

# Hill Top Hotel Traffic Impact Study

## Jefferson County, WV

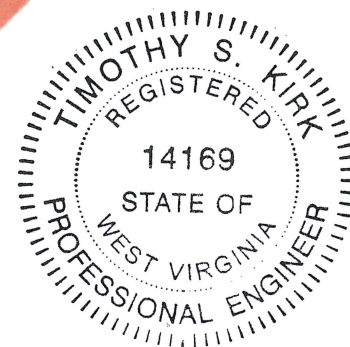
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**TABLE OF CONTENTS**

Executive Summary..... 1  
 Introduction ..... 5  
 Study Area Description ..... 5  
 Existing Roadway Conditions ..... 9  
 Trip Generation ..... 12  
 Trip Distribution ..... 12  
 Project Traffic Volumes..... 15  
     2020 Existing Conditions ..... 15  
     2022 No-Build Conditions ..... 15  
     2022 Build Conditions..... 15  
 Capacity Analysis..... 19  
     2020 Existing Conditions Analysis..... 20  
     2022 No-Build Conditions Analysis..... 21  
     2022 Build Conditions Analysis ..... 22  
 Queuing Analysis..... 28  
     2020 Existing Conditions Analysis..... 28  
     2022 No-Build Conditions Analysis..... 28  
     2022 Build Conditions Analysis ..... 28  
 Conclusions/Recommendations ..... 33

**List of Figures**

Figure 1: Site Location Map ..... 7  
 Figure 2: Site Plan..... 8  
 Figure 3: 2020 Existing Lane Configuration ..... 11  
 Figure 4: New External Trip Distribution..... 13  
 Figure 5: New Site Trip Assignments ..... 14  
 Figure 6: 2020 Existing Traffic Volume ..... 16  
 Figure 7: 2022 No-Build Traffic Volumes ..... 17  
 Figure 8: 2022 Build Traffic Volumes ..... 18  
 Figure 9: 2020 Existing Level of Service ..... 25  
 Figure 10: 2022 No-Build Level of Service ..... 26  
 Figure 11: 2022 Build Level of Service ..... 27  
 Figure 12: 2020 Existing Conditions Queuing Analysis ..... 30  
 Figure 13: 2022 No-Build Conditions Queuing Analysis..... 31  
 Figure 14: 2022 Build Conditions Queuing Analysis ..... 32

**List of Tables**

Table 1: Roadway Facility Summary ..... 10  
 Table 2: Trip Generation Summary..... 12  
 Table 3: Level of Service Criteria..... 19  
 Table 4: Level of Service Analysis Summary ..... 24  
 Table 5: Queueing Analysis Summary..... 29



**Appendices**

Study Area Photos.....Appendix A  
Traffic Data & Volume Calculations.....Appendix B  
Synchro Outputs.....Appendix C  
SimTraffic Outputs.....Appendix D  
Project Correspondence.....Appendix E



## **EXECUTIVE SUMMARY**

This report summarizes the existing and future traffic analyses conducted in support of the proposed Hilltop House Hotel development. The proposed hotel renovation is to be located at the existing Hilltop House Hotel site on East Ridge Street, northeast of the intersection of Columbia Street with Washington Street in Harpers Ferry, Jefferson County. The proposed hotel includes 129 rooms and is expected to be completed by 2022.

The proposed hotel will be served by multiple existing municipal streets within the study area. It is assumed that primary access to the hotel will utilize Columbia Street via Washington Street to enter the property.

Traffic analysis will consider future conditions at the anticipated build-out year of 2022. This report summarizes the analyses of 2020 Existing conditions, 2022 No-Build conditions (without the proposed development in place), and 2022 Build conditions (with the proposed development in place) during the weekday AM, PM, and Saturday peak hours. The annual growth rate of 1.88% was previously obtained from WVDOH for US 340 near Harpers Ferry.

WVDOH has undertaken a Preliminary Investigation and Engineering Study of the US 340 corridor from Washington Street/Shoreline Drive to the MD 67 Interchange to identify potential operational improvements. This study is still in progress and has not been finalized. It is conceivable that some infrastructure capacity improvements may be implemented following the build year of 2022. In any case, the ongoing study delineates existing level of service issues that are known to be an issue in existing and future year conditions.

AMT (A. Morton Thomas and Associates, Inc.) was retained to determine the projected traffic impacts of the proposed hotel development in accordance with the guidelines set forth by the WVDOH (Division of Highways) in Traffic Engineering Directive (TED) 106-2. The intention of the study is to fully examine the impacts of the traffic generated by the hotel development on the existing transportation system and identify potential mitigation measures. This report presents trip generation, trip distribution, intersection capacity analysis, queuing analysis, auxiliary lane analysis, and recommendations for transportation improvements required to meet anticipated traffic demands.

Based upon a review of the site plan and adjacent transportation network, the following five (5) existing intersections are included within the scope of the Traffic Impact Study (TIS) for the proposed Hilltop House Hotel development:

- |                                                               |                                            |
|---------------------------------------------------------------|--------------------------------------------|
| 1) US 340 with Shenandoah Street                              | <i>(TWSC "T" type intersection)</i>        |
| 2) US 340 with Union Street                                   | <i>(TWSC "T" type intersection)</i>        |
| 3) US 340 with Washington Street (US 340 Alt)/Shoreline Drive | <i>(Signalized Plus type intersection)</i> |
| 4) Washington Street with Union Street                        | <i>(TWSC Plus type intersection)</i>       |
| 5) Washington Street with Columbia Street                     | <i>(TWSC Plus type intersection)</i>       |

### **Site Trip Generation and Distribution**

The proposed Hilltop House Hotel development will include 129 rooms. The trip generation "Peak Hour of Generator" rates from the ITE Trip Generation Manual, 10<sup>th</sup> Edition, were utilized for Hotel (LUC 310).



The trip generation analysis indicates that a total of 1,078 new daily trips will be generated, including 70 new AM peak hour trips, 79 new PM peak hour trips, and 93 new Saturday peak hour trips.

The AM, PM, and Saturday peak hour site generated trips to/from the proposed site were distributed based upon interpolation from current traffic patterns with all trips entering the development via Columbia Street. The distribution of the new external trips is as follows:

- 60% to/from the north on US 340
- 40% to/from the south on US 340

### **2020 Existing Conditions Analysis**

The results of the 2020 existing conditions capacity analyses indicate that four traffic movements that currently operate worse than LOS D, which is considered the minimum tolerable level.

Traffic movements that are anticipated to operate worse than LOS D are as follows:

- *Eastbound Shenandoah Street Left-Turn Movement to US 340 LOS E during the weekday AM and PM peak hours*
- *Eastbound Union Street Left-Turn Movement to US 340 LOS F during the weekday AM and PM peak hours*
- *Northbound US 340 Left-Turn Movement to Washington Street LOS E during the weekday AM peak hour*
- *Southbound US 340 Left-Turn Movement to Shoreline Drive LOS F during the weekday AM, weekday PM, and Saturday peak hours*
- *Eastbound Washington Street Right-Turn Movement to US 340 LOS E during the PM peak hour*

### **2022 No-Build Conditions Analysis**

The 2022 No-Build Conditions include the existing 2020 traffic volume and the anticipated annual traffic growth prior to 2022.

The results of the 2022 No-Build Conditions capacity analyses indicate that the traffic movements that are anticipated to operate worse than LOS D during the Existing conditions are expected to continue to operate worse than LOS D.

Traffic movements that will continue to operate worse than LOS D by 2022 due to normal traffic growth are as follows:

- *Eastbound Shenandoah Street Left-Turn Movement to US 340 LOS E during the weekday AM and LOS F during the PM peak hour*
- *Eastbound Union Street Left-Turn Movement to US 340 LOS F during the weekday AM and PM peak hours and LOS E during the Saturday peak hour*
- *Northbound US 340 Left-Turn Movement to Washington Street LOS E during weekday AM and PM peak hours*
- *Southbound US 340 Left-Turn Movement to Shoreline Drive LOS F during the weekday AM, weekday PM, and Saturday peak hours*



- *Eastbound Washington Street Shared Left/Thru Lane to US 340 LOS E during the weekday AM peak hour*
- *Eastbound Washington Street Right-Turn Movement to US 340 LOS E during the weekday PM peak hour*

### **2022 Build Conditions Analysis**

The 2022 Build Conditions include the existing 2020 traffic volume, the anticipated annual traffic growth prior to 2022, and the traffic generated by the Hilltop House Hotel development.

The results of the 2022 Build Conditions capacity analyses indicate that most of the traffic movements that are anticipated to operate worse than LOS D during the No-Build conditions are expected to continue to operate worse than LOS D. Some of these movements have been improved due to optimized signal timings at the US 340 with Washington Street intersection.

Traffic movements that are anticipated to operate worse than LOS D during the Build conditions are as follows:

- *Eastbound Shenandoah Street Left-Turn Movement to US 340 LOS F during the weekday PM peak hour*
- *Eastbound Union Street Left-Turn Movement to US 340 LOS F during the weekday AM and PM peak hours and LOS E during the Saturday peak hour*
- *Northbound US 340 Left-Turn Movement to Washington Street LOS E during the weekday PM peak hour*
- *Southbound US 340 Left-Turn Movement to Shoreline Drive LOS F during the weekday AM peak hour and LOS E during the weekday PM peak hour*
- *Eastbound Washington Street Shared Left/Thru Lane to US 340 LOS E during the weekday AM peak hour*
- *Eastbound Washington Street Right-Turn Movement to US 340 LOS E during the PM peak hour*

### **Conclusions/Recommendations**

The results of the capacity analyses and the queueing analyses indicate that the trips generated by the proposed site can be accommodated within the existing transportation network.

Based on the findings of this study, no capacity improvements, auxiliary lanes, or intersection control modifications are recommended as a result of renovation to the Hilltop House Hotel development.

The study identified the following potential infrastructure improvements for further consideration by the WVDOH and the Town of Harpers Ferry:

#### **General**

- During the next roadway paving or construction project, upgrade the sidewalk ramps at the various intersections along Washington Street to meet current ADA and *Public Rights-of-Way Accessibility Guidelines* (PROWAG) guidance.



**Washington Street with Columbia Street**

- Adjust the installation of the existing STOP signs at the intersection. The STOP sign on the southbound Columbia Street approach should be raised to be 7 feet above the roadway per the MUTCD. It would be preferable to relocate the STOP sign on the northbound Columbia Street approach closer to the intersection with Washington Street.



## INTRODUCTION

This report summarizes the existing and future traffic analyses conducted in support of the proposed Hilltop House Hotel development. The proposed hotel renovation is to be located at the existing Hilltop House Hotel site on East Ridge Street, northeast of the intersection of Columbia Street with Washington Street in Harpers Ferry, Jefferson County. The proposed hotel includes 129 rooms and is expected to be completed by 2022.

The proposed hotel will be served by multiple existing municipal streets within the study area. It is assumed that primary access to the hotel will utilize Columbia Street via Washington Street to enter the property.

Traffic analysis will consider future conditions at the anticipated build-out year of 2022. This report summarizes the analyses of 2020 Existing conditions, 2022 No-Build conditions (without the proposed development in place), and 2022 Build conditions (with the proposed development in place) during the weekday AM, PM, and Saturday peak hours. The annual growth rate of 1.88% was previously obtained from WVDOH for US 340 near Harpers Ferry.

WVDOH has undertaken a Preliminary Investigation and Engineering Study of the US 340 corridor from Washington Street/Shoreline Drive to the MD 67 Interchange to identify potential operational improvements. This study is still in progress and has not been finalized. It is conceivable that some infrastructure capacity improvements may be implemented following the build year of 2022. In any case, the ongoing study delineates existing level of service issues that are known to be an issue in existing and future year conditions.

AMT (A. Morton Thomas and Associates, Inc.) was retained to determine the projected traffic impacts of the proposed hotel development in accordance with the guidelines set forth by the WVDOH (Division of Highways) in Traffic Engineering Directive (TED) 106-2. The intention of the study is to fully examine the impacts of the traffic generated by the hotel development on the existing transportation system and identify potential mitigation measures. This report presents trip generation, trip distribution, intersection capacity analysis, queuing analysis, auxiliary lane analysis, and recommendations for transportation improvements required to meet anticipated traffic demands.

AMT coordinated with WVDOH to determine the intersections to be studied within the scope of work, preliminary trip generation, distribution, and study methodology for this Traffic Impact Study (TIS).

## STUDY AREA DESCRIPTION

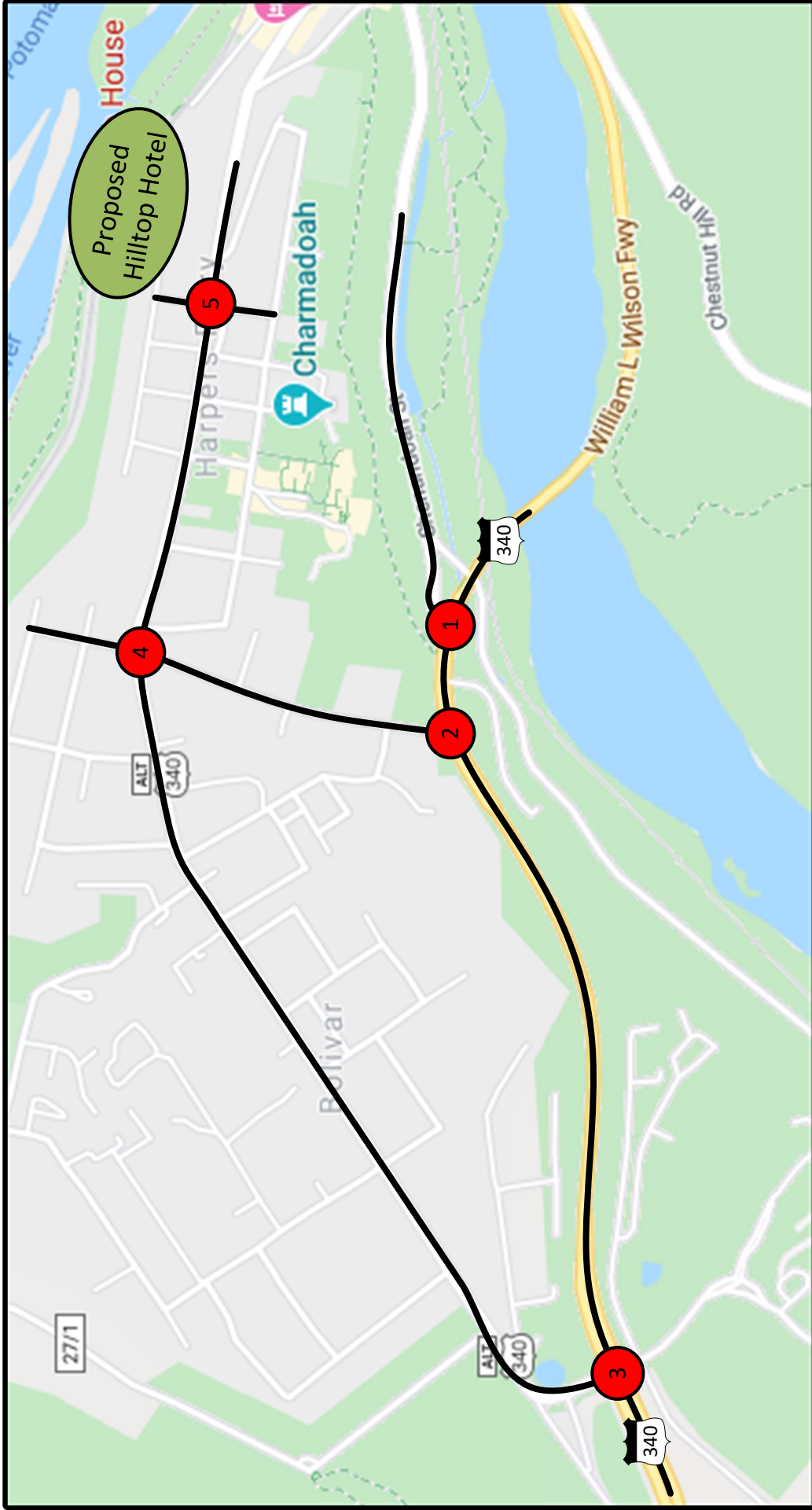
Based upon a review of the site plan and adjacent transportation network, the following five (5) existing intersections are included within the scope of the Traffic Impact Study (TIS) for the proposed Hilltop House Hotel development:



- |                                                               |                                            |
|---------------------------------------------------------------|--------------------------------------------|
| 1) US 340 with Shenandoah Street                              | <i>(TWSC "T" type intersection)</i>        |
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| 3) US 340 with Washington Street (US 340 Alt)/Shoreline Drive | <i>(Signalized Plus type intersection)</i> |
| 4) Washington Street with Union Street                        | <i>(TWSC Plus type intersection)</i>       |
| 5) Washington Street with Columbia Street                     | <i>(TWSC Plus type intersection)</i>       |

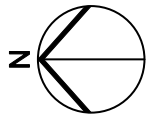




The study area and key intersections are shown on **Figure 1**; the proposed site plan is shown on **Figure 2**.



