:00-8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15-8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30-8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45-8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00-9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15-9:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30-9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>AM Peak 6:30-7:30</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	1
<b>PM</b>																											
4:00-4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15-4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30-4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45-5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00-5:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15-5:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	1	0	1
5:30-5:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45-6:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00-6:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15-6:30	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
6:30-6:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45-7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>3 Hour Totals</b>	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	0	2
<b>1 Hour Totals</b>																											
4:00-5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15-5:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30-5:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	1	0	1
4:45-5:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	1	0	1
5:00-6:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	1	0	1
5:15-6:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	1	0	1
5:30-6:30	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
5:45-6:45	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
6:00-7:00	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
<b>PM Peak 4:30-5:30</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	1

Project Name: Kaiser Aspen Hill LATR

Project Number: 7908  
 Location: Montgomery Co., MD

Intersection: Connecticut Ave. & Independence

Weather: cold  
 Date: 11/20/2019  
 Surveyor: Majda



Connecticut Avenue - 185

Hourly Pedestrian Count

Time Period	From:		To:		SE	NE	SW	SE	SW	SE	SW	NW	SW	NW	NE	NW	NE	NW	NE	Total	1 & 2	3 & 4	5 & 6	7 & 8
	SE	NE	SW	SE																				
<b>AM PEAK</b>																								
6:30	1	1	2	2	4	4	1	1	1	1	1	1	1	1	0	0	0	0	0	10	2	6	2	0
7:45	1	1	3	3	4	4	1	1	1	1	1	1	1	1	0	0	0	0	0	11	2	7	2	0
8:00	1	0	3	3	5	5	1	1	1	1	1	1	1	1	0	0	0	0	0	10	1	8	1	0
8:15	0	0	3	3	6	6	0	0	0	0	0	0	0	0	0	0	0	0	9	0	9	0	0	
8:30	0	0	3	3	6	6	0	0	0	0	0	0	0	0	0	0	0	0	9	0	9	0	0	
8:45	1	0	3	3	6	6	1	1	1	1	1	1	1	1	0	0	0	0	11	1	9	1	0	
9:00	1	0	1	1	6	6	1	1	1	1	1	1	1	1	0	0	0	0	9	1	7	1	0	
9:15	2	0	2	2	6	6	2	2	2	2	2	2	2	2	0	0	0	0	12	2	8	2	0	
9:30	2	0	2	2	4	4	2	2	2	2	2	2	2	2	0	0	0	0	10	2	6	2	0	
<b>PM PEAK</b>																								
16:00	2	0	20	20	5	5	1	1	1	1	1	1	1	1	0	0	0	0	39	2	25	12	0	
16:15	2	0	20	20	7	7	1	1	1	1	1	1	1	1	0	0	0	0	36	2	27	7	0	
16:30	1	0	19	19	5	5	1	1	1	1	1	1	1	1	0	0	0	0	27	1	24	2	0	
16:45	0	0	23	23	4	4	0	0	0	0	0	0	0	0	0	0	0	0	27	0	27	0	0	
17:00	0	0	19	19	4	4	0	0	0	0	0	0	0	0	0	0	0	0	25	0	23	2	0	
17:15	0	0	16	16	2	2	0	0	0	0	0	0	0	0	0	0	0	0	22	0	18	4	0	
17:30	0	0	15	15	2	2	1	1	1	1	1	1	1	1	0	0	0	0	24	0	17	7	0	
17:45	0	0	14	14	2	2	4	4	2	2	2	2	2	2	0	0	0	0	26	0	16	10	0	
18:00	0	0	14	14	0	0	4	4	0	0	0	0	0	0	0	0	0	0	24	0	14	10	0	



Project Name: Kaiser Aggan Hill EMR

Project Number: 7508

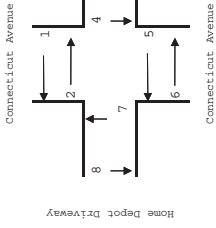
Location: Montgomery County, MD

Intersection: Connecticut Ave. & Home Depot B

Weather: clear

Date: 11/20/2019

Surveyor: Laura



Hourly Pedestrian Count

Time Period	From:		To:		SE NE	NE SE	2	3	4	5	6	7	8	NE NW	NW NE	Total	1 & 2	3 & 4	5 & 6	7 & 8
	SE	NE	SE	NE																
6:00	0	0	0	0	1	1	0	0	0	0	0	3	1	0	5	1	0	0	0	4
6:15	0	0	0	0	1	1	0	0	0	0	0	3	2	0	6	1	0	0	0	5
6:30	1	1	0	0	1	1	0	0	0	0	0	2	2	0	6	2	0	0	0	4
6:45	1	0	0	0	0	0	0	0	0	0	0	1	1	0	3	1	0	0	0	2
7:00	1	0	0	0	0	0	0	0	0	0	0	0	1	0	2	1	0	0	0	1
7:15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
8:00	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	2
8:15	0	1	0	0	0	0	0	0	0	0	0	2	0	0	3	1	0	0	0	2
8:30	0	1	0	0	0	0	0	0	0	0	0	2	0	0	3	1	0	0	0	2
8:45	0	1	0	0	0	0	0	0	0	0	0	2	0	0	3	1	0	0	0	2
9:00	0	1	0	0	0	0	0	0	0	0	0	1	0	0	2	1	0	0	0	1
9:15	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
9:30	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
9:45	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	2
10:45	0	1	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	2
11:00	1	1	0	0	0	0	0	0	0	0	0	1	0	0	9	1	0	0	0	6
11:15	1	1	0	0	0	0	0	0	0	0	0	1	0	0	9	2	0	0	0	5
11:30	1	1	0	0	0	0	0	0	0	0	0	7	1	0	12	2	0	0	0	9
11:45	1	1	0	0	0	0	0	0	0	0	0	8	1	0	10	2	0	0	0	9
12:00	0	0	0	0	0	0	0	0	0	0	0	6	2	0	9	1	0	0	0	8
12:15	0	0	0	0	0	0	0	0	0	0	0	6	2	0	8	0	0	0	0	8
12:30	0	0	0	0	0	0	0	0	0	0	0	2	3	0	6	0	0	0	0	5
12:45	0	0	0	0	0	0	0	0	0	0	0	2	2	0	5	0	0	0	0	4
13:00	0	1	0	0	0	0	0	0	0	0	0	1	1	0	4	0	0	0	0	2
13:15	0	1	0	0	0	0	0	0	0	0	0	1	1	0	4	1	0	0	0	2
13:30	1	1	0	0	0	0	0	0	0	0	0	1	2	0	5	1	0	0	0	3
13:45	1	1	0	0	0	0	0	0	0	0	0	1	3	0	6	2	0	0	0	4
14:00	1	0	0	0	0	0	0	0	0	0	0	2	3	0	6	1	0	0	0	4
14:15	0	0	0	0	0	0	0	0	0	0	0	2	2	0	6	1	0	0	0	5
14:30	0	1	0	0	0	0	0	0	0	0	0	2	3	0	6	0	0	0	0	5
14:45	0	1	0	0	0	0	0	0	0	0	0	2	2	0	5	0	0	0	0	4
15:00	1	1	0	0	0	0	0	0	0	0	0	1	3	0	5	1	0	0	0	4
15:15	1	1	0	0	0	0	0	0	0	0	0	1	2	0	5	2	0	0	0	3
15:30	1	1	0	0	0	0	0	0	0	0	0	1	3	0	6	2	0	0	0	4
15:45	0	0	0	0	0	0	0	0	0	0	0	2	4	0	6	0	0	0	0	6
16:00	0	0	0	0	0	0	0	0	0	0	0	3	4	0	7	0	0	0	0	7
16:15	0	0	0	0	0	0	0	0	0	0	0	2	5	0	7	0	0	0	0	7
16:30	0	0	0	0	0	0	0	0	0	0	0	1	3	0	4	0	0	0	0	4
16:45	0	0	0	0	0	0	0	0	0	0	0	1	4	0	5	0	0	0	0	5
17:00	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	4
17:15	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2
17:30	0	0	0	0	0	0	0	0	0	0	0	0	4	0	5	0	0	0	0	4
17:45	0	0	0	0	0	0	0	0	0	0	0	1	2	0	3	0	0	0	0	3
18:00	0	0	0	0	0	0	0	0	0	0	0	1	3	0	4	0	0	0	0	4





## APPENDIX

# B

Speed Data Materials

# Connor Speed Report

**Dataset**

Site Name NB CONNECTICUT  
 Direction North

Tuesday, March 1, 2022

Time [--	Vbin 6 12	Vbin 12 19	Vbin 19 25	Vbin 25 31	Vbin 31 37	Vbin 37 43	Vbin 43 50	Vbin 50 56	Vbin 56 62	Vbin 62 68	Vbin 68 75	Vbin 75 81	Vbin 81 87	Vbin 87 93	Vbin 93 99	Vpp 50	JPSL 35
0000	0	3	8	28	30	25	10	2	0	0	0	0	0	0	0	34.1	50
0100	0	1	5	14	11	13	4	0	0	0	0	0	0	0	0	34.7	24
0200	0	1	4	5	7	5	2	0	0	0	0	0	0	0	0	31.5	9
0300	0	1	1	5	6	5	5	2	0	0	0	0	0	0	0	37.1	15
0400	0	0	5	15	13	12	8	2	0	0	0	0	0	0	0	32.8	26
0500	0	5	20	60	42	46	27	2	1	0	0	0	0	0	0	33	87
0600	0	9	19	136	115	55	33	5	1	0	0	0	0	0	0	32.2	127
0700	0	8	50	200	243	107	40	9	1	3	0	0	0	0	0	32.9	246
0800	1	17	38	214	239	133	47	8	0	0	0	0	0	0	0	32.7	256
0900	2	15	67	197	236	97	34	9	0	0	0	0	0	0	0	31.9	200
1000	2	23	47	214	240	111	25	3	0	0	0	0	0	0	0	32	207
1100	1	21	83	247	214	102	28	6	0	0	0	0	0	0	0	31	180
1200	0	27	80	307	228	93	20	3	1	0	0	0	0	0	0	30.3	193
1300	1	25	84	343	276	117	25	3	0	0	0	0	0	0	0	30.8	221
1400	0	24	86	328	327	139	27	7	1	1	0	0	0	0	0	31.5	262
1500	1	30	64	413	408	214	38	6	1	0	0	0	0	0	0	32.2	399
1600	1	28	125	453	429	165	37	6	1	0	0	0	0	0	0	31.2	315
1700	0	26	132	602	404	126	20	0	0	0	0	0	0	0	0	30.2	243
1800	0	25	157	499	324	143	26	3	1	0	0	0	0	0	0	30.1	273
1900	0	22	90	316	241	111	37	8	0	0	0	0	0	0	0	30.6	216
2000	1	15	48	211	197	125	29	6	0	0	0	0	0	0	0	32	225
2100	0	15	34	166	170	66	22	3	0	0	0	0	0	0	0	31.7	156
2200	0	7	15	110	104	43	12	5	0	0	0	0	0	0	0	31.7	87
2300	0	6	10	57	70	44	11	1	2	0	0	0	0	0	0	33.1	80
<b>00-00</b>	<b>10</b>	<b>354</b>	<b>1272</b>	<b>5140</b>	<b>4574</b>	<b>2097</b>	<b>567</b>	<b>99</b>	<b>10</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>31.3</b>	<b>4097</b>

Vehicles = 14127  
 Posted speed limit = 35 mph, Exceeding = 4097 (29.00%), Mean Exceeding = 39.80 mph  
 Maximum = 63.7 mph, Minimum = 10.3 mph, Mean = 31.9 mph  
 50% Speed = 31.32 mph, 85% Speed = 38.70 mph, Median = 31.32 mph  
 12 mph Pace = 25 - 37, Number in Pace = 9492 (67.19%)  
 Variance = 43.17, Standard Deviation = 6.57 mph

Wednesday, March 2, 2022

Time [--	Vbin 6 12	Vbin 12 19	Vbin 19 25	Vbin 25 31	Vbin 31 37	Vbin 37 43	Vbin 43 50	Vbin 50 56	Vbin 56 62	Vbin 62 68	Vbin 68 75	Vbin 75 81	Vbin 81 87	Vbin 87 93	Vbin 93 99	Vpp 50	JPSL 35
0000	1	1	10	29	20	17	6	0	0	0	0	0	0	0	0	31.4	29
0100	0	3	4	18	13	14	5	1	1	0	0	0	0	0	0	33.4	24
0200	0	1	2	6	11	12	4	2	0	0	0	0	0	0	0	36.2	22
0300	0	2	1	3	11	5	0	0	0	0	0	0	0	0	0	33.8	9
0400	1	3	6	17	25	20	14	0	0	0	0	0	0	0	0	33.6	37
0500	0	5	15	56	46	41	26	4	1	0	0	0	0	0	0	33	90
0600	0	7	34	112	110	76	37	6	3	0	0	0	0	0	0	33	160
0700	1	11	37	245	183	102	47	8	1	2	0	0	0	0	0	31.5	212
0800	0	7	52	231	206	133	44	7	0	0	0	0	0	0	0	32.3	247
0900	1	8	48	246	215	98	38	2	0	0	0	0	0	0	0	31.9	202
1000	0	7	50	235	183	94	21	7	1	0	0	0	0	0	0	31.2	176
1100	0	11	39	305	247	99	20	6	0	0	0	0	0	0	0	31.3	197
1200	0	23	101	367	207	111	32	3	0	0	0	0	0	0	0	29.9	213
1300	0	18	78	336	269	112	37	3	0	0	0	0	0	0	0	31	229
1400	1	33	81	367	290	144	30	1	0	0	0	0	0	0	0	31	273
1500	0	9	89	422	440	172	30	4	0	0	0	0	0	0	0	31.8	348
1600	0	18	99	506	449	171	41	7	0	0	0	0	0	0	0	31.4	362
1700	0	16	107	510	432	159	20	5	0	0	0	0	0	0	0	31	323
1800	0	13	132	496	352	119	24	2	1	0	0	0	0	0	0	30.3	261
1900	4	27	78	328	250	141	33	2	0	0	0	0	0	0	0	30.8	249
2000	0	11	38	231	204	106	30	5	0	0	0	0	0	0	0	31.9	209
2100	0	9	42	153	172	83	32	1	0	0	0	0	0	0	0	32.5	174
2200	0	5	11	85	107	62	17	3	0	0	0	0	0	0	0	33.5	116
2300	0	3	13	59	80	46	11	2	0	1	0	0	0	0	0	33.1	80
<b>00-00</b>	<b>9</b>	<b>251</b>	<b>1167</b>	<b>5363</b>	<b>4522</b>	<b>2137</b>	<b>599</b>	<b>81</b>	<b>8</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>31.3</b>	<b>4242</b>

Vehicles = 14140

Posted speed limit = 35 mph, Exceeding = 4242 (30.00%), Mean Exceeding = 39.74 mph

Maximum = 67.5 mph, Minimum = 9.1 mph, Mean = 32.1 mph

50% Speed = 31.32 mph, 85% Speed = 38.81 mph, Median = 31.32 mph

12 mph Pace = 26 - 38, Number in Pace = 9700 (68.60%)

Variance = 41.14, Standard Deviation = 6.41 mph

**Grand Total**

Time [--	Vbin 6 12	Vbin 12 19	Vbin 19 25	Vbin 25 31	Vbin 31 37	Vbin 37 43	Vbin 43 50	Vbin 50 56	Vbin 56 62	Vbin 62 68	Vbin 68 75	Vbin 75 81	Vbin 81 87	Vbin 87 93	Vbin 93 99	Vpp 50	JPSL 35
--	19	605	2439	10503	9096	4234	1166	180	18	7	0	0	0	0	0	31.3	8339

Vehicles = 28267

Posted speed limit = 35 mph, Exceeding = 8339 (29.50%), Mean Exceeding = 39.77 mph

Maximum = 67.5 mph, Minimum = 9.1 mph, Mean = 32.0 mph

50% Speed = 31.32 mph, 85% Speed = 38.70 mph, Median = 31.32 mph

12 mph Pace = 26 - 38, Number in Pace = 19184 (67.87%)

Variance = 42.16, Standard Deviation = 6.49 mph

# Connor Speed Report

**Dataset**

Site Name SB CONNECTICUT  
Direction SOUTH  
Encoded Direction 5

**Tuesday, March 1, 2022**

Time [--]	Vbin 6 12	Vbin 12 19	Vbin 19 25	Vbin 25 31	Vbin 31 37	Vbin 37 43	Vbin 43 50	Vbin 50 56	Vbin 56 62	Vbin 62 68	Vbin 68 75	Vbin 75 81	Vbin 81 87	Vbin 87 93	Vbin 93 99	Vpp 50	JPSL 35
0000	0	0	3	7	15	31	7	2	0	2	0	0	0	0	0	38.6	52
0100	0	0	5	2	12	17	7	1	0	1	0	0	0	0	0	38.5	30
0200	0	0	3	0	7	12	3	7	0	0	0	0	0	0	0	41	25
0300	0	0	1	2	6	13	15	12	1	0	0	0	0	0	0	44.5	44
0400	0	0	2	11	10	52	46	19	5	0	0	0	0	0	0	43.4	127
0500	0	0	2	23	61	141	96	44	13	1	2	0	0	0	0	41.8	330
0600	5	30	70	107	268	342	184	39	12	0	0	0	0	0	0	37.9	693
0700	51	205	282	302	397	359	108	29	4	0	0	0	0	0	0	31.5	669
0800	52	229	306	313	420	266	75	19	4	0	0	0	0	0	1	30	530
0900	9	30	119	227	363	241	76	19	2	0	0	0	0	0	0	34	485
1000	7	58	151	279	287	136	33	8	1	0	0	0	0	0	0	30.8	274
1100	2	37	135	277	276	169	27	14	0	1	0	0	0	0	0	31.6	297
1200	7	46	158	308	341	130	27	3	0	0	0	0	0	0	0	31	284
1300	6	38	189	310	252	113	30	5	0	0	0	0	0	0	0	29.9	228
1400	11	69	157	297	328	134	30	8	0	0	0	0	0	0	0	30.8	282
1500	18	83	190	227	242	182	41	9	0	0	0	0	0	3	0	30.4	335
1600	20	57	156	303	281	157	44	8	0	0	1	0	0	0	1	30.6	297
1700	14	68	168	287	268	144	52	5	0	0	0	0	0	0	0	30.5	299
1800	19	64	148	248	297	130	44	4	3	0	0	0	0	1	0	31	283
1900	0	11	57	167	275	199	46	8	2	0	0	0	0	0	0	35	380
2000	0	0	17	51	174	194	50	10	2	0	0	0	0	0	0	37.5	336
2100	0	0	16	42	164	161	59	12	0	0	0	0	0	0	0	37.5	301
2200	0	0	9	24	75	105	45	10	0	0	0	1	0	0	0	38.9	196
2300	0	1	2	14	42	76	19	6	0	1	0	0	0	0	0	38.8	124
<b>00-00</b>	<b>221</b>	<b>1026</b>	<b>2346</b>	<b>3828</b>	<b>4861</b>	<b>3504</b>	<b>1164</b>	<b>301</b>	<b>49</b>	<b>6</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>2</b>	<b>32.9</b>	<b>6901</b>

Vehicles = 17316  
 Posted speed limit = 35 mph, Exceeding = 6901 (39.85%), Mean Exceeding = 40.67 mph  
 Maximum = 98.6 mph, Minimum = 6.4 mph, Mean = 32.2 mph  
 50% Speed = 32.88 mph, 85% Speed = 41.05 mph, Median = 32.88 mph  
 12 mph Pace = 28 - 40, Number in Pace = 8799 (50.81%)  
 Variance = 78.62, Standard Deviation = 8.87 mph

Wednesday, March 2, 2022

Time [--]	Vbin 6 12	Vbin 12 19	Vbin 19 25	Vbin 25 31	Vbin 31 37	Vbin 37 43	Vbin 43 50	Vbin 50 56	Vbin 56 62	Vbin 62 68	Vbin 68 75	Vbin 75 81	Vbin 81 87	Vbin 87 93	Vbin 93 99	Vpp 50	]PSL 35
0000	0	0	3	5	20	37	17	1	2	0	0	0	0	0	0	39.6	69
0100	0	1	2	5	10	12	9	4	1	0	0	0	0	0	0	38.5	27
0200	0	0	2	1	11	17	15	4	1	1	0	0	0	0	0	42.3	44
0300	0	1	1	2	11	23	12	4	1	0	0	0	0	0	0	40.6	45
0400	0	0	5	12	22	53	37	26	7	0	1	0	0	0	0	42.5	136
0500	0	1	2	19	70	138	135	43	7	0	2	0	0	0	0	42.5	366
0600	6	18	65	124	276	317	168	42	11	2	0	0	0	0	0	37.8	652
0700	51	240	258	308	406	355	112	27	2	0	0	1	0	0	0	31.8	682
0800	33	188	225	311	390	326	119	18	1	0	0	0	0	0	0	32.1	627
0900	6	41	121	266	312	254	76	10	2	1	0	0	0	0	0	33.3	470
1000	4	29	120	259	308	140	44	7	1	1	0	0	0	3	0	32	305
1100	11	57	150	272	280	136	29	6	2	0	0	0	0	0	0	30.4	275
1200	15	61	146	304	288	118	21	5	1	0	0	0	0	0	0	30.3	238
1300	13	58	204	299	271	125	26	3	0	1	0	0	0	0	0	29.5	228
1400	11	42	153	296	327	153	51	6	0	0	0	0	0	0	0	31.3	312
1500	24	134	174	259	263	181	28	9	0	1	0	0	0	0	0	30	308
1600	22	99	255	319	257	161	44	5	2	0	0	0	0	0	0	29.2	299
1700	11	65	191	298	280	167	55	7	0	1	0	0	0	0	0	30.4	327
1800	16	77	204	253	236	161	33	9	0	0	0	0	0	0	0	29.8	282
1900	0	8	54	121	242	238	71	15	1	0	0	0	0	0	0	36.5	447
2000	0	2	20	82	189	185	68	6	5	1	0	0	0	0	0	37.1	347
2100	0	2	16	58	165	162	36	4	1	3	0	0	0	0	0	36.7	266
2200	0	0	3	21	102	124	38	6	3	0	0	0	0	0	0	38.1	226
2300	0	0	3	12	50	66	31	8	3	0	0	0	0	0	0	38.8	130
<b>00-00</b>	<b>223</b>	<b>1124</b>	<b>2377</b>	<b>3906</b>	<b>4786</b>	<b>3649</b>	<b>1275</b>	<b>275</b>	<b>54</b>	<b>12</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>32.8</b>	<b>7108</b>

Vehicles = 17688

Posted speed limit = 35 mph, Exceeding = 7108 (40.19%), Mean Exceeding = 40.72 mph

Maximum = 88.7 mph, Minimum = 6.4 mph, Mean = 32.2 mph

50% Speed = 32.77 mph, 85% Speed = 41.16 mph, Median = 32.77 mph

12 mph Pace = 29 - 41, Number in Pace = 8814 (49.83%)

Variance = 79.67, Standard Deviation = 8.93 mph

Grand Total

Time [--]	Vbin 6 12	Vbin 12 19	Vbin 19 25	Vbin 25 31	Vbin 31 37	Vbin 37 43	Vbin 43 50	Vbin 50 56	Vbin 56 62	Vbin 62 68	Vbin 68 75	Vbin 75 81	Vbin 81 87	Vbin 87 93	Vbin 93 99	Vpp 50	]PSL 35
--	444	2150	4723	7734	9647	7153	2439	576	103	18	6	2	0	7	2	32.9	14009

Vehicles = 35004

Posted speed limit = 35 mph, Exceeding = 14009 (40.02%), Mean Exceeding = 40.69 mph

Maximum = 98.6 mph, Minimum = 6.4 mph, Mean = 32.2 mph

50% Speed = 32.88 mph, 85% Speed = 41.05 mph, Median = 32.88 mph

12 mph Pace = 28 - 40, Number in Pace = 17578 (50.22%)

Variance = 79.15, Standard Deviation = 8.90 mph

# Connor Speed Report

**Dataset**

**Site Name** SB RAMP FROM MD 97  
**Direction** South

**Tuesday, March 1, 2022**

Time [--	Vbin 6 12	Vbin 12 19	Vbin 19 25	Vbin 25 31	Vbin 31 37	Vbin 37 43	Vbin 43 50	Vbin 50 56	Vbin 56 62	Vbin 62 68	Vbin 68 75	Vbin 75 81	Vbin 81 87	Vbin 87 93	Vbin 93 99	Vpp 50	JPSL 35
0000	0	0	1	15	18	3	0	1	0	0	0	0	0	0	0	31.7	10
0100	0	0	0	9	10	3	0	0	0	0	0	0	0	0	0	32.2	5
0200	0	0	1	3	8	7	0	0	0	0	0	0	0	0	0	34.4	8
0300	0	0	0	4	16	12	0	0	0	0	0	0	0	0	0	35.6	16
0400	0	1	0	9	43	27	3	0	0	0	0	0	0	0	0	35.7	50
0500	0	0	0	36	126	63	12	0	0	0	0	0	0	0	0	35	119
0600	0	0	7	108	365	114	10	2	0	0	0	0	0	0	0	34.1	242
0700	0	0	14	329	665	96	4	0	0	0	0	0	0	0	0	32.7	247
0800	0	0	24	340	637	84	10	0	0	0	0	0	0	0	0	32.3	243
0900	0	0	6	160	371	81	5	0	0	0	0	0	0	0	0	33.1	185
1000	0	0	8	148	308	45	4	0	0	0	0	0	0	0	0	32.7	138
1100	0	0	21	186	268	50	5	0	0	0	0	0	0	0	0	32.1	117
1200	0	0	14	199	289	33	3	1	0	0	0	0	0	0	0	32	107
1300	0	1	18	160	256	45	3	0	0	0	0	0	0	0	0	32.2	104
1400	0	1	23	224	284	41	2	0	0	0	0	0	0	0	0	31.7	107
1500	0	0	23	193	278	54	4	0	0	0	0	0	0	0	0	32.2	130
1600	0	4	13	203	343	48	3	0	0	0	0	0	0	0	0	32.3	139
1700	0	0	14	178	307	50	0	0	0	0	0	0	0	0	0	32.5	132
1800	0	0	16	199	263	39	3	0	0	0	0	0	0	0	0	31.9	106
1900	0	0	12	148	158	33	6	0	0	0	0	0	0	0	0	31.4	85
2000	0	0	8	74	151	27	2	0	0	0	0	0	0	0	0	32.8	74
2100	0	0	8	77	116	29	2	0	0	0	0	0	0	0	0	32.2	63
2200	0	0	9	42	71	29	6	1	0	0	0	0	0	0	0	33.4	55
2300	0	0	1	26	46	11	0	0	0	0	0	0	0	0	0	32.8	26
<b>00-00</b>	<b>0</b>	<b>7</b>	<b>241</b>	<b>3070</b>	<b>5397</b>	<b>1024</b>	<b>87</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>32.5</b>	<b>2508</b>

Vehicles = 9831

Posted speed limit = 35 mph, Exceeding = 2508 (25.51%), Mean Exceeding = 37.70 mph

Maximum = 54.4 mph, Minimum = 15.2 mph, Mean = 32.7 mph

50% Speed = 32.55 mph, 85% Speed = 36.57 mph, Median = 32.55 mph

12 mph Pace = 26 - 38, Number in Pace = 8587 (87.35%)

Variance = 16.16, Standard Deviation = 4.02 mph

Wednesday, March 2, 2022

Time [--]	Vbin 6 12	Vbin 12 19	Vbin 19 25	Vbin 25 31	Vbin 31 37	Vbin 37 43	Vbin 43 50	Vbin 50 56	Vbin 56 62	Vbin 62 68	Vbin 68 75	Vbin 75 81	Vbin 81 87	Vbin 87 93	Vbin 93 99	Vpp 50	JPSL 35
0000	0	0	3	11	24	8	1	1	0	0	0	0	0	0	0	33.3	19
0100	0	0	1	8	7	6	0	0	0	0	0	0	0	0	0	32.6	7
0200	0	0	1	10	17	4	1	2	0	0	0	0	0	0	0	33.3	16
0300	0	0	2	6	18	7	0	0	0	0	0	0	0	0	0	34	12
0400	0	0	1	14	49	26	8	1	0	0	0	0	0	0	0	35.6	59
0500	0	0	3	36	145	71	4	0	0	0	0	0	0	0	0	35.3	138
0600	0	0	7	121	368	99	8	0	0	0	0	0	0	0	0	33.7	225
0700	0	0	9	343	636	112	2	0	0	0	0	0	0	0	0	32.6	267
0800	0	0	5	283	608	114	5	1	0	0	0	0	0	0	0	32.9	276
0900	0	0	12	166	349	63	6	1	0	0	0	0	0	0	0	33	175
1000	0	0	10	179	277	40	7	0	0	0	0	0	0	0	0	32.5	132
1100	0	5	18	176	240	52	1	0	0	0	0	0	0	0	0	32.3	109
1200	0	0	12	176	267	51	5	0	1	0	0	0	0	0	0	32.2	130
1300	0	0	10	171	285	43	3	1	0	0	0	0	0	0	0	32.3	119
1400	0	0	24	220	253	37	0	1	0	0	0	0	0	0	0	31.5	101
1500	0	0	19	242	302	43	3	1	0	0	0	0	0	0	0	31.7	111
1600	0	0	15	286	304	61	1	0	0	0	0	0	0	0	0	31.7	140
1700	0	0	20	216	317	51	9	0	0	0	0	0	0	0	0	32.1	137
1800	0	2	16	235	245	33	4	0	0	0	0	0	0	0	0	31.3	85
1900	0	2	8	142	196	34	3	0	0	0	0	0	0	0	0	32.2	85
2000	0	1	10	118	129	30	1	0	0	0	0	0	0	0	0	31.8	60
2100	0	0	10	84	111	26	3	0	0	0	0	0	0	0	0	32.1	65
2200	0	0	3	63	86	19	2	0	0	0	0	0	0	0	0	32.4	46
2300	0	0	4	34	51	17	0	0	0	0	0	0	0	0	0	32.7	28
<b>00-00</b>	<b>0</b>	<b>10</b>	<b>223</b>	<b>3340</b>	<b>5284</b>	<b>1047</b>	<b>77</b>	<b>9</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>32.4</b>	<b>2542</b>

Vehicles = 9991

Posted speed limit = 35 mph, Exceeding = 2542 (25.44%), Mean Exceeding = 37.68 mph  
 Maximum = 58.7 mph, Minimum = 14.0 mph, Mean = 32.6 mph  
 50% Speed = 32.44 mph, 85% Speed = 36.57 mph, Median = 32.44 mph  
 12 mph Pace = 27 - 39, Number in Pace = 8710 (87.18%)  
 Variance = 16.50, Standard Deviation = 4.06 mph

**Grand Total**

Time [--]	Vbin 6 12	Vbin 12 19	Vbin 19 25	Vbin 25 31	Vbin 31 37	Vbin 37 43	Vbin 43 50	Vbin 50 56	Vbin 56 62	Vbin 62 68	Vbin 68 75	Vbin 75 81	Vbin 81 87	Vbin 87 93	Vbin 93 99	Vpp 50	JPSL 35
--	0	17	464	6410	10681	2071	164	14	1	0	0	0	0	0	0	32.5	5050

Vehicles = 19822

Posted speed limit = 35 mph, Exceeding = 5050 (25.48%), Mean Exceeding = 37.69 mph  
 Maximum = 58.7 mph, Minimum = 14.0 mph, Mean = 32.6 mph  
 50% Speed = 32.55 mph, 85% Speed = 36.57 mph, Median = 32.55 mph  
 12 mph Pace = 26 - 38, Number in Pace = 17292 (87.24%)  
 Variance = 16.33, Standard Deviation = 4.04 mph

## APPENDIX

# C

USLIMITS2 Outputs



# USLIMITS2 Speed Zoning Report

## Project Overview

**Project Name: MD 185**

**Analyst:** STV

**Date:** 2022-03-15

### Basic Project Information

Route Name: MD 185  
 State: Maryland  
 County: Montgomery County  
 City: Aspen Hill CDP  
 Route Type: Road Section in Developed Area  
 Route Status: Existing

### Roadway Information

Section Length: 0.95 mile(s)  
 Statutory Speed Limit: 35 mph  
 Existing Speed Limit: 35 mph  
 Adverse Alignment: No  
 One-Way Street: No  
 Divided/Undivided: Divided  
 Number of Through Lanes: 6  
 Area Type: Large Complexes  
 Number of Driveways: 13  
 Number of Signals: 3

### Crash Data Information

Crash Data Years: 7.00  
 Crash AADT: 31636 veh/day  
 Total Number of Crashes: 140  
 Total Number of Injury Crashes: 63  
 Section Crash Rate: 182 per 100 MVM  
 Section Injury Crash Rate: 82 per 100 MVM  
 Crash Rate Average for Similar Roads: 242  
 Injury Rate Average for Similar Roads: 86

### Traffic Information

85th Percentile Speed: 40 mph  
 50th Percentile Speed: 32 mph  
 AADT: 31636 veh/day  
 On Street Parking and Usage: Not High  
 Pedestrian / Bicyclist Activity: High

## Recommended Speed Limit: **30**

**Disclaimer:** The U.S. Government assumes no liability for the use of the information contained in this report. This report does not constitute a standard, specification, or regulation.

## Equations Used in the Crash Data Calculations

### Exposure (M)

$$M = (\text{Section AADT} * 365 * \text{Section Length} * \text{Duration of Crash Data}) / (100000000)$$

$$M = (31636 * 365 * 0.95 * 7.00) / (100000000)$$

$$M = 0.7679$$

### Crash Rate (Rc)

$$Rc = (\text{Section Crash Average} * 100000000) / (\text{Section AADT} * 365 * \text{Section Length})$$

$$Rc = (20.00 * 100000000) / (31636 * 365 * 0.95)$$

$$Rc = 182.32 \text{ crashes per 100 MVM}$$

### Injury Rate (Ri)

$$Ri = (\text{Section Injury Crash Average} * 100000000) / (\text{Section AADT} * 365 * \text{Section Length})$$

$$Ri = (9.00 * 100000000) / (31636 * 365 * 0.95)$$

$$Ri = 82.04 \text{ injuries per 100 MVM}$$

### Critical Crash Rate (Cc)

$$Cc = \text{Crash Average of Similar Sections} + 1.645 * (\text{Crash Average of Similar Sections} / \text{Exposure}) ^ (1/2) +$$

$(1 / (2 * \text{Exposure}))$

$$C_c = 242.05 + 1.645 * (242.05 / 0.7679)^{(1/2)} + (1 / (2 * 0.7679))$$

$C_c = 271.90$  crashes per 100 MVM

*Critical Injury Rate (Ic)*

$I_c = \text{Injury Crash Average of Similar Sections} + 1.645 * (\text{Injury Crash Average of Similar Sections} / \text{Exposure})^{(1/2)} + (1 / (2 * \text{Exposure}))$

$$I_c = 85.60 + 1.645 * (85.60 / 0.7679)^{(1/2)} + (1 / (2 * 0.7679))$$

$I_c = 103.62$  injuries per 100 MVM

## APPENDIX

# D

HIN Fatal, Severe Injury, and Minor Injury Crash Reports

Crash Data (2015 - 2021) - Connecticut Avenue  
Matthew Henson Trail to Georgia Avenue

ReportNumber	CollisionType	CrashDateTime	LaneDirection	FixedObjectStruck	HarmfulEvent1	Junction	LaneNumber	POLICE_LAT	POLICE_LON	Light	CRASH_HIGHE ST_INJURY	NonMotorist Related	SurfaceCond ition	Weather	ROAD_NAME	REFERENCE_ROADNAME	MilePoint Distance	MilePoint DistUnits	LOGMILE DIR
MCP1168000G	OTHER	2/2/16 10:01 AM	N	N/A	PEDESTRIAN	CROSSOVER RELATED	1	39.08397741	-77.07787201	DAYLIGHT	3	PEDESTRIAN	WET	CLEAR	GEORGIA AVE	CONNECTICUT AVE	300	FEET	N
MCP15650019	SAME DIR REND RIGHT TURN	7/30/15 5:17 PM	S	N/A	OTHER VEHICLE	INTERSECTION	3	39.08207	-77.07983833	DAYLIGHT	3		DRY	CLEAR	CONNECTICUT AVE	ASPEN HILL RD	0	FEET	N
MCP2039001Y	STRAIGHT MOVEMENT ANGLE	9/5/16 12:26 PM	S	OTHER POLE	OTHER VEHICLE	INTERSECTION	2	39.08019485	-77.08065748	DAYLIGHT	3		DRY	CLEAR	CONNECTICUT AVE	ASPEN HILL RD	0	FEET	N
MCP2039005P	HEAD ON LEFT TURN	9/29/19 10:45 AM	N	N/A	BICYCLE	N/A	1	39.08048	-77.08027833	DAYLIGHT	3	BICYCLIST	DRY	CLEAR	CONNECTICUT AVE	ASPEN HILL RD	15	FEET	N
MCP25340020	SINGLE VEHICLE	8/5/17 3:00 AM	N	CURB	FIXED OBJECT	NON INTERSECTION	3	39.07268333	-77.07765667	DARK LIGHTS ON	3		DRY	CLEAR	CONNECTICUT AVE	INDEPENDENCE ST	0.4	MILES	N
MCP2588000R	SAME DIR REAR END	4/14/15 10:48 AM	S	N/A	OTHER VEHICLE	NON INTERSECTION	3	39.08206333	-77.07990833	DAYLIGHT	3		DRY	N/A	CONNECTICUT AVE	ASPEN HILL RD	200	FEET	N
MCP2588002F	SAME DIRECTION SIDESWIPE	4/28/17 9:44 AM	S	N/A	OTHER VEHICLE	NON INTERSECTION		39.081665	-77.07981333	DAYLIGHT	3		DRY	CLEAR	CONNECTICUT AVE	ASPEN HILL RD	400	FEET	N
MCP2992000X	STRAIGHT MOVEMENT ANGLE	10/28/16 9:43 PM	E	N/A	OTHER VEHICLE	INTERSECTION	1	39.078135	-77.08080833	DARK LIGHTS ON	3		N/A	CLEAR	CONNECTICUT AVE	ASPEN HILL RD	0	FEET	N
MCP30500023	SAME DIR REAR END	2/16/18 4:10 PM	S	N/A	OTHER VEHICLE	INTERSECTION RELATED	2	39.08443333	-77.07822833	DARK LIGHTS ON	3		WET	CLEAR	GEORGIA AVE	CONNECTICUT AVE	50	FEET	N
MCP30730049	OTHER	10/20/19 5:30 PM	N	N/A	PEDESTRIAN	INTERSECTION	2	39.07645167	-77.08045167	DAYLIGHT	3	PEDESTRIAN	WET	N/A	CONNECTICUT AVE	INDEPENDENCE ST	0	FEET	N
MCP3073005G	STRAIGHT MOVEMENT ANGLE	2/13/21 6:30 PM	S	CURB	OTHER VEHICLE	INTERSECTION	1	39.08023833	-77.08084333	DARK LIGHTS ON	3		WET	WINTRY MIX	CONNECTICUT AVE	ASPEN HILL RD	0	FEET	N
MCP31300040	SINGLE VEHICLE	9/23/21 7:10 AM	N	OTHER	PEDESTRIAN	INTERSECTION	2	39.08033167	-77.08037	DAWN	3	PEDESTRIAN	WET	RAINING	CONNECTICUT AVE	ASPEN HILL RD	0	FEET	N
MCP3190002N	SINGLE VEHICLE	8/22/21 6:20 AM	W	OTHER TRAFFIC BARRIER	N/A	OTHER	1	39.08334167	-77.07886	DAWN	3		DRY	CLEAR	GEORGIA AVE	CONNECTICUT AVE	0	FEET	N
MCP3279000R	STRAIGHT MOVEMENT ANGLE	6/29/21 6:49 PM	W	N/A	OTHER VEHICLE	INTERSECTION	1	39.07628612	-77.08071604	DAYLIGHT	3		DRY	CLEAR	CONNECTICUT AVE	INDEPENDENCE ST	0	FEET	N
MCP9406001H	SAME DIR REAR END	5/19/17 8:48 PM	S	N/A	OTHER VEHICLE	INTERSECTION RELATED		39.08231333	-77.08218667	DARK LIGHTS ON	3		DRY	CLEAR	CONNECTICUT AVE	ASPEN HILL RD	30	FEET	N
MCP3073002N	SAME DIR REAR END	11/18/18 4:37 PM	S	N/A	OTHER VEHICLE	N/A	3	39.07447	-77.079215	DAYLIGHT	3		N/A	N/A	INDEPENDENCE ST	CONNECTICUT AVE	100	FEET	E
MCP29920021	STRAIGHT MOVEMENT ANGLE	9/27/18 4:15 PM	N	N/A	OTHER VEHICLE	INTERSECTION	3	39.07796833	-77.080665	DAYLIGHT	3		WET	RAINING	CONNECTICUT AVE	ASPEN HILL RD	0	FEET	N
MCP2885001J	SAME DIR REAR END	6/30/16 10:08 PM	S	N/A	OTHER VEHICLE	INTERSECTION RELATED	2	39.08393837	-77.07801819	DARK LIGHTS ON	3		DRY	CLEAR	GEORGIA AVE	CONNECTICUT AVE	15	FEET	N
MCP2746000Y	SAME DIR REAR END	8/7/15 6:16 PM	N	N/A	OTHER VEHICLE	INTERSECTION	1	39.083415	-77.07742833	DAYLIGHT	3		DRY	CLEAR	GEORGIA AVE	CONNECTICUT AVE	0	FEET	N
MCP2992001G	STRAIGHT MOVEMENT ANGLE	9/16/17 7:00 PM	N	N/A	OTHER VEHICLE	INTERSECTION	1	39.07808967	-77.08072917	DUSK	3		DRY	CLEAR	CONNECTICUT AVE	ASPEN HILL RD	0	FEET	N
MCP2948000B	SAME DIR REAR END	5/29/15 6:20 PM	N	N/A	OTHER VEHICLE	INTERSECTION	2	39.0837535	-77.0776471	DAYLIGHT	3		DRY	CLEAR	GEORGIA AVE	CONNECTICUT AVE	0	FEET	N
MCP28230015	STRAIGHT MOVEMENT ANGLE	3/23/15 6:26 PM	S	N/A	OTHER VEHICLE	NON INTERSECTION	2	39.08027	-77.08017167	DAYLIGHT	3		DRY	CLEAR	ASPEN HILL RD	CONNECTICUT AVE	500	FEET	N
MCP2725000R	SINGLE VEHICLE	4/14/15 10:24 PM	N	N/A	PEDESTRIAN	INTERSECTION	1	39.08391667	-77.07775833	DARK LIGHTS ON	3	PEDESTRIAN	WET	RAINING	GEORGIA AVE	CONNECTICUT AVE	0	FEET	N
MCP3225000G	SAME DIR REAR END	5/4/20 3:30 PM	S	N/A	OTHER VEHICLE	NON INTERSECTION	1	39.08525475	-77.07860584	DAYLIGHT	3		DRY	CLEAR	GEORGIA AVE	CONNECTICUT AVE	600	FEET	N
MCP3078002K	SINGLE VEHICLE	12/8/18 9:35 PM	S	N/A	PEDESTRIAN	INTERSECTION		39.08388	-77.077535	DARK LIGHTS ON	3	PEDESTRIAN	DRY	CLEAR	GEORGIA AVE	CONNECTICUT AVE	0	FEET	N
MCP3023003D	SAME DIR REAR END	10/16/19 2:35 PM	S	N/A	OTHER VEHICLE	INTERCHANGE RELATED	2	39.084484	-77.07843433	DAYLIGHT	3		WET	RAINING	GEORGIA AVE	CONNECTICUT AVE	0	FEET	N
MCP2966002N	HEAD ON	1/25/17 3:30 PM	W	N/A	OTHER VEHICLE	INTERSECTION		39.08020734	-77.08043218	DAYLIGHT	3		DRY	CLEAR	ASPEN HILL RD	CONNECTICUT AVE	0	FEET	N
MCP2917001D	SAME DIR REAR END	10/31/16 7:02 PM	S	N/A	OTHER VEHICLE	INTERSECTION	3	39.08040667	-77.08064	DARK LIGHTS ON	3		DRY	CLEAR	CONNECTICUT AVE	ASPEN HILL RD	0	FEET	N
MCP2782001D	SAME DIRECTION SIDESWIPE	2/17/16 12:14 PM	N	N/A	OTHER VEHICLE	INTERSECTION RELATED	1	39.080965	-77.079845	DAYLIGHT	3		DRY	CLEAR	CONNECTICUT AVE	ASPEN HILL RD	20	FEET	N
MCP2612001K	OTHER	11/28/16 5:21 PM	N	N/A	PEDESTRIAN	INTERSECTION	2	39.08044333	-77.08018333	DARK LIGHTS ON	3	PEDESTRIAN	DRY	CLEAR	CONNECTICUT AVE	ASPEN HILL RD	0	FEET	N
MCP2588000W	OTHER	6/12/15 1:57 PM	S	N/A	PEDESTRIAN	INTERSECTION RELATED	3	39.08431333	-77.078245	DAYLIGHT	3	PEDESTRIAN	DRY	CLEAR	GEORGIA AVE	CONNECTICUT AVE	20	FEET	N
MCP1123000Q	SAME DIR REAR END	3/16/15 7:14 AM	S	N/A	OTHER VEHICLE	NON INTERSECTION	1	39.08169833	-77.07986167	DUSK	4		DRY	CLEAR	CONNECTICUT AVE	ASPEN HILL RD	400	FEET	N
MCP3073002T	OTHER	12/22/18 3:45 PM	S	N/A	PEDESTRIAN	INTERSECTION	2	39.07981	-77.08098167	DAYLIGHT	3	PEDESTRIAN	N/A	N/A	ASPEN HILL RD	CONNECTICUT AVE	0	FEET	N
MCP2966001B	STRAIGHT MOVEMENT ANGLE	11/18/15 8:22 AM	N	N/A	OTHER VEHICLE	INTERSECTION	1	39.08149667	-77.07972	DAYLIGHT	3		DRY	CLEAR	CONNECTICUT AVE	ASPEN HILL RD	0	FEET	N
MCP2753002N	HEAD ON LEFT TURN	7/21/17 8:47 AM	N	N/A	OTHER VEHICLE	INTERSECTION	1	39.07628455	-77.08068967	DAYLIGHT	3		DRY	CLEAR	CONNECTICUT AVE	INDEPENDENCE ST	0	FEET	N
MCP27470014	STRAIGHT MOVEMENT ANGLE	8/10/15 8:45 PM	S	N/A	PEDESTRIAN	INTERSECTION RELATED	4	39.0841	-77.08213833	DARK LIGHTS ON	3	PEDESTRIAN	WET	CLOUDY	GEORGIA AVE	CONNECTICUT AVE	0	FEET	N
MCP3124001J	OTHER	11/23/18 6:00 PM	S	N/A	OTHER VEHICLE	N/A	1	39.08024052	-77.08069878	DARK -- UNKNOWN LIGHTING	3	PEDESTRIAN	DRY	CLEAR	CONNECTICUT AVE	ASPEN HILL RD	5	FEET	N
MCP2722001P	SAME DIR REAR END	7/14/16 1:24 PM	N	N/A	OTHER VEHICLE	INTERSECTION RELATED		39.076435	-77.08075667	DAYLIGHT	4		DRY	CLEAR	CONNECTICUT AVE	INDEPENDENCE ST	10	FEET	N
MCP2617009M	STRAIGHT MOVEMENT ANGLE	6/21/21 7:45 PM	N	OTHER POLE	OTHER VEHICLE	INTERSECTION	3	39.08388211	-77.07767681	DUSK	3		WET	CLOUDY	GEORGIA AVE	CONNECTICUT AVE	0	FEET	N
MCP1119009G	OTHER	12/3/21 8:18 AM	N	N/A	PEDESTRIAN	INTERSECTION	3	39.08398667	-77.07765833	DAYLIGHT	3	PEDESTRIAN	N/A	CLEAR	GEORGIA AVE	CONNECTICUT AVE	0	FEET	N
MCP2182000P	OTHER	5/6/17 3:08 PM	W	OTHER	OTHER VEHICLE	NON INTERSECTION	2	39.08392172	-77.07725644	DAYLIGHT	3		WET	RAINING	CONNECTICUT AVE	GEORGIA AVE	375	FEET	N
MCP2997000N	SINGLE VEHICLE	1/28/17 4:38 AM	S	CURB	FIXED OBJECT	NON INTERSECTION	3	39.08380667	-77.07747167	DARK LIGHTS ON	3		DRY	CLEAR	CONNECTICUT AVE	GEORGIA AVE	10	FEET	N
MCP27220033	SINGLE VEHICLE	2/6/19 6:45 PM	N	N/A	PEDESTRIAN	INTERSECTION	2	39.08376417	-77.07760769	DARK LIGHTS ON	3	PEDESTRIAN	WET	RAINING	CONNECTICUT AVE	GEORGIA AVE	0	FEET	N
MCP3050000J	SINGLE VEHICLE	4/4/17 8:24 AM	N	CURB	OTHER	INTERSECTION	3	39.08393167	-77.07767333	DAYLIGHT	4		WET	RAINING	CONNECTICUT AVE	GEORGIA AVE	0	FEET	N
MCP136600BK	STRAIGHT MOVEMENT ANGLE	12/1/21 5:02 PM	S	N/A	PEDESTRIAN	INTERSECTION	3	39.08410333	-77.07764833	DARK LIGHTS ON	4	PEDESTRIAN	DRY	CLOUDY	CONNECTICUT AVE	GEORGIA AVE	0	FEET	N
MCP2001000R	SINGLE VEHICLE	7/18/17 9:23 PM	S	N/A	PEDESTRIAN	INTERSECTION	2	39.08211036	-77.0797348	DARK LIGHTS ON	4	PEDESTRIAN	DRY	CLEAR	CONNECTICUT AVE	GEORGIA AVE	0	FEET	N
MCP2783000P	ANGLE MEETS RIGHT TURN	8/6/15 11:19 PM	S	N/A	OTHER VEHICLE	INTERSECTION	3	39.07672833	-77.13983833	DARK LIGHTS ON	3		WET	RAINING	CONNECTICUT AVE	GEORGIA AVE	0	FEET	N
MCP0539003R	SAME DIR REAR END	1/11/18 9:28 AM	N	N/A	OTHER VEHICLE	OTHER	1	39.07794833	-77.08081667	DAYLIGHT	3		WET	CLOUDY	CONNECTICUT AVE	ENT TO ASPEN HILLS SHOPPING CTR	0	FEET	N
MCP3073003W	SAME DIR REAR END	7/20/19 3:57 PM	N	N/A	OTHER VEHICLE	INTERSECTION	1	39.07792167	-77.08079167	DAYLIGHT	3		N/A	N/A	CONNECTICUT AVE	ENT TO ASPEN HILLS SHOPPING CTR	0	FEET	N
MCP3118000H	HEAD ON LEFT TURN	4/16/18 10:31 AM	E	N/A	OTHER VEHICLE	INTERSECTION		39.07818333	-77.080495	DAYLIGHT	3		WET	RAINING	CONNECTICUT AVE	ENT TO ASPEN HILLS SHOPPING CTR	0	FEET	N
MCP30230046	STRAIGHT MOVEMENT ANGLE	8/6/21 9:00 AM	S	N/A	OTHER VEHICLE	OTHER DRIVEWAY	1	39.078112	-77.08074217	DAYLIGHT	3		DRY	CLEAR	CONNECTICUT AVE	ENT TO ASPEN HILLS SHOPPING CTR	0	FEET	N
MCP29660011	ANGLE MEETS RIGHT TURN	9/13/15 1:54 PM	S	N/A	OTHER VEHICLE	INTERSECTION RELATED	2	39.07813	-77.08099333	DAYLIGHT	3		DRY	CLEAR	CONNECTICUT AVE	ENT TO ASPEN HILLS SHOPPING CTR	0	FEET	N
MCP27820018	STRAIGHT MOVEMENT ANGLE	11/10/15 8:15 AM	S	N/A	OTHER VEHICLE	INTERSECTION	1	39.08195333	-77.07978667	DAYLIGHT	3		WET	RAINING	CONNECTICUT AVE	ENT TO BUSINESS	0	FEET	N
MCP2039004N	STRAIGHT MOVEMENT ANGLE	11/3/18 11:35 AM	N	CURB	OTHER VEHICLE	INTERSECTION	2	39.07844833	-77.08079667	DAYLIGHT	4		DRY	CLOUDY	CONNECTICUT AVE	ENT TO ASPEN HILLS SHOPPING CTR	0	FEET	N
MCP25130003	SAME DIR REAR END	12/14/15 4:10 PM	N	N/A	OTHER VEHICLE	INTERSECTION RELATED	3	39.08437	-77.07786167	DAYLIGHT	3		DRY	CLOUDY	GEORGIA AVE	CONNECTICUT AVE	0	FEET	N
MCP3014000P	STRAIGHT MOVEMENT ANGLE	6/26/16 3:14 AM	S	N/A	PEDESTRIAN	N/A	1	39.08314096	-77.07761317	DARK LIGHTS ON	3	PEDESTRIAN	DRY	CLEAR	GEORGIA AVE	CONNECTICUT AVE	200	FEET	N
MCP2516000R	SAME DIRECTION LEFT TURN	3/18/16 3:06 PM	N	N/A	OTHER VEHICLE	NON INTERSECTION	3	39.09453833	-77.07784667	DAYLIGHT	3		DRY	CLEAR	GEORGIA AVE	CONNECTICUT AVE	10	FEET	N

## APPENDIX

# E

Photographs

Missing pedestrian warning sign (W11-2) (Issue 2.02)



Pedestrian crossing midblock, east of intersection (Issue 1.02)



Damaged sign in northeast corner (Issue 2.03)



Damaged sidewalk in northeast corner (Issue 2.12)



High Mounting Height for Pedestrian Push Button in Southwest Corner (Issue 2.14)



No sidewalk buffer on the west side of Connecticut Avenue (Issue 1.03)



Bus shelter creates 90 degree turn in sidewalk (Issue 5.06)





No continental crosswalks across Connecticut Avenue (Issue 5.01)



No warning signs for pedestrian and left turning vehicle conflicts (Issue 5.03)



Overgrown vegetation reducing available sidewalk width on the west side (Issue 7.02)



Intersection warning signs for the Aspen Hill Shopping Center misstate geometry Issue (Issue 6.01)



Damaged sign in median at Aspen Hill Shopping Center (Issue 6.02)



Exposed Drainage Structure (Issue 6.03)



### Connecticut Avenue High Injury Network Report

Figure E5

Connecticut Avenue between Aspen Hill Road and Independence Street



**Pedestrian crossing against signal on north leg (Issue 7.04)**



**Northwest corner pedestrian ramps are poorly aligned from east leg crossing (Issue 7.06)**



**No marked crosswalk on east leg (Issue 7.05)**



**No marked crosswalk on south leg (Issue 7.05)**



## APPENDIX

# F

MD 97 (Georgia Avenue) and MD 185 (Connecticut Avenue) HIN Study Support  
– Operational Analysis



# MEMORANDUM

700 East Pratt Street, Suite 500  
Baltimore, MD 21202  
Phone 410.728.2900  
Fax 410.728.2834

**Date:** July 1, 2022  
**To:** Mr. Eric Sideras, P.E.  
Montgomery County Department of Transportation  
**From:** William Wu, P.E., PTOE, Project Manager, RK&K  
Kylie Snyder, P.E. PTOE, Project Engineer, RK&K  
**Reference:** MD 97 and MD 185 HIN Studies  
**Subject:** MD 97 (Georgia Ave) and MD 185 (Connecticut Avenue) HIN Study Support – Operational Analysis

---

## **INTRODUCTION**

The purpose of this memorandum is to document the data, analysis, findings, and conclusions of a traffic operations study along MD 97 (Georgia Avenue) and MD 185 (Connecticut Avenue) in Aspen Hill, Maryland. High Injury Network (HIN) studies were conducted in 2021/2022 for MD 97 from Bel Pre Road to Hewitt Avenue, and for MD 185 from MD 97 to the Matthew Henson Trail (south of Independence Street). These studies recommended operational changes to improve pedestrian and vehicular safety, such as restricting turns on red, modifying vehicular phasing changes, installing Leading Pedestrian Intervals (LPis), and implementing geometric changes. The objective of this study is to determine the capacity and queuing impacts associated with various improvements recommended as part of recent corridor studies, for Existing and Future year 2040 conditions.

## **STUDY AREA**

The study area includes seven (7) signalized intersections and six (6) unsignalized intersections (including major driveways along MD 97 and the Home Depot Driveway along MD 185). The study area is shown in **Figure 1**.

MD 97 is a six-lane, divided State-owned roadway that runs in the north-south direction. The posted speed limit is 45 mph from Bel Pre Rd to MD 185, and 35 mph from MD 185 to Hewitt Ave.

MD 185 is a six-lane, divided State-owned roadway that also runs in the north-south direction with a posted speed limit of 45 mph.

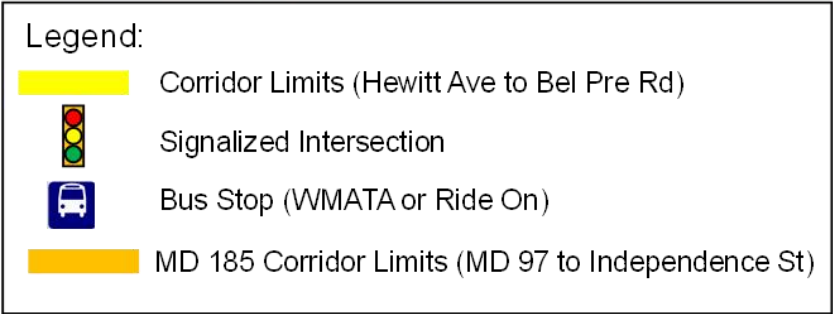
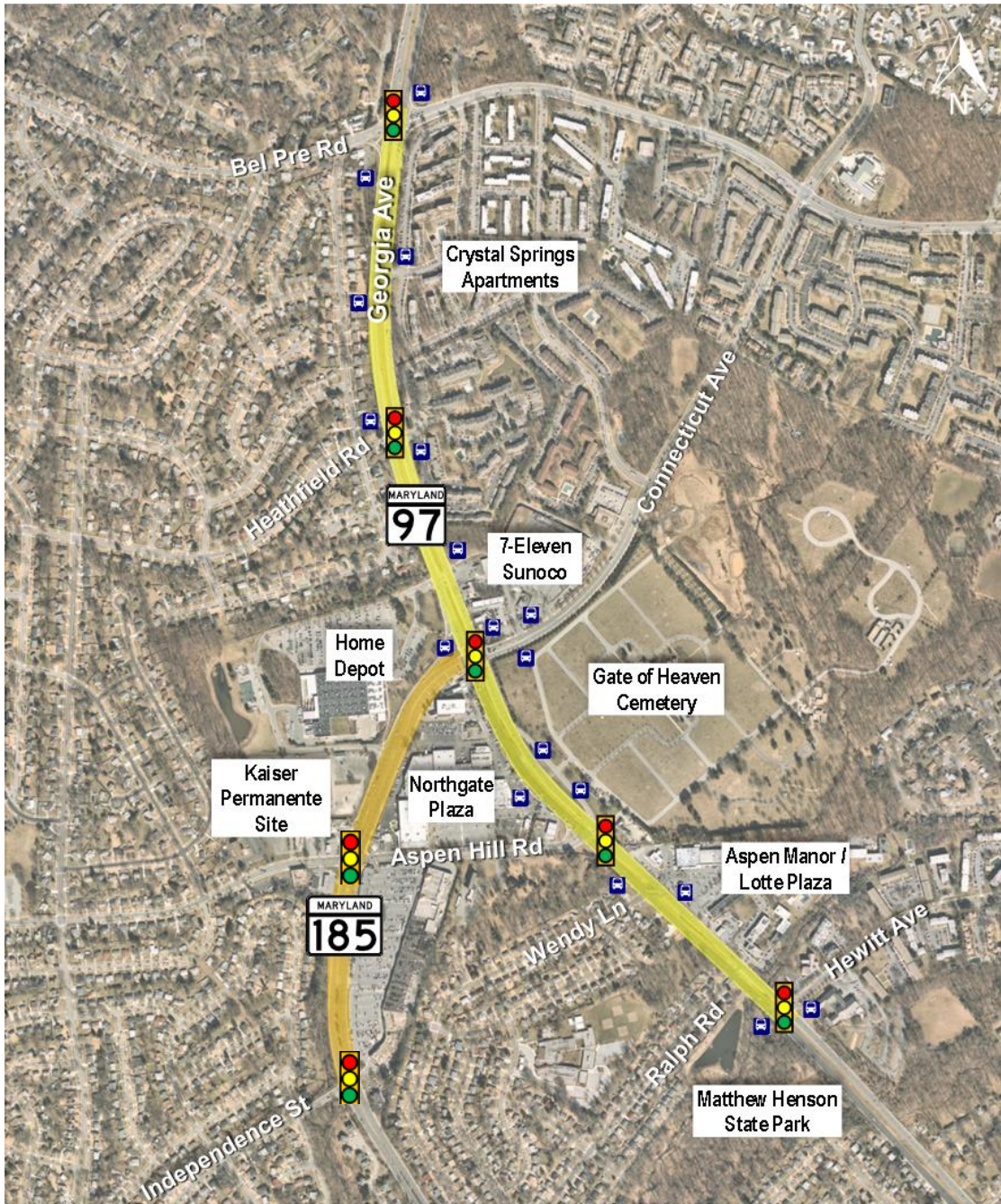


Figure 1: Study Area

## Traffic Volumes

### *Existing Conditions*

AM and PM peak hour turning movement volumes for the study corridor were based on traffic counts collected in December 2018 and November 2019 as part of the December 2019 *Kaiser Aspen Hill Local Transportation Area Review*, and counts collected on Wednesday, September 21, 2021. Volumes were balanced throughout the network, and the resultant existing 2021 peak hour volumes used in this analysis are shown in **Figure 2**. Existing lane use at the study intersections is shown in **Figure 3**.