- LEGEND**
-  = Proposed Site
  -  = Existing Intersection



NOT TO SCALE

**Hilltop House Hotel TIS**

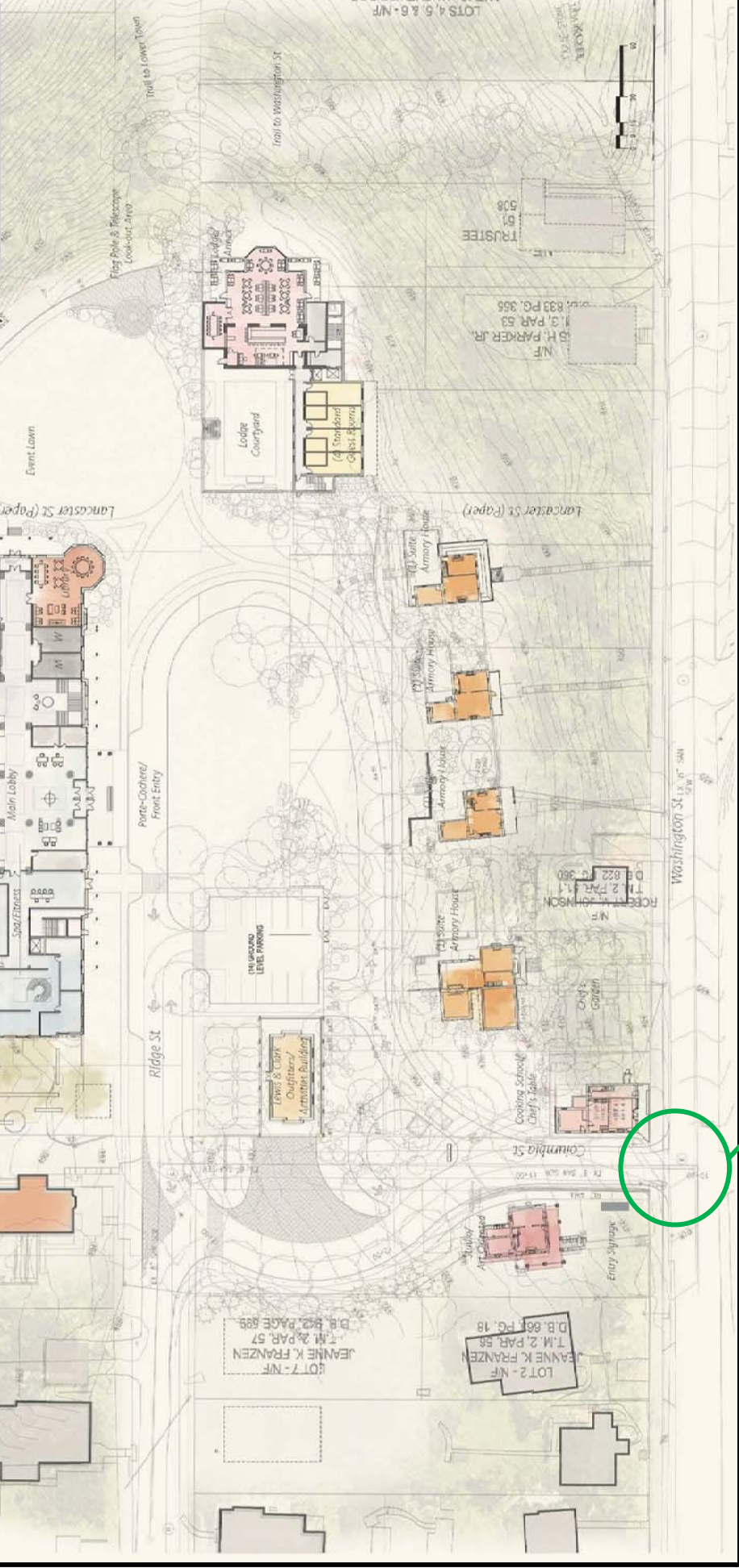
Site Location Map

DATE: September 2020

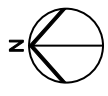
**FIGURE 1**

# Site/Ground Level Plan

Building	Level	# of Lodging Rooms
Main	Ground	0
	2	41
	3	35
	4	32
Annex	Ground	4
	2	6
Yellow House	Ground	1
	2	1
Armory Houses	Ground	5
	2	4
Total		129



Intersection #5 –  
Washington Street &  
Columbia Street (Full  
Access)



NOT  
TO  
SCALE

## Hilltop House Hotel TIS

Site Plan

DATE: September 2020

FIGURE 2





## **EXISTING ROADWAY CONDITIONS**

Below is a detailed description of the existing study area roadway network. All Average Annual Daily Traffic (AADT) information provided in this description was obtained from the WVDOH GIS website.

US 340 is a north-south urban arterial route within the project area. US 340 is designated as William L. Wilson Freeway in West Virginia within the project area. US 340 is a component of the National Highway System (NHS) and is a two-lane highway with 12-foot wide typical lanes and shoulders of varying width. Exclusive turn lanes are provided at all of the study intersections. The land use along US 340 is predominantly undeveloped forest land, with commercial developments prevalent west of the study area. Much of the property along US 340 is federal land part of the National Park Service. The Harpers Ferry National Historical Park is centered in the Town of Harper's Ferry and contains land and artifacts in West Virginia, Virginia, and Maryland. Many area and regional residents commute to destinations within the Washington DC metropolitan area with significant housing growth in the region. The Hagerstown Eastern Panhandle Metropolitan Planning Organization (HEPMPO) estimates that the region has experienced a 39% increase in residents who commute to work. In addition, tourism in the area from the National Park and the whitewater rafting contribute to traffic growth. The posted speed limit is 45 miles per hour (MPH) within the study area. The AADT volume was 23,651 vehicles per day (VPD) near the Washington Street signal, recorded in 2019.

Washington Street, also known as Alt US 340, is an east-west two-lane federal highway within the project area. Washington Street consists of 12-foot wide typical lanes and no shoulders. Washington Street is primarily an access road to multiple residential homes as well as providing access to the Bolivar Heights Battlefield which also attracts tourists daily. Washington Street also provides access to the Historical district of Harpers Ferry, which is where the Hilltop House Hotel is located. The posted speed limit is 25 mph within the study area. The AADT along Washington Street is 4,058 vpd north of the signalized intersection with US 340.

Shoreline Drive is an east-west two-lane municipal street that aligns with Washington Street at the signalized intersection with US 340. Shoreline Drive consists of 11-foot wide lanes and no shoulders. Shoreline Drive is access road to the Harpers Ferry National Historical Park that numerous tourists visit daily. The posted speed limit on Shoreline Drive is 25 mph. The AADT along Shoreline Drive is 330 vpd, based on TMC collected by AMT in 2019.

Union Street is an east-west two-lane municipal street that connects with US 340 within the project area. Union Street consists of two 11-foot wide lanes and no shoulders. Union Street provides access to many residential homes and connects with Washington Street to the north. The eastbound approach of Union Street is stop controlled while traffic is free flow on US 340. The posted speed limit on Union Street is 25 mph. The AADT along Union Street is 340 vpd, based on TMC collected by AMT in 2019.

Shenandoah Street is an east-west two-lane municipal street that connects with US 340 within the project area. Shenandoah Street consists of 10-foot wide lanes with no shoulders. Shenandoah Street provides access to the Historical district of Harpers Ferry. The eastbound approach of Shenandoah Street is stop controlled while traffic is free flow on US 340. The posted speed limit on Shenandoah Street is 25 mph. The AADT along Shenandoah Street is 240 vpd, based on TMC collected by AMT in 2019.





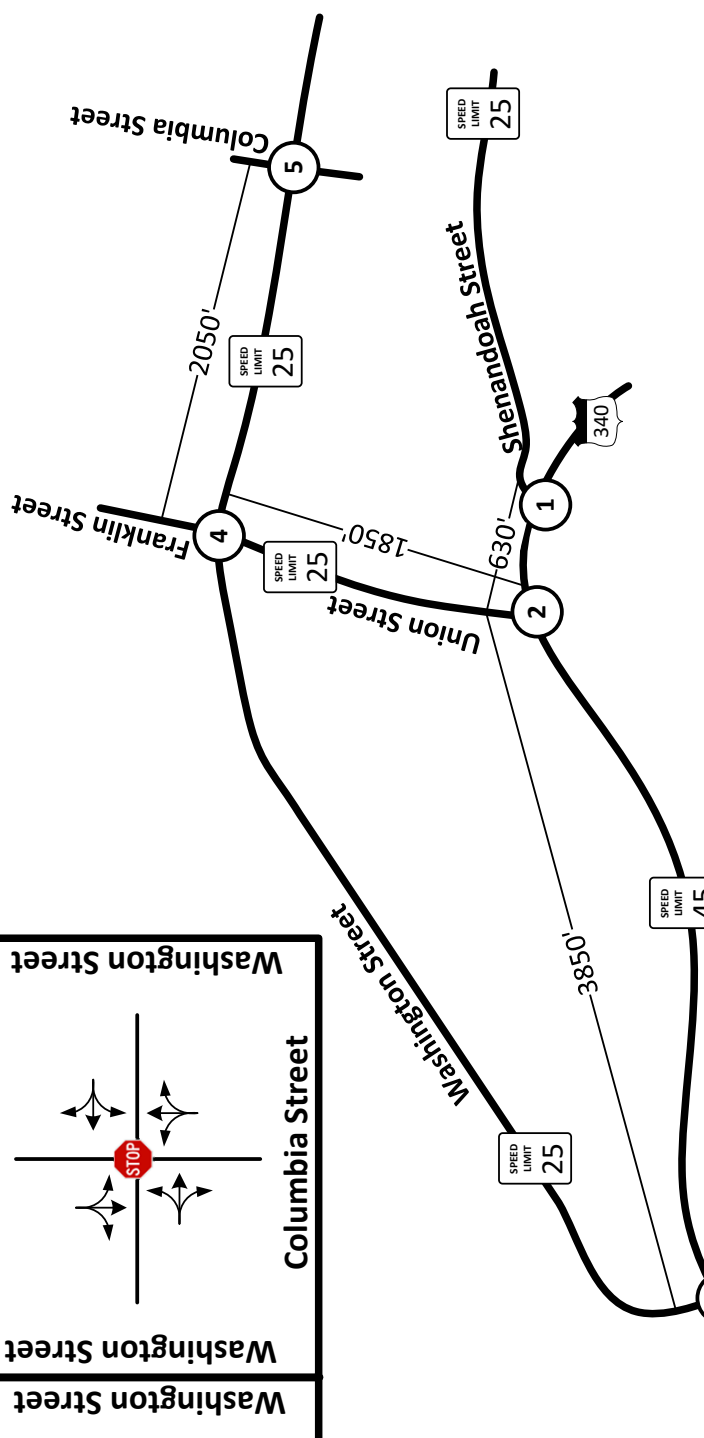
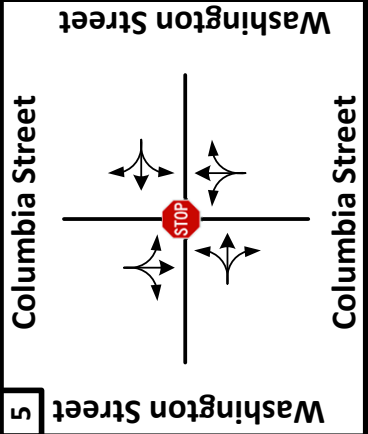
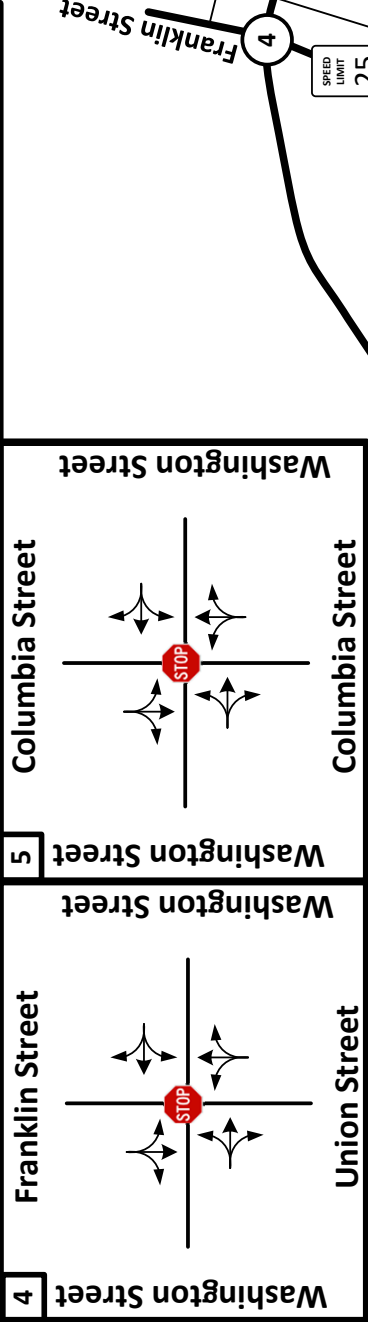
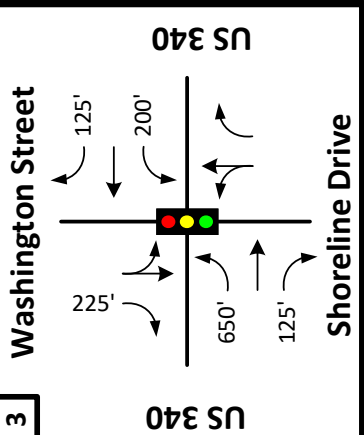
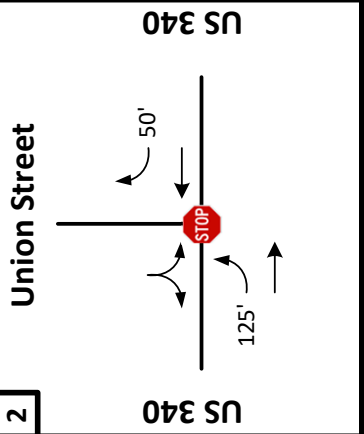
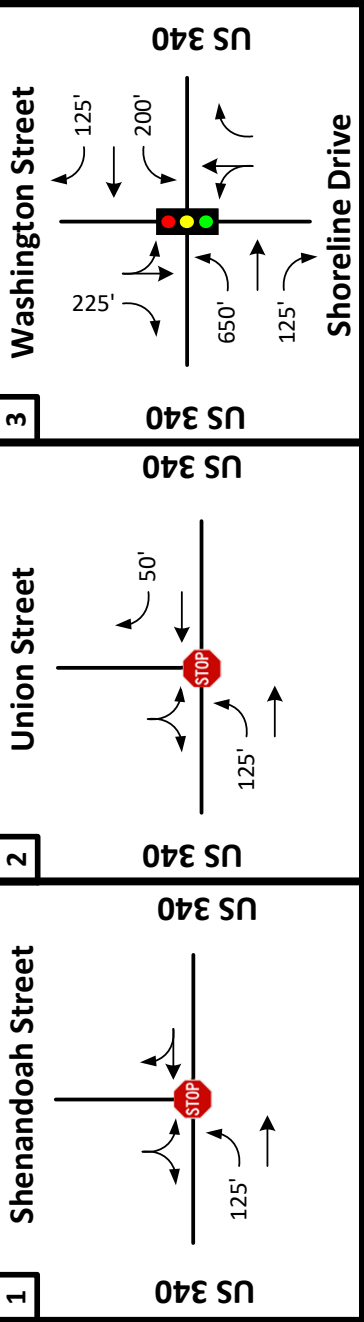
Columbia Street is a north-south two-lane municipal street that connects with Washington Street within the project area. Columbia Street consists of two 9-foot wide lanes and no shoulders. Columbia Street provides access to multiple residential properties, including the Hilltop House Hotel. The northbound and southbound approaches of Columbia Street is stop controlled while traffic is free flow on Washington Street. The posted speed limit on Columbia Street is 25 mph. The AADT along Columbia Street is 50 vpd, based on TMC collected by AMT in 2020.

**Table 1** below provides a detailed description of the existing study area roadway network. All Average Annual Daily Traffic (AADT) information provided in this description was obtained from the WVDOH GIS and GEOCOUNTS websites.

**Table 1: Roadway Facility Summary**

Name	Code	Classification	Area	Direction	Speed Limit (mph)	AADT	Year	Description
William L. Wilson Freeway	US 340	Federal Highway	Harpers Ferry	N-S	45	23,651	2019	US 340 is a N-S federal highway that runs parallel to the Shenandoah River connecting with WV 9 to the west and MD 67 to the east
Washington Street	US 340 Alt	Federal Highway	Harpers Ferry	E-W	25	4,058	2017	Washington Street is an E-W federal highway that begins at the intersection with US 340 and runs west through the town of Harpers Ferry until it connects with Shenandoah Street
Shoreline Drive	N/A	Municipal Street	Harpers Ferry	E-W	25	330	2019	Shoreline Drive is a primary access road to the Harpers Ferry National Historical Park and aligns with Washington Street
Union Street	N/A	Municipal Street	Harpers Ferry	E-W	25	340	2019	Union Street is a municipal street that begins at the intersection with US 340 and runs west until it connects with Washington Street
Shenandoah Street	N/A	Municipal Street	Harpers Ferry	E-W	25	240	2019	Shenandoah Street is a municipal street that begins at the intersection with US 340 and runs west until it connects with Washington Street. Shenandoah Street provides access to the Historical District of Harpers Ferry
Columbia Street	N/A	Municipal Street	Harpers Ferry	N-S	25	50	2020	Columbia Street is a municipal street that is the primary access road for the Hilltop Hotel and connects with Washington Street

The 2020 existing intersection lane configurations and intersection control are shown on **Figure 3**.



		<b>Hilltop House Hotel TIS</b>	
		2020 Existing Lane Configuration	
<b>LEGEND</b>		<b>DATE:</b> September 2020	
		<b>NOT TO SCALE</b>	
		<b>FIGURE 3</b>	



## TRIP GENERATION

This report summarizes the existing and future traffic analyses conducted in support of the proposed Hilltop House Hotel development. The proposed hotel renovation is to be located at the existing Hilltop House Hotel site on East Ridge Street, northeast of the Columbia Street with Washington Street intersection in Harpers Ferry, Jefferson County. The proposed Hilltop House Hotel development will include 129 rooms. The trip generation “Peak Hour of Generator” rates from the ITE Trip Generation Manual, 10<sup>th</sup> Edition, were utilized for Hotel (LUC 310).

As shown in **Table 2** below, the proposed hotel development will generate a total of 1,078 new daily trips will be generated, including 70 new AM peak hour trips, 79 new PM peak hour trips, and 93 new Saturday peak hour trips.

**Table 2: Trip Generation Summary**

Description	LUC	Density	Daily Trips	AM Peak			PM Peak			SAT Peak		
				Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
Hotel	310	129 Rooms	1,078	38	32	70	46	33	79	52	41	93
<b>Total</b>			<b>1,078</b>	<b>38</b>	<b>32</b>	<b>70</b>	<b>46</b>	<b>33</b>	<b>79</b>	<b>52</b>	<b>41</b>	<b>93</b>

## TRIP DISTRIBUTION

The AM, PM, and Saturday peak hour site generated trips to/from the proposed site were distributed based upon interpolation from current traffic patterns with all trips entering the development via Columbia Street. The distribution of the new external trips is as follows:

- 60% to/from the north on US 340
- 40% to/from the south on US 340

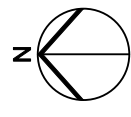
The external trip distribution percentages are shown in **Figure 4**, and the AM, PM, and Saturday peak hour new site trip assignments are shown on **Figure 5**.

# Hilltop House Hotel TIS

New Trip Distribution

DATE: September 2020

**FIGURE 4**

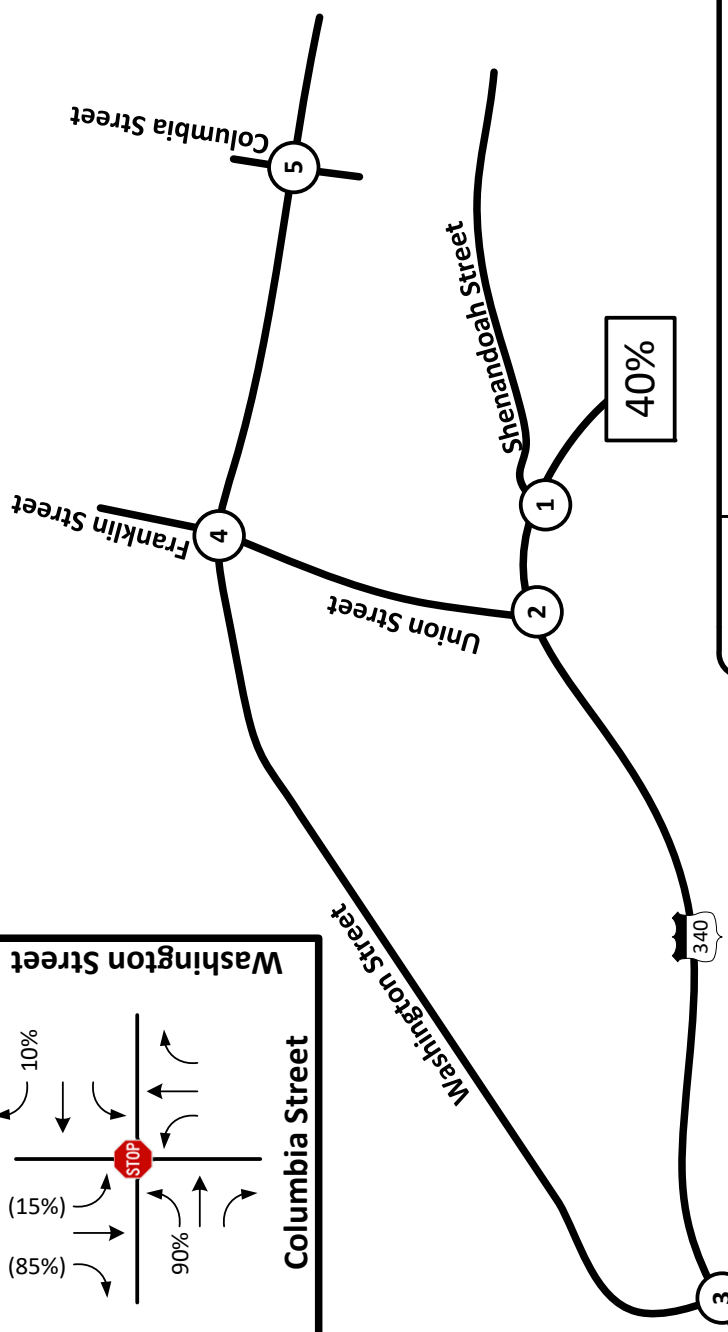
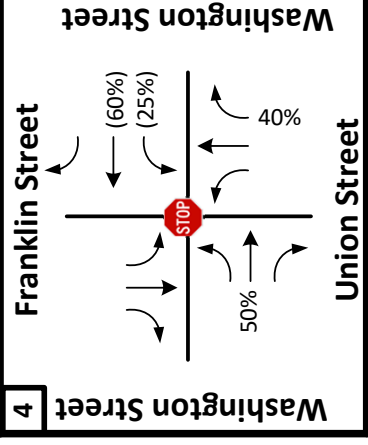
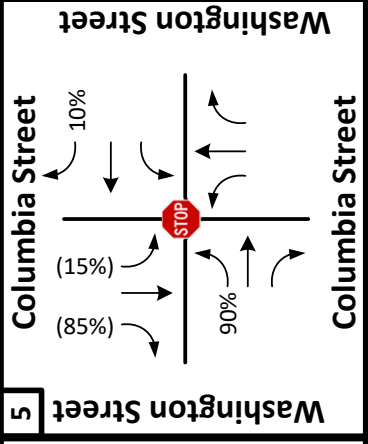
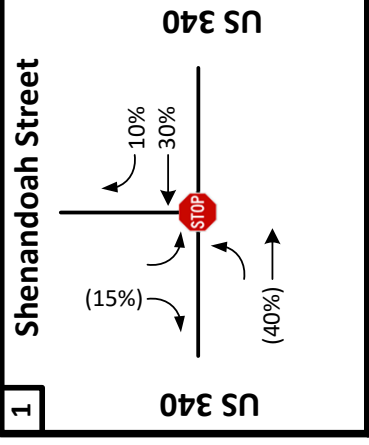
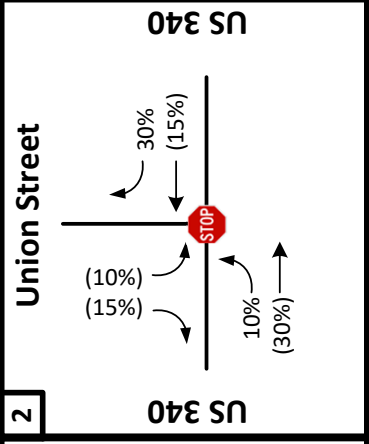
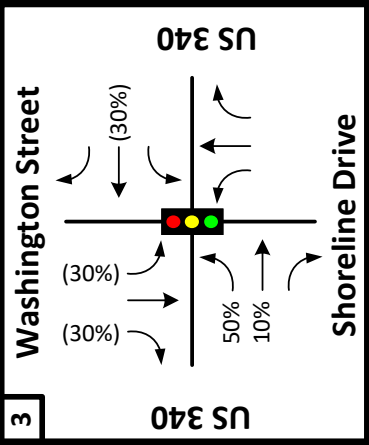


NOT TO SCALE



## LEGEND

- Existing Traffic Control
- Existing Roadway
- Existing Lane Configuration
- XX% Entering Trip Percentage
- (XX%) Exiting Trip Percentage



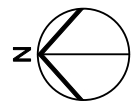


# Hilltop House Hotel TIS

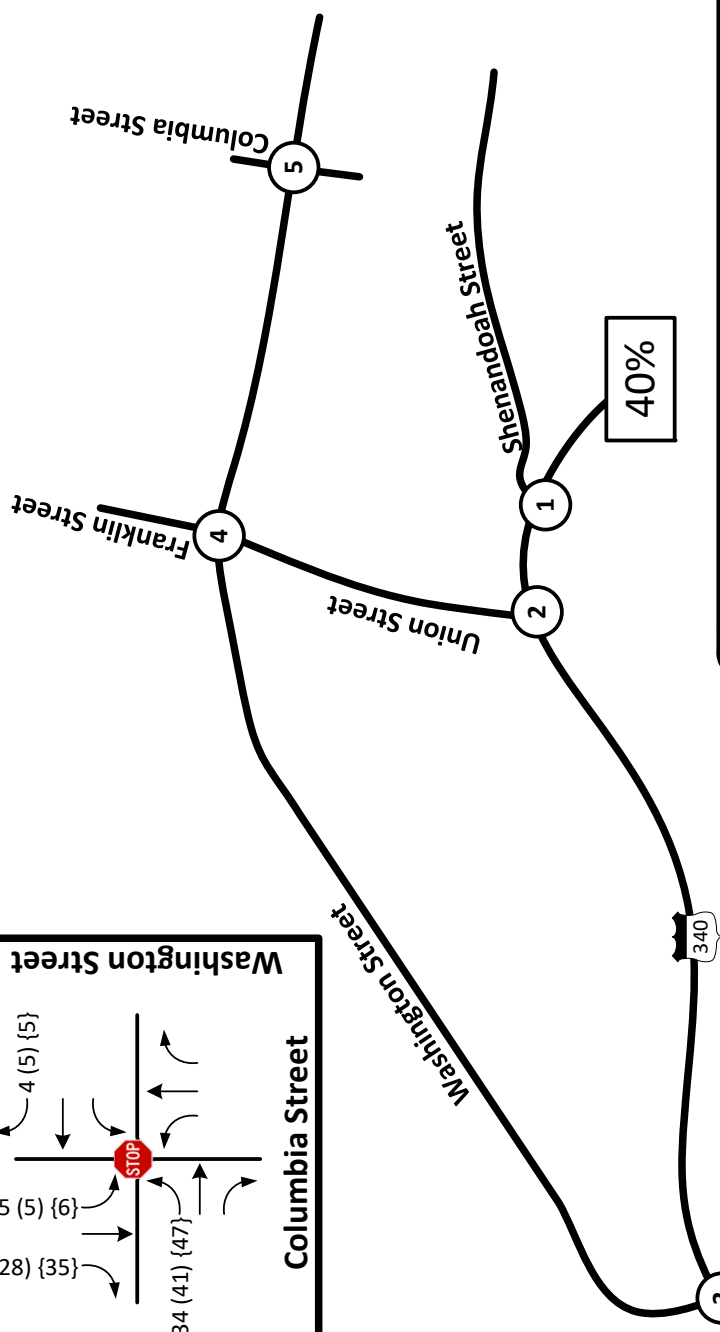
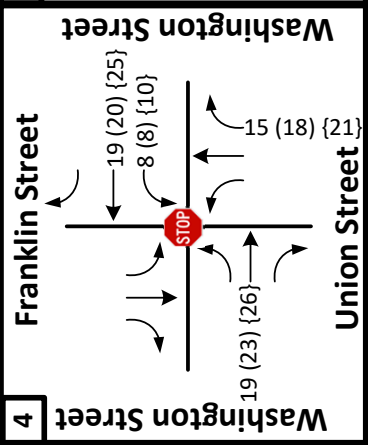
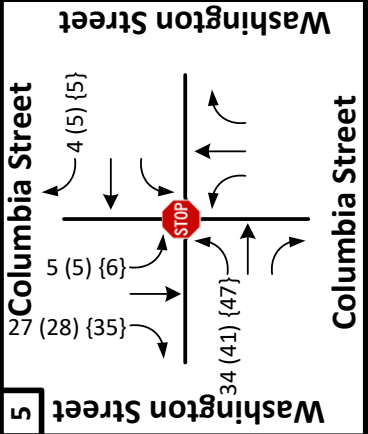
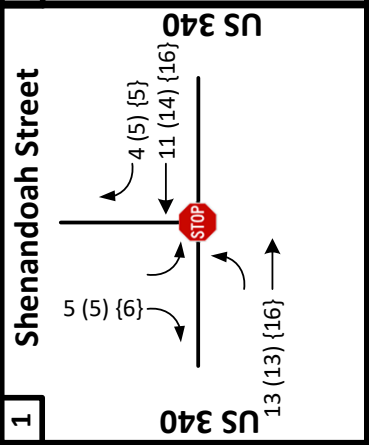
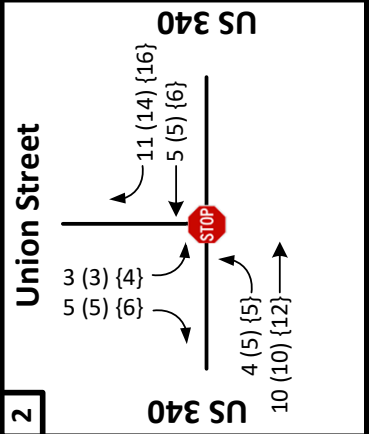
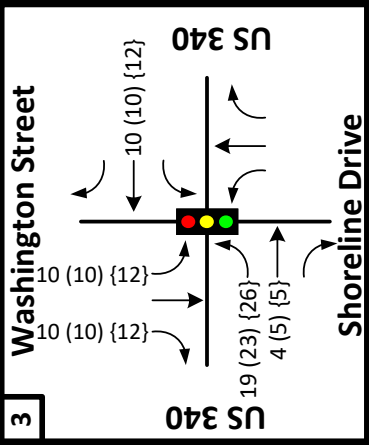
New Site Trip Assignments

DATE: September 2020

**FIGURE 5**



NOT TO SCALE



## LEGEND

- Existing Traffic Control
- Existing Roadway
- Existing Lane Configuration
- STOP
- XX AM Peak Hour Trips
- (XX) PM Peak Hour Trips
- {XX} SAT Peak Hour Trips

## PROJECT TRAFFIC VOLUMES

### 2020 Existing Conditions

Peak hour turning movement counts were collected at three of the five existing intersections within the study area by AMT on Wednesday February 27, 2019 between the hours of 6 AM and 7 PM and on Saturday March 2, 2019 between the hours of 11 AM and 2 PM. These three intersections are located along US 340. The remaining two existing intersections within the study area were collected by AMT on Friday August 28, 2020 between the hours of 7-9 AM and 3-6 PM and on Saturday August 29, 2020 between the hours of 11 AM and 2 PM. The traffic count data is located in **Appendix B** and the 2020 Existing Traffic Volumes for the weekday AM, PM, and Saturday peak period volumes are shown on **Figure 6**.

The annual growth rate provided by the WVDOH at a compound rate of 1.88% per year was utilized in order to generate 2020 traffic volumes from the 2019 traffic counts.

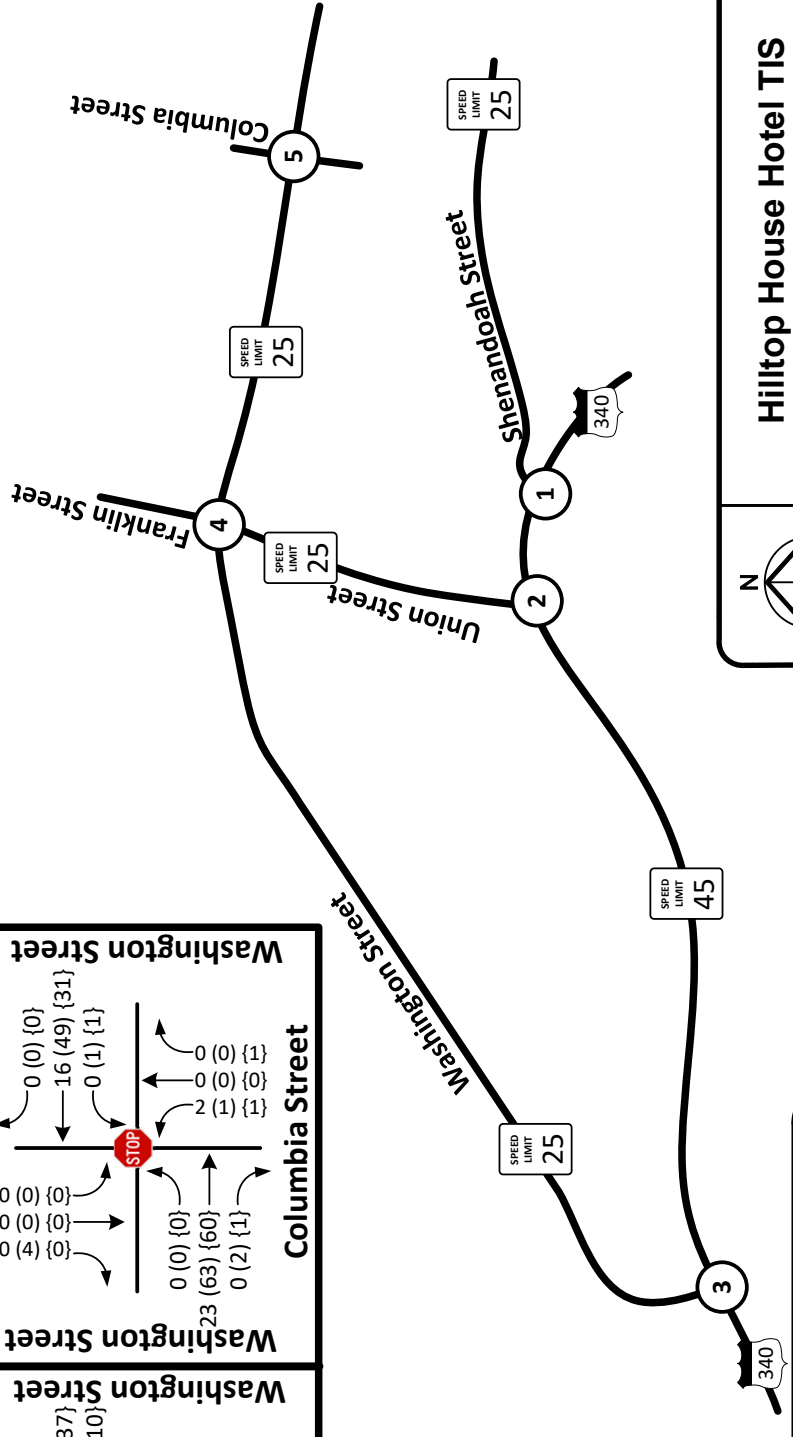
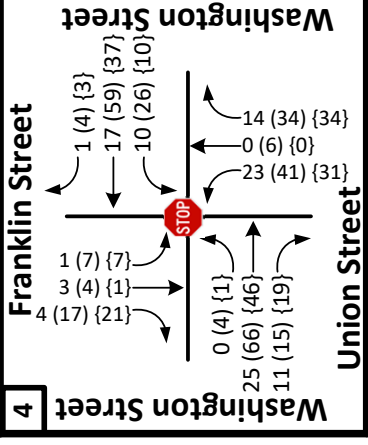
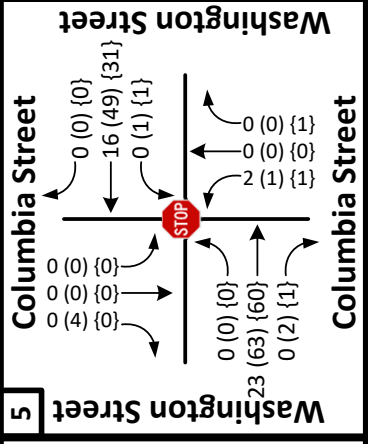
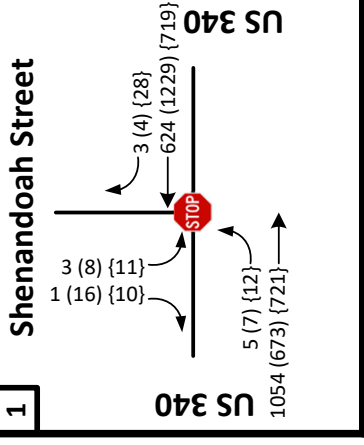
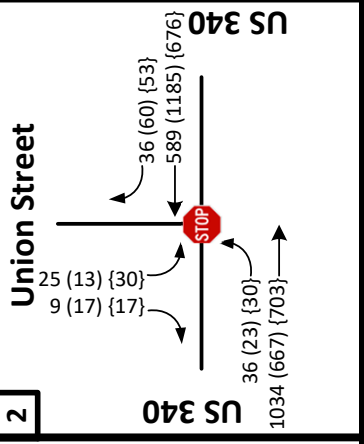
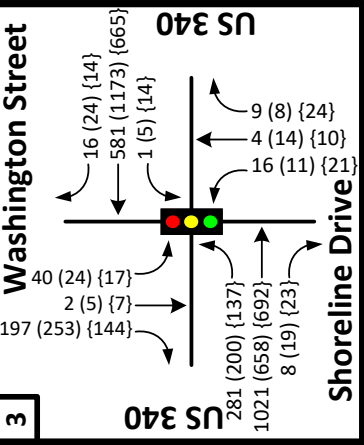
### 2022 No-Build Conditions

The proposed hotel development is expected to be fully built-out by the year 2022. The 2022 No-Build traffic volumes include the existing 2020 traffic volumes and the annual traffic growth prior to the year 2022. The growth rate provided by the WVDOH was applied to the existing peak hour traffic counts in order to analyze the study intersection operations in the year 2022 without the site in place. The 2022 No-Build Traffic Volumes for the weekday AM, PM, and Saturday peak period volumes are shown on **Figure 7**.