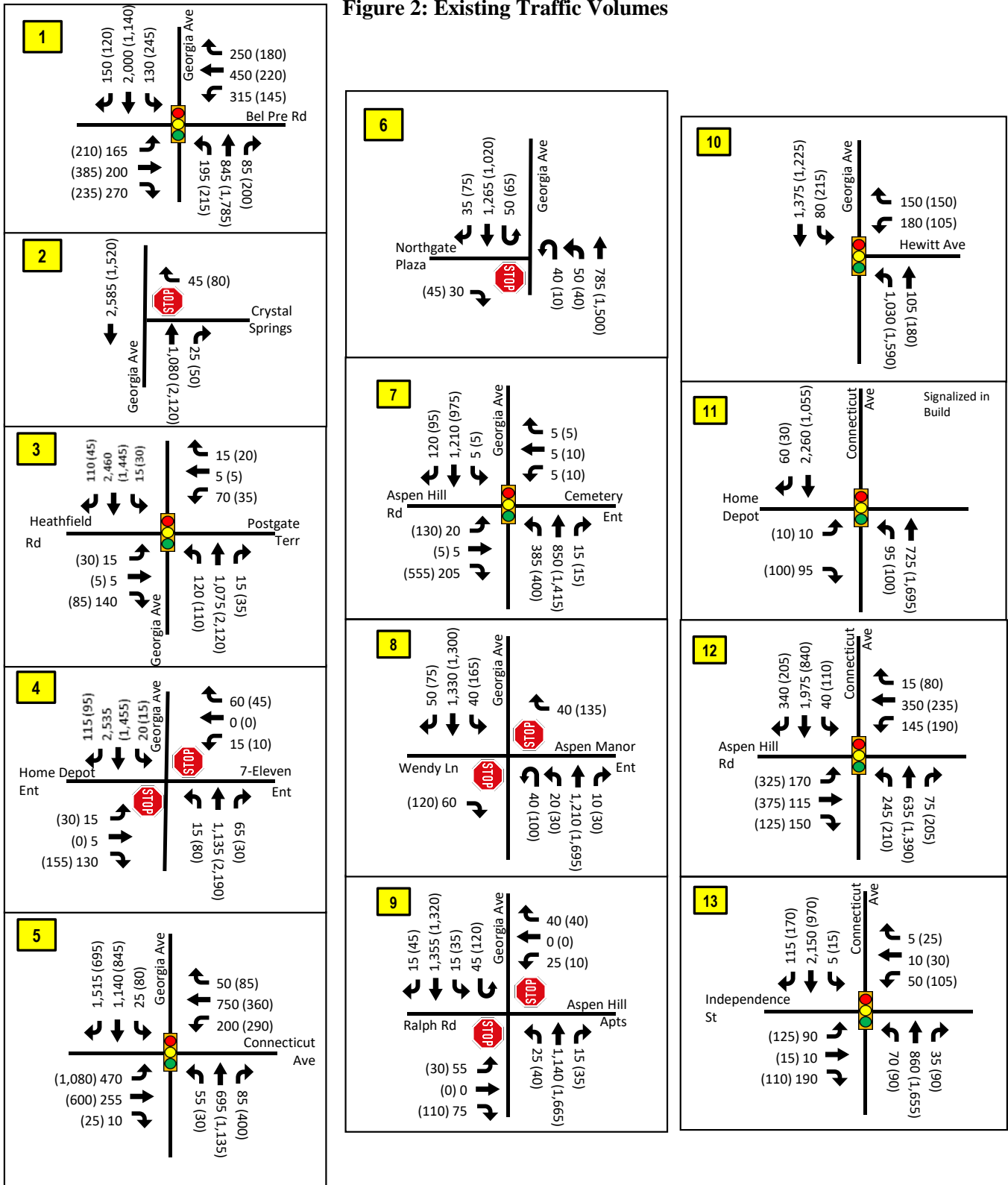
Please note that due to the COVID-19 pandemic and its effect on traffic volumes, peak hour turning movement counts from 2018 and 2019 were used as a basis for this study (counts from September 2021 were used as a supplemental data resource). These pre-COVID counts were used in an effort to analyze a more conservative scenario that does not reflect traffic conditions impacted by the pandemic, which have been more variable, but are largely rebounding toward pre-COVID levels. Traffic count data is provided in **Appendix A**.

### *Future 2040 Conditions*

To develop future year 2040 volumes, nearby background development net new vehicle trips were first added to existing 2021 volumes, based on trip distributions found in the Traffic Impact Studies for each development's Local Area Transportation Review. The background developments included the Montgomery County Humane Society Campus (to be located in the SW quadrant of the MD 97/Aspen Hill Road intersection), and the Kaiser Permanente Aspen Hill Development (to be located along the west side of MD 185, with access points via the existing Home Depot Driveway and on Aspen Hill Road). These developments are planned but not yet built (they were assumed to be built out by year 2040). Additionally, the MWCOG regional travel demand model was used to apply annual regional growth rates of 0.25% to the MD 97 corridor, and 0.20% to the MD 185 corridor. The resultant 2040 volumes were balanced throughout the network, and are shown in **Figure 4**.



Figure 2: Existing Traffic Volumes





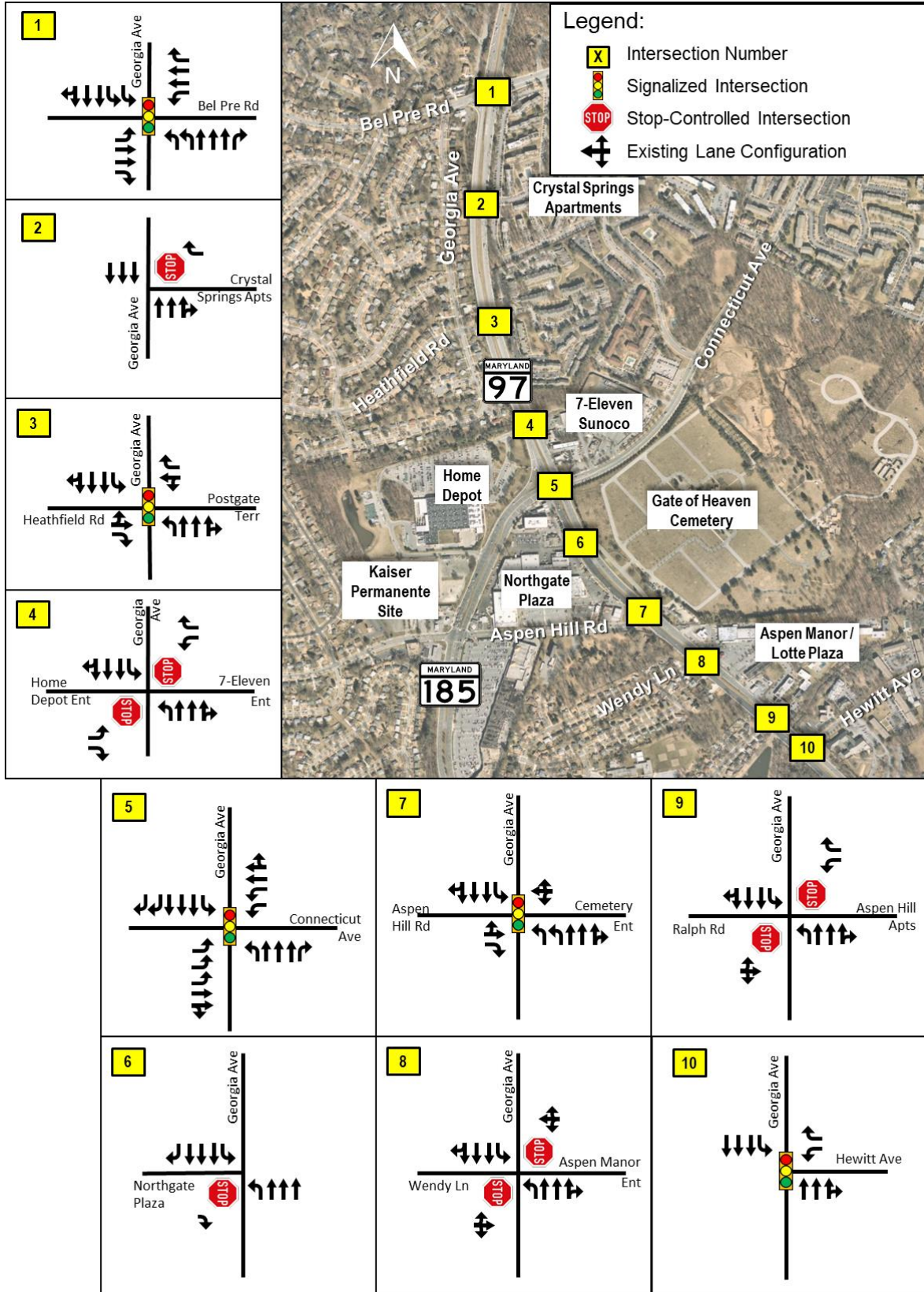


Figure 3: Existing Lane Use and Traffic Control

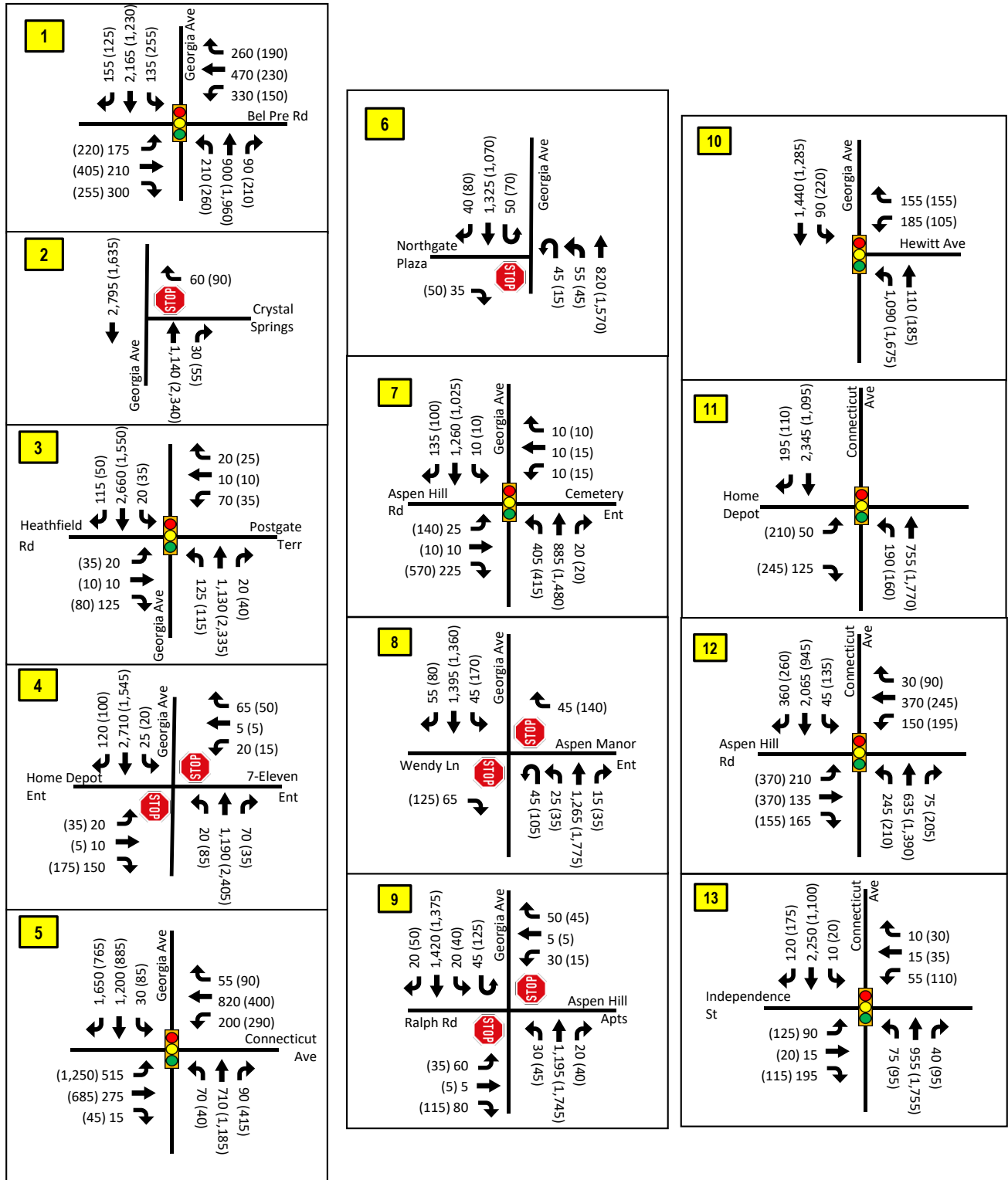


Figure 4: Future 2040 No-Build Volumes

### **Synchro and SimTraffic Analysis**

Synchro 11 software, and the companion simulation software SimTraffic were used to evaluate Existing and Future year 2040 traffic operations conditions for the MD 97 and MD 185 roadway network. The measures of effectiveness (MOEs) evaluated include Level of Service (LOS) and delay for the AM and PM peak hours. The results of the capacity analysis are found in the following sections for Existing and Future 2040 conditions.

SimTraffic, a microsimulation model within the Synchro software package, was also used to obtain detailed queuing data. The queuing analysis results are based on an average of five one-hour simulation runs. MOEs evaluated include average queues and 95<sup>th</sup> percentile queues for the AM and PM peak hours.

### **Existing No-Build Condition - Traffic Analysis**

The Existing No-Build condition assumes roadway geometry and signal timings as observed in the field as of 2021/2022, as well as balanced existing traffic volumes. The results of the capacity and queuing analyses for the Existing No-Build condition are summarized in **Table 1**. The results indicate that while there are several failing movements and approaches throughout the network, all signalized intersections operate at LOS E or better in the AM peak period and operate at LOS D or better in the PM peak period. Several unsignalized intersections experienced LOS F conditions in the AM and/or PM peak period, primarily due to side street turning vehicles waiting for gaps in traffic along MD 97 and MD 185 to turn. It should be noted that delays (and queues) for side street left turning vehicles at unsignalized intersections in general may not be as high as that shown in the results tables. This is because the wider medians along MD 97 and MD 185 allow left turning vehicles to complete their turns in two stages (vehicles will store in the median to complete their turns). Synchro software cannot properly model two stage left turns, so delays (and subsequent queues) are calculated based on needing to make a one stage left turn, which can result in values higher than those expected in the field. It should also be noted that delays for the westbound approach along Independence Street at MD 185 are shown as significant (> 150 seconds) during the AM peak. Actual delays for this movement are likely lower as vehicles tend to cross into the intersection when waiting for gaps in eastbound traffic; however, Synchro software has difficulty modeling this behavior, instead having westbound vehicles wait at the stop bar to find gaps. The result is that very few westbound vehicles are processed each cycle, leading to delays that would not likely materialize to that extent in the field.

Southbound through queues along MD 97 at MD 185 extend back to the Home Depot/7-Eleven driveway unsignalized intersection, as observed in the field. Similarly, through queues on the southbound approach of MD 185 at Aspen Hill Rd extend past the Home Depot driveway unsignalized intersection on MD 185, as observed in the field. Several turning movement queues throughout the network also exceed available storage bay lengths during the AM and/or PM peak hours.



**Table 1: Existing Conditions Capacity and Queuing Analysis**

Movement	AM Peak					PM Peak					
	Delay (s)	LOS	Average Queue (ft)	95 <sup>th</sup> Queue (ft)	Storage Length	Delay (s)	LOS	Average Queue (ft)	95 <sup>th</sup> Queue (ft)	Storage Length	
MD 97 at Bel Pre Rd	EBL	64	E	125	200	180	66	E	175	250	180
	EBT	68	E	100	200	-	79	E	250	600**	-
	EBR	<1	A	<265	<265	265	<1	A	<265	<265	265
	EB	38	D	-	-	-	53	D	-	-	-
	WBL	90	F	225	350	280	65	E	100	200	280
	WBT	80	E	250	475	-	71	E	100	175	-
	WBR	<1	A	<150	<150	150	<1	A	<150	<150	150
	WB	63	E	-	-	-	46	D	-	-	-
	NBL	82	F	100	200	455	109	F	100	200	455
	NBT	31	C	150	250	900	33	C	325	500	900
	NBR	>150	F	<200	<200	200	9	A	<200	<200	200
	NB	51	D	-	-	-	39	D	-	-	-
	SBL	85	F	50	100	560	89	F	100	150	560
	SBT	51	D	675	1,075	-	33	C	175	275	-
	SBR	29	C	<40	<40	40	25	C	<40	<40	40
SB	51	D	-	-	-	41	D	-	-	-	
<b>Overall</b>	<b>52</b>	<b>D</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>43</b>	<b>D</b>	<b>-</b>	<b>-</b>	<b>-</b>	
MD 97 at Crystal Springs Apartment	WB	9	A	25	50	225	9	A	50	100	225
	SB	0	-	75	500	900	0	-	<25	125	900
	<b>Overall</b>	<b>9</b>	<b>A</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>9</b>	<b>A</b>	<b>-</b>	<b>-</b>	<b>-</b>
MD 97 at Heathfield Rd/Postgate Terrace	EB	68	E	200	400	350	88	F	100	225	350
	WB	<150	F	125	250	250	106	F	50	125	250
	NBL	77	E	100	200	350	5	A	50	100	350
	NBTR	16	B	125	250	850	2	A	100	200	850
	NB	22	C	-	-	-	2	A	-	-	-



	SBL	3	A	<25	25	350	18	B	25	50	350
	SBTR	8	A	125	250	1,025	9	A	150	325	1,025
	SB	8	A	-	-	-	9	A	-	-	-
	<b>Overall</b>	<b>23</b>	<b>C</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>9</b>	<b>A</b>	<b>-</b>	<b>-</b>	<b>-</b>
MD 97 at Home Depot Ent/7-Eleven	EBLT	>150	F	25	75	1,100	138	F	25	75	1,100
	EBR	12	B	50	75	1,100	11	B	75	150	1,100
	EB	71	F	-	-	-	31	D	-	-	-
	WBLT	32	D	25	50	100	>150	F	25	50	100
	WBR	9	A	25	50	100	9	A	25	75	100
	WB	14	B	-	-	-	127	F	-	-	-
	NBL	22	C	25	25	250	14	B	50	75	250
	SBL	11	-	<25	25	235	21	C	<25	25	235
	SB	<1	-	25	250	850	<1	-	<25	25	850
<b>Overall</b>	<b>&gt;150</b>	<b>F</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>&gt; 150</b>	<b>F</b>	<b>-</b>	<b>-</b>	<b>-</b>	
MD 97 at MD 185	EBL	91	F	175	250	425	54	D	300	400	425
	EBTR	90	F	125	200	1,350	49	D	200	325	1,350
	EB	91	F	-	-	-	52	D	-	-	-
	WBL	65	E	100	225	280	87	F	125	200	280
	WBLTR	72	E	325	450	-	76	E	200	325	-
	WB	71	E	-	-	-	79	E	-	-	-
	NBL	103	F	50	100	330	118	F	25	75	330
	NBT	31	C	125	200	675	40	D	225	425	675
	NBR	72	E	25	75	280	24	D	150	300**	280
	NB	40	D	-	-	-	38	D	-	-	-
	SBL	28	C	25	125	200	40	D	100	225	200
	SBT	32	C	300	500	475	42	D	225	350	475
SB	32	C	-	-	-	42	D	-	-	-	
<b>Overall</b>	<b>56</b>	<b>E</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>50</b>	<b>D</b>	<b>-</b>	<b>-</b>	<b>-</b>	
MD 97 at Northgate Plaza	EBR	9	A	25	50	250	9	A	25	50	250
	NBUL	10	B	50	100	175	9	A	25	50	175
	SBUL	0	-	25	50	150	0	-	50	100	150
	<b>Overall</b>	<b>10</b>	<b>B</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>9</b>	<b>A</b>	<b>-</b>	<b>-</b>	<b>-</b>
	EBLT	69	E	25	50	900	70	E	150	250	900



MD 97 at Aspen Hill Rd	EBR	52	D	100	175	900	80	F	375	575	900
	EB	54	D	-	-	-	78	E	-	-	-
	WBLTR	99	F	25	50	215	95	F	25	75	215
	NBL	97	F	200	275	250	72	E	175	250	250
	NBTR	11	B	75	175	470	8	A	100	250	470
	NB	38	D	-	-	-	22	C	-	-	-
	SBL	122	F	<25	25	190	129	F	<25	25	190
	SBT	11	B	75	175	475	14	B	125	225	475
	SBR	1	A	<70	<70	70	46	D	<70	<70	70
	SB	11	B	-	-	-	17	B	-	-	-
<b>Overall</b>	<b>29</b>	<b>C</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>32</b>	<b>C</b>	<b>-</b>	<b>-</b>	<b>-</b>	
MD 97 at Wendy Ln	EBR	9	A	25	50	-	9	A	200	450	-
	WBR	9	A	25	50	-	9	A	50	100	-
	NBUL	11	B	25	75	200	12	B	75	150	200
	SBL	12	B	25	50	150	21	D	100	200	150
	<b>Overall</b>	<b>12</b>	<b>B</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>21</b>	<b>D</b>	<b>-</b>	<b>-</b>	<b>-</b>
MD 97 at Ralph Rd	EB*	24	C	50	75	-	13	B	75	250	-
	WBLTR	17	C	50	100	370	28	D	50	125	370
	NBL	11	B	<25	25	125	12	B	25	50	125
	SBUL	11	B	25	75	175	15	B	75	150	175
	<b>Overall</b>	<b>24</b>	<b>C</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>28</b>	<b>D</b>	<b>-</b>	<b>-</b>	<b>-</b>
MD 97 at Hewitt Ave	WBL	85	F	100	125	90	79	E	75	125	90
	WBR	66	E	200	400	435	72	E	100	200	435
	WB	77	E	-	-	-	75	E	-	-	-
	NBTR	11	B	150	275	-	15	B	225	400	-
	SBL	6	A	50	100	140	35	E	125	175	140
	SBT	4	A	125	225	350	5	A	125	275	350
	SB	4	A	-	-	-	9	A	-	-	-
	<b>Overall</b>	<b>15</b>	<b>B</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>18</b>	<b>B</b>	<b>-</b>	<b>-</b>	<b>-</b>
MD 185 at Independence St	EBL	79	E	75	150	100	79	E	100	150	100
	EBTR	72	E	125	225	-	64	175	175	400**	-
	EB	74	E	-	-	-	71	E	-	-	-
	WB	>150	F	50	125	-	118	F	150	225	-



	NBL	86	F	50	125	250	87	F	100	175	250
	NBTR	6	A	50	150	-	14	B	175	275	-
	NB	12	B	-	-	-	18	B	-	-	-
	SBL	107	F	0	0	270	106	F	<25	25	270
	SBTR	5	A	50	250	1,325	8	A	50	100	1,325
	SB	5	A	-	-	-	9	A	-	-	-
	<b>Overall</b>	<b>18</b>	<b>B</b>	-	-	-	<b>23</b>	<b>C</b>	-	-	-
MD 185 at Aspen Hill Rd	EBL	71	E	125	225	300	60	E	225	350	300
	EBTR	66	E	150	275	-	72		275	425	-
	EB	68	E	-	-	-	67	E	-	-	-
	WBL	60	E	75	200	410	60	E	150	250	410
	WBTR	76	E	125	275	450	73	E	100	200	450
	WB	72	E	-	-	-	68	E	-	-	-
	NBL	97	F	125	200	350	92	F	125	200	350
	NBT	18	B	75	150	1,325	33	C	250	325	1,325
	NBR	12	B	<25	25	350	19	B	25	100	350
	NB	38	D	-	-	-	38	D	-	-	-
	SBL	89	F	25	75	650	81	F	100	175	325
	SBTR	53	D	575	1,400	650	54	D	325	450	650
	SB	54	D	-	-	-	57	E	-	-	-
<b>Overall</b>	<b>53</b>	<b>D</b>	-	-	-	<b>53</b>	<b>D</b>	-	-	-	
MD 185 at Home Depot (MD 185 is NB/SB)***	EBL	-	-	25	100	600	-	-	<25	25	600
	EBR	-	-	25	125	600	-	-	<25	25	600
	NBL	-	-	100	175	215	-	-	25	75	215
	SBT	-	-	175	775	775	-	-	0	<25	775
	SBR	-	-	75	350	775	-	-	-	-	775
	<b>Overall</b>	-	-	-	-	-	-	-	-	-	-

- Indicates that the queue exceeds storage capacity

\*A right-turn lane was provided for the software analysis due to the limitation of cars being capable of making a 2-stage left-turn in Synchro/SimTraffic. The right-turn lane results were taken in this case.

\*\*Queue results from adjacent lane queue spillover

\*\*\*HCM LOS and delay results are not available for MD 185 at Home Depot Driveway, due to HCM modeling limitations.

### Existing Build Condition – Traffic Analysis

This analysis considered numerous potential operational recommendations for the MD 97 and MD 185 corridors. Operational treatments considered were based on those identified in the MCDOT's 2021/2022 field reviews of the MD 97 and MD 185 HIN corridors, recent MDOT SHA improvements implemented since the MD 97 and MD 185 HIN field reviews, the 2011 MD 185 Pedestrian Road Safety Audit (PRSA), and Maryland National Capital Park and Planning Commission's (MNCPPC) 2019 Aspen Hill Vision Zero Study. Given the magnitude of operational recommendations proposed from these studies, it was necessary to understand the cumulative impact these recommendations would have on the MD 97 and MD 185 corridors together. An iterative process was undertaken in Synchro/SimTraffic to determine the combination of recommendations that could be implemented under Existing (and Future 2040) conditions without significantly degrading roadway operations as compared to the No-Build conditions. Excessive queuing that could lead to frequently blocked intersections, turning bays, and turning movements (as compared to existing conditions) was intended to be avoided to the extent possible. The following list of recommended improvements were analyzed in Synchro/SimTraffic using existing (2021) volumes and the results are summarized in **Table 2**.

#### *Networkwide*

- Traffic signal timing and offset optimization

#### *MD 97 at Heathfield Rd/Postgate Terrace*

- Protected only left-turn signal phasing – northbound and southbound MD 97 approaches
- No Turn on Red – all approaches

#### *MD 97 at MD 185*

- Protected only left-turn phasing – southbound MD 97 approach
- No Turn on Red – northbound MD 97, northbound MD 185, and southbound MD 185 approaches
- Right-turn overlap signal phasing – northbound MD 97 approach (concurrent with southbound MD 185 phasing)
- Extend pedestrian crossing times for the west (crossing MD 185), north, and south legs (crossing MD 97) to meet MdmUTC requirements for a 3.5 ft/s walking speed
- Lead Pedestrian Interval (LPI) – east leg crossing (crossing Connecticut Avenue)

#### *MD 97 at Hewitt Ave*

- Protected only left-turn phasing – southbound MD 97 approach
- No Turn on Red – northbound MD 97 approaches
- Lead Pedestrian Interval (LPI) – north leg crossing (crossing MD 97) and east leg crossing (crossing Hewitt Avenue)



- Reduce the signal cycle length to 120 seconds

*MD 185 at Home Depot Driveway (currently unsignalized)*

- Install a full-color traffic signal with a 180-second cycle length, remove right turn channelization on the southbound MD 97 and eastbound Home Depot Driveway approaches, and install a 100 foot eastbound right-turn storage lane on the Home Depot Driveway approach (recommended following the 2019 Kaiser Aspen Hill Local Area Transportation Review)
- Right-turn overlap signal phasing – eastbound Home Depot Driveway approach (concurrent with northbound MD 185 phasing); southbound MD 185 approach (concurrent with eastbound Home Depot Driveway phasing)
- Protected only left-turn signal phasing – northbound MD 185

*MD 185 at Aspen Hill Rd*

- No Turn on Red – all approaches
- Lead Pedestrian Interval (LPI) – north and south leg crossings (crossing MD 185)

*MD 185 at Independence St*

- No Turn on Red – all approaches
- Lead Pedestrian Interval (LPI) – all legs



**Table 2: Existing Build Alternatives Capacity and Queuing Analysis**

Movement	AM Peak					PM Peak					
	Delay (s)	LOS	Average Queue (ft)	95 <sup>th</sup> Queue (ft)	Storage Length	Delay (s)	LOS	Average Queue (ft)	95 <sup>th</sup> Queue (ft)	Storage Length	
MD 97 at Bel Pre Rd	EBL	70	E	125	200	180	71	E	150	250	180
	EBT	67	E	100	225	-	78	E	200	450	-
	EBR	<1	A	<265	<265	265	<1	A	<265	<265	265
	EB	39	D	-	-	-	54	D	-	-	-
	WBL	108	F	250	375	280	103	F	100	200	280
	WBT	79	E	375	800	-	80	F	100	175	-
	WBR	<1	A	<150	<150	150	<1	A	<150	<150	150
	WB	69	E	-	-	-	60	E	-	-	-
	NBL	106	F	100	150	455	91	F	100	175	455
	NBT	13	B	100	150	900	23	C	275	450	900
	NBR	12	B	<200	<200	200	16	B	<200	<200	200
	NB	29	C	-	-	-	29	C	-	-	-
	SBL	86	F	25	75	560	87	F	100	150	560
	SBT	48	D	500	700	-	29	C	150	300	-
	SBR	28	C	<40	<40	40	22	C	<40	<40	40
	SB	49	D	-	-	-	38	D	-	-	-
<b>Overall</b>	<b>48</b>	<b>D</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>39</b>	<b>D</b>	<b>-</b>	<b>-</b>	<b>-</b>	
MD 97 at Crystal Springs Apartment	WB	9	A	25	50	225	9	A	50	100	225
	SB	0	-	75	475	900	0	-	-	-	900
	<b>Overall</b>	<b>9</b>	<b>A</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>9</b>	<b>A</b>	<b>-</b>	<b>-</b>	<b>-</b>
MD 97 at Heathfield Rd/Postgate Terrace	EB	72	E	150	250	350	90	F	125	225	350
	WB	133	F	100	175	250	77	E	50	100	250
	NBL	100	F	100	200	350	83	F	125	200	350
	NBTR	14	B	100	225	850	11	B	200	350	850
	NB	22	C	-	-	-	14	B	-	-	-
	SBL	102	F	<25	50	350	70	E	25	50	350
	SBTR	13	B	325	525	1,025	17	B	250	425	1,025



	SB	13	B	-	-	-	18	B	-	-	-
	<b>Overall</b>	<b>23</b>	<b>C</b>	-	-	-	<b>20</b>	<b>B</b>	-	-	-
MD 97 at Home Depot Ent/7-Eleven	EBLT	>150	F	25	100	1,100	66	F	25	75	1,100
	EBR	13	B	50	100	1,100	9	A	75	125	1,100
	EB	47	E	-	-	-	19	C	-	-	-
	WBLT	18	C	25	75	100	>150	F	<25	25	100
	WBR	9	A	25	50	100	9	A	25	75	100
	WB	11	B	-	-	-	65	F	-	-	-
	NBL	19	C	25	50	250	13	B	50	100	250
	SBL	11	-	<25	50	235	20	C	25	50	235
	SB	<1	-	200	675	850	<1	-	<25	125	850
	<b>Overall</b>	<b>&gt;150</b>	<b>F</b>	-	-	-	<b>&gt;150</b>	<b>F</b>	-	-	-
MD 97 at MD 185	EBL	66	E	175	250	425	58	E	275	300	425
	EBTR	63	E	150	200	1,350	50	D	200	325	1,350
	EB	65	E	-	-	-	55	E	-	-	-
	WBL	64	E	100	225	280	78	E	125	225	280
	WBLTR	71	E	300	425	-	72	E	200	325	-
	WB	69	E	-	-	-	73	E	-	-	-
	NBL	109	F	50	125	330	105	F	50	125	330
	NBT	30	D	150	250	675	54	D	300	500	675
	NBR	11	B	25	100	280	34	D	225	375**	280
	NB	33	C	-	-	-	50	D	-	-	-
	SBL	82	F	50	175	200	100	F	100	200	200
	SBT	49	D	475	925	475	44	D	175	275	475
	SB	80	D	-	-	-	48	D	-	-	-
<b>Overall</b>	<b>54</b>	<b>D</b>	-	-	-	<b>55</b>	<b>D</b>	-	-	-	
MD 97 at Northgate Plaza	EBR	9	A	25	50	250	9	A	25	50	250
	NBUL	10	B	25	75	175	9	A	25	75	175
	SBUL	0	-	25	50	150	0	-	25	75	150
	<b>Overall</b>	<b>10</b>	<b>B</b>	-	-	-	<b>9</b>	<b>A</b>	-	-	-
MD 97 at Aspen Hill Rd	EBLT	69	E	25	75	900	70	E	125	225	900
	EBR	52	D	75	125	900	80	F	250	425	900
	EB	54	D	-	-	-	78	E	-	-	-



	WBLTR	99	F	25	50	215	95	F	25	75	215
	NBL	80	E	150	275	250	71	E	150	250	250
	NBTR	14	B	75	200	470	18	B	200	400	470
	NB	34	C	-	-	-	29	C	-	-	-
	SBL	124	F	<25	25	190	120	F	<25	50	190
	SBT	12	B	100	200	475	20	B	150	275	475
	SBR	2	A	<70	<70	70	51	D	<70	<70**	70
	SB	11	B	-	-	-	23	C	-	-	-
	<b>Overall</b>	<b>28</b>	<b>C</b>	-	-	-	<b>38</b>	<b>D</b>	-	-	-
MD 97 at Wendy Ln	EBR	9	A	25	50	-	9	A	150	325	-
	WBR	9	A	25	50	-	11	B	50	100	-
	NBUL	11	B	25	50	200	12	B	75	125	200
	SBL	11	B	25	50	150	14	B	100	200	150
	<b>Overall</b>	<b>11</b>	<b>B</b>	-	-	-	<b>14</b>	<b>B</b>	-	-	-
MD 97 at Ralph Rd	EB*	15	B	50	75	-	11	B	50	150	-
	WBLTR	12	B	50	75	370	17	C	50	75	370
	NBL	11	B	<25	25	125	12	B	25	50	125
	SBUL	9	A	25	50	175	11	B	75	150	175
	<b>Overall</b>	<b>15</b>	<b>B</b>	-	-	-	<b>17</b>	<b>C</b>	-	-	-
MD 97 at Hewitt Ave	WBL	51	D	100	125	90	49	D	75	125	90
	WBR	42	D	150	300	435	46	D	75	150	435
	WB	47	D	-	-	-	47	D	-	-	-
	NBTR	21	C	225	325	-	35	C	350	500	-
	SBL	57	E	75	150	140	50	D	150	175	140
	SBT	9	A	175	325	350	7	A	150	325	350
	SB	12	B	-	-	-	13	B	-	-	-
	<b>Overall</b>	<b>19</b>	<b>B</b>	-	-	-	<b>27</b>	<b>C</b>	-	-	-
MD 185 at Independence St	EBL	70	E	75	150	100	78	E	100	150	100
	EBTR	97	F	250	425	-	69	E	150	300	-
	EB	89	F	-	-	-	73	E	-	-	-
	WB	95	F	50	125	-	115	F	125	225	-
	NBL	88	F	75	125	250	87	F	100	200	250
	NBTR	12	B	75	200	-	20	B	225	375	-



	NB	18	B	-	-	-	23	C	-	-	-
	SBL	112	F	0	<25	270	93	F	<25	25	270
	SBTR	8	A	75	275	1,325	13	B	100	175	1,325
	SB	9	A	-	-	-	14	B	-	-	-
	<b>Overall</b>	<b>19</b>	<b>B</b>	-	-	-	<b>28</b>	<b>C</b>	-	-	-
MD 185 at Aspen Hill Rd	EBL	81	F	125	225	300	69	E	225	325	300
	EBTR	72	E	175	300	-	74	E	250	375	-
	EB	76	E	-	-	-	72	E	-	-	-
	WBL	62	E	150	250	410	69	E	175	300	410
	WBTR	79	E	200	300	450	77	E	200	275	450
	WB	74	E	-	-	-	74	E	-	-	-
	NBL	93	F	150	275	350	113	F	125	200	350
	NBT	19	B	75	175	1,325	29	C	200	325	1,325
	NBR	18	B	<25	50	350	24	C	100	225	350
	NB	38	D	-	-	-	38	D	-	-	-
	SBL	125	F	50	150	650	88	F	100	175	325
	SBTR	76	E	550	2,100	650	36	D	275	400	650
	SB	76	E	-	-	-	41	D	-	-	-
<b>Overall</b>	<b>66</b>	<b>E</b>	-	-	-	<b>50</b>	<b>D</b>	-	-	-	
MD 185 at Home Depot (MD 185 is NB/SB)	EBL	77.8	E	25	125	600	79	E	25	50	600
	EBR	68	E	75	150	600	67	E	50	75	600
	EB	69	E	-	-	-	68	E	-	-	-
	NBL	102	F	100	175	215	117	F	100	175	215
	NBT	2	A	<25	50	-	1	A	<25	50	-
	NB	14	B	-	-	-	7	A	-	-	-
	SBT	19	B	300	1,500	775	9	A	125	275	775
	SBR	18	B	75	350	775	2	A	<25	75	775
	SB	19	B	-	-	-	9	A	-	-	-
<b>Overall</b>	<b>19</b>	<b>B</b>	-	-	-	<b>11</b>	<b>B</b>	-	-	-	

- Indicates that the queue exceeds storage capacity

\*A right-turn lane was provided for the software analysis due to the limitation of cars being capable of making a 2-stage left-turn in Synchro/SimTraffic. The right-turn lane results were taken in this case

\*\* Queue results from adjacent lane queue spillover

The results indicate that all signalized intersections along the MD 97 corridor operate at LOS D or better in both peak periods. Several unsignalized intersections experienced LOS F conditions in the AM and/or PM peak period, again primarily due to side street turning vehicles waiting for gaps in traffic along MD 97 and MD 185 to turn. Similar to Existing No-Build conditions, there are several movements and approaches that are projected to fail, and several queues that exceed their storage capacity.

The following movements are projected to worsen to a failing condition, exceed storage capacity, or improve from a LOS F from Existing No-Build conditions:

#### *MD 97 at Bel Pre Rd*

- The northbound MD 97 right-turn is projected to improve from LOS F in existing no-build conditions to LOS B under build conditions in the AM peak period. Additional green time given to the MD 97 approaches reduces queues and therefore allows right-turning vehicles to move into the turn lane faster from the adjacent through lane.
- The westbound Bel Pre Road left and through movements are projected to fail in the PM peak period under build conditions. Green time is added to the MD 97 approaches and is therefore taken away from the Bel Pre Rd approaches; however, queues are not projected to exceed storage capacity.

#### *MD 97 at Heathfield Rd/Postgate Terrace*

- The northbound MD 97 left-turning movement is projected to worsen from LOS E (A) in existing no-build conditions to LOS F (F) under build conditions. This is due to the implementation of left-turn protected-only phasing. Protected only phasing was recommended to reduce the risk of left-turn crashes associated with crossing three opposing through lanes of vehicular traffic. Queues are not expected to exceed available storage.
- The southbound MD 97 left-turning movement is projected to worsen from LOS A (B) in existing no-build conditions to LOS F (F) under build conditions. This is due to the implementation of left-turn protected-only phasing. Protected only phasing was recommended to reduce the risk of left-turn crashes associated with crossing three opposing through lanes of vehicular traffic. Queues are not expected to exceed available storage.
- The westbound Postgate Drive approach is projected to improve from LOS F (F) to LOS F (E). This is due to additional green time being given to the westbound approach in the build condition.

#### *MD 97 at MD 185*

- The eastbound (northbound) MD 185 approach is projected to improve from LOS F in existing no-build conditions to LOS E under build conditions in the AM peak period. The MD 97 south leg pedestrian clearance interval was increased (for crossing MD 97), which also provided additional green time for the eastbound (northbound) MD 185 approach and reduced delays.

- The southbound MD 97 left-turn movement is projected to worsen from LOS C (D) in existing no-build conditions to LOS F (F) under build conditions. This is due to the implementation of left-turn protected-only phasing. Protected only phasing was recommended to reduce the risk of left-turn crashes associated with crossing three opposing through lanes of vehicular traffic. Queues are not expected to exceed available storage.

#### *MD 97 at Aspen Hill Rd*

- The northbound MD 97 left-turn movement is projected to improve in the AM peak period from LOS F in existing no-build conditions to LOS E under build conditions. The intersection signal offset was optimized to improve traffic flow along MD 97.

#### *MD 97 at Hewitt Ave*

- The southbound MD 97 left-turn queue is expected to exceed its storage capacity in both peak periods under build conditions (existing No-Build queues also exceed storage capacity during the PM peak). This is due to the implementation of left-turn protected-only phasing. Protected only phasing was recommended to reduce the risk of left-turn crashes associated with crossing three opposing through lanes of vehicular traffic. Average and 95<sup>th</sup> percentile queues are expected to exceed storage by about 1 car length in the PM build condition, while the 95<sup>th</sup> percentile queue exceeds storage by less than 1 car length in the AM peak.
- The westbound Hewitt Avenue left-turn movement is projected to improve from LOS F in existing no-build conditions to LOS D in build conditions in the AM peak period. This is due to the reduction in cycle length from 180 seconds in existing conditions to 120 seconds under build conditions, allowing the westbound approach to receive a green signal indication more frequently.

#### *MD 185 at Independence St*

- Several movements and approaches are projected to worsen due to the installation of the LPI phase for all 4 legs (reducing time for the vehicular phases), as well as the implementation of a no turn on red restriction for all approaches. These recommendations were made to improve pedestrian safety at the intersection.

#### *MD 185 at Aspen Hill Rd*

- The southbound MD 185 95<sup>th</sup> percentile through queue length is projected to worsen in the AM peak period by about 700 feet, as compared to no-build. Build condition 95<sup>th</sup> through queues extend back to the southbound double right channelized lanes and onto MD 97, but average queues only extend toward the MD 185 at Home Depot Driveway intersection. By comparison, no-build AM southbound 95<sup>th</sup> percentile through queues still extend into the southbound double right channelized lanes from MD 97 to MD 185. Although signal timings and offsets were optimized in the build condition, the installation of LPI, right turn on red restrictions, and modifications to the signal timings throughout the network is expected to

increase delays and queues for through movements along portions of southbound MD 97 and southbound MD 185. These recommendations were made to improve pedestrian and vehicular safety at this intersection and elsewhere in the study network.

#### *MD 185 at Home Depot Driveway*

- This intersection is modified from an unsignalized intersection with free flow conditions along MD 185 and channelized right-turning movements along southbound MD 185 and eastbound Home Depot Driveway to a fully signalized intersection. These modifications are expected to increase delays and queues for several intersection movements, but is not expected to have a significant impact on the queues discussed above for southbound MD 97 and MD 185. This recommendation is assumed based on the follow-up to the Kaiser Aspen Hill Development TIS, and would improve pedestrian and vehicular safety for several movements entering and exiting the Home Depot Driveway.

The following list of operational treatments were considered, but were ultimately not carried forward as a recommended improvement for reasons discussed below.

#### *MD 97 at Bel Pre Rd*

- Protected-only left-turn phasing for the eastbound/westbound Bel Pre Road approaches
  - By implementing protected-only left-turn phasing, the left-turn movement queues are projected to increase extensively and spill onto Bel Pre Rd through lanes. These extensive queues would frequently block through traffic on Bel Pre Road, and present an extended increased rear end crash risk.

#### *MD 97 at Heathfield Rd*

- Reducing the cycle length to 90 seconds (half of the existing 180 seconds)
  - For a 90 second cycle, nearly half of the time needed to be allocated to the eastbound and westbound Heathfield Road/Postgate Drive approaches to account for adequate pedestrian crossing times of MD 97. In the AM peak, providing only about half of a 90 second cycle to the heavy southbound through movement was inadequate in clearing queues, resulting in cycle failure and extensive queues/delays.

#### *MD 185 at MD 97*

- LPI for all four legs of the intersection.
  - Adding an LPI to all four legs would worsen all movements to LOS E or LOS F in the PM peak period.
- LPI for the MD 97 north leg and south leg (for crossing MD 97)
  - Adding an LPI to the north and south leg would worsen all movements to LOS E or LOS F in the PM peak period.



*MD 97 at Hewitt Ave*

- Reducing the cycle length to 90 seconds (half of the existing 180 seconds)
  - For a 90 second cycle, nearly half of the time needed to be allocated to the westbound Hewitt Avenue approach to account for adequate pedestrian crossing times of MD 97. Providing only about half of a 90 second cycle to the heavy MD 97 through movements was inadequate in clearing queues, resulting in cycle failure and extensive queues/delays.

*MD 185 at Independence St*

- Reducing the cycle length to 90 seconds (half of the existing 180 seconds)
  - There is not enough time in a 90 second cycle for all pedestrian clearance intervals to occur without significantly failing the southbound MD 185 approach.
- Split Phasing eastbound and westbound Independence Street
  - Split phasing is projected to fail overall intersection operations if an LPI is also implemented.

*MD 185 at Aspen Hill Rd*

- Protected-only eastbound and westbound Aspen Hill Road left-turn phasing
  - The left-turn queues exceed their storage lengths significantly and frequently block the adjacent through lane on Aspen Hill Road, creating extensive queues for the through movement. There are no opportunities to adjust the signal timing for the lefts without significantly affecting other intersection movements.

*MD 185 at Home Depot*

- Reducing the cycle length to 90 seconds (half of the existing 180 seconds)
  - For a 90 second cycle, nearly half of the time needed to be allocated to the eastbound Home Depot Driveway approach to account for adequate pedestrian crossing times of MD 185. Providing only about half of a 90 second cycle to the heavy MD 185 through movements (particularly southbound MD 185) resulted in cycle failure and extensive queues/delays.
  - By reducing the cycle length in half, the eastbound approach used about half of the full cycle to account for the new south leg crosswalk pedestrian phase. This reduced the southbound green time and significantly increased delays and queues.

**2040 Future No-Build Traffic Analysis**

In the future no-build condition, no changes were made to the geometry of the roadway or signal phasing compared to the existing no-build condition, except that the full signal at the MD 185 at Home Depot intersection was carried forward from the existing build condition (it is assumed that this signal will be



installed as part of the Kaiser Aspen Hill development). Signal timing and offset optimization were considered at each of the intersections, and adjusted to reduce excessive delays and queues to the extent possible. The results of the capacity and queuing analyses for the future no-build condition are summarized in **Table 3**.



**Table 3: Future No-Build Capacity and Queuing Analysis**

Movement	AM Peak					PM Peak					
	Delay (s)	LOS	Average Queue (ft)	95 <sup>th</sup> Queue (ft)	Storage Length	Delay (s)	LOS	Average Queue (ft)	95 <sup>th</sup> Queue (ft)	Storage Length	
MD 97 at Bel Pre Rd	EBL	65	E	125	225	180	68	E	175	250	180
	EBT	67	E	125	250	-	79	E	250	700	-
	EBR	<1	A	<265	<265	265	<1	A	<265	<265	265
	EB	37	D	-	-	-	53	D	-	-	-
	WBL	99	F	225	350	280	66	E	100	175	280
	WBT	81	F	250	425	-	70	E	100	175	-
	WBR	<1	A	<150	<150	150	<1	A	<150	<150	150
	WB	67	E	-	-	-	46	D	-	-	-
	NBL	85	F	100	175	455	106	F	175	400	455
	NBT	32	C	150	250	900	52	D	450	700	900
	NBR	122	F	<200	<200	200	11	B	<200	<200	200
	NB	48	D	-	-	-	54	D	-	-	-
	SBL	85	F	25	75	560	89	F	100	175	560
	SBT	66	E	1,525	2,675	-	36	D	200	350	-
	SBR	30	D	<40	<40	40	27	D	<40	<40	40
SB	65	E	-	-	-	44	D	-	-	-	
<b>Overall</b>	<b>58</b>	<b>E</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>50</b>	<b>D</b>	<b>-</b>	<b>-</b>	<b>-</b>	
MD 97 at Crystal Springs Apartment	WB	9	A	25	50	225	10	B	75	125	225
	SB	0	-	100	550	900	0	-	<25	125	900
	<b>Overall</b>	<b>9</b>	<b>A</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>10</b>	<b>B</b>	<b>-</b>	<b>-</b>	<b>-</b>
MD 97 at Heathfield Rd/Postgate Terrace	EB	66	E	125	225	350	89	F	100	200	350
	WB	148	F	100	200	250	87	F	75	125	250
	NBL	127	F	100	200	350	15	B	50	100	350
	NBTR	18	B	150	275	850	4	A	175	300	850
	NB	29	C	-	-	-	4	A	-	-	-
	SBL	4	A	<25	25	350	37	D	25	100	350
	SBTR	11	B	225	350	1,025	13	B	250	450	1,025



	SB	11	B	-	-	-	14	B	-	-	-
	<b>Overall</b>	<b>24</b>	<b>C</b>	-	-	-	<b>13</b>	<b>B</b>	-	-	-
MD 97 at Home Depot Ent/7-Eleven	EBLT	>150	F	75	175	1,100	>150	F	50	150	1,100
	EBR	14	B	75	125	1,100	10	B	125	250	1,100
	EB	>150	F	-	-	-	>150	F	-	-	-
	WBLT	>150	F	50	100	100	>150	F	25	75	100
	WBR	9	A	25	50	100	9	A	25	75	100
	WB	>150	F	-	-	-	>150	F	-	-	-
	NBL	24	C	25	75	250	15	B	75	125	250
	SBL	11	B	<25	50	235	26	D	<25	25	235
	SB	<1	-	200	675	850	<1	-	<25	125	850
	<b>Overall</b>	<b>&gt;150</b>	<b>F</b>	-	-	-	<b>&gt;150</b>	<b>F</b>	-	-	-
MD 97 at MD 185	EBL	89	F	175	250	425	75	E	425	975	425
	EBTR	87	F	150	225	1,350	62	E	275	950	1,350
	EB	88	F	-	-	-	70	E	-	-	-
	WBL	63	E	150	275	280	89	F	125	225	280
	WBLTR	74	E	450	750	-	76	E	250	400	-
	WB	72	E	-	-	-	79	E	-	-	-
	NBL	103	F	75	150	330	121	F	50	150	330
	NBT	35	D	125	225	675	41	D	250	425	675
	NBR	71	E	25	50	280	20	C	175	325**	280
	NB	45	D	-	-	-	38	D	-	-	-
	SBL	32	C	25	125	200	49	D	100	225	200
	SBT	38	D	325	700	475	44	D	225	375	475
	SB	38	D	-	-	-	45	D	-	-	-
<b>Overall</b>	<b>59</b>	<b>E</b>	-	-	-	<b>57</b>	<b>E</b>	-	-	-	
MD 97 at Northgate Plaza	EBR	9	A	25	50	250	9	A	25	50	250
	NBUL	10	B	50	100	175	10	B	25	50	175
	SBUL	0	-	25	50	150	0	-	50	100	150
	<b>Overall</b>	<b>10</b>	<b>B</b>	-	-	-	<b>10</b>	<b>B</b>	-	-	-
MD 97 at Aspen Hill Rd	EBLT	69	E	25	75	900	72	E	150	250	900
	EBR	54	D	125	225	900	81	F	400	600	900
	EB	56	E	-	-	-	79	E	-	-	-



	WBLTR	>150	F	50	200	215	103	F	50	100	215
	NBL	100	F	200	300	250	68	E	175	275	250
	NBTR	12	B	100	250	470	9	A	150	275	470
	NB	39	D	-	-	-	22	C	-	-	-
	SBL	112	F	25	50	190	114	F	25	50	190
	SBT	10	B	100	175	475	17	B	150	250	475
	SBR	1	A	<70	<70	70	32	C	<70	<70	70
	SB	10	B	-	-	-	19	B	-	-	-
	<b>Overall</b>	<b>36</b>	<b>D</b>	-	-	-	<b>33</b>	<b>C</b>	-	-	-
MD 97 at Wendy Ln	EBR	9	A	25	75	-	9	A	225	500	-
	WBR	9	A	25	50	-	9	A	75	125	-
	NBUL	11	B	50	100	200	12	B	100	175	200
	SBL	12	B	25	50	150	22	C	125	225	150
	<b>Overall</b>	<b>12</b>	<b>B</b>	-	-	-	<b>22</b>	<b>C</b>	-	-	-
MD 97 at Ralph Rd	EB*	40	E	50	75	-	17	C	125	400	-
	WBLTR	28	D	50	125	370	127	F	375	700	370
	NBL	12	B	<25	25	125	13	B	25	50	125
	SBUL	11	B	25	75	175	15	C	100	175	175
	<b>Overall</b>	<b>40</b>	<b>E</b>	-	-	-	<b>127</b>	<b>F</b>	-	-	-
MD 97 at Hewitt Ave	WBL	86	F	100	125	90	79	E	75	125	90
	WBR	66	E	200	400	435	72	E	100	225	435
	WB	77	E	-	-	-	75	E	-	-	-
	NBTR	12	B	175	300	-	17	B	250	400	-
	SBL	10	B	50	100	140	39	D	125	200	140
	SBT	4	A	150	225	350	5	A	150	300	350
	SB	5	A	-	-	-	10	B	-	-	-
	<b>Overall</b>	<b>15</b>	<b>B</b>	-	-	-	<b>19</b>	<b>B</b>	-	-	-
MD 185 at Independence St	EBL	74	E	75	150	100	76	E	100	150	100
	EBTR	69	E	150	300	-	62	E	150	350	-
	EB	71	E	-	-	-	69	E	-	-	-
	WB	>150	F	75	125	-	128	F	175	250	-
	NBL	86	F	75	150	250	88	F	100	200	250
	NBTR	9	A	75	200	-	16	B	175	300	-



	NB	14	B	-	-	-	19	B	-	-	-
	SBL	103	F	<25	25	270	102	F	<25	50	270
	SBTR	5	A	75	125	1,325	9	A	50	125	1,325
	SB	6	A	-	-	-	10	V	-	-	-
	<b>Overall</b>	<b>17</b>	<b>B</b>	-	-	-	<b>25</b>	<b>C</b>	-	-	-
MD 185 at Aspen Hill Rd	EBL	97	F	175	300	300	74	E	250	375	300
	EBTR	66	E	175	350	-	71	E	275	475	-
	EB	79	E	-	-	-	72	E	-	-	-
	WBL	58	E	75	175	410	61	E	150	275	410
	WBTR	77	E	125	250	450	74	E	125	225	450
	WB	72	E	-	-	-	69	E	-	-	-
	NBL	89	F	150	250	350	91	F	150	325	350
	NBT	20	C	100	175	1,325	38	D	325	500	1,325
	NBR	7	A	<25	25	350	25	D	100	300	350
	NB	37	D	-	-	-	43	D	-	-	-
	SBL	115	F	25	75	650	87	F	125	500	325
	SBTR	106	F	525	1,875	650	64	E	400	550	650
	SB	107	F	-	-	-	66	E	-	-	-
<b>Overall</b>	<b>80</b>	<b>F</b>	-	-	-	<b>58</b>	<b>E</b>	-	-	-	
MD 185 at Home Depot (MD 185 is NB/SB)	EBL	78	E	75	200	600	92	F	575	>600	600
	EBR	57	E	75	150	600	57	E	100	175	600
	EB	63	E	-	-	-	73	E	-	-	-
	NBL	100	F	175	275	215	71	E	150	250	215
	NBT	2	A	75	300	-	12	B	125	350	-
	NB	22	C	-	-	-	17	B	-	-	-
	SBT	14	B	650	1,200	775	12	B	150	275	775
	SBR	5	A	275	1,150**	775	2	A	25	50	775
	SB	13	B	-	-	-	11	B	-	-	-
<b>Overall</b>	<b>18</b>	<b>B</b>	-	-	-	<b>23</b>	<b>C</b>	-	-	-	

- Indicates that the queue exceeds storage capacity

\*A right-turn lane was provided for the software analysis due to the limitation of cars being capable of making a 2-stage left-turn in Synchro/SimTraffic. The right-turn lane results were taken in this case

\*\* Queue results from adjacent lane queue spillover

The results indicate that several movements and approaches are projected to fail in the future with no operational improvements. Notably, the southbound queue in the AM peak period is projected to extend from MD 185 at Aspen Hill Rd to MD 97 at Home Depot/7-Eleven Driveway. The unsignalized intersection of MD 97 at Home Depot/7-Eleven is projected to have significant delays for the driveway approaches. It is important to again note that Synchro does not provide the capability for vehicles to make two-stage left-turns (which is how many left turns are completed for vehicles exiting side streets and driveways in the MD 97 and MD 185 corridors). Therefore, actual delays experienced may be less than what is being reported at several unsignalized intersections due to this limitation.

#### **2040 Future Build Traffic Analysis**

As part of the future build analysis, some modifications to existing intersections were recommended, including modifying an unsignalized intersection to a Pedestrian Hybrid Beacon (PHB), fully signalizing unsignalized intersections, and redistributing traffic volumes at locations where new traffic signals would permit a currently restricted movement. Five intersections are included in these modifications, and the traffic control device used with the redistributed 2040 volumes are shown in **Figure 5**. The following list of recommended improvements were analyzed in Synchro/SimTraffic using future (2040) volumes and the results are summarized in **Table 4**.

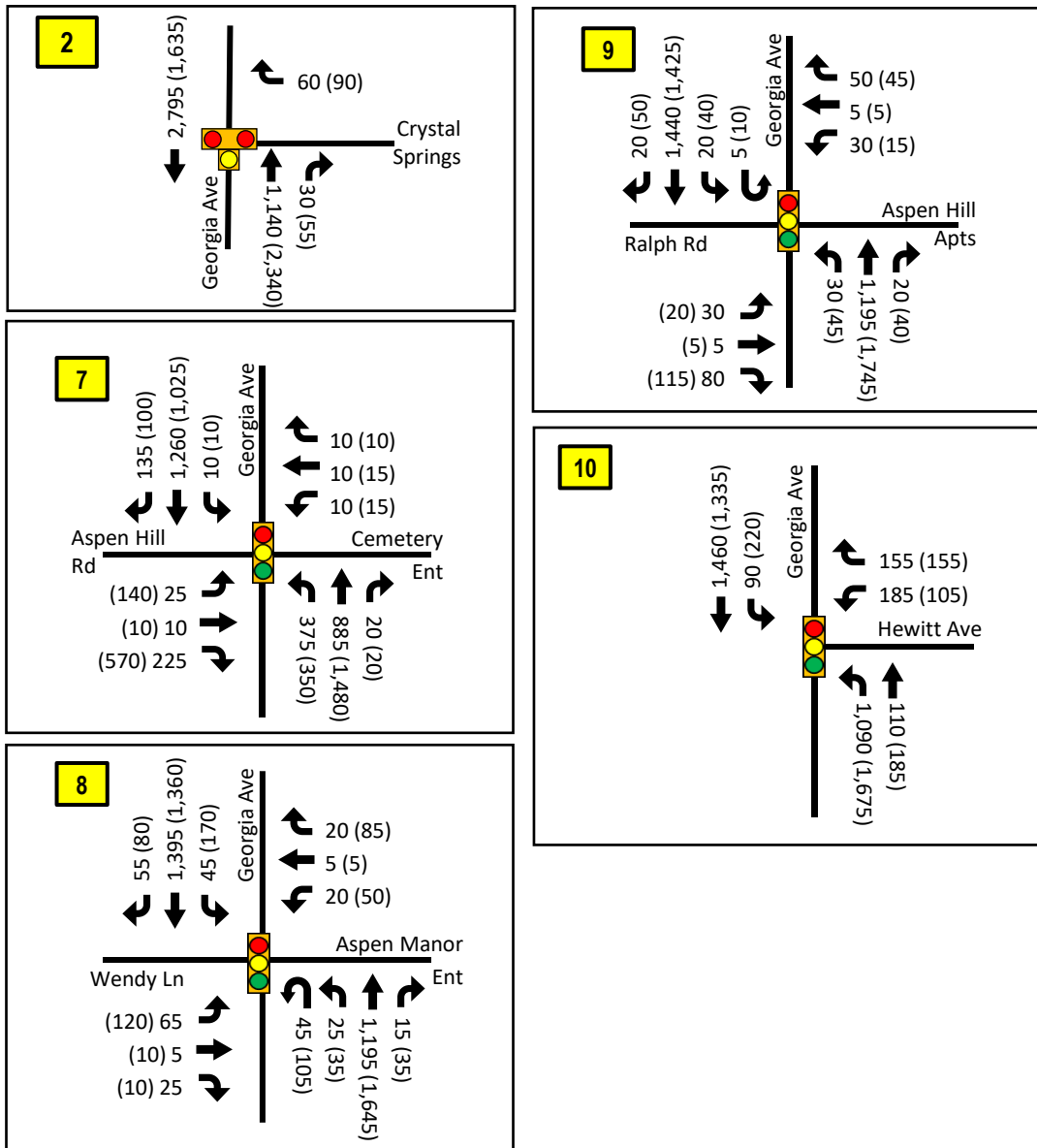


Figure 5: 2040 Build Volumes





**Table 4: Future Build Capacity and Queuing Analysis**

Movement	AM Peak					PM Peak					
	Delay (s)	LOS	Average Queue (ft)	95 <sup>th</sup> Queue (ft)	Storage Length	Delay (s)	LOS	Average Queue (ft)	95 <sup>th</sup> Queue (ft)	Storage Length	
MD 97 at Bel Pre Rd	EBL	95	F	150	225	180	79	E	175	250	180
	EBT	77	E	150	350	-	79	E	250	525	-
	EBR	85	F	175	250	265	56	E	100	225	265
	EB	85	F	-	-	-	72	E	-	-	-
	WBL	71	E	225	350	280	77	E	100	175	280
	WBT	67	E	275	450	-	73	E	100	200	-
	WBR	53	D	150	225	150	58	E	100	175	150
	WB	65	E	-	-	-	69	E	-	-	-
	NBL	108	F	125	225	455	95	F	125	275	455
	NBT	29	C	125	225	900	78	E	425	625	900
	NBR	29	C	<25	75	200	68	E	150	300	200
	NB	43	D	-	-	-	79	E	-	-	-
	SBL	85	F	25	75	560	97	F	125	200	560
	SBT	68	E	950	1,475	-	40	D	200	325	-
	SBR	30	C	50**	75**	40	29	C	25	75**	40
	SB	67	E	-	-	-	48	D	-	-	-
<b>Overall</b>	<b>64</b>	<b>E</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>68</b>	<b>E</b>	<b>-</b>	<b>-</b>	<b>-</b>	
MD 97 at Crystal Springs Apartment	WB	<1	A	25	50	225	<1	A	50	100	225
	SB	2	A	150	550	900	<1		25	200	900
	<b>Overall</b>	<b>2</b>	<b>A</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>&lt;1</b>	<b>A</b>	<b>-</b>	<b>-</b>	<b>-</b>
MD 97 at Heathfield Rd/Postgate Terrace	EB	74	E	175	300	350	93	F	100	200	350
	WB	>150	F	100	200	250	79	E	50	125	250
	NBL	73	E	100	200	350	90	F	100	200	350
	NBTR	18	B	75	175	850	8	A	175	325	850
	NB	24	C	-	-	-	12	B	-	-	-



	SBL	129	F	25	75	350	93	F	50	100	350
	SBTR	15	B	400	700	1,025	7	A	100	225	1,025
	SB	16	B	-	-	-	8	A	-	-	-
	<b>Overall</b>	<b>26</b>	<b>C</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>15</b>	<b>B</b>	<b>-</b>	<b>-</b>	<b>-</b>
MD 97 at Home Depot Ent/7-Eleven	EBLT	72	E	25	75	1,100	79	E	50	75	1,100
	EBR	81	F	50	125	1,100	76	E	75	150	1,100
	EB	79	E	-	-	-	76	E	-	-	-
	WBLT	73	E	25	75	100	76	E	25	50	100
	WBR	71	E	25	75	100	75	E	25	75	100
	WB	71	E	-	-	-	75	E	-	-	-
	NBL	97	F	25	50	250	75	E	75	100	250
	NBTR	<1	A	50	100	475	6	A	125	200	475
	NB	2	A	-	-	-	8	A	-	-	-
	SBL	114	F	25	100	235	82	F	25	50	235
	SBTR	8	A	225	675	940	5	A	175	300	940
	SB	9	A	-	-	-	6	A	-	-	-
<b>Overall</b>	<b>11</b>	<b>B</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>12</b>	<b>B</b>	<b>-</b>	<b>-</b>	<b>-</b>	
MD 97 at MD 185	EBL	89	F	175	225	425	75	E	350	550	425
	EBTR	86	F	150	225	1,350	60	E	375	575	1,350
	EB	88	F	-	-	-	69	E	-	-	-
	WBL	60	E	100	225	280	79	E	100	200	280
	WBLTR	70	E	350	500	-	72	E	275	425	-
	WB	68	E	-	-	-	74	E	-	-	-
	NBL	117	F	75	175	330	114	F	50	175	330
	NBT	34	C	125	225	675	62	E	325	575	675
	NBR	16	B	25	75	280	46	D	250	375**	280
	NB	39	D	-	-	-	59	E	-	-	-
	SBL	112	F	50	150	200	113	F	125	225	200
	SBT	36	D	325	1,000	475	67	E	275	425	475
	SB	38	D	-	-	-	71	E	-	-	-
<b>Overall</b>	<b>56</b>	<b>E</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>67</b>	<b>E</b>	<b>-</b>	<b>-</b>	<b>-</b>	
	EBR	9	A	25	50	250	9	A	25	50	250
	NBUL	10	B	50	100	175	10	A	25	75	175



MD 97 at Northgate Plaza	SBUL	0	-	25	50	150	0	-	50	100	150
	<b>Overall</b>	<b>10</b>	<b>B</b>	-	-	-	<b>10</b>	<b>A</b>	-	-	-
MD 97 at Aspen Hill Rd	EBLT	69	E	25	50	900	71	E	125	250	900
	EBR	54	D	50	100	900	84	F	250	475	900
	EB	56	E	-	-	-	82	F	-	-	-
	WBLTR	>150	F	50	200	215	103	F	50	100	215
	NBL	88	F	175	300	250	82	F	150	275	250
	NBTR	17		100	275	470	30	C	250	425	470
	NB	38	D	-	-	-	40	D	-	-	-
	SBL	111	F	<25	25	190	108	F	<25	50	190
	SBT	9	A	100	175	475	21	C	125	225	475
	SBR	<1	A	25	<70	70	28	C	50	<70	70
	SB	9	A	-	-	-	22	C	-	-	-
<b>Overall</b>	<b>35</b>	<b>D</b>	-	-	-	<b>43</b>	<b>D</b>	-	-	-	
MD 97 at Wendy Ln	EB	37	D	50	125	-	37	D	75	125	-
	WBR	34	C	25	75	-	34	C	75	125	-
	NBUL	8	A	25	100	200	15	B	100	225	200
	NBTR	10	B	200	700	650	22	C	100	450	650
	NB	10	A	-	-	-	21	C	-	-	-
	SBL	8	A	25	50	150	34	C	125	250	150
	SBTR	11	B	250	275	525	28	C	300	425	525
	SB	11	B	-	-	-	28	C	-	-	-
<b>Overall</b>	<b>12</b>	<b>B</b>	-	-	-	<b>25</b>	<b>C</b>	-	-	-	
MD 97 at Ralph Rd	EB	59	E	100	150	-	59	E	100	200	-
	WB	53	D	75	125	370	48	D	50	125	370
	NBL	9	A	25	100	125	3	A	25	50	125
	NBTR	11	B	200	700	375	3	A	25	100	375
	NB	11	B	-	-	-	3	A	-	-	-
	SBUL	5	A	25	75	175	9	A	25	75	175
	SBTR	9	A	125	250	650	11	B	100	225	650
	SB	9	A	-	-	-	11	B	-	-	-
<b>Overall</b>	<b>13</b>	<b>B</b>	-	-	-	<b>9</b>	<b>A</b>	-	-	-	



MD 97 at Hewitt Ave	WBL	51	D	100	125	90	49	D	75	125	90
	WBR	42	D	125	275	435	46	D	75	150	435
	WB	47	D	-	-	-	47	D	-	-	-
	NBTR	22	C	225	350	-	39	D	375	575	-
	SBL	50	D	75	175	140	56	E	150	200	140
	SBT	9	A	200	350	350	7	A	150	350	350
	SB	12	B	-	-	-	14	B	-	-	-
	<b>Overall</b>	<b>20</b>	<b>B</b>	-	-	-	<b>29</b>	<b>C</b>	-	-	-
MD 185 at Independence St	EBL	70	E	75	150	100	73	E	100	150	100
	EBTR	98	F	300	525	-	66	E	175	325	-
	EB	89	F	-	-	-	69	E	-	-	-
	WB	129	F	75	150	-	113	F	150	225	-
	NBL	91	F	75	150	250	87	F	125	225	250
	NBTR	14	B	100	225	-	23	C	250	425	-
	NB	19	B	-	-	-	26	C	-	-	-
	SBL	60	E	<25	100	270	94	F	<25	50	270
	SBTR	51	D	600	725	1,325	15	B	125	200	1,325
	SB	51	D	-	-	-	16	B	-	-	-
	<b>Overall</b>	<b>47</b>	<b>D</b>	-	-	-	<b>30</b>	<b>C</b>	-	-	-
MD 185 at Aspen Hill Rd	EBL	118	F	175	300	300	80	F	250	375	300
	EBTR	72	E	225	350	-	72	E	300	525	-
	EB	91	F	-	-	-	75	E	-	-	-
	WBL	61	E	100	200	410	66	E	150	250	410
	WBTR	79	E	225	325	450	79	E	200	275	450
	WB	74	E	-	-	-	74	E	-	-	-
	NBL	72	E	125	225	350	110	F	150	250	350
	NBT	22	C	125	250	1,325	31	C	225	375	1,325
	NBR	18	B	25	75	350	26	C	100	250	350
	NB	35	C	-	-	-	40	D	-	-	-
	SBL	115	F	50	100	650	84	F	100	200	325
	SBTR	84	F	425	1,350	650	39	D	375	525	650
	SB	84	F	-	-	-	44	D	-	-	-



	<b>Overall</b>	<b>70</b>	<b>E</b>	-	-	-	<b>52</b>	<b>D</b>	-	-	-
MD 185 at Home Depot (MD 185 is NB/SB)	EBL	78	E	75	175	600	87	F	500	>600	600
	EBR	53	D	75	150	100	56	E	100	175	100
	EB	60	E	-	-	-	70	E	-	-	-
	NBL	95	F	200	275	215	86	F	150	250	215
	NBT	2	A	100	350	-	6	A	125	275	-
	NB	21	C	-	-	-	12	B	-	-	-
	SBT	19	B	375	825	775	22	C	175	300	775
	SBR	6	A	175	425**	775	18	B	25	150	775
	SB	18	B	-	-	-	22	C	-	-	-
	<b>Overall</b>	<b>21</b>	<b>C</b>	-	-	-	<b>24</b>	<b>C</b>	-	-	-

- Indicates that the queue exceeds storage capacity

\*\* Queue results from adjacent lane queue spillover

*Networkwide*

- All Existing Build improvements except:
  - MD 185 at Aspen Hill Rd LPI
    - Although LPI at this intersection was included in the existing build condition, maintaining it in year 2040 resulted in extensive eastbound Aspen Hill Road left-turn queues, which exceeds available storage and block the adjacent eastbound Aspen Hill through lane. This creates extensive queues and delays in the through lane as well. There is not an opportunity to reallocate green time from other intersection approaches, due to pedestrian crossing time requirements, and the heavy vehicle volumes expected on other approaches. Reallocating the LPI time to the eastbound left-turn phase eliminates the extensive queue spillback. In practice, field conditions could dictate if and when an LPI implemented in the near future would need to be considered for removal. For the purposes of this analysis, the LPI at MD 185 and Aspen Hill Road was removed for the future 2040 build condition.
- Signal split and offset adjustments

*MD 97 at Bel Pre Rd*

- Eastbound Bel Pre Road right-turn overlap phase with northbound left-turn phase
- Westbound Bel Pre Road right-turn overlap phase with southbound left-turn phase
- Westbound Bel Pre Road lead/lag protected/permissive left-turn phasing
- Removal of right-turn channelization

*MD 97 at Crystal Springs Apartments*

- Provide a PHB (for crossing MD 97)

*MD 97 at Home Depot/7-Eleven*

- Full traffic signal with northbound/southbound MD 97 protected-only left-turn movements, with permissive phasing for eastbound/westbound driveways.