### 2022 Build Conditions

The 2022 Build Conditions include the existing 2020 traffic volume, the anticipated annual traffic growth prior to 2022, and the traffic generated by the Hilltop House Hotel development. Site generated traffic was distributed into the transportation network based upon existing traffic patterns and anticipated origin and destination of the new site trips (see **Figure 4** and **Figure 5**). The weekday AM, PM, and Saturday peak hour 2022 Build Conditions Traffic Volumes are shown on **Figure 8**.

The peak hour traffic forecast calculations are also included in **Appendix B**.



**LEGEND**

- Existing Traffic Control
- Existing Traffic Control
- Existing Roadway
- Existing Lane Configuration
- XX AM Peak Hour Volume
- (XX) PM Peak Hour Volume
- {XX} SAT Peak Hour Volume

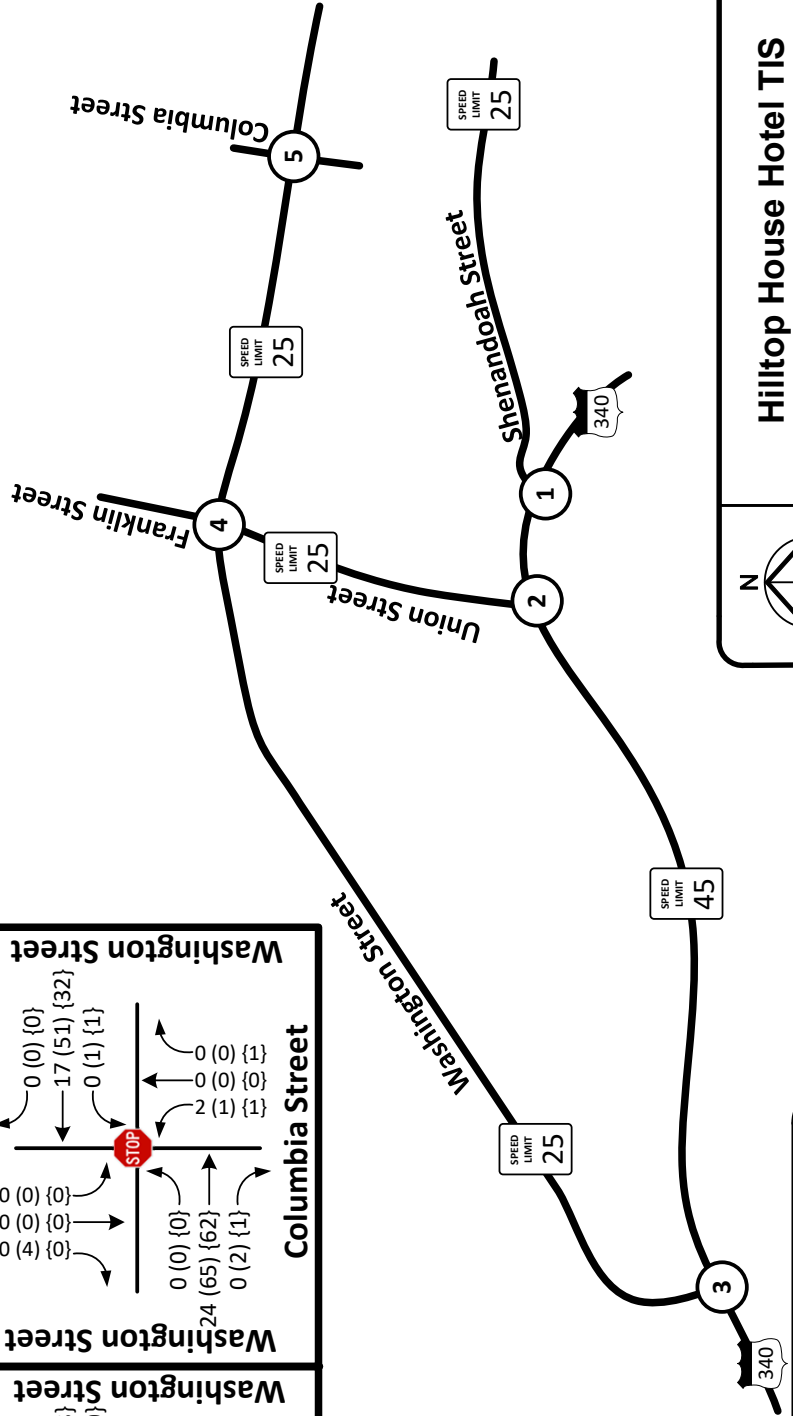
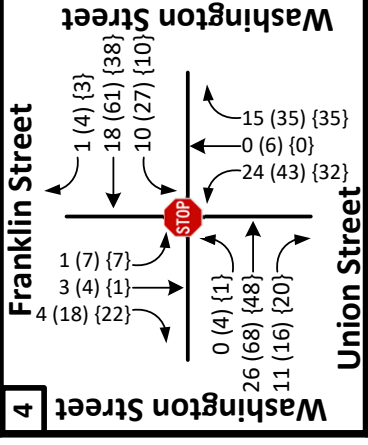
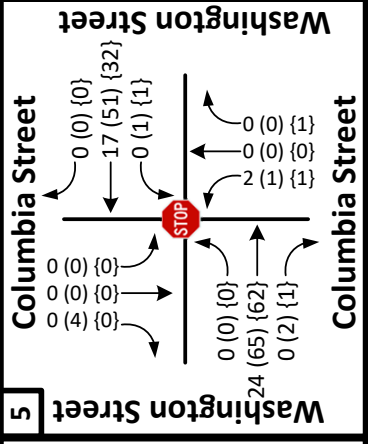
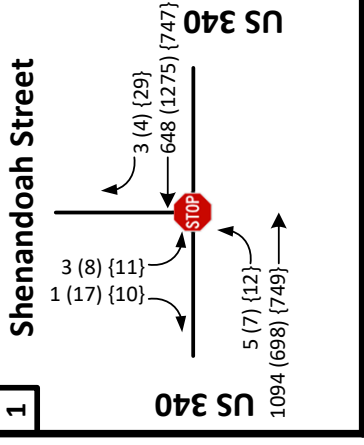
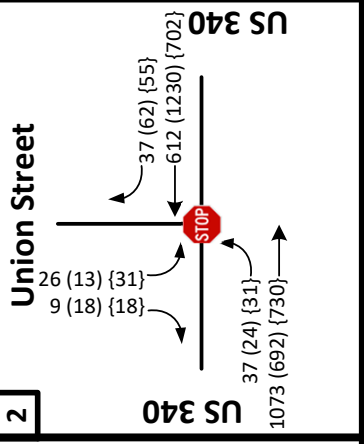
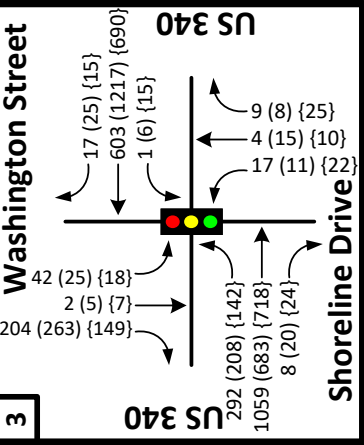
**Hilltop House Hotel TIS**

2020 Existing Traffic Volumes

DATE: September 2020

NOT TO SCALE

**FIGURE 6**



**LEGEND**

- Existing Traffic Control
- Existing Traffic Control
- Existing Roadway
- Existing Lane Configuration
- XX AM Peak Hour Volume
- (XX) PM Peak Hour Volume
- {XX} SAT Peak Hour Volume

**Hilltop House Hotel TIS**

2022 No-Build Traffic Volumes

DATE: September 2020

NOT TO SCALE

**FIGURE 7**

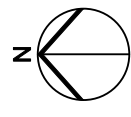


# Hilltop House Hotel TIS

2022 Build Traffic Volumes

DATE: September 2020

**FIGURE 8**

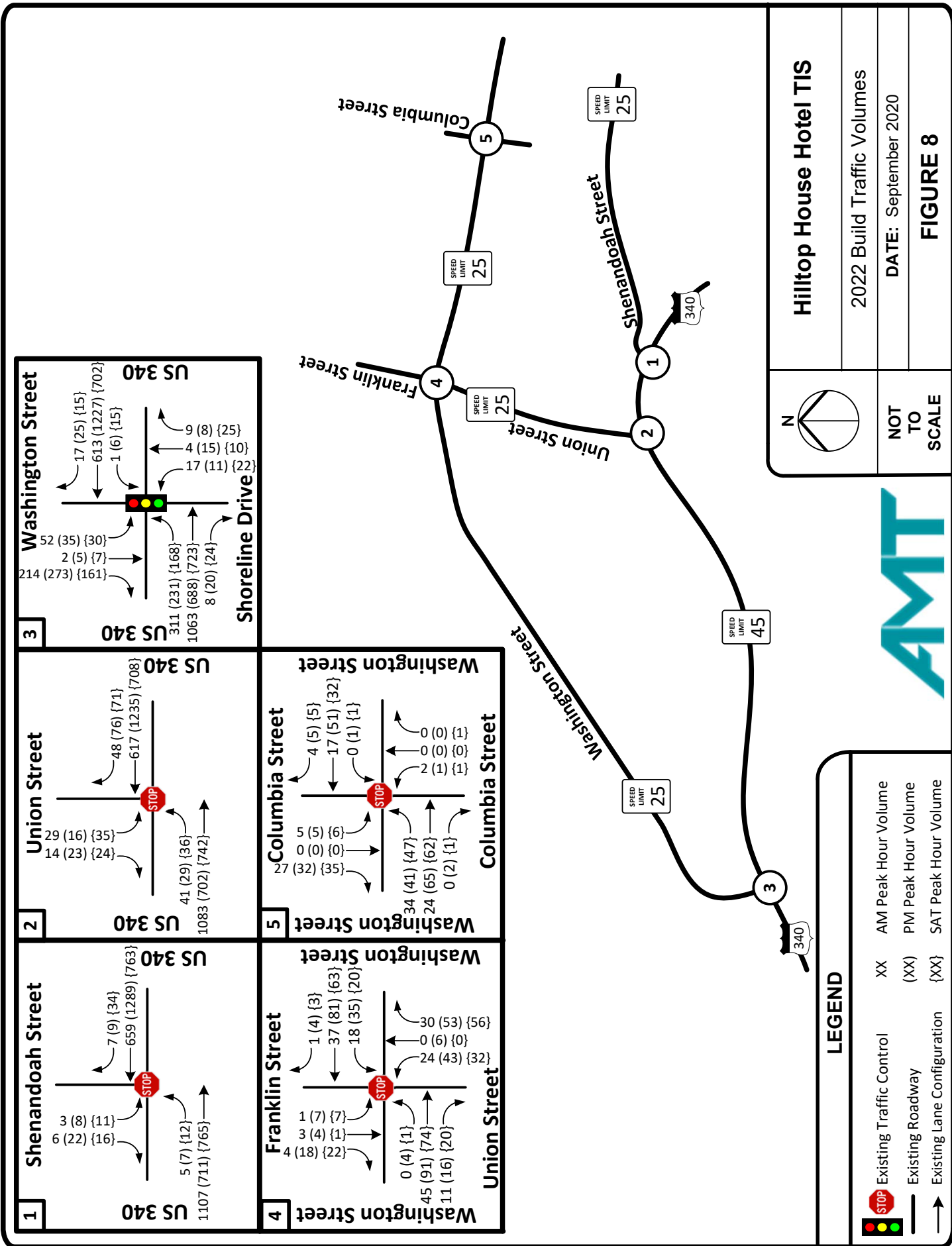


NOT TO SCALE



## LEGEND

- Existing Traffic Control
- Existing Roadway
- Existing Lane Configuration
- XX AM Peak Hour Volume
- (XX) PM Peak Hour Volume
- {XX} SAT Peak Hour Volume



**3**

Washington Street

US 340

Shoreline Drive

US 340

214 (273) {161}

2 (5) {7}

52 (35) {30}

17 (25) {15}

613 (1227) {702}

1 (6) {15}

17 (11) {22}

4 (15) {10}

9 (8) {25}

311 (231) {168}

1063 (688) {723}

8 (20) {24}

**2**

Union Street

US 340

US 340

14 (23) {24}

29 (16) {35}

48 (76) {71}

617 (1235) {708}

41 (29) {36}

1083 (702) {742}

**1**

Shenandoah Street

US 340

US 340

6 (22) {16}

3 (8) {11}

7 (9) {34}

659 (1289) {763}

5 (7) {12}

1107 (711) {765}

**5**

Washington Street

US 340

US 340

27 (32) {35}

5 (5) {6}

0 (0) {0}

0 (0) {0}

4 (5) {5}

17 (51) {32}

0 (1) {1}

34 (41) {47}

24 (65) {62}

0 (2) {1}

0 (0) {0}

0 (0) {0}

2 (1) {1}

**4**

Washington Street

US 340

US 340

4 (18) {22}

1 (7) {7}

3 (4) {1}

1 (4) {3}

37 (81) {63}

18 (35) {20}

0 (4) {1}

45 (91) {74}

11 (16) {20}

30 (53) {56}

0 (6) {0}

24 (43) {32}

## CAPACITY ANALYSIS

The Highway Capacity Manual defines capacity as the maximum suitable flow rate at which vehicles reasonably can be expected to traverse a point during a specified time period. Capacity uses the measure of efficiency, Level-of-Service (LOS), to describe the traffic performance at intersections. LOS is defined for the overall intersection delay for signalized intersections. An acceptable LOS for a signalized intersection is considered to be LOS D or better (i.e. A, B, C or D).

At unsignalized intersections, the LOS is defined by the control delay for the movement that must yield right-of-way. It may be typical for stop-controlled minor streets to experience long delays during peak periods, while the majority of the traffic flows through the intersection on the major street travel unimpeded.

The procedures outlined in the Highway Capacity Manual, 6<sup>th</sup> Edition were used as guidelines for the analysis of the study area intersections. This manual provides procedures for the analysis of both signalized and unsignalized intersections. LOS categories range from LOS "A" (best) to "F" (worst) as shown in **Table 3**.

**Table 3: Level of Service Criteria**

Level of Service	SIGNALIZED Intersection Control Delay (sec/veh)	UNSIGNALIZED Intersection Control Delay (sec/veh)	Intersection LOS Description
A	≤ 10.0	≤ 10.0	Free flow, insignificant delays.
B	10.1-20.0	10.1-15.0	Stable operation, minimal delays.
C	20.1-35.0	15.1-25.0	Stable operation, acceptable delays.
D	35.1-55.0	25.1-35.0	Restricted flow, common delays.
E	55.1-80.0	35.1-50.0	Maximum capacity, extended delays. Volumes at or near capacity. Long queues form upstream from intersection.
F	> 80.0	> 50.0	Forced flow, excessive delays. Represents jammed conditions. Intersection operates below capacity with low volumes. Queues may block upstream intersections.

The LOS analysis was completed through the use of Synchro, version 10.0. The software package categorizes the LOS based on HCM methodology and criteria. According to industry standards, any signalized intersection or any approach of an unsignalized intersection is considered acceptable if the average delay is at LOS D or better with LOS A representing little or no delay. Any signalized intersection or approach with a LOS of E or F is considered substandard and may need solutions to improve the operational performance. The copies of the Synchro analyses outputs for each analysis year/scenario are shown in **Appendix C**.

## 2020 Existing Conditions Analysis

The capacity analysis indicates the eastbound Shenandoah Street approach to US 340 currently operates at LOS E during both weekday peak hours and LOS D during the Saturday peak hour under stop control. The northbound US 340 left-turn movement to Shenandoah Street currently operates at LOS A during the AM peak hour, LOS B during the PM peak hour, and LOS A during the Saturday peak hour while the through movement operates as free flow traveling unimpeded through the intersection. The southbound US 340 approach to Shenandoah Street currently operates as free flow traveling unimpeded through the intersection.

Capacity analysis indicates the eastbound Union Street approach to US 340 currently operates at LOS F during both weekday peak hours and LOS D during the Saturday peak hour under stop control. The northbound US 340 left-turn movement to Union Street currently operates at LOS A during the AM peak hour, LOS B during the PM peak hour, and LOS A during the Saturday peak hour while the through movement operates as free flow traveling unimpeded through the intersection. The southbound US 340 approach to Union Street currently operates as free flow traveling unimpeded through the intersection.

Capacity analysis indicates the eastbound Washington Street approach to US 340 currently operates at LOS C during the AM peak hour, LOS E during the PM peak hour, and LOS C during the Saturday peak hour under signal control. The westbound Shoreline Drive approach to US 340 currently operates at LOS C during both weekday peak hours and LOS B during the Saturday peak hour under signal control. The northbound US 340 approach to Washington Street/Shoreline Drive currently operates at LOS C during both weekday peak hours and LOS B during the Saturday peak hour under signal control. The southbound US 340 approach to Washington Street/Shoreline Drive currently operates at LOS C during both weekday peak hours and LOS B during the Saturday peak hour under signal control. The overall signalized intersection currently operates at LOS C during both weekday peak hours and LOS B during the Saturday peak hour.

Capacity analysis indicates the eastbound Washington Street approach to Union Street/Franklin Street currently operates at LOS A during all peak hours analyzed. The westbound Washington Street approach to Union Street/Franklin Street currently operates at LOS A during all peak hours analyzed. The northbound Union Street approach to Washington Street currently operates at LOS A during the AM peak hour, LOS B during the PM peak hour, and LOS A during the Saturday midday peak hour under stop control. The southbound Franklin Street approach to Washington Street currently operates at LOS A during all peak hours analyzed under stop control.

Capacity analysis indicates the eastbound Washington Street approach to Columbia Street currently operates at LOS A during all peak hours analyzed. The westbound Washington Street approach to Columbia Street currently operates at LOS A during all peak hours analyzed. The northbound Columbia Street approach to Washington Street currently operates at LOS A during all peak hours analyzed under stop control. The southbound Columbia Street approach to Washington Street currently operates at LOS A during all peak hours analyzed under stop control.

**Figure 9** shows the LOS during the weekday AM, PM, and Saturday peak hours for the 2020 Existing Conditions for each lane group movement at each study intersection.





## 2022 No-Build Conditions Analysis

The 2022 No-Build Conditions include the existing 2020 traffic volume and the anticipated annual traffic growth to 2022.