*MD 97 at MD 185*

- Reduce the model vehicle turn speed for the double channelized southbound MD 97 right-turn segment to mimic a tighter turning radius.

*MD 97 at Aspen Hill Rd*

- Remove southbound MD 97 right-turn channelization

*MD 97 at Wendy Lane*

- Full traffic signal with northbound/southbound MD 97 protected/permissive left-turn phasing,

with permissive phasing for eastbound/westbound Wendy Lane/Aspen Manor Shopping Center Driveway

*MD 97 at Ralph Rd*

- Full traffic signal with northbound/southbound MD 97 protected/permissive left-turn phasing, with permissive phasing for eastbound/westbound Ralph Road/Aspen Hill Apartments Driveway

The results indicate that all intersections along the MD 97 corridor operate at LOS E or better in both peak periods. Similar to future no-build conditions, several movements and approaches are projected to fail, and several queues exceed their storage capacity.

The following movements are projected to worsen to a failing condition, exceed storage capacity, or improve from a LOS F from future no-build conditions:

*MD 97 at Bel Pre Rd*

- The eastbound Bel Pre Road left-turn is projected to worsen from LOS E under future no-build conditions to LOS F under future build conditions in the AM peak period. To effectively clear the westbound left-turn and through queues, green time was reallocated from the protected portion of the eastbound Bel Pre Road left-turn phase, though 95<sup>th</sup> percentile queues are not projected to increase by more than 150 feet.
- The eastbound Bel Pre Road right-turn is projected to worsen from LOS A under future no-build conditions to LOS F under future build conditions in the AM peak period. The eastbound right-turn is permitted on red; however, heavy westbound Bel Pre Road left turns and southbound MD 97 throughs do not offer many gaps to complete these turns on red. The removal of the right-turn channelization brings right-turns to the intersection, meaning vehicles must first stop (rather than yield) before completing their turns.
- Westbound Bel Pre Road left-turn and through movements are projected to improve from LOS F/F under future no-build conditions to LOS E/E under build conditions, respectively, due to the protected lead/lag left-turn phasing, allowing more opportunities for lefts to turn without conflicting traffic.
- All right-turn 95<sup>th</sup> percentile queues (except eastbound Bel Pre Road rights) exceed available storage capacity in one or both peaks due to the removal of the right-turn channelization. These queues are not expected to be significantly greater than available storage though.

*MD 97 at Heathfield Rd/Postgate Terrace*

- The westbound Postgate Terrace approach is projected to improve from LOS F under future no-build conditions to LOS E under future build conditions in the PM peak period. This is due to additional green time that is provided to the eastbound/westbound phases in the build

condition.

- The northbound MD 97 left-turn is projected to improve from LOS F under future no-build conditions to LOS E under future build conditions in the AM peak period, due to additional green time being given to this movement. Although the phasing has been modified from protected/permissive to protected-only, the northbound left-turn volumes are low in the AM peak period and are able to clear in the allotted time.
- The northbound MD 97 left-turn is projected to worsen from LOS B under future no-build conditions to LOS F under future build conditions in the PM peak period. Although additional green time is given to this movement, the northbound approach is the critical movement in the PM peak period and the modification from protected/permissive phasing to protected-only phasing affects this operation. More green time was not able to be allotted to the movement, due to heavy southbound traffic in the PM peak as well. However, northbound left-turn queues are not expected to exceed available storage.
- The southbound MD 97 left-turn is projected to worsen from LOS A (D) under future no-build conditions to LOS F (F) under build conditions. This is due to the change in left-turn phasing to protected-only. However, southbound left-turn queues are not expected to exceed available storage.

#### *MD 97 at Home Depot/7-Eleven*

- The eastbound and westbound Home Depot/7-Eleven approaches are projected to improve from LOS F under future no-build conditions to LOS E under future build conditions. Under no-build conditions, the intersection is unsignalized and vehicles have difficulty finding gaps in traffic to complete their turns, causing significant delays. With signalization, the MD 97 mainline approaches are stopped at regular intervals, allowing the side streets to process traffic.
- The northbound MD 97 left-turn worsens from LOS C under future no-build conditions to LOS F under future build conditions in the AM peak period. When the intersection was unsignalized, the left-turn movement was able to use an available gap to turn, but must now wait for a green signal indication. However, queues are not expected to exceed available storage.
- The southbound MD 97 left-turn is projected to worsen from LOS B (D) under future no-build conditions to LOS F (F) under future build conditions in both peak periods. When the intersection was unsignalized, the left-turn movement was able to use an available gap to turn, but must now wait for a green signal indication. However, queues are not expected to exceed available storage.



*MD 97 at MD 185*

- The westbound (southbound) MD 185 left-turn is projected to improve from LOS F under future no-build conditions to LOS E under future build conditions in the PM peak period. As part of increasing the pedestrian clearance time for the north leg crossing (crossing MD 97), the westbound vehicular split was increased, providing additional green time to the approach.
- The southbound MD 97 left-turn is projected to worsen from LOS C (D) under future no-build conditions to LOS F (F) under future build conditions. This is due to the change in left-turn phasing to protected-only. However, queues are not expected to exceed available storage, except for the 95<sup>th</sup> percentile queue in the PM peak, where they will exceed storage by approximately 1 car length (25 feet).

*MD 97 at Aspen Hill Rd*

- The northbound MD 97 left-turns are projected to worsen from LOS E under future no-build conditions to LOS F under future build conditions in the PM peak period. However, queues are not expected to degrade from future no-build.

*MD 97 at Wendy Ln*

- The northbound MD 97 95<sup>th</sup> percentile through queues exceed available storage during the AM peak, and extend to the Ralph Road intersection upstream. This is largely due to full movement and full signal implementation at this intersection, though the signal offset favors the northbound approach to promote effective traffic progression to the extent reasonable. Queues of this length are expected to be infrequent, and a fully signalized MD 97 at Wendy Lane was determined to provide safer movements for both pedestrians and turning vehicles, particularly given the proximity of nearby bus stops, and the Aspen Manor Shopping Center at this intersection.

*MD 97 at Ralph Rd*

- The westbound Aspen Hill Apartments Driveway approach is expected to improve from LOS F under future no-build conditions to LOS D under future build conditions in the PM peak period. Under no-build conditions, the intersection is unsignalized, and vehicles and pedestrians must find gaps in traffic on MD 97 to cross the street. With signalization, the MD 97 mainline approaches are stopped, side street approaches can clear, and pedestrians can cross MD 97.

*MD 97 at Hewitt Avenue*

- The westbound Hewitt Avenue left-turn is projected to improve from LOS F under future no-build conditions to LOS D under future build conditions in the AM peak period. By reducing the cycle length at this intersection, the westbound approach receives a green signal

indication more frequently and delays are expected to reduce. Pedestrians and bicyclists also have more frequent opportunities to cross MD 97 (including those using the Matthew Henson Trail).

- The southbound MD 97 left-turn queues exceeds available storage capacity in both peak periods. This is due in part to the change in left-turn phasing to protected-only, and the shorter cycle length, though these queues are not significantly greater than those experienced under future no-build conditions (where southbound left-turn queues would exceed available storage in the PM peak). The protected left-turn phasing and shorter cycle lengths benefit the safety of southbound left-turning vehicles, and provide more opportunities for pedestrians and bicyclists using the Matthew Henson Trail to cross MD 97.

#### *MD 185 at Independence St*

- The eastbound Independence Street approach is projected to worsen from LOS E under future no-build conditions to LOS F under future build conditions in the AM peak period. Although comparable green time is given to the approach as in future no-build, LPI phases are provided for all four legs of the intersection, affecting vehicular operations slightly.
- The southbound MD 185 left-turn is projected to improve from LOS F under future no-build conditions to LOS E under future build conditions in the AM peak period. The intersection signal offset was adjusted and optimized to favor the critical movement along the southbound approach during the AM peak.

#### *MD 185 at Aspen Hill Rd*

- The eastbound Aspen Hill Road left-turn is projected to worsen from LOS E under future no-build conditions to LOS F under future build conditions in the PM peak period. Although the signal timing for the protected portions of the left-turn phases did not change on these approaches, more green time was given to the critical approaches along MD 185 in the northbound and southbound direction to limit extensive queue lengths along MD 185. This meant taking green time away from the eastbound and westbound Aspen Hill approach through movements, which are used by the eastbound and westbound lefts to make turns during the permissive portion of their phases. Eastbound and westbound left-turn queues are not expected to be significantly different from the future no-build condition, however.
- The eastbound approach is projected to worsen from LOS E under future no-build conditions to LOS F under future build conditions in the AM peak period. To meet the southbound MD 185 traffic demand and limit extensive queuing, green time was taken away from the eastbound/westbound approaches and given to the MD 185 approaches. However, eastbound Aspen Hill Road left turn queues are similar to those in the future no-build condition.
- The northbound MD 185 left-turn is projected to improve from LOS F under future no-build

conditions to LOS E under future build conditions in the AM peak period. Additional green time was given to the exclusive left-turn phase.

- The overall intersection is projected to improve from LOS F under future no-build conditions to LOS E under future build conditions in the AM peak period. By giving additional time to the critical approach along southbound MD 185 as well as optimizing the intersection offsets, delays are projected to reduce somewhat for the overall intersection.

#### *MD 185 at Home Depot*

- The northbound MD 185 left-turn is projected to worsen from LOS E under future no-build conditions to LOS F under future build conditions in the PM peak period. However, queue lengths are similar to those found in the future no-build condition.

While the operational changes listed above are recommended to improve safety for vehicles, pedestrians, and bicyclists while not extensively degrading overall traffic operations in the MD 97 and MD 185 study corridors (which could lead to other safety concerns), there were also several operational treatments that were considered but ultimately not chosen as a recommended improvement. These treatments are found below, along with an explanation as to why they were not carried forward.

#### *MD 97 at MD 185*

- Signalizing the southbound double channelized right-turn from MD 97 to southbound MD 185 (or removing the channelized lanes and tying them into the fully signalized intersection at MD 97 and MD 185) – Signalizing this movement resulted in extensive southbound MD 97 AM peak queue lengths. Queues would extend beyond Bel Pre Road.
- Repurposing the approximately 200 foot long third southbound through lane on the MD 97 approach to MD 185 into a bus only lane – Repurposing the third southbound through lane resulted in southbound through queues extending through the Home Depot/7-Eleven intersection and back to Heathfield Road/Postgate Terrace. Such a queue would interfere with southbound right-turning traffic as well.

































### **Conclusion**

Based on the analysis results discussed above, the recommended operational changes in the MD 97 and MD 185 study corridors are expected to improve pedestrian, bicyclist, and vehicular safety without significantly degrading overall traffic operations in these corridors. While LOS, delay, and/or queue lengths for some individual movements may not be optimal under existing or future build conditions, other movements are expected to improve, and the overall short- and long-term expected safety benefits gained provide a strong argument for implementing the recommended operational changes in this memo.

# HCM Signalized Intersection Capacity Analysis

## 101: MD 97 & Bel Pre Rd

Existing  
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 	  		 	  	
Traffic Volume (vph)	165	200	270	315	450	250	195	845	85	130	2000	150
Future Volume (vph)	165	200	270	315	450	250	195	845	85	130	2000	150
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1600	1900	1900	1750	1900
Total Lost time (s)	9.0	7.0	4.0	9.0	7.0	4.0	8.5	7.0	7.0	8.5	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	*1.00	1.00
Frbp, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1561	1764	3539	1583	3433	4282	1561	3433	5147	1561
Flt Permitted	0.20	1.00	1.00	0.49	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	368	3539	1561	902	3539	1583	3433	4282	1561	3433	5147	1561
Peak-hour factor, PHF	0.90	0.90	0.90	0.86	0.86	0.86	0.94	0.94	0.94	0.97	0.97	0.97
Adj. Flow (vph)	183	222	300	366	523	291	207	899	90	134	2062	155
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	48	0	0	71
Lane Group Flow (vph)	183	222	300	366	523	291	207	899	42	134	2062	84
Confl. Peds. (#/hr)			7	7			1		1	1		1
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4		Free	8		Free			6			2
Actuated Green, G (s)	48.8	29.0	180.0	55.2	32.2	180.0	15.1	84.4	84.4	12.1	81.4	81.4
Effective Green, g (s)	48.8	29.0	180.0	55.2	32.2	180.0	15.1	84.4	84.4	12.1	81.4	81.4
Actuated g/C Ratio	0.27	0.16	1.00	0.31	0.18	1.00	0.08	0.47	0.47	0.07	0.45	0.45
Clearance Time (s)	9.0	7.0		9.0	7.0		8.5	7.0	7.0	8.5	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2	0.2	3.0	0.2	0.2
Lane Grp Cap (vph)	253	570	1561	386	633	1583	287	2007	731	230	2327	705
v/s Ratio Prot	0.08	0.06		c0.12	0.15		c0.06	0.21		0.04	c0.40	
v/s Ratio Perm	0.12		c0.19	c0.17		0.18			0.03			0.05
v/c Ratio	0.72	0.39	0.19	0.95	0.83	0.18	0.72	0.45	0.06	0.58	0.89	0.12
Uniform Delay, d1	54.3	67.6	0.0	57.6	71.2	0.0	80.4	32.1	26.1	81.5	45.1	28.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.93	0.94	6.66	1.00	1.00	1.00
Incremental Delay, d2	9.8	0.4	0.3	32.3	8.7	0.3	8.3	0.7	0.1	3.7	5.4	0.3
Delay (s)	64.1	68.0	0.3	89.9	79.9	0.3	82.7	31.0	174.0	85.2	50.5	28.9
Level of Service	E	E	A	F	E	A	F	C	F	F	D	C
Approach Delay (s)		38.2			63.4			50.7			51.1	
Approach LOS		D			E			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			52.0				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			31.5		
Intersection Capacity Utilization			103.7%				ICU Level of Service			G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
 102: MD 97 & Crystal Springs Apt

Existing  
 AM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations		↗	↕↕↕			↕↕↕	
Traffic Volume (veh/h)	0	45	1080	25	0	2585	
Future Volume (Veh/h)	0	45	1080	25	0	2585	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	49	1174	27	0	2810	
Pedestrians	5						
Lane Width (ft)	12.0						
Walking Speed (ft/s)	3.5						
Percent Blockage	0						
Right turn flare (veh)							
Median type			None			None	
Median storage (veh)							
Upstream signal (ft)			1091			919	
pX, platoon unblocked	0.67	0.92			0.92		
vC, conflicting volume	2129	410			1206		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	131	52			918		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	95			100		
cM capacity (veh/h)	564	920			676		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	49	470	470	262	937	937	937
Volume Left	0	0	0	0	0	0	0
Volume Right	49	0	0	27	0	0	0
cSH	920	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.05	0.28	0.28	0.15	0.55	0.55	0.55
Queue Length 95th (ft)	4	0	0	0	0	0	0
Control Delay (s)	9.1	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A						
Approach Delay (s)	9.1	0.0			0.0		
Approach LOS	A						
Intersection Summary							
Average Delay			0.1				
Intersection Capacity Utilization			53.3%		ICU Level of Service		A
Analysis Period (min)			15				

HCM Signalized Intersection Capacity Analysis  
103: MD 97 & Heathfield Rd/Postgate Terr

Existing  
AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↑↑↑		↕	↑↑↑	
Traffic Volume (vph)	15	5	140	70	5	15	120	1075	15	15	2460	110
Future Volume (vph)	15	5	140	70	5	15	120	1075	15	15	2460	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0		5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.91		1.00	0.91	
Frbp, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.88			0.98		1.00	1.00		1.00	0.99	
Flt Protected		1.00			0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1633			1745		1770	5073		1769	5047	
Flt Permitted		0.96			0.40		0.03	1.00		0.22	1.00	
Satd. Flow (perm)		1579			727		60	5073		417	5047	
Peak-hour factor, PHF	0.79	0.79	0.79	0.58	0.58	0.58	0.92	0.92	0.92	0.98	0.98	0.98
Adj. Flow (vph)	19	6	177	121	9	26	130	1168	16	15	2510	112
RTOR Reduction (vph)	0	107	0	0	4	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	95	0	0	152	0	130	1183	0	15	2619	0
Confl. Peds. (#/hr)	10						10	1		2	2	1
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)		30.0			30.0		137.0	128.4		122.8	119.2	
Effective Green, g (s)		30.0			30.0		137.0	128.4		122.8	119.2	
Actuated g/C Ratio		0.17			0.17		0.76	0.71		0.68	0.66	
Clearance Time (s)		7.0			7.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)		4.0			3.5		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		263			121		167	3618		311	3342	
v/s Ratio Prot							c0.06	0.23		0.00	0.52	
v/s Ratio Perm		0.06			c0.21		c0.54			0.03		
v/c Ratio		0.36			1.25		0.78	0.33		0.05	0.78	
Uniform Delay, d1		66.5			75.0		57.8	9.6		9.2	21.3	
Progression Factor		1.00			1.00		1.01	1.61		0.32	0.30	
Incremental Delay, d2		1.2			165.4		19.0	0.2		0.0	1.1	
Delay (s)		67.7			240.4		77.1	15.8		3.0	7.6	
Level of Service		E			F		E	B		A	A	
Approach Delay (s)		67.7			240.4			21.8			7.6	
Approach LOS		E			F			C			A	

Intersection Summary

HCM 2000 Control Delay	23.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	97.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis  
 104: MD 97 & Home Depot Ent./7-11

Existing  
 AM Peak

























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗	↗	↑↑↑		↗	↑↑↑	
Traffic Volume (veh/h)	15	5	130	15	0	60	15	1135	65	20	2535	115
Future Volume (Veh/h)	15	5	130	15	0	60	15	1135	65	20	2535	115
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.74	0.74	0.74	0.91	0.91	0.91	0.97	0.97	0.97
Hourly flow rate (vph)	16	5	137	20	0	81	16	1247	71	21	2613	119
Pedestrians		14			12							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		3.5			3.5							
Percent Blockage		1			1							
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								553			933	
pX, platoon unblocked	0.68	0.68	0.63	0.68	0.68	0.90	0.63			0.90		
vC, conflicting volume	3257	4090	944	2379	4114	463	2746			1330		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1669	2902	0	370	2938	18	1699			980		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	54	46	80	87	100	91	93			97		
cM capacity (veh/h)	35	9	670	156	9	941	229			623		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	21	137	20	81	16	499	499	320	21	1045	1045	642
Volume Left	16	0	20	0	16	0	0	0	21	0	0	0
Volume Right	0	137	0	81	0	0	0	71	0	0	0	119
cSH	21	670	156	941	229	1700	1700	1700	623	1700	1700	1700
Volume to Capacity	1.01	0.20	0.13	0.09	0.07	0.29	0.29	0.19	0.03	0.61	0.61	0.38
Queue Length 95th (ft)	70	19	11	7	6	0	0	0	3	0	0	0
Control Delay (s)	457.6	11.7	31.5	9.2	21.9	0.0	0.0	0.0	11.0	0.0	0.0	0.0
Lane LOS	F	B	D	A	C				B			
Approach Delay (s)	71.0		13.6		0.3				0.1			
Approach LOS	F		B									
Intersection Summary												
Average Delay			3.0									
Intersection Capacity Utilization			73.0%		ICU Level of Service				C			
Analysis Period (min)			15									

# HCM Signalized Intersection Capacity Analysis

## 105: MD 97 & MD 185



















Existing  
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	470	255	10	200	750	50	55	695	85	25	1140	0
Future Volume (vph)	470	255	10	200	750	50	55	695	85	25	1140	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1750	1900
Total Lost time (s)	7.5	7.5		7.0	7.0		8.5	7.0	7.0	8.5	7.0	
Lane Util. Factor	0.94	0.95		0.86	0.86		1.00	0.91	1.00	1.00	0.91	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	4990	3517		1522	4748		1770	5085	1531	1766	4684	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.32	1.00	
Satd. Flow (perm)	4990	3517		1522	4748		1770	5085	1531	587	4684	
Peak-hour factor, PHF	0.96	0.96	0.96	0.92	0.92	0.92	0.88	0.88	0.88	0.97	0.97	0.97
Adj. Flow (vph)	490	266	10	217	815	54	62	790	97	26	1175	0
RTOR Reduction (vph)	0	2	0	0	4	0	0	0	55	0	0	0
Lane Group Flow (vph)	490	274	0	195	887	0	63	790	42	26	1175	0
Confl. Peds. (#/hr)	10		7	7		10	5		10	10		5
Turn Type	Split	NA		Split	NA		Prot	NA	Perm	pm+pt		NA
Protected Phases	3	3		4	4		1	6		5		2
Permitted Phases									6	2		
Actuated Green, G (s)	25.7	25.7		40.5	40.5		12.3	78.6	78.6	76.7	71.5	
Effective Green, g (s)	25.7	25.7		40.5	40.5		12.3	78.6	78.6	76.7	71.5	
Actuated g/C Ratio	0.14	0.14		0.22	0.22		0.07	0.44	0.44	0.43	0.40	
Clearance Time (s)	7.5	7.5		7.0	7.0		8.5	7.0	7.0	8.5	7.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	0.2	0.2	4.0	0.2	
Lane Grp Cap (vph)	712	502		342	1068		120	2220	668	284	1860	
v/s Ratio Prot	c0.10	0.08		0.13	c0.19		c0.04	c0.16		0.00	c0.25	
v/s Ratio Perm									0.03	0.04		
v/c Ratio	0.69	0.55		0.57	0.83		0.53	0.36	0.06	0.09	0.63	
Uniform Delay, d1	73.3	71.7		62.0	66.5		81.0	33.8	29.4	30.2	43.7	
Progression Factor	1.20	1.23		1.00	1.00		1.21	0.91	2.44	0.92	0.70	
Incremental Delay, d2	2.9	1.4		2.7	5.8		5.2	0.4	0.2	0.1	1.1	
Delay (s)	91.0	89.5		64.8	72.3		103.3	31.3	71.7	28.0	31.6	
Level of Service	F	F		E	E		F	C	E	C	C	
Approach Delay (s)		90.5			71.0			40.2			31.5	
Approach LOS		F			E			D			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			55.6				HCM 2000 Level of Service				E	
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)				30.0	
Intersection Capacity Utilization			83.7%				ICU Level of Service				E	
Analysis Period (min)			15									
c Critical Lane Group												



HCM Unsignalized Intersection Capacity Analysis  
 106: MD 97 & Northgate Plaza

Existing  
 AM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	
Lane Configurations									  				
Traffic Volume (veh/h)	0	0	30	0	0	0	40	50	785	0	50	0	
Future Volume (Veh/h)	0	0	30	0	0	0	40	50	785	0	50	0	
Sign Control	Stop			Stop			Free						
Grade	0%			0%			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	
Hourly flow rate (vph)	0	0	33	0	0	0	0	54	853	0	0	0	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None												
Median storage (veh)													
Upstream signal (ft)	547												
pX, platoon unblocked	0.85	0.85	0.81	0.85	0.85	0.93	0.00	0.81			0.00	0.93	
vC, conflicting volume	1786	2355	477	1452	2374	284	0	1413			0	853	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	736	1408	0	341	1431	0	0	692			0	581	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	0.0	4.1			0.0	4.1	
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2			0.0	2.2	
p0 queue free %	100	100	96	100	100	100	0	93			0	100	
cM capacity (veh/h)	245	108	879	452	104	1009	0	729			0	921	
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4				
Volume Total	33	54	284	284	284	0	550	550	313				
Volume Left	0	54	0	0	0	0	0	0	0				
Volume Right	33	0	0	0	0	0	0	0	38				
cSH	879	729	1700	1700	1700	1700	1700	1700	1700				
Volume to Capacity	0.04	0.07	0.17	0.17	0.17	0.00	0.32	0.32	0.18				
Queue Length 95th (ft)	3	6	0	0	0	0	0	0	0				
Control Delay (s)	9.3	10.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Lane LOS	A	B											
Approach Delay (s)	9.3	0.6					0.0						
Approach LOS	A												
Intersection Summary													
Average Delay			0.4										
Intersection Capacity Utilization			43.5%	ICU Level of Service					A				
Analysis Period (min)			15										

HCM Unsignalized Intersection Capacity Analysis  
 106: MD 97 & Northgate Plaza






















Existing  
 AM Peak



Movement	SBT	SBR
Lane Configurations	↑↑↑	↘
Traffic Volume (veh/h)	1265	35
Future Volume (Veh/h)	1265	35
Sign Control	Free	
Grade	0%	
Peak Hour Factor	0.92	0.92
Hourly flow rate (vph)	1375	38
Pedestrians		
Lane Width (ft)		
Walking Speed (ft/s)		
Percent Blockage		
Right turn flare (veh)		
Median type	None	
Median storage (veh)		
Upstream signal (ft)	801	
pX, platoon unblocked		
vC, conflicting volume		
vC1, stage 1 conf vol		
vC2, stage 2 conf vol		
vCu, unblocked vol		
tC, single (s)		
tC, 2 stage (s)		
tF (s)		
p0 queue free %		
cM capacity (veh/h)		
Direction, Lane #		




















HCM Signalized Intersection Capacity Analysis  
 107: MD 97 & Aspen Hill Rd/Cemetery

Existing  
 AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	5	205	5	5	5	385	850	15	5	1210	120
Future Volume (vph)	20	5	205	5	5	5	385	850	15	5	1210	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.5	6.0		8.0		6.0	7.0		6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00		0.97	0.91		1.00	0.91	1.00
Frbp, ped/bikes		1.00	0.98		1.00		1.00	1.00		1.00	1.00	0.96
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		0.95		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.96	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1790	1546		1750		3433	5061		1770	5085	1518
Flt Permitted		0.96	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1790	1546		1750		3433	5061		1770	5085	1518
Peak-hour factor, PHF	0.77	0.77	0.77	0.25	0.25	0.25	0.88	0.88	0.88	0.97	0.97	0.97
Adj. Flow (vph)	26	6	266	20	20	20	438	966	17	5	1247	124
RTOR Reduction (vph)	0	0	60	0	10	0	0	1	0	0	0	63
Lane Group Flow (vph)	0	32	206	0	50	0	438	982	0	5	1247	61
Confl. Peds. (#/hr)			29	29			10		21	29		10
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4									2
Actuated Green, G (s)		24.3	53.9		8.8		29.6	116.9		1.5	88.8	88.8
Effective Green, g (s)		24.3	53.9		8.8		29.6	116.9		1.5	88.8	88.8
Actuated g/C Ratio		0.14	0.30		0.05		0.16	0.65		0.01	0.49	0.49
Clearance Time (s)		7.5	6.0		8.0		6.0	7.0		6.0	7.0	7.0
Vehicle Extension (s)		3.0	5.0		5.0		5.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)		241	462		85		564	3286		14	2508	748
v/s Ratio Prot		0.02	c0.07		c0.03		c0.13	0.19		0.00	c0.25	
v/s Ratio Perm			0.06									0.04
v/c Ratio		0.13	0.45		0.58		0.78	0.30		0.36	0.50	0.08
Uniform Delay, d1		68.6	51.0		83.8		72.0	13.7		88.8	30.6	24.1
Progression Factor		1.00	1.00		1.00		1.25	0.81		1.24	0.34	0.04
Incremental Delay, d2		0.3	1.4		14.8		7.5	0.2		12.5	0.6	0.2
Delay (s)		68.8	52.4		98.6		97.4	11.4		122.4	11.1	1.0
Level of Service		E	D		F		F	B		F	B	A
Approach Delay (s)		54.2			98.6		37.9			10.6		
Approach LOS		D			F		D			B		
<b>Intersection Summary</b>												
HCM 2000 Control Delay			28.7				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			28.5		
Intersection Capacity Utilization			72.3%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
 108: MD 97 & Wendy Ln/Aspen Manor

Existing  
 AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	0	0	60	0	0	40	40	20	1210	10	40	1330
Future Volume (Veh/h)	0	0	60	0	0	40	40	20	1210	10	40	1330
Sign Control	Stop			Stop					Free			Free
Grade	0%			0%					0%			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
Hourly flow rate (vph)	0	0	65	0	0	43	0	22	1315	11	43	1446
Pedestrians	1			5								
Lane Width (ft)	12.0			12.0								
Walking Speed (ft/s)	3.5			3.5								
Percent Blockage	0			0								
Right turn flare (veh)												
Median type									None			None
Median storage veh												
Upstream signal (ft)									1156			557
pX, platoon unblocked	0.87	0.87	0.84	0.87	0.87	0.93	0.00	0.84			0.93	
vC, conflicting volume	2085	2935	510	2002	2956	449	0	1501			1331	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1220	2194	0	1125	2218	162	0	926			1107	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	0.0	4.1			4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2			2.2	
p0 queue free %	100	100	93	100	100	95	0	96			93	
cM capacity (veh/h)	103	35	909	118	33	794	0	615			582	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4		
Volume Total	65	43	22	526	526	274	43	578	578	343		
Volume Left	0	0	22	0	0	0	43	0	0	0		
Volume Right	65	43	0	0	0	11	0	0	0	54		
cSH	909	794	615	1700	1700	1700	582	1700	1700	1700		
Volume to Capacity	0.07	0.05	0.04	0.31	0.31	0.16	0.07	0.34	0.34	0.20		
Queue Length 95th (ft)	6	4	3	0	0	0	6	0	0	0		
Control Delay (s)	9.3	9.8	11.1	0.0	0.0	0.0	11.7	0.0	0.0	0.0		
Lane LOS	A	A	B				B					
Approach Delay (s)	9.3	9.8	0.2				0.3					
Approach LOS	A	A										
Intersection Summary												
Average Delay			0.6									
Intersection Capacity Utilization			43.9%	ICU Level of Service				A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis  
 108: MD 97 & Wendy Ln/Aspen Manor





















Existing  
 AM Peak



Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	50
Future Volume (Veh/h)	50
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	54
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Unsignalized Intersection Capacity Analysis  
 109: MD 97 & Ralph Rd/Aspen Hill Apt

Existing  
 AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	55	0	75	25	0	40	25	1140	15	45	15	1355
Future Volume (Veh/h)	55	0	75	25	0	40	25	1140	15	45	15	1355
Sign Control		Stop			Stop			Free				Free
Grade		0%			0%			0%				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
Hourly flow rate (vph)	60	0	82	27	0	43	27	1239	16	0	16	1473
Pedestrians					12							
Lane Width (ft)					12.0							
Walking Speed (ft/s)					3.5							
Percent Blockage					1							
Right turn flare (veh)			12									
Median type								None				None
Median storage (veh)												
Upstream signal (ft)								425				1288
pX, platoon unblocked	0.90	0.90	0.85	0.90	0.90	0.91	0.85			0.00	0.91	
vC, conflicting volume	2023	2834	499	1836	2834	433	1489			0	1267	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1051	1951	0	843	1951	14	975			0	934	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			0.0	4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			0.0	2.2	
p0 queue free %	59	100	91	86	100	95	96			0	98	
cM capacity (veh/h)	146	53	926	196	53	952	601			0	653	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4		
Volume Total	142	70	27	496	496	264	16	589	589	311		
Volume Left	60	27	27	0	0	0	16	0	0	0		
Volume Right	82	43	0	0	0	16	0	0	0	16		
cSH	347	382	601	1700	1700	1700	653	1700	1700	1700		
Volume to Capacity	0.41	0.18	0.04	0.29	0.29	0.16	0.02	0.35	0.35	0.18		
Queue Length 95th (ft)	48	17	4	0	0	0	2	0	0	0		
Control Delay (s)	24.6	16.5	11.3	0.0	0.0	0.0	10.7	0.0	0.0	0.0		
Lane LOS	C	C	B				B					
Approach Delay (s)	24.6	16.5	0.2				0.1					
Approach LOS	C	C										
Intersection Summary												
Average Delay			1.7									
Intersection Capacity Utilization			50.4%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis  
 109: MD 97 & Ralph Rd/Aspen Hill Apt

Existing  
 AM Peak



Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	15
Future Volume (Veh/h)	15
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	16
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage (veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Signalized Intersection Capacity Analysis  
110: MD 97 & Hewitt Ave.

Existing  
AM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶	↶	↷↷↷		↶	↷↷↷
Traffic Volume (vph)	180	150	1030	105	80	1375
Future Volume (vph)	180	150	1030	105	80	1375
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.91		1.00	0.91
Frpb, ped/bikes	1.00	0.97	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1537	4994		1770	5085
Flt Permitted	0.95	1.00	1.00		0.17	1.00
Satd. Flow (perm)	1770	1537	4994		318	5085
Peak-hour factor, PHF	0.90	0.90	0.87	0.87	0.92	0.92
Adj. Flow (vph)	200	167	1184	121	87	1495
RTOR Reduction (vph)	0	142	5	0	0	0
Lane Group Flow (vph)	200	25	1300	0	87	1495
Confl. Peds. (#/hr)	4	13		4	4	
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	4		2		1	6
Permitted Phases		4			6	
Actuated Green, G (s)	26.9	26.9	126.9		140.6	140.6
Effective Green, g (s)	26.9	26.9	126.9		140.6	140.6
Actuated g/C Ratio	0.15	0.15	0.71		0.78	0.78
Clearance Time (s)	6.5	6.5	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	0.2		3.0	0.2
Lane Grp Cap (vph)	264	229	3520		310	3971
v/s Ratio Prot	c0.11		0.26		0.01	c0.29
v/s Ratio Perm		0.02			0.21	
v/c Ratio	0.76	0.11	0.37		0.28	0.38
Uniform Delay, d1	73.4	66.2	10.6		5.9	6.1
Progression Factor	1.00	1.00	1.00		1.02	0.59
Incremental Delay, d2	11.7	0.2	0.3		0.5	0.3
Delay (s)	85.2	66.4	10.9		6.4	3.9
Level of Service	F	E	B		A	A
Approach Delay (s)	76.6		10.9			4.0
Approach LOS	E		B			A

Intersection Summary






















HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



# HCM Signalized Intersection Capacity Analysis

## 201: MD 185 & Independence St





























Existing  
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	10	190	50	10	5	70	860	35	5	2150	115
Future Volume (vph)	90	10	190	50	10	5	70	860	35	5	2150	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0			7.0		5.5	6.0		5.5	6.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.91		1.00	0.91	
Frbp, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.86			0.99		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00			0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1765	1597			1774		1770	5051		1770	5047	
Flt Permitted	0.73	1.00			0.23		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1354	1597			433		1770	5051		1770	5047	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	11	207	54	11	5	76	935	38	5	2337	125
RTOR Reduction (vph)	0	162	0	0	2	0	0	1	0	0	2	0
Lane Group Flow (vph)	98	56	0	0	68	0	76	972	0	5	2460	0
Confl. Peds. (#/hr)	2					2			2	2		
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8								
Actuated Green, G (s)	23.1	23.1			23.1		14.0	136.8		1.6	124.4	
Effective Green, g (s)	23.1	23.1			23.1		14.0	136.8		1.6	124.4	
Actuated g/C Ratio	0.13	0.13			0.13		0.08	0.76		0.01	0.69	
Clearance Time (s)	7.0	7.0			7.0		5.5	6.0		5.5	6.0	
Vehicle Extension (s)	4.0	4.0			4.0		4.0	0.2		4.0	0.2	
Lane Grp Cap (vph)	173	204			55		137	3838		15	3488	
v/s Ratio Prot		0.03					c0.04	0.19		0.00	c0.49	
v/s Ratio Perm	0.07				c0.16							
v/c Ratio	0.57	0.27			1.24		0.55	0.25		0.33	0.71	
Uniform Delay, d1	73.7	70.9			78.5		80.0	6.4		88.7	16.7	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.13	0.28	
Incremental Delay, d2	5.1	1.0			199.9		5.9	0.2		7.5	0.5	
Delay (s)	78.8	71.9			278.3		85.9	6.6		107.9	5.2	
Level of Service	E	E			F		F	A		F	A	
Approach Delay (s)		74.0			278.3			12.3			5.4	
Approach LOS		E			F			B			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			17.7				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			18.5		
Intersection Capacity Utilization			87.2%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

## 202: MD 185 & Aspen Hill Rd

Existing  
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 	  			  	
Traffic Volume (vph)	170	115	150	145	350	15	245	635	75	40	1975	340
Future Volume (vph)	170	115	150	145	350	15	245	635	75	40	1975	340
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	7.0		6.5	7.0		5.5	7.0	7.0	5.5	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.91	1.00	1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.91		1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1767	3200		1766	3514		3433	5085	1538	1770	4956	
Flt Permitted	0.27	1.00		0.44	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	493	3200		817	3514		3433	5085	1538	1770	4956	
Peak-hour factor, PHF	0.91	0.91	0.91	0.87	0.87	0.87	0.77	0.77	0.77	0.97	0.97	0.97
Adj. Flow (vph)	187	126	165	167	402	17	318	825	97	41	2036	351
RTOR Reduction (vph)	0	138	0	0	2	0	0	0	43	0	12	0
Lane Group Flow (vph)	187	153	0	167	417	0	318	825	54	41	2375	0
Confl. Peds. (#/hr)	11		7	7		11	5		7	7		5
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8					6			
Actuated Green, G (s)	45.9	29.6		45.7	29.5		22.8	99.8	99.8	8.4	85.4	
Effective Green, g (s)	45.9	29.6		45.7	29.5		22.8	99.8	99.8	8.4	85.4	
Actuated g/C Ratio	0.25	0.16		0.25	0.16		0.13	0.55	0.55	0.05	0.47	
Clearance Time (s)	6.5	7.0		6.5	7.0		5.5	7.0	7.0	5.5	7.0	
Vehicle Extension (s)	3.0	4.0		5.0	4.0		5.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)	241	526		292	575		434	2819	852	82	2351	
v/s Ratio Prot	c0.07	0.05		0.05	0.12		c0.09	0.16		0.02	c0.48	
v/s Ratio Perm	c0.13			0.09					0.03			
v/c Ratio	0.78	0.29		0.57	0.73		0.73	0.29	0.06	0.50	1.01	
Uniform Delay, d1	56.6	66.0		55.5	71.4		75.7	21.3	18.5	83.8	47.3	
Progression Factor	1.00	1.00		1.00	1.00		1.18	0.85	0.61	1.02	0.74	
Incremental Delay, d2	14.4	0.4		4.3	4.8		7.5	0.3	0.1	3.3	18.1	
Delay (s)	71.0	66.4		59.8	76.3		96.7	18.3	11.5	88.6	52.9	
Level of Service	E	E		E	E		F	B	B	F	D	
Approach Delay (s)		68.2			71.6			37.9			53.5	
Approach LOS		E			E			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			53.1				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			26.0		
Intersection Capacity Utilization			102.0%				ICU Level of Service			G		
Analysis Period (min)			15									
c Critical Lane Group												

---

Intersection has too many lanes per leg.

HCM All-Way analysis is limited to two lanes per leg.

Channelized right turn lanes are not counted.

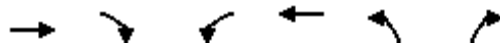
---

Intersection Sign configuration not allowed in HCM analysis.

---

HCM Signalized Intersection Capacity Analysis  
2000: HAWK & Aspen Hill Rd

Existing  
AM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		
Traffic Volume (vph)	230	0	0	510	0	0
Future Volume (vph)	230	0	0	510	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0		
Lane Util. Factor	0.95			0.95		
Frt	1.00			1.00		
Flt Protected	1.00			1.00		
Satd. Flow (prot)	3539			3539		
Flt Permitted	1.00			1.00		
Satd. Flow (perm)	3539			3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	250	0	0	554	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	250	0	0	554	0	0
Turn Type	NA			NA		
Protected Phases	2			6		
Permitted Phases						
Actuated Green, G (s)	11.4			11.4		
Effective Green, g (s)	11.4			11.4		
Actuated g/C Ratio	0.48			0.48		
Clearance Time (s)	6.0			6.0		
Vehicle Extension (s)	3.0			3.0		
Lane Grp Cap (vph)	1681			1681		
v/s Ratio Prot	0.07			0.16		
v/s Ratio Perm						
v/c Ratio	0.15			0.33		
Uniform Delay, d1	3.6			3.9		
Progression Factor	1.00			1.00		
Incremental Delay, d2	0.0			0.1		
Delay (s)	3.6			4.0		
Level of Service	A			A		
Approach Delay (s)	3.6			4.0	0.0	
Approach LOS	A			A	A	

Intersection Summary

HCM 2000 Control Delay	3.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	24.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	19.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis  
3000: MD 97

Existing  
AM Peak



Movement	NBL	NBT	SBT	SBR	NEL	NER	
Lane Configurations		↑↑↑	↑↑	↗			
Traffic Volume (veh/h)	0	1215	1165	1515	0	0	
Future Volume (Veh/h)	0	1215	1165	1515	0	0	
Sign Control		Free	Free		Stop		
Grade		0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	1321	1266	1647	0	0	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None	None				
Median storage (veh)							
Upstream signal (ft)		400	1086				
pX, platoon unblocked	0.63				0.67	0.63	
vC, conflicting volume	2913				1596	633	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	2861				0	0	
tC, single (s)	4.1				6.8	6.9	
tC, 2 stage (s)							
tF (s)	2.2				3.5	3.3	
p0 queue free %	100				100	100	
cM capacity (veh/h)	81				687	680	
Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	330	330	330	330	844	971	1098
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	549	1098
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.19	0.19	0.19	0.19	0.50	0.57	0.65
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0				0.0		
Approach LOS							
Intersection Summary							
Average Delay			0.0				
Intersection Capacity Utilization			65.9%		ICU Level of Service		C
Analysis Period (min)			15				

## Arterial Level of Service: NB MD 97

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Hewitt Ave.	110	12.9	55.9	0.4	27
Aspen Hill Apt	109	2.2	10.6	0.1	27
Aspen Manor	108	1.1	15.4	0.1	32
Cemetery	107	8.5	19.6	0.1	19
	106	1.2	11.7	0.1	32
MD 185	105	34.3	49.0	0.2	11
	3000	2.5	9.2	0.1	30
7-11	104	0.6	3.6	0.0	29
Postgate Terr	103	9.0	23.1	0.2	27
Crystal Springs Apt	102	2.7	19.3	0.2	39
Bel Pre Rd	101	35.2	48.6	0.2	13
Total		110.2	266.0	1.7	23

## Arterial Level of Service: SB MD 97

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Bel Pre Rd	101	93.8	180.1	1.1	23
Crystal Springs Apt	102	11.6	25.5	0.2	25
Heathfield Rd	103	13.1	29.6	0.2	25
Home Depot Ent.	104	12.1	26.0	0.2	24
	3000	2.4	4.7	0.0	22
MD 185	105	43.8	49.6	0.1	6
Northgate Plaza	106	3.7	19.5	0.2	28
Aspen Hill Rd	107	9.1	19.9	0.1	19
Wendy Ln	108	1.8	12.6	0.1	30
Ralph Rd	109	1.2	15.9	0.1	31
Hewitt Ave.	110	8.2	16.5	0.1	18
Total		200.9	399.9	2.4	21

## Arterial Level of Service: NB MD 185

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Independence St	201	7.1	43.3	0.5	38
Aspen Hill Rd	202	18.7	38.6	0.3	26
Home Depot Ent	203	2.6	13.2	0.1	36
	1000	1.0	7.4	0.1	38
MD 97	105	74.9	80.4	0.1	4
Total		104.2	183.0	1.0	20

Arterial Level of Service: SB MD 185

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
MD 97	105	72.0	87.0	0.2	8
	1000	7.1	13.8	0.1	22
Home Depot Ent	203	6.9	14.1	0.1	20
Aspen Hill Rd	202	62.4	73.2	0.1	7
Independence St	201	12.0	34.1	0.3	29
Total		160.4	222.1	0.8	13



Intersection: 23: Bend

Movement	WB	WB
Directions Served	T	
Maximum Queue (ft)	361	330
Average Queue (ft)	138	60
95th Queue (ft)	371	245
Link Distance (ft)	361	361
Upstream Blk Time (%)	0	0
Queuing Penalty (veh)	1	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 101: MD 97 & Bel Pre Rd

Movement	EB	EB	EB	EB	B23	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	T	L	T	T	R	L	L	T
Maximum Queue (ft)	203	306	256	265	40	305	572	562	175	195	232	244
Average Queue (ft)	119	88	87	37	1	235	254	256	105	98	104	130
95th Queue (ft)	205	192	172	175	22	345	480	486	243	172	188	220
Link Distance (ft)		361			2205		2748	2748				808
Upstream Blk Time (%)		0										
Queuing Penalty (veh)		0										
Storage Bay Dist (ft)	180		265	265		280			150	455	455	
Storage Blk Time (%)	4	0	0	0		9	5	27	1			
Queuing Penalty (veh)	21	1	0	1		22	17	70	1			

Intersection: 101: MD 97 & Bel Pre Rd

Movement	NB	NB	NB	SB	SB	SB	SB	SB	SB
Directions Served	T	T	R	L	L	T	T	T	R
Maximum Queue (ft)	256	298	223	120	584	950	977	990	65
Average Queue (ft)	152	158	14	44	205	630	666	683	54
95th Queue (ft)	235	252	105	99	603	1030	1054	1078	83
Link Distance (ft)	808	808				5872	5872	5872	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			200	560	560				40
Storage Blk Time (%)		4	0		0	18		50	2
Queuing Penalty (veh)		3	0		0	24		75	15

Intersection: 102: MD 97 & Crystal Springs Apt

Movement	WB	NB	SB	SB
Directions Served	R	T	T	T
Maximum Queue (ft)	56	8	659	824
Average Queue (ft)	24	0	86	86
95th Queue (ft)	47	6	493	497
Link Distance (ft)	234	1036	808	808
Upstream Blk Time (%)			0	0
Queuing Penalty (veh)			1	2
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 103: MD 97 & Heathfield Rd/Postgate Terr

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	T	TR	L	T	T	TR
Maximum Queue (ft)	359	273	210	205	208	262	28	240	260	257
Average Queue (ft)	204	122	96	77	87	114	7	100	114	117
95th Queue (ft)	397	253	189	191	213	259	23	236	256	260
Link Distance (ft)	346	247		860	860	860		1036	1036	1036
Upstream Blk Time (%)	20	8								
Queuing Penalty (veh)	0	0								
Storage Bay Dist (ft)			350				350			
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 104: MD 97 & Home Depot Ent./7-11

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	TR	L	T	T	TR
Maximum Queue (ft)	89	101	61	76	48	4	6	23	44	210	528	278
Average Queue (ft)	33	50	17	30	13	0	0	1	11	14	40	27
95th Queue (ft)	78	83	50	59	35	3	4	11	34	136	241	152
Link Distance (ft)	1151	1151	213	213	75	75	75	75		860	860	860
Upstream Blk Time (%)					0							
Queuing Penalty (veh)					0							
Storage Bay Dist (ft)									235			
Storage Blk Time (%)										0		
Queuing Penalty (veh)										0		

Intersection: 105: MD 97 & MD 185

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	L	T	TR	L	LT	T	TR	L	T	T
Maximum Queue (ft)	230	258	273	244	229	241	305	532	490	130	238	227
Average Queue (ft)	133	148	163	125	115	107	227	291	317	59	124	118
95th Queue (ft)	202	224	239	198	192	226	328	439	451	111	203	196
Link Distance (ft)		261	261	261				968	968		682	682
Upstream Blk Time (%)	0	1	2	0	0							
Queuing Penalty (veh)	0	2	4	1	0							
Storage Bay Dist (ft)	425				300	280	280			330		
Storage Blk Time (%)	0	1		0	0	0	1	9			0	
Queuing Penalty (veh)	0	1		0	0	0	2	41			0	

Intersection: 105: MD 97 & MD 185

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	T
Maximum Queue (ft)	233	130	225	386	370	200
Average Queue (ft)	126	26	31	276	248	175
95th Queue (ft)	203	78	118	402	352	236
Link Distance (ft)	682			260	260	
Upstream Blk Time (%)				15	10	
Queuing Penalty (veh)				86	61	
Storage Bay Dist (ft)		280	200			175
Storage Blk Time (%)	0	0	0	27	25	14
Queuing Penalty (veh)	0	0	0	7	97	55

Intersection: 106: MD 97 & Northgate Plaza

Movement	EB	NB	SB	SB
Directions Served	R	UL	UL	T
Maximum Queue (ft)	76	121	94	11
Average Queue (ft)	17	40	22	0
95th Queue (ft)	47	93	61	8
Link Distance (ft)	253			682
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		175	150	
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 107: MD 97 & Aspen Hill Rd/Cemetery

Movement	EB	EB	WB	NB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	L	T	T	TR	L	T	T	T
Maximum Queue (ft)	84	216	83	283	317	275	159	154	41	192	222	240
Average Queue (ft)	23	97	14	185	200	81	57	64	7	67	71	86
95th Queue (ft)	60	181	55	263	280	187	123	131	26	142	154	179
Link Distance (ft)	894	894	216			470	470	470		472	472	472
Upstream Blk Time (%)						0						
Queuing Penalty (veh)						0						
Storage Bay Dist (ft)				250	250				190			
Storage Blk Time (%)				2	3	1				0		17
Queuing Penalty (veh)				5	9	2				0		21

Intersection: 107: MD 97 & Aspen Hill Rd/Cemetery

Movement	SB
Directions Served	R
Maximum Queue (ft)	95
Average Queue (ft)	19
95th Queue (ft)	80
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	70
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 108: MD 97 & Wendy Ln/Aspen Manor

Movement	EB	WB	NB	SB	SB	SB
Directions Served	R	R	UL	L	T	TR
Maximum Queue (ft)	85	55	82	57	13	15
Average Queue (ft)	27	18	27	15	0	1
95th Queue (ft)	59	40	63	40	8	8
Link Distance (ft)	1228	342			470	470
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			200	150		
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 109: MD 97 & Ralph Rd/Aspen Hill Apt

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	TR	UL	TR
Maximum Queue (ft)	134	94	125	47	1	102	5
Average Queue (ft)	54	40	45	9	0	28	0
95th Queue (ft)	111	75	93	29	1	70	3
Link Distance (ft)	1188		370		352		650
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		300		125		175	
Storage Blk Time (%)						0	
Queuing Penalty (veh)						0	

Intersection: 110: MD 97 & Hewitt Ave.