The capacity analysis indicates the eastbound Shenandoah Street approach to US 340 is expected to operate at LOS E during the AM peak hour, LOS F during the PM peak hour, and LOS D during the Saturday peak hour under stop control. The northbound US 340 left-turn movement to Shenandoah Street will continue to operate at LOS A during the AM peak hour, LOS B during the PM peak hour, and LOS A during the Saturday peak hour while the through movement operates as free flow traveling unimpeded through the intersection. The southbound US 340 approach to Shenandoah Street will continue to operate as free flow traveling unimpeded through the intersection.

Capacity analysis indicates the eastbound Union Street approach to US 340 is expected to operate at LOS F during both weekday peak hours and LOS E during the Saturday peak hour under stop control. The northbound US 340 left-turn movement to Union Street will continue to operate at LOS A during the AM peak hour, LOS B during the PM peak hour, and LOS A during the Saturday peak hour while the through movement operates as free flow traveling unimpeded through the intersection. The southbound US 340 approach to Union Street will continue to operate as free flow traveling unimpeded through the intersection.

Capacity analysis indicates the eastbound Washington Street approach to US 340 is expected to operate at LOS C during the AM peak hour, LOS E during the PM peak hour, and LOS C during the Saturday peak hour under signal control. The westbound Shoreline Drive approach to US 340 is expected to operate at LOS D during both weekday peak hours and LOS B during the Saturday peak hour under signal control. The northbound US 340 approach to Washington Street/Shoreline Drive will continue to operate at LOS C during both weekday peak hours and LOS B during the Saturday peak hour under signal control. The southbound US 340 approach to Washington Street/Shoreline Drive will continue to operate at LOS C during both weekday peak hours and LOS B during the Saturday peak hour under signal control. The overall signalized intersection will continue to operate at LOS C during both weekday peak hours and LOS B during the Saturday peak hour.

Capacity analysis indicates the eastbound Washington Street approach to Union Street/Franklin Street will continue to operate at LOS A during all peak hours analyzed. The westbound Washington Street approach to Union Street/Franklin Street will continue to operate at LOS A during all peak hours analyzed. The northbound Union Street approach to Washington Street will continue to operate at LOS A during the AM peak hour, LOS B during the PM peak hour, and LOS A during the Saturday midday peak hour under stop control. The southbound Franklin Street approach to Washington Street will continue to operate at LOS A during all peak hours analyzed under stop control.

Capacity analysis indicates the eastbound Washington Street approach to Columbia Street will continue to operate at LOS A during all peak hours analyzed. The westbound Washington Street approach to Columbia Street will continue to operate at LOS A during all peak hours analyzed. The northbound Columbia Street approach to Washington Street will continue to operate at LOS A during all peak hours analyzed under stop control. The southbound Columbia Street approach to Washington Street will continue to operate at LOS A during all peak hours analyzed under stop control.



**Figure 10** shows the LOS during the weekday AM, PM, and Saturday peak hours for the 2022 No-Build Conditions for each lane group movement at each study intersection.

## 2022 Build Conditions Analysis

The 2022 Build Conditions include the existing 2020 traffic volume, the anticipated annual traffic growth prior to 2022, and the traffic generated by the Hilltop House Hotel development.

Improvements included in the 2022 Full Build Conditions consist of modifications to signal timings at the US 340 with Washington Street intersection. This was done to provide the most efficient cycle length and split timings to minimize existing delay issues.

The capacity analysis indicates the eastbound Shenandoah Street approach to US 340 is expected to operate at LOS D during the AM peak hour, LOS F during the PM peak hour, and LOS D during the Saturday peak hour under stop control. The northbound US 340 left-turn movement to Shenandoah Street will continue to operate at LOS A during the AM peak hour, LOS B during the PM peak hour, and LOS A during the Saturday peak hour while the through movement operates as free flow traveling unimpeded through the intersection. The southbound US 340 approach to Shenandoah Street will continue to operate as free flow traveling unimpeded through the intersection.

Capacity analysis indicates the eastbound Union Street approach to US 340 will continue to operate at LOS F during both weekday peak hours and LOS E during the Saturday peak hour under stop control. The northbound US 340 left-turn movement to Union Street will continue to operate at LOS A during the AM peak hour, LOS B during the PM peak hour, and LOS A during the Saturday peak hour while the through movement operates as free flow traveling unimpeded through the intersection. The southbound US 340 approach to Union Street will continue to operate as free flow traveling unimpeded through the intersection.

Capacity analysis indicates the eastbound Washington Street approach to US 340 will continue to operate at LOS C during the AM peak hour, LOS E during the PM peak hour, and LOS C during the Saturday peak hour under signal control. The westbound Shoreline Drive approach to US 340 is expected to operate at LOS C during both weekday peak hours and LOS B during the Saturday peak hour under signal control. The northbound US 340 approach to Washington Street/Shoreline Drive will continue to operate at LOS C during both weekday peak hours and LOS B during the Saturday peak hour under signal control. The southbound US 340 approach to Washington Street/Shoreline Drive is expected to operate at LOS C during the AM peak hour, LOS D during the PM peak hour, and LOS B during the Saturday peak hour under signal control. The overall signalized intersection is expected to operate at LOS C during the AM peak hour, LOS D during the PM peak hour, and LOS B during the Saturday peak hour.

Capacity analysis indicates the eastbound Washington Street approach to Union Street/Franklin Street will continue to operate at LOS A during all peak hours analyzed. The westbound Washington Street approach to Union Street/Franklin Street will continue to operate at LOS A during all peak hours analyzed. The northbound Union Street approach to Washington Street will continue to operate at LOS A during the AM peak hour, LOS B during the PM peak hour, and LOS A during the Saturday midday peak hour under stop control. The southbound Franklin Street approach to Washington Street will continue to operate at LOS A during all peak hours analyzed under stop control.



Capacity analysis indicates the eastbound Washington Street approach to Columbia Street will continue to operate at LOS A during all peak hours analyzed. The westbound Washington Street approach to Columbia Street will continue to operate at LOS A during all peak hours analyzed. The northbound Columbia Street approach to Washington Street is expected to operate at LOS A during the AM peak hour, LOS B during the PM peak hour, and LOS A during the Saturday midday peak hour under stop control. The southbound Columbia Street approach to Washington Street will continue to operate at LOS A during all peak hours analyzed under stop control.

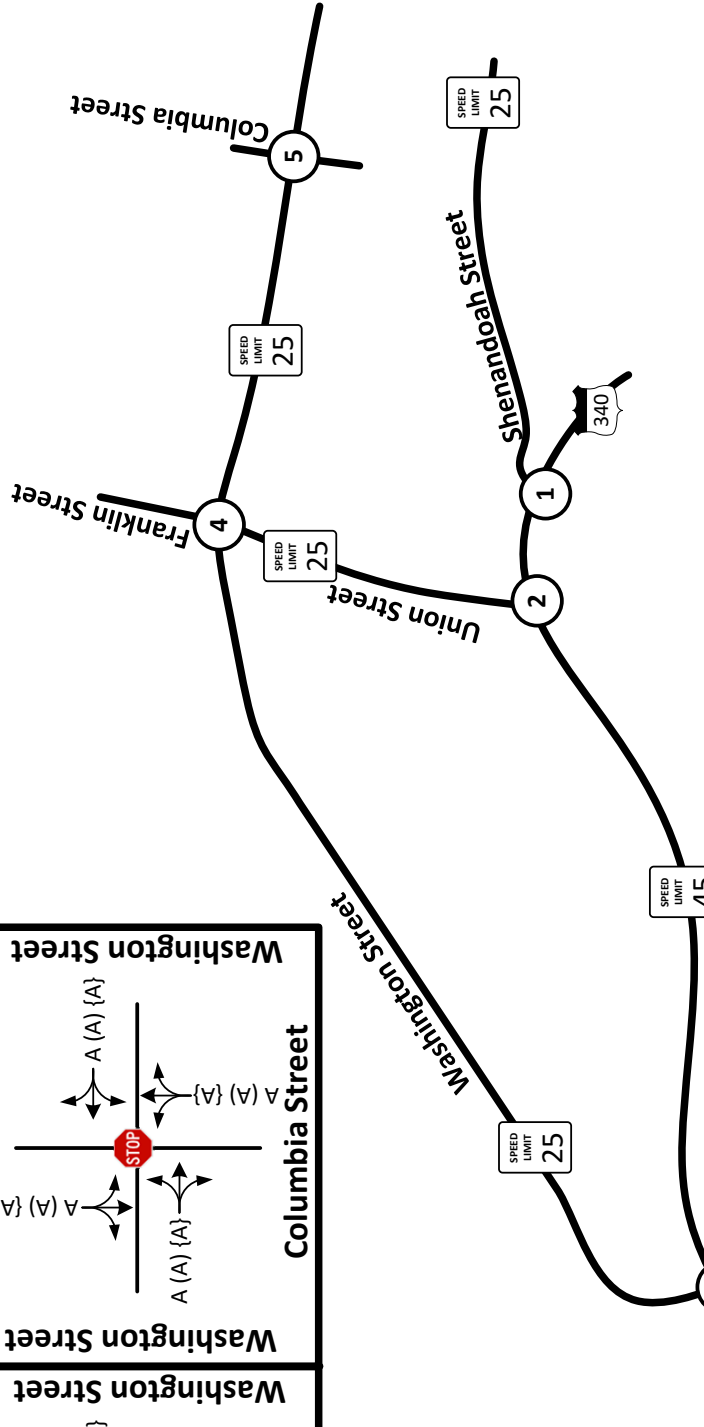
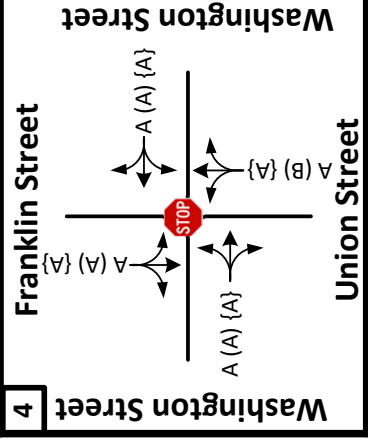
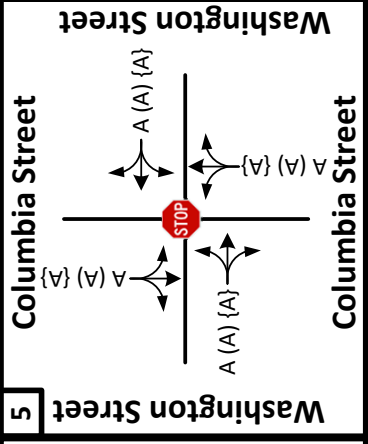
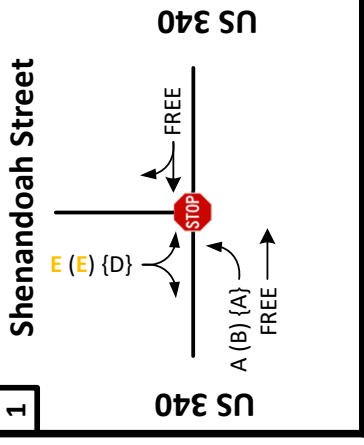
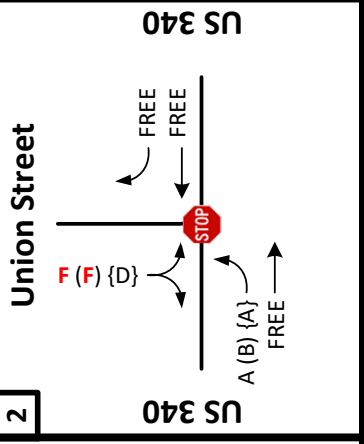
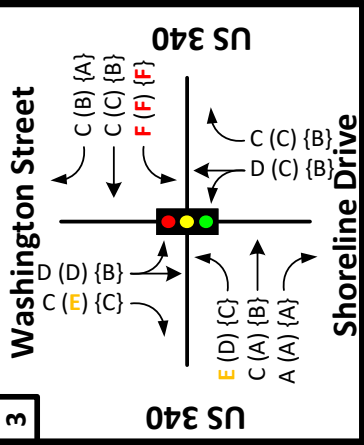
**Figure 11** shows the LOS during the weekday AM, PM, and Saturday peak hours for the 2022 Build Conditions for each lane group movement at each study intersection.

**Table 4** on the following pages show the LOS results for the intersections within the study area during the weekday AM, PM, and Saturday peak hours for the 2020 Existing Conditions, 2022 No-Build Conditions, and 2022 Build Conditions.



Table 4: Level of Service Analysis Summary

Intersection	Movement	2020 Existing Conditions						2022 No Build Conditions						2022 Build Conditions					
		AM Peak		PM Peak		SAT Peak		AM Peak		PM Peak		SAT Peak		AM Peak		PM Peak		SAT Peak	
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Intersection 1 - US 340 at Shenandoah Street	NB LT	A	9.0	B	11.9	A	9.4	A	9.1	B	12.2	A	9.5	A	9.1	B	12.4	A	9.6
	NB Thru	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE
	NB Approach	A	0.0	A	0.1	A	0.2	A	0.0	A	0.1	A	0.1	A	0.0	A	0.1	A	0.1
	SB Thru/RT	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE
	SB Approach	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0
	EB LT/RT	E	41.1	E	45.9	D	26.9	E	44.7	F	50.5	D	28.8	D	28.5	F	51.7	D	27.5
	EB Approach	E	41.1	E	45.9	D	26.9	E	44.7	F	50.5	D	28.8	D	28.5	F	51.7	D	27.5
	Overall	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Existing Three legged unsignalized intersection with stop control on Shenandoah Street																			
Intersection 2 - US 340 at Union Street	NB LT	A	9.0	B	12.3	A	9.4	A	9.1	B	12.7	A	9.5	A	9.2	B	12.9	A	9.6
	NB Thru	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE
	NB Approach	A	0.3	A	0.4	A	0.4	A	0.3	A	0.4	A	0.4	A	0.3	A	0.4	A	0.4
	SB Thru	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE
	SB RT	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A	FREE
	SB Approach	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0
	EB LT/RT	F	52.8	F	58.0	D	33.6	F	61.5	F	66.8	E	37.1	F	64.9	F	78.6	E	40.5
	EB Approach	F	52.8	F	58.0	D	33.6	F	61.5	F	66.8	E	37.1	F	64.9	F	78.6	E	40.5
Overall	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Existing Three legged unsignalized intersection with stop control on Union Street																			
Intersection 3 - US 340 at Shoreline Drive/Washington Street	NB LT	E	58.0	D	54.8	C	25.3	E	62.3	E	63.6	C	25.7	D	43.1	E	74.2	C	28.1
	NB Thru	C	20.8	A	9.9	B	10.0	C	21.5	B	10.4	C	24.4	B	10.3	B	11.3	B	12.4
	NB RT	A	9.5	A	7.0	A	6.6	A	9.2	A	7.2	A	6.6	A	8.5	A	7.8	A	7.8
	NB Approach	C	28.8	C	20.1	B	12.4	C	30.2	C	22.5	B	12.6	C	28.5	C	26.7	B	15.2
	SB LT	F	183.7	F	**	F	120.7	F	194.4	F	**	F	115.6	F	133.1	E	67.7	C	34.0
	SB Thru	C	25.8	C	23.4	B	12.6	C	26.2	C	26.2	B	12.9	C	26.4	D	39.4	B	15.6
	SB RT	C	20.1	B	13.3	A	9.3	C	20.2	B	14.1	A	9.4	B	19.3	B	14.4	B	11.1
	SB Approach	C	25.9	C	24.0	B	14.7	C	26.3	C	26.8	B	15.0	C	26.4	D	39.1	B	15.9
	WB LT/Thru	D	36.8	C	32.6	B	16.5	D	39.7	D	35.8	B	17.0	C	34.1	C	31.9	B	18.3
	WB RT	C	24.0	C	31.4	B	16.6	C	25.4	C	33.9	B	17.1	C	24.1	C	29.1	B	17.9
	WB Approach	C	32.8	C	32.3	B	16.6	D	35.4	D	35.3	B	17.1	C	31.1	C	31.2	B	18.1
	EB LT/Thru	D	53.6	D	40.0	B	16.4	E	60.1	D	45.9	B	16.9	E	56.3	D	48.7	C	20.6
	EB RT	C	29.5	E	57.8	C	21.9	C	32.0	E	67.3	C	22.6	D	35.1	E	76.1	C	23.5
	EB Approach	C	33.7	E	55.9	C	21.1	D	37.0	E	65.2	C	21.8	D	39.4	E	72.6	C	23.0
Overall	C	28.6	C	26.5	B	14.2	C	29.9	C	29.8	B	14.5	C	29.2	D	38.5	B	16.3	
Existing Four legged Signalized intersection																			
Intersection 4 - Washington Street at Union Street/Franklin Street	EB Left/Thru/Right	A	0.0	A	0.3	A	0.1	A	0.0	A	0.3	A	0.1	A	0.0	A	0.3	A	0.1
	EB Approach	A	0.0	A	0.3	A	0.1	A	0.0	A	0.3	A	0.1	A	0.0	A	0.3	A	0.1
	WB Left/Thru/Right	A	2.6	A	2.2	A	1.5	A	2.5	A	2.2	A	1.4	A	2.4	A	2.2	A	1.7
	WB Approach	A	2.6	A	2.2	A	1.5	A	2.5	A	2.2	A	1.4	A	2.4	A	2.2	A	1.7
	NB Left/Thru/Right	A	9.1	B	10.4	A	9.4	A	9.1	B	10.5	A	9.4	A	9.2	B	10.6	A	9.7
	NB Approach	A	9.1	B	10.4	A	9.4	A	9.1	B	10.5	A	9.4	A	9.2	B	10.6	A	9.7
	SB Left/Thru/Right	A	9.0	A	9.6	A	8.9	A	9.0	A	9.6	A	9.0	A	9.2	A	9.8	A	9.3
	SB Approach	A	9.0	A	9.6	A	8.9	A	9.0	A	9.6	A	9.0	A	9.2	A	9.8	A	9.3
Overall	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Existing Four legged unsignalized intersection with stop control on Union Street/Franklin Street																			
Intersection 5 - Washington Street at Columbia Street	EB Left/Thru/Right	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	4.3	A	2.8	A	3.1
	EB Approach	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	4.3	A	2.8	A	3.1
	WB Left/Thru/Right	A	0.0	A	0.1	A	0.2	A	0.0	A	0.1	A	0.2	A	0.0	A	0.1	A	0.2
	WB Approach	A	0.0	A	0.1	A	0.2	A	0.0	A	0.1	A	0.2	A	0.0	A	0.1	A	0.2
	NB Left/Thru/Right	A	8.9	A	9.3	A	8.9	A	8.9	A	9.4	A	8.9	A	9.5	B	10.4	A	9.5
	NB Approach	A	8.9	A	9.3	A	8.9	A	8.9	A	9.4	A	8.9	A	9.5	B	10.4	A	9.5
	SB Left/Thru/Right	A	0.0	A	8.6	A	0.0	A	0.0	A	8.6	A	0.0	A	8.7	A	8.9	A	8.9
	SB Approach	A	0.0	A	8.6	A	0.0	A	0.0	A	8.6	A	0.0	A	8.7	A	8.9	A	8.9
Overall	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Existing Four legged unsignalized intersection with stop control on Columbia Street																			



**Hilltop House Hotel TIS**

2020 Existing Level of Service

DATE: September 2020

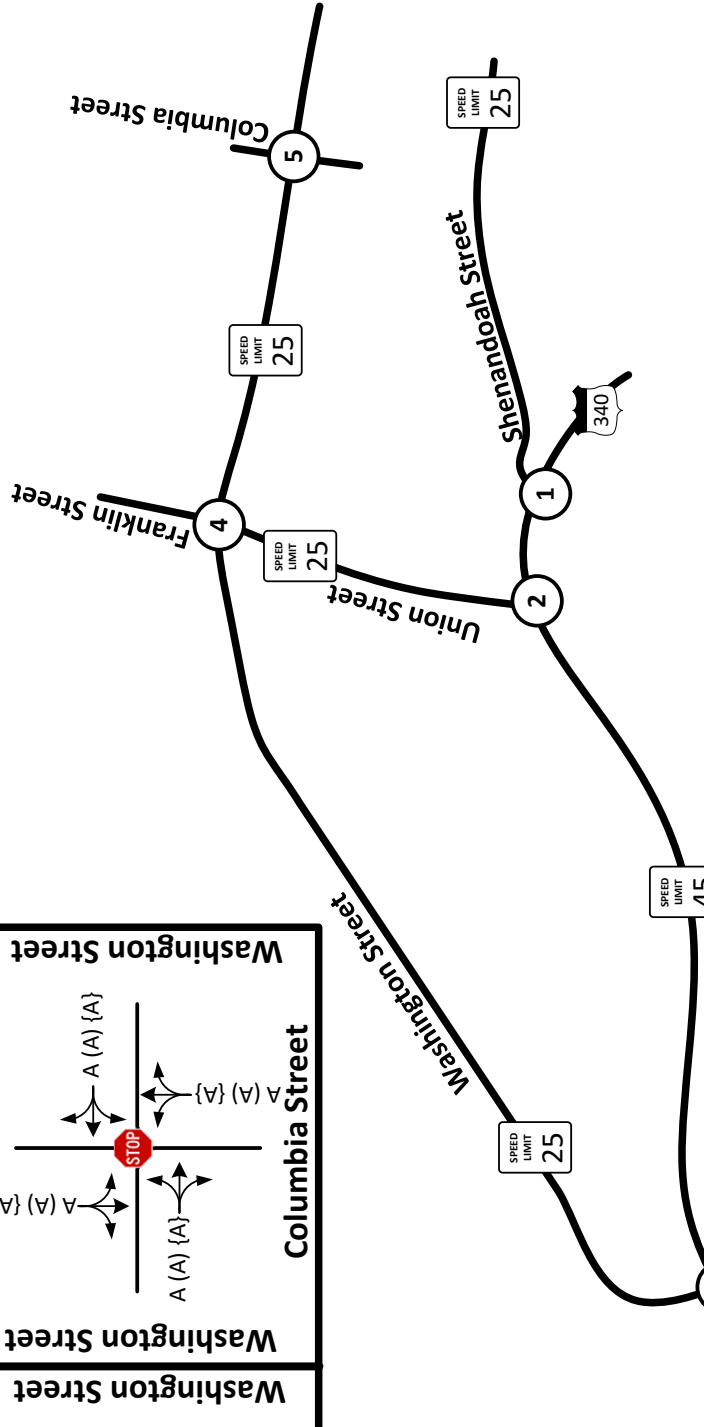
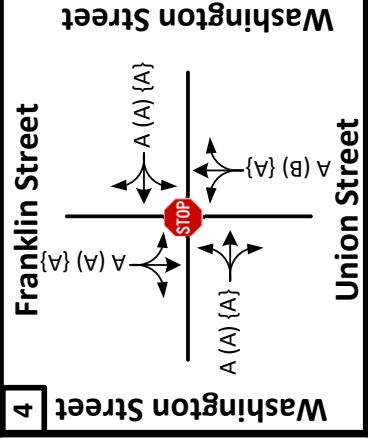
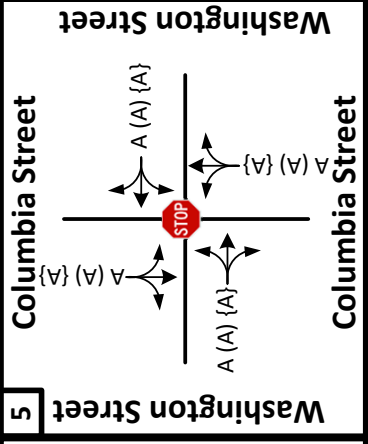
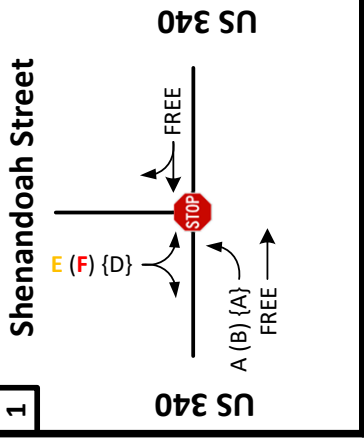
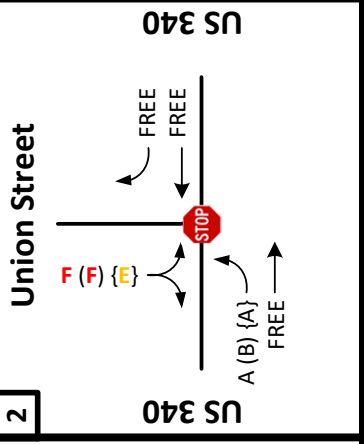
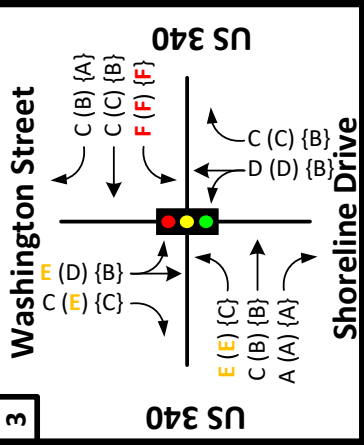
**FIGURE 9**

NOT TO SCALE

**AMT**

**LEGEND**

- Existing Traffic Control
- Existing Roadway
- Existing Lane Configuration
- AM Level of Service
- PM Level of Service
- {A} symbol"/> SAT Level of Service



**Hilltop House Hotel TIS**

2022 No-Build Level of Service

DATE: September 2020

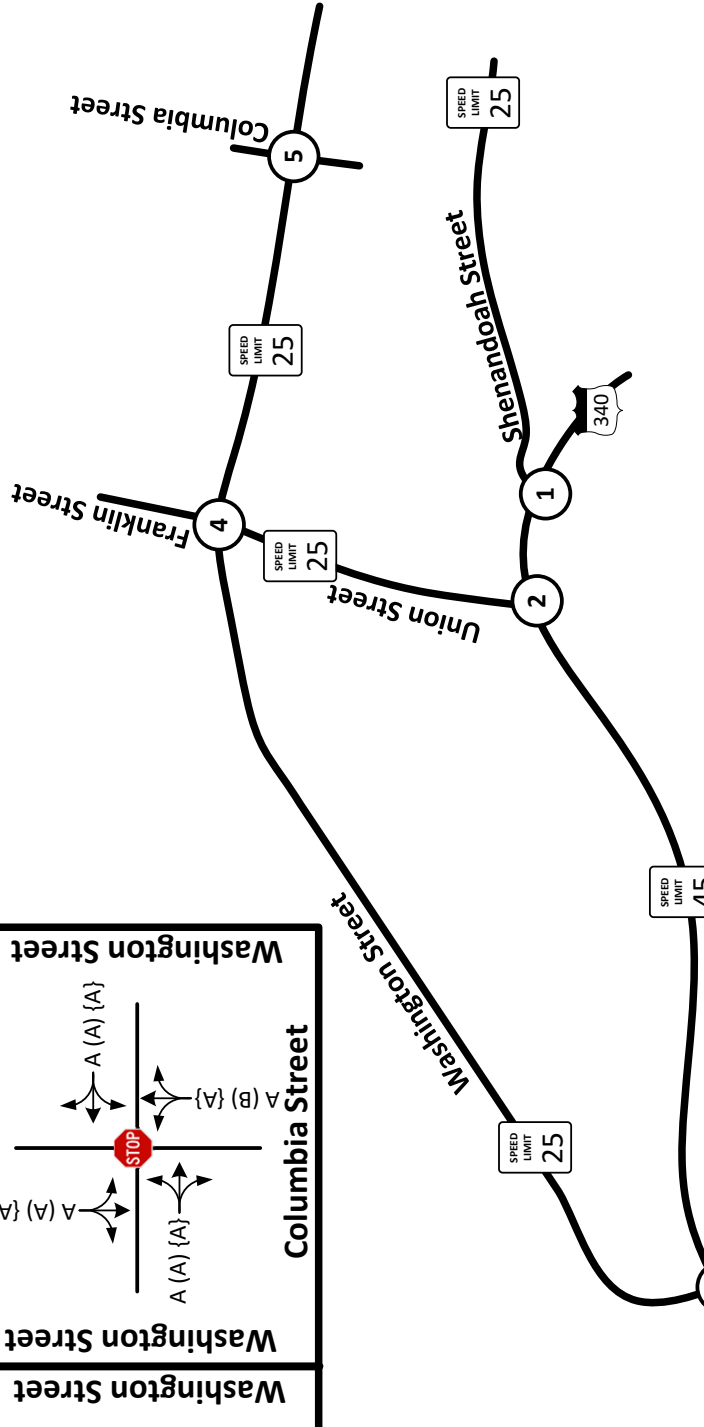
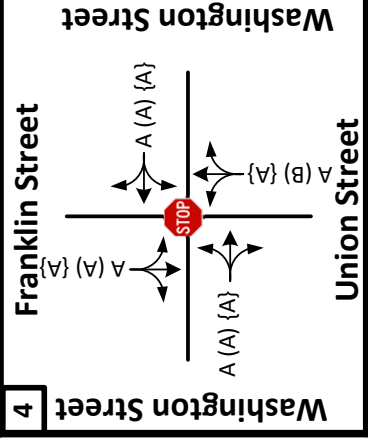
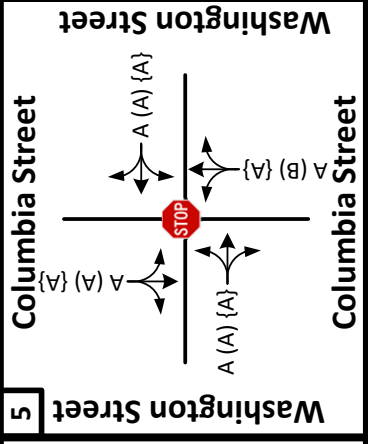
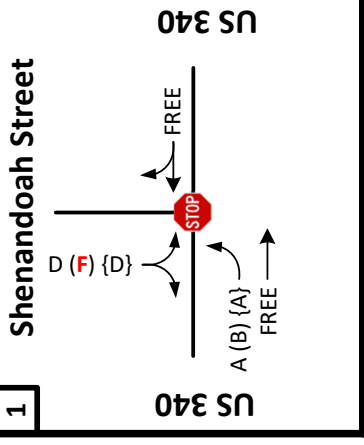
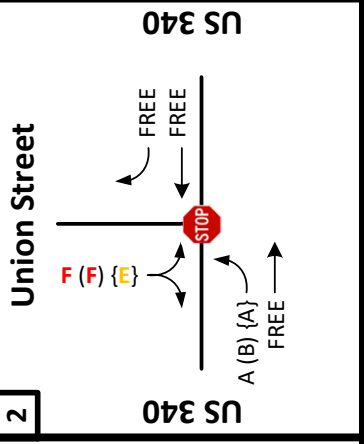
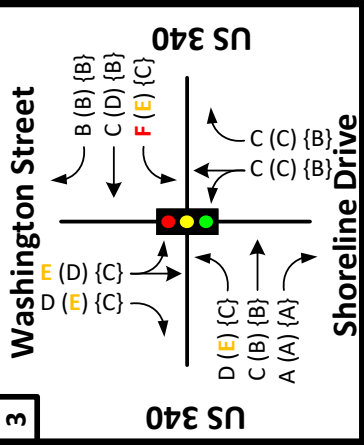
**FIGURE 10**

NOT TO SCALE

**AMT**

**LEGEND**

- Existing Traffic Control
- Existing Roadway
- Existing Lane Configuration
- AM Level of Service
- PM Level of Service
- {A} symbol"/> SAT Level of Service



N

NOT TO SCALE

<b>Hilltop House Hotel TIS</b>	
2022 Build Level of Service	
DATE: September 2020	
<b>FIGURE 11</b>	



**LEGEND**

- Existing Traffic Control
- Existing Roadway
- Existing Lane Configuration
- AM Level of Service
- PM Level of Service
- {A} symbol"/> SAT Level of Service

## QUEUING ANALYSIS

### 2020 Existing Conditions Analysis

Queuing analysis was performed for all study intersections during the weekday AM, PM, and Saturday peak hours using the SimTraffic micro-simulation model, which is a simulation complement to the Synchro traffic analysis models utilized for the capacity analysis. The queuing calculations produced by SimTraffic are acknowledged within the industry to be a realistic replication of actual conditions. Each simulation model was seeded for 10 minutes and recorded for 60 minutes. The simulation was run five times and then averaged to estimate the 95<sup>th</sup> percentile queuing for all scenarios.

The queuing analysis indicates that there are no existing turning movements that currently exceed storage length during any peak hour analyzed.

### 2022 No-Build Conditions Analysis

The queuing analysis indicates that some conditions described in the 2020 Existing Conditions are expected to continue with similar queues with the increase in traffic due to regional growth in the study area. Analysis indicates that there will continue to be no movements that are expected to exceed storage length.

### 2022 Build Conditions Analysis

The queuing analysis indicates that all conditions described in the 2022 No-Build Conditions are expected to continue with similar queues with the increase in traffic due to the completion of the Hilltop House Hotel development. Analysis indicates that there will continue to be no movements that are expected to exceed storage length.

**Table 5** below presents the 95% queuing results for the study intersections within the study area during the weekday AM, PM, and Saturday peak hours for the 2020 Existing Conditions, 2022 No-Build Conditions, and 2022 Build Conditions. **Figure 12** shows the 2020 Existing Conditions Queuing Analysis for the weekday AM, PM, and Saturday peak periods; **Figure 13** shows the 2022 No-Build Queuing Analysis for the weekday AM, PM, and Saturday peak periods; and **Figure 14** shows the 2022 Build Queuing Analysis for the weekday AM, PM, and Saturday peak periods. Copies of the SimTraffic analyses outputs are included in **Appendix D**.



Table 5: Queueing Analysis Summary

Intersection	Movement	Existing Storage Length (ft)	2020 Existing			2022 No Build			Proposed Storage Length (ft)	2022 Build		
			AM	PM	SAT	AM	PM	SAT		AM	PM	SAT
Intersection 1 - US 340 at Shenandoah Street  Existing Three legged unsignalized intersection with stop control on Shenandoah Street	NB LT	125	15	21	6	17	24	26	125	17	22	27
	NB Thru	-	FREE	FREE	FREE	FREE	FREE	FREE	-	FREE	FREE	FREE
	SB Thru/RT	-	FREE	FREE	FREE	FREE	FREE	FREE	-	FREE	FREE	FREE
	EB LT/RT	-	23	53	46	21	54	46	-	30	70	47
Intersection 2 - US 340 at Union Street  Existing Three legged unsignalized intersection with stop control on Union Street	NB LT	125	40	39	40	37	43	40	125	38	50	40
	NB Thru	-	FREE	FREE	FREE	FREE	FREE	FREE	-	FREE	FREE	FREE
	SB Thru	-	FREE	FREE	FREE	FREE	FREE	FREE	-	FREE	FREE	FREE
	SB RT	50	FREE	FREE	FREE	FREE	FREE	FREE	50	FREE	FREE	FREE
	EB LT/RT	-	61	60	56	58	59	53	-	64	116	62
Intersection 3 - US 340 at Shoreline Drive/Washington Street  Existing Four legged Signalized intersection	NB LT	650	221	185	104	228	223	106	650	202	216	118
	NB Thru	-	167	151	146	194	156	157	-	210	166	151
	NB RT	125	5	15	17	11	18	18	125	11	17	21
	SB LT	200	8	16	39	5	22	39	200	5	23	37
	SB Thru	-	168	298	141	186	317	151	-	174	298	170
	SB RT	125	20	58	19	21	81	19	125	24	114	45
	WB LT/Thru	-	32	44	41	37	41	39	-	35	37	40
	WB RT	-	12	12	19	14	14	23	-	13	13	28
	EB LT/Thru	-	65	51	44	64	65	42	-	74	58	50
	EB RT	225	84	162	74	90	186	78	225	90	162	88
Intersection 4 - Washington Street at Union Street/Franklin Street  Existing Four legged unsignalized intersection with stop control on Union Street/Franklin Street	EB Left/Thru/Right	-	0	7	0	0	0	0	-	0	8	0
	WB Left/Thru/Right	-	4	16	4	0	10	6	-	14	22	21
	NB Left/Thru/Right	-	26	41	38	26	43	35	-	31	49	39
	SB Left/Thru/Right	-	19	37	36	22	36	36	-	24	38	37
Intersection 5 - Washington Street at Columbia Street  Existing Four legged unsignalized intersection with stop control on Columbia Street	EB Left/Thru/Right	-	0	0	0	0	0	0	-	9	19	17
	WB Left/Thru/Right	-	0	0	0	0	0	0	-	0	0	0
	NB Left/Thru/Right	-	14	7	10	15	0	12	-	14	7	14
	SB Left/Thru/Right	-	0	21	0	0	19	0	-	43	48	46