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	R	T	T	TR	L	T	T	T
Maximum Queue (ft)	115	453	350	282	210	126	198	227	249
Average Queue (ft)	105	204	153	113	83	47	88	123	135
95th Queue (ft)	127	408	280	235	177	92	165	211	229
Link Distance (ft)		438	2204	2204	2204		352	352	352
Upstream Blk Time (%)		1							
Queuing Penalty (veh)		0							
Storage Bay Dist (ft)	90					140			
Storage Blk Time (%)	45	2					2		
Queuing Penalty (veh)	67	3					1		

Intersection: 201: MD 185 & Independence St

Movement	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	LTR	L	T	T	TR	L	T	T	TR
Maximum Queue (ft)	124	266	155	149	179	133	110	0	351	386	161
Average Queue (ft)	78	122	62	57	60	32	27	0	44	67	62
95th Queue (ft)	138	235	128	122	157	95	83	0	233	258	142
Link Distance (ft)		872	167		2375	2375	2375		1317	1317	1317
Upstream Blk Time (%)			0						0	0	
Queuing Penalty (veh)			0						0	0	
Storage Bay Dist (ft)	100			250				270			
Storage Blk Time (%)	12	14									
Queuing Penalty (veh)	24	13									

Intersection: 202: MD 185 & Aspen Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	NB
Directions Served	L	T	TR	L	T	TR	L	L	T	T	T	R
Maximum Queue (ft)	268	221	293	295	343	349	243	284	203	196	156	31
Average Queue (ft)	122	52	150	80	108	124	102	119	64	61	46	2
95th Queue (ft)	219	135	266	201	257	266	181	205	146	142	115	16
Link Distance (ft)		1834	1834		450	450			1317	1317	1317	
Upstream Blk Time (%)				0	0	0						
Queuing Penalty (veh)				0	0	0						
Storage Bay Dist (ft)	300			410			350	350				350
Storage Blk Time (%)	0	0		0	0		0	0				
Queuing Penalty (veh)	0	0		0	0		0	0				

Intersection: 202: MD 185 & Aspen Hill Rd

Movement	SB	SB	SB	SB
Directions Served	L	T	T	TR
Maximum Queue (ft)	114	613	655	683
Average Queue (ft)	29	478	535	567
95th Queue (ft)	78	706	739	773
Link Distance (ft)	618	618	618	618
Upstream Blk Time (%)		3	9	25
Queuing Penalty (veh)		17	54	148
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 203: MD 185 & Home Depot Ent

Movement	EB	EB	NB	NB	SB	SB	SB	SB
Directions Served	L	R	L	T	T	T	T	R
Maximum Queue (ft)	101	130	218	148	256	446	515	332
Average Queue (ft)	35	37	88	7	61	141	184	82
95th Queue (ft)	89	113	178	77	239	426	548	362
Link Distance (ft)	604	604		618	360	360	360	360
Upstream Blk Time (%)					0	2	10	3
Queuing Penalty (veh)					0	11	44	14
Storage Bay Dist (ft)			215					
Storage Blk Time (%)			2	0				
Queuing Penalty (veh)			4	0				

Intersection: 1000: MD 185

Movement	WB	WB	SB	SB
Directions Served	T	T	R	R
Maximum Queue (ft)	11	31	501	139
Average Queue (ft)	0	2	93	51
95th Queue (ft)	8	17	420	295
Link Distance (ft)	261	261	474	474
Upstream Blk Time (%)			4	3
Queuing Penalty (veh)			30	20
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2000: HAWK & Aspen Hill Rd

Movement	EB	EB	WB	WB
Directions Served	T	T	T	T
Maximum Queue (ft)	43	85	147	164
Average Queue (ft)	3	14	14	18
95th Queue (ft)	20	57	77	81
Link Distance (ft)	450	450	894	894
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3000: MD 97

































Movement	SB	SB	SB
Directions Served	T	TR	R
Maximum Queue (ft)	120	142	108
Average Queue (ft)	19	35	19
95th Queue (ft)	84	120	78
Link Distance (ft)	75	75	75
Upstream Blk Time (%)	2	5	2
Queuing Penalty (veh)	20	48	15
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 1184
------------------------------------

HCM Signalized Intersection Capacity Analysis  
101: MD 97 & Bel Pre Rd

Existing  
PM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		 			 		 	  		 	  		
Traffic Volume (vph)	210	385	235	145	220	180	215	1785	200	245	1140	120	
Future Volume (vph)	210	385	235	145	220	180	215	1785	200	245	1140	120	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1600	1900	1900	1750	1900	
Total Lost time (s)	9.0	7.0	4.0	9.0	7.0	4.0	8.5	7.0	7.0	8.5	7.0	7.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	3539	1562	1768	3539	1583	3433	4282	1583	3433	4684	1583	
Flt Permitted	0.47	1.00	1.00	0.26	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	880	3539	1562	485	3539	1583	3433	4282	1583	3433	4684	1583	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.97	0.97	0.96	0.96	0.96	
Adj. Flow (vph)	231	423	258	159	242	198	222	1840	206	255	1188	125	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	68	0	0	64	
Lane Group Flow (vph)	231	423	258	159	242	198	222	1840	138	255	1188	61	
Confl. Peds. (#/hr)			5	5									
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Perm	Prot	NA	Perm	
Protected Phases	7	4		3	8		1	6		5	2		
Permitted Phases	4		Free	8		Free			6			2	
Actuated Green, G (s)	46.3	28.3	180.0	43.5	26.9	180.0	16.3	86.0	86.0	17.6	87.3	87.3	
Effective Green, g (s)	46.3	28.3	180.0	43.5	26.9	180.0	16.3	86.0	86.0	17.6	87.3	87.3	
Actuated g/C Ratio	0.26	0.16	1.00	0.24	0.15	1.00	0.09	0.48	0.48	0.10	0.48	0.48	
Clearance Time (s)	9.0	7.0		9.0	7.0		8.5	7.0	7.0	8.5	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2	0.2	3.0	0.2	0.2	
Lane Grp Cap (vph)	315	556	1562	235	528	1583	310	2045	756	335	2271	767	
v/s Ratio Prot	c0.07	c0.12		0.06	0.07		0.06	c0.43		c0.07	0.25		
v/s Ratio Perm	0.12		c0.17	0.10		0.13			0.09			0.04	
v/c Ratio	0.73	0.76	0.17	0.68	0.46	0.13	0.72	0.90	0.18	0.76	0.52	0.08	
Uniform Delay, d1	57.9	72.6	0.0	57.4	69.9	0.0	79.6	43.1	26.9	79.2	32.0	24.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.29	0.63	0.34	1.00	1.00	1.00	
Incremental Delay, d2	8.5	6.1	0.2	7.5	0.6	0.2	6.6	6.0	0.5	9.8	0.9	0.2	
Delay (s)	66.4	78.7	0.2	64.9	70.5	0.2	109.2	33.2	9.5	88.9	32.9	25.0	
Level of Service	E	E	A	E	E	A	F	C	A	F	C	C	
Approach Delay (s)		53.4			45.8			38.5			41.3		
Approach LOS		D			D			D			D		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			42.7		HCM 2000 Level of Service						D		
HCM 2000 Volume to Capacity ratio			0.85										
Actuated Cycle Length (s)			180.0		Sum of lost time (s)					31.5			
Intersection Capacity Utilization			95.8%		ICU Level of Service					F			
Analysis Period (min)			15										
c Critical Lane Group													



HCM Unsignalized Intersection Capacity Analysis  
 102: MD 97 & Crystal Spring Apt



















Existing  
 PM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations		↗	↕↕↕↕			↕↕↕	
Traffic Volume (veh/h)	0	80	2120	50	0	1520	
Future Volume (Veh/h)	0	80	2120	50	0	1520	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	87	2304	54	0	1652	
Pedestrians	9						
Lane Width (ft)	12.0						
Walking Speed (ft/s)	3.5						
Percent Blockage	1						
Right turn flare (veh)							
Median type			None			None	
Median storage veh							
Upstream signal (ft)			1091			919	
pX, platoon unblocked	0.89	0.81			0.81		
vC, conflicting volume	2891	804			2367		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1429	0			1857		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	90			100		
cM capacity (veh/h)	111	868			258		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	87	922	922	515	551	551	551
Volume Left	0	0	0	0	0	0	0
Volume Right	87	0	0	54	0	0	0
cSH	868	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.10	0.54	0.54	0.30	0.32	0.32	0.32
Queue Length 95th (ft)	8	0	0	0	0	0	0
Control Delay (s)	9.6	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A						
Approach Delay (s)	9.6	0.0			0.0		
Approach LOS	A						
Intersection Summary							
Average Delay			0.2				
Intersection Capacity Utilization			53.7%		ICU Level of Service		A
Analysis Period (min)			15				























HCM Signalized Intersection Capacity Analysis  
103: MD 97 & Heathfield Rd/Postgate Terr

Existing  
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	5	85	35	5	20	110	2120	35	30	1445	45
Future Volume (vph)	30	5	85	35	5	20	110	2120	35	30	1445	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0		5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.91		1.00	0.91	
Frbp, ped/bikes		0.99			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.90			0.95		1.00	1.00		1.00	1.00	
Flt Protected		0.99			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1641			1710		1770	5066		1770	5058	
Flt Permitted		0.89			0.50		0.14	1.00		0.06	1.00	
Satd. Flow (perm)		1476			874		255	5066		109	5058	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.96	0.96	0.96	0.97	0.97	0.97
Adj. Flow (vph)	38	6	109	45	6	26	115	2208	36	31	1490	46
RTOR Reduction (vph)	0	53	0	0	11	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	100	0	0	66	0	115	2243	0	31	1535	0
Confl. Peds. (#/hr)	10		1	1		10	2		14	14		2
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)		18.7			18.7		146.1	138.3		140.5	135.5	
Effective Green, g (s)		18.7			18.7		146.1	138.3		140.5	135.5	
Actuated g/C Ratio		0.10			0.10		0.81	0.77		0.78	0.75	
Clearance Time (s)		7.0			7.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)		4.0			3.5		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		153			90		272	3892		131	3807	
v/s Ratio Prot							c0.02	c0.44		0.01	0.30	
v/s Ratio Perm		0.07			c0.08		0.32			0.18		
v/c Ratio		0.65			0.74		0.42	0.58		0.24	0.40	
Uniform Delay, d1		77.5			78.3		4.7	8.7		6.9	7.9	
Progression Factor		1.00			1.00		0.89	0.17		2.51	1.13	
Incremental Delay, d2		10.6			27.3		0.7	0.4		0.8	0.3	
Delay (s)		88.2			105.6		5.0	1.9		18.1	9.2	
Level of Service		F			F		A	A		B	A	
Approach Delay (s)		88.2			105.6			2.0			9.4	
Approach LOS		F			F			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			9.9				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			18.0		
Intersection Capacity Utilization			73.5%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
 104: MD 97 & Home Depot Ent./7-11























Existing  
 PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	0	155	10	0	45	80	2190	30	15	1455	95
Future Volume (Veh/h)	30	0	155	10	0	45	80	2190	30	15	1455	95
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.81	0.81	0.81	0.93	0.93	0.93	0.96	0.96	0.96
Hourly flow rate (vph)	34	0	176	12	0	56	86	2355	32	16	1516	99
Pedestrians		2			23							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		3.5			3.5							
Percent Blockage		0			2							
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)								553			933	
pX, platoon unblocked	0.85	0.85	0.90	0.85	0.85	0.80	0.90			0.80		
vC, conflicting volume	2612	4182	557	3279	4215	824	1617			2410		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1472	3311	104	2254	3351	0	1286			1893		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	40	100	79	0	100	93	82			93		
cM capacity (veh/h)	57	5	833	12	5	850	479			244		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	34	176	12	56	86	942	942	503	16	606	606	402
Volume Left	34	0	12	0	86	0	0	0	16	0	0	0
Volume Right	0	176	0	56	0	0	0	32	0	0	0	99
cSH	57	833	12	850	479	1700	1700	1700	244	1700	1700	1700
Volume to Capacity	0.60	0.21	1.00	0.07	0.18	0.55	0.55	0.30	0.07	0.36	0.36	0.24
Queue Length 95th (ft)	61	20	53	5	16	0	0	0	5	0	0	0
Control Delay (s)	137.5	10.5	674.4	9.5	14.1	0.0	0.0	0.0	20.8	0.0	0.0	0.0
Lane LOS	F	B	F	A	B				C			
Approach Delay (s)	31.0		126.9		0.5				0.2			
Approach LOS	D		F									
Intersection Summary												
Average Delay			3.8									
Intersection Capacity Utilization			64.7%		ICU Level of Service				C			
Analysis Period (min)			15									

# HCM Signalized Intersection Capacity Analysis



















## 105: MD 97 & MD 185

Existing  
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1080	600	25	290	360	85	30	1135	400	80	845	0
Future Volume (vph)	1080	600	25	290	360	85	30	1135	400	80	845	0
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1750	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		8.5	7.0	7.0	8.5	7.0	
Lane Util. Factor	0.94	0.95		0.86	0.86		1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.93	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	4990	3510		1522	4629		1770	5085	1470	1770	4684	
Flt Permitted	0.95	1.00		0.95	0.99		0.95	1.00	1.00	0.10	1.00	
Satd. Flow (perm)	4990	3510		1522	4629		1770	5085	1470	193	4684	
Peak-hour factor, PHF	0.93	0.93	0.93	0.91	0.91	0.91	0.96	0.96	0.96	0.94	0.94	0.94
Adj. Flow (vph)	1161	645	27	319	396	93	31	1182	417	85	899	0
RTOR Reduction (vph)	0	1	0	0	13	0	0	0	225	0	0	0
Lane Group Flow (vph)	1161	671	0	201	594	0	31	1182	192	85	899	0
Confl. Peds. (#/hr)	11		26	26		11	8		28	28		8
Turn Type	Split	NA		Split	NA		Prot	NA	Perm	pm+pt		NA
Protected Phases	3	3		4	4		1	6			5	2
Permitted Phases									6		2	
Actuated Green, G (s)	49.4	49.4		30.4	30.4		8.2	59.7	59.7	73.5	62.5	
Effective Green, g (s)	49.4	49.4		30.4	30.4		8.2	59.7	59.7	73.5	62.5	
Actuated g/C Ratio	0.27	0.27		0.17	0.17		0.05	0.33	0.33	0.41	0.35	
Clearance Time (s)	7.0	7.0		7.0	7.0		8.5	7.0	7.0	8.5	7.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	0.2	0.2	4.0	0.2	
Lane Grp Cap (vph)	1369	963		257	781		80	1686	487	175	1626	
v/s Ratio Prot	c0.23	0.19		c0.13	0.13		0.02	c0.23		c0.03	c0.19	
v/s Ratio Perm									0.13	0.17		
v/c Ratio	0.85	0.70		0.78	0.76		0.39	0.70	0.40	0.49	0.55	
Uniform Delay, d1	61.8	58.6		71.6	71.3		83.5	52.4	46.3	37.1	47.5	
Progression Factor	0.80	0.80		1.00	1.00		1.37	0.73	0.47	0.99	0.87	
Incremental Delay, d2	4.1	1.8		15.1	4.7		3.9	2.3	2.2	2.7	1.3	
Delay (s)	53.7	48.8		86.7	76.0		118.4	40.3	24.1	39.4	42.4	
Level of Service	D	D		F	E		F	D	C	D	D	
Approach Delay (s)		51.9			78.6			37.7			42.1	
Approach LOS		D			E			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			49.8				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			29.5		
Intersection Capacity Utilization			92.0%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
 106: MD 97 & Northgate Plaza

Existing  
 PM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	
Lane Configurations									  				
Traffic Volume (veh/h)	0	0	45	0	0	0	10	40	1500	0	65	0	
Future Volume (Veh/h)	0	0	45	0	0	0	10	40	1500	0	65	0	
Sign Control	Stop			Stop			Free						
Grade	0%			0%			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	
Hourly flow rate (vph)	0	0	49	0	0	0	0	43	1630	0	0	0	
Pedestrians	8												
Lane Width (ft)	12.0												
Walking Speed (ft/s)	3.5												
Percent Blockage	1												
Right turn flare (veh)													
Median type	None												
Median storage (veh)													
Upstream signal (ft)	547												
pX, platoon unblocked	0.92	0.92	0.86	0.92	0.92	0.85	0.00	0.86			0.00	0.85	
vC, conflicting volume	1787	2874	419	2135	2915	543	0	1199			0	1630	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	524	1707	0	902	1752	0	0	665			0	1120	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	0.0	4.1			0.0	4.1	
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2			0.0	2.2	
p0 queue free %	100	100	95	100	100	100	0	95			0	100	
cM capacity (veh/h)	379	78	926	193	73	921	0	786			0	526	
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4				
Volume Total	49	43	543	543	543	0	444	444	304				
Volume Left	0	43	0	0	0	0	0	0	0				
Volume Right	49	0	0	0	0	0	0	0	82				
cSH	926	786	1700	1700	1700	1700	1700	1700	1700				
Volume to Capacity	0.05	0.05	0.32	0.32	0.32	0.00	0.26	0.26	0.18				
Queue Length 95th (ft)	4	4	0	0	0	0	0	0	0				
Control Delay (s)	9.1	9.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Lane LOS	A	A											
Approach Delay (s)	9.1	0.3					0.0						
Approach LOS	A												
Intersection Summary													
Average Delay			0.3										
Intersection Capacity Utilization			39.2%	ICU Level of Service					A				
Analysis Period (min)			15										

HCM Unsignalized Intersection Capacity Analysis  
 106: MD 97 & Northgate Plaza






















Existing  
 PM Peak



Movement	SBT	SBR
Lane Configurations	↑↑↑	↔
Traffic Volume (veh/h)	1020	75
Future Volume (Veh/h)	1020	75
Sign Control	Free	
Grade	0%	
Peak Hour Factor	0.92	0.92
Hourly flow rate (vph)	1109	82
Pedestrians		
Lane Width (ft)		
Walking Speed (ft/s)		
Percent Blockage		
Right turn flare (veh)		
Median type	None	
Median storage (veh)		
Upstream signal (ft)	801	
pX, platoon unblocked		
vC, conflicting volume		
vC1, stage 1 conf vol		
vC2, stage 2 conf vol		
vCu, unblocked vol		
tC, single (s)		
tC, 2 stage (s)		
tF (s)		
p0 queue free %		
cM capacity (veh/h)		
Direction, Lane #		

HCM Signalized Intersection Capacity Analysis  
107: MD 97 & Aspen Hill Rd/Cemetery

Existing  
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	5	555	10	10	5	400	1415	15	5	975	95
Future Volume (vph)	130	5	555	10	10	5	400	1415	15	5	975	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.5	6.0		8.0		6.0	7.0		6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00		0.97	0.91		1.00	0.91	1.00
Frbp, ped/bikes		1.00	0.98		1.00		1.00	1.00		1.00	1.00	0.96
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		0.97		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1777	1546		1777		3433	5070		1770	5085	1518
Flt Permitted		0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1777	1546		1777		3433	5070		1770	5085	1518
Peak-hour factor, PHF	0.96	0.96	0.96	0.57	0.57	0.57	0.96	0.96	0.96	0.94	0.94	0.94
Adj. Flow (vph)	135	5	578	18	18	9	417	1474	16	5	1037	101
RTOR Reduction (vph)	0	0	74	0	5	0	0	0	0	0	0	56
Lane Group Flow (vph)	0	140	504	0	40	0	417	1490	0	5	1037	45
Confl. Peds. (#/hr)			29	29			10		21	29		10
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4									2
Actuated Green, G (s)		28.7	63.0		8.0		34.3	113.3		1.5	80.5	80.5
Effective Green, g (s)		28.7	63.0		8.0		34.3	113.3		1.5	80.5	80.5
Actuated g/C Ratio		0.16	0.35		0.04		0.19	0.63		0.01	0.45	0.45
Clearance Time (s)		7.5	6.0		8.0		6.0	7.0		6.0	7.0	7.0
Vehicle Extension (s)		3.0	5.0		5.0		5.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)		283	541		78		654	3191		14	2274	678
v/s Ratio Prot		0.08	c0.18		c0.02		0.12	c0.29		0.00	0.20	
v/s Ratio Perm			0.15									0.03
v/c Ratio		0.49	0.93		0.52		0.64	0.47		0.36	0.46	0.07
Uniform Delay, d1		69.0	56.4		84.1		67.1	17.5		88.8	34.5	28.3
Progression Factor		1.00	1.00		1.00		1.03	0.42		1.30	0.38	1.62
Incremental Delay, d2		1.4	23.7		11.0		2.6	0.4		12.8	0.6	0.2
Delay (s)		70.4	80.2		95.1		71.6	7.9		128.6	13.6	46.1
Level of Service		E	F		F		E	A		F	B	D
Approach Delay (s)		78.3			95.1		21.8			17.0		
Approach LOS		E			F		C			B		
<b>Intersection Summary</b>												
HCM 2000 Control Delay			31.9				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			28.5		
Intersection Capacity Utilization			76.7%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
 108: MD 97 & Wendy Ln/Aspen Manor

Existing  
 PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations			↗			↗		↘	↑↑↑		↗	↑↑↑
Traffic Volume (veh/h)	0	0	120	0	0	135	100	30	1695	30	165	1300
Future Volume (Veh/h)	0	0	120	0	0	135	100	30	1695	30	165	1300
Sign Control		Stop			Stop				Free			Free
Grade		0%			0%				0%			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
Hourly flow rate (vph)	0	0	130	0	0	147	0	33	1842	33	179	1413
Pedestrians		10			8							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		3.5			3.5							
Percent Blockage		1			1							
Right turn flare (veh)												
Median type									None			None
Median storage veh												
Upstream signal (ft)									1156			557
pX, platoon unblocked	0.91	0.91	0.87	0.91	0.91	0.84	0.00	0.87			0.84	
vC, conflicting volume	2649	3771	522	2892	3796	638	0	1505			1883	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1483	2717	0	1749	2744	0	0	1050			1394	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	0.0	4.1			4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2			2.2	
p0 queue free %	100	100	86	100	100	84	0	94			56	
cM capacity (veh/h)	41	10	932	26	9	907	0	566			407	
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>NB 3</b>	<b>NB 4</b>	<b>SB 1</b>	<b>SB 2</b>	<b>SB 3</b>	<b>SB 4</b>		
Volume Total	130	147	33	737	737	401	179	565	565	365		
Volume Left	0	0	33	0	0	0	179	0	0	0		
Volume Right	130	147	0	0	0	33	0	0	0	82		
cSH	932	907	566	1700	1700	1700	407	1700	1700	1700		
Volume to Capacity	0.14	0.16	0.06	0.43	0.43	0.24	0.44	0.33	0.33	0.21		
Queue Length 95th (ft)	12	14	5	0	0	0	55	0	0	0		
Control Delay (s)	9.5	9.7	11.7	0.0	0.0	0.0	20.6	0.0	0.0	0.0		
Lane LOS	A	A	B				C					
Approach Delay (s)	9.5	9.7	0.2				2.2					
Approach LOS	A	A										
<b>Intersection Summary</b>												
Average Delay			1.7									
Intersection Capacity Utilization			51.5%		ICU Level of Service				A			
Analysis Period (min)			15									



HCM Unsignalized Intersection Capacity Analysis  
 108: MD 97 & Wendy Ln/Aspen Manor

Existing  
 PM Peak



Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	75
Future Volume (Veh/h)	75
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	82
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage (veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Unsignalized Intersection Capacity Analysis  
 109: MD 97 & Ralph Rd/Aspen Hill Apt

Existing  
 PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations		↕	↗		↔		↖	↑↑↑			↙	↑↑↑
Traffic Volume (veh/h)	30	0	110	10	0	40	40	1665	35	120	35	1320
Future Volume (Veh/h)	30	0	110	10	0	40	40	1665	35	120	35	1320
Sign Control		Stop			Stop			Free				Free
Grade		0%			0%			0%				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
Hourly flow rate (vph)	33	0	120	11	0	43	43	1810	38	0	38	1435
Pedestrians		7			41							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		3.5			3.5							
Percent Blockage		1			4							
Right turn flare (veh)				12								
Median type								None				None
Median storage (veh)												
Upstream signal (ft)								425				1288
pX, platoon unblocked	0.86	0.86	0.91	0.86	0.86	0.82	0.91			0.00	0.82	
vC, conflicting volume	2275	3518	510	2510	3523	663	1491			0	1889	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1186	2624	93	1459	2631	0	1177			0	1303	
tC, single (s)	*5.0	6.5	6.9	7.5	6.5	6.9	4.1			0.0	4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			0.0	2.2	
p0 queue free %	86	100	86	80	100	95	92			0	91	
cM capacity (veh/h)	229	16	850	54	16	851	530			0	414	
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>NB 3</b>	<b>NB 4</b>	<b>SB 1</b>	<b>SB 2</b>	<b>SB 3</b>	<b>SB 4</b>		
Volume Total	153	54	43	724	724	400	38	574	574	336		
Volume Left	33	11	43	0	0	0	38	0	0	0		
Volume Right	120	43	0	0	0	38	0	0	0	49		
cSH	1060	214	530	1700	1700	1700	414	1700	1700	1700		
Volume to Capacity	0.14	0.25	0.08	0.43	0.43	0.24	0.09	0.34	0.34	0.20		
Queue Length 95th (ft)	13	24	7	0	0	0	8	0	0	0		
Control Delay (s)	12.8	27.5	12.4	0.0	0.0	0.0	14.6	0.0	0.0	0.0		
Lane LOS	B	D	B				B					
Approach Delay (s)	12.8	27.5	0.3				0.4					
Approach LOS	B	D										
<b>Intersection Summary</b>												
Average Delay			1.3									
Intersection Capacity Utilization			61.3%		ICU Level of Service				B			
Analysis Period (min)			15									

\* User Entered Value

HCM Unsignalized Intersection Capacity Analysis  
 109: MD 97 & Ralph Rd/Aspen Hill Apt
















Existing  
 PM Peak



Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	45
Future Volume (Veh/h)	45
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	49
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage (veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Signalized Intersection Capacity Analysis  
110: MD 97 & Hewitt Ave.

Existing  
PM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			  			  
Traffic Volume (vph)	105	150	1590	180	215	1225
Future Volume (vph)	105	150	1590	180	215	1225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.91		1.00	0.91
Frpb, ped/bikes	1.00	0.97	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1543	4946		1770	5085
Flt Permitted	0.95	1.00	1.00		0.08	1.00
Satd. Flow (perm)	1770	1543	4946		152	5085
Peak-hour factor, PHF	0.94	0.94	0.96	0.96	0.96	0.96
Adj. Flow (vph)	112	160	1656	188	224	1276
RTOR Reduction (vph)	0	142	6	0	0	0
Lane Group Flow (vph)	112	18	1838	0	224	1276
Confl. Peds. (#/hr)	9	10		16	16	
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	4		2		1	6
Permitted Phases		4			6	
Actuated Green, G (s)	20.2	20.2	122.3		147.3	147.3
Effective Green, g (s)	20.2	20.2	122.3		147.3	147.3
Actuated g/C Ratio	0.11	0.11	0.68		0.82	0.82
Clearance Time (s)	6.5	6.5	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	0.2		3.0	0.2
Lane Grp Cap (vph)	198	173	3360		295	4161
v/s Ratio Prot	c0.06		0.37		c0.08	0.25
v/s Ratio Perm		0.01			c0.54	
v/c Ratio	0.57	0.10	0.55		0.76	0.31
Uniform Delay, d1	75.7	71.8	14.7		35.6	4.0
Progression Factor	1.00	1.00	1.00		0.72	1.28
Incremental Delay, d2	3.7	0.3	0.6		9.5	0.2
Delay (s)	79.4	72.0	15.4		35.1	5.2
Level of Service	E	E	B		D	A
Approach Delay (s)	75.1		15.4			9.7
Approach LOS	E		B			A
<b>Intersection Summary</b>						
HCM 2000 Control Delay			17.5		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.75			
Actuated Cycle Length (s)			180.0		Sum of lost time (s)	18.5
Intersection Capacity Utilization			75.8%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis  
 201: MD 185 & Independence St

Existing  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	15	110	105	30	25	90	1655	90	15	970	170
Future Volume (vph)	125	15	110	105	30	25	90	1655	90	15	970	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0			7.0		5.5	6.0		5.5	6.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.91		1.00	0.91	
Frbp, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.97	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.87			0.98		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1725	1616			1752		1770	5039		1770	4918	
Flt Permitted	0.65	1.00			0.60		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1182	1616			1085		1770	5039		1770	4918	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	136	16	120	114	33	27	98	1799	98	16	1054	185
RTOR Reduction (vph)	0	99	0	0	3	0	0	2	0	0	12	0
Lane Group Flow (vph)	136	37	0	0	171	0	98	1895	0	16	1227	0
Confl. Peds. (#/hr)	25					25	10		8	8		10
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8								
Actuated Green, G (s)	30.8	30.8			30.8		16.1	125.3		5.4	114.6	
Effective Green, g (s)	30.8	30.8			30.8		16.1	125.3		5.4	114.6	
Actuated g/C Ratio	0.17	0.17			0.17		0.09	0.70		0.03	0.64	
Clearance Time (s)	7.0	7.0			7.0		5.5	6.0		5.5	6.0	
Vehicle Extension (s)	4.0	4.0			4.0		4.0	0.2		4.0	0.2	
Lane Grp Cap (vph)	202	276			185		158	3507		53	3131	
v/s Ratio Prot		0.02					c0.06	c0.38		0.01	0.25	
v/s Ratio Perm	0.12				c0.16							
v/c Ratio	0.67	0.13			0.92		0.62	0.54		0.30	0.39	
Uniform Delay, d1	69.9	63.3			73.4		79.0	13.3		85.5	15.8	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.20	0.46	
Incremental Delay, d2	9.3	0.3			45.0		8.3	0.6		3.8	0.3	
Delay (s)	79.2	63.6			118.4		87.3	13.9		106.4	7.6	
Level of Service	E	E			F		F	B		F	A	
Approach Delay (s)		71.4			118.4			17.5			8.8	
Approach LOS		E			F			B			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			23.3				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			18.5		
Intersection Capacity Utilization			85.8%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
202: MD 185 & Aspen Hill Rd

Existing  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	325	375	125	190	235	80	210	1390	205	110	840	205
Future Volume (vph)	325	375	125	190	235	80	210	1390	205	110	840	205
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	7.0		6.5	7.0		5.5	7.0	7.0	5.5	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.91	1.00	1.00	0.91	
Frbp, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	0.95	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	0.96		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1767	3380		1766	3382		3433	5085	1511	1770	4910	
Flt Permitted	0.27	1.00		0.27	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	510	3380		509	3382		3433	5085	1511	1770	4910	
Peak-hour factor, PHF	0.96	0.96	0.96	0.87	0.87	0.87	0.97	0.97	0.97	0.96	0.96	0.96
Adj. Flow (vph)	339	391	130	218	270	92	216	1433	211	115	875	214
RTOR Reduction (vph)	0	19	0	0	21	0	0	0	89	0	18	0
Lane Group Flow (vph)	339	502	0	218	341	0	216	1433	122	115	1071	0
Confl. Peds. (#/hr)	11		16	16		11	6		14	14		6
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8					6			
Actuated Green, G (s)	66.5	36.2		52.9	29.1		18.5	77.0	77.0	17.0	75.5	
Effective Green, g (s)	66.5	36.2		52.9	29.1		18.5	77.0	77.0	17.0	75.5	
Actuated g/C Ratio	0.37	0.20		0.29	0.16		0.10	0.43	0.43	0.09	0.42	
Clearance Time (s)	6.5	7.0		6.5	7.0		5.5	7.0	7.0	5.5	7.0	
Vehicle Extension (s)	3.0	4.0		5.0	4.0		5.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)	404	679		315	546		352	2175	646	167	2059	
v/s Ratio Prot	c0.14	0.15		0.09	0.10		0.06	c0.28		c0.06	0.22	
v/s Ratio Perm	c0.17			0.11					0.08			
v/c Ratio	0.84	0.74		0.69	0.62		0.61	0.66	0.19	0.69	0.52	
Uniform Delay, d1	45.5	67.5		51.7	70.4		77.3	41.0	32.1	78.9	38.8	
Progression Factor	1.00	1.00		1.00	1.00		1.14	0.77	0.58	0.90	1.38	
Incremental Delay, d2	14.2	4.5		8.1	2.5		3.9	1.3	0.5	10.4	0.9	
Delay (s)	59.7	72.0		59.8	72.9		91.8	32.9	19.0	81.3	54.3	
Level of Service	E	E		E	E		F	C	B	F	D	
Approach Delay (s)		67.1			68.0			38.1			56.9	
Approach LOS		E			E			D			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			52.5				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)				26.0	
Intersection Capacity Utilization			90.1%				ICU Level of Service				E	
Analysis Period (min)			15									
c Critical Lane Group												

---

Intersection has too many lanes per leg.

HCM All-Way analysis is limited to two lanes per leg.

Channelized right turn lanes are not counted.

---

Intersection Sign configuration not allowed in HCM analysis.

---



HCM Signalized Intersection Capacity Analysis  
2000: HAWK & Aspen Hill Rd

Existing  
PM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		
Traffic Volume (vph)	690	0	0	505	0	0
Future Volume (vph)	690	0	0	505	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0		
Lane Util. Factor	0.95			0.95		
Frt	1.00			1.00		
Flt Protected	1.00			1.00		
Satd. Flow (prot)	3539			3539		
Flt Permitted	1.00			1.00		
Satd. Flow (perm)	3539			3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	750	0	0	549	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	750	0	0	549	0	0
Turn Type	NA			NA		
Protected Phases	2			6		
Permitted Phases						
Actuated Green, G (s)	14.1			14.1		
Effective Green, g (s)	14.1			14.1		
Actuated g/C Ratio	0.53			0.53		
Clearance Time (s)	6.0			6.0		
Vehicle Extension (s)	3.0			3.0		
Lane Grp Cap (vph)	1868			1868		
v/s Ratio Prot	c0.21			0.16		
v/s Ratio Perm						
v/c Ratio	0.40			0.29		
Uniform Delay, d1	3.8			3.5		
Progression Factor	1.00			1.00		
Incremental Delay, d2	0.1			0.1		
Delay (s)	3.9			3.6		
Level of Service	A			A		
Approach Delay (s)	3.9			3.6	0.0	
Approach LOS	A			A	A	







Intersection Summary

HCM 2000 Control Delay	3.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	26.7	Sum of lost time (s)	10.5
Intersection Capacity Utilization	24.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis  
3000: MD 97

Existing  
PM Peak

							
Movement	NBL	NBT	SBT	SBR	NEL	NER	
Lane Configurations		↑↑↑	↑↑	↗			
Traffic Volume (veh/h)	0	2300	925	695	0	0	
Future Volume (Veh/h)	0	2300	925	695	0	0	
Sign Control		Free	Free		Stop		
Grade		0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	2500	1005	755	0	0	
<b>Pedestrians</b>							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None	None				
Median storage (veh)							
Upstream signal (ft)		400	1086				
pX, platoon unblocked	0.90				0.86	0.90	
vC, conflicting volume	1760				1630	502	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1622				230	225	
tC, single (s)	4.1				6.8	6.9	
tC, 2 stage (s)							
tF (s)	2.2				3.5	3.3	
p0 queue free %	100				100	100	
cM capacity (veh/h)	357				635	701	
<b>Direction, Lane #</b>	<b>NB 1</b>	<b>NB 2</b>	<b>NB 3</b>	<b>NB 4</b>	<b>SB 1</b>	<b>SB 2</b>	<b>SB 3</b>
Volume Total	625	625	625	625	670	587	503
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	252	503
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.37	0.37	0.37	0.37	0.39	0.35	0.30
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0				0.0		
Approach LOS							
<b>Intersection Summary</b>							
Average Delay			0.0				
Intersection Capacity Utilization			36.7%		ICU Level of Service		A
Analysis Period (min)			15				

## Arterial Level of Service: NB MD 97

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Hewitt Ave.	110	20.4	63.2	0.4	24
Aspen Hill Apt	109	3.3	11.7	0.1	25
Aspen Manor	108	1.9	16.2	0.1	31
Cemetery	107	8.5	19.6	0.1	19
	106	1.7	12.0	0.1	31
MD 185	105	38.8	53.5	0.2	10
	3000	4.2	10.9	0.1	25
7-11	104	1.0	4.1	0.0	26
Postgate Terr	103	6.6	20.8	0.2	31
Crystal Spring Apt	102	3.4	19.9	0.2	37
Bel Pre Rd	101	37.0	50.6	0.2	12
Total		126.9	282.4	1.7	21

## Arterial Level of Service: SB MD 97

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Bel Pre Rd	101	34.0	89.0	0.7	28
Crystal Spring Apt	102	6.1	20.0	0.2	31
Heathfield Rd	103	15.0	31.5	0.2	24
Home Depot Ent.	104	6.6	20.5	0.2	31
	3000	1.3	3.6	0.0	29
MD 185	105	38.8	44.5	0.1	6
Northgate Plaza	106	4.1	19.9	0.2	27
Aspen Hill Rd	107	19.5	30.2	0.1	12
Wendy Ln	108	3.0	13.8	0.1	28
Ralph Rd	109	1.5	16.7	0.1	30
Hewitt Ave.	110	8.9	17.2	0.1	17
Total		138.9	306.9	1.9	23

## Arterial Level of Service: NB MD 185

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Independence St	201	14.2	50.6	0.5	33
Aspen Hill Rd	202	45.1	66.2	0.3	15
Home Depot Ent	203	6.2	17.2	0.1	28
	1000	3.3	9.6	0.1	30
MD 97	105	51.9	57.6	0.1	5
Total		120.7	201.2	1.0	18

Arterial Level of Service: SB MD 185

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
MD 97	105	73.0	86.8	0.2	8
	1000	4.5	11.3	0.1	27
Home Depot Ent	203	1.5	8.5	0.1	34
Aspen Hill Rd	202	55.7	66.2	0.1	7
Independence St	201	7.5	29.7	0.3	34
Total		142.1	202.5	0.8	14

Intersection: 24: Bend

Movement	WB	WB
Directions Served	T	
Maximum Queue (ft)	191	107
Average Queue (ft)	17	5
95th Queue (ft)	102	46
Link Distance (ft)	361	361
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 101: MD 97 & Bel Pre Rd

Movement	EB	EB	EB	EB	B24	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	T	L	T	T	R	L	L	T
Maximum Queue (ft)	205	432	290	273	386	215	184	197	80	190	284	512
Average Queue (ft)	175	248	202	18	45	107	101	94	9	104	112	261
95th Queue (ft)	247	439	321	129	245	193	161	170	76	166	203	447
Link Distance (ft)	361		2203			2717		2717		808		
Upstream Blk Time (%)	6											
Queuing Penalty (veh)	0											
Storage Bay Dist (ft)	180	265		265	280		150		455	455		
Storage Blk Time (%)	17	13	2	0	0		2					0
Queuing Penalty (veh)	105	82	8	0	0		3					0

Intersection: 101: MD 97 & Bel Pre Rd

Movement	NB	NB	NB	SB	SB	SB	SB	SB	SB
Directions Served	T	T	R	L	L	T	T	T	R
Maximum Queue (ft)	488	502	225	179	185	265	301	293	65
Average Queue (ft)	284	316	109	91	90	156	172	163	44
95th Queue (ft)	454	488	293	160	158	264	280	287	88
Link Distance (ft)	808	808				3584	3584	3584	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			200	560	560				40
Storage Blk Time (%)			21	0				25	1
Queuing Penalty (veh)			42	0				30	5

Intersection: 102: MD 97 & Crystal Spring Apt

Movement	WB	NB	SB	SB
Directions Served	R	TR	T	T
Maximum Queue (ft)	106	15	158	5
Average Queue (ft)	47	1	6	0
95th Queue (ft)	90	10	115	3
Link Distance (ft)	234	1036	808	808
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 103: MD 97 & Heathfield Rd/Postgate Terr

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	T	TR	L	T	T	TR
Maximum Queue (ft)	271	175	143	164	194	226	70	344	367	340
Average Queue (ft)	105	61	47	52	75	95	18	137	158	141
95th Queue (ft)	217	129	99	135	176	205	49	307	334	315
Link Distance (ft)	346	247		860	860	860		1036	1036	1036
Upstream Blk Time (%)	0	0								
Queuing Penalty (veh)	0	0								
Storage Bay Dist (ft)			350				350			
Storage Blk Time (%)								0		
Queuing Penalty (veh)								0		

Intersection: 104: MD 97 & Home Depot Ent./7-11

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	T	TR
Maximum Queue (ft)	93	160	60	80	100	15	11	51	17	38	16
Average Queue (ft)	34	70	13	30	38	0	0	9	1	2	1
95th Queue (ft)	75	138	43	66	84	5	7	33	12	17	5
Link Distance (ft)	1151	1151	213	213	76	76	76		860	860	860
Upstream Blk Time (%)					2						
Queuing Penalty (veh)					12						
Storage Bay Dist (ft)								235			
Storage Blk Time (%)											
Queuing Penalty (veh)											

Intersection: 105: MD 97 & MD 185

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	L	T	TR	L	LT	T	TR	L	T	T
Maximum Queue (ft)	278	388	401	390	279	226	259	324	359	91	384	415
Average Queue (ft)	213	257	285	198	180	119	160	145	192	36	206	215
95th Queue (ft)	305	381	409	325	277	207	236	255	313	77	338	355
Link Distance (ft)		280	280	280				968	968		682	682
Upstream Blk Time (%)	2	9	18	3	1							
Queuing Penalty (veh)	0	52	104	18	0							
Storage Bay Dist (ft)	425				300	280	280			330		
Storage Blk Time (%)	2	9		3	1	0	0	0			1	
Queuing Penalty (veh)	7	33		10	2	0	0	0			0	

Intersection: 105: MD 97 & MD 185

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	T
Maximum Queue (ft)	492	305	225	392	361	200
Average Queue (ft)	232	151	94	220	203	153
95th Queue (ft)	413	312	215	367	346	240
Link Distance (ft)	682			253	253	
Upstream Blk Time (%)				7	6	
Queuing Penalty (veh)				33	28	
Storage Bay Dist (ft)		280	200			175
Storage Blk Time (%)	3	0	0	14	12	6
Queuing Penalty (veh)	13	0	0	11	35	18

Intersection: 106: MD 97 & Northgate Plaza

Movement	EB	NB	SB	SB
Directions Served	R	UL	UL	TR
Maximum Queue (ft)	63	85	128	30
Average Queue (ft)	21	22	39	2
95th Queue (ft)	48	59	96	14
Link Distance (ft)	253			682
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		175	150	
Storage Blk Time (%)			0	
Queuing Penalty (veh)			2	

Intersection: 107: MD 97 & Aspen Hill Rd/Cemetery

Movement	EB	EB	WB	NB	NB	NB	NB	NB	SB	SB	SB	SB	
Directions Served	LT	R	LTR	L	L	T	T	TR	L	T	T	T	
Maximum Queue (ft)	274	651	86	287	292	238	256	287	38	264	242	266	
Average Queue (ft)	138	382	24	167	171	52	70	111	6	125	112	119	
95th Queue (ft)	243	586	68	250	260	150	183	244	26	226	201	225	
Link Distance (ft)	894	894	216			470	470	470		466	466	466	
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (ft)				250	250				190				
Storage Blk Time (%)				2	2	0				2			27
Queuing Penalty (veh)				8	9	1				0			26

Intersection: 107: MD 97 & Aspen Hill Rd/Cemetery

Movement	SB
Directions Served	R
Maximum Queue (ft)	95
Average Queue (ft)	22
95th Queue (ft)	87
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	70
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 108: MD 97 & Wendy Ln/Aspen Manor

Movement	EB	WB	NB	NB	SB	SB	SB	SB
Directions Served	R	R	UL	TR	L	T	T	TR
Maximum Queue (ft)	486	143	168	22	218	304	75	96
Average Queue (ft)	192	55	81	1	100	24	3	6
95th Queue (ft)	462	104	152	11	200	153	46	51
Link Distance (ft)	1228	342		650		470	470	470
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			200		150			
Storage Blk Time (%)			0		9	0		
Queuing Penalty (veh)			0		40	0		



Intersection: 109: MD 97 & Ralph Rd/Aspen Hill Apt

Movement	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	T	TR	UL	T	T	TR
Maximum Queue (ft)	735	254	150	63	3	9	14	178	98	26	10
Average Queue (ft)	346	79	55	18	0	0	1	74	4	1	1
95th Queue (ft)	891	245	118	45	2	7	7	145	46	17	5
Link Distance (ft)	1188		370		352	352	352		650	650	650
Upstream Blk Time (%)	5										
Queuing Penalty (veh)	0										
Storage Bay Dist (ft)		300		125				175			
Storage Blk Time (%)	32	0						0	0		
Queuing Penalty (veh)	35	0						2	0		

Intersection: 110: MD 97 & Hewitt Ave.

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	R	T	T	TR	L	T	T	T
Maximum Queue (ft)	114	260	454	444	441	165	328	297	307
Average Queue (ft)	86	92	235	208	208	119	112	113	131
95th Queue (ft)	126	204	395	376	364	186	275	247	268
Link Distance (ft)		438	2204	2204	2204		352	352	352
Upstream Blk Time (%)							0	0	0
Queuing Penalty (veh)							2	0	0
Storage Bay Dist (ft)	90					140			
Storage Blk Time (%)	21	6				15	3		
Queuing Penalty (veh)	31	6				62	6		

Intersection: 201: MD 185 & Independence St

Movement	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	LTR	L	T	T	TR	L	T	T	TR
Maximum Queue (ft)	125	487	198	206	298	295	296	48	80	101	127
Average Queue (ft)	107	180	154	95	161	156	167	8	17	34	47
95th Queue (ft)	147	409	232	175	267	260	270	32	54	84	107
Link Distance (ft)		872	179		2375	2375	2375		1338	1338	1338
Upstream Blk Time (%)			25								
Queuing Penalty (veh)			0								
Storage Bay Dist (ft)	100			250				270			
Storage Blk Time (%)	42	9		0	1						
Queuing Penalty (veh)	52	11		0	1						

Intersection: 202: MD 185 & Aspen Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	NB
Directions Served	L	T	TR	L	T	TR	L	L	T	T	T	R
Maximum Queue (ft)	324	453	416	299	178	234	174	289	360	363	364	116
Average Queue (ft)	225	227	266	146	76	106	101	122	227	238	234	37
95th Queue (ft)	359	435	397	261	162	205	164	207	326	333	336	90
Link Distance (ft)		1838	1838		450	450			1338	1338	1338	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	300			410			350	350				350
Storage Blk Time (%)	9	1						0	1		1	
Queuing Penalty (veh)	16	2						0	2		1	

Intersection: 202: MD 185 & Aspen Hill Rd

Movement	SB	SB	SB	SB
Directions Served	L	T	T	TR
Maximum Queue (ft)	198	364	424	476
Average Queue (ft)	99	228	280	326
95th Queue (ft)	180	328	395	438
Link Distance (ft)	618	618	618	618
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 203: MD 185 & Home Depot Ent

Movement	EB	EB	NB	SB
Directions Served	L	R	L	T
Maximum Queue (ft)	41	61	104	4
Average Queue (ft)	10	4	31	0
95th Queue (ft)	32	30	70	3
Link Distance (ft)	604	604		348
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			215	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 1000: MD 185

Movement	EB	EB	EB	SB
Directions Served	T	T	T	R
Maximum Queue (ft)	171	188	93	365
Average Queue (ft)	14	17	4	17
95th Queue (ft)	103	111	39	183
Link Distance (ft)	348	348	348	481
Upstream Blk Time (%)	0	0		
Queuing Penalty (veh)	0	0		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2000: HAWK & Aspen Hill Rd

Movement	EB	EB	WB	WB
Directions Served	T	T	T	T
Maximum Queue (ft)	158	201	185	183
Average Queue (ft)	20	42	24	23
95th Queue (ft)	86	131	105	103
Link Distance (ft)	450	450	894	894
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3000: MD 97

































Movement	NB	NB	SB	SB	SB
Directions Served	T	T	T	TR	R
Maximum Queue (ft)	50	55	85	123	39
Average Queue (ft)	2	2	6	9	1
95th Queue (ft)	37	40	45	64	17
Link Distance (ft)	253	253	76	76	76
Upstream Blk Time (%)		0	1	1	0
Queuing Penalty (veh)		0	3	5	0
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 978
-----------------------------------

HCM Signalized Intersection Capacity Analysis  
101: MD 97 & Bel Pre Rd

Existing Build  
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 	  		 	  	
Traffic Volume (vph)	165	200	270	315	450	250	195	845	85	130	2000	150
Future Volume (vph)	165	200	270	315	450	250	195	845	85	130	2000	150
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1600	1900	1900	1750	1900
Total Lost time (s)	9.0	7.0	4.0	9.0	7.0	4.0	8.5	7.0	7.0	8.5	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	*1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1561	1764	3539	1583	3433	4282	1561	3433	5147	1561
Flt Permitted	0.19	1.00	1.00	0.51	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	359	3539	1561	945	3539	1583	3433	4282	1561	3433	5147	1561
Peak-hour factor, PHF	0.90	0.90	0.90	0.86	0.86	0.86	0.94	0.94	0.94	0.97	0.97	0.97
Adj. Flow (vph)	183	222	300	366	523	291	207	899	90	134	2062	155
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	47	0	0	70
Lane Group Flow (vph)	183	222	300	366	523	291	207	899	43	134	2062	85
Confl. Peds. (#/hr)			7	7			1		1	1		1
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4		Free	8		Free			6			2
Actuated Green, G (s)	48.2	30.3	180.0	52.4	32.4	180.0	15.2	86.5	86.5	11.7	83.0	83.0
Effective Green, g (s)	48.2	30.3	180.0	52.4	32.4	180.0	15.2	86.5	86.5	11.7	83.0	83.0
Actuated g/C Ratio	0.27	0.17	1.00	0.29	0.18	1.00	0.08	0.48	0.48	0.06	0.46	0.46
Clearance Time (s)	9.0	7.0		9.0	7.0		8.5	7.0	7.0	8.5	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2	0.2	3.0	0.2	0.2
Lane Grp Cap (vph)	236	595	1561	366	637	1583	289	2057	750	223	2373	719
v/s Ratio Prot	0.08	0.06		c0.11	0.15		c0.06	0.21		0.04	c0.40	
v/s Ratio Perm	0.13		c0.19	c0.18		0.18			0.03			0.05
v/c Ratio	0.78	0.37	0.19	1.00	0.82	0.18	0.72	0.44	0.06	0.60	0.87	0.12
Uniform Delay, d1	54.9	66.4	0.0	61.0	71.0	0.0	80.3	30.7	25.0	81.9	43.6	27.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.22	0.40	0.48	1.00	1.00	1.00
Incremental Delay, d2	14.7	0.4	0.3	47.0	8.4	0.3	7.9	0.6	0.1	4.5	4.7	0.3
Delay (s)	69.6	66.8	0.3	108.1	79.4	0.3	105.6	12.9	12.1	86.4	48.3	28.0
Level of Service	E	E	A	F	E	A	F	B	B	F	D	C
Approach Delay (s)		39.2			68.8			28.9			49.1	
Approach LOS		D			E			C			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			47.6				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			31.5		
Intersection Capacity Utilization			103.7%				ICU Level of Service			G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
 102: MD 97 & Crystal Springs Apt




















Existing Build  
 AM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations		↗	↕↕↕			↕↕↕	
Traffic Volume (veh/h)	0	45	1080	25	0	2585	
Future Volume (Veh/h)	0	45	1080	25	0	2585	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	49	1174	27	0	2810	
Pedestrians	5						
Lane Width (ft)	12.0						
Walking Speed (ft/s)	3.5						
Percent Blockage	0						
Right turn flare (veh)							
Median type			None			None	
Median storage veh							
Upstream signal (ft)			1091			919	
pX, platoon unblocked	0.68	0.91			0.91		
vC, conflicting volume	2129	410			1206		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	107	7			882		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	95			100		
cM capacity (veh/h)	593	972			691		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	49	470	470	262	937	937	937
Volume Left	0	0	0	0	0	0	0
Volume Right	49	0	0	27	0	0	0
cSH	972	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.05	0.28	0.28	0.15	0.55	0.55	0.55
Queue Length 95th (ft)	4	0	0	0	0	0	0
Control Delay (s)	8.9	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A						
Approach Delay (s)	8.9	0.0			0.0		
Approach LOS	A						
Intersection Summary							
Average Delay			0.1				
Intersection Capacity Utilization			53.3%		ICU Level of Service		A
Analysis Period (min)			15				























HCM Signalized Intersection Capacity Analysis  
103: MD 97 & Heathfield Rd/Postgate Terr

Existing Build  
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	5	140	70	5	15	120	1075	15	15	2460	110
Future Volume (vph)	15	5	140	70	5	15	120	1075	15	15	2460	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0		5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.91		1.00	0.91	
Frbp, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.88			0.98		1.00	1.00		1.00	0.99	
Flt Protected		1.00			0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1633			1745		1770	5073		1770	5047	
Flt Permitted		0.96			0.45		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1577			822		1770	5073		1770	5047	
Peak-hour factor, PHF	0.79	0.79	0.79	0.58	0.58	0.58	0.92	0.92	0.92	0.98	0.98	0.98
Adj. Flow (vph)	19	6	177	121	9	26	130	1168	16	15	2510	112
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	202	0	0	156	0	130	1184	0	15	2622	0
Confl. Peds. (#/hr)	10						10	1		2	2	1
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8								
Actuated Green, G (s)		35.4			35.4		16.7	123.2		3.4	109.9	
Effective Green, g (s)		35.4			35.4		16.7	123.2		3.4	109.9	
Actuated g/C Ratio		0.20			0.20		0.09	0.68		0.02	0.61	
Clearance Time (s)		7.0			7.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)		4.0			3.5		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		310			161		164	3472		33	3081	
v/s Ratio Prot							c0.07	0.23		0.01	c0.52	
v/s Ratio Perm		0.13			c0.19							
v/c Ratio		0.65			0.97		0.79	0.34		0.45	0.85	
Uniform Delay, d1		66.6			71.8		80.0	11.7		87.4	28.4	
Progression Factor		1.00			1.00		0.98	1.16		1.10	0.37	
Incremental Delay, d2		5.4			61.2		21.4	0.3		5.7	1.9	
Delay (s)		72.0			133.0		99.4	13.8		102.2	12.5	
Level of Service		E			F		F	B		F	B	
Approach Delay (s)		72.0			133.0			22.3			13.0	
Approach LOS		E			F			C			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			23.0				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			18.0		
Intersection Capacity Utilization			97.9%				ICU Level of Service				F	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
 104: MD 97 & Home Depot Ent./7-11

Existing Build  
 AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	5	130	15	0	60	15	1135	65	20	2535	115
Future Volume (Veh/h)	15	5	130	15	0	60	15	1135	65	20	2535	115
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.74	0.74	0.74	0.91	0.91	0.91	0.97	0.97	0.97
Hourly flow rate (vph)	16	5	137	20	0	81	16	1247	71	21	2613	119
Pedestrians		14			12							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		3.5			3.5							
Percent Blockage		1			1							
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)								553			933	
pX, platoon unblocked	0.62	0.62	0.57	0.62	0.62	0.89	0.57			0.89		
vC, conflicting volume	3257	4090	944	2379	4114	463	2746			1330		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1355	2692	0	0	2730	0	1425			952		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	71	58	78	93	100	92	94			97		
cM capacity (veh/h)	56	12	610	301	11	958	266			633		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	21	137	20	81	16	499	499	320	21	1045	1045	642
Volume Left	16	0	20	0	16	0	0	0	21	0	0	0
Volume Right	0	137	0	81	0	0	0	71	0	0	0	119
cSH	29	610	301	958	266	1700	1700	1700	633	1700	1700	1700
Volume to Capacity	0.71	0.22	0.07	0.08	0.06	0.29	0.29	0.19	0.03	0.61	0.61	0.38
Queue Length 95th (ft)	58	21	5	7	5	0	0	0	3	0	0	0
Control Delay (s)	270.8	12.6	17.8	9.1	19.4	0.0	0.0	0.0	10.9	0.0	0.0	0.0
Lane LOS	F	B	C	A	C				B			
Approach Delay (s)	46.9		10.8		0.2				0.1			
Approach LOS	E		B									
Intersection Summary												
Average Delay			2.1									
Intersection Capacity Utilization			73.0%		ICU Level of Service				C			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis  
105: MD 97 & MD 185



















Existing Build  
AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	470	255	10	200	750	50	55	695	85	25	1140	0
Future Volume (vph)	470	255	10	200	750	50	55	695	85	25	1140	0
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1750	1900
Total Lost time (s)	7.5	7.5		7.0	7.0		8.5	7.0	7.0	8.5	7.0	
Lane Util. Factor	0.94	0.95		0.86	0.86		1.00	0.91	1.00	1.00	0.91	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	4990	3517		1522	4749		1770	5085	1557	1770	4684	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	4990	3517		1522	4749		1770	5085	1557	1770	4684	
Peak-hour factor, PHF	0.96	0.96	0.96	0.92	0.92	0.92	0.88	0.88	0.88	0.97	0.97	0.97
Adj. Flow (vph)	490	266	10	217	815	54	62	790	97	26	1175	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	490	276	0	195	891	0	63	790	97	26	1175	0
Confl. Peds. (#/hr)	10		7	7		10	5		10	10		5
Turn Type	Split	NA		Split	NA		Prot	NA	pm+ov	Prot	NA	
Protected Phases	3	3		4	4		1	6	4	5	2	
Permitted Phases									6			
Actuated Green, G (s)	26.8	26.8		41.4	41.4		11.7	71.7	113.1	5.1	70.1	
Effective Green, g (s)	26.8	26.8		41.4	41.4		11.7	71.7	113.1	5.1	70.1	
Actuated g/C Ratio	0.15	0.15		0.23	0.23		0.06	0.40	0.63	0.03	0.39	
Clearance Time (s)	7.5	7.5		7.0	7.0		8.5	7.0	7.0	8.5	7.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	0.2	4.0	4.0	0.2	
Lane Grp Cap (vph)	742	523		350	1092		115	2025	978	50	1824	
v/s Ratio Prot	c0.10	0.08		0.13	c0.19		c0.04	0.16	0.02	0.01	c0.25	
v/s Ratio Perm									0.04			
v/c Ratio	0.66	0.53		0.56	0.82		0.55	0.39	0.10	0.52	0.64	
Uniform Delay, d1	72.3	70.8		61.2	65.7		81.6	38.6	13.3	86.2	44.8	
Progression Factor	0.88	0.88		1.00	1.00		1.26	0.76	0.79	0.86	1.08	
Incremental Delay, d2	2.4	1.2		2.4	5.1		6.4	0.6	0.1	8.0	1.1	
Delay (s)	66.3	63.3		63.6	70.7		109.1	29.8	10.5	81.9	49.4	
Level of Service	E	E		E	E		F	C	B	F	D	
Approach Delay (s)		65.2			69.5			33.1			50.1	
Approach LOS		E			E			C			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			54.2				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)				33.0	
Intersection Capacity Utilization			85.6%				ICU Level of Service				E	
Analysis Period (min)			15									
c Critical Lane Group												



HCM Unsignalized Intersection Capacity Analysis  
 106: MD 97 & Northgate Plaza

Existing Build  
 AM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	
Lane Configurations									  				
Traffic Volume (veh/h)	0	0	30	0	0	0	40	50	785	0	50	0	
Future Volume (Veh/h)	0	0	30	0	0	0	40	50	785	0	50	0	
Sign Control	Stop			Stop					Free				
Grade	0%			0%					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	
Hourly flow rate (vph)	0	0	33	0	0	0	0	54	853	0	0	0	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None												
Median storage veh													
Upstream signal (ft)	547												
pX, platoon unblocked	0.84	0.84	0.81	0.84	0.84	0.93	0.00	0.81			0.00	0.93	
vC, conflicting volume	1786	2355	477	1452	2374	284	0	1413			0	853	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	724	1399	0	328	1421	0	0	680			0	581	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	0.0	4.1			0.0	4.1	
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2			0.0	2.2	
p0 queue free %	100	100	96	100	100	100	0	93			0	100	
cM capacity (veh/h)	249	109	876	460	105	1009	0	734			0	921	
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4				
Volume Total	33	54	284	284	284	0	550	550	313				
Volume Left	0	54	0	0	0	0	0	0	0				
Volume Right	33	0	0	0	0	0	0	0	38				
cSH	876	734	1700	1700	1700	1700	1700	1700	1700				
Volume to Capacity	0.04	0.07	0.17	0.17	0.17	0.00	0.32	0.32	0.18				
Queue Length 95th (ft)	3	6	0	0	0	0	0	0	0				
Control Delay (s)	9.3	10.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Lane LOS	A	B											
Approach Delay (s)	9.3	0.6					0.0						
Approach LOS	A												
Intersection Summary													
Average Delay			0.4										
Intersection Capacity Utilization			43.5%	ICU Level of Service					A				
Analysis Period (min)			15										

HCM Unsignalized Intersection Capacity Analysis  
 106: MD 97 & Northgate Plaza






















Existing Build  
 AM Peak



Movement	SBT	SBR
Lane Configurations	↑↑↑	↘
Traffic Volume (veh/h)	1265	35
Future Volume (Veh/h)	1265	35
Sign Control	Free	
Grade	0%	
Peak Hour Factor	0.92	0.92
Hourly flow rate (vph)	1375	38
Pedestrians		
Lane Width (ft)		
Walking Speed (ft/s)		
Percent Blockage		
Right turn flare (veh)		
Median type	None	
Median storage (veh)		
Upstream signal (ft)	801	
pX, platoon unblocked		
vC, conflicting volume		
vC1, stage 1 conf vol		
vC2, stage 2 conf vol		
vCu, unblocked vol		
tC, single (s)		
tC, 2 stage (s)		
tF (s)		
p0 queue free %		
cM capacity (veh/h)		
Direction, Lane #		




















HCM Signalized Intersection Capacity Analysis  
107: MD 97 & Aspen Hill Rd/Cemetery

Existing Build  
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	5	205	5	5	5	385	850	15	5	1210	120
Future Volume (vph)	20	5	205	5	5	5	385	850	15	5	1210	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.5	6.0		8.0		6.0	7.0		6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00		0.97	0.91		1.00	0.91	1.00
Frbp, ped/bikes		1.00	0.98		1.00		1.00	1.00		1.00	1.00	0.96
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		0.95		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.96	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1790	1546		1750		3433	5061		1770	5085	1518
Flt Permitted		0.96	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1790	1546		1750		3433	5061		1770	5085	1518
Peak-hour factor, PHF	0.77	0.77	0.77	0.25	0.25	0.25	0.88	0.88	0.88	0.97	0.97	0.97
Adj. Flow (vph)	26	6	266	20	20	20	438	966	17	5	1247	124
RTOR Reduction (vph)	0	0	60	0	10	0	0	1	0	0	0	63
Lane Group Flow (vph)	0	32	206	0	50	0	438	982	0	5	1247	61
Confl. Peds. (#/hr)			29	29			10		21	29		10
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4									2
Actuated Green, G (s)		24.3	53.9		8.8		29.6	116.9		1.5	88.8	88.8
Effective Green, g (s)		24.3	53.9		8.8		29.6	116.9		1.5	88.8	88.8
Actuated g/C Ratio		0.14	0.30		0.05		0.16	0.65		0.01	0.49	0.49
Clearance Time (s)		7.5	6.0		8.0		6.0	7.0		6.0	7.0	7.0
Vehicle Extension (s)		3.0	5.0		5.0		5.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)		241	462		85		564	3286		14	2508	748
v/s Ratio Prot		0.02	c0.07		c0.03		c0.13	0.19		0.00	c0.25	
v/s Ratio Perm			0.06									0.04
v/c Ratio		0.13	0.45		0.58		0.78	0.30		0.36	0.50	0.08
Uniform Delay, d1		68.6	51.0		83.8		72.0	13.7		88.8	30.6	24.1
Progression Factor		1.00	1.00		1.00		1.00	1.02		1.25	0.37	0.06
Incremental Delay, d2		0.3	1.4		14.8		7.7	0.2		12.4	0.6	0.2
Delay (s)		68.8	52.4		98.6		80.0	14.2		123.5	11.9	1.6
Level of Service		E	D		F		E	B		F	B	A
Approach Delay (s)		54.2			98.6		34.5			11.4		
Approach LOS		D			F		C			B		
<b>Intersection Summary</b>												
HCM 2000 Control Delay			27.5				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			28.5		
Intersection Capacity Utilization			72.3%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
108: MD 97 & Wendy Ln/Aspen Manor

Existing Build  
AM Peak





















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	0	0	60	0	0	40	40	20	1210	10	40	1330
Future Volume (Veh/h)	0	0	60	0	0	40	40	20	1210	10	40	1330
Sign Control		Stop			Stop				Free			Free
Grade		0%			0%				0%			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
Hourly flow rate (vph)	0	0	65	0	0	43	0	22	1315	11	43	1446
Pedestrians		1			5							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		3.5			3.5							
Percent Blockage		0			0							
Right turn flare (veh)												
Median type									None			None
Median storage veh												
Upstream signal (ft)									1156			557
pX, platoon unblocked	0.90	0.90	0.84	0.90	0.90	0.88	0.00	0.84			0.88	
vC, conflicting volume	2085	2935	510	2002	2956	449	0	1501			1331	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	911	1856	0	819	1880	0	0	926			897	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	0.0	4.1			4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2			2.2	
p0 queue free %	100	100	93	100	100	95	0	96			93	
cM capacity (veh/h)	181	59	909	205	57	949	0	615			659	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4		
Volume Total	65	43	22	526	526	274	43	578	578	343		
Volume Left	0	0	22	0	0	0	43	0	0	0		
Volume Right	65	43	0	0	0	11	0	0	0	54		
cSH	909	949	615	1700	1700	1700	659	1700	1700	1700		
Volume to Capacity	0.07	0.05	0.04	0.31	0.31	0.16	0.07	0.34	0.34	0.20		
Queue Length 95th (ft)	6	4	3	0	0	0	5	0	0	0		
Control Delay (s)	9.3	9.0	11.1	0.0	0.0	0.0	10.8	0.0	0.0	0.0		
Lane LOS	A	A	B				B					
Approach Delay (s)	9.3	9.0	0.2				0.3					
Approach LOS	A	A										
Intersection Summary												
Average Delay			0.6									
Intersection Capacity Utilization			43.9%	ICU Level of Service	A							
Analysis Period (min)			15									



Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	50
Future Volume (Veh/h)	50
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	54
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage (veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Unsignalized Intersection Capacity Analysis  
 109: MD 97 & Ralph Rd/Aspen Hill Apt

Existing Build  
 AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	55	0	75	25	0	40	25	1140	15	45	15	1355
Future Volume (Veh/h)	55	0	75	25	0	40	25	1140	15	45	15	1355
Sign Control		Stop			Stop			Free				Free
Grade		0%			0%			0%				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
Hourly flow rate (vph)	60	0	82	27	0	43	27	1239	16	0	16	1473
Pedestrians					12							
Lane Width (ft)					12.0							
Walking Speed (ft/s)					3.5							
Percent Blockage					1							
Right turn flare (veh)			12									
Median type								None				None
Median storage (veh)												
Upstream signal (ft)								425				1288
pX, platoon unblocked	0.91	0.91	0.85	0.91	0.91	0.84	0.85			0.00	0.84	
vC, conflicting volume	2023	2834	499	1836	2834	433	1489			0	1267	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	708	1596	0	503	1596	0	975			0	651	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			0.0	4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			0.0	2.2	
p0 queue free %	77	100	91	92	100	95	96			0	98	
cM capacity (veh/h)	264	89	926	350	89	900	601			0	773	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4		
Volume Total	142	70	27	496	496	264	16	589	589	311		
Volume Left	60	27	27	0	0	0	16	0	0	0		
Volume Right	82	43	0	0	0	16	0	0	0	16		
cSH	624	560	601	1700	1700	1700	773	1700	1700	1700		
Volume to Capacity	0.23	0.12	0.04	0.29	0.29	0.16	0.02	0.35	0.35	0.18		
Queue Length 95th (ft)	22	11	4	0	0	0	2	0	0	0		
Control Delay (s)	14.9	12.3	11.3	0.0	0.0	0.0	9.8	0.0	0.0	0.0		
Lane LOS	B	B	B				A					
Approach Delay (s)	14.9	12.3	0.2				0.1					
Approach LOS	B	B										
Intersection Summary												
Average Delay			1.1									
Intersection Capacity Utilization			50.4%		ICU Level of Service				A			
Analysis Period (min)			15									



Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	15
Future Volume (Veh/h)	15
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	16
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Signalized Intersection Capacity Analysis  
110: MD 97 & Hewitt Ave.