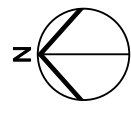


# Hilltop House Hotel TIS

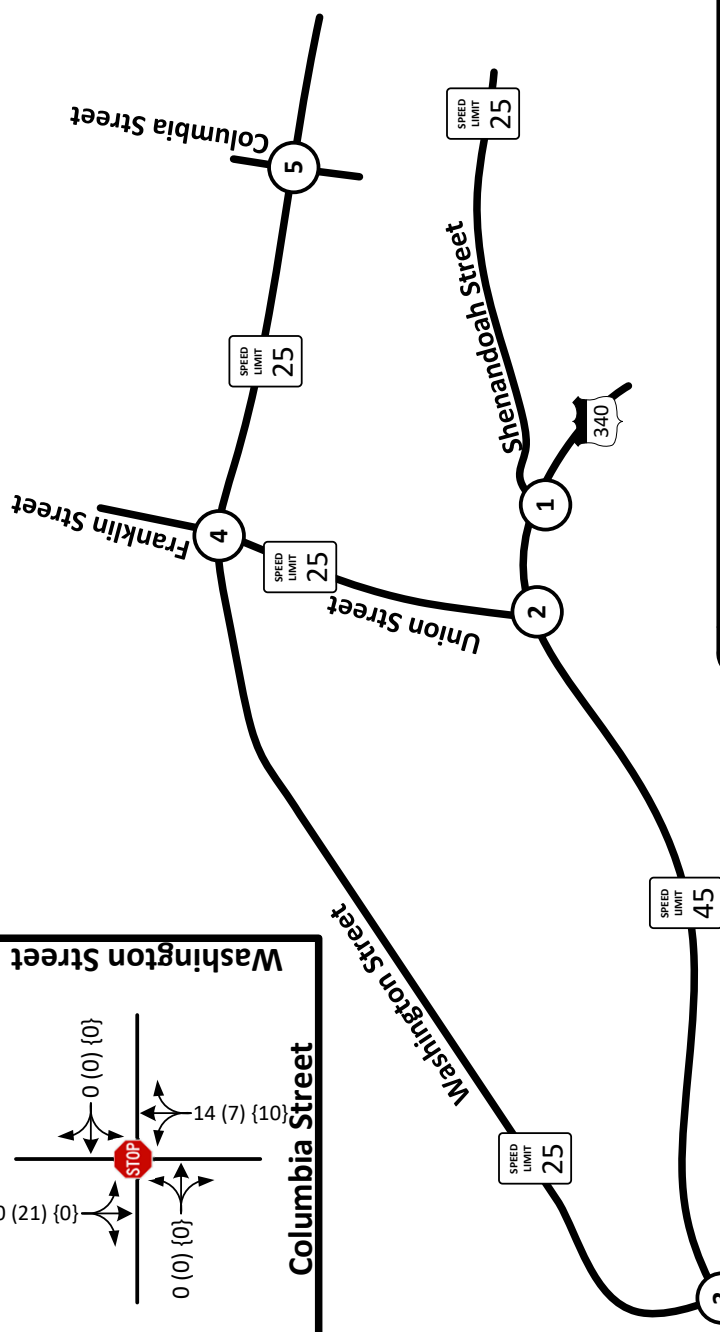
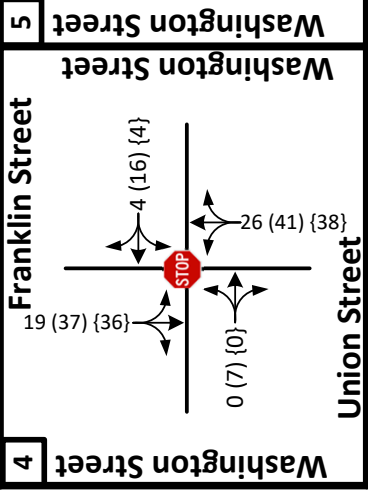
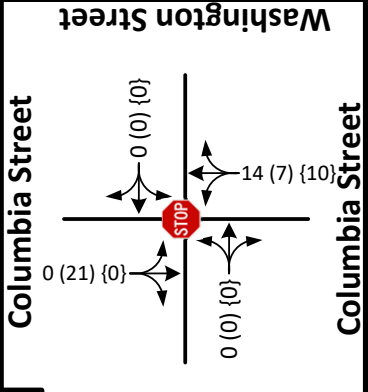
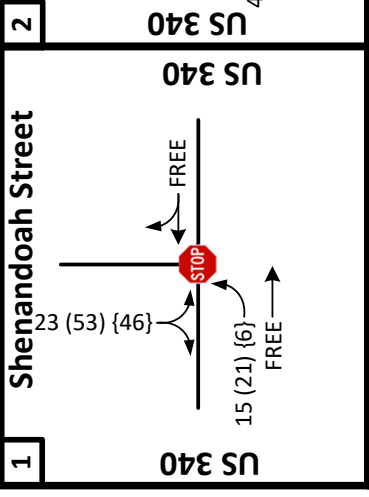
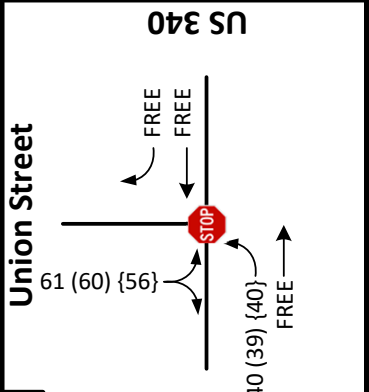
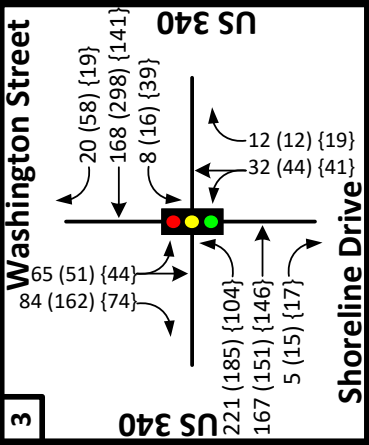
2020 Existing Queuing Analysis

DATE: September 2020

FIGURE 12



NOT TO SCALE



## LEGEND

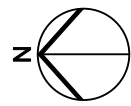
- Existing Traffic Control
- Existing Traffic Control
- Existing Roadway
- Existing Lane Configuration
- XX AM Peak Hour Queue (FT)
- (XX) PM Peak Hour Queue (FT)
- {XX} SAT Peak Hour Queue (FT)

# Hilltop House Hotel TIS

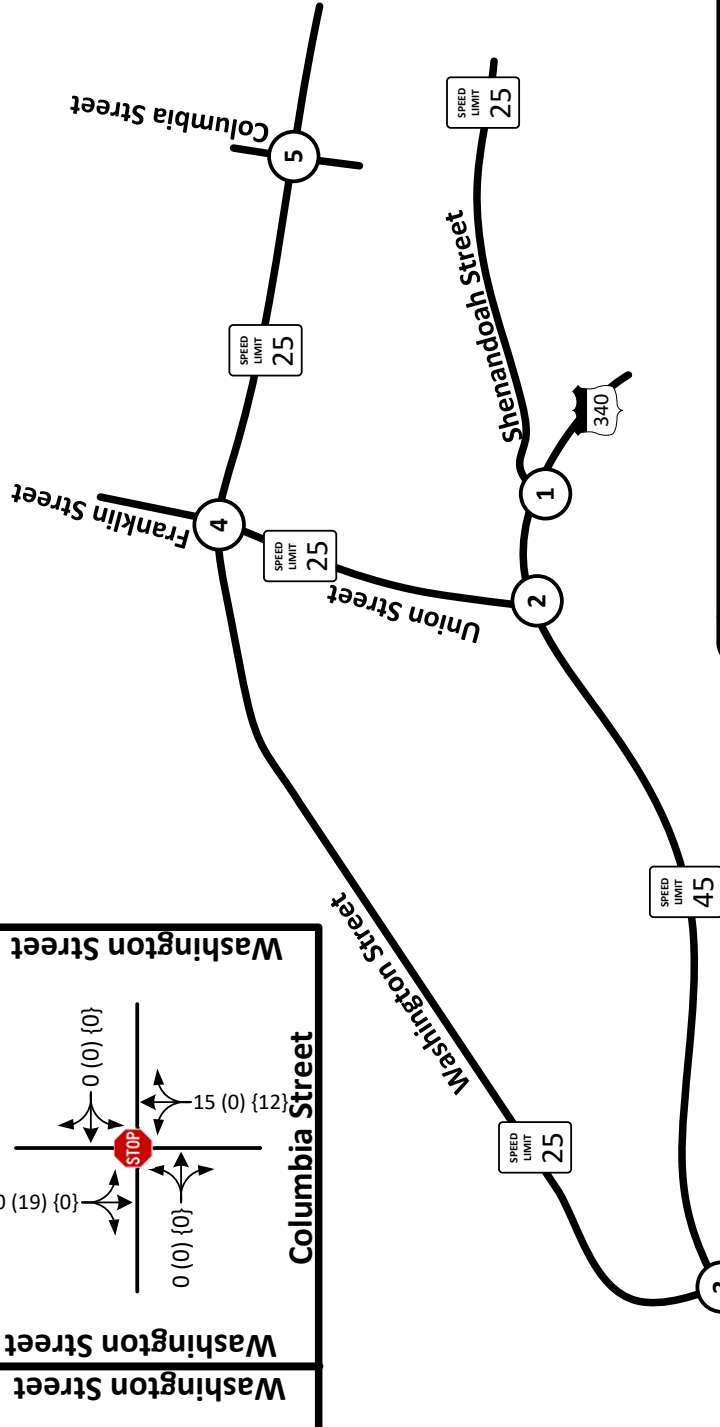
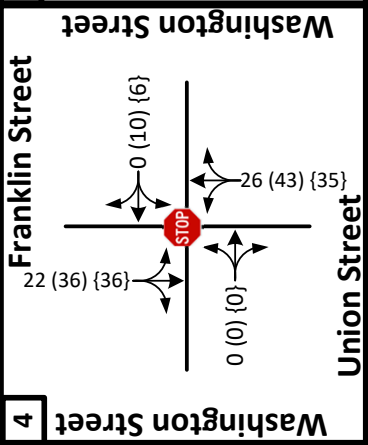
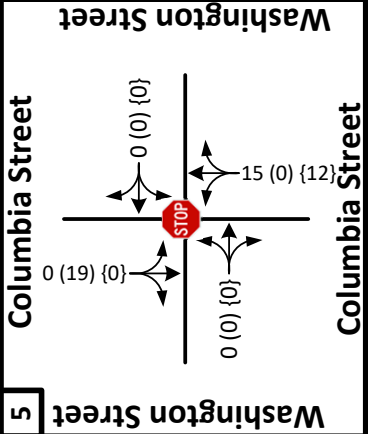
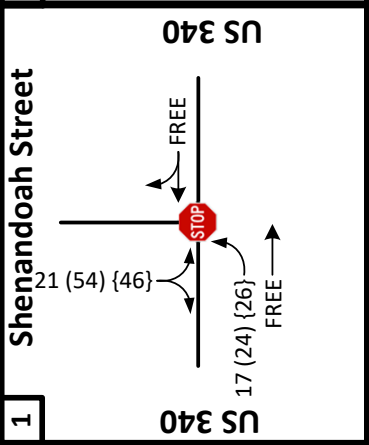
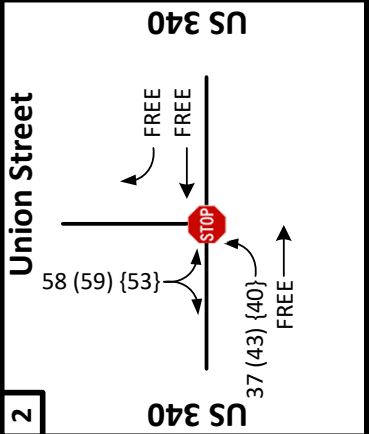
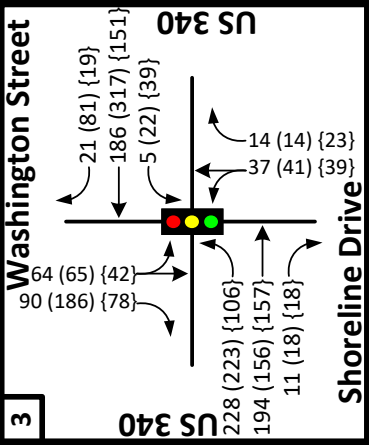
2022 No Build Queuing Analysis

DATE: September 2020

**FIGURE 13**

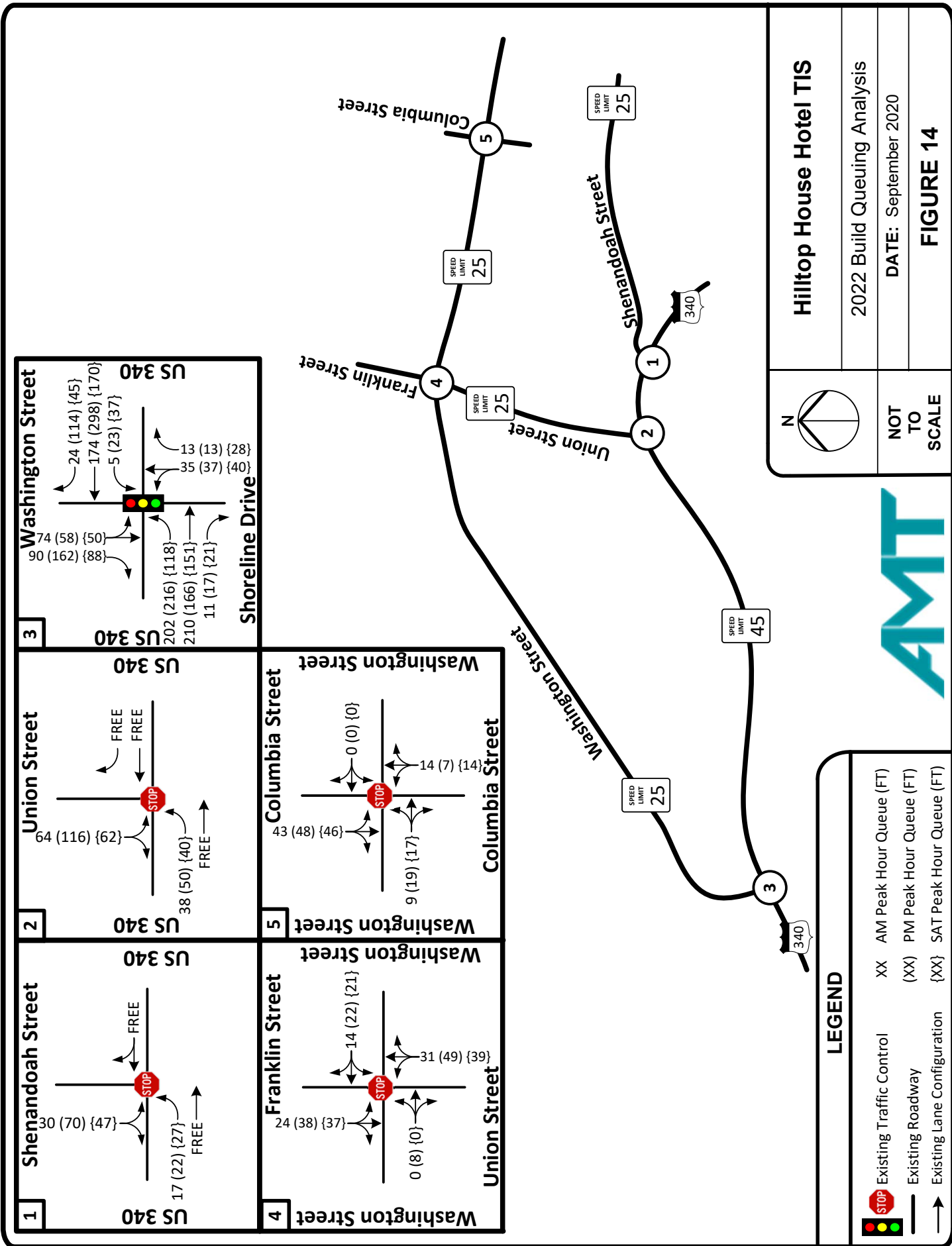


NOT TO SCALE



## LEGEND

- Existing Traffic Control
- Existing Traffic Control
- Existing Roadway
- Existing Lane Configuration
- XX AM Peak Hour Queue (FT)
- (XX) PM Peak Hour Queue (FT)
- {XX} SAT Peak Hour Queue (FT)





## CONCLUSIONS/RECOMMENDATIONS

The proposed hotel renovation is to be located at the existing Hilltop House Hotel site on East Ridge Street, northeast of the intersection of Columbia Street with Washington Street in Harpers Ferry, Jefferson County. The proposed hotel includes 129 rooms and is expected to be completed by 2022.

The proposed hotel will be served by multiple existing municipal streets within the study area. It is assumed that primary access to the hotel will utilize Columbia Street via Washington Street to enter the property.

The results of the capacity analyses and the queueing analyses indicate that the trips generated by the proposed site can be accommodated within the existing transportation network.

Based on the findings of this study, no capacity improvements, auxiliary lanes, or intersection control modifications are recommended as a result of renovation to the Hilltop House Hotel development.

The study identified the following potential infrastructure improvements for further consideration by the WVDOH and the Town of Harpers Ferry:

### **General**

- During the next roadway paving or construction project, upgrade the sidewalk ramps at the various intersections along Washington Street to meet current ADA and *Public Rights-of-Way Accessibility Guidelines* (PROWAG) guidance.

### **Washington Street with Columbia Street**

- Adjust the installation of the existing STOP signs at the intersection. The STOP sign on the southbound Columbia Street approach should be raised to be 7 feet above the roadway per the MUTCD. It would be preferable to relocate the STOP sign on the northbound Columbia Street approach closer to the intersection with Washington Street.