Existing Build  
AM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	180	150	1030	105	80	1375
Future Volume (vph)	180	150	1030	105	80	1375
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.91		1.00	0.91
Frpb, ped/bikes	1.00	0.97	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1544	4993		1770	5085
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1544	4993		1770	5085
Peak-hour factor, PHF	0.90	0.90	0.87	0.87	0.92	0.92
Adj. Flow (vph)	200	167	1184	121	87	1495
RTOR Reduction (vph)	0	138	0	0	0	0
Lane Group Flow (vph)	200	29	1305	0	87	1495
Confl. Peds. (#/hr)	4	13		4	4	
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		4				
Actuated Green, G (s)	20.8	20.8	60.1		10.6	81.7
Effective Green, g (s)	20.8	20.8	60.1		10.6	81.7
Actuated g/C Ratio	0.17	0.17	0.50		0.09	0.68
Clearance Time (s)	6.5	6.5	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	0.2		3.0	0.2
Lane Grp Cap (vph)	306	267	2500		156	3462
v/s Ratio Prot	c0.11		c0.26		0.05	c0.29
v/s Ratio Perm		0.02				
v/c Ratio	0.65	0.11	0.52		0.56	0.43
Uniform Delay, d1	46.2	41.8	20.2		52.5	8.7
Progression Factor	1.00	1.00	1.00		1.00	1.03
Incremental Delay, d2	4.9	0.2	0.8		4.3	0.4
Delay (s)	51.2	42.0	21.0		56.6	9.3
Level of Service	D	D	C		E	A
Approach Delay (s)	47.0		21.0			11.9
Approach LOS	D		C			B

Intersection Summary

HCM 2000 Control Delay	19.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	24.5
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



HCM Signalized Intersection Capacity Analysis  
201: MD 185 & Independence St

Existing Build  
AM Peak































Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔			↔		↔	↑↑↑		↔	↑↑↑	
Traffic Volume (vph)	90	10	190	50	10	5	70	860	35	5	2150	115
Future Volume (vph)	90	10	190	50	10	5	70	860	35	5	2150	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0			7.0		5.5	6.0		5.5	6.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.91		1.00	0.91	
Frbp, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.86			0.99		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00			0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1764	1597			1774		1770	5048		1770	5047	
Flt Permitted	0.73	1.00			0.33		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1348	1597			610		1770	5048		1770	5047	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	11	207	54	11	5	76	935	38	5	2337	125
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	98	218	0	0	70	0	76	973	0	5	2462	0
Confl. Peds. (#/hr)	2					2			2	2		
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8								
Actuated Green, G (s)	28.7	28.7			28.7		13.3	121.2		1.6	109.5	
Effective Green, g (s)	28.7	28.7			28.7		13.3	121.2		1.6	109.5	
Actuated g/C Ratio	0.16	0.16			0.16		0.07	0.67		0.01	0.61	
Clearance Time (s)	7.0	7.0			7.0		5.5	6.0		5.5	6.0	
Vehicle Extension (s)	3.0	3.0			3.0		4.0	0.2		4.0	0.2	
Lane Grp Cap (vph)	214	254			97		130	3398		15	3070	
v/s Ratio Prot		c0.14					c0.04	c0.19		0.00	c0.49	
v/s Ratio Perm	0.07				0.11							
v/c Ratio	0.46	0.86			0.72		0.58	0.29		0.33	0.80	
Uniform Delay, d1	68.6	73.7			71.9		80.7	11.9		88.7	27.0	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.20	0.29	
Incremental Delay, d2	1.6	23.8			23.1		7.7	0.2		5.6	0.7	
Delay (s)	70.2	97.4			94.9		88.4	12.1		112.1	8.4	
Level of Service	E	F			F		F	B		F	A	
Approach Delay (s)		89.0			94.9			17.6			8.6	
Approach LOS		F			F			B			A	

Intersection Summary

HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	24.5
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis  
202: MD 185 & Aspen Hill Rd

Existing Build  
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 	  			  	
Traffic Volume (vph)	170	115	150	145	350	15	245	635	75	40	1975	340
Future Volume (vph)	170	115	150	145	350	15	245	635	75	40	1975	340
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	7.0		6.5	7.0		5.5	7.0	7.0	5.5	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.91	1.00	1.00	0.91	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.91		1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1767	3198		1765	3514		3433	5085	1538	1770	4956	
Flt Permitted	0.26	1.00		0.43	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	476	3198		797	3514		3433	5085	1538	1770	4956	
Peak-hour factor, PHF	0.91	0.91	0.91	0.87	0.87	0.87	0.77	0.77	0.77	0.97	0.97	0.97
Adj. Flow (vph)	187	126	165	167	402	17	318	825	97	41	2036	351
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	187	291	0	167	419	0	318	825	97	41	2387	0
Confl. Peds. (#/hr)	11		7	7		11	5		7	7		5
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8					6			
Actuated Green, G (s)	43.7	28.4		43.9	28.5		24.2	97.5	97.5	7.7	81.0	
Effective Green, g (s)	43.7	28.4		43.9	28.5		24.2	97.5	97.5	7.7	81.0	
Actuated g/C Ratio	0.24	0.16		0.24	0.16		0.13	0.54	0.54	0.04	0.45	
Clearance Time (s)	6.5	7.0		6.5	7.0		5.5	7.0	7.0	5.5	7.0	
Vehicle Extension (s)	3.0	4.0		5.0	4.0		5.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)	225	504		277	556		461	2754	833	75	2230	
v/s Ratio Prot	c0.07	0.09		0.05	0.12		c0.09	0.16		0.02	c0.48	
v/s Ratio Perm	c0.13			0.10					0.06			
v/c Ratio	0.83	0.58		0.60	0.75		0.69	0.30	0.12	0.55	1.07	
Uniform Delay, d1	59.1	70.2		57.0	72.4		74.3	22.6	20.2	84.4	49.5	
Progression Factor	1.00	1.00		1.00	1.00		1.18	0.83	0.86	1.39	0.72	
Incremental Delay, d2	22.2	1.9		5.4	6.1		5.4	0.3	0.3	6.9	40.1	
Delay (s)	81.3	72.2		62.4	78.5		92.7	18.9	17.6	124.5	75.6	
Level of Service	F	E		E	E		F	B	B	F	E	
Approach Delay (s)		75.7			73.9			37.8			76.4	
Approach LOS		E			E			D			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			65.9				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			29.0		
Intersection Capacity Utilization			100.7%				ICU Level of Service			G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
203: MD 185 & Home Depot Ent

Existing Build  
AM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	10	95	95	725	2260	60
Future Volume (vph)	10	95	95	725	2260	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	0.91	0.86	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1572	1770	5085	6408	1546
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1572	1770	5085	6408	1546
Peak-hour factor, PHF	0.78	0.78	0.88	0.88	0.94	0.94
Adj. Flow (vph)	13	122	108	824	2404	64
RTOR Reduction (vph)	0	0	0	0	0	13
Lane Group Flow (vph)	13	122	108	824	2404	51
Confl. Peds. (#/hr)		3	3			3
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Actuated Green, G (s)	13.6	29.9	16.3	152.4	129.1	142.7
Effective Green, g (s)	13.6	29.9	16.3	152.4	129.1	142.7
Actuated g/C Ratio	0.08	0.17	0.09	0.85	0.72	0.79
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	133	322	160	4305	4595	1285
v/s Ratio Prot	0.01	c0.03	c0.06	0.16	c0.38	0.00
v/s Ratio Perm		0.04				0.03
v/c Ratio	0.10	0.38	0.68	0.19	0.52	0.04
Uniform Delay, d1	77.5	66.8	79.3	2.5	11.5	4.0
Progression Factor	1.00	1.00	1.16	0.77	1.62	4.45
Incremental Delay, d2	0.3	0.7	10.1	0.1	0.3	0.0
Delay (s)	77.8	67.5	102.2	2.0	18.9	17.8
Level of Service	E	E	F	A	B	B
Approach Delay (s)	68.5			13.6	18.9	
Approach LOS	E			B	B	

Intersection Summary

HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

---

Intersection Sign configuration not allowed in HCM analysis.

---

HCM Signalized Intersection Capacity Analysis  
2000: HAWK & Aspen Hill Rd

Existing Build  
AM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		
Traffic Volume (vph)	230	0	0	510	0	0
Future Volume (vph)	230	0	0	510	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0		
Lane Util. Factor	0.95			0.95		
Frt	1.00			1.00		
Flt Protected	1.00			1.00		
Satd. Flow (prot)	3539			3539		
Flt Permitted	1.00			1.00		
Satd. Flow (perm)	3539			3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	250	0	0	554	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	250	0	0	554	0	0
Turn Type	NA			NA		
Protected Phases	2			6		
Permitted Phases						
Actuated Green, G (s)	11.4			11.4		
Effective Green, g (s)	11.4			11.4		
Actuated g/C Ratio	0.48			0.48		
Clearance Time (s)	6.0			6.0		
Vehicle Extension (s)	3.0			3.0		
Lane Grp Cap (vph)	1681			1681		
v/s Ratio Prot	0.07			0.16		
v/s Ratio Perm						
v/c Ratio	0.15			0.33		
Uniform Delay, d1	3.6			3.9		
Progression Factor	1.00			1.00		
Incremental Delay, d2	0.0			0.1		
Delay (s)	3.6			4.0		
Level of Service	A			A		
Approach Delay (s)	3.6			4.0	0.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	3.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	24.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	19.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis  
3000: MD 97

Existing Build  
AM Peak



Movement	NBL	NBT	SBT	SBR	NEL	NER	
Lane Configurations		↑↑↑	↑↑	↗			
Traffic Volume (veh/h)	0	1215	1165	1515	0	0	
Future Volume (Veh/h)	0	1215	1165	1515	0	0	
Sign Control		Free	Free		Stop		
Grade		0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	1321	1266	1647	0	0	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None	None				
Median storage (veh)							
Upstream signal (ft)		400	1086				
pX, platoon unblocked	0.57				0.62	0.57	
vC, conflicting volume	2913				1596	633	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	2848				0	0	
tC, single (s)	4.1				6.8	6.9	
tC, 2 stage (s)							
tF (s)	2.2				3.5	3.3	
p0 queue free %	100				100	100	
cM capacity (veh/h)	74				633	620	
Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	330	330	330	330	844	971	1098
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	549	1098
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.19	0.19	0.19	0.19	0.50	0.57	0.65
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0				0.0		
Approach LOS							
Intersection Summary							
Average Delay			0.0				
Intersection Capacity Utilization			65.9%		ICU Level of Service		C
Analysis Period (min)			15				

## Arterial Level of Service: NB MD 97

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Hewitt Ave.	110	22.5	65.3	0.4	23
Aspen Hill Apt	109	3.2	11.6	0.1	25
Aspen Manor	108	1.2	15.5	0.1	32
Cemetery	107	9.5	20.6	0.1	18
	106	1.4	11.8	0.1	32
MD 185	105	37.0	51.7	0.2	11
	3000	3.1	9.9	0.1	28
7-11	104	0.8	3.8	0.0	28
Postgate Terr	103	8.7	22.9	0.2	28
Crystal Springs Apt	102	3.3	20.0	0.2	37
Bel Pre Rd	101	23.6	37.1	0.2	17
Total		114.4	270.1	1.7	22

## Arterial Level of Service: SB MD 97

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Bel Pre Rd	101	60.1	147.0	1.1	28
Crystal Springs Apt	102	11.3	25.2	0.2	25
Heathfield Rd	103	28.5	45.0	0.2	17
Home Depot Ent.	104	18.5	32.4	0.2	20
	3000	6.5	8.9	0.0	12
MD 185	105	45.8	51.5	0.1	5
Northgate Plaza	106	4.4	20.2	0.2	27
Aspen Hill Rd	107	10.0	20.8	0.1	18
Wendy Ln	108	2.1	13.0	0.1	29
Ralph Rd	109	1.9	16.8	0.1	30
Hewitt Ave.	110	12.6	20.9	0.1	14
Total		201.8	401.8	2.4	21

## Arterial Level of Service: NB MD 185

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Independence St	201	11.2	47.4	0.5	35
Aspen Hill Rd	202	20.3	40.5	0.3	25
Home Depot Ent	203	2.3	12.6	0.1	38
	1000	1.3	7.9	0.1	36
MD 97	105	55.2	60.7	0.1	5
Total		90.3	169.2	1.0	22

Arterial Level of Service: SB MD 185

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
MD 97	105	65.4	80.7	0.2	9
	1000	6.8	13.5	0.1	23
Home Depot Ent	203	13.5	20.5	0.1	14
Aspen Hill Rd	202	50.7	61.2	0.1	8
Independence St	201	13.3	35.2	0.3	28
Total		149.7	211.1	0.8	13



Intersection: 23: Bend

Movement	WB	WB
Directions Served	T	
Maximum Queue (ft)	325	284
Average Queue (ft)	94	36
95th Queue (ft)	296	166
Link Distance (ft)	361	361
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 101: MD 97 & Bel Pre Rd

Movement	EB	EB	EB	EB	B23	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	T	L	T	T	R	L	L	T
Maximum Queue (ft)	198	344	261	258	47	305	716	718	175	183	210	189
Average Queue (ft)	118	101	97	47	2	253	376	346	88	95	95	55
95th Queue (ft)	198	232	200	200	27	367	796	737	229	151	162	143
Link Distance (ft)	361		2205			2748		2748		808		
Upstream Blk Time (%)	1											
Queuing Penalty (veh)	0											
Storage Bay Dist (ft)	180	265		265	280		150		455	455		
Storage Blk Time (%)	4	0	0	1	32		2	25	0			
Queuing Penalty (veh)	19	1	1	3	73		9	64	1			

Intersection: 101: MD 97 & Bel Pre Rd

Movement	NB	NB	NB	SB	SB	SB	SB	SB	SB	
Directions Served	T	T	R	L	L	T	T	T	R	
Maximum Queue (ft)	185	197	60	112	400	675	724	718	67	
Average Queue (ft)	81	88	2	35	73	445	490	509	50	
95th Queue (ft)	152	162	35	81	257	666	697	701	82	
Link Distance (ft)	808	808				5872	5872	5872		
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)			200	560	560				40	
Storage Blk Time (%)	0				0	2		45	2	
Queuing Penalty (veh)	0				0	3		67	13	

Intersection: 102: MD 97 & Crystal Springs Apt

Movement	WB	SB	SB
Directions Served	R	T	T
Maximum Queue (ft)	56	657	826
Average Queue (ft)	24	41	78
95th Queue (ft)	46	334	463
Link Distance (ft)	234	808	808
Upstream Blk Time (%)		0	0
Queuing Penalty (veh)		1	1
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 103: MD 97 & Heathfield Rd/Postgate Terr

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	T	TR	L	T	T	TR
Maximum Queue (ft)	286	222	225	211	226	262	59	478	618	499
Average Queue (ft)	150	93	112	62	68	89	12	293	327	317
95th Queue (ft)	249	185	195	171	187	232	41	474	524	489
Link Distance (ft)	346	247		860	860	860		1036	1036	1036
Upstream Blk Time (%)	0	0								
Queuing Penalty (veh)	0	0								
Storage Bay Dist (ft)			350				350			
Storage Blk Time (%)								4		
Queuing Penalty (veh)								1		

Intersection: 104: MD 97 & Home Depot Ent./7-11

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	TR	L	T	T	TR
Maximum Queue (ft)	112	119	86	80	64	6	82	833	866	867
Average Queue (ft)	37	57	25	30	14	0	9	142	210	159
95th Queue (ft)	93	99	66	60	44	3	50	511	674	576
Link Distance (ft)	1151	1151	213	213	75	75		860	860	860
Upstream Blk Time (%)					0			0	0	0
Queuing Penalty (veh)					0			0	1	0
Storage Bay Dist (ft)							235			
Storage Blk Time (%)								2		
Queuing Penalty (veh)								0		

Intersection: 105: MD 97 & MD 185

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	L	T	TR	L	LT	T	TR	L	T	T
Maximum Queue (ft)	235	262	295	237	227	267	304	495	465	148	246	269
Average Queue (ft)	132	149	172	142	131	104	218	277	297	59	130	132
95th Queue (ft)	213	238	262	208	196	227	325	414	425	119	226	234
Link Distance (ft)		261	261	261				968	968		682	682
Upstream Blk Time (%)	0	0	1	0	0							
Queuing Penalty (veh)	0	1	2	0	0							
Storage Bay Dist (ft)	425				300	280	280			330		
Storage Blk Time (%)	0	0		0	0	0	1	6				
Queuing Penalty (veh)	0	1		0	0	0	2	27				

Intersection: 105: MD 97 & MD 185

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	T
Maximum Queue (ft)	280	137	225	403	384	200
Average Queue (ft)	146	23	53	364	310	181
95th Queue (ft)	251	94	168	469	413	246
Link Distance (ft)	682			260	260	
Upstream Blk Time (%)				25	19	
Queuing Penalty (veh)				145	112	
Storage Bay Dist (ft)		280	200			175
Storage Blk Time (%)	0	0	0	31	27	13
Queuing Penalty (veh)	0	0	0	8	103	50

Intersection: 106: MD 97 & Northgate Plaza

Movement	EB	NB	NB	SB	SB
Directions Served	R	UL	T	UL	TR
Maximum Queue (ft)	64	116	6	78	13
Average Queue (ft)	18	34	0	20	0
95th Queue (ft)	44	83	4	58	7
Link Distance (ft)	253		472		682
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		175		150	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 107: MD 97 & Aspen Hill Rd/Cemetery

Movement	EB	EB	WB	NB	NB	NB	NB	NB	SB	SB	SB	SB	
Directions Served	LT	R	LTR	L	L	T	T	TR	L	T	T	T	
Maximum Queue (ft)	87	167	106	290	316	294	192	249	34	244	241	264	
Average Queue (ft)	27	63	14	160	161	66	46	63	6	73	81	94	
95th Queue (ft)	69	130	62	262	269	188	136	173	25	160	169	193	
Link Distance (ft)	894	894	216			470	470	470		472	472	472	
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (ft)				250	250				190				
Storage Blk Time (%)				2	3	0				0			19
Queuing Penalty (veh)				6	9	1				0			23

Intersection: 107: MD 97 & Aspen Hill Rd/Cemetery

Movement	SB
Directions Served	R
Maximum Queue (ft)	95
Average Queue (ft)	20
95th Queue (ft)	82
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	70
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 108: MD 97 & Wendy Ln/Aspen Manor

Movement	EB	WB	NB	SB	SB	SB
Directions Served	R	R	UL	L	T	TR
Maximum Queue (ft)	90	57	78	75	2	5
Average Queue (ft)	28	20	24	18	0	0
95th Queue (ft)	61	44	59	47	2	5
Link Distance (ft)	1228	342			470	470
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			200	150		
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 109: MD 97 & Ralph Rd/Aspen Hill Apt

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	UL	T	T	TR
Maximum Queue (ft)	124	111	111	45	7	1	72	19	50	74
Average Queue (ft)	55	42	43	11	0	0	22	1	2	6
95th Queue (ft)	102	79	83	34	5	1	59	11	22	36
Link Distance (ft)	1188		370		352	352		650	650	650
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		300		125			175			
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 110: MD 97 & Hewitt Ave.

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	R	T	T	TR	L	T	T	T
Maximum Queue (ft)	114	345	366	306	246	164	343	362	360
Average Queue (ft)	99	138	213	168	131	78	121	147	166
95th Queue (ft)	128	290	324	287	222	147	287	311	326
Link Distance (ft)		438	2204	2204	2204		352	352	352
Upstream Blk Time (%)							0	0	0
Queuing Penalty (veh)							1	1	2
Storage Bay Dist (ft)	90					140			
Storage Blk Time (%)	26	2					3	4	
Queuing Penalty (veh)	38	3					13	4	

Intersection: 201: MD 185 & Independence St

Movement	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB	
Directions Served	L	TR	LTR	L	T	T	TR	L	T	T	TR	
Maximum Queue (ft)	125	433	143	145	252	178	146	5	384	401	198	
Average Queue (ft)	79	260	60	65	86	45	46	0	60	84	87	
95th Queue (ft)	153	422	123	127	208	127	118	4	245	263	167	
Link Distance (ft)		872	167		2375	2375	2375		1317	1317	1317	
Upstream Blk Time (%)	0											
Queuing Penalty (veh)	0											
Storage Bay Dist (ft)	100					250						270
Storage Blk Time (%)	7	53					0					
Queuing Penalty (veh)	14	47					0					

Intersection: 202: MD 185 & Aspen Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	NB
Directions Served	L	T	TR	L	T	TR	L	L	T	T	T	R
Maximum Queue (ft)	231	264	348	292	296	318	258	274	245	146	146	80
Average Queue (ft)	129	57	186	141	175	191	142	157	73	54	51	12
95th Queue (ft)	215	152	296	250	270	288	252	269	175	116	110	47
Link Distance (ft)		1834	1834		450	450			1317	1317	1317	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	300			410			350	350				350
Storage Blk Time (%)		0					1	1				
Queuing Penalty (veh)		0					1	1				

Intersection: 202: MD 185 & Aspen Hill Rd

Movement	SB	SB	SB	SB
Directions Served	L	T	T	TR
Maximum Queue (ft)	336	646	629	634
Average Queue (ft)	39	507	537	549
95th Queue (ft)	161	767	756	745
Link Distance (ft)	606	606	606	606
Upstream Blk Time (%)	0	3	4	5
Queuing Penalty (veh)	0	17	22	28
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 203: MD 185 & Home Depot Ent

Movement	EB	EB	NB	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	L	R	L	T	T	T	T	T	T	T	R
Maximum Queue (ft)	166	124	205	68	73	61	169	396	483	531	420
Average Queue (ft)	30	78	99	7	10	8	14	117	233	295	87
95th Queue (ft)	116	138	170	37	45	37	111	323	471	570	339
Link Distance (ft)	589			606	606	606	355	355	355	355	355
Upstream Blk Time (%)							0	1	4	7	1
Queuing Penalty (veh)							1	6	20	31	7
Storage Bay Dist (ft)		100	215								
Storage Blk Time (%)		11	0								
Queuing Penalty (veh)		1	1								

Intersection: 1000: MD 185

Movement	WB	WB	SB	SB
Directions Served	T	T	R	R
Maximum Queue (ft)	4	23	505	266
Average Queue (ft)	0	1	135	40
95th Queue (ft)	0	13	504	225
Link Distance (ft)	261	261	474	474
Upstream Blk Time (%)			1	0
Queuing Penalty (veh)			4	2
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2000: HAWK & Aspen Hill Rd

Movement	EB	EB	WB	WB
Directions Served	T	T	T	T
Maximum Queue (ft)	42	97	125	130
Average Queue (ft)	3	16	14	19
95th Queue (ft)	21	59	64	73
Link Distance (ft)	450	450	894	894
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3000: MD 97


































Movement	SB	SB	SB
Directions Served	T	TR	R
Maximum Queue (ft)	182	188	137
Average Queue (ft)	117	99	37
95th Queue (ft)	225	208	111
Link Distance (ft)	75	75	75
Upstream Blk Time (%)	17	10	1
Queuing Penalty (veh)	149	86	12
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 1260
------------------------------------

HCM Signalized Intersection Capacity Analysis  
101: MD 97 & Bel Pre Rd

Existing Build  
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 	  		  	  	
Traffic Volume (vph)	210	385	235	145	220	180	215	1785	200	245	1140	120
Future Volume (vph)	210	385	235	145	220	180	215	1785	200	245	1140	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1600	1900	1900	1750	1900
Total Lost time (s)	9.0	7.0	4.0	9.0	7.0	4.0	8.5	7.0	7.0	8.5	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1562	1767	3539	1583	3433	4282	1583	3433	4684	1583
Flt Permitted	0.30	1.00	1.00	0.38	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	559	3539	1562	700	3539	1583	3433	4282	1583	3433	4684	1583
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.97	0.97	0.96	0.96	0.96
Adj. Flow (vph)	231	423	258	159	242	198	222	1840	206	255	1188	125
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	92	0	0	61
Lane Group Flow (vph)	231	423	258	159	242	198	222	1840	114	255	1188	64
Confl. Peds. (#/hr)			5	5								
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4		Free	8		Free			6			2
Actuated Green, G (s)	48.8	28.8	180.0	30.4	19.4	180.0	15.9	90.7	90.7	18.0	92.8	92.8
Effective Green, g (s)	48.8	28.8	180.0	30.4	19.4	180.0	15.9	90.7	90.7	18.0	92.8	92.8
Actuated g/C Ratio	0.27	0.16	1.00	0.17	0.11	1.00	0.09	0.50	0.50	0.10	0.52	0.52
Clearance Time (s)	9.0	7.0		9.0	7.0		8.5	7.0	7.0	8.5	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2	0.2	3.0	0.2	0.2
Lane Grp Cap (vph)	288	566	1562	183	381	1583	303	2157	797	343	2414	816
v/s Ratio Prot	c0.09	c0.12		0.05	0.07		0.06	c0.43		c0.07	0.25	
v/s Ratio Perm	c0.13		c0.17	0.09		0.13			0.07			0.04
v/c Ratio	0.80	0.75	0.17	0.87	0.64	0.13	0.73	0.85	0.14	0.74	0.49	0.08
Uniform Delay, d1	55.7	72.1	0.0	70.1	76.9	0.0	80.0	38.9	23.9	78.8	28.3	22.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.05	0.50	0.66	1.00	1.00	1.00
Incremental Delay, d2	14.8	5.4	0.2	32.6	3.4	0.2	7.4	3.8	0.3	8.4	0.7	0.2
Delay (s)	70.5	77.5	0.2	102.7	80.4	0.2	91.2	23.4	16.0	87.2	29.0	22.2
Level of Service	E	E	A	F	F	A	F	C	B	F	C	C
Approach Delay (s)		53.9			59.8			29.3			37.9	
Approach LOS		D			E			C			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			39.5				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			31.5		
Intersection Capacity Utilization			95.8%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												



HCM Unsignalized Intersection Capacity Analysis  
 102: MD 97 & Crystal Spring Apt



















Existing Build  
 PM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations		↗	↕↕↕			↕↕↕	
Traffic Volume (veh/h)	0	80	2120	50	0	1520	
Future Volume (Veh/h)	0	80	2120	50	0	1520	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	87	2304	54	0	1652	
Pedestrians	9						
Lane Width (ft)	12.0						
Walking Speed (ft/s)	3.5						
Percent Blockage	1						
Right turn flare (veh)							
Median type			None			None	
Median storage (veh)							
Upstream signal (ft)			1091			919	
pX, platoon unblocked	0.85	0.77			0.77		
vC, conflicting volume	2891	804			2367		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1355	0			1727		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	89			100		
cM capacity (veh/h)	118	827			276		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	87	922	922	515	551	551	551
Volume Left	0	0	0	0	0	0	0
Volume Right	87	0	0	54	0	0	0
cSH	827	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.11	0.54	0.54	0.30	0.32	0.32	0.32
Queue Length 95th (ft)	9	0	0	0	0	0	0
Control Delay (s)	9.9	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A						
Approach Delay (s)	9.9	0.0			0.0		
Approach LOS	A						
Intersection Summary							
Average Delay			0.2				
Intersection Capacity Utilization			53.7%		ICU Level of Service		A
Analysis Period (min)			15				























HCM Signalized Intersection Capacity Analysis  
103: MD 97 & Heathfield Rd/Postgate Terr

Existing Build  
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	5	85	35	5	20	110	2120	35	30	1445	45
Future Volume (vph)	30	5	85	35	5	20	110	2120	35	30	1445	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0		5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.91		1.00	0.91	
Frbp, ped/bikes		0.99			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.90			0.95		1.00	1.00		1.00	1.00	
Flt Protected		0.99			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1641			1710		1770	5066		1770	5058	
Flt Permitted		0.89			0.57		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1480			1003		1770	5066		1770	5058	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.96	0.96	0.96	0.97	0.97	0.97
Adj. Flow (vph)	38	6	109	45	6	26	115	2208	36	31	1490	46
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	153	0	0	77	0	115	2244	0	31	1536	0
Confl. Peds. (#/hr)	10		1	1		10	2		14	14		2
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8								
Actuated Green, G (s)		24.8			24.8		17.0	129.7		7.5	120.2	
Effective Green, g (s)		24.8			24.8		17.0	129.7		7.5	120.2	
Actuated g/C Ratio		0.14			0.14		0.09	0.72		0.04	0.67	
Clearance Time (s)		7.0			7.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)		4.0			3.5		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		203			138		167	3650		73	3377	
v/s Ratio Prot							c0.06	c0.44		0.02	0.30	
v/s Ratio Perm		c0.10			0.08							
v/c Ratio		0.75			0.56		0.69	0.61		0.42	0.45	
Uniform Delay, d1		74.7			72.5		78.9	12.6		84.1	14.3	
Progression Factor		1.00			1.00		0.97	0.83		0.79	1.13	
Incremental Delay, d2		15.5			5.3		6.9	0.5		3.6	0.4	
Delay (s)		90.1			77.8		83.4	11.0		69.8	16.6	
Level of Service		F			E		F	B		E	B	
Approach Delay (s)		90.1			77.8		14.5			17.6		
Approach LOS		F			E		B			B		
<b>Intersection Summary</b>												
HCM 2000 Control Delay			19.6				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			18.0		
Intersection Capacity Utilization			73.5%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												






















HCM Unsignalized Intersection Capacity Analysis  
 104: MD 97 & Home Depot Ent./7-11

Existing Build  
 PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	0	155	10	0	45	80	2190	30	15	1455	95
Future Volume (Veh/h)	30	0	155	10	0	45	80	2190	30	15	1455	95
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.81	0.81	0.81	0.93	0.93	0.93	0.96	0.96	0.96
Hourly flow rate (vph)	34	0	176	12	0	56	86	2355	32	16	1516	99
Pedestrians		2			23							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		3.5			3.5							
Percent Blockage		0			2							
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								553			933	
pX, platoon unblocked	0.86	0.86	0.86	0.86	0.86	0.79	0.86			0.79		
vC, conflicting volume	2612	4182	557	3279	4215	824	1617			2410		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1203	3028	0	1978	3067	0	1146			1853		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	63	100	81	41	100	93	83			94		
cM capacity (veh/h)	92	8	930	20	8	837	519			250		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	34	176	12	56	86	942	942	503	16	606	606	402
Volume Left	34	0	12	0	86	0	0	0	16	0	0	0
Volume Right	0	176	0	56	0	0	0	32	0	0	0	99
cSH	92	930	20	837	519	1700	1700	1700	250	1700	1700	1700
Volume to Capacity	0.37	0.19	0.59	0.07	0.17	0.55	0.55	0.30	0.06	0.36	0.36	0.24
Queue Length 95th (ft)	37	17	41	5	15	0	0	0	5	0	0	0
Control Delay (s)	65.8	9.8	323.2	9.6	13.3	0.0	0.0	0.0	20.4	0.0	0.0	0.0
Lane LOS	F	A	F	A	B				C			
Approach Delay (s)	18.8		64.9		0.5				0.2			
Approach LOS	C		F									
Intersection Summary												
Average Delay			2.2									
Intersection Capacity Utilization			64.7%		ICU Level of Service				C			
Analysis Period (min)			15									



















HCM Signalized Intersection Capacity Analysis  
105: MD 97 & MD 185

Existing Build  
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1080	600	25	290	360	85	30	1135	400	80	845	0
Future Volume (vph)	1080	600	25	290	360	85	30	1135	400	80	845	0
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1750	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		8.5	7.0	7.0	8.5	7.0	
Lane Util. Factor	0.94	0.95		0.86	0.86		1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	4990	3511		1522	4631		1770	5085	1534	1770	4684	
Flt Permitted	0.95	1.00		0.95	0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	4990	3511		1522	4631		1770	5085	1534	1770	4684	
Peak-hour factor, PHF	0.93	0.93	0.93	0.91	0.91	0.91	0.96	0.96	0.96	0.94	0.94	0.94
Adj. Flow (vph)	1161	645	27	319	396	93	31	1182	417	85	899	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1161	672	0	201	607	0	31	1182	417	85	899	0
Confl. Peds. (#/hr)	11		26	26		11	8		28	28		8
Turn Type	Split	NA		Split	NA		Prot	NA	pm+ov	Prot	NA	
Protected Phases	3	3		4	4		1	6	4	5	2	
Permitted Phases									6			
Actuated Green, G (s)	47.0	47.0		33.3	33.3		6.9	52.5	85.8	12.7	63.3	
Effective Green, g (s)	47.0	47.0		33.3	33.3		6.9	52.5	85.8	12.7	63.3	
Actuated g/C Ratio	0.26	0.26		0.18	0.18		0.04	0.29	0.48	0.07	0.35	
Clearance Time (s)	7.0	7.0		7.0	7.0		8.5	7.0	7.0	8.5	7.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	0.2	4.0	4.0	0.2	
Lane Grp Cap (vph)	1302	916		281	856		67	1483	731	124	1647	
v/s Ratio Prot	c0.23	0.19		c0.13	0.13		0.02	c0.23	0.11	c0.05	c0.19	
v/s Ratio Perm									0.17			
v/c Ratio	0.89	0.73		0.72	0.71		0.46	0.80	0.57	0.69	0.55	
Uniform Delay, d1	64.0	60.8		68.9	68.8		84.7	58.8	33.9	81.7	46.8	
Progression Factor	0.79	0.77		1.00	1.00		1.16	0.84	0.98	1.04	0.91	
Incremental Delay, d2	7.8	3.1		8.9	2.9		6.3	4.2	1.2	14.8	1.2	
Delay (s)	58.2	49.7		77.8	71.7		104.8	53.6	34.5	100.1	43.7	
Level of Service	E	D		E	E		F	D	C	F	D	
Approach Delay (s)		55.1			73.2			49.7			48.5	
Approach LOS		E			E			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			55.0				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)				31.5	
Intersection Capacity Utilization			95.7%				ICU Level of Service				F	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
 106: MD 97 & Northgate Plaza

Existing Build  
 PM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	
Lane Configurations									  				
Traffic Volume (veh/h)	0	0	45	0	0	0	10	40	1500	0	65	0	
Future Volume (Veh/h)	0	0	45	0	0	0	10	40	1500	0	65	0	
Sign Control	Stop			Stop					Free				
Grade	0%			0%					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	
Hourly flow rate (vph)	0	0	49	0	0	0	0	43	1630	0	0	0	
Pedestrians	8												
Lane Width (ft)	12.0												
Walking Speed (ft/s)	3.5												
Percent Blockage	1												
Right turn flare (veh)													
Median type	None												
Median storage (veh)													
Upstream signal (ft)	547												
pX, platoon unblocked	0.92	0.92	0.86	0.92	0.92	0.85	0.00	0.86			0.00	0.85	
vC, conflicting volume	1787	2874	419	2135	2915	543	0	1199			0	1630	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	530	1713	0	908	1758	0	0	670			0	1120	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	0.0	4.1			0.0	4.1	
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2			0.0	2.2	
p0 queue free %	100	100	95	100	100	100	0	95			0	100	
cM capacity (veh/h)	375	77	927	191	72	921	0	784			0	526	
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4				
Volume Total	49	43	543	543	543	0	444	444	304				
Volume Left	0	43	0	0	0	0	0	0	0				
Volume Right	49	0	0	0	0	0	0	0	82				
cSH	927	784	1700	1700	1700	1700	1700	1700	1700				
Volume to Capacity	0.05	0.05	0.32	0.32	0.32	0.00	0.26	0.26	0.18				
Queue Length 95th (ft)	4	4	0	0	0	0	0	0	0				
Control Delay (s)	9.1	9.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Lane LOS	A	A											
Approach Delay (s)	9.1	0.3				0.0							
Approach LOS	A												
Intersection Summary													
Average Delay			0.3										
Intersection Capacity Utilization			39.2%	ICU Level of Service					A				
Analysis Period (min)			15										

HCM Unsignalized Intersection Capacity Analysis  
 106: MD 97 & Northgate Plaza






















Existing Build  
 PM Peak



Movement	SBT	SBR
Lane Configurations	↑↑↑	↔
Traffic Volume (veh/h)	1020	75
Future Volume (Veh/h)	1020	75
Sign Control	Free	
Grade	0%	
Peak Hour Factor	0.92	0.92
Hourly flow rate (vph)	1109	82
Pedestrians		
Lane Width (ft)		
Walking Speed (ft/s)		
Percent Blockage		
Right turn flare (veh)		
Median type	None	
Median storage (veh)		
Upstream signal (ft)	801	
pX, platoon unblocked		
vC, conflicting volume		
vC1, stage 1 conf vol		
vC2, stage 2 conf vol		
vCu, unblocked vol		
tC, single (s)		
tC, 2 stage (s)		
tF (s)		
p0 queue free %		
cM capacity (veh/h)		
Direction, Lane #		





















HCM Signalized Intersection Capacity Analysis  
107: MD 97 & Aspen Hill Rd/Cemetery

Existing Build  
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	5	555	10	10	5	400	1415	15	5	975	95
Future Volume (vph)	130	5	555	10	10	5	400	1415	15	5	975	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.5	6.0		8.0		6.0	7.0		6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00		0.97	0.91		1.00	0.91	1.00
Frbp, ped/bikes		1.00	0.98		1.00		1.00	1.00		1.00	1.00	0.96
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		0.97		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1777	1546		1777		3433	5070		1770	5085	1518
Flt Permitted		0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1777	1546		1777		3433	5070		1770	5085	1518
Peak-hour factor, PHF	0.96	0.96	0.96	0.57	0.57	0.57	0.96	0.96	0.96	0.94	0.94	0.94
Adj. Flow (vph)	135	5	578	18	18	9	417	1474	16	5	1037	101
RTOR Reduction (vph)	0	0	74	0	5	0	0	0	0	0	0	56
Lane Group Flow (vph)	0	140	504	0	40	0	417	1490	0	5	1037	45
Confl. Peds. (#/hr)			29	29			10		21	29		10
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4									2
Actuated Green, G (s)		28.7	63.0		8.0		34.3	113.3		1.5	80.5	80.5
Effective Green, g (s)		28.7	63.0		8.0		34.3	113.3		1.5	80.5	80.5
Actuated g/C Ratio		0.16	0.35		0.04		0.19	0.63		0.01	0.45	0.45
Clearance Time (s)		7.5	6.0		8.0		6.0	7.0		6.0	7.0	7.0
Vehicle Extension (s)		3.0	5.0		5.0		5.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)		283	541		78		654	3191		14	2274	678
v/s Ratio Prot		0.08	c0.18		c0.02		0.12	c0.29		0.00	0.20	
v/s Ratio Perm			0.15									0.03
v/c Ratio		0.49	0.93		0.52		0.64	0.47		0.36	0.46	0.07
Uniform Delay, d1		69.0	56.4		84.1		67.1	17.5		88.8	34.5	28.3
Progression Factor		1.00	1.00		1.00		1.01	1.00		1.21	0.56	1.78
Incremental Delay, d2		1.4	23.7		11.0		2.8	0.5		13.0	0.6	0.2
Delay (s)		70.4	80.2		95.1		70.6	17.9		120.0	20.0	50.7
Level of Service		E	F		F		E	B		F	B	D
Approach Delay (s)		78.3			95.1		29.4			23.1		
Approach LOS		E			F		C			C		
<b>Intersection Summary</b>												
HCM 2000 Control Delay			37.5				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			28.5		
Intersection Capacity Utilization			76.7%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
 108: MD 97 & Wendy Ln/Aspen Manor

Existing Build  
 PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations									 			 
Traffic Volume (veh/h)	0	0	120	0	0	135	100	30	1695	30	165	1300
Future Volume (Veh/h)	0	0	120	0	0	135	100	30	1695	30	165	1300
Sign Control	Stop				Stop				Free			Free
Grade	0%				0%				0%			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
Hourly flow rate (vph)	0	0	130	0	0	147	0	33	1842	33	179	1413
Pedestrians	10				8							
Lane Width (ft)	12.0				12.0							
Walking Speed (ft/s)	3.5				3.5							
Percent Blockage	1				1							
Right turn flare (veh)												
Median type									None			None
Median storage veh												
Upstream signal (ft)									1156			557
pX, platoon unblocked	0.78	0.78	0.87	0.78	0.78	0.72	0.00	0.87			0.72	
vC, conflicting volume	2649	3771	522	2892	3796	638	0	1505			1883	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	992	2428	0	1302	2459	0	0	1050			843	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	0.0	4.1			4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2			2.2	
p0 queue free %	100	100	86	100	100	81	0	94			68	
cM capacity (veh/h)	89	16	932	56	15	770	0	566			560	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4		
Volume Total	130	147	33	737	737	401	179	565	565	365		
Volume Left	0	0	33	0	0	0	179	0	0	0		
Volume Right	130	147	0	0	0	33	0	0	0	82		
cSH	932	770	566	1700	1700	1700	560	1700	1700	1700		
Volume to Capacity	0.14	0.19	0.06	0.43	0.43	0.24	0.32	0.33	0.33	0.21		
Queue Length 95th (ft)	12	18	5	0	0	0	34	0	0	0		
Control Delay (s)	9.5	10.8	11.7	0.0	0.0	0.0	14.4	0.0	0.0	0.0		
Lane LOS	A	B	B					B				
Approach Delay (s)	9.5	10.8	0.2					1.5				
Approach LOS	A	B										
Intersection Summary												
Average Delay			1.5									
Intersection Capacity Utilization			51.5%		ICU Level of Service				A			
Analysis Period (min)			15									





Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	75
Future Volume (Veh/h)	75
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	82
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage (veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Unsignalized Intersection Capacity Analysis  
 109: MD 97 & Ralph Rd/Aspen Hill Apt

Existing Build  
 PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations		↕	↗		↔		↖	↑↑↑			↙	↑↑↑
Traffic Volume (veh/h)	30	0	110	10	0	40	40	1665	35	120	35	1320
Future Volume (Veh/h)	30	0	110	10	0	40	40	1665	35	120	35	1320
Sign Control		Stop			Stop			Free				Free
Grade		0%			0%			0%				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
Hourly flow rate (vph)	33	0	120	11	0	43	43	1810	38	0	38	1435
Pedestrians		7			41							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		3.5			3.5							
Percent Blockage		1			4							
Right turn flare (veh)				12								
Median type								None				None
Median storage (veh)												
Upstream signal (ft)								425				1288
pX, platoon unblocked	0.72	0.72	0.91	0.72	0.72	0.68	0.91			0.00	0.68	
vC, conflicting volume	2275	3518	510	2510	3523	663	1491			0	1889	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	546	2262	93	871	2270	0	1177			0	643	
tC, single (s)	*5.0	6.5	6.9	7.5	6.5	6.9	4.1			0.0	4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			0.0	2.2	
p0 queue free %	91	100	86	91	100	94	92			0	94	
cM capacity (veh/h)	361	24	850	126	24	705	530			0	610	
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>NB 3</b>	<b>NB 4</b>	<b>SB 1</b>	<b>SB 2</b>	<b>SB 3</b>	<b>SB 4</b>		
Volume Total	153	54	43	724	724	400	38	574	574	336		
Volume Left	33	11	43	0	0	0	38	0	0	0		
Volume Right	120	43	0	0	0	38	0	0	0	49		
cSH	1084	365	530	1700	1700	1700	610	1700	1700	1700		
Volume to Capacity	0.14	0.15	0.08	0.43	0.43	0.24	0.06	0.34	0.34	0.20		
Queue Length 95th (ft)	12	13	7	0	0	0	5	0	0	0		
Control Delay (s)	11.2	16.6	12.4	0.0	0.0	0.0	11.3	0.0	0.0	0.0		
Lane LOS	B	C	B				B					
Approach Delay (s)	11.2	16.6	0.3				0.3					
Approach LOS	B	C										
<b>Intersection Summary</b>												
Average Delay			1.0									
Intersection Capacity Utilization			61.3%		ICU Level of Service				B			
Analysis Period (min)			15									

\* User Entered Value



Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	45
Future Volume (Veh/h)	45
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	49
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage (veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Signalized Intersection Capacity Analysis  
110: MD 97 & Hewitt Ave.

Existing Build  
PM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↰	↑↑↑		↰	↑↑↑
Traffic Volume (vph)	105	150	1590	180	215	1225
Future Volume (vph)	105	150	1590	180	215	1225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.91		1.00	0.91
Frpb, ped/bikes	1.00	0.98	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1548	4944		1770	5085
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1548	4944		1770	5085
Peak-hour factor, PHF	0.94	0.94	0.96	0.96	0.96	0.96
Adj. Flow (vph)	112	160	1656	188	224	1276
RTOR Reduction (vph)	0	138	0	0	0	0
Lane Group Flow (vph)	112	22	1844	0	224	1276
Confl. Peds. (#/hr)	9	10		16	16	
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		4				
Actuated Green, G (s)	16.4	16.4	52.6		22.5	86.1
Effective Green, g (s)	16.4	16.4	52.6		22.5	86.1
Actuated g/C Ratio	0.14	0.14	0.44		0.19	0.72
Clearance Time (s)	6.5	6.5	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	0.2		3.0	0.2
Lane Grp Cap (vph)	241	211	2167		331	3648
v/s Ratio Prot	c0.06		c0.37		c0.13	c0.25
v/s Ratio Perm		0.01				
v/c Ratio	0.46	0.10	0.85		0.68	0.35
Uniform Delay, d1	47.8	45.4	30.2		45.4	6.4
Progression Factor	1.00	1.00	1.00		0.98	1.09
Incremental Delay, d2	1.4	0.2	4.4		5.4	0.3
Delay (s)	49.2	45.6	34.6		50.0	7.2
Level of Service	D	D	C		D	A
Approach Delay (s)	47.1		34.6			13.6
Approach LOS	D		C			B
<b>Intersection Summary</b>						
HCM 2000 Control Delay			26.9		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.73			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	24.5
Intersection Capacity Utilization			74.7%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						





























HCM Signalized Intersection Capacity Analysis  
201: MD 185 & Independence St

Existing Build  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	15	110	105	30	25	90	1655	90	15	970	170
Future Volume (vph)	125	15	110	105	30	25	90	1655	90	15	970	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0			7.0		5.5	6.0		5.5	6.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.91		1.00	0.91	
Frbp, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	0.97	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.87			0.98		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	1616			1750		1770	5022		1770	4891	
Flt Permitted	0.65	1.00			0.60		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1178	1616			1091		1770	5022		1770	4891	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	136	16	120	114	33	27	98	1799	98	16	1054	185
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	136	136	0	0	174	0	98	1897	0	16	1239	0
Confl. Peds. (#/hr)	25						25	10		8	8	10
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8								
Actuated Green, G (s)	31.5	31.5			31.5		16.2	114.6		5.4	103.8	
Effective Green, g (s)	31.5	31.5			31.5		16.2	114.6		5.4	103.8	
Actuated g/C Ratio	0.18	0.18			0.18		0.09	0.64		0.03	0.58	
Clearance Time (s)	7.0	7.0			7.0		5.5	6.0		5.5	6.0	
Vehicle Extension (s)	4.0	4.0			3.0		4.0	0.2		4.0	0.2	
Lane Grp Cap (vph)	206	282			190		159	3197		53	2820	
v/s Ratio Prot		0.08					c0.06	c0.38		0.01	0.25	
v/s Ratio Perm	0.12				c0.16							
v/c Ratio	0.66	0.48			0.92		0.62	0.59		0.30	0.44	
Uniform Delay, d1	69.3	66.9			72.9		78.9	19.1		85.5	21.6	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.05	0.59	
Incremental Delay, d2	8.4	1.8			41.9		7.9	0.8		3.6	0.4	
Delay (s)	77.7	68.7			114.8		86.8	19.9		93.5	13.2	
Level of Service	E	E			F		F	B		F	B	
Approach Delay (s)		73.2			114.8			23.2			14.2	
Approach LOS		E			F			C			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			28.1				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			24.5		
Intersection Capacity Utilization			83.4%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
202: MD 185 & Aspen Hill Rd

Existing Build  
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 	  			  	
Traffic Volume (vph)	325	375	125	190	235	80	210	1390	205	110	840	205
Future Volume (vph)	325	375	125	190	235	80	210	1390	205	110	840	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	7.0		6.5	7.0		5.5	7.0	7.0	5.5	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.91	1.00	1.00	0.91	
Frbp, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	0.95	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	0.96		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1767	3378		1765	3381		3433	5085	1511	1770	4910	
Flt Permitted	0.24	1.00		0.29	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	452	3378		533	3381		3433	5085	1511	1770	4910	
Peak-hour factor, PHF	0.96	0.96	0.96	0.87	0.87	0.87	0.97	0.97	0.97	0.96	0.96	0.96
Adj. Flow (vph)	339	391	130	218	270	92	216	1433	211	115	875	214
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	339	521	0	218	362	0	216	1433	211	115	1089	0
Confl. Peds. (#/hr)	11		16	16		11	6		14	14		6
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8					6			
Actuated Green, G (s)	65.4	36.0		48.2	27.4		17.4	76.1	76.1	16.1	74.8	
Effective Green, g (s)	65.4	36.0		48.2	27.4		17.4	76.1	76.1	16.1	74.8	
Actuated g/C Ratio	0.36	0.20		0.27	0.15		0.10	0.42	0.42	0.09	0.42	
Clearance Time (s)	6.5	7.0		6.5	7.0		5.5	7.0	7.0	5.5	7.0	
Vehicle Extension (s)	3.0	4.0		5.0	4.0		5.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)	379	675		285	514		331	2149	638	158	2040	
v/s Ratio Prot	c0.15	0.15		0.09	0.11		0.06	c0.28		c0.06	0.22	
v/s Ratio Perm	c0.18			0.12					0.14			
v/c Ratio	0.89	0.77		0.76	0.70		0.65	0.67	0.33	0.73	0.53	
Uniform Delay, d1	46.8	68.1		55.4	72.5		78.4	41.8	34.9	79.8	39.5	
Progression Factor	1.00	1.00		1.00	1.00		1.37	0.65	0.66	0.91	0.89	
Incremental Delay, d2	22.5	5.8		13.5	4.7		5.1	1.4	1.1	15.1	1.0	
Delay (s)	69.3	73.9		68.9	77.1		112.6	28.7	24.2	88.2	36.0	
Level of Service	E	E		E	E		F	C	C	F	D	
Approach Delay (s)		72.1			74.0			37.9			40.9	
Approach LOS		E			E			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			49.9				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			29.0		
Intersection Capacity Utilization			88.8%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

## 203: MD 185 & Home Depot Ent

Existing Build  
PM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↶	↷	↶	↑↑↑	↓↓↓	↷
Traffic Volume (vph)	10	100	100	1695	1055	30
Future Volume (vph)	10	100	100	1695	1055	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	0.91	0.86	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1572	1770	5085	6408	1545
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1572	1770	5085	6408	1545
Peak-hour factor, PHF	0.79	0.79	0.97	0.97	0.98	0.98
Adj. Flow (vph)	13	127	103	1747	1077	31
RTOR Reduction (vph)	0	49	0	0	0	6
Lane Group Flow (vph)	13	78	103	1747	1077	25
Confl. Peds. (#/hr)		3	3			3
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Actuated Green, G (s)	12.5	28.3	15.8	153.5	130.7	143.2
Effective Green, g (s)	12.5	28.3	15.8	153.5	130.7	143.2
Actuated g/C Ratio	0.07	0.16	0.09	0.85	0.73	0.80
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	122	308	155	4336	4652	1289
v/s Ratio Prot	0.01	c0.02	c0.06	c0.34	0.17	0.00
v/s Ratio Perm		0.03				0.01
v/c Ratio	0.11	0.25	0.66	0.40	0.23	0.02
Uniform Delay, d1	78.5	66.6	79.5	3.0	8.1	3.8
Progression Factor	1.00	1.00	1.38	0.23	1.13	0.39
Incremental Delay, d2	0.4	0.4	7.4	0.2	0.1	0.0
Delay (s)	78.9	67.0	117.2	0.9	9.3	1.5
Level of Service	E	E	F	A	A	A
Approach Delay (s)	68.1			7.4	9.1	
Approach LOS	E			A	A	

### Intersection Summary

HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

---

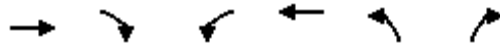
Intersection Sign configuration not allowed in HCM analysis.

---



HCM Signalized Intersection Capacity Analysis  
2000: HAWK & Aspen Hill Rd

Existing Build  
PM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		
Traffic Volume (vph)	690	0	0	505	0	0
Future Volume (vph)	690	0	0	505	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0		
Lane Util. Factor	0.95			0.95		
Frt	1.00			1.00		
Flt Protected	1.00			1.00		
Satd. Flow (prot)	3539			3539		
Flt Permitted	1.00			1.00		
Satd. Flow (perm)	3539			3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	750	0	0	549	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	750	0	0	549	0	0
Turn Type	NA			NA		
Protected Phases	2			6		
Permitted Phases						
Actuated Green, G (s)	14.1			14.1		
Effective Green, g (s)	14.1			14.1		
Actuated g/C Ratio	0.53			0.53		
Clearance Time (s)	6.0			6.0		
Vehicle Extension (s)	3.0			3.0		
Lane Grp Cap (vph)	1868			1868		
v/s Ratio Prot	c0.21			0.16		
v/s Ratio Perm						
v/c Ratio	0.40			0.29		
Uniform Delay, d1	3.8			3.5		
Progression Factor	1.00			1.00		
Incremental Delay, d2	0.1			0.1		
Delay (s)	3.9			3.6		
Level of Service	A			A		
Approach Delay (s)	3.9			3.6	0.0	
Approach LOS	A			A	A	







Intersection Summary

HCM 2000 Control Delay	3.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	26.7	Sum of lost time (s)	10.5
Intersection Capacity Utilization	24.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis  
3000: MD 97

Existing Build  
PM Peak

							
Movement	NBL	NBT	SBT	SBR	NEL	NER	
Lane Configurations		↑↑↑	↑↑	↗			
Traffic Volume (veh/h)	0	2300	925	695	0	0	
Future Volume (Veh/h)	0	2300	925	695	0	0	
Sign Control		Free	Free		Stop		
Grade		0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	2500	1005	755	0	0	
<b>Pedestrians</b>							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None	None				
Median storage (veh)							
Upstream signal (ft)		400	1086				
pX, platoon unblocked	0.86				0.87	0.86	
vC, conflicting volume	1760				1630	502	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1562				15	104	
tC, single (s)	4.1				6.8	6.9	
tC, 2 stage (s)							
tF (s)	2.2				3.5	3.3	
p0 queue free %	100				100	100	
cM capacity (veh/h)	361				869	803	
<b>Direction, Lane #</b>	<b>NB 1</b>	<b>NB 2</b>	<b>NB 3</b>	<b>NB 4</b>	<b>SB 1</b>	<b>SB 2</b>	<b>SB 3</b>
Volume Total	625	625	625	625	670	587	503
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	252	503
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.37	0.37	0.37	0.37	0.39	0.35	0.30
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Lane LOS</b>							
Approach Delay (s)	0.0				0.0		
<b>Approach LOS</b>							
<b>Intersection Summary</b>							
Average Delay			0.0				
Intersection Capacity Utilization			36.7%		ICU Level of Service		A
Analysis Period (min)			15				

## Arterial Level of Service: NB MD 97

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Hewitt Ave.	110	37.9	80.3	0.4	19
Aspen Hill Apt	109	4.3	12.8	0.1	23
Aspen Manor	108	2.0	16.4	0.1	30
Cemetery	107	16.1	27.2	0.1	14
	106	2.6	12.9	0.1	29
MD 185	105	50.0	64.6	0.2	8
	3000	4.4	11.0	0.1	25
7-11	104	1.1	4.2	0.0	25
Postgate Terr	103	15.4	29.5	0.2	22
Crystal Spring Apt	102	4.5	21.0	0.2	35
Bel Pre Rd	101	26.9	40.4	0.2	16
Total		165.2	320.2	1.7	19

## Arterial Level of Service: SB MD 97

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Bel Pre Rd	101	31.9	86.3	0.7	29
Crystal Spring Apt	102	5.7	19.6	0.2	32
Heathfield Rd	103	26.9	43.5	0.2	17
Home Depot Ent.	104	8.4	22.3	0.2	28
	3000	1.1	3.3	0.0	31
MD 185	105	41.5	47.3	0.1	6
Northgate Plaza	106	4.0	19.7	0.2	28
Aspen Hill Rd	107	19.1	29.8	0.1	13
Wendy Ln	108	3.7	14.5	0.1	26
Ralph Rd	109	1.7	16.8	0.1	30
Hewitt Ave.	110	9.0	17.2	0.1	17
Total		153.0	320.4	1.9	22

## Arterial Level of Service: NB MD 185

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Independence St	201	22.4	58.5	0.5	28
Aspen Hill Rd	202	37.8	58.9	0.3	17
Home Depot Ent	203	6.5	17.3	0.1	28
	1000	3.8	10.3	0.1	28
MD 97	105	35.2	40.9	0.1	8
Total		105.7	185.9	1.0	20

Arterial Level of Service: SB MD 185

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
MD 97	105	69.1	83.0	0.2	9
	1000	4.5	11.4	0.1	27
Home Depot Ent	203	17.8	24.8	0.1	11
Aspen Hill Rd	202	44.6	55.0	0.1	9
Independence St	201	7.8	29.9	0.3	33
Total		143.9	204.0	0.8	14

Intersection: 24: Bend

Movement	WB	WB
Directions Served	T	
Maximum Queue (ft)	190	52
Average Queue (ft)	15	2
95th Queue (ft)	93	21
Link Distance (ft)	361	361
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 101: MD 97 & Bel Pre Rd

Movement	EB	EB	EB	EB	B24	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	T	L	T	T	R	L	L	T
Maximum Queue (ft)	205	423	290	216	201	236	197	210	53	173	217	371
Average Queue (ft)	158	198	175	9	12	104	97	96	13	97	101	194
95th Queue (ft)	239	362	285	89	92	204	160	179	87	163	180	355
Link Distance (ft)		361			2203		2717	2717				808
Upstream Blk Time (%)		2										
Queuing Penalty (veh)		0										
Storage Bay Dist (ft)	180		265	265		280			150	455	455	
Storage Blk Time (%)	10	11	1	0		0		2	0			
Queuing Penalty (veh)	66	69	3	0		0		3	0			

Intersection: 101: MD 97 & Bel Pre Rd

Movement	NB	NB	NB	SB	SB	SB	SB	SB	SB
Directions Served	T	T	R	L	L	T	T	T	R
Maximum Queue (ft)	411	444	225	174	174	304	316	338	65
Average Queue (ft)	226	263	107	84	88	148	162	158	47
95th Queue (ft)	392	445	291	155	152	267	286	306	88
Link Distance (ft)	808	808				3584	3584	3584	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			200	560	560				40
Storage Blk Time (%)		14	0					24	1
Queuing Penalty (veh)		29	1					29	5

Intersection: 102: MD 97 & Crystal Spring Apt

Movement	WB	NB	NB
Directions Served	R	T	TR
Maximum Queue (ft)	115	11	17
Average Queue (ft)	51	0	1
95th Queue (ft)	93	8	9
Link Distance (ft)	234	1036	1036
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 103: MD 97 & Heathfield Rd/Postgate Terr

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	T	TR	L	T	T	TR
Maximum Queue (ft)	252	128	237	311	344	360	81	428	468	434
Average Queue (ft)	121	49	115	157	187	211	23	211	238	219
95th Queue (ft)	215	105	196	284	334	356	60	403	429	402
Link Distance (ft)	346	247		860	860	860		1036	1036	1036
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)			350				350			
Storage Blk Time (%)				0				2		
Queuing Penalty (veh)				0				1		

Intersection: 104: MD 97 & Home Depot Ent./7-11

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	T	TR
Maximum Queue (ft)	90	179	39	107	114	21	20	57	133	179	49
Average Queue (ft)	31	70	8	34	43	1	1	13	5	6	2
95th Queue (ft)	75	133	31	72	92	13	9	40	97	121	19
Link Distance (ft)	1151	1151	213	213	76	76	76		860	860	860
Upstream Blk Time (%)					3	0					
Queuing Penalty (veh)					15	0					
Storage Bay Dist (ft)								235			
Storage Blk Time (%)											
Queuing Penalty (veh)											

Intersection: 105: MD 97 & MD 185

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	L	T	TR	L	LT	T	TR	L	T	T
Maximum Queue (ft)	279	332	391	318	278	245	273	379	368	235	437	426
Average Queue (ft)	195	238	275	200	198	118	166	160	210	46	248	256
95th Queue (ft)	307	347	388	290	271	215	258	298	326	124	392	403
Link Distance (ft)		280	280	280				968	968		682	682
Upstream Blk Time (%)	0	1	4	0	0							
Queuing Penalty (veh)	0	5	25	3	0							
Storage Bay Dist (ft)	425				300	280	280			330		
Storage Blk Time (%)	0	1		0	0	0	1	1				3
Queuing Penalty (veh)	0	3		2	1	0	1	6				1

Intersection: 105: MD 97 & MD 185

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	T
Maximum Queue (ft)	531	305	224	362	373	200
Average Queue (ft)	299	225	101	186	182	138
95th Queue (ft)	489	376	201	317	324	227
Link Distance (ft)	682			253	253	
Upstream Blk Time (%)	0			5	6	
Queuing Penalty (veh)	0			24	27	
Storage Bay Dist (ft)		280	200			175
Storage Blk Time (%)	10	6	0	13	11	8
Queuing Penalty (veh)	38	22	0	11	32	22

Intersection: 106: MD 97 & Northgate Plaza

Movement	EB	NB	SB	SB	SB
Directions Served	R	UL	UL	T	TR
Maximum Queue (ft)	57	81	88	18	35
Average Queue (ft)	22	24	32	1	2
95th Queue (ft)	46	64	73	9	16
Link Distance (ft)	253			682	682
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		175	150		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 107: MD 97 & Aspen Hill Rd/Cemetery

Movement	EB	EB	WB	NB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	L	T	T	TR	L	T	T	T
Maximum Queue (ft)	262	482	110	279	306	325	380	423	71	340	291	331
Average Queue (ft)	129	249	29	153	161	111	148	203	8	142	132	149
95th Queue (ft)	220	434	84	246	256	271	335	405	44	261	247	274
Link Distance (ft)	894	894	216			470	470	470		466	466	466
Upstream Blk Time (%)								0				
Queuing Penalty (veh)								0				
Storage Bay Dist (ft)				250	250				190			
Storage Blk Time (%)				1	1	2				3		24
Queuing Penalty (veh)				5	6	7				0		23

Intersection: 107: MD 97 & Aspen Hill Rd/Cemetery

Movement	SB
Directions Served	R
Maximum Queue (ft)	95
Average Queue (ft)	39
95th Queue (ft)	113
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	70
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 108: MD 97 & Wendy Ln/Aspen Manor

Movement	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	R	R	UL	T	TR	L	T	T	TR
Maximum Queue (ft)	358	147	159	5	45	212	229	19	27
Average Queue (ft)	140	58	68	0	2	97	25	1	3
95th Queue (ft)	321	112	136	3	19	190	146	12	16
Link Distance (ft)	1228	342		650	650		470	470	470
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			200			150			
Storage Blk Time (%)			0			7	0		
Queuing Penalty (veh)			0			30	0		



Intersection: 109: MD 97 & Ralph Rd/Aspen Hill Apt

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	UL	T	T	TR
Maximum Queue (ft)	207	158	108	70	8	15	172	78	60	28
Average Queue (ft)	92	58	43	20	0	1	76	3	0	2
95th Queue (ft)	245	144	87	48	3	9	144	54	3	17
Link Distance (ft)	1188		370		352	352		650	650	650
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		300		125			175			
Storage Blk Time (%)	1	0					1			
Queuing Penalty (veh)	1	0					4			

Intersection: 110: MD 97 & Hewitt Ave.

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	R	T	T	TR	L	T	T	T
Maximum Queue (ft)	114	234	518	488	504	164	313	311	322
Average Queue (ft)	69	73	340	315	320	143	139	112	132
95th Queue (ft)	118	161	495	468	478	186	327	240	253
Link Distance (ft)		438	2204	2204	2204		352	352	352
Upstream Blk Time (%)							0	0	0
Queuing Penalty (veh)							1	0	0
Storage Bay Dist (ft)	90					140			
Storage Blk Time (%)	8	4				27	1		
Queuing Penalty (veh)	12	4				110	3		

Intersection: 201: MD 185 & Independence St

Movement	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	LTR	L	T	T	TR	L	T	T	TR
Maximum Queue (ft)	125	331	201	274	378	371	387	39	122	155	192
Average Queue (ft)	97	158	136	101	201	204	215	7	45	72	96
95th Queue (ft)	150	308	214	201	358	361	366	26	104	139	171
Link Distance (ft)		872	179		2375	2375	2375		1338	1338	1338
Upstream Blk Time (%)			8								
Queuing Penalty (veh)			0								
Storage Bay Dist (ft)	100			250				270			
Storage Blk Time (%)	24	22		0	6						
Queuing Penalty (veh)	30	28		2	5						

Intersection: 202: MD 185 & Aspen Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	NB
Directions Served	L	T	TR	L	T	TR	L	L	T	T	T	R
Maximum Queue (ft)	324	417	419	326	251	298	193	246	343	359	416	318
Average Queue (ft)	219	204	255	177	162	197	107	125	189	200	204	105
95th Queue (ft)	330	375	382	292	240	273	167	196	298	315	336	230
Link Distance (ft)		1838	1838		450	450			1338	1338	1338	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	300			410			350	350				350
Storage Blk Time (%)	3	1		0					0		0	0
Queuing Penalty (veh)	6	5		0					0		1	0

Intersection: 202: MD 185 & Aspen Hill Rd

Movement	SB	SB	SB	SB
Directions Served	L	T	T	TR
Maximum Queue (ft)	220	392	434	493
Average Queue (ft)	98	174	221	266
95th Queue (ft)	180	315	351	400
Link Distance (ft)	606	606	606	606
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 203: MD 185 & Home Depot Ent

Movement	EB	EB	NB	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	L	R	L	T	T	T	T	T	T	T	R
Maximum Queue (ft)	77	103	188	78	99	71	131	169	283	327	153
Average Queue (ft)	13	42	112	10	12	11	30	66	93	130	9
95th Queue (ft)	47	81	181	45	57	48	90	150	218	274	75
Link Distance (ft)	589			606	606	606	343	343	343	343	343
Upstream Blk Time (%)									0	0	0
Queuing Penalty (veh)									0	0	0
Storage Bay Dist (ft)		100	215								
Storage Blk Time (%)		1	0								
Queuing Penalty (veh)		0	2								

Intersection: 1000: MD 185

Movement	EB	EB	EB	SB
Directions Served	T	T	T	R
Maximum Queue (ft)	12	42	37	239
Average Queue (ft)	1	3	2	13
95th Queue (ft)	10	20	33	155
Link Distance (ft)	343	343	343	481
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2000: HAWK & Aspen Hill Rd

Movement	EB	EB	WB	WB
Directions Served	T	T	T	T
Maximum Queue (ft)	106	214	194	192
Average Queue (ft)	15	44	29	30
95th Queue (ft)	66	140	109	111
Link Distance (ft)	450	450	894	894
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3000: MD 97

































Movement	SB	SB	SB
Directions Served	T	TR	R
Maximum Queue (ft)	32	67	14
Average Queue (ft)	1	3	1
95th Queue (ft)	15	26	11
Link Distance (ft)	76	76	76
Upstream Blk Time (%)	0	0	0
Queuing Penalty (veh)	0	2	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 732

HCM Signalized Intersection Capacity Analysis  
101: MD 97 & Bel Pre Rd

Future No-Build  
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 	  		 	  	
Traffic Volume (vph)	175	210	300	330	470	260	210	900	90	135	2165	155
Future Volume (vph)	175	210	300	330	470	260	210	900	90	135	2165	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1600	1900	1900	1750	1900
Total Lost time (s)	9.0	7.0	4.0	9.0	7.0	4.0	8.5	7.0	7.0	8.5	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	*1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1561	1764	3539	1583	3433	4282	1561	3433	5147	1561
Flt Permitted	0.18	1.00	1.00	0.49	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	332	3539	1561	904	3539	1583	3433	4282	1561	3433	5147	1561
Peak-hour factor, PHF	0.90	0.90	0.90	0.86	0.86	0.86	0.94	0.94	0.94	0.97	0.97	0.97
Adj. Flow (vph)	194	233	333	384	547	302	223	957	96	139	2232	160
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	52	0	0	73
Lane Group Flow (vph)	194	233	333	384	547	302	223	957	44	139	2232	87
Confl. Peds. (#/hr)			7	7			1		1	1		1
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4		Free	8		Free			6			2
Actuated Green, G (s)	50.9	30.5	180.0	56.1	33.1	180.0	15.9	82.7	82.7	12.3	79.1	79.1
Effective Green, g (s)	50.9	30.5	180.0	56.1	33.1	180.0	15.9	82.7	82.7	12.3	79.1	79.1
Actuated g/C Ratio	0.28	0.17	1.00	0.31	0.18	1.00	0.09	0.46	0.46	0.07	0.44	0.44
Clearance Time (s)	9.0	7.0		9.0	7.0		8.5	7.0	7.0	8.5	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2	0.2	3.0	0.2	0.2
Lane Grp Cap (vph)	256	599	1561	391	650	1583	303	1967	717	234	2261	685
v/s Ratio Prot	0.09	0.07		c0.13	0.15		c0.06	0.22		0.04	c0.43	
v/s Ratio Perm	0.13		c0.21	c0.18		0.19			0.03			0.06
v/c Ratio	0.76	0.39	0.21	0.98	0.84	0.19	0.74	0.49	0.06	0.59	0.99	0.13
Uniform Delay, d1	53.2	66.5	0.0	58.1	70.9	0.0	80.0	33.9	27.1	81.4	49.9	30.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.93	4.50	1.00	1.00	1.00
Incremental Delay, d2	12.1	0.4	0.3	40.5	9.6	0.3	8.6	0.8	0.2	4.0	16.1	0.4
Delay (s)	65.3	66.9	0.3	98.6	80.6	0.3	84.8	32.3	121.9	85.4	66.1	30.3
Level of Service	E	E	A	F	F	A	F	C	F	F	E	C
Approach Delay (s)		37.3			66.5			48.2			64.9	
Approach LOS		D			E			D			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			57.9				HCM 2000 Level of Service				E	
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)				31.5	
Intersection Capacity Utilization			108.9%				ICU Level of Service				G	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
 102: MD 97 & Crystal Springs Apt



















Future No-Build  
 AM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Volume (veh/h)	0	60	1140	30	0	2795	
Future Volume (Veh/h)	0	60	1140	30	0	2795	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	65	1239	33	0	3038	
Pedestrians	5						
Lane Width (ft)	12.0						
Walking Speed (ft/s)	3.5						
Percent Blockage	0						
Right turn flare (veh)							
Median type			None			None	
Median storage (veh)							
Upstream signal (ft)			1091			919	
pX, platoon unblocked	0.62	0.90			0.90		
vC, conflicting volume	2273	434			1277		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	0	7			938		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	93			100		
cM capacity (veh/h)	632	967			654		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	65	496	496	281	1013	1013	1013
Volume Left	0	0	0	0	0	0	0
Volume Right	65	0	0	33	0	0	0
cSH	967	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.07	0.29	0.29	0.17	0.60	0.60	0.60
Queue Length 95th (ft)	5	0	0	0	0	0	0
Control Delay (s)	9.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A						
Approach Delay (s)	9.0	0.0			0.0		
Approach LOS	A						
Intersection Summary							
Average Delay			0.1				
Intersection Capacity Utilization			57.3%		ICU Level of Service		B
Analysis Period (min)			15				























HCM Signalized Intersection Capacity Analysis  
103: MD 97 & Heathfield Rd/Postgate Terr

Future No-Build  
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	10	125	70	10	20	125	1130	20	20	2660	115
Future Volume (vph)	20	10	125	70	10	20	125	1130	20	20	2660	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0		5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.91		1.00	0.91	
Frbp, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.89			0.97		1.00	1.00		1.00	0.99	
Flt Protected		0.99			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1647			1742		1770	5069		1769	5049	
Flt Permitted		0.94			0.48		0.03	1.00		0.20	1.00	
Satd. Flow (perm)		1562			870		61	5069		371	5049	
Peak-hour factor, PHF	0.79	0.79	0.79	0.58	0.58	0.58	0.92	0.92	0.92	0.98	0.98	0.98
Adj. Flow (vph)	25	13	158	121	17	34	136	1228	22	20	2714	117
RTOR Reduction (vph)	0	75	0	0	5	0	0	1	0	0	2	0
Lane Group Flow (vph)	0	121	0	0	167	0	136	1249	0	20	2829	0
Confl. Peds. (#/hr)	10						10	1		2	2	1
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)		34.0			34.0		133.0	124.2		121.8	118.0	
Effective Green, g (s)		34.0			34.0		133.0	124.2		121.8	118.0	
Actuated g/C Ratio		0.19			0.19		0.74	0.69		0.68	0.66	
Clearance Time (s)		7.0			7.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)		4.0			3.5		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		295			164		140	3497		280	3309	
v/s Ratio Prot							c0.05	0.25		0.00	0.56	
v/s Ratio Perm		0.08			c0.19		c0.67			0.05		
v/c Ratio		0.41			1.02		0.97	0.36		0.07	0.85	
Uniform Delay, d1		64.2			73.0		63.0	11.5		9.7	24.3	
Progression Factor		1.00			1.00		1.01	1.55		0.37	0.38	
Incremental Delay, d2		1.3			75.4		64.0	0.3		0.0	1.4	
Delay (s)		65.5			148.4		127.4	18.1		3.6	10.6	
Level of Service		E			F		F	B		A	B	
Approach Delay (s)		65.5			148.4			28.8			10.6	
Approach LOS		E			F			C			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			23.5				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			18.0		
Intersection Capacity Utilization			99.1%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												























HCM Unsignalized Intersection Capacity Analysis  
 104: MD 97 & Home Depot Ent./7-11

Future No-Build  
 AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	10	150	20	5	65	20	1190	70	25	2710	120
Future Volume (Veh/h)	20	10	150	20	5	65	20	1190	70	25	2710	120
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.74	0.74	0.74	0.91	0.91	0.91	0.97	0.97	0.97
Hourly flow rate (vph)	21	11	158	27	7	88	22	1308	77	26	2794	124
Pedestrians		14			12							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		3.5			3.5							
Percent Blockage		1			1							
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)								553			933	
pX, platoon unblocked	0.60	0.60	0.54	0.60	0.60	0.89	0.54			0.89		
vC, conflicting volume	3494	4363	1007	2549	4386	486	2932			1397		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1599	3056	0	17	3095	4	1613			1024		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	0	73	0	0	91	90			96		
cM capacity (veh/h)	0	6	581	0	6	952	215			595		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	32	158	34	88	22	523	523	339	26	1118	1118	683
Volume Left	21	0	27	0	22	0	0	0	26	0	0	0
Volume Right	0	158	0	88	0	0	0	77	0	0	0	124
cSH	0	581	0	952	215	1700	1700	1700	595	1700	1700	1700
Volume to Capacity	Err	0.27	Err	0.09	0.10	0.31	0.31	0.20	0.04	0.66	0.66	0.40
Queue Length 95th (ft)	Err	27	Err	8	8	0	0	0	3	0	0	0
Control Delay (s)	Err	13.5	Err	9.2	23.7	0.0	0.0	0.0	11.3	0.0	0.0	0.0
Lane LOS	F	B	F	A	C				B			
Approach Delay (s)	Err		Err		0.4				0.1			
Approach LOS	F		F									
Intersection Summary												
Average Delay			Err									
Intersection Capacity Utilization			77.7%		ICU Level of Service				D			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis  
105: MD 97 & MD 185


















Future No-Build  
AM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	515	275	15	200	820	55	70	710	90	30	1200	0	
Future Volume (vph)	515	275	15	200	820	55	70	710	90	30	1200	0	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1750	1900	
Total Lost time (s)	7.5	7.5		7.0	7.0		8.5	7.0	7.0	8.5	7.0		
Lane Util. Factor	0.94	0.95		0.86	0.86		1.00	0.91	1.00	1.00	0.91		
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00		
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00		
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	1.00		
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	4990	3507		1522	4748		1770	5085	1531	1767	4684		
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.30	1.00		
Satd. Flow (perm)	4990	3507		1522	4748		1770	5085	1531	554	4684		
Peak-hour factor, PHF	0.96	0.96	0.96	0.92	0.92	0.92	0.88	0.88	0.88	0.97	0.97	0.97	
Adj. Flow (vph)	536	286	16	217	891	60	80	807	102	31	1237	0	
RTOR Reduction (vph)	0	3	0	0	4	0	0	0	60	0	0	0	
Lane Group Flow (vph)	536	299	0	195	969	0	80	807	42	31	1237	0	
Confl. Peds. (#/hr)	10		7	7		10	5		10	10		5	
Turn Type	Split	NA		Split	NA		Prot	NA	Perm	pm+pt		NA	
Protected Phases	3	3		4	4		1	6		5		2	
Permitted Phases									6	2			
Actuated Green, G (s)	27.4	27.4		42.3	42.3		13.4	73.4	73.4	73.8	66.9		
Effective Green, g (s)	27.4	27.4		42.3	42.3		13.4	73.4	73.4	73.8	66.9		
Actuated g/C Ratio	0.15	0.15		0.23	0.23		0.07	0.41	0.41	0.41	0.37		
Clearance Time (s)	7.5	7.5		7.0	7.0		8.5	7.0	7.0	8.5	7.0		
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	0.2	0.2	4.0	0.2		
Lane Grp Cap (vph)	759	533		357	1115		131	2073	624	273	1740		
v/s Ratio Prot	c0.11	0.09		0.13	c0.20		c0.05	c0.16		0.00	c0.26		
v/s Ratio Perm									0.03	0.04			
v/c Ratio	0.71	0.56		0.55	0.87		0.61	0.39	0.07	0.11	0.71		
Uniform Delay, d1	72.5	70.7		60.4	66.2		80.8	37.5	32.4	32.1	48.3		
Progression Factor	1.19	1.21		1.00	1.00		1.17	0.93	2.18	1.00	0.76		
Incremental Delay, d2	3.2	1.6		2.1	7.6		8.9	0.5	0.2	0.2	1.6		
Delay (s)	89.2	87.0		62.6	73.8		103.3	35.3	71.0	32.3	38.2		
Level of Service	F	F		E	E		F	D	E	C	D		
Approach Delay (s)		88.4			71.9			44.5			38.0		
Approach LOS		F			E			D			D		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			58.7		HCM 2000 Level of Service				E				
HCM 2000 Volume to Capacity ratio			0.75										
Actuated Cycle Length (s)			180.0		Sum of lost time (s)				30.0				
Intersection Capacity Utilization			87.1%		ICU Level of Service				E				
Analysis Period (min)			15										
c Critical Lane Group													



HCM Unsignalized Intersection Capacity Analysis  
 106: MD 97 & Northgate Plaza

Future No-Build  
 AM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	
Lane Configurations													
Traffic Volume (veh/h)	0	0	35	0	0	0	45	55	820	0	50	0	
Future Volume (Veh/h)	0	0	35	0	0	0	45	55	820	0	50	0	
Sign Control	Stop			Stop					Free				
Grade	0%			0%					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	
Hourly flow rate (vph)	0	0	38	0	0	0	0	60	891	0	0	0	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None												
Median storage (veh)													
Upstream signal (ft)	547												
pX, platoon unblocked	0.82	0.82	0.79	0.82	0.82	0.92	0.00	0.79			0.00	0.92	
vC, conflicting volume	1878	2472	502	1529	2494	297	0	1483			0	891	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	701	1421	0	277	1447	0	0	664			0	595	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	0.0	4.1			0.0	4.1	
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2			0.0	2.2	
p0 queue free %	100	100	96	100	100	100	0	92			0	100	
cM capacity (veh/h)	251	102	853	482	99	1002	0	724			0	903	
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4				
Volume Total	38	60	297	297	297	0	576	576	331				
Volume Left	0	60	0	0	0	0	0	0	0				
Volume Right	38	0	0	0	0	0	0	0	43				
cSH	853	724	1700	1700	1700	1700	1700	1700	1700				
Volume to Capacity	0.04	0.08	0.17	0.17	0.17	0.00	0.34	0.34	0.19				
Queue Length 95th (ft)	3	7	0	0	0	0	0	0	0				
Control Delay (s)	9.4	10.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Lane LOS	A	B											
Approach Delay (s)	9.4	0.7					0.0						
Approach LOS	A												
Intersection Summary													
Average Delay			0.4										
Intersection Capacity Utilization			45.4%	ICU Level of Service	A								
Analysis Period (min)			15										

HCM Unsignalized Intersection Capacity Analysis  
 106: MD 97 & Northgate Plaza






















Future No-Build  
 AM Peak



Movement	SBT	SBR
Lane Configurations	↑↑↑	
Traffic Volume (veh/h)	1325	40
Future Volume (Veh/h)	1325	40
Sign Control	Free	
Grade	0%	
Peak Hour Factor	0.92	0.92
Hourly flow rate (vph)	1440	43
Pedestrians		
Lane Width (ft)		
Walking Speed (ft/s)		
Percent Blockage		
Right turn flare (veh)		
Median type	None	
Median storage (veh)		
Upstream signal (ft)	801	
pX, platoon unblocked		
vC, conflicting volume		
vC1, stage 1 conf vol		
vC2, stage 2 conf vol		
vCu, unblocked vol		
tC, single (s)		
tC, 2 stage (s)		
tF (s)		
p0 queue free %		
cM capacity (veh/h)		
Direction, Lane #		




















HCM Signalized Intersection Capacity Analysis  
107: MD 97 & Aspen Hill Rd/Cemetery

Future No-Build  
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	10	225	10	10	10	405	885	20	10	1260	135
Future Volume (vph)	25	10	225	10	10	10	405	885	20	10	1260	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.5	6.0		8.0		6.0	7.0		6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00		0.97	0.91		1.00	0.91	1.00
Frbp, ped/bikes		1.00	0.98		1.00		1.00	1.00		1.00	1.00	0.67
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		0.95		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.97	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1799	1546		1750		3433	5054		1770	5085	1066
Flt Permitted		0.97	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1799	1546		1750		3433	5054		1770	5085	1066
Peak-hour factor, PHF	0.77	0.77	0.77	0.25	0.25	0.25	0.88	0.88	0.88	0.97	0.97	0.97
Adj. Flow (vph)	32	13	292	40	40	40	460	1006	23	10	1299	139
RTOR Reduction (vph)	0	0	51	0	10	0	0	1	0	0	0	71
Lane Group Flow (vph)	0	45	241	0	110	0	460	1028	0	10	1299	68
Confl. Peds. (#/hr)			29	29			10		21	1260		135
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4									2
Actuated Green, G (s)		24.5	54.6		9.0		30.1	114.9		3.1	87.9	87.9
Effective Green, g (s)		24.5	54.6		9.0		30.1	114.9		3.1	87.9	87.9
Actuated g/C Ratio		0.14	0.30		0.05		0.17	0.64		0.02	0.49	0.49
Clearance Time (s)		7.5	6.0		8.0		6.0	7.0		6.0	7.0	7.0
Vehicle Extension (s)		3.0	5.0		5.0		5.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)		244	468		87		574	3226		30	2483	520
v/s Ratio Prot		0.03	c0.09		c0.06		c0.13	0.20		0.01	c0.26	
v/s Ratio Perm			0.07									0.06
v/c Ratio		0.18	0.52		1.26		0.80	0.32		0.33	0.52	0.13
Uniform Delay, d1		68.9	51.8		85.5		72.1	14.8		87.4	31.6	25.2
Progression Factor		1.00	1.00		1.00		1.26	0.79		1.23	0.30	0.03
Incremental Delay, d2		0.4	1.9		181.3		8.6	0.3		5.1	0.6	0.4
Delay (s)		69.3	53.7		266.8		99.8	11.9		112.3	10.2	1.2
Level of Service		E	D		F		F	B		F	B	A
Approach Delay (s)		55.8			266.8		39.0			10.1		
Approach LOS		E			F		D			B		
<b>Intersection Summary</b>												
HCM 2000 Control Delay			36.4				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			28.5		
Intersection Capacity Utilization			74.0%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
 108: MD 97 & Wendy Ln/Aspen Manor

Future No-Build  
 AM Peak





















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	0	0	65	0	0	45	45	25	1265	15	45	1395
Future Volume (Veh/h)	0	0	65	0	0	45	45	25	1265	15	45	1395
Sign Control	Stop			Stop				Free				Free
Grade	0%			0%				0%				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
Hourly flow rate (vph)	0	0	71	0	0	49	0	27	1375	16	49	1516
Pedestrians	1			5								
Lane Width (ft)	12.0			12.0								
Walking Speed (ft/s)	3.5			3.5								
Percent Blockage	0			0								
Right turn flare (veh)												
Median type									None		None	
Median storage veh												
Upstream signal (ft)									1156		557	
pX, platoon unblocked	0.87	0.87	0.83	0.87	0.87	0.92	0.00	0.83			0.92	
vC, conflicting volume	2206	3095	536	2116	3117	471	0	1577			1396	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1264	2290	0	1160	2316	143	0	971			1143	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	0.0	4.1			4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2			2.2	
p0 queue free %	100	100	92	100	100	94	0	95			91	
cM capacity (veh/h)	92	29	897	107	28	808	0	584			558	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4		
Volume Total	71	49	27	550	550	291	49	606	606	363		
Volume Left	0	0	27	0	0	0	49	0	0	0		
Volume Right	71	49	0	0	0	16	0	0	0	60		
cSH	897	808	584	1700	1700	1700	558	1700	1700	1700		
Volume to Capacity	0.08	0.06	0.05	0.32	0.32	0.17	0.09	0.36	0.36	0.21		
Queue Length 95th (ft)	6	5	4	0	0	0	7	0	0	0		
Control Delay (s)	9.4	9.7	11.5	0.0	0.0	0.0	12.1	0.0	0.0	0.0		
Lane LOS	A	A	B				B					
Approach Delay (s)	9.4	9.7	0.2				0.4					
Approach LOS	A	A										
Intersection Summary												
Average Delay			0.6									
Intersection Capacity Utilization			46.1%		ICU Level of Service				A			
Analysis Period (min)			15									



Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	55
Future Volume (Veh/h)	55
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	60
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage (veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Unsignalized Intersection Capacity Analysis  
 109: MD 97 & Ralph Rd/Aspen Hill Apt

Future No-Build  
 AM Peak

















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	60	5	80	30	5	50	30	1195	20	45	20	1420
Future Volume (Veh/h)	60	5	80	30	5	50	30	1195	20	45	20	1420
Sign Control		Stop			Stop			Free				Free
Grade		0%			0%			0%				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
Hourly flow rate (vph)	65	5	87	33	5	54	33	1299	22	0	22	1543
Pedestrians					12							
Lane Width (ft)					12.0							
Walking Speed (ft/s)					3.5							
Percent Blockage					1							
Right turn flare (veh)			12									
Median type								None				None
Median storage veh												
Upstream signal (ft)								425				1288
pX, platoon unblocked	0.90	0.90	0.84	0.90	0.90	0.90	0.84			0.00	0.90	
vC, conflicting volume	2154	2997	525	1949	2997	456	1565			0	1333	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1101	2043	0	872	2043	0	1022			0	968	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			0.0	4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			0.0	2.2	
p0 queue free %	45	89	90	80	89	94	94			0	96	
cM capacity (veh/h)	119	45	915	166	45	961	569			0	627	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4		
Volume Total	157	92	33	520	520	282	22	617	617	331		
Volume Left	65	33	33	0	0	0	22	0	0	0		
Volume Right	87	54	0	0	0	22	0	0	0	22		
cSH	255	251	569	1700	1700	1700	627	1700	1700	1700		
Volume to Capacity	0.62	0.37	0.06	0.31	0.31	0.17	0.04	0.36	0.36	0.19		
Queue Length 95th (ft)	92	40	5	0	0	0	3	0	0	0		
Control Delay (s)	39.9	27.5	11.7	0.0	0.0	0.0	10.9	0.0	0.0	0.0		
Lane LOS	E	D	B				B					
Approach Delay (s)	39.9	27.5	0.3				0.2					
Approach LOS	E	D										
Intersection Summary												
Average Delay			3.0									
Intersection Capacity Utilization			52.9%	ICU Level of Service						A		
Analysis Period (min)			15									



Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	20
Future Volume (Veh/h)	20
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	22
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage (veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Signalized Intersection Capacity Analysis  
110: MD 97 & Hewitt Ave.

Future No-Build  
AM Peak





















						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			   			  
Traffic Volume (vph)	185	155	1090	110	90	1440
Future Volume (vph)	185	155	1090	110	90	1440
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.91		1.00	0.91
Frpb, ped/bikes	1.00	0.97	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1537	4995		1770	5085
Flt Permitted	0.95	1.00	1.00		0.15	1.00
Satd. Flow (perm)	1770	1537	4995		289	5085
Peak-hour factor, PHF	0.90	0.90	0.87	0.87	0.92	0.92
Adj. Flow (vph)	206	172	1253	126	98	1565
RTOR Reduction (vph)	0	146	4	0	0	0
Lane Group Flow (vph)	206	26	1375	0	98	1565
Confl. Peds. (#/hr)	4	13		4	4	
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	4		2		1	6
Permitted Phases		4			6	
Actuated Green, G (s)	27.4	27.4	126.1		140.1	140.1
Effective Green, g (s)	27.4	27.4	126.1		140.1	140.1
Actuated g/C Ratio	0.15	0.15	0.70		0.78	0.78
Clearance Time (s)	6.5	6.5	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	0.2		3.0	0.2
Lane Grp Cap (vph)	269	233	3499		290	3957
v/s Ratio Prot	c0.12		0.28		0.01	c0.31
v/s Ratio Perm		0.02			0.25	
v/c Ratio	0.77	0.11	0.39		0.34	0.40
Uniform Delay, d1	73.2	65.8	11.1		6.4	6.4
Progression Factor	1.00	1.00	1.00		1.49	0.63
Incremental Delay, d2	12.2	0.2	0.3		0.6	0.3
Delay (s)	85.5	66.0	11.5		10.2	4.3
Level of Service	F	E	B		B	A
Approach Delay (s)	76.6		11.5			4.7
Approach LOS	E		B			A
<b>Intersection Summary</b>						
HCM 2000 Control Delay			15.4		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.47			
Actuated Cycle Length (s)			180.0		Sum of lost time (s)	18.5
Intersection Capacity Utilization			62.3%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						



# HCM Signalized Intersection Capacity Analysis





























## 201: MD 185 & Independence St

Future No-Build  
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	15	195	55	15	10	75	955	40	10	2250	120
Future Volume (vph)	90	15	195	55	15	10	75	955	40	10	2250	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0			7.0		5.5	6.0		5.5	6.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.91		1.00	0.91	
Frbp, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.86			0.98		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1765	1603			1767		1770	5051		1770	5047	
Flt Permitted	0.70	1.00			0.28		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1307	1603			514		1770	5051		1770	5047	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	16	212	60	16	11	82	1038	43	11	2446	130
RTOR Reduction (vph)	0	158	0	0	3	0	0	2	0	0	3	0
Lane Group Flow (vph)	98	70	0	0	84	0	82	1079	0	11	2573	0
Confl. Peds. (#/hr)	2					2			2	2		
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8								
Actuated Green, G (s)	26.6	26.6			26.6		14.6	131.4		3.5	120.3	
Effective Green, g (s)	26.6	26.6			26.6		14.6	131.4		3.5	120.3	
Actuated g/C Ratio	0.15	0.15			0.15		0.08	0.73		0.02	0.67	
Clearance Time (s)	7.0	7.0			7.0		5.5	6.0		5.5	6.0	
Vehicle Extension (s)	4.0	4.0			4.0		4.0	0.2		4.0	0.2	
Lane Grp Cap (vph)	193	236			75		143	3687		34	3373	
v/s Ratio Prot		0.04					c0.05	0.21		0.01	c0.51	
v/s Ratio Perm	0.07				c0.16							
v/c Ratio	0.51	0.30			1.11		0.57	0.29		0.32	0.76	
Uniform Delay, d1	70.7	68.4			76.7		79.7	8.3		87.1	20.2	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.17	0.24	
Incremental Delay, d2	2.8	1.0			138.5		6.5	0.2		0.7	0.2	
Delay (s)	73.5	69.3			215.2		86.2	8.5		102.6	5.1	
Level of Service	E	E			F		F	A		F	A	
Approach Delay (s)		70.6			215.2			14.0			5.5	
Approach LOS		E			F			B			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			17.3				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			18.5		
Intersection Capacity Utilization			90.3%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
202: MD 185 & Aspen Hill Rd

Future No-Build  
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 	  			  	
Traffic Volume (vph)	210	135	165	150	370	30	270	705	80	45	2065	360
Future Volume (vph)	210	135	165	150	370	30	270	705	80	45	2065	360
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	7.0		6.5	7.0		5.5	7.0	7.0	5.5	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.91	1.00	1.00	0.91	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.92		1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1768	3210		1766	3493		3433	5085	1538	1770	4954	
Flt Permitted	0.23	1.00		0.40	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	433	3210		750	3493		3433	5085	1538	1770	4954	
Peak-hour factor, PHF	0.91	0.91	0.91	0.87	0.87	0.87	0.77	0.77	0.77	0.97	0.97	0.97
Adj. Flow (vph)	231	148	181	172	425	34	351	916	104	46	2129	371
RTOR Reduction (vph)	0	135	0	0	3	0	0	0	48	0	14	0
Lane Group Flow (vph)	231	194	0	172	456	0	351	916	56	46	2486	0
Confl. Peds. (#/hr)	11		7	7		11	5		7	7		5
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8					6			
Actuated Green, G (s)	49.0	31.5		48.2	31.1		27.4	96.5	96.5	8.9	78.0	
Effective Green, g (s)	49.0	31.5		48.2	31.1		27.4	96.5	96.5	8.9	78.0	
Actuated g/C Ratio	0.27	0.18		0.27	0.17		0.15	0.54	0.54	0.05	0.43	
Clearance Time (s)	6.5	7.0		6.5	7.0		5.5	7.0	7.0	5.5	7.0	
Vehicle Extension (s)	3.0	4.0		5.0	4.0		5.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)	247	561		297	603		522	2726	824	87	2146	
v/s Ratio Prot	c0.09	0.06		0.05	0.13		c0.10	0.18		0.03	c0.50	
v/s Ratio Perm	c0.16			0.10					0.04			
v/c Ratio	0.94	0.35		0.58	0.76		0.67	0.34	0.07	0.53	1.16	
Uniform Delay, d1	57.8	65.2		53.7	70.8		72.1	23.6	20.1	83.5	51.0	
Progression Factor	1.00	1.00		1.00	1.00		1.17	0.84	0.35	1.32	0.59	
Incremental Delay, d2	39.6	0.5		4.3	5.7		4.3	0.3	0.2	4.6	76.0	
Delay (s)	97.4	65.7		58.0	76.5		88.7	20.1	7.2	115.2	106.3	
Level of Service	F	E		E	E		F	C	A	F	F	
Approach Delay (s)		78.8			71.5			36.7			106.5	
Approach LOS		E			E			D			F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			80.4				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			26.0		
Intersection Capacity Utilization			107.8%				ICU Level of Service			G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
203: MD 185 & Home Depot Ent

Future No-Build  
AM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	50	125	190	755	2345	195
Future Volume (vph)	50	125	190	755	2345	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	0.91	0.86	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1572	1770	5085	6408	1541
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1572	1770	5085	6408	1541
Peak-hour factor, PHF	0.78	0.78	0.88	0.88	0.94	0.94
Adj. Flow (vph)	64	160	216	858	2495	207
RTOR Reduction (vph)	0	1	0	0	0	55
Lane Group Flow (vph)	64	159	216	858	2495	152
Confl. Peds. (#/hr)		5	5			5
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Actuated Green, G (s)	17.0	43.6	26.6	149.0	115.4	132.4
Effective Green, g (s)	17.0	43.6	26.6	149.0	115.4	132.4
Actuated g/C Ratio	0.09	0.24	0.15	0.83	0.64	0.74
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	167	441	261	4209	4108	1193
v/s Ratio Prot	0.04	c0.05	c0.12	0.17	c0.39	0.01
v/s Ratio Perm		0.05				0.09
v/c Ratio	0.38	0.36	0.83	0.20	0.61	0.13
Uniform Delay, d1	76.6	56.6	74.5	3.2	19.0	6.9
Progression Factor	1.00	1.00	1.11	0.63	0.69	0.68
Incremental Delay, d2	1.5	0.5	17.4	0.1	0.4	0.0
Delay (s)	78.0	57.1	99.9	2.1	13.5	4.7
Level of Service	E	E	F	A	B	A
Approach Delay (s)	63.1			21.8	12.9	
Approach LOS	E			C	B	

Intersection Summary

HCM 2000 Control Delay	18.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

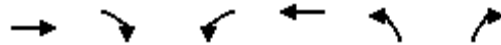
---

Intersection Sign configuration not allowed in HCM analysis.

---

HCM Signalized Intersection Capacity Analysis  
2000: HAWK & Aspen Hill Rd

Future No-Build  
AM Peak









Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		
Traffic Volume (vph)	260	0	0	550	0	0
Future Volume (vph)	260	0	0	550	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0		
Lane Util. Factor	0.95			0.95		
Frt	1.00			1.00		
Flt Protected	1.00			1.00		
Satd. Flow (prot)	3539			3539		
Flt Permitted	1.00			1.00		
Satd. Flow (perm)	3539			3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	283	0	0	598	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	283	0	0	598	0	0
Turn Type	NA			NA		
Protected Phases	2			6		
Permitted Phases						
Actuated Green, G (s)	11.9			11.9		
Effective Green, g (s)	11.9			11.9		
Actuated g/C Ratio	0.49			0.49		
Clearance Time (s)	6.0			6.0		
Vehicle Extension (s)	3.0			3.0		
Lane Grp Cap (vph)	1725			1725		
v/s Ratio Prot	0.08			0.17		
v/s Ratio Perm						
v/c Ratio	0.16			0.35		
Uniform Delay, d1	3.5			3.9		
Progression Factor	1.00			1.00		
Incremental Delay, d2	0.0			0.1		
Delay (s)	3.5			4.0		
Level of Service	A			A		
Approach Delay (s)	3.5			4.0	0.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	3.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	24.4	Sum of lost time (s)	10.5
Intersection Capacity Utilization	20.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis  
3000: MD 97

Future No-Build  
AM Peak

							
Movement	NBL	NBT	SBT	SBR	NEL	NER	
Lane Configurations		↑↑↑	↑↑	↗			
Traffic Volume (veh/h)	0	1280	1230	1650	0	0	
Future Volume (Veh/h)	0	1280	1230	1650	0	0	
Sign Control		Free	Free		Stop		
Grade		0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	1391	1337	1793	0	0	
<b>Pedestrians</b>							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None	None				
Median storage (veh)							
Upstream signal (ft)		400	1086				
pX, platoon unblocked	0.54				0.59	0.54	
vC, conflicting volume	3130				1685	668	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	3240				0	0	
tC, single (s)	4.1				6.8	6.9	
tC, 2 stage (s)							
tF (s)	2.2				3.5	3.3	
p0 queue free %	100				100	100	
cM capacity (veh/h)	49				605	588	
<b>Direction, Lane #</b>	<b>NB 1</b>	<b>NB 2</b>	<b>NB 3</b>	<b>NB 4</b>	<b>SB 1</b>	<b>SB 2</b>	<b>SB 3</b>
Volume Total	348	348	348	348	891	1043	1195
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	598	1195
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.20	0.20	0.20	0.20	0.52	0.61	0.70
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Lane LOS</b>							
Approach Delay (s)	0.0				0.0		
<b>Approach LOS</b>							
<b>Intersection Summary</b>							
Average Delay			0.0				
Intersection Capacity Utilization			71.4%		ICU Level of Service		C
Analysis Period (min)			15				

## Arterial Level of Service: NB MD 97

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Hewitt Ave.	110	14.6	57.6	0.4	27
Aspen Hill Apt	109	2.5	10.9	0.1	27
Aspen Manor	108	1.3	15.5	0.1	32
Cemetery	107	9.2	20.3	0.1	19
	106	1.2	11.6	0.1	32
MD 185	105	36.2	51.0	0.2	11
	3000	2.7	9.4	0.1	29
7-11	104	0.8	3.7	0.0	28
Postgate Terr	103	11.5	25.7	0.2	25
Crystal Springs Apt	102	3.3	20.0	0.2	37
Bel Pre Rd	101	32.5	46.0	0.2	14
Total		115.7	271.6	1.7	22

## Arterial Level of Service: SB MD 97

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Bel Pre Rd	101	223.9	308.4	1.1	13
Crystal Springs Apt	102	12.0	25.8	0.2	24
Heathfield Rd	103	18.8	35.3	0.2	21
Home Depot Ent.	104	14.2	28.1	0.2	23
	3000	2.6	4.9	0.0	22
MD 185	105	43.2	49.0	0.1	6
Northgate Plaza	106	4.1	19.9	0.2	27
Aspen Hill Rd	107	9.4	20.3	0.1	18
Wendy Ln	108	1.9	12.7	0.1	30
Ralph Rd	109	1.3	16.1	0.1	31
Hewitt Ave.	110	9.3	17.6	0.1	17
Total		340.6	538.0	2.4	16

## Arterial Level of Service: NB MD 185

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Independence St	201	8.4	44.4	0.5	37
Aspen Hill Rd	202	21.5	41.5	0.3	24
Home Depot Ent	203	4.4	14.9	0.1	32
	1000	1.5	8.1	0.1	35
MD 97	105	79.2	84.5	0.1	4
Total		115.0	193.5	1.0	19

Arterial Level of Service: SB MD 185

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
MD 97	105	98.0	112.8	0.2	6
	1000	7.6	14.3	0.1	22
Home Depot Ent	203	30.0	37.1	0.1	8
Aspen Hill Rd	202	52.2	62.6	0.1	8
Independence St	201	12.2	34.3	0.3	29
Total		199.9	261.2	0.8	11



Intersection: 23: Bend

Movement	WB	WB
Directions Served	T	
Maximum Queue (ft)	341	336
Average Queue (ft)	128	52
95th Queue (ft)	354	223
Link Distance (ft)	361	361
Upstream Blk Time (%)	0	0
Queuing Penalty (veh)	1	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 101: MD 97 & Bel Pre Rd

Movement	EB	EB	EB	EB	B23	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	T	L	T	T	R	L	L	T
Maximum Queue (ft)	204	419	290	269	63	304	492	469	175	195	215	226
Average Queue (ft)	133	113	109	69	4	237	244	235	100	101	106	121
95th Queue (ft)	221	260	226	247	40	347	436	415	239	173	187	207
Link Distance (ft)		361			2205		2748	2748				808
Upstream Blk Time (%)		1										
Queuing Penalty (veh)		0										
Storage Bay Dist (ft)	180		265	265		280			150	455	455	
Storage Blk Time (%)	8	1	1	1		11	3	24	0			
Queuing Penalty (veh)	41	4	2	4		26	10	64	1			

Intersection: 101: MD 97 & Bel Pre Rd

Movement	NB	NB	NB	SB	SB	SB	SB	SB	SB
Directions Served	T	T	R	L	L	T	T	T	R
Maximum Queue (ft)	244	250	224	120	585	2385	2380	2424	65
Average Queue (ft)	144	151	11	33	280	1469	1495	1518	54
95th Queue (ft)	227	242	91	87	728	2629	2651	2666	81
Link Distance (ft)	808	808				5872	5872	5872	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			200	560	560				40
Storage Blk Time (%)		4	0	0	0	48		54	2
Queuing Penalty (veh)		3	0	0	0	65		84	18

Intersection: 102: MD 97 & Crystal Springs Apt

Movement	WB	SB	SB	SB
Directions Served	R	T	T	T
Maximum Queue (ft)	52	820	826	433
Average Queue (ft)	28	57	104	15
95th Queue (ft)	48	398	539	190
Link Distance (ft)	234	808	808	808
Upstream Blk Time (%)		0	0	0
Queuing Penalty (veh)		1	2	1
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 103: MD 97 & Heathfield Rd/Postgate Terr

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	T	TR	L	T	T	TR
Maximum Queue (ft)	276	274	208	222	243	253	42	308	368	372
Average Queue (ft)	116	96	101	107	118	146	9	188	220	221
95th Queue (ft)	220	210	188	223	240	284	31	312	343	350
Link Distance (ft)	346	1048		861	861	861		1037	1037	1037
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)			350				350			
Storage Blk Time (%)								0		
Queuing Penalty (veh)								0		

Intersection: 104: MD 97 & Home Depot Ent./7-11

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	T	TR
Maximum Queue (ft)	176	155	130	55	82	3	4	51	430	667	651
Average Queue (ft)	67	66	42	31	23	0	0	12	25	86	67
95th Queue (ft)	165	124	106	54	64	2	3	38	205	376	320
Link Distance (ft)	1151	1151	801	801	75	75	75		861	861	861
Upstream Blk Time (%)					2						0
Queuing Penalty (veh)					8						0
Storage Bay Dist (ft)								235			
Storage Blk Time (%)									0		
Queuing Penalty (veh)									0		

Intersection: 105: MD 97 & MD 185

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	L	T	TR	L	LT	T	TR	L	T	T
Maximum Queue (ft)	240	260	274	279	243	287	305	768	702	159	253	231
Average Queue (ft)	150	166	187	144	139	140	260	437	445	75	128	123
95th Queue (ft)	222	243	258	225	217	271	354	761	696	139	218	202
Link Distance (ft)		261	261	261				968	968		682	682
Upstream Blk Time (%)	0	0	2	1	0			0				
Queuing Penalty (veh)	0	1	6	1	0			0				
Storage Bay Dist (ft)	425				300	280	280			330		
Storage Blk Time (%)	0	0		1	0	0	3	23				0
Queuing Penalty (veh)	0	1		1	0	0	9	111				0

Intersection: 105: MD 97 & MD 185

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	T
Maximum Queue (ft)	244	67	223	386	378	200
Average Queue (ft)	136	24	30	287	261	183
95th Queue (ft)	222	58	117	413	372	234
Link Distance (ft)	682			260	260	
Upstream Blk Time (%)				14	11	
Queuing Penalty (veh)				83	66	
Storage Bay Dist (ft)		280	200			175
Storage Blk Time (%)	0		0	28	27	11
Queuing Penalty (veh)	0		0	9	109	44

Intersection: 106: MD 97 & Northgate Plaza

Movement	EB	NB	SB	SB
Directions Served	R	UL	UL	TR
Maximum Queue (ft)	74	135	73	18
Average Queue (ft)	21	46	19	1
95th Queue (ft)	52	100	51	8
Link Distance (ft)	253			682
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		175	150	
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Intersection: 107: MD 97 & Aspen Hill Rd/Cemetery

Movement	EB	EB	WB	NB	NB	NB	NB	NB	SB	SB	SB	SB	
Directions Served	LT	R	LTR	L	L	T	T	TR	L	T	T	T	
Maximum Queue (ft)	105	271	244	300	326	346	216	209	50	163	194	221	
Average Queue (ft)	33	116	50	187	195	93	58	63	13	75	81	90	
95th Queue (ft)	80	215	195	279	295	248	142	148	40	146	154	180	
Link Distance (ft)	894	894	533			470	470	470		472	472	472	
Upstream Blk Time (%)	0												
Queuing Penalty (veh)	0												
Storage Bay Dist (ft)					250	250					190		
Storage Blk Time (%)					2	5	1					0	17
Queuing Penalty (veh)					5	14	3					0	23

Intersection: 107: MD 97 & Aspen Hill Rd/Cemetery

Movement	SB
Directions Served	R
Maximum Queue (ft)	95
Average Queue (ft)	21
95th Queue (ft)	84
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	70
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 108: MD 97 & Wendy Ln/Aspen Manor

Movement	EB	WB	NB	NB	SB	SB
Directions Served	R	R	UL	TR	L	TR
Maximum Queue (ft)	95	43	124	4	62	6
Average Queue (ft)	35	19	40	0	18	0
95th Queue (ft)	74	38	89	3	48	6
Link Distance (ft)	1228	342		650		470
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)				200	150	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 109: MD 97 & Ralph Rd/Aspen Hill Apt

Movement	EB	EB	WB	NB	NB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	T	T	TR	UL	TR
Maximum Queue (ft)	173	82	168	46	4	4	0	78	9
Average Queue (ft)	84	38	62	11	0	0	0	28	0
95th Queue (ft)	169	71	129	35	3	3	0	63	4
Link Distance (ft)	1188		370		352	352	352		650
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)		300		125				175	
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 110: MD 97 & Hewitt Ave.

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	R	T	T	TR	L	T	T	T
Maximum Queue (ft)	115	492	381	336	256	151	194	230	238
Average Queue (ft)	103	205	167	120	87	50	104	139	151
95th Queue (ft)	131	408	306	260	198	102	179	215	234
Link Distance (ft)		1177	2204	2204	2204		352	352	352
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	90					140			
Storage Blk Time (%)	44	1				0	2		
Queuing Penalty (veh)	68	2				1	2		

Intersection: 201: MD 185 & Independence St

Movement	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	LTR	L	T	T	TR	L	T	T	TR
Maximum Queue (ft)	125	358	168	181	225	178	168	31	137	149	155
Average Queue (ft)	77	148	70	75	84	46	42	2	38	57	65
95th Queue (ft)	140	294	134	150	195	130	117	14	102	128	137
Link Distance (ft)		872	167		2375	2375	2375		1317	1317	1317
Upstream Blk Time (%)	1										
Queuing Penalty (veh)	0										
Storage Bay Dist (ft)	100			250				270			
Storage Blk Time (%)	9	20			0						
Queuing Penalty (veh)	19	18			0						

Intersection: 202: MD 185 & Aspen Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	NB
Directions Served	L	T	TR	L	T	TR	L	L	T	T	T	R
Maximum Queue (ft)	306	390	380	264	363	366	297	320	235	192	155	24
Average Queue (ft)	172	108	179	78	109	131	131	152	91	77	64	2
95th Queue (ft)	305	342	314	183	244	260	231	257	182	152	138	13
Link Distance (ft)		1834	1834		450	450			1317	1317	1317	
Upstream Blk Time (%)					0	0						
Queuing Penalty (veh)					0	0						
Storage Bay Dist (ft)	300			410			350	350				350
Storage Blk Time (%)	7				0		0	0	0			
Queuing Penalty (veh)	5				0		0	0	0			

Intersection: 202: MD 185 & Aspen Hill Rd

Movement	SB	SB	SB	SB
Directions Served	L	T	T	TR
Maximum Queue (ft)	121	613	650	618
Average Queue (ft)	33	453	496	516
95th Queue (ft)	85	686	733	718
Link Distance (ft)	606	606	606	606
Upstream Blk Time (%)		1	4	6
Queuing Penalty (veh)		4	25	36
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 203: MD 185 & Home Depot Ent

Movement	EB	EB	NB	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	L	R	L	T	T	T	T	T	T	T	R
Maximum Queue (ft)	256	125	239	406	156	114	248	342	483	546	531
Average Queue (ft)	82	81	174	81	22	20	26	217	335	431	283
95th Queue (ft)	197	140	263	300	85	67	134	347	496	655	596
Link Distance (ft)	589			606	606	606	355	355	355	355	355
Upstream Blk Time (%)							0	0	10	29	12
Queuing Penalty (veh)							0	0	51	149	60
Storage Bay Dist (ft)		100	215								
Storage Blk Time (%)	2	12	12								
Queuing Penalty (veh)	2	6	29								

Intersection: 1000: MD 185

Movement	WB	WB	WB	SB	SB
Directions Served	T	T	T	R	R
Maximum Queue (ft)	7	67	71	574	566
Average Queue (ft)	0	3	4	296	243
95th Queue (ft)	5	40	30	717	654
Link Distance (ft)	261	261	261	474	474
Upstream Blk Time (%)		0		12	8
Queuing Penalty (veh)		0		98	66
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2000: HAWK & Aspen Hill Rd

Movement	EB	EB	WB	WB
Directions Served	T	T	T	T
Maximum Queue (ft)	32	85	178	174
Average Queue (ft)	3	18	17	20
95th Queue (ft)	19	57	86	88
Link Distance (ft)	450	450	894	894
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3000: MD 97

























Movement	SB	SB	SB
Directions Served	T	TR	R
Maximum Queue (ft)	131	168	143
Average Queue (ft)	18	69	39
95th Queue (ft)	77	181	121
Link Distance (ft)	75	75	75
Upstream Blk Time (%)	1	10	3
Queuing Penalty (veh)	9	94	28
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 1596
------------------------------------

HCM Signalized Intersection Capacity Analysis  
101: MD 97 & Bel Pre Rd

Future No-Build  
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	220	405	255	150	230	190	260	1960	210	255	1230	125
Future Volume (vph)	220	405	255	150	230	190	260	1960	210	255	1230	125
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1600	1900	1900	1750	1900
Total Lost time (s)	9.0	7.0	4.0	9.0	7.0	4.0	8.5	7.0	7.0	8.5	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1562	1769	3539	1583	3433	4282	1583	3433	4684	1583
Flt Permitted	0.46	1.00	1.00	0.24	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	864	3539	1562	450	3539	1583	3433	4282	1583	3433	4684	1583
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.97	0.97	0.96	0.96	0.96
Adj. Flow (vph)	242	445	280	165	253	209	268	2021	216	266	1281	130
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	69	0	0	69
Lane Group Flow (vph)	242	445	280	165	253	209	268	2021	147	266	1281	61
Confl. Peds. (#/hr)			5	5								
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4		Free	8		Free			6			2
Actuated Green, G (s)	47.2	29.2	180.0	44.6	27.9	180.0	18.2	84.5	84.5	18.1	84.4	84.4
Effective Green, g (s)	47.2	29.2	180.0	44.6	27.9	180.0	18.2	84.5	84.5	18.1	84.4	84.4
Actuated g/C Ratio	0.26	0.16	1.00	0.25	0.15	1.00	0.10	0.47	0.47	0.10	0.47	0.47
Clearance Time (s)	9.0	7.0		9.0	7.0		8.5	7.0	7.0	8.5	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2	0.2	3.0	0.2	0.2
Lane Grp Cap (vph)	317	574	1562	233	548	1583	347	2010	743	345	2196	742
v/s Ratio Prot	c0.08	c0.13		0.07	0.07		c0.08	c0.47		0.08	0.27	
v/s Ratio Perm	0.12		c0.18	0.11		0.13			0.09			0.04
v/c Ratio	0.76	0.78	0.18	0.71	0.46	0.13	0.77	1.01	0.20	0.77	0.58	0.08
Uniform Delay, d1	57.9	72.3	0.0	56.9	69.2	0.0	78.9	47.8	27.9	78.9	34.9	26.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.24	0.69	0.36	1.00	1.00	1.00
Incremental Delay, d2	10.4	6.5	0.3	9.4	0.6	0.2	8.4	19.3	0.5	10.2	1.1	0.2
Delay (s)	68.3	78.7	0.3	66.3	69.8	0.2	106.2	52.1	10.6	89.1	36.1	26.6
Level of Service	E	E	A	E	E	A	F	D	B	F	D	C
Approach Delay (s)		53.4			45.7			54.3			43.8	
Approach LOS		D			D			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			50.1				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			31.5		
Intersection Capacity Utilization			100.6%				ICU Level of Service			G		
Analysis Period (min)			15									
c Critical Lane Group												



HCM Unsignalized Intersection Capacity Analysis  
 102: MD 97 & Crystal Spring Apt



















Future No-Build  
 PM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations		↗	↕↕↕			↕↕↕	
Traffic Volume (veh/h)	0	90	2340	55	0	1635	
Future Volume (Veh/h)	0	90	2340	55	0	1635	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	98	2543	60	0	1777	
Pedestrians	9						
Lane Width (ft)	12.0						
Walking Speed (ft/s)	3.5						
Percent Blockage	1						
Right turn flare (veh)							
Median type			None			None	
Median storage (veh)							
Upstream signal (ft)			1091			919	
pX, platoon unblocked	0.84	0.75			0.75		
vC, conflicting volume	3174	887			2612		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1385	0			1969		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	88			100		
cM capacity (veh/h)	112	802			215		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	98	1017	1017	569	592	592	592
Volume Left	0	0	0	0	0	0	0
Volume Right	98	0	0	60	0	0	0
cSH	802	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.12	0.60	0.60	0.33	0.35	0.35	0.35
Queue Length 95th (ft)	10	0	0	0	0	0	0
Control Delay (s)	10.1	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	10.1	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.2				
Intersection Capacity Utilization			58.7%		ICU Level of Service		B
Analysis Period (min)			15				























HCM Signalized Intersection Capacity Analysis  
103: MD 97 & Heathfield Rd/Postgate Terr

Future No-Build  
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	10	80	35	10	25	115	2335	40	35	1550	50
Future Volume (vph)	35	10	80	35	10	25	115	2335	40	35	1550	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0		5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.91		1.00	0.91	
Frbp, ped/bikes		0.99			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.91			0.95		1.00	1.00		1.00	1.00	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1658			1712		1770	5065		1770	5057	
Flt Permitted		0.86			0.57		0.12	1.00		0.04	1.00	
Satd. Flow (perm)		1441			1006		217	5065		76	5057	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.96	0.96	0.96	0.97	0.97	0.97
Adj. Flow (vph)	45	13	103	45	13	32	120	2432	42	36	1598	52
RTOR Reduction (vph)	0	39	0	0	12	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	122	0	0	78	0	120	2473	0	36	1649	0
Confl. Peds. (#/hr)	10		1	1		10	2		14	14		2
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)		21.7			21.7		143.2	135.0		137.4	132.1	
Effective Green, g (s)		21.7			21.7		143.2	135.0		137.4	132.1	
Actuated g/C Ratio		0.12			0.12		0.80	0.75		0.76	0.73	
Clearance Time (s)		7.0			7.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)		4.0			3.5		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		173			121		243	3798		107	3711	
v/s Ratio Prot							c0.02	c0.49		0.01	0.33	
v/s Ratio Perm		c0.08			0.08		0.37			0.25		
v/c Ratio		0.71			0.64		0.49	0.65		0.34	0.44	
Uniform Delay, d1		76.1			75.4		6.4	11.0		10.8	9.5	
Progression Factor		1.00			1.00		2.18	0.30		3.26	1.36	
Incremental Delay, d2		13.2			11.6		0.9	0.5		1.6	0.3	
Delay (s)		89.3			87.0		14.7	3.8		37.0	13.2	
Level of Service		F			F		B	A		D	B	
Approach Delay (s)		89.3			87.0			4.3			13.7	
Approach LOS		F			F			A			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			12.5				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			18.0		
Intersection Capacity Utilization			77.7%				ICU Level of Service				D	
Analysis Period (min)			15									
c Critical Lane Group												























HCM Unsignalized Intersection Capacity Analysis  
 104: MD 97 & Home Depot Ent./7-11

Future No-Build  
 PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	5	175	15	5	50	85	2405	35	20	1545	100
Future Volume (Veh/h)	35	5	175	15	5	50	85	2405	35	20	1545	100
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.81	0.81	0.81	0.93	0.93	0.93	0.96	0.96	0.96
Hourly flow rate (vph)	40	6	199	19	6	62	91	2586	38	21	1609	104
Pedestrians		2			23							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		3.5			3.5							
Percent Blockage		0			2							
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								553			933	
pX, platoon unblocked	0.85	0.85	0.87	0.85	0.85	0.79	0.87			0.79		
vC, conflicting volume	2814	4534	590	3590	4567	904	1715			2647		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1520	3546	32	2435	3585	0	1317			2144		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	0	78	0	0	93	80			89		
cM capacity (veh/h)	0	3	904	0	3	834	455			191		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	46	199	25	62	91	1034	1034	555	21	644	644	426
Volume Left	40	0	19	0	91	0	0	0	21	0	0	0
Volume Right	0	199	0	62	0	0	0	38	0	0	0	104
cSH	0	904	0	834	455	1700	1700	1700	191	1700	1700	1700
Volume to Capacity	Err	0.22	Err	0.07	0.20	0.61	0.61	0.33	0.11	0.38	0.38	0.25
Queue Length 95th (ft)	Err	21	Err	6	18	0	0	0	9	0	0	0
Control Delay (s)	Err	10.1	Err	9.7	14.9	0.0	0.0	0.0	26.2	0.0	0.0	0.0
Lane LOS	F	B	F	A	B				D			
Approach Delay (s)	Err		Err		0.5				0.3			
Approach LOS	F		F									
Intersection Summary												
Average Delay			Err									
Intersection Capacity Utilization			69.5%		ICU Level of Service				C			
Analysis Period (min)			15									



















HCM Signalized Intersection Capacity Analysis  
105: MD 97 & MD 185

Future No-Build  
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1250	685	45	290	400	90	40	1185	415	85	885	0
Future Volume (vph)	1250	685	45	290	400	90	40	1185	415	85	885	0
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1750	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		8.5	7.0	7.0	8.5	7.0	
Lane Util. Factor	0.94	0.95		0.86	0.86		1.00	0.91	1.00	1.00	0.91	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.93	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	4990	3495		1522	4636		1770	5085	1470	1770	4684	
Flt Permitted	0.95	1.00		0.95	0.99		0.95	1.00	1.00	0.09	1.00	
Satd. Flow (perm)	4990	3495		1522	4636		1770	5085	1470	160	4684	
Peak-hour factor, PHF	0.93	0.93	0.93	0.91	0.91	0.91	0.96	0.96	0.96	0.94	0.94	0.94
Adj. Flow (vph)	1344	737	48	319	440	99	42	1234	432	90	941	0
RTOR Reduction (vph)	0	3	0	0	13	0	0	0	226	0	0	0
Lane Group Flow (vph)	1344	782	0	214	631	0	42	1234	206	90	941	0
Confl. Peds. (#/hr)	11		26	26		11	8		28	28		8
Turn Type	Split	NA		Split	NA		Prot	NA	Perm	pm+pt		NA
Protected Phases	3	3		4	4		1	6			5	2
Permitted Phases									6		2	
Actuated Green, G (s)	50.0	50.0		31.3	31.3		8.9	58.0	58.0	71.5	60.3	
Effective Green, g (s)	50.0	50.0		31.3	31.3		8.9	58.0	58.0	71.5	60.3	
Actuated g/C Ratio	0.28	0.28		0.17	0.17		0.05	0.32	0.32	0.40	0.33	
Clearance Time (s)	7.0	7.0		7.0	7.0		8.5	7.0	7.0	8.5	7.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	0.2	0.2	4.0	0.2	
Lane Grp Cap (vph)	1386	970		264	806		87	1638	473	163	1569	
v/s Ratio Prot	c0.27	0.22		c0.14	0.14		0.02	c0.24		c0.03	0.20	
v/s Ratio Perm									0.14	0.18		
v/c Ratio	0.97	0.81		0.81	0.78		0.48	0.75	0.44	0.55	0.60	
Uniform Delay, d1	64.3	60.5		71.5	71.1		83.3	54.6	48.1	39.2	49.8	
Progression Factor	0.92	0.95		1.00	1.00		1.39	0.70	0.37	1.13	0.86	
Incremental Delay, d2	16.2	4.8		17.7	5.3		5.1	2.9	2.6	4.6	1.6	
Delay (s)	75.2	62.0		89.2	76.4		121.2	41.0	20.3	48.7	44.5	
Level of Service	E	E		F	E		F	D	C	D	D	
Approach Delay (s)		70.4			79.6			37.7			44.8	
Approach LOS		E			E			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			57.4				HCM 2000 Level of Service				E	
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)				29.5	
Intersection Capacity Utilization			95.0%				ICU Level of Service				F	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
 106: MD 97 & Northgate Plaza

Future No-Build  
 PM Peak

															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL			
Lane Configurations									  						
Traffic Volume (veh/h)	0	0	50	0	0	0	15	45	1570	0	70	0			
Future Volume (Veh/h)	0	0	50	0	0	0	15	45	1570	0	70	0			
Sign Control	Stop			Stop			Free								
Grade	0%			0%			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			
Hourly flow rate (vph)	0	0	54	0	0	0	0	49	1707	0	0	0			
Pedestrians	8														
Lane Width (ft)	12.0														
Walking Speed (ft/s)	3.5														
Percent Blockage	1														
Right turn flare (veh)															
Median type	None														
Median storage (veh)															
Upstream signal (ft)	547														
pX, platoon unblocked	0.90	0.90	0.85	0.90	0.90	0.83	0.00	0.85			0.00	0.83			
vC, conflicting volume	1882	3020	439	2247	3063	569	0	1258			0	1707			
vC1, stage 1 conf vol															
vC2, stage 2 conf vol															
vCu, unblocked vol	467	1728	0	871	1776	0	0	679			0	1123			
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	0.0	4.1			0.0	4.1			
tC, 2 stage (s)															
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2			0.0	2.2			
p0 queue free %	100	100	94	100	100	100	0	94			0	100			
cM capacity (veh/h)	406	73	913	197	69	897	0	765			0	511			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4						
Volume Total	54	49	569	569	569	0	465	465	320						
Volume Left	0	49	0	0	0	0	0	0	0						
Volume Right	54	0	0	0	0	0	0	0	87						
cSH	913	765	1700	1700	1700	1700	1700	1700	1700						
Volume to Capacity	0.06	0.06	0.33	0.33	0.33	0.00	0.27	0.27	0.19						
Queue Length 95th (ft)	5	5	0	0	0	0	0	0	0						
Control Delay (s)	9.2	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						
Lane LOS	A	B													
Approach Delay (s)	9.2	0.3							0.0						
Approach LOS	A														
Intersection Summary															
Average Delay			0.3												
Intersection Capacity Utilization			40.9%				ICU Level of Service				A				
Analysis Period (min)	15														

HCM Unsignalized Intersection Capacity Analysis  
 106: MD 97 & Northgate Plaza






















Future No-Build  
 PM Peak



Movement	SBT	SBR
Lane Configurations	↑↑↑	
Traffic Volume (veh/h)	1070	80
Future Volume (Veh/h)	1070	80
Sign Control	Free	
Grade	0%	
Peak Hour Factor	0.92	0.92
Hourly flow rate (vph)	1163	87
Pedestrians		
Lane Width (ft)		
Walking Speed (ft/s)		
Percent Blockage		
Right turn flare (veh)		
Median type	None	
Median storage (veh)		
Upstream signal (ft)	801	
pX, platoon unblocked		
vC, conflicting volume		
vC1, stage 1 conf vol		
vC2, stage 2 conf vol		
vCu, unblocked vol		
tC, single (s)		
tC, 2 stage (s)		
tF (s)		
p0 queue free %		
cM capacity (veh/h)		
Direction, Lane #		




















HCM Signalized Intersection Capacity Analysis  
107: MD 97 & Aspen Hill Rd/Cemetery

Future No-Build  
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	140	20	570	15	15	10	415	1480	20	10	1025	100
Future Volume (vph)	140	20	570	15	15	10	415	1480	20	10	1025	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.5	6.0		8.0		6.0	7.0		6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00		0.97	0.91		1.00	0.91	1.00
Frbp, ped/bikes		1.00	0.98		1.00		1.00	1.00		1.00	1.00	0.69
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		0.97		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.96	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1785	1546		1765		3433	5067		1770	5085	1099
Flt Permitted		0.96	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1785	1546		1765		3433	5067		1770	5085	1099
Peak-hour factor, PHF	0.96	0.96	0.96	0.57	0.57	0.57	0.96	0.96	0.96	0.94	0.94	0.94
Adj. Flow (vph)	146	21	594	26	26	18	432	1542	21	11	1090	106
RTOR Reduction (vph)	0	0	54	0	7	0	0	1	0	0	0	62
Lane Group Flow (vph)	0	167	540	0	63	0	432	1562	0	11	1090	44
Confl. Peds. (#/hr)			29	29			10		21	1025		100
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4									2
Actuated Green, G (s)		29.6	66.4		9.9		36.8	108.8		3.2	75.2	75.2
Effective Green, g (s)		29.6	66.4		9.9		36.8	108.8		3.2	75.2	75.2
Actuated g/C Ratio		0.16	0.37		0.06		0.20	0.60		0.02	0.42	0.42
Clearance Time (s)		7.5	6.0		8.0		6.0	7.0		6.0	7.0	7.0
Vehicle Extension (s)		3.0	5.0		5.0		5.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)		293	570		97		701	3062		31	2124	459
v/s Ratio Prot		0.09	c0.19		c0.04		0.13	c0.31		0.01	0.21	
v/s Ratio Perm			0.16									0.04
v/c Ratio		0.57	0.95		0.65		0.62	0.51		0.35	0.51	0.10
Uniform Delay, d1		69.3	55.1		83.4		65.2	20.4		87.4	38.8	31.8
Progression Factor		1.00	1.00		1.00		1.02	0.44		1.24	0.42	0.98
Incremental Delay, d2		2.5	25.8		19.3		2.1	0.5		5.6	0.7	0.3
Delay (s)		71.9	80.9		102.7		68.4	9.5		113.9	17.0	31.6
Level of Service		E	F		F		E	A		F	B	C
Approach Delay (s)		78.9			102.7		22.2			19.1		
Approach LOS		E			F		C			B		
<b>Intersection Summary</b>												
HCM 2000 Control Delay			33.4				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			28.5		
Intersection Capacity Utilization			78.6%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
108: MD 97 & Wendy Ln/Aspen Manor

Future No-Build  
PM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	
Lane Configurations													
Traffic Volume (veh/h)	0	0	125	0	0	140	105	35	1775	35	170	1360	
Future Volume (Veh/h)	0	0	125	0	0	140	105	35	1775	35	170	1360	
Sign Control	Stop			Stop					Free			Free	
Grade	0%			0%					0%			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	
Hourly flow rate (vph)	0	0	136	0	0	152	0	38	1929	38	185	1478	
Pedestrians	10			8									
Lane Width (ft)	12.0			12.0									
Walking Speed (ft/s)	3.5			3.5									
Percent Blockage	1			1									
Right turn flare (veh)													
Median type									None				None
Median storage (veh)													
Upstream signal (ft)									1156				557
pX, platoon unblocked	0.89	0.89	0.85	0.89	0.89	0.82	0.00	0.85				0.82	
vC, conflicting volume	2772	3952	546	3031	3977	670	0	1575				1975	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	1434	2756	0	1724	2784	0	0	1061				1413	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	0.0	4.1				4.1	
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2				2.2	
p0 queue free %	100	100	85	100	100	83	0	93				52	
cM capacity (veh/h)	41	8	913	25	8	880	0	549				388	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4			
Volume Total	136	152	38	772	772	424	185	591	591	383			
Volume Left	0	0	38	0	0	0	185	0	0	0			
Volume Right	136	152	0	0	0	38	0	0	0	87			
cSH	913	880	549	1700	1700	1700	388	1700	1700	1700			
Volume to Capacity	0.15	0.17	0.07	0.45	0.45	0.25	0.48	0.35	0.35	0.23			
Queue Length 95th (ft)	13	16	6	0	0	0	62	0	0	0			
Control Delay (s)	9.6	9.9	12.0	0.0	0.0	0.0	22.4	0.0	0.0	0.0			
Lane LOS	A	A	B				C						
Approach Delay (s)	9.6	9.9	0.2				2.4						
Approach LOS	A	A											
Intersection Summary													
Average Delay			1.8										
Intersection Capacity Utilization			53.6%		ICU Level of Service				A				
Analysis Period (min)			15										





Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	80
Future Volume (Veh/h)	80
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	87
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage (veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Unsignalized Intersection Capacity Analysis  
 109: MD 97 & Aspen Hill Apt

Future No-Build  
 PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations		↕	↗		↔		↖	↑↑↑			↙	↑↑↑
Traffic Volume (veh/h)	35	5	115	15	5	45	45	1745	40	125	40	1375
Future Volume (Veh/h)	35	5	115	15	5	45	45	1745	40	125	40	1375
Sign Control		Stop			Stop			Free				Free
Grade		0%			0%			0%				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
Hourly flow rate (vph)	38	5	125	16	5	49	49	1897	43	0	43	1495
Pedestrians		7			41							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		3.5			3.5							
Percent Blockage		1			4							
Right turn flare (veh)				20								
Median type								None				None
Median storage veh												
Upstream signal (ft)								425				1288
pX, platoon unblocked	0.85	0.85	0.89	0.85	0.85	0.79	0.89			0.00	0.79	
vC, conflicting volume	2397	3694	532	2644	3700	695	1556			0	1981	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1127	2657	31	1419	2663	0	1184			0	1319	
tC, single (s)	*5.0	6.5	6.9	7.5	6.5	6.9	4.1			0.0	4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			0.0	2.2	
p0 queue free %	78	66	86	62	66	94	91			0	89	
cM capacity (veh/h)	171	15	913	42	15	825	516			0	396	
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>NB 3</b>	<b>NB 4</b>	<b>SB 1</b>	<b>SB 2</b>	<b>SB 3</b>	<b>SB 4</b>		
Volume Total	168	70	49	759	759	422	43	598	598	353		
Volume Left	38	16	49	0	0	0	43	0	0	0		
Volume Right	125	49	0	0	0	43	0	0	0	54		
cSH	596	89	516	1700	1700	1700	396	1700	1700	1700		
Volume to Capacity	0.28	0.79	0.09	0.45	0.45	0.25	0.11	0.35	0.35	0.21		
Queue Length 95th (ft)	29	102	8	0	0	0	9	0	0	0		
Control Delay (s)	16.7	126.5	12.7	0.0	0.0	0.0	15.2	0.0	0.0	0.0		
Lane LOS	C	F	B				C					
Approach Delay (s)	16.7	126.5	0.3				0.4					
Approach LOS	C	F										
<b>Intersection Summary</b>												
Average Delay			3.4									
Intersection Capacity Utilization			64.4%		ICU Level of Service				C			
Analysis Period (min)			15									

\* User Entered Value



Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	50
Future Volume (Veh/h)	50
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	54
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage (veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Signalized Intersection Capacity Analysis  
110: MD 97 & Hewitt Ave.

Future No-Build  
PM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	105	155	1675	185	220	1285
Future Volume (vph)	105	155	1675	185	220	1285
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.91		1.00	0.91
Frbp, ped/bikes	1.00	0.97	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1543	4949		1770	5085
Flt Permitted	0.95	1.00	1.00		0.07	1.00
Satd. Flow (perm)	1770	1543	4949		130	5085
Peak-hour factor, PHF	0.94	0.94	0.96	0.96	0.96	0.96
Adj. Flow (vph)	112	165	1745	193	229	1339
RTOR Reduction (vph)	0	146	6	0	0	0
Lane Group Flow (vph)	112	19	1932	0	229	1339
Confl. Peds. (#/hr)	9	10		16	16	
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	4		2		1	6
Permitted Phases		4			6	
Actuated Green, G (s)	20.2	20.2	119.9		147.3	147.3
Effective Green, g (s)	20.2	20.2	119.9		147.3	147.3
Actuated g/C Ratio	0.11	0.11	0.67		0.82	0.82
Clearance Time (s)	6.5	6.5	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	0.2		3.0	0.2
Lane Grp Cap (vph)	198	173	3296		301	4161
v/s Ratio Prot	c0.06		0.39		c0.09	0.26
v/s Ratio Perm		0.01			c0.53	
v/c Ratio	0.57	0.11	0.59		0.76	0.32
Uniform Delay, d1	75.7	71.8	16.5		42.8	4.0
Progression Factor	1.00	1.00	1.00		0.69	1.33
Incremental Delay, d2	3.7	0.3	0.8		9.3	0.2
Delay (s)	79.4	72.1	17.2		38.8	5.5
Level of Service	E	E	B		D	A
Approach Delay (s)	75.0		17.2			10.4
Approach LOS	E		B			B






















Intersection Summary

HCM 2000 Control Delay	18.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Signalized Intersection Capacity Analysis





























## 201: MD 185 & Independence St

Future No-Build  
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	20	115	110	35	30	95	1755	95	20	1100	175
Future Volume (vph)	125	20	115	110	35	30	95	1755	95	20	1100	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0			7.0		5.5	6.0		5.5	6.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.91		1.00	0.91	
Frbp, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.87			0.98		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1727	1625			1748		1770	5040		1770	4932	
Flt Permitted	0.63	1.00			0.59		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1151	1625			1063		1770	5040		1770	4932	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	136	22	125	120	38	33	103	1908	103	22	1196	190
RTOR Reduction (vph)	0	102	0	0	4	0	0	3	0	0	11	0
Lane Group Flow (vph)	136	45	0	0	187	0	103	2008	0	22	1375	0
Confl. Peds. (#/hr)	25					25	10		8	8		10
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8								
Actuated Green, G (s)	32.8	32.8			32.8		16.5	122.8		5.9	112.2	
Effective Green, g (s)	32.8	32.8			32.8		16.5	122.8		5.9	112.2	
Actuated g/C Ratio	0.18	0.18			0.18		0.09	0.68		0.03	0.62	
Clearance Time (s)	7.0	7.0			7.0		5.5	6.0		5.5	6.0	
Vehicle Extension (s)	4.0	4.0			4.0		4.0	0.2		4.0	0.2	
Lane Grp Cap (vph)	209	296			193		162	3438		58	3074	
v/s Ratio Prot		0.03					c0.06	c0.40		0.01	0.28	
v/s Ratio Perm	0.12				c0.18							
v/c Ratio	0.65	0.15			0.97		0.64	0.58		0.38	0.45	
Uniform Delay, d1	68.3	61.9			73.1		78.9	15.1		85.3	17.7	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.14	0.47	
Incremental Delay, d2	7.8	0.3			55.2		8.9	0.7		4.5	0.4	
Delay (s)	76.1	62.2			128.3		87.7	15.8		102.0	8.7	
Level of Service	E	E			F		F	B		F	A	
Approach Delay (s)		68.9			128.3			19.3			10.1	
Approach LOS		E			F			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			24.8				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			18.5		
Intersection Capacity Utilization			88.8%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
202: MD 185 & Aspen Hill Rd

Future No-Build  
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 	  			  	
Traffic Volume (vph)	370	380	155	195	245	90	225	1470	215	135	945	260
Future Volume (vph)	370	380	155	195	245	90	225	1470	215	135	945	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	7.0		6.5	7.0		5.5	7.0	7.0	5.5	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.91	1.00	1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	0.95	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	0.96		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1767	3355		1766	3374		3433	5085	1511	1770	4892	
Flt Permitted	0.25	1.00		0.26	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	473	3355		487	3374		3433	5085	1511	1770	4892	
Peak-hour factor, PHF	0.96	0.96	0.96	0.87	0.87	0.87	0.97	0.97	0.97	0.96	0.96	0.96
Adj. Flow (vph)	385	396	161	224	282	103	232	1515	222	141	984	271
RTOR Reduction (vph)	0	25	0	0	23	0	0	0	93	0	22	0
Lane Group Flow (vph)	385	532	0	224	362	0	232	1515	129	141	1233	0
Confl. Peds. (#/hr)	11		16	16		11	6		14	14		6
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8					6			
Actuated Green, G (s)	68.6	38.1		53.6	29.6		19.3	72.2	72.2	19.7	72.6	
Effective Green, g (s)	68.6	38.1		53.6	29.6		19.3	72.2	72.2	19.7	72.6	
Actuated g/C Ratio	0.38	0.21		0.30	0.16		0.11	0.40	0.40	0.11	0.40	
Clearance Time (s)	6.5	7.0		6.5	7.0		5.5	7.0	7.0	5.5	7.0	
Vehicle Extension (s)	3.0	4.0		5.0	4.0		5.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)	413	710		315	554		368	2039	606	193	1973	
v/s Ratio Prot	c0.17	0.16		0.09	0.11		0.07	c0.30		c0.08	0.25	
v/s Ratio Perm	c0.19			0.12					0.09			
v/c Ratio	0.93	0.75		0.71	0.65		0.63	0.74	0.21	0.73	0.62	
Uniform Delay, d1	45.7	66.5		51.4	70.4		76.9	46.0	35.3	77.6	42.8	
Progression Factor	1.00	1.00		1.00	1.00		1.14	0.78	0.68	0.95	1.46	
Incremental Delay, d2	27.8	4.6		9.1	3.1		4.0	2.0	0.7	12.8	1.4	
Delay (s)	73.5	71.1		60.5	73.5		91.4	38.0	24.6	86.5	63.9	
Level of Service	E	E		E	E		F	D	C	F	E	
Approach Delay (s)		72.1			68.7			42.8			66.2	
Approach LOS		E			E			D			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			58.2				HCM 2000 Level of Service				E	
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)				26.0	
Intersection Capacity Utilization			95.9%				ICU Level of Service				F	
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

## 203: MD 185 & Home Depot Ent

Future No-Build  
PM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	210	245	160	1770	1095	110
Future Volume (vph)	210	245	160	1770	1095	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	0.91	0.86	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1559	1770	5085	6408	1533
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1559	1770	5085	6408	1533
Peak-hour factor, PHF	0.79	0.79	0.97	0.97	0.98	0.98
Adj. Flow (vph)	266	310	165	1825	1117	112
RTOR Reduction (vph)	0	12	0	0	0	22
Lane Group Flow (vph)	266	298	165	1825	1117	90
Confl. Peds. (#/hr)		11	10			10
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Actuated Green, G (s)	32.8	54.9	22.1	138.2	111.6	144.4
Effective Green, g (s)	32.8	54.9	22.1	138.2	111.6	144.4
Actuated g/C Ratio	0.18	0.30	0.12	0.77	0.62	0.80
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	322	514	217	3904	3972	1268
v/s Ratio Prot	c0.15	0.07	c0.09	c0.36	0.17	0.01
v/s Ratio Perm		0.12				0.05
v/c Ratio	0.83	0.58	0.76	0.47	0.28	0.07
Uniform Delay, d1	70.9	52.8	76.4	7.6	15.7	3.7
Progression Factor	1.08	1.04	0.81	1.50	0.77	0.49
Incremental Delay, d2	15.6	1.7	9.5	0.3	0.2	0.0
Delay (s)	92.0	56.5	71.2	11.6	12.3	1.8
Level of Service	F	E	E	B	B	A
Approach Delay (s)	72.9			16.6	11.3	
Approach LOS	E			B	B	

### Intersection Summary

HCM 2000 Control Delay	23.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

---

Intersection Sign configuration not allowed in HCM analysis.

---



HCM Signalized Intersection Capacity Analysis  
2000: HAWK & Aspen Hill Rd

Future No-Build  
PM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		
Traffic Volume (vph)	730	0	0	530	0	0
Future Volume (vph)	730	0	0	530	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0		
Lane Util. Factor	0.95			0.95		
Frt	1.00			1.00		
Flt Protected	1.00			1.00		
Satd. Flow (prot)	3539			3539		
Flt Permitted	1.00			1.00		
Satd. Flow (perm)	3539			3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	793	0	0	576	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	793	0	0	576	0	0
Turn Type	NA			NA		
Protected Phases	2			6		
Permitted Phases						
Actuated Green, G (s)	15.1			15.1		
Effective Green, g (s)	15.1			15.1		
Actuated g/C Ratio	0.55			0.55		
Clearance Time (s)	6.0			6.0		
Vehicle Extension (s)	3.0			3.0		
Lane Grp Cap (vph)	1929			1929		
v/s Ratio Prot	c0.22			0.16		
v/s Ratio Perm						
v/c Ratio	0.41			0.30		
Uniform Delay, d1	3.7			3.4		
Progression Factor	1.00			1.00		
Incremental Delay, d2	0.1			0.1		
Delay (s)	3.8			3.5		
Level of Service	A			A		
Approach Delay (s)	3.8			3.5	0.0	
Approach LOS	A			A	A	

Intersection Summary

HCM 2000 Control Delay	3.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	27.7	Sum of lost time (s)	10.5
Intersection Capacity Utilization	25.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis  
3000: MD 97

Future No-Build  
PM Peak



Movement	NBL	NBT	SBT	SBR	NEL	NER	
Lane Configurations		↑↑↑	↑↑	↗			
Traffic Volume (veh/h)	0	2525	970	765	0	0	
Future Volume (Veh/h)	0	2525	970	765	0	0	
Sign Control		Free	Free		Stop		
Grade		0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	2745	1054	832	0	0	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None	None				
Median storage (veh)							
Upstream signal (ft)		400	1086				
pX, platoon unblocked	0.88				0.86	0.88	
vC, conflicting volume	1886				1740	527	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1731				178	182	
tC, single (s)	4.1				6.8	6.9	
tC, 2 stage (s)							
tF (s)	2.2				3.5	3.3	
p0 queue free %	100				100	100	
cM capacity (veh/h)	316				681	728	
Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	686	686	686	686	703	629	555
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	277	555
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.40	0.40	0.40	0.40	0.41	0.37	0.33
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0				0.0		
Approach LOS							
Intersection Summary							
Average Delay			0.0				
Intersection Capacity Utilization			39.9%		ICU Level of Service		A
Analysis Period (min)			15				

## Arterial Level of Service: NB MD 97

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Hewitt Ave.	110	19.5	62.6	0.4	25
Aspen Hill Apt	109	3.2	11.6	0.1	25
Aspen Manor	108	2.2	16.6	0.1	30
Cemetery	107	10.1	21.2	0.1	18
	106	2.1	12.5	0.1	30
MD 185	105	40.1	54.9	0.2	10
	3000	4.5	11.1	0.1	25
7-11	104	1.2	4.3	0.0	24
Postgate Terr	103	10.5	24.6	0.2	26
Crystal Spring Apt	102	5.2	21.7	0.2	34
Bel Pre Rd	101	50.0	63.5	0.2	10
Total		148.7	304.5	1.7	20

## Arterial Level of Service: SB MD 97

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Bel Pre Rd	101	37.1	92.3	0.7	27
Crystal Spring Apt	102	6.7	20.5	0.2	31
Heathfield Rd	103	22.1	38.6	0.2	19
Home Depot Ent.	104	8.1	22.1	0.2	29
	3000	1.3	3.6	0.0	29
MD 185	105	45.5	51.2	0.1	5
Northgate Plaza	106	4.2	20.0	0.2	27
Aspen Hill Rd	107	23.4	34.2	0.1	11
Wendy Ln	108	3.3	14.1	0.1	27
	109	1.6	16.7	0.1	30
Hewitt Ave.	110	9.3	17.5	0.1	17
Total		162.6	330.9	1.9	21

## Arterial Level of Service: NB MD 185

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Independence St	201	15.4	51.8	0.5	32
Aspen Hill Rd	202	63.3	84.6	0.3	12
Home Depot Ent	203	16.2	26.9	0.1	18
	1000	14.5	21.0	0.1	14
MD 97	105	68.4	74.2	0.1	4
Total		177.8	258.5	1.0	14

Arterial Level of Service: SB MD 185

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
MD 97	105	80.8	94.6	0.2	8
	1000	4.6	11.4	0.1	27
Home Depot Ent	203	2.2	9.1	0.1	31
Aspen Hill Rd	202	79.6	90.1	0.1	5
Independence St	201	7.2	29.4	0.3	34
Total		174.4	234.6	0.8	12

Intersection: 24: Bend

Movement	WB	WB
Directions Served	T	
Maximum Queue (ft)	214	100
Average Queue (ft)	25	5
95th Queue (ft)	126	51
Link Distance (ft)	361	361
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 101: MD 97 & Bel Pre Rd

Movement	EB	EB	EB	EB	B24	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	T	L	T	T	R	L	L	T
Maximum Queue (ft)	205	447	290	274	454	236	178	220	188	219	450	677
Average Queue (ft)	174	245	207	14	53	101	99	94	11	124	180	384
95th Queue (ft)	242	432	320	112	342	181	158	168	91	192	403	662
Link Distance (ft)		361			2203		2717	2717				808
Upstream Blk Time (%)		5										0
Queuing Penalty (veh)		0										1
Storage Bay Dist (ft)	180		265	265		280			200	455	455	
Storage Blk Time (%)	15	14	1	0		0		0	1		0	4
Queuing Penalty (veh)	104	97	5	0		0		0	1		0	11

Intersection: 101: MD 97 & Bel Pre Rd

Movement	NB	NB	NB	SB	SB	SB	SB	SB	SB
Directions Served	T	T	R	L	L	T	T	T	R
Maximum Queue (ft)	698	709	225	203	211	321	337	334	65
Average Queue (ft)	416	442	139	100	100	182	199	188	49
95th Queue (ft)	685	708	318	170	176	318	326	338	86
Link Distance (ft)	808	808				3584	3584	3584	
Upstream Blk Time (%)	0	1							
Queuing Penalty (veh)	3	5							
Storage Bay Dist (ft)			200	560	560				40
Storage Blk Time (%)		33	0					29	1
Queuing Penalty (veh)		69	1					36	6

Intersection: 102: MD 97 & Crystal Spring Apt

Movement	WB	NB	NB	NB	SB
Directions Served	R	T	T	TR	T
Maximum Queue (ft)	147	12	32	56	159
Average Queue (ft)	64	0	2	3	6
95th Queue (ft)	121	8	23	27	116
Link Distance (ft)	234	1036	1036	1036	808
Upstream Blk Time (%)					0
Queuing Penalty (veh)					0
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 103: MD 97 & Heathfield Rd/Postgate Terr

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	T	TR	L	T	T	TR
Maximum Queue (ft)	244	140	114	212	269	318	190	432	460	440
Average Queue (ft)	109	63	51	114	138	164	25	217	243	230
95th Queue (ft)	208	118	101	217	264	299	101	419	439	421
Link Distance (ft)	346	247		860	860	860		1036	1036	1036
Upstream Blk Time (%)	0									
Queuing Penalty (veh)	0									
Storage Bay Dist (ft)			350				350			
Storage Blk Time (%)								2		
Queuing Penalty (veh)								1		

Intersection: 104: MD 97 & Home Depot Ent./7-11

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	TR	L	T	T	TR
Maximum Queue (ft)	151	292	94	92	117	4	16	18	48	4	13	28
Average Queue (ft)	58	119	29	32	39	0	1	1	12	0	0	1
95th Queue (ft)	153	256	77	68	89	3	9	6	35	3	8	11
Link Distance (ft)	1133	1133	213	213	76	76	76	76		860	860	860
Upstream Blk Time (%)					3							
Queuing Penalty (veh)					16							
Storage Bay Dist (ft)									235			
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 105: MD 97 & MD 185

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	L	T	TR	L	LT	T	TR	L	T	T
Maximum Queue (ft)	279	428	423	391	280	275	290	390	427	204	436	446
Average Queue (ft)	271	383	384	282	236	113	165	171	241	54	224	226
95th Queue (ft)	306	458	442	433	321	217	256	322	397	140	382	390
Link Distance (ft)		280	280	280				968	968		682	682
Upstream Blk Time (%)	12	45	59	18	3							
Queuing Penalty (veh)	0	300	387	117	0							
Storage Bay Dist (ft)	425				300	280	280			330		
Storage Blk Time (%)	12	45		18	3	0	0	1				2
Queuing Penalty (veh)	51	189		69	11	0	1	3				1

Intersection: 105: MD 97 & MD 185

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	T
Maximum Queue (ft)	507	305	225	381	371	200
Average Queue (ft)	239	168	102	229	218	164
95th Queue (ft)	415	325	222	365	344	240
Link Distance (ft)	682			253	253	
Upstream Blk Time (%)				10	8	
Queuing Penalty (veh)				47	37	
Storage Bay Dist (ft)		280	200			175
Storage Blk Time (%)	4	1	0	17	17	10
Queuing Penalty (veh)	15	3	1	15	51	31

Intersection: 106: MD 97 & Northgate Plaza

Movement	EB	NB	NB	SB	SB	SB	SB
Directions Served	R	UL	T	UL	T	T	TR
Maximum Queue (ft)	57	70	11	123	11	3	12
Average Queue (ft)	23	25	0	40	0	0	1
95th Queue (ft)	45	60	8	90	8	2	8
Link Distance (ft)	253		466		682	682	682
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		175		150			
Storage Blk Time (%)				0			
Queuing Penalty (veh)				0			

Intersection: 107: MD 97 & Aspen Hill Rd/Cemetery

Movement	EB	EB	WB	NB	NB	NB	NB	NB	SB	SB	SB	SB	
Directions Served	LT	R	LTR	L	L	T	T	TR	L	T	T	T	
Maximum Queue (ft)	301	620	120	297	325	291	269	362	84	282	270	276	
Average Queue (ft)	158	410	44	184	185	74	96	141	13	145	129	142	
95th Queue (ft)	259	595	99	278	282	188	216	281	53	249	234	253	
Link Distance (ft)	894	894	216			470	470	470		466	466	466	
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (ft)					250	250					190		
Storage Blk Time (%)					4	3	0					3	36
Queuing Penalty (veh)					18	14	0					0	37

Intersection: 107: MD 97 & Aspen Hill Rd/Cemetery

Movement	SB
Directions Served	R
Maximum Queue (ft)	95
Average Queue (ft)	29
95th Queue (ft)	99
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	70
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 108: MD 97 & Wendy Ln/Aspen Manor

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB	
Directions Served	R	R	UL	T	T	TR	L	T	T	TR	
Maximum Queue (ft)	486	170	208	278	77	90	224	388	238	97	
Average Queue (ft)	214	64	92	18	5	4	119	59	8	5	
95th Queue (ft)	497	130	176	146	74	55	220	252	99	57	
Link Distance (ft)	1228	342		651	651	651		470	470	470	
Upstream Blk Time (%)									0	0	
Queuing Penalty (veh)									1	0	
Storage Bay Dist (ft)				200				150			
Storage Blk Time (%)				2	0				13	0	
Queuing Penalty (veh)				12	0				59	0	



Intersection: 109: MD 97 & Aspen Hill Apt

Movement	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	T	TR	UL	T	T	TR
Maximum Queue (ft)	816	598	654	56	2	19	16	185	99	12	32
Average Queue (ft)	374	119	387	21	0	1	1	88	7	0	2
95th Queue (ft)	725	408	706	47	1	9	8	166	70	7	17
Link Distance (ft)	1188		887		352	352	352		651	651	651
Upstream Blk Time (%)	1										
Queuing Penalty (veh)	0										
Storage Bay Dist (ft)		500		125				175			
Storage Blk Time (%)	30							1			
Queuing Penalty (veh)	34							6			

Intersection: 110: MD 97 & Hewitt Ave.

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	R	T	T	TR	L	T	T	T
Maximum Queue (ft)	114	268	414	423	409	165	332	309	299
Average Queue (ft)	82	106	241	213	215	129	137	137	151
95th Queue (ft)	135	217	394	376	368	189	300	283	293
Link Distance (ft)		438	2204	2204	2204		352	352	352
Upstream Blk Time (%)							0	0	0
Queuing Penalty (veh)							0	0	0
Storage Bay Dist (ft)	90					140			
Storage Blk Time (%)	19	8				18	2		
Queuing Penalty (veh)	30	9				79	5		

Intersection: 201: MD 185 & Independence St

Movement	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	LTR	L	T	T	TR	L	T	T	TR
Maximum Queue (ft)	125	418	212	258	348	333	320	56	76	124	146
Average Queue (ft)	103	152	163	106	177	174	184	12	21	42	56
95th Queue (ft)	149	357	238	202	304	293	307	42	62	96	118
Link Distance (ft)		872	179		2375	2375	2375		1338	1338	1338
Upstream Blk Time (%)			32								
Queuing Penalty (veh)			0								
Storage Bay Dist (ft)	100			250				270			
Storage Blk Time (%)	33	8		0	2						
Queuing Penalty (veh)	45	9		1	2						

Intersection: 202: MD 185 & Aspen Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	NB
Directions Served	L	T	TR	L	T	TR	L	L	T	T	T	R
Maximum Queue (ft)	325	529	455	291	252	297	176	374	591	602	588	375
Average Queue (ft)	247	258	277	152	78	113	105	160	316	323	314	98
95th Queue (ft)	363	481	415	275	182	224	166	317	498	501	503	310
Link Distance (ft)		1838	1838		450	450			1338	1338	1338	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	300			410			350	350				350
Storage Blk Time (%)	13	1						0	8		9	0
Queuing Penalty (veh)	24	3						0	18		19	0

Intersection: 202: MD 185 & Aspen Hill Rd

Movement	SB	SB	SB	SB
Directions Served	L	T	T	TR
Maximum Queue (ft)	202	448	541	591
Average Queue (ft)	126	294	346	410
95th Queue (ft)	199	421	494	554
Link Distance (ft)	603	603	603	603
Upstream Blk Time (%)			0	0
Queuing Penalty (veh)			0	1
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 203: MD 185 & Home Depot Ent

Movement	EB	EB	NB	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	L	R	L	T	T	T	T	T	T	T	R
Maximum Queue (ft)	854	125	239	464	473	480	111	184	271	303	78
Average Queue (ft)	578	104	145	115	118	109	32	61	135	153	14
95th Queue (ft)	974	171	245	357	350	327	79	165	238	265	46
Link Distance (ft)	1344			603	603	603	348	348	348	348	348
Upstream Blk Time (%)									0	0	
Queuing Penalty (veh)									0	0	
Storage Bay Dist (ft)		100	215								
Storage Blk Time (%)	62	6	8	2							
Queuing Penalty (veh)	153	13	47	2							

Intersection: 1000: MD 185

Movement	EB	EB	EB	SB
Directions Served	T	T	T	R
Maximum Queue (ft)	410	402	256	236
Average Queue (ft)	130	135	34	8
95th Queue (ft)	365	367	142	124
Link Distance (ft)	348	348	348	481
Upstream Blk Time (%)	4	4	0	
Queuing Penalty (veh)	25	27	0	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2000: HAWK & Aspen Hill Rd

Movement	EB	EB	WB	WB
Directions Served	T	T	T	T
Maximum Queue (ft)	161	220	189	188
Average Queue (ft)	23	44	19	22
95th Queue (ft)	89	135	89	89
Link Distance (ft)	450	450	894	894
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3000: MD 97

































Movement	NB	NB	NB	SB	SB	SB
Directions Served	T	T	T	T	TR	R
Maximum Queue (ft)	50	53	8	71	107	29
Average Queue (ft)	2	2	0	4	7	1
95th Queue (ft)	37	39	6	30	44	15
Link Distance (ft)	253	253	253	76	76	76
Upstream Blk Time (%)		0		0	0	0
Queuing Penalty (veh)		0		2	3	0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 2384
------------------------------------

HCM Signalized Intersection Capacity Analysis  
101: MD 97 & Bel Pre Rd

Future Build 2040  
AM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		 			 		 	  		 	  		
Traffic Volume (vph)	175	210	300	330	470	260	210	900	90	135	2165	155	
Future Volume (vph)	175	210	300	330	470	260	210	900	90	135	2165	155	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1600	1900	1900	1750	1900	
Total Lost time (s)	7.0	7.0	8.5	7.0	7.0	8.5	8.5	7.0	7.0	8.5	7.0	7.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	*1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	3539	1563	1763	3539	1583	3433	4282	1561	3433	5147	1561	
Flt Permitted	0.19	1.00	1.00	0.61	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	358	3539	1563	1125	3539	1583	3433	4282	1561	3433	5147	1561	
Peak-hour factor, PHF	0.90	0.90	0.90	0.86	0.86	0.86	0.94	0.94	0.94	0.97	0.97	0.97	
Adj. Flow (vph)	194	233	333	384	547	302	223	957	96	139	2232	160	
RTOR Reduction (vph)	0	0	88	0	0	77	0	0	54	0	0	90	
Lane Group Flow (vph)	194	233	245	384	547	225	223	957	42	139	2232	70	
Confl. Peds. (#/hr)			7	7			1		1	1		1	
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm	
Protected Phases	7	4	1	3	8	5	1	6		5	2		
Permitted Phases	4		4	8		8			6			2	
Actuated Green, G (s)	38.9	20.9	34.6	53.7	40.2	52.8	13.7	79.6	79.6	12.6	78.5	78.5	
Effective Green, g (s)	38.9	20.9	34.6	53.7	40.2	52.8	13.7	79.6	79.6	12.6	78.5	78.5	
Actuated g/C Ratio	0.22	0.12	0.19	0.30	0.22	0.29	0.08	0.44	0.44	0.07	0.44	0.44	
Clearance Time (s)	7.0	7.0	8.5		7.0	8.5	8.5	7.0	7.0	8.5	7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	0.2	0.2	3.0	0.2	0.2	
Lane Grp Cap (vph)	219	410	300	452	790	464	261	1893	690	240	2244	680	
v/s Ratio Prot	c0.09	0.07	c0.06	c0.16	0.15	0.03	c0.06	0.22		0.04	c0.43		
v/s Ratio Perm	0.10		0.09	c0.10		0.11			0.03			0.04	
v/c Ratio	0.89	0.57	0.82	0.85	0.69	0.48	0.85	0.51	0.06	0.58	0.99	0.10	
Uniform Delay, d1	63.0	75.3	69.7	56.7	64.2	52.4	82.2	36.1	28.8	81.1	50.5	30.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.04	0.79	1.00	1.00	1.00	1.00	
Incremental Delay, d2	31.8	1.8	15.6	13.9	2.6	0.8	22.5	0.9	0.2	3.4	17.8	0.3	
Delay (s)	94.8	77.1	85.3	70.6	66.9	53.2	107.5	29.4	29.0	84.5	68.3	30.3	
Level of Service	F	E	F	E	E	D	F	C	C	F	E	C	
Approach Delay (s)		85.2			64.7			43.0			66.8		
Approach LOS		F			E			D			E		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			63.5		HCM 2000 Level of Service				E				
HCM 2000 Volume to Capacity ratio			0.98										
Actuated Cycle Length (s)			180.0		Sum of lost time (s)				34.0				
Intersection Capacity Utilization			107.8%		ICU Level of Service				G				
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis  
 102: MD 97 & Crystal Springs Apt



















Future Build 2040  
 AM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↵	↵↵↵			↵↵↵
Traffic Volume (vph)	0	60	1140	30	0	2795
Future Volume (vph)	0	60	1140	30	0	2795
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0			6.0
Lane Util. Factor		1.00	0.91			0.91
Frbp, ped/bikes		1.00	1.00			1.00
Flpb, ped/bikes		1.00	1.00			1.00
Frt		0.86	1.00			1.00
Flt Protected		1.00	1.00			1.00
Satd. Flow (prot)		1611	5060			5085
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		1611	5060			5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	65	1239	33	0	3038
RTOR Reduction (vph)	0	6	1	0	0	0
Lane Group Flow (vph)	0	59	1271	0	0	3038
Confl. Peds. (#/hr)	5			5	5	
Turn Type		Perm	NA			NA
Protected Phases			2			6
Permitted Phases		6				
Actuated Green, G (s)		164.0	164.0			164.0
Effective Green, g (s)		164.0	164.0			164.0
Actuated g/C Ratio		0.91	0.91			0.91
Clearance Time (s)		6.0	6.0			6.0
Vehicle Extension (s)		3.0	3.0			3.0
Lane Grp Cap (vph)		1467	4610			4633
v/s Ratio Prot			0.25			c0.60
v/s Ratio Perm		0.04				
v/c Ratio		0.04	0.28			0.66
Uniform Delay, d1		0.7	0.9			1.8
Progression Factor		1.00	0.16			1.17
Incremental Delay, d2		0.1	0.1			0.3
Delay (s)		0.8	0.3			2.3
Level of Service		A	A			A
Approach Delay (s)	0.8		0.3			2.3
Approach LOS	A		A			A
<b>Intersection Summary</b>						
HCM 2000 Control Delay			1.7		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.63			
Actuated Cycle Length (s)			180.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			59.0%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						























HCM Signalized Intersection Capacity Analysis  
103: MD 97 & Heathfield Rd/Postgate Terr

Future Build 2040  
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	10	125	70	10	20	125	1130	20	20	2660	115
Future Volume (vph)	20	10	125	70	10	20	125	1130	20	20	2660	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0		5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.91		1.00	0.91	
Frbp, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.89			0.97		1.00	1.00		1.00	0.99	
Flt Protected		0.99			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1647			1742		1770	5069		1770	5049	
Flt Permitted		0.94			0.48		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1562			870		1770	5069		1770	5049	
Peak-hour factor, PHF	0.79	0.79	0.79	0.58	0.58	0.58	0.92	0.92	0.92	0.98	0.98	0.98
Adj. Flow (vph)	25	13	158	121	17	34	136	1228	22	20	2714	117
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	196	0	0	172	0	136	1250	0	20	2831	0
Confl. Peds. (#/hr)	10						10	1		2	2	1
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8								
Actuated Green, G (s)		34.0			34.0		16.8	125.0		3.0	111.2	
Effective Green, g (s)		34.0			34.0		16.8	125.0		3.0	111.2	
Actuated g/C Ratio		0.19			0.19		0.09	0.69		0.02	0.62	
Clearance Time (s)		7.0			7.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)		4.0			3.5		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		295			164		165	3520		29	3119	
v/s Ratio Prot							c0.08	0.25		0.01	c0.56	
v/s Ratio Perm		0.13			c0.20							
v/c Ratio		0.66			1.05		0.82	0.36		0.69	0.91	
Uniform Delay, d1		67.7			73.0		80.1	11.2		88.0	29.9	
Progression Factor		1.00			1.00		0.59	1.60		0.99	0.36	
Incremental Delay, d2		6.1			83.8		26.2	0.3		41.7	4.0	
Delay (s)		73.8			156.8		73.3	18.1		128.8	14.8	
Level of Service		E			F		E	B		F	B	
Approach Delay (s)		73.8			156.8		23.5			15.6		
Approach LOS		E			F		C			B		
<b>Intersection Summary</b>												
HCM 2000 Control Delay			25.7				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			18.0		
Intersection Capacity Utilization			99.1%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												



































HCM Signalized Intersection Capacity Analysis  
 104: MD 97 & Home Depot Ent./7-11

Future Build 2040  
 AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	10	150	20	5	65	20	1190	70	25	2710	120
Future Volume (vph)	20	10	150	20	5	65	20	1190	70	25	2710	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5	4.5	7.0	4.5		4.5	4.5	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91		1.00	0.91	
Frbp, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.97	1.00		0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1804	1583		1792	1583	1770	5035		1770	5047	
Flt Permitted		0.82	1.00		0.78	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1536	1583		1460	1583	1770	5035		1770	5047	
Peak-hour factor, PHF	0.95	0.95	0.95	0.74	0.74	0.74	0.91	0.91	0.91	0.97	0.97	0.97
Adj. Flow (vph)	21	11	158	27	7	88	22	1308	77	26	2794	124
RTOR Reduction (vph)	0	0	46	0	0	78	0	2	0	0	2	0
Lane Group Flow (vph)	0	32	112	0	34	10	22	1383	0	26	2916	0
Confl. Peds. (#/hr)							14		12	12		14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1		6
Permitted Phases	4		4	8		8						
Actuated Green, G (s)		21.0	21.0		21.0	21.0	4.4	140.4		5.1	138.6	
Effective Green, g (s)		21.0	21.0		21.0	21.0	4.4	140.4		5.1	138.6	
Actuated g/C Ratio		0.12	0.12		0.12	0.12	0.02	0.78		0.03	0.77	
Clearance Time (s)		4.5	4.5		4.5	4.5	7.0	4.5		4.5	4.5	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		179	184		170	184	43	3927		50	3886	
v/s Ratio Prot							0.01	0.27		c0.01	c0.58	
v/s Ratio Perm		0.02	c0.07		0.02	0.01						
v/c Ratio		0.18	0.61		0.20	0.06	0.51	0.35		0.52	0.75	
Uniform Delay, d1		71.7	75.6		71.9	70.7	86.7	6.0		86.2	11.3	
Progression Factor		1.00	1.00		1.00	1.00	1.01	0.10		1.28	0.63	
Incremental Delay, d2		0.5	5.6		0.6	0.1	9.0	0.2		4.0	0.6	
Delay (s)		72.2	81.2		72.5	70.8	96.8	0.8		114.3	7.7	
Level of Service		E	F		E	E	F	A		F	A	
Approach Delay (s)		79.7			71.3			2.3			8.7	
Approach LOS		E			E			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			11.3				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)				16.0	
Intersection Capacity Utilization			79.8%				ICU Level of Service				D	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
105: MD 97 & MD 185

Future Build 2040  
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	  	 		   				  	 	  	  	 
Traffic Volume (vph)	515	275	15	200	820	55	70	710	90	30	1200	0
Future Volume (vph)	515	275	15	200	820	55	70	710	90	30	1200	0
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1750	1900
Total Lost time (s)	7.5	7.5		7.0	7.0			8.5	7.0	7.0	8.5	7.0
Lane Util. Factor	0.94	0.95		0.86	0.86			1.00	0.91	1.00	1.00	0.91
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	4990	3507		1522	4748			1770	5085	1559	1770	4684
Flt Permitted	0.95	1.00		0.95	1.00			0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)	4990	3507		1522	4748			1770	5085	1559	1770	4684
Peak-hour factor, PHF	0.96	0.96	0.96	0.92	0.92	0.92	0.88	0.88	0.88	0.97	0.97	0.97
Adj. Flow (vph)	536	286	16	217	891	60	80	807	102	31	1237	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	536	302	0	195	973	0	80	807	102	31	1237	0
Confl. Peds. (#/hr)	10		7	7		10	5		10	10		5
Turn Type	Split	NA		Split	NA		Prot	NA	pm+ov	Prot	NA	
Protected Phases	3	3		4	4		1	6	4	5	2	
Permitted Phases									6			
Actuated Green, G (s)	28.4	28.4		44.3	44.3		12.3	65.3	109.6	7.0	65.0	
Effective Green, g (s)	28.4	28.4		44.3	44.3		12.3	65.3	109.6	7.0	65.0	
Actuated g/C Ratio	0.16	0.16		0.25	0.25		0.07	0.36	0.61	0.04	0.36	
Clearance Time (s)	7.5	7.5		7.0	7.0		8.5	7.0	7.0	8.5	7.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	0.2	4.0	4.0	0.2	
Lane Grp Cap (vph)	787	553		374	1168		120	1844	949	68	1691	
v/s Ratio Prot	c0.11	0.09		0.13	c0.20		c0.05	0.16	0.03	0.02	c0.26	
v/s Ratio Perm									0.04			
v/c Ratio	0.68	0.55		0.52	0.83		0.67	0.44	0.11	0.46	0.73	
Uniform Delay, d1	71.5	69.9		58.7	64.3		81.8	43.4	14.7	84.6	49.9	
Progression Factor	1.20	1.21		1.00	1.00		1.26	0.78	1.09	1.27	0.69	
Incremental Delay, d2	2.6	1.4		1.7	5.5		13.8	0.7	0.1	4.8	2.1	
Delay (s)	88.5	85.9		60.4	69.8		117.1	34.4	16.1	112.3	36.4	
Level of Service	F	F		E	E		F	C	B	F	D	
Approach Delay (s)		87.5			68.2			39.2			38.2	
Approach LOS		F			E			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			56.4				HCM 2000 Level of Service		E			
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)		33.0			
Intersection Capacity Utilization			89.0%				ICU Level of Service		E			
Analysis Period (min)			15									
c Critical Lane Group												



HCM Unsignalized Intersection Capacity Analysis  
 106: MD 97 & Northgate Plaza

Future Build 2040  
 AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	
Lane Configurations													
Traffic Volume (veh/h)	0	0	35	0	0	0	45	55	820	0	50	0	
Future Volume (Veh/h)	0	0	35	0	0	0	45	55	820	0	50	0	
Sign Control	Stop			Stop					Free				
Grade	0%			0%					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	
Hourly flow rate (vph)	0	0	38	0	0	0	0	60	891	0	0	0	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type													
None													
Median storage veh													
Upstream signal (ft)													
547													
pX, platoon unblocked	0.82	0.82	0.78	0.82	0.82	0.92	0.00	0.78			0.00	0.92	
vC, conflicting volume	1878	2472	502	1529	2494	297	0	1483			0	891	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	683	1407	0	257	1433	0	0	646			0	595	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	0.0	4.1			0.0	4.1	
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2			0.0	2.2	
p0 queue free %	100	100	96	100	100	100	0	92			0	100	
cM capacity (veh/h)	258	104	849	496	100	1002	0	732			0	903	
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4				
Volume Total	38	60	297	297	297	0	576	576	331				
Volume Left	0	60	0	0	0	0	0	0	0				
Volume Right	38	0	0	0	0	0	0	0	43				
cSH	849	732	1700	1700	1700	1700	1700	1700	1700				
Volume to Capacity	0.04	0.08	0.17	0.17	0.17	0.00	0.34	0.34	0.19				
Queue Length 95th (ft)	4	7	0	0	0	0	0	0	0				
Control Delay (s)	9.4	10.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Lane LOS	A	B											
Approach Delay (s)	9.4	0.7				0.0							
Approach LOS	A												
Intersection Summary													
Average Delay			0.4										
Intersection Capacity Utilization			45.4%	ICU Level of Service					A				
Analysis Period (min)			15										

HCM Unsignalized Intersection Capacity Analysis  
 106: MD 97 & Northgate Plaza






















Future Build 2040  
 AM Peak



Movement	SBT	SBR
Lane Configurations	↑↑↑	
Traffic Volume (veh/h)	1325	40
Future Volume (Veh/h)	1325	40
Sign Control	Free	
Grade	0%	
Peak Hour Factor	0.92	0.92
Hourly flow rate (vph)	1440	43
Pedestrians		
Lane Width (ft)		
Walking Speed (ft/s)		
Percent Blockage		
Right turn flare (veh)		
Median type	None	
Median storage (veh)		
Upstream signal (ft)	801	
pX, platoon unblocked		
vC, conflicting volume		
vC1, stage 1 conf vol		
vC2, stage 2 conf vol		
vCu, unblocked vol		
tC, single (s)		
tC, 2 stage (s)		
tF (s)		
p0 queue free %		
cM capacity (veh/h)		
Direction, Lane #		



















HCM Signalized Intersection Capacity Analysis  
107: MD 97 & Aspen Hill Rd/Cemetery

Future Build 2040  
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	10	225	10	10	10	375	885	20	10	1260	135
Future Volume (vph)	25	10	225	10	10	10	375	885	20	10	1260	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.5	6.0		8.0		6.0	7.0		6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00		0.97	0.91		1.00	0.91	1.00
Frbp, ped/bikes		1.00	0.98		1.00		1.00	1.00		1.00	1.00	0.96
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		0.95		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.97	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1799	1546		1750		3433	5054		1770	5085	1518
Flt Permitted		0.97	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1799	1546		1750		3433	5054		1770	5085	1518
Peak-hour factor, PHF	0.77	0.77	0.77	0.25	0.25	0.25	0.88	0.88	0.88	0.97	0.97	0.97
Adj. Flow (vph)	32	13	292	40	40	40	426	1006	23	10	1299	139
RTOR Reduction (vph)	0	0	51	0	10	0	0	1	0	0	0	71
Lane Group Flow (vph)	0	45	241	0	110	0	426	1028	0	10	1299	68
Confl. Peds. (#/hr)			29	29			10		21	29		10
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4									2
Actuated Green, G (s)		24.5	53.9		9.0		29.4	114.9		3.1	88.6	88.6
Effective Green, g (s)		24.5	53.9		9.0		29.4	114.9		3.1	88.6	88.6
Actuated g/C Ratio		0.14	0.30		0.05		0.16	0.64		0.02	0.49	0.49
Clearance Time (s)		7.5	6.0		8.0		6.0	7.0		6.0	7.0	7.0
Vehicle Extension (s)		3.0	5.0		5.0		5.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)		244	462		87		560	3226		30	2502	747
v/s Ratio Prot		0.03	c0.08		c0.06		c0.12	0.20		0.01	c0.26	
v/s Ratio Perm			0.07									0.05
v/c Ratio		0.18	0.52		1.26		0.76	0.32		0.33	0.52	0.09
Uniform Delay, d1		68.9	52.3		85.5		71.9	14.8		87.4	31.2	24.3
Progression Factor		1.00	1.00		1.00		1.13	1.12		1.21	0.27	0.03
Incremental Delay, d2		0.4	2.0		181.3		6.7	0.2		5.0	0.6	0.2
Delay (s)		69.3	54.4		266.8		88.4	16.8		111.0	9.1	0.9
Level of Service		E	D		F		F	B		F	A	A
Approach Delay (s)		56.3			266.8		37.7			9.0		
Approach LOS		E			F		D			A		
<b>Intersection Summary</b>												
HCM 2000 Control Delay			35.4				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			28.5		
Intersection Capacity Utilization			73.2%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
108: MD 97 & Wendy Ln/Aspen Manor

Future Build 2040  
AM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	
Lane Configurations													
Traffic Volume (vph)	65	5	25	20	5	20	45	25	1195	15	45	1395	
Future Volume (vph)	65	5	25	20	5	20	45	25	1195	15	45	1395	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		7.0			7.0			4.5	7.0		4.5	7.0	
Lane Util. Factor		1.00			1.00			1.00	0.91		1.00	0.91	
Frb, ped/bikes		1.00			0.99			1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00			1.00	1.00		1.00	1.00	
Frt		0.96			0.94			1.00	1.00		1.00	0.99	
Flt Protected		0.97			0.98			0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1729			1700			1770	5074		1769	5052	
Flt Permitted		0.76			0.84			0.12	1.00		0.18	1.00	
Satd. Flow (perm)		1366			1465			217	5074		334	5052	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	71	5	27	22	5	22	49	27	1299	16	49	1516	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	0	103	0	0	49	0	0	76	1315	0	49	1576	
Confl. Peds. (#/hr)	2		1	1		2		1		5	5		
Turn Type	Perm	NA		Perm	NA		Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8			5	2		1	6	
Permitted Phases	4			8			2	2			6		
Actuated Green, G (s)		13.8			13.8			59.0	54.1		56.4	52.8	
Effective Green, g (s)		13.8			13.8			59.0	54.1		56.4	52.8	
Actuated g/C Ratio		0.15			0.15			0.66	0.60		0.63	0.59	
Clearance Time (s)		7.0			7.0			4.5	7.0		4.5	7.0	
Vehicle Extension (s)		3.0			3.0			3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		209			224			226	3050		266	2963	
v/s Ratio Prot								c0.02	0.26		0.01	c0.31	
v/s Ratio Perm		c0.08			0.03			0.20			0.11		
v/c Ratio		0.49			0.22			0.34	0.43		0.18	0.53	
Uniform Delay, d1		34.9			33.4			6.7	9.7		6.6	11.2	
Progression Factor		1.00			1.00			1.00	1.00		1.09	0.94	
Incremental Delay, d2		1.8			0.5			0.9	0.4		0.3	0.6	
Delay (s)		36.7			33.9			7.5	10.1		7.5	11.1	
Level of Service		D			C			A	B		A	B	
Approach Delay (s)		36.7			33.9			10.0				11.0	
Approach LOS		D			C			A				B	
<b>Intersection Summary</b>													
HCM 2000 Control Delay			11.8									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.51										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	18.5
Intersection Capacity Utilization			56.8%									ICU Level of Service	B
Analysis Period (min)			15										
c Critical Lane Group													

Movement	SBR
<b>Lane Configurations</b>	
Traffic Volume (vph)	55
Future Volume (vph)	55
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frbp, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	60
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	1
<b>Turn Type</b>	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
<b>Intersection Summary</b>	

HCM Signalized Intersection Capacity Analysis  
 109: MD 97 & Ralph Rd/Aspen Hill Apt

Future Build 2040  
 AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations		↕			↕		↕	↑↑↑			↕	↑↑↑
Traffic Volume (vph)	30	5	80	30	5	50	30	1195	20	5	20	1440
Future Volume (vph)	30	5	80	30	5	50	30	1195	20	5	20	1440
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0		4.5	7.0			4.5	7.0
Lane Util. Factor		1.00			1.00		1.00	0.91			1.00	0.91
Frbp, ped/bikes		0.99			0.99		1.00	1.00			1.00	1.00
Flpb, ped/bikes		1.00			1.00		1.00	1.00			1.00	1.00
Frt		0.91			0.92		1.00	1.00			1.00	1.00
Flt Protected		0.99			0.98		0.95	1.00			0.95	1.00
Satd. Flow (prot)		1649			1669		1769	5068			1768	5072
Flt Permitted		0.89			0.78		0.13	1.00			0.18	1.00
Satd. Flow (perm)		1481			1327		239	5068			335	5072
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	5	87	33	5	54	33	1299	22	5	22	1565
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	125	0	0	92	0	33	1321	0	0	27	1587
Confl. Peds. (#/hr)	4		1	1		4	5		12		12	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	pm+pt	NA
Protected Phases		4			8		5	2			1	6
Permitted Phases	4			8			2			6	6	
Actuated Green, G (s)		15.3			15.3		86.2	82.4			86.2	82.4
Effective Green, g (s)		15.3			15.3		86.2	82.4			86.2	82.4
Actuated g/C Ratio		0.13			0.13		0.72	0.69			0.72	0.69
Clearance Time (s)		7.0			7.0		4.5	7.0			4.5	7.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		188			169		220	3480			286	3482
v/s Ratio Prot							c0.00	0.26			0.00	c0.31
v/s Ratio Perm		c0.08			0.07		0.10				0.06	
v/c Ratio		0.66			0.54		0.15	0.38			0.09	0.46
Uniform Delay, d1		49.9			49.1		5.4	8.0			5.0	8.6
Progression Factor		1.00			1.00		1.62	1.34			1.00	1.00
Incremental Delay, d2		8.6			3.6		0.3	0.3			0.1	0.4
Delay (s)		58.5			52.6		9.1	10.9			5.2	9.0
Level of Service		E			D		A	B			A	A
Approach Delay (s)		58.5			52.6		10.9					8.9
Approach LOS		E			D		B					A

Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	SBR
<b>Lane Configurations</b>	
Traffic Volume (vph)	20
Future Volume (vph)	20
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frbp, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	22
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	5
<b>Turn Type</b>	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
<b>Intersection Summary</b>	

HCM Signalized Intersection Capacity Analysis  
110: MD 97 & Hewitt Ave.

Future Build 2040  
AM Peak
























Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	185	155	1090	110	90	1460
Future Volume (vph)	185	155	1090	110	90	1460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.91		1.00	0.91
Frpb, ped/bikes	1.00	0.97	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1544	4994		1770	5085
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1544	4994		1770	5085
Peak-hour factor, PHF	0.90	0.90	0.87	0.87	0.92	0.92
Adj. Flow (vph)	206	172	1253	126	98	1587
RTOR Reduction (vph)	0	142	0	0	0	0
Lane Group Flow (vph)	206	30	1379	0	98	1587
Confl. Peds. (#/hr)	4	13		4	4	
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		4				
Actuated Green, G (s)	21.1	21.1	59.3		11.1	81.4
Effective Green, g (s)	21.1	21.1	59.3		11.1	81.4
Actuated g/C Ratio	0.18	0.18	0.49		0.09	0.68
Clearance Time (s)	6.5	6.5	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	0.2		3.0	0.2
Lane Grp Cap (vph)	311	271	2467		163	3449
v/s Ratio Prot	c0.12		c0.28		0.06	c0.31
v/s Ratio Perm		0.02				
v/c Ratio	0.66	0.11	0.56		0.60	0.46
Uniform Delay, d1	46.1	41.6	21.2		52.3	9.0
Progression Factor	1.00	1.00	1.00		0.84	0.96
Incremental Delay, d2	5.2	0.2	0.9		5.6	0.4
Delay (s)	51.4	41.8	22.1		49.6	9.1
Level of Service	D	D	C		D	A
Approach Delay (s)	47.0		22.1			11.5
Approach LOS	D		C			B
<b>Intersection Summary</b>						
HCM 2000 Control Delay			19.6		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.59			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	24.5
Intersection Capacity Utilization			60.9%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						






























HCM Signalized Intersection Capacity Analysis  
201: MD 185 & Independence St

Future Build 2040  
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	15	195	55	15	10	75	955	40	10	2250	120
Future Volume (vph)	90	15	195	55	15	10	75	955	40	10	2250	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0			7.0		5.5	6.0		5.5	6.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.91		1.00	0.91	
Frbp, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.86			0.98		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1764	1603			1766		1770	5047		1770	5047	
Flt Permitted	0.70	1.00			0.33		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1307	1603			602		1770	5047		1770	5047	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	16	212	60	16	11	82	1038	43	11	2446	130
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	98	228	0	0	87	0	82	1081	0	11	2576	0
Confl. Peds. (#/hr)	2					2			2	2		
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8								
Actuated Green, G (s)	29.6	29.6			29.6		13.5	118.4		3.5	108.4	
Effective Green, g (s)	29.6	29.6			29.6		13.5	118.4		3.5	108.4	
Actuated g/C Ratio	0.16	0.16			0.16		0.08	0.66		0.02	0.60	
Clearance Time (s)	7.0	7.0			7.0		5.5	6.0		5.5	6.0	
Vehicle Extension (s)	3.0	3.0			3.0		4.0	0.2		4.0	0.2	
Lane Grp Cap (vph)	214	263			98		132	3319		34	3039	
v/s Ratio Prot		0.14					c0.05	c0.21		0.01	c0.51	
v/s Ratio Perm	0.07				c0.14							
v/c Ratio	0.46	0.87			0.89		0.62	0.33		0.32	0.85	
Uniform Delay, d1	68.0	73.3			73.6		80.8	13.4		87.1	29.1	
Progression Factor	1.00	1.00			1.00		1.00	1.00		0.66	1.72	
Incremental Delay, d2	1.6	24.5			55.8		9.9	0.3		2.0	0.9	
Delay (s)	69.5	97.8			129.4		90.7	13.7		59.8	51.0	
Level of Service	E	F			F		F	B		E	D	
Approach Delay (s)		89.3			129.4			19.1			51.0	
Approach LOS		F			F			B			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			46.7				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			24.5		
Intersection Capacity Utilization			90.1%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
202: MD 185 & Aspen Hill Rd

Future Build 2040  
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 	 			 	
Traffic Volume (vph)	210	135	165	150	370	30	270	705	80	45	2065	360
Future Volume (vph)	210	135	165	150	370	30	270	705	80	45	2065	360
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	7.0		6.5	7.0		5.5	7.0	7.0	5.5	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.91	1.00	1.00	0.91	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.92		1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1768	3208		1766	3493		3433	5085	1538	1770	4954	
Flt Permitted	0.22	1.00		0.39	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	417	3208		731	3493		3433	5085	1538	1770	4954	
Peak-hour factor, PHF	0.91	0.91	0.91	0.87	0.87	0.87	0.77	0.77	0.77	0.97	0.97	0.97
Adj. Flow (vph)	231	148	181	172	425	34	351	916	104	46	2129	371
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	231	329	0	172	459	0	351	916	104	46	2500	0
Confl. Peds. (#/hr)	11		7	7		11	5		7	7		5
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8					6			
Actuated Green, G (s)	46.9	30.4		46.5	30.2		24.8	99.1	99.1	8.2	82.5	
Effective Green, g (s)	46.9	30.4		46.5	30.2		24.8	99.1	99.1	8.2	82.5	
Actuated g/C Ratio	0.26	0.17		0.26	0.17		0.14	0.55	0.55	0.05	0.46	
Clearance Time (s)	6.5	7.0		6.5	7.0		5.5	7.0	7.0	5.5	7.0	
Vehicle Extension (s)	3.0	4.0		5.0	4.0		5.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)	232	541		282	586		472	2799	846	80	2270	
v/s Ratio Prot	c0.09	0.10		0.06	0.13		c0.10	0.18		0.03	c0.50	
v/s Ratio Perm	c0.17			0.10					0.07			
v/c Ratio	1.00	0.61		0.61	0.78		0.74	0.33	0.12	0.57	1.10	
Uniform Delay, d1	60.8	69.3		55.1	71.8		74.5	22.2	19.5	84.2	48.8	
Progression Factor	1.00	1.00		1.00	1.00		0.87	0.98	0.92	1.28	0.66	
Incremental Delay, d2	57.5	2.2		5.4	7.2		7.3	0.3	0.3	7.8	51.7	
Delay (s)	118.3	71.5		60.5	78.9		72.2	22.1	18.3	115.4	83.8	
Level of Service	F	E		E	E		E	C	B	F	F	
Approach Delay (s)		90.8			73.9			34.6			84.4	
Approach LOS		F			E			C			F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			70.4				HCM 2000 Level of Service				E	
HCM 2000 Volume to Capacity ratio			1.01									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)				26.0	
Intersection Capacity Utilization			106.5%				ICU Level of Service				G	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
203: MD 185 & Home Depot Ent

Future Build 2040  
AM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	50	125	190	755	2345	195
Future Volume (vph)	50	125	190	755	2345	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	7.0	7.0	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	0.91	0.86	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1575	1770	5085	6408	1547
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1575	1770	5085	6408	1547
Peak-hour factor, PHF	0.78	0.78	0.88	0.88	0.94	0.94
Adj. Flow (vph)	64	160	216	858	2495	207
RTOR Reduction (vph)	0	1	0	0	0	17
Lane Group Flow (vph)	64	159	216	858	2495	190
Confl. Peds. (#/hr)		3	3			3
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Actuated Green, G (s)	17.0	49.7	32.7	154.0	114.3	131.3
Effective Green, g (s)	17.0	49.7	32.7	154.0	114.3	131.3
Actuated g/C Ratio	0.09	0.28	0.18	0.86	0.63	0.73
Clearance Time (s)	4.5	7.0	7.0	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	167	434	321	4350	4069	1167
v/s Ratio Prot	c0.04	0.07	c0.12	0.17	c0.39	0.02
v/s Ratio Perm		0.03				0.11
v/c Ratio	0.38	0.37	0.67	0.20	0.61	0.16
Uniform Delay, d1	76.6	52.5	68.7	2.3	19.6	7.5
Progression Factor	1.00	1.00	1.32	0.90	0.94	0.78
Incremental Delay, d2	1.5	0.5	5.0	0.1	0.5	0.0
Delay (s)	78.0	53.0	95.2	2.1	18.9	5.9
Level of Service	E	D	F	A	B	A
Approach Delay (s)	60.1			20.8	17.9	
Approach LOS	E			C	B	

Intersection Summary

HCM 2000 Control Delay	21.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

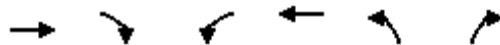
---

Intersection Sign configuration not allowed in HCM analysis.

---

HCM Signalized Intersection Capacity Analysis  
2000: HAWK & Aspen Hill Rd

Future Build 2040  
AM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		
Traffic Volume (vph)	260	0	0	550	0	0
Future Volume (vph)	260	0	0	550	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0		
Lane Util. Factor	0.95			0.95		
Frt	1.00			1.00		
Flt Protected	1.00			1.00		
Satd. Flow (prot)	3539			3539		
Flt Permitted	1.00			1.00		
Satd. Flow (perm)	3539			3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	283	0	0	598	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	283	0	0	598	0	0
Turn Type	NA			NA		
Protected Phases	2			6		
Permitted Phases						
Actuated Green, G (s)	11.9			11.9		
Effective Green, g (s)	11.9			11.9		
Actuated g/C Ratio	0.49			0.49		
Clearance Time (s)	6.0			6.0		
Vehicle Extension (s)	3.0			3.0		
Lane Grp Cap (vph)	1725			1725		
v/s Ratio Prot	0.08			0.17		
v/s Ratio Perm						
v/c Ratio	0.16			0.35		
Uniform Delay, d1	3.5			3.9		
Progression Factor	1.00			1.00		
Incremental Delay, d2	0.0			0.1		
Delay (s)	3.5			4.0		
Level of Service	A			A		
Approach Delay (s)	3.5			4.0	0.0	
Approach LOS	A			A	A	







Intersection Summary

HCM 2000 Control Delay	3.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	24.4	Sum of lost time (s)	10.5
Intersection Capacity Utilization	20.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis  
3000: MD 97

Future Build 2040  
AM Peak

							
Movement	NBL	NBT	SBT	SBR	NEL	NER	
Lane Configurations		↑↑↑	↑↑	↗			
Traffic Volume (veh/h)	0	1280	1230	1650	0	0	
Future Volume (Veh/h)	0	1280	1230	1650	0	0	
Sign Control		Free	Free		Stop		
Grade		0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	1391	1337	1793	0	0	
<b>Pedestrians</b>							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None	None				
Median storage (veh)							
Upstream signal (ft)		400	153				
pX, platoon unblocked	0.67				0.73	0.67	
vC, conflicting volume	3130				1685	668	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	3193				98	0	
tC, single (s)	4.1				6.8	6.9	
tC, 2 stage (s)							
tF (s)	2.2				3.5	3.3	
p0 queue free %	100				100	100	
cM capacity (veh/h)	64				646	730	
<b>Direction, Lane #</b>	<b>NB 1</b>	<b>NB 2</b>	<b>NB 3</b>	<b>NB 4</b>	<b>SB 1</b>	<b>SB 2</b>	<b>SB 3</b>
Volume Total	348	348	348	348	891	1043	1195
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	598	1195
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.20	0.20	0.20	0.20	0.52	0.61	0.70
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Lane LOS</b>							
Approach Delay (s)	0.0				0.0		
<b>Approach LOS</b>							
<b>Intersection Summary</b>							
Average Delay			0.0				
Intersection Capacity Utilization			71.4%		ICU Level of Service		C
Analysis Period (min)			15				

## Arterial Level of Service: NB MD 97

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Hewitt Ave.	110	26.5	69.0	0.4	22
Aspen Hill Apt	109	14.9	23.3	0.1	12
Aspen Manor	108	11.5	25.5	0.1	20
Cemetery	107	14.7	25.7	0.1	15
	106	1.8	12.1	0.1	31
MD 185	105	34.3	48.9	0.2	11
	3000	2.6	9.5	0.1	29
7-11	104	2.5	5.4	0.0	19
Postgate Terr	103	11.3	25.4	0.2	25
Crystal Springs Apt	102	5.9	22.2	0.2	34
Bel Pre Rd	101	26.3	39.6	0.2	16
Total		152.2	306.5	1.7	20

## Arterial Level of Service: SB MD 97

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Bel Pre Rd	101	132.9	217.9	1.1	19
Crystal Springs Apt	102	17.6	31.7	0.2	20
Heathfield Rd	103	34.6	50.9	0.2	15
Home Depot Ent.	104	21.1	35.2	0.2	18
	3000	4.3	6.6	0.0	16
MD 185	105	43.1	48.9	0.1	6
Northgate Plaza	106	4.2	20.0	0.2	27
Aspen Hill Rd	107	8.8	19.6	0.1	19
Wendy Ln	108	11.2	22.1	0.1	17
Ralph Rd	109	10.1	24.9	0.1	20
Hewitt Ave.	110	17.4	25.7	0.1	11
Total		305.4	503.6	2.4	17

## Arterial Level of Service: NB MD 185

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Independence St	201	12.8	48.9	0.5	34
Aspen Hill Rd	202	22.2	42.4	0.3	23
Home Depot Ent	203	4.3	14.5	0.1	33
	1000	1.8	8.4	0.1	34
MD 97	105	75.4	81.0	0.1	4
Total		116.4	195.2	1.0	19

Arterial Level of Service: SB MD 185

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
MD 97	105	74.9	89.8	0.2	8
	1000	7.4	14.0	0.1	22
Home Depot Ent	203	7.0	14.1	0.1	20
Aspen Hill Rd	202	41.1	51.6	0.1	9
Independence St	201	59.5	81.6	0.3	12
Total		189.9	251.1	0.8	11



Intersection: 23: Bend

Movement	WB	WB
Directions Served	T	
Maximum Queue (ft)	345	330
Average Queue (ft)	153	69
95th Queue (ft)	377	253
Link Distance (ft)	350	350
Upstream Blk Time (%)	0	0
Queuing Penalty (veh)	1	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 101: MD 97 & Bel Pre Rd

Movement	EB	EB	EB	EB	B23	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	T	L	T	T	R	L	L	T
Maximum Queue (ft)	204	425	290	267	245	305	515	500	175	246	250	275
Average Queue (ft)	150	156	130	163	17	220	258	267	148	121	119	84
95th Queue (ft)	230	349	264	262	123	346	447	457	222	216	223	202
Link Distance (ft)		350			2205		2732	2732				788
Upstream Blk Time (%)		4										
Queuing Penalty (veh)		0										
Storage Bay Dist (ft)	180		265	265		280			150	455	455	
Storage Blk Time (%)	14	0	1	1		8	4	30	2			
Queuing Penalty (veh)	75	2	2	4		20	14	79	6			

Intersection: 101: MD 97 & Bel Pre Rd

Movement	NB	NB	NB	SB	SB	SB	SB	SB	SB
Directions Served	T	T	R	L	L	T	T	T	R
Maximum Queue (ft)	271	290	142	100	584	1346	1380	1409	66
Average Queue (ft)	105	117	12	36	272	905	933	957	46
95th Queue (ft)	221	236	86	86	708	1424	1443	1467	86
Link Distance (ft)	788	788				5847	5847	5847	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			200	560	560				40
Storage Blk Time (%)		2	0		0	36		55	1
Queuing Penalty (veh)		2	0		0	49		86	4

**Intersection: 102: MD 97 & Crystal Springs Apt**

Movement	WB	NB	NB	NB	SB	SB	SB
Directions Served	R	T	T	TR	T	T	T
Maximum Queue (ft)	46	204	226	241	782	730	656
Average Queue (ft)	16	22	25	32	141	156	122
95th Queue (ft)	43	114	127	145	536	558	470
Link Distance (ft)	234	1035	1035	1035	788	788	788
Upstream Blk Time (%)					0	0	0
Queuing Penalty (veh)					1	0	0
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

**Intersection: 103: MD 97 & Heathfield Rd/Postgate Terr**

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	T	TR	L	T	T	TR
Maximum Queue (ft)	350	259	226	257	258	272	132	727	780	704
Average Queue (ft)	170	101	110	61	63	87	22	374	411	401
95th Queue (ft)	288	196	196	177	180	217	87	661	702	664
Link Distance (ft)	2375	1855		868	868	868		1035	1035	1035
Upstream Blk Time (%)									0	
Queuing Penalty (veh)									0	
Storage Bay Dist (ft)			350				350			
Storage Blk Time (%)								8		
Queuing Penalty (veh)								2		

**Intersection: 104: MD 97 & Home Depot Ent./7-11**

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	TR	L	T	T	TR
Maximum Queue (ft)	99	162	85	92	68	104	84	118	111	765	776	608
Average Queue (ft)	32	61	27	34	19	16	19	44	31	144	234	131
95th Queue (ft)	74	116	67	68	51	63	62	106	91	503	665	439
Link Distance (ft)	1151	1151	213	213	75	75	75	75		868	868	868
Upstream Blk Time (%)					0	1	0	3			0	0
Queuing Penalty (veh)					1	3	1	10			0	0
Storage Bay Dist (ft)									235			
Storage Blk Time (%)									0	1		
Queuing Penalty (veh)									0	0		

Intersection: 105: MD 97 & MD 185

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	L	T	TR	L	LT	T	TR	L	T	T
Maximum Queue (ft)	219	234	247	267	246	268	305	596	565	190	269	255
Average Queue (ft)	135	145	163	141	133	90	231	321	357	83	118	117
95th Queue (ft)	199	211	237	219	208	218	347	498	506	164	220	216
Link Distance (ft)		261	261	261				968	968		682	682
Upstream Blk Time (%)	0	0	0	0	0							
Queuing Penalty (veh)	0	0	0	1	0							
Storage Bay Dist (ft)	425				300	280	280			330		
Storage Blk Time (%)	0	0		0	0	0	1	11			0	
Queuing Penalty (veh)	0	0		1	0	0	3	50			0	

Intersection: 105: MD 97 & MD 185

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	T
Maximum Queue (ft)	256	92	224	396	373	200
Average Queue (ft)	125	22	46	313	271	180
95th Queue (ft)	225	70	150	453	381	237
Link Distance (ft)	682			260	260	
Upstream Blk Time (%)				13	10	
Queuing Penalty (veh)				80	63	
Storage Bay Dist (ft)		280	200			175
Storage Blk Time (%)	0		0	23	22	13
Queuing Penalty (veh)	0		0	7	90	51

Intersection: 106: MD 97 & Northgate Plaza

Movement	EB	NB	SB	SB	SB	SB
Directions Served	R	UL	UL	T	T	TR
Maximum Queue (ft)	47	120	75	3	4	4
Average Queue (ft)	18	43	18	0	0	0
95th Queue (ft)	42	101	51	2	3	3
Link Distance (ft)	253			682	682	682
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		175	150			
Storage Blk Time (%)		0				
Queuing Penalty (veh)		0				

Intersection: 107: MD 97 & Aspen Hill Rd/Cemetery

Movement	EB	EB	WB	NB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	L	T	T	TR	L	T	T	T
Maximum Queue (ft)	81	164	216	278	314	357	304	267	54	166	190	199
Average Queue (ft)	21	52	55	169	183	109	79	90	10	74	81	92
95th Queue (ft)	62	112	197	268	297	284	217	221	35	140	149	173
Link Distance (ft)	880	880	216			470	470	470		469	469	469
Upstream Blk Time (%)			8			0						
Queuing Penalty (veh)			0			1						
Storage Bay Dist (ft)				250	250				190			
Storage Blk Time (%)				2	3	1				0		16
Queuing Penalty (veh)				6	10	5				0		22

Intersection: 107: MD 97 & Aspen Hill Rd/Cemetery

Movement	SB
Directions Served	R
Maximum Queue (ft)	95
Average Queue (ft)	31
95th Queue (ft)	91
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	70
Storage Blk Time (%)	0
Queuing Penalty (veh)	1

Intersection: 108: MD 97 & Wendy Ln/Aspen Manor

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	UL	T	T	TR	L	T	T	TR
Maximum Queue (ft)	143	77	192	402	218	244	92	247	270	272
Average Queue (ft)	58	27	36	127	62	72	14	88	108	122
95th Queue (ft)	114	65	112	312	175	190	40	221	249	260
Link Distance (ft)	1228	342		650	650	650		470	470	470
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)			200				150			
Storage Blk Time (%)			0	4				4		
Queuing Penalty (veh)			0	3				2		

Intersection: 109: MD 97 & Ralph Rd/Aspen Hill Apt

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	T	TR	UL	T	T	TR
Maximum Queue (ft)	206	186	129	379	372	311	134	259	298	317
Average Queue (ft)	88	64	25	201	121	103	18	90	103	115
95th Queue (ft)	159	133	94	386	281	235	74	223	246	258
Link Distance (ft)	1189	370		364	364	364		650	650	650
Upstream Blk Time (%)				1	0	0				
Queuing Penalty (veh)				6	1	0				
Storage Bay Dist (ft)			125				175			
Storage Blk Time (%)				11				2		
Queuing Penalty (veh)				3				0		

Intersection: 110: MD 97 & Hewitt Ave.

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	R	T	T	TR	L	T	T	T
Maximum Queue (ft)	114	284	409	387	261	164	355	381	380
Average Queue (ft)	98	128	232	192	148	87	153	183	198
95th Queue (ft)	130	275	360	325	249	167	321	352	363
Link Distance (ft)		438	2204	2204	2204		364	364	364
Upstream Blk Time (%)							0	1	1
Queuing Penalty (veh)							1	3	4
Storage Bay Dist (ft)	90					140			
Storage Blk Time (%)	24	2				2	9		
Queuing Penalty (veh)	37	3				10	9		

Intersection: 201: MD 185 & Independence St

Movement	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	LTR	L	T	T	TR	L	T	T	TR
Maximum Queue (ft)	125	518	172	177	252	194	178	239	687	756	715
Average Queue (ft)	82	307	73	75	111	70	61	10	564	594	611
95th Queue (ft)	152	527	147	148	223	165	138	91	674	714	717
Link Distance (ft)		872	167		2375	2375	2375		1317	1317	1317
Upstream Blk Time (%)			1								
Queuing Penalty (veh)			0								
Storage Bay Dist (ft)	100			250				270			
Storage Blk Time (%)	9	54			0				25		
Queuing Penalty (veh)	18	48			0				3		

Intersection: 202: MD 185 & Aspen Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	NB
Directions Served	L	T	TR	L	T	TR	L	L	T	T	T	R
Maximum Queue (ft)	311	412	392	251	327	356	233	242	257	225	244	102
Average Queue (ft)	177	105	224	105	192	216	108	121	116	93	86	21
95th Queue (ft)	304	296	353	212	308	323	203	219	245	206	197	66
Link Distance (ft)		1834	1834		450	450			1317	1317	1317	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	300			410			350	350				350
Storage Blk Time (%)	5	0										
Queuing Penalty (veh)	4	0										

Intersection: 202: MD 185 & Aspen Hill Rd

Movement	SB	SB	SB	SB
Directions Served	L	T	T	TR
Maximum Queue (ft)	114	584	609	625
Average Queue (ft)	40	353	409	435
95th Queue (ft)	96	583	640	654
Link Distance (ft)	606	606	606	606
Upstream Blk Time (%)		0	0	1
Queuing Penalty (veh)		0	3	9
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 203: MD 185 & Home Depot Ent

Movement	EB	EB	NB	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	L	R	L	T	T	T	T	T	T	T	R
Maximum Queue (ft)	253	125	239	359	136	112	88	352	492	530	470
Average Queue (ft)	80	83	192	76	28	27	8	111	262	310	141
95th Queue (ft)	191	143	266	270	95	77	46	291	495	593	421
Link Distance (ft)	589			606	606	606	355	355	355	355	355
Upstream Blk Time (%)								0	3	8	3
Queuing Penalty (veh)								0	16	41	14
Storage Bay Dist (ft)		100	215								
Storage Blk Time (%)	3	12	14								
Queuing Penalty (veh)	3	7	37								

Intersection: 1000: MD 185

Movement	WB	WB	SB	SB
Directions Served	T	T	R	R
Maximum Queue (ft)	40	92	561	331
Average Queue (ft)	2	4	98	41
95th Queue (ft)	20	37	380	196
Link Distance (ft)	261	261	474	474
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2000: HAWK & Aspen Hill Rd

Movement	EB	EB	WB	WB
Directions Served	T	T	T	T
Maximum Queue (ft)	43	97	185	216
Average Queue (ft)	4	18	22	28
95th Queue (ft)	24	62	103	117
Link Distance (ft)	450	450	880	880
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3000: MD 97

Movement	SB	SB	SB
Directions Served	T	TR	R
Maximum Queue (ft)	171	168	116
Average Queue (ft)	51	56	29
95th Queue (ft)	162	155	87
Link Distance (ft)	75	75	75
Upstream Blk Time (%)	6	3	0
Queuing Penalty (veh)	58	34	4
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

























Network wide Queuing Penalty: 1132
------------------------------------

# HCM Signalized Intersection Capacity Analysis

Future Build 2040

101: MD 97 & Bel Pre Rd

PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	220	405	255	150	230	190	260	1960	210	255	1230	125
Future Volume (vph)	220	405	255	150	230	190	260	1960	210	255	1230	125
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1600	1900	1900	1750	1900
Total Lost time (s)	9.0	7.0	8.5	9.0	7.0	8.5	8.5	7.0	7.0	8.5	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frbp, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1565	1767	3539	1583	3433	4282	1583	3433	4684	1583
Flt Permitted	0.24	1.00	1.00	0.49	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	449	3539	1565	919	3539	1583	3433	4282	1583	3433	4684	1583
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.97	0.97	0.96	0.96	0.96
Adj. Flow (vph)	242	445	280	165	253	209	268	2021	216	266	1281	130
RTOR Reduction (vph)	0	0	89	0	0	102	0	0	118	0	0	72
Lane Group Flow (vph)	242	445	191	165	253	107	268	2021	98	266	1281	58
Confl. Peds. (#/hr)			5	5								
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4	1	3.9	8	5	1	6		5	2	
Permitted Phases	4		4	8		8			6			2
Actuated Green, G (s)	42.1	29.1	47.8	31.1	24.6	41.4	18.7	81.6	81.6	16.8	79.7	79.7
Effective Green, g (s)	42.1	29.1	47.8	31.1	24.6	41.4	18.7	81.6	81.6	16.8	79.7	79.7
Actuated g/C Ratio	0.23	0.16	0.27	0.17	0.14	0.23	0.10	0.45	0.45	0.09	0.44	0.44
Clearance Time (s)	9.0	7.0	8.5		7.0	8.5	8.5	7.0	7.0	8.5	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	0.2	0.2	3.0	0.2	0.2
Lane Grp Cap (vph)	292	572	415	236	483	364	356	1941	717	320	2073	700
v/s Ratio Prot	c0.12	c0.13	0.05	c0.06	0.07	0.03	c0.08	c0.47		0.08	0.27	
v/s Ratio Perm	0.08		0.07	c0.06		0.04			0.06			0.04
v/c Ratio	0.83	0.78	0.46	0.70	0.52	0.29	0.75	1.04	0.14	0.83	0.62	0.08
Uniform Delay, d1	61.7	72.4	55.3	67.9	72.3	57.2	78.4	49.2	28.7	80.2	38.5	29.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.12	0.95	2.35	1.00	1.00	1.00
Incremental Delay, d2	17.3	6.6	0.8	8.7	1.0	0.4	7.6	30.7	0.3	16.6	1.4	0.2
Delay (s)	79.0	79.0	56.1	76.7	73.3	57.7	95.4	77.5	67.7	96.8	39.9	29.2
Level of Service	E	E	E	E	E	E	F	E	E	F	D	C
Approach Delay (s)		72.4			69.0			78.6			48.1	
Approach LOS		E			E			E			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			67.6				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			36.0		
Intersection Capacity Utilization			100.6%				ICU Level of Service			G		
Analysis Period (min)			15									
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 102: MD 97 & Crystal Spring Apt

Future Build 2040  
 PM Peak





















Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↖	↖↖↖			↗↗↗
Traffic Volume (vph)	0	90	2340	55	0	1635
Future Volume (vph)	0	90	2340	55	0	1635
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0			6.0
Lane Util. Factor		1.00	0.91			0.91
Frbp, ped/bikes		1.00	1.00			1.00
Flpb, ped/bikes		1.00	1.00			1.00
Frt		0.86	1.00			1.00
Flt Protected		1.00	1.00			1.00
Satd. Flow (prot)		1611	5060			5085
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		1611	5060			5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	98	2543	60	0	1777
RTOR Reduction (vph)	0	9	0	0	0	0
Lane Group Flow (vph)	0	89	2603	0	0	1777
Confl. Peds. (#/hr)	5			9	9	
Turn Type		Perm	NA			NA
Protected Phases			2			6
Permitted Phases		6				
Actuated Green, G (s)		164.0	164.0			164.0
Effective Green, g (s)		164.0	164.0			164.0
Actuated g/C Ratio		0.91	0.91			0.91
Clearance Time (s)		6.0	6.0			6.0
Vehicle Extension (s)		3.0	3.0			3.0
Lane Grp Cap (vph)		1467	4610			4633
v/s Ratio Prot			c0.51			0.35
v/s Ratio Perm		0.06				
v/c Ratio		0.06	0.56			0.38
Uniform Delay, d1		0.8	1.5			1.1
Progression Factor		1.00	0.08			0.40
Incremental Delay, d2		0.1	0.4			0.2
Delay (s)		0.8	0.5			0.6
Level of Service		A	A			A
Approach Delay (s)	0.8		0.5			0.6
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	0.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			























HCM Signalized Intersection Capacity Analysis  
103: MD 97 & Heathfield Rd/Postgate Terr

Future Build 2040  
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	10	80	35	10	25	115	2335	40	35	1550	50
Future Volume (vph)	35	10	80	35	10	25	115	2335	40	35	1550	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0		5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.91		1.00	0.91	
Frbp, ped/bikes		0.99			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.91			0.95		1.00	1.00		1.00	1.00	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1658			1712		1770	5065		1770	5057	
Flt Permitted		0.86			0.61		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1449			1071		1770	5065		1770	5057	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.96	0.96	0.96	0.97	0.97	0.97
Adj. Flow (vph)	45	13	103	45	13	32	120	2432	42	36	1598	52
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	161	0	0	90	0	120	2474	0	36	1650	0
Confl. Peds. (#/hr)	10		1	1		10	2		14	14		2
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8								
Actuated Green, G (s)		25.6			25.6		17.5	128.5		7.9	118.9	
Effective Green, g (s)		25.6			25.6		17.5	128.5		7.9	118.9	
Actuated g/C Ratio		0.14			0.14		0.10	0.71		0.04	0.66	
Clearance Time (s)		7.0			7.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)		4.0			3.5		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		206			152		172	3615		77	3340	
v/s Ratio Prot							c0.07	c0.49		0.02	0.33	
v/s Ratio Perm		c0.11			0.08							
v/c Ratio		0.78			0.59		0.70	0.68		0.47	0.49	
Uniform Delay, d1		74.5			72.3		78.7	14.4		84.0	15.4	
Progression Factor		1.00			1.00		1.02	0.49		1.06	0.39	
Incremental Delay, d2		18.2			6.4		9.3	0.8		4.2	0.5	
Delay (s)		92.7			78.7		89.7	7.9		93.4	6.5	
Level of Service		F			E		F	A		F	A	
Approach Delay (s)		92.7			78.7			11.7			8.4	
Approach LOS		F			E			B			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			14.7				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			18.0		
Intersection Capacity Utilization			77.7%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												
































HCM Signalized Intersection Capacity Analysis  
104: MD 97 & Home Depot Ent./7-11

Future Build 2040  
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	5	175	15	5	50	85	2405	35	20	1545	100
Future Volume (vph)	35	5	175	15	5	50	85	2405	35	20	1545	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5	4.5	7.0	4.5		4.5	4.5	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91		1.00	0.91	
Frbp, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected		0.96	1.00		0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1785	1583		1795	1583	1770	5072		1770	5032	
Flt Permitted		0.74	1.00		0.79	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1371	1583		1467	1583	1770	5072		1770	5032	
Peak-hour factor, PHF	0.88	0.88	0.88	0.81	0.81	0.81	0.93	0.93	0.93	0.96	0.96	0.96
Adj. Flow (vph)	40	6	199	19	6	62	91	2586	38	21	1609	104
RTOR Reduction (vph)	0	0	181	0	0	56	0	0	0	0	2	0
Lane Group Flow (vph)	0	46	18	0	25	6	91	2624	0	21	1711	0
Confl. Peds. (#/hr)							2		23	23		2
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)		16.3	16.3		16.3	16.3	14.6	145.1		5.1	133.1	
Effective Green, g (s)		16.3	16.3		16.3	16.3	14.6	145.1		5.1	133.1	
Actuated g/C Ratio		0.09	0.09		0.09	0.09	0.08	0.81		0.03	0.74	
Clearance Time (s)		4.5	4.5		4.5	4.5	7.0	4.5		4.5	4.5	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		124	143		132	143	143	4088		50	3720	
v/s Ratio Prot							c0.05	c0.52		0.01	0.34	
v/s Ratio Perm		c0.03	0.01		0.02	0.00						
v/c Ratio		0.37	0.13		0.19	0.04	0.64	0.64		0.42	0.46	
Uniform Delay, d1		77.0	75.3		75.7	74.7	80.1	7.0		86.0	9.3	
Progression Factor		1.00	1.00		1.00	1.00	0.88	0.74		0.89	0.51	
Incremental Delay, d2		1.9	0.4		0.7	0.1	3.8	0.3		5.0	0.4	
Delay (s)		78.9	75.7		76.4	74.8	74.8	5.5		81.9	5.0	
Level of Service		E	E		E	E	E	A		F	A	
Approach Delay (s)		76.3			75.3			7.9			6.0	
Approach LOS		E			E			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			11.9				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)				16.0	
Intersection Capacity Utilization			71.6%				ICU Level of Service				C	
Analysis Period (min)			15									
c Critical Lane Group												



















HCM Signalized Intersection Capacity Analysis  
105: MD 97 & MD 185

Future Build 2040  
PM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	  	 			   			  			  		
Traffic Volume (vph)	1250	685	45	290	400	90	40	1185	415	85	885	0	
Future Volume (vph)	1250	685	45	290	400	90	40	1185	415	85	885	0	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1750	1900	
Total Lost time (s)	7.0	7.0		7.0	7.0		8.5	7.0	7.0	8.5	7.0		
Lane Util. Factor	0.94	0.95		0.86	0.86		1.00	0.91	1.00	1.00	0.91		
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00		
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00		
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	1.00		
Flt Protected	0.95	1.00		0.95	0.99		0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	4990	3497		1522	4638		1770	5085	1536	1770	4684		
Flt Permitted	0.95	1.00		0.95	0.99		0.95	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	4990	3497		1522	4638		1770	5085	1536	1770	4684		
Peak-hour factor, PHF	0.93	0.93	0.93	0.91	0.91	0.91	0.96	0.96	0.96	0.94	0.94	0.94	
Adj. Flow (vph)	1344	737	48	319	440	99	42	1234	432	90	941	0	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	1344	785	0	214	644	0	42	1234	432	90	941	0	
Confl. Peds. (#/hr)	11		26	26		11	8		28	28		8	
Turn Type	Split	NA		Split	NA		Prot	NA	pm+ov	Prot	NA		
Protected Phases	3	3		4	4		1	6	4	5	2		
Permitted Phases									6				
Actuated Green, G (s)	50.0	50.0		34.2	34.2		7.7	49.1	83.3	12.2	58.6		
Effective Green, g (s)	50.0	50.0		34.2	34.2		7.7	49.1	83.3	12.2	58.6		
Actuated g/C Ratio	0.28	0.28		0.19	0.19		0.04	0.27	0.46	0.07	0.33		
Clearance Time (s)	7.0	7.0		7.0	7.0		8.5	7.0	7.0	8.5	7.0		
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	0.2	4.0	4.0	0.2		
Lane Grp Cap (vph)	1386	971		289	881		75	1387	710	119	1524		
v/s Ratio Prot	c0.27	0.22		c0.14	0.14		0.02	c0.24	0.12	c0.05	c0.20		
v/s Ratio Perm									0.17				
v/c Ratio	0.97	0.81		0.74	0.73		0.56	0.89	0.61	0.76	0.62		
Uniform Delay, d1	64.3	60.5		68.7	68.6		84.5	62.8	36.2	82.4	51.2		
Progression Factor	0.91	0.91		1.00	1.00		1.23	0.85	1.23	1.09	1.26		
Incremental Delay, d2	16.2	4.8		10.4	3.4		10.1	8.1	1.6	23.1	1.7		
Delay (s)	75.0	59.8		79.1	71.9		114.1	61.7	46.0	113.1	66.5		
Level of Service	E	E		E	E		F	E	D	F	E		
Approach Delay (s)		69.4			73.7			59.0			70.5		
Approach LOS		E			E			E			E		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			67.1									HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio			0.88										
Actuated Cycle Length (s)			180.0									Sum of lost time (s)	31.5
Intersection Capacity Utilization			98.7%									ICU Level of Service	F
Analysis Period (min)			15										
c Critical Lane Group													

HCM Unsignalized Intersection Capacity Analysis  
 106: MD 97 & Northgate Plaza

Future Build 2040  
 PM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	
Lane Configurations									  				
Traffic Volume (veh/h)	0	0	50	0	0	0	15	45	1570	0	70	0	
Future Volume (Veh/h)	0	0	50	0	0	0	15	45	1570	0	70	0	
Sign Control	Stop			Stop					Free				
Grade	0%			0%					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	
Hourly flow rate (vph)	0	0	54	0	0	0	0	49	1707	0	0	0	
Pedestrians	8												
Lane Width (ft)	12.0												
Walking Speed (ft/s)	3.5												
Percent Blockage	1												
Right turn flare (veh)													
Median type	None												
Median storage (veh)													
Upstream signal (ft)	547												
pX, platoon unblocked	0.90	0.90	0.85	0.90	0.90	0.83	0.00	0.85			0.00	0.83	
vC, conflicting volume	1882	3020	439	2247	3063	569	0	1258			0	1707	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	459	1716	0	862	1765	0	0	669			0	1127	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	0.0	4.1			0.0	4.1	
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2			0.0	2.2	
p0 queue free %	100	100	94	100	100	100	0	94			0	100	
cM capacity (veh/h)	412	75	911	200	70	898	0	770			0	510	
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4				
Volume Total	54	49	569	569	569	0	465	465	320				
Volume Left	0	49	0	0	0	0	0	0	0				
Volume Right	54	0	0	0	0	0	0	0	87				
cSH	911	770	1700	1700	1700	1700	1700	1700	1700				
Volume to Capacity	0.06	0.06	0.33	0.33	0.33	0.00	0.27	0.27	0.19				
Queue Length 95th (ft)	5	5	0	0	0	0	0	0	0				
Control Delay (s)	9.2	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Lane LOS	A	A											
Approach Delay (s)	9.2	0.3				0.0							
Approach LOS	A												
Intersection Summary													
Average Delay			0.3										
Intersection Capacity Utilization			40.9%	ICU Level of Service					A				
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis  
 106: MD 97 & Northgate Plaza






















Future Build 2040  
 PM Peak



Movement	SBT	SBR
Lane Configurations	↑↑↑	
Traffic Volume (veh/h)	1070	80
Future Volume (Veh/h)	1070	80
Sign Control	Free	
Grade	0%	
Peak Hour Factor	0.92	0.92
Hourly flow rate (vph)	1163	87
Pedestrians		
Lane Width (ft)		
Walking Speed (ft/s)		
Percent Blockage		
Right turn flare (veh)		
Median type	None	
Median storage (veh)		
Upstream signal (ft)	801	
pX, platoon unblocked		
vC, conflicting volume		
vC1, stage 1 conf vol		
vC2, stage 2 conf vol		
vCu, unblocked vol		
tC, single (s)		
tC, 2 stage (s)		
tF (s)		
p0 queue free %		
cM capacity (veh/h)		
Direction, Lane #		



















HCM Signalized Intersection Capacity Analysis  
 107: MD 97 & Aspen Hill Rd/Cemetery

Future Build 2040  
 PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	140	10	570	15	15	10	350	1480	20	10	1025	100
Future Volume (vph)	140	10	570	15	15	10	350	1480	20	10	1025	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.5	6.0		8.0		6.0	7.0		6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00		0.97	0.91		1.00	0.91	1.00
Frbp, ped/bikes		1.00	0.98		1.00		1.00	1.00		1.00	1.00	0.96
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		0.97		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.96	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1779	1546		1765		3433	5067		1770	5085	1518
Flt Permitted		0.96	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1779	1546		1765		3433	5067		1770	5085	1518
Peak-hour factor, PHF	0.96	0.96	0.96	0.57	0.57	0.57	0.96	0.96	0.96	0.94	0.94	0.94
Adj. Flow (vph)	146	10	594	26	26	18	365	1542	21	11	1090	106
RTOR Reduction (vph)	0	0	61	0	7	0	0	1	0	0	0	61
Lane Group Flow (vph)	0	156	533	0	63	0	365	1562	0	11	1090	45
Confl. Peds. (#/hr)			29	29			10		21	29		10
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4									2
Actuated Green, G (s)		29.2	64.9		9.9		35.7	109.2		3.2	76.7	76.7
Effective Green, g (s)		29.2	64.9		9.9		35.7	109.2		3.2	76.7	76.7
Actuated g/C Ratio		0.16	0.36		0.06		0.20	0.61		0.02	0.43	0.43
Clearance Time (s)		7.5	6.0		8.0		6.0	7.0		6.0	7.0	7.0
Vehicle Extension (s)		3.0	5.0		5.0		5.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)		288	557		97		680	3073		31	2166	646
v/s Ratio Prot		0.09	c0.19		c0.04		0.11	c0.31		0.01	0.21	
v/s Ratio Perm			0.16									0.03
v/c Ratio		0.54	0.96		0.65		0.54	0.51		0.35	0.50	0.07
Uniform Delay, d1		69.3	56.2		83.4		64.7	20.1		87.4	37.7	30.6
Progression Factor		1.00	1.00		1.00		1.24	1.46		1.17	0.53	0.90
Incremental Delay, d2		2.1	28.0		19.3		1.0	0.4		5.6	0.7	0.2
Delay (s)		71.3	84.2		102.7		81.5	29.8		107.6	20.6	27.5
Level of Service		E	F		F		F	C		F	C	C
Approach Delay (s)		81.5			102.7		39.6			22.0		
Approach LOS		F			F		D			C		
<b>Intersection Summary</b>												
HCM 2000 Control Delay			43.3				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			28.5		
Intersection Capacity Utilization			78.6%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
108: MD 97 & Wendy Ln/Aspen Manor

Future Build 2040  
PM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	
Lane Configurations													
Traffic Volume (vph)	120	10	10	50	5	85	105	35	1645	35	170	1360	
Future Volume (vph)	120	10	10	50	5	85	105	35	1645	35	170	1360	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		7.0			7.0			4.5	7.0		4.5	7.0	
Lane Util. Factor		1.00			1.00			1.00	0.91		1.00	0.91	
Frb, ped/bikes		1.00			0.99			1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00			1.00	1.00		1.00	1.00	
Frt		0.99			0.92			1.00	1.00		1.00	0.99	
Flt Protected		0.96			0.98			0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1758			1657			1769	5065		1770	5029	
Flt Permitted		0.66			0.85			0.11	1.00		0.09	1.00	
Satd. Flow (perm)		1210			1429			206	5065		165	5029	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	130	11	11	54	5	92	114	38	1788	38	185	1478	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	0	152	0	0	151	0	0	152	1826	0	185	1565	
Confl. Peds. (#/hr)	9		7	7		9		10		8	8		
Turn Type	Perm	NA		Perm	NA		Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8			5	2		1	6	
Permitted Phases	4			8			2	2			6		
Actuated Green, G (s)		18.3			18.3			50.8	42.8		55.6	45.2	
Effective Green, g (s)		18.3			18.3			50.8	42.8		55.6	45.2	
Actuated g/C Ratio		0.20			0.20			0.56	0.48		0.62	0.50	
Clearance Time (s)		7.0			7.0			4.5	7.0		4.5	7.0	
Vehicle Extension (s)		3.0			3.0			3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		246			290			255	2408		287	2525	
v/s Ratio Prot								0.05	c0.36		c0.07	0.31	
v/s Ratio Perm		c0.13			0.11			0.28			0.32		
v/c Ratio		0.62			0.52			0.60	0.76		0.64	0.62	
Uniform Delay, d1		32.7			31.9			10.9	19.4		15.9	16.2	
Progression Factor		1.00			1.00			1.00	1.00		1.90	1.66	
Incremental Delay, d2		4.6			1.7			3.7	2.3		3.8	0.9	
Delay (s)		37.2			33.6			14.7	21.7		34.0	27.7	
Level of Service		D			C			B	C		C	C	
Approach Delay (s)		37.2			33.6			21.1				28.3	
Approach LOS		D			C			C				C	
<b>Intersection Summary</b>													
HCM 2000 Control Delay			25.3									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.71										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	18.5
Intersection Capacity Utilization			74.6%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													



Movement	SBR
<b>Lane Configurations</b>	
Traffic Volume (vph)	80
Future Volume (vph)	80
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frbp, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	87
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	10
<b>Turn Type</b>	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
<b>Intersection Summary</b>	

HCM Signalized Intersection Capacity Analysis  
 109: MD 97 & Ralph Rd/Aspen Hill Apt

Future Build 2040  
 PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations		↕			↕		↕	↑↑↑			↕	↑↑↑
Traffic Volume (vph)	20	5	115	15	5	45	45	1745	40	10	40	1425
Future Volume (vph)	20	5	115	15	5	45	45	1745	40	10	40	1425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0		4.5	7.0			4.5	7.0
Lane Util. Factor		1.00			1.00		1.00	0.91			1.00	0.91
Frbp, ped/bikes		0.99			0.98		1.00	1.00			1.00	1.00
Flpb, ped/bikes		1.00			1.00		1.00	1.00			1.00	1.00
Frt		0.89			0.91		1.00	1.00			1.00	0.99
Flt Protected		0.99			0.99		0.95	1.00			0.95	1.00
Satd. Flow (prot)		1623			1642		1769	5051			1770	5052
Flt Permitted		0.94			0.87		0.12	1.00			0.08	1.00
Satd. Flow (perm)		1537			1441		227	5051			142	5052
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	5	125	16	5	49	49	1897	43	11	43	1549
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	152	0	0	70	0	49	1940	0	0	54	1603
Confl. Peds. (#/hr)	5		1	1		5	7		41		41	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	pm+pt	NA
Protected Phases		4			8		5	2			1	6
Permitted Phases	4			8			2			6	6	
Actuated Green, G (s)		17.0			17.0		84.5	79.2			84.5	79.2
Effective Green, g (s)		17.0			17.0		84.5	79.2			84.5	79.2
Actuated g/C Ratio		0.14			0.14		0.70	0.66			0.70	0.66
Clearance Time (s)		7.0			7.0		4.5	7.0			4.5	7.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		217			204		227	3333			171	3334
v/s Ratio Prot							0.01	c0.38			c0.01	0.32
v/s Ratio Perm		c0.10			0.05		0.14				0.21	
v/c Ratio		0.70			0.34		0.22	0.58			0.32	0.48
Uniform Delay, d1		49.1			46.5		6.2	11.3			7.7	10.2
Progression Factor		1.00			1.00		0.50	0.23			1.00	1.00
Incremental Delay, d2		9.8			1.0		0.3	0.4			1.1	0.5
Delay (s)		58.8			47.5		3.4	3.0			8.7	10.7
Level of Service		E			D		A	A			A	B
Approach Delay (s)		58.8			47.5			3.0				10.6
Approach LOS		E			D			A				B

Intersection Summary			
HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
<b>Lane Configurations</b>	
Traffic Volume (vph)	50
Future Volume (vph)	50
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frbp, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	54
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	7
<b>Turn Type</b>	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
<b>Intersection Summary</b>	

HCM Signalized Intersection Capacity Analysis  
110: MD 97 & Hewitt Ave.






















Future Build 2040  
PM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	105	155	1675	185	220	1335
Future Volume (vph)	105	155	1675	185	220	1335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.91		1.00	0.91
Frpb, ped/bikes	1.00	0.98	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1548	4947		1770	5085
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1548	4947		1770	5085
Peak-hour factor, PHF	0.94	0.94	0.96	0.96	0.96	0.96
Adj. Flow (vph)	112	165	1745	193	229	1391
RTOR Reduction (vph)	0	142	0	0	0	0
Lane Group Flow (vph)	112	23	1938	0	229	1391
Confl. Peds. (#/hr)	9	10		16	16	
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		4				
Actuated Green, G (s)	16.4	16.4	51.9		23.2	86.1
Effective Green, g (s)	16.4	16.4	51.9		23.2	86.1
Actuated g/C Ratio	0.14	0.14	0.43		0.19	0.72
Clearance Time (s)	6.5	6.5	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	0.2		3.0	0.2
Lane Grp Cap (vph)	241	211	2139		342	3648
v/s Ratio Prot	c0.06		c0.39		c0.13	c0.27
v/s Ratio Perm		0.01				
v/c Ratio	0.46	0.11	0.91		0.67	0.38
Uniform Delay, d1	47.8	45.4	31.8		44.8	6.6
Progression Factor	1.00	1.00	1.00		1.14	0.95
Incremental Delay, d2	1.4	0.2	7.0		4.4	0.3
Delay (s)	49.2	45.6	38.7		55.7	6.5
Level of Service	D	D	D		E	A
Approach Delay (s)	47.0		38.7			13.5
Approach LOS	D		D			B
<b>Intersection Summary</b>						
HCM 2000 Control Delay			28.7		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.75			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	24.5
Intersection Capacity Utilization			76.7%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						





























HCM Signalized Intersection Capacity Analysis  
201: MD 185 & Independence St

Future Build 2040  
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	20	115	110	35	30	95	1755	95	20	1100	175
Future Volume (vph)	125	20	115	110	35	30	95	1755	95	20	1100	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0			7.0		5.5	6.0		5.5	6.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.91		1.00	0.91	
Frbp, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.97	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.87			0.98		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1722	1625			1746		1770	5023		1770	4907	
Flt Permitted	0.63	1.00			0.60		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1148	1625			1080		1770	5023		1770	4907	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	136	22	125	120	38	33	103	1908	103	22	1196	190
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	136	147	0	0	191	0	103	2011	0	22	1386	0
Confl. Peds. (#/hr)	25						25	10		8	8	10
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8								
Actuated Green, G (s)	34.6	34.6			34.6		16.7	111.4		5.5	100.2	
Effective Green, g (s)	34.6	34.6			34.6		16.7	111.4		5.5	100.2	
Actuated g/C Ratio	0.19	0.19			0.19		0.09	0.62		0.03	0.56	
Clearance Time (s)	7.0	7.0			7.0		5.5	6.0		5.5	6.0	
Vehicle Extension (s)	4.0	4.0			3.0		4.0	0.2		4.0	0.2	
Lane Grp Cap (vph)	220	312			207		164	3108		54	2731	
v/s Ratio Prot		0.09					c0.06	c0.40		0.01	0.28	
v/s Ratio Perm	0.12				c0.18							
v/c Ratio	0.62	0.47			0.92		0.63	0.65		0.41	0.51	
Uniform Delay, d1	66.6	64.6			71.4		78.7	21.8		85.7	24.7	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.02	0.56	
Incremental Delay, d2	5.8	1.5			41.4		8.3	1.1		5.3	0.5	
Delay (s)	72.5	66.1			112.7		86.9	22.9		93.0	14.5	
Level of Service	E	E			F		F	C		F	B	
Approach Delay (s)		69.2			112.7			26.0			15.7	
Approach LOS		E			F			C			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			29.6				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			24.5		
Intersection Capacity Utilization			86.4%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
202: MD 185 & Aspen Hill Rd

Future Build 2040  
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 	  			  	
Traffic Volume (vph)	370	370	155	195	245	90	225	1470	215	135	945	260
Future Volume (vph)	370	370	155	195	245	90	225	1470	215	135	945	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	7.0		6.5	7.0		5.5	7.0	7.0	5.5	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.91	1.00	1.00	0.91	
Frbp, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	0.95	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	0.96		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1767	3348		1765	3372		3433	5085	1511	1770	4892	
Flt Permitted	0.24	1.00		0.30	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	440	3348		551	3372		3433	5085	1511	1770	4892	
Peak-hour factor, PHF	0.96	0.96	0.96	0.87	0.87	0.87	0.97	0.97	0.97	0.96	0.96	0.96
Adj. Flow (vph)	385	385	161	224	282	103	232	1515	222	141	984	271
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	385	546	0	224	385	0	232	1515	222	141	1255	0
Confl. Peds. (#/hr)	11		16	16		11	6		14	14		6
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8					6			
Actuated Green, G (s)	66.9	38.3		49.9	27.8		18.2	75.0	75.0	18.6	75.4	
Effective Green, g (s)	66.9	38.3		49.9	27.8		18.2	75.0	75.0	18.6	75.4	
Actuated g/C Ratio	0.37	0.21		0.28	0.15		0.10	0.42	0.42	0.10	0.42	
Clearance Time (s)	6.5	7.0		6.5	7.0		5.5	7.0	7.0	5.5	7.0	
Vehicle Extension (s)	3.0	4.0		5.0	4.0		5.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)	403	712		301	520		347	2118	629	182	2049	
v/s Ratio Prot	c0.17	0.16		0.09	0.11		0.07	c0.30		c0.08	0.26	
v/s Ratio Perm	c0.18			0.11					0.15			
v/c Ratio	0.96	0.77		0.74	0.74		0.67	0.72	0.35	0.77	0.61	
Uniform Delay, d1	47.1	66.6		54.2	72.7		78.0	43.6	35.9	78.7	40.9	
Progression Factor	1.00	1.00		1.00	1.00		1.35	0.67	0.69	0.84	0.94	
Incremental Delay, d2	33.2	5.3		11.4	6.0		5.0	1.6	1.2	17.7	1.3	
Delay (s)	80.2	71.9		65.6	78.6		110.2	30.9	26.1	84.2	39.5	
Level of Service	F	E		E	E		F	C	C	F	D	
Approach Delay (s)		75.3			73.8			39.7			44.1	
Approach LOS		E			E			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			51.9				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)				26.0	
Intersection Capacity Utilization			94.7%				ICU Level of Service				F	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
203: MD 185 & Home Depot Ent

Future Build 2040  
PM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↙	↖	↑↑↑	↓↓↓	↙
Traffic Volume (vph)	210	245	160	1770	1095	110
Future Volume (vph)	210	245	160	1770	1095	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	7.0	7.0	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	0.91	0.86	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1568	1770	5085	6408	1551
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1568	1770	5085	6408	1551
Peak-hour factor, PHF	0.79	0.79	0.97	0.97	0.98	0.98
Adj. Flow (vph)	266	310	165	1825	1117	112
RTOR Reduction (vph)	0	10	0	0	0	24
Lane Group Flow (vph)	266	300	165	1825	1117	88
Confl. Peds. (#/hr)		3	3			3
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Actuated Green, G (s)	32.8	54.9	22.1	138.2	109.1	141.9
Effective Green, g (s)	32.8	54.9	22.1	138.2	109.1	141.9
Actuated g/C Ratio	0.18	0.30	0.12	0.77	0.61	0.79
Clearance Time (s)	4.5	7.0	7.0	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	322	478	217	3904	3883	1261
v/s Ratio Prot	c0.15	0.08	c0.09	c0.36	0.17	0.01
v/s Ratio Perm		0.11				0.04
v/c Ratio	0.83	0.63	0.76	0.47	0.29	0.07
Uniform Delay, d1	70.9	53.8	76.4	7.6	16.9	4.3
Progression Factor	1.00	1.00	1.00	0.70	1.31	4.21
Incremental Delay, d2	15.7	2.6	9.7	0.3	0.2	0.0
Delay (s)	86.6	56.4	85.8	5.5	22.2	18.0
Level of Service	F	E	F	A	C	B
Approach Delay (s)	70.3			12.2	21.9	
Approach LOS	E			B	C	

Intersection Summary

HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

---

Intersection Sign configuration not allowed in HCM analysis.

---



HCM Signalized Intersection Capacity Analysis  
 2000: HAWK & Aspen Hill Rd

Future Build 2040  
 PM Peak









Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		
Traffic Volume (vph)	720	0	0	530	0	0
Future Volume (vph)	720	0	0	530	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0		
Lane Util. Factor	0.95			0.95		
Frt	1.00			1.00		
Flt Protected	1.00			1.00		
Satd. Flow (prot)	3539			3539		
Flt Permitted	1.00			1.00		
Satd. Flow (perm)	3539			3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	783	0	0	576	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	783	0	0	576	0	0
Turn Type	NA			NA		
Protected Phases	2			6		
Permitted Phases						
Actuated Green, G (s)	14.7			14.7		
Effective Green, g (s)	14.7			14.7		
Actuated g/C Ratio	0.54			0.54		
Clearance Time (s)	6.0			6.0		
Vehicle Extension (s)	3.0			3.0		
Lane Grp Cap (vph)	1912			1912		
v/s Ratio Prot	c0.22			0.16		
v/s Ratio Perm						
v/c Ratio	0.41			0.30		
Uniform Delay, d1	3.7			3.4		
Progression Factor	1.00			1.00		
Incremental Delay, d2	0.1			0.1		
Delay (s)	3.8			3.5		
Level of Service	A			A		
Approach Delay (s)	3.8			3.5	0.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	3.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	27.2	Sum of lost time (s)	10.5
Intersection Capacity Utilization	24.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis  
3000: MD 97

Future Build 2040  
PM Peak

							
Movement	NBL	NBT	SBT	SBR	NEL	NER	
Lane Configurations		↑↑↑	↑↑	↗			
Traffic Volume (veh/h)	0	2525	970	765	0	0	
Future Volume (Veh/h)	0	2525	970	765	0	0	
Sign Control		Free	Free		Stop		
Grade		0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	2745	1054	832	0	0	
<b>Pedestrians</b>							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None	None				
Median storage (veh)							
Upstream signal (ft)		400	153				
pX, platoon unblocked	0.87				0.85	0.87	
vC, conflicting volume	1886				1740	527	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1713				26	144	
tC, single (s)	4.1				6.8	6.9	
tC, 2 stage (s)							
tF (s)	2.2				3.5	3.3	
p0 queue free %	100				100	100	
cM capacity (veh/h)	317				836	760	
<b>Direction, Lane #</b>	<b>NB 1</b>	<b>NB 2</b>	<b>NB 3</b>	<b>NB 4</b>	<b>SB 1</b>	<b>SB 2</b>	<b>SB 3</b>
Volume Total	686	686	686	686	703	629	555
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	277	555
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.40	0.40	0.40	0.40	0.41	0.37	0.33
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0				0.0		
Approach LOS							
<b>Intersection Summary</b>							
Average Delay			0.0				
Intersection Capacity Utilization			39.9%		ICU Level of Service		A
Analysis Period (min)			15				

## Arterial Level of Service: NB MD 97

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Hewitt Ave.	110	46.1	88.6	0.4	17
Aspen Hill Apt	109	5.4	13.9	0.1	21
Aspen Manor	108	25.5	39.6	0.1	13
Cemetery	107	27.9	39.1	0.1	10
	106	3.8	14.1	0.1	26
MD 185	105	58.1	72.6	0.2	8
	3000	4.6	11.2	0.1	24
7-11	104	8.2	11.3	0.0	9
Postgate Terr	103	11.9	26.1	0.2	24
Crystal Spring Apt	102	7.1	23.5	0.2	32
Bel Pre Rd	101	52.3	65.4	0.2	10
Total		250.9	405.4	1.7	15

## Arterial Level of Service: SB MD 97

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Bel Pre Rd	101	37.7	91.5	0.7	27
Crystal Spring Apt	102	7.7	21.7	0.2	29
Heathfield Rd	103	12.2	28.8	0.2	26
Home Depot Ent.	104	16.8	30.8	0.2	21
	3000	3.0	5.3	0.0	20
MD 185	105	53.4	59.2	0.1	5
Northgate Plaza	106	5.0	20.7	0.2	26
Aspen Hill Rd	107	16.9	27.6	0.1	14
Wendy Ln	108	34.1	44.9	0.1	8
Ralph Rd	109	9.9	24.9	0.1	20
Hewitt Ave.	110	10.0	18.2	0.1	16
Total		206.7	373.8	1.9	19

## Arterial Level of Service: NB MD 185

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Independence St	201	25.0	61.1	0.5	27
Aspen Hill Rd	202	42.1	63.0	0.3	16
Home Depot Ent	203	13.0	23.7	0.1	20
	1000	8.8	15.2	0.1	19
MD 97	105	51.8	57.5	0.1	5
Total		140.7	220.5	1.0	17

Arterial Level of Service: SB MD 185

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
MD 97	105	77.1	90.9	0.2	8
	1000	5.1	12.0	0.1	26
Home Depot Ent	203	11.4	18.3	0.1	16
Aspen Hill Rd	202	32.3	42.5	0.1	11
Independence St	201	8.9	30.9	0.3	32
Total		134.7	194.6	0.8	14

Intersection: 24: Bend

Movement	WB	WB
Directions Served	T	
Maximum Queue (ft)	255	188
Average Queue (ft)	25	10
95th Queue (ft)	128	82
Link Distance (ft)	350	350
Upstream Blk Time (%)	0	0
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 101: MD 97 & Bel Pre Rd

Movement	EB	EB	EB	EB	B24	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	T	L	T	T	R	L	L	T
Maximum Queue (ft)	205	437	290	277	345	221	232	256	195	209	366	574
Average Queue (ft)	178	247	205	108	28	89	104	103	108	112	128	383
95th Queue (ft)	239	429	321	214	171	180	172	193	182	181	270	571
Link Distance (ft)		350			2203		2698	2698				788
Upstream Blk Time (%)		5										
Queuing Penalty (veh)		0										
Storage Bay Dist (ft)	180		265	265		280			150	455	455	
Storage Blk Time (%)	16	11	1	0		0		2	4		0	5
Queuing Penalty (veh)	106	73	6	1		0		4	5		0	13

Intersection: 101: MD 97 & Bel Pre Rd

Movement	NB	NB	NB	SB	SB	SB	SB	SB	SB
Directions Served	T	T	R	L	L	T	T	T	R
Maximum Queue (ft)	595	630	225	210	204	343	348	356	65
Average Queue (ft)	410	434	141	109	113	189	200	196	32
95th Queue (ft)	600	625	308	192	196	311	321	329	82
Link Distance (ft)	788	788				3557	3557	3557	
Upstream Blk Time (%)	0	0							
Queuing Penalty (veh)	0	2							
Storage Bay Dist (ft)			200	560	560				40
Storage Blk Time (%)		39	0					31	0
Queuing Penalty (veh)		82	1					39	1

Intersection: 102: MD 97 & Crystal Spring Apt

Movement	WB	NB	NB	NB	SB	SB	SB
Directions Served	R	T	T	TR	T	T	T
Maximum Queue (ft)	144	260	296	316	330	339	235
Average Queue (ft)	54	33	34	39	29	36	29
95th Queue (ft)	111	162	171	186	175	192	136
Link Distance (ft)	234	1036	1036	1036	788	788	788
Upstream Blk Time (%)					0	0	
Queuing Penalty (veh)					0	0	
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 103: MD 97 & Heathfield Rd/Postgate Terr

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	T	TR	L	T	T	TR
Maximum Queue (ft)	229	146	236	332	367	379	144	330	338	318
Average Queue (ft)	112	58	112	114	138	170	39	86	100	90
95th Queue (ft)	201	122	193	244	286	321	101	222	235	220
Link Distance (ft)	346	247		860	860	860		1036	1036	1036
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)			350				350			
Storage Blk Time (%)				0				1		
Queuing Penalty (veh)				0				0		

Intersection: 104: MD 97 & Home Depot Ent./7-11

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	TR	L	T	T	TR
Maximum Queue (ft)	106	206	64	87	202	206	212	224	74	286	305	276
Average Queue (ft)	40	83	22	32	88	155	174	189	17	143	184	133
95th Queue (ft)	87	161	57	67	175	242	246	252	52	257	297	251
Link Distance (ft)	1151	1151	213	213	76	76	76	76		860	860	860
Upstream Blk Time (%)					18	15	17	18				
Queuing Penalty (veh)					111	98	107	117				
Storage Bay Dist (ft)									235			
Storage Blk Time (%)										2		
Queuing Penalty (veh)										0		

Intersection: 105: MD 97 & MD 185

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	L	T	TR	L	LT	T	TR	L	T	T
Maximum Queue (ft)	279	411	428	414	280	228	292	460	452	333	522	585
Average Queue (ft)	258	347	371	311	255	110	168	199	265	61	274	287
95th Queue (ft)	319	455	455	450	315	208	262	365	421	180	435	470
Link Distance (ft)		280	280	280				968	968		682	682
Upstream Blk Time (%)	3	14	25	7	2							0
Queuing Penalty (veh)	0	90	164	48	0							0
Storage Bay Dist (ft)	425				300	280	280			330		
Storage Blk Time (%)	3	14		7	2	0	0	1		0	5	
Queuing Penalty (veh)	13	57		28	8	0	0	4		0	2	

Intersection: 105: MD 97 & MD 185

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	T
Maximum Queue (ft)	643	305	225	391	379	200
Average Queue (ft)	333	253	118	279	253	175
95th Queue (ft)	566	379	225	424	377	236
Link Distance (ft)	682			253	253	
Upstream Blk Time (%)	0			14	10	
Queuing Penalty (veh)	1			70	48	
Storage Bay Dist (ft)		280	200			175
Storage Blk Time (%)	13	12	3	24	23	13
Queuing Penalty (veh)	54	46	8	20	69	38

Intersection: 106: MD 97 & Northgate Plaza

Movement	EB	NB	NB	NB	SB	SB	SB	SB
Directions Served	R	UL	T	T	UL	T	T	TR
Maximum Queue (ft)	58	119	4	27	116	42	3	34
Average Queue (ft)	21	33	0	1	46	1	0	3
95th Queue (ft)	47	87	3	20	102	31	2	20
Link Distance (ft)	253		463	463		682	682	682
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)		175			150			
Storage Blk Time (%)					0			
Queuing Penalty (veh)					1			

Intersection: 107: MD 97 & Aspen Hill Rd/Cemetery

Movement	EB	EB	WB	NB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	L	T	T	TR	L	T	T	T
Maximum Queue (ft)	355	531	134	285	370	440	467	460	77	252	269	290
Average Queue (ft)	127	259	44	135	153	194	214	254	10	116	121	136
95th Queue (ft)	251	476	107	227	277	374	405	436	46	194	207	229
Link Distance (ft)	880	880	216			470	470	470		463	463	463
Upstream Blk Time (%)		0	0			0	0	0				
Queuing Penalty (veh)		0	0			1	1	3				
Storage Bay Dist (ft)				250	250				190			
Storage Blk Time (%)				0	1	6				1		25
Queuing Penalty (veh)				1	6	22				0		25

Intersection: 107: MD 97 & Aspen Hill Rd/Cemetery

Movement	SB
Directions Served	R
Maximum Queue (ft)	95
Average Queue (ft)	38
95th Queue (ft)	106
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	70
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 108: MD 97 & Wendy Ln/Aspen Manor

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	UL	T	T	TR	L	T	T	TR
Maximum Queue (ft)	160	146	225	533	497	503	225	428	446	454
Average Queue (ft)	71	71	104	232	218	251	128	254	271	292
95th Queue (ft)	132	128	231	461	429	459	260	406	418	434
Link Distance (ft)	1228	342		650	650	650		470	470	470
Upstream Blk Time (%)				0				0	0	0
Queuing Penalty (veh)				0				0	0	1
Storage Bay Dist (ft)			200				150			
Storage Blk Time (%)			0	13			1	17		
Queuing Penalty (veh)			0	19			5	28		



Intersection: 109: MD 97 & Ralph Rd/Aspen Hill Apt

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB	
Directions Served	LTR	LTR	L	T	T	TR	UL	T	T	TR	
Maximum Queue (ft)	271	140	86	179	219	115	99	252	262	255	
Average Queue (ft)	112	59	23	27	19	27	31	73	85	94	
95th Queue (ft)	199	116	60	106	104	78	74	193	214	220	
Link Distance (ft)	1189	370		364	364	364		650	650	650	
Upstream Blk Time (%)						0					
Queuing Penalty (veh)						0					
Storage Bay Dist (ft)				125				175			
Storage Blk Time (%)					0					1	
Queuing Penalty (veh)					0					1	

Intersection: 110: MD 97 & Hewitt Ave.

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB	
Directions Served	L	R	T	T	TR	L	T	T	T	
Maximum Queue (ft)	114	177	627	611	620	165	360	356	318	
Average Queue (ft)	68	71	386	367	381	145	162	125	121	
95th Queue (ft)	118	145	579	563	564	188	343	280	245	
Link Distance (ft)		438	2204	2204	2204		364	364	364	
Upstream Blk Time (%)							1	0	0	
Queuing Penalty (veh)							3	0	0	
Storage Bay Dist (ft)	90					140				
Storage Blk Time (%)	8	4					34	1		
Queuing Penalty (veh)	12	5					151	3		

Intersection: 201: MD 185 & Independence St

Movement	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB	
Directions Served	L	TR	LTR	L	T	T	TR	L	T	T	TR	
Maximum Queue (ft)	125	358	208	274	435	429	437	64	139	177	200	
Average Queue (ft)	103	175	148	115	226	224	242	11	52	89	118	
95th Queue (ft)	151	325	223	228	405	402	419	41	122	169	200	
Link Distance (ft)		872	179		2375	2375	2375		1338	1338	1338	
Upstream Blk Time (%)				15								
Queuing Penalty (veh)				0								
Storage Bay Dist (ft)	100				250						270	
Storage Blk Time (%)	25	23			0	8						
Queuing Penalty (veh)	34	29			2	8						

Intersection: 202: MD 185 & Aspen Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	NB
Directions Served	L	T	TR	L	T	TR	L	L	T	T	T	R
Maximum Queue (ft)	325	550	526	295	256	288	191	340	382	413	425	327
Average Queue (ft)	261	285	304	158	159	192	100	138	221	230	223	108
95th Queue (ft)	371	531	471	259	240	276	166	250	347	362	369	242
Link Distance (ft)		1838	1838		450	450			1338	1338	1338	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	300			410			350	350				350
Storage Blk Time (%)	14	3							1		2	0
Queuing Penalty (veh)	26	13							2		3	1

Intersection: 202: MD 185 & Aspen Hill Rd

Movement	SB	SB	SB	SB
Directions Served	L	T	T	TR
Maximum Queue (ft)	267	371	473	538
Average Queue (ft)	100	239	275	364
95th Queue (ft)	212	373	414	520
Link Distance (ft)	606	606	606	606
Upstream Blk Time (%)				0
Queuing Penalty (veh)				0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 203: MD 185 & Home Depot Ent

Movement	EB	EB	NB	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	L	R	L	T	T	T	T	T	T	T	R
Maximum Queue (ft)	621	125	238	348	290	334	192	279	357	379	297
Average Queue (ft)	510	97	150	114	120	128	41	85	151	169	35
95th Queue (ft)	760	174	245	268	254	286	109	220	269	294	145
Link Distance (ft)	589			606	606	606	343	343	343	343	343
Upstream Blk Time (%)	42								0	0	0
Queuing Penalty (veh)	0								1	1	0
Storage Bay Dist (ft)		100	215								
Storage Blk Time (%)	67	1	4	1							
Queuing Penalty (veh)	166	3	23	1							

Intersection: 1000: MD 185

Movement	EB	EB	EB	SB
Directions Served	T	T	T	R
Maximum Queue (ft)	316	327	361	369
Average Queue (ft)	82	95	69	35
95th Queue (ft)	282	292	255	265
Link Distance (ft)	343	343	343	481
Upstream Blk Time (%)	1	1	1	
Queuing Penalty (veh)	5	7	4	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2000: HAWK & Aspen Hill Rd

Movement	EB	EB	WB	WB
Directions Served	T	T	T	T
Maximum Queue (ft)	153	200	192	202
Average Queue (ft)	23	51	30	29
95th Queue (ft)	94	149	108	106
Link Distance (ft)	450	450	880	880
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3000: MD 97

Movement	NB	NB	NB	NB	SB	SB	SB
Directions Served	T	T	T	T	T	TR	R
Maximum Queue (ft)	21	80	105	134	150	167	70
Average Queue (ft)	1	13	25	51	26	27	3
95th Queue (ft)	22	53	79	119	103	110	30
Link Distance (ft)		253	253	253	76	76	76
Upstream Blk Time (%)					3	2	0
Queuing Penalty (veh)					16	11	0
Storage Bay Dist (ft)	100						
Storage Blk Time (%)	0	0					
Queuing Penalty (veh)	2	0					

Network Summary

Network wide Queuing Penalty: 2185
------------------------------------