# **Appendix A**

## **Study Area Photos**



**US 340 Northbound Approach to Washington Street/Shoreline Drive**



**US 340 Southbound Approach to Washington Street/Shoreline Drive**





**Washington Street Eastbound Approach to US 340**



**Shoreline Drive Westbound Approach to US 340**





**US 340 Southbound Truck Climbing Lane Between Union Street & US 340 Alt**



**US 340 Northbound Approach to Union Street**





**US 340 Southbound Approach to Union Street**



**Union Street Eastbound Approach to US 340**





**US 340 Northbound Approach to Shenandoah Street**



**US 340 Southbound Approach to Shenandoah Street**





**Shenandoah Street Eastbound Approach to US 340**



**Shenandoah Street Looking Westbound After Turning from US 340**





**Washington Street Eastbound Approach to Union Street/Franklin Street**



**Washington Street Westbound Approach to Union Street/Franklin Street**





**Union Street Northbound Approach to Washington Street**



**Franklin Street Southbound Approach to Washington Street**





**Washington Street Eastbound Approach to Columbia Street**



**Washington Street Westbound Approach to Columbia Street**





**Columbia Street Northbound Approach to Washington Street**



**Columbia Street Southbound Approach to Washington Street**



# **Appendix B**

## **Traffic Data & Volume Calculations**

19-0037.001-Hilltop Hotel TIS - Traffic Volume Calculations

	Existing Traffic (2020)			Total Historical Growth			No Build (2022)			Site Trip Distribution			Total Site Trip Assignment			Full Build (2022)			Site Impact		
	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT	Enter	Exit	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT	

Intersection 1 - US 340 with Shemandoah Street

EBL	3	8	11	0	0	0	3	8	11			0	0	0	3	8	11	55.6%	16.7%	22.2%
EBT	0	0	0	0	0	0	0	0	0	15%		0	0	0	0	0	0	0.0%	0.0%	100.0%
EBR	1	16	10	0	1	17	1	17	10			5	5	6	6	22	16			
WBL	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0			
WBT	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0			
WBR	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0			
NBL	5	7	12	0	0	0	5	7	12			0	0	0	5	7	12			
NBT	1,054	673	721	40	25	28	1,094	698	749			13	13	16	1,107	711	765	1.2%	1.8%	2.1%
NBR	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0			
SBL	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0			
SBT	624	1,229	719	24	46	28	648	1,275	747			11	14	16	659	1,289	763	2.3%	1.5%	2.6%
SBR	3	4	28	0	0	1	3	4	29			4	5	5	7	9	34			

Intersection 2 - US 340 with Union Street

EBL	25	13	30	1	0	1	26	13	31			3	3	4	29	16	35	18.6%	20.5%	16.9%
EBT	0	0	0	0	0	0	0	0	0	10%		0	0	0	0	0	0			
EBR	9	17	17	0	1	1	9	18	18			5	5	6	14	23	24			
WBL	0	0	0	0	0	0	0	0	0	15%		0	0	0	0	0	0			
WBT	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0			
WBR	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0			
NBL	36	23	30	1	1	1	37	24	31			4	5	5	41	29	36			
NBT	1,034	667	703	39	25	27	1,073	692	730			10	10	12	1,083	702	742	1.2%	2.1%	2.2%
NBR	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0			
SBL	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0			
SBT	589	1,185	676	23	45	26	612	1,230	702			5	5	6	617	1,235	708	2.4%	1.4%	2.8%
SBR	36	60	53	1	2	2	37	62	55			11	14	16	48	76	71			

Intersection 3 - US 340 with Washington Street

EBL	40	24	17	2	1	1	42	25	18			10	10	12	52	35	30	7.5%	6.4%	12.1%
EBT	2	5	7	0	0	0	2	5	7			0	0	0	2	5	7			
EBR	197	253	144	7	10	5	204	263	149			10	10	12	214	273	161			
WBL	16	11	21	1	0	1	17	11	22			0	0	0	17	11	22			
WBT	4	14	10	0	1	0	4	15	10			0	0	0	4	15	10			
WBR	9	8	24	0	0	1	9	8	25			0	0	0	9	8	25			
NBL	281	200	137	11	8	5	292	208	142			19	23	26	311	231	168			
NBT	1,021	658	692	38	25	26	1,059	683	718			4	5	5	1,063	688	723	1.7%	3.0%	3.4%
NBR	8	19	23	0	1	1	8	20	24			0	0	0	8	20	24			
SBL	1	5	14	0	1	1	1	6	15			0	0	0	1	6	15			
SBT	581	1,173	665	22	44	25	603	1,217	690			10	10	12	613	1,227	702	1.6%	0.8%	1.6%
SBR	16	24	14	1	1	1	17	25	15			0	0	0	17	25	15			

Intersection 4 - Washington Street with Union Street

EBL	0	4	1	0	0	0	0	4	1			0	0	0	0	4	1	33.9%	20.7%	27.4%
EBT	25	66	46	1	2	2	26	68	48			19	23	26	45	91	74			
EBR	11	15	19	0	1	1	11	16	20			0	0	0	11	16	20			
WBL	10	26	10	0	1	0	10	27	10			8	8	10	18	35	20			
WBT	17	59	37	1	2	1	18	61	38	25%		19	20	25	37	81	63	48.2%	23.3%	100.0%
WBR	1	4	3	0	0	0	1	4	3	60%		0	0	0	1	4	3			
NBL	23	41	31	1	2	1	24	43	32			0	0	0	24	43	32			
NBT	0	6	0	0	0	0	0	6	0			0	0	0	0	6	0			
NBR	14	34	34	1	1	1	15	35	35			15	18	21	30	53	56			
SBL	1	7	7	0	0	0	1	7	7	40%		0	0	0	1	7	7			
SBT	3	4	1	0	0	0	3	4	1			0	0	0	3	4	1	0.0%	0.0%	0.0%
SBR	4	17	21	0	1	1	4	18	22			0	0	0	4	18	22			

Annual Growth Rate 1.88%

US 340 Count Year 2019  
Existing Year 2020  
Full Build Year 2022

AM Peak		PM Peak		SAT Peak	
Enter	Exit	Enter	Exit	Enter	Exit
38	32	46	33	52	41

Net New Trips



# VEHICLE AND PEDESTRIAN VOLUME SUMMARY

COUNT LOCATION	
CITY	Harpers Ferry
STATE	WV
DATE	2/27/2019
INTERSECTION	Int 1: US 340 @ Shenandoah Street
COUNT BY	AMT

Wednesday

STREET	Shenandoah Street										US 340										Total			PEAK HR
	From North					From South					From East					From West					N-S	E-W	ALL	
	L	T	R	TOT		L	T	R	TOT		L	T	R	TOT		L	T	R	TOT					
0600 - 0615	1	0	0	1	0	0	0	0	0	0	63	0	0	63	0	184	0	0	184	1	247	248		
0615 - 0630	1	0	0	1	0	0	0	0	0	0	72	0	0	72	0	265	0	0	265	1	337	338		
0630 - 0645	0	0	0	0	0	0	0	0	0	0	109	0	0	109	0	272	0	0	272	0	388	388		
0645 - 0700	0	0	3	3	0	0	0	0	0	0	121	0	0	121	0	268	0	0	268	3	394	397		
<b>0700 - 0715</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>151</b>	<b>0</b>	<b>0</b>	<b>151</b>	<b>1</b>	<b>276</b>	<b>0</b>	<b>277</b>	<b>1</b>	<b>428</b>	<b>429</b>			
<b>0715 - 0730</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>155</b>	<b>0</b>	<b>0</b>	<b>155</b>	<b>2</b>	<b>306</b>	<b>0</b>	<b>308</b>	<b>1</b>	<b>463</b>	<b>464</b>			
<b>0730 - 0745</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>166</b>	<b>2</b>	<b>168</b>	<b>0</b>	<b>257</b>	<b>0</b>	<b>259</b>	<b>2</b>	<b>427</b>	<b>428</b>	<b>2692</b>			
<b>0745 - 0800</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>140</b>	<b>1</b>	<b>141</b>	<b>0</b>	<b>241</b>	<b>0</b>	<b>241</b>	<b>0</b>	<b>382</b>	<b>383</b>	<b>3075</b>			
0800 - 0815	0	0	3	3	0	0	0	0	0	0	108	3	111	0	221	0	224	0	224	3	335	338		
0815 - 0830	1	0	0	1	0	0	0	0	0	0	124	4	128	0	198	0	204	0	204	1	332	333		
0830 - 0845	2	0	0	2	0	0	0	0	0	0	125	2	127	0	220	0	223	0	223	2	350	352		
0845 - 0900	0	0	2	2	0	0	0	0	0	0	144	2	146	0	172	0	175	0	175	2	321	323		
0900 - 0915	1	0	0	1	0	0	0	0	0	0	124	2	126	0	181	0	183	0	183	1	309	310		
0915 - 0930	0	0	1	1	0	0	0	0	0	0	130	2	132	0	142	0	144	0	144	1	276	277		
0930 - 0945	0	0	1	1	0	0	0	0	0	0	113	3	116	0	165	0	165	0	165	1	281	282		
0945 - 1000	1	0	4	5	0	0	0	0	0	0	83	0	83	0	123	0	127	0	127	5	210	215		
1000 - 1015	0	0	0	0	0	0	0	0	0	0	123	1	124	0	135	0	137	0	137	0	261	261		
1015 - 1030	2	0	1	3	0	0	0	0	0	0	142	2	144	0	136	0	137	0	137	3	281	284		
1030 - 1045	0	0	4	4	0	0	0	0	0	0	145	1	146	0	151	0	152	0	152	4	298	302		
1045 - 1100	0	0	2	2	0	0	0	0	0	0	164	1	165	0	116	0	119	0	119	2	284	286		
1100 - 1115	0	0	0	0	0	0	0	0	0	0	124	2	126	0	102	0	105	0	105	0	231	231		
1115 - 1130	0	0	3	3	0	0	0	0	0	0	86	2	88	0	109	0	109	0	109	3	197	200		
1130 - 1145	0	0	3	3	0	0	0	0	0	0	131	4	135	0	130	0	133	0	133	3	268	271		
1145 - 1200	0	0	3	3	0	0	0	0	0	0	138	2	140	0	107	0	108	0	108	3	248	251		
1200 - 1215	3	0	2	5	0	0	0	0	0	0	156	3	159	0	112	0	113	0	113	5	272	277		
1215 - 1230	1	0	4	5	0	0	0	0	0	0	138	3	141	0	157	0	157	0	157	5	298	303		
1230 - 1245	1	0	4	5	0	0	0	0	0	0	150	1	151	0	123	0	125	0	125	5	276	281		
1245 - 1300	1	0	1	2	0	0	0	0	0	0	141	0	141	0	125	0	128	0	128	2	269	271		
1300 - 1315	3	0	4	7	0	0	0	0	0	0	134	2	136	0	144	0	149	0	149	7	285	292		
1315 - 1330	2	0	0	2	0	0	0	0	0	0	167	4	171	0	148	0	151	0	151	2	322	324		
1330 - 1345	2	0	1	3	0	0	0	0	0	0	150	3	153	0	142	0	146	0	146	3	299	302		
1345 - 1400	1	0	1	2	0	0	0	0	0	0	141	1	142	0	137	0	137	0	137	2	279	281		
1400 - 1415	1	0	2	3	0	0	0	0	0	0	160	2	162	0	151	0	151	0	151	3	313	316		
1415 - 1430	1	0	1	2	0	0	0	0	0	0	216	3	219	0	156	0	160	0	160	2	379	381		
1430 - 1445	1	0	2	3	0	0	0	0	0	0	172	0	172	0	144	0	144	0	144	3	316	319		
1445 - 1500	0	0	4	4	0	0	0	0	0	0	229	4	233	0	142	0	142	0	142	4	375	379		

1500 - 1515	2	0	1	3	0	0	0	0	0	237	0	237	0	237	0	147	0	149	3	386	389	1468
1515 - 1530	1	0	1	2	0	0	0	0	0	237	0	237	0	237	0	147	0	153	2	390	392	1479
1530 - 1545	0	0	1	1	0	0	0	0	0	249	2	251	0	251	0	158	0	161	1	412	413	1573
1545 - 1600	0	0	6	6	0	0	0	0	0	270	2	272	0	272	0	157	0	159	6	431	437	1631
1600 - 1615	5	0	4	9	0	0	0	0	0	322	1	323	0	323	0	171	0	175	9	498	507	1749
1615 - 1630	2	0	3	5	0	0	0	0	0	309	0	309	0	309	0	162	0	163	5	472	477	1834
1630 - 1645	1	0	3	4	0	0	0	0	0	305	1	306	0	306	0	172	0	172	4	478	482	1903
1645 - 1700	2	0	2	4	0	0	0	0	0	306	0	306	0	306	0	171	0	173	4	479	483	1949
1700 - 1715	3	0	0	3	0	0	0	0	0	304	2	306	0	306	0	162	0	165	3	471	474	1916
1715 - 1730	1	0	9	10	0	0	0	0	0	343	2	345	0	345	0	187	0	191	10	536	546	1985
1730 - 1745	2	0	0	2	0	0	0	0	0	311	1	312	0	312	0	126	0	130	2	442	444	1947
1745 - 1800	2	0	3	5	0	0	0	0	0	298	0	298	0	298	0	149	0	150	5	448	453	1917
1800 - 1815	0	0	4	4	0	0	0	0	0	271	0	271	0	271	0	135	0	136	4	407	411	1854
1815 - 1830	1	0	1	2	0	0	0	0	0	216	0	216	0	216	0	123	0	124	2	340	342	1650
1830 - 1845	2	0	4	6	0	0	0	0	0	240	0	240	0	240	0	99	0	100	6	340	346	1552
1845 - 1900	0	0	1	1	0	0	0	0	0	177	2	179	0	179	0	81	0	82	1	261	262	1361
Peak HR AM																						
0700 - 0800	3	0	1	4	0	0	0	0	0	612	3	615	0	615	0	1080	0	1085	4	1700	1704	
Peak HR PM																						
1545 - 1645	8	0	16	24	0	0	0	0	0	1206	4	1210	0	1210	0	662	0	669	24	1879	1903	
AM PHF			1.000			0.000				0.915						0.881				0.918		
PM PHF			0.667			0.000				0.937						0.956				0.938		

# VEHICLE AND PEDESTRIAN VOLUME SUMMARY

COUNT LOCATION	
CITY	Harpers Ferry
STATE	WV
DATE	3/2/2019
INTERSECTION	Int 1: US 340 @ Shenandoah Street
COUNT BY	AMT

Saturday

STREET	Shenandoah Street										US 340						Total		PEAK HR			
	From North					From South					From East			From West			N-S	E-W		ALL		
	L	T	R	TOT	TOT	L	T	R	TOT	TOT	L	T	R	TOT	L	T					R	TOT
1100 - 1115	6	0	1	7	0	0	0	0	0	0	162	7	169	0	182	0	182	0	182	7	351	358
1115 - 1130	1	0	2	3	0	0	0	0	0	0	150	4	154	0	163	0	163	0	163	3	319	322
1130 - 1145	1	0	2	3	0	0	0	0	0	0	176	1	177	0	177	0	177	0	177	3	359	362
1145 - 1200	4	0	4	8	0	0	0	0	0	0	181	7	188	0	176	0	176	0	176	8	367	375
1200 - 1215	3	0	2	5	0	0	0	0	0	0	162	6	168	0	160	0	160	0	160	5	332	337
1215 - 1230	3	0	2	5	0	0	0	0	0	0	178	9	187	0	191	0	191	0	191	5	380	385
1230 - 1245	1	0	2	3	0	0	0	0	0	0	185	5	190	0	190	0	190	0	190	3	384	387
1245 - 1300	3	0	5	8	0	0	0	0	0	0	189	6	195	0	155	0	155	0	155	8	353	361
1300 - 1315	3	0	5	8	0	0	0	0	0	0	173	8	181	0	166	0	166	0	166	8	350	358
1315 - 1330	7	0	7	14	0	0	0	0	0	0	201	6	207	0	166	0	166	0	166	14	376	390
1330 - 1345	3	0	7	10	0	0	0	0	0	0	178	7	185	0	162	0	162	0	162	10	355	365
1345 - 1400	1	0	7	8	0	0	0	0	0	0	165	7	172	0	179	0	179	0	179	8	358	366
Peak HR																						
1145 - 1245	11	0	10	21	0	0	0	0	0	0	706	27	733	0	717	0	717	0	717	21	1463	1484
PHF						0.000					0.964			0.941			0.959					

# VEHICLE AND PEDESTRIAN VOLUME SUMMARY

COUNT LOCATION	
CITY	Harpers Ferry
STATE	WV
DATE	2/27/2019
INTERSECTION	Int 2: US 340 @ Union Street
COUNT BY	AMT

Wednesday

STREET	Union Street						US 340						US 340						Total			PEAK HR
	From North			From South			From East			From West			From East			From West						
	L	T	R	TOT	L	T	R	TOT	L	T	R	TOT	L	T	R	TOT	N-S	E-W	ALL			
0600 - 0615	11	0	2	13	0	0	0	0	0	56	1	57	0	181	0	184	13	241	254			
0615 - 0630	15	0	2	17	0	0	0	0	0	73	3	76	0	247	0	250	17	326	343			
0630 - 0645	5	0	1	6	0	0	0	0	0	108	6	114	0	284	0	288	6	402	408			
0645 - 0700	12	0	0	12	0	0	0	0	0	119	5	124	0	271	0	276	12	400	412			
<b>0700 - 0715</b>	<b>7</b>	<b>0</b>	<b>1</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>158</b>	<b>4</b>	<b>162</b>	<b>0</b>	<b>280</b>	<b>0</b>	<b>287</b>	<b>8</b>	<b>449</b>	<b>457</b>			
<b>0715 - 0730</b>	<b>8</b>	<b>0</b>	<b>2</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>140</b>	<b>10</b>	<b>150</b>	<b>0</b>	<b>287</b>	<b>0</b>	<b>302</b>	<b>10</b>	<b>452</b>	<b>462</b>			
<b>0730 - 0745</b>	<b>5</b>	<b>0</b>	<b>3</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>157</b>	<b>12</b>	<b>169</b>	<b>0</b>	<b>259</b>	<b>0</b>	<b>265</b>	<b>8</b>	<b>434</b>	<b>442</b>			
<b>0745 - 0800</b>	<b>5</b>	<b>0</b>	<b>3</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>136</b>	<b>9</b>	<b>145</b>	<b>0</b>	<b>235</b>	<b>0</b>	<b>242</b>	<b>8</b>	<b>387</b>	<b>395</b>			
0800 - 0815	8	0	5	13	0	0	0	0	0	104	11	115	0	214	0	220	13	335	348			
0815 - 0830	4	0	4	8	0	0	0	0	0	112	9	121	0	210	0	217	8	338	346			
0830 - 0845	8	0	7	15	0	0	0	0	0	126	2	128	0	203	0	210	15	338	353			
0845 - 0900	4	0	0	4	0	0	0	0	0	133	12	145	0	171	0	183	4	328	332			
0900 - 0915	7	0	1	8	0	0	0	0	0	127	4	131	0	178	0	184	8	315	323			
0915 - 0930	3	0	6	9	0	0	0	0	0	110	11	121	0	148	0	152	9	273	282			
0930 - 0945	3	0	3	6	0	0	0	0	0	109	6	115	0	156	0	161	6	276	282			
0945 - 1000	6	0	0	6	0	0	0	0	0	99	7	106	0	130	0	138	6	244	250			
1000 - 1015	5	0	1	6	0	0	0	0	0	114	9	123	0	133	0	136	6	259	265			
1015 - 1030	9	0	4	13	0	0	0	0	0	145	5	150	0	126	0	128	13	278	291			
1030 - 1045	4	0	3	7	0	0	0	0	0	126	7	133	0	136	0	140	7	273	280			
1045 - 1100	4	0	8	12	0	0	0	0	0	158	5	163	0	106	0	108	12	271	283			
1100 - 1115	5	0	1	6	0	0	0	0	0	116	7	123	0	112	0	116	6	239	245			
1115 - 1130	5	0	4	9	0	0	0	0	0	143	8	151	0	136	0	140	9	291	300			
1130 - 1145	2	0	3	5	0	0	0	0	0	129	8	137	0	126	0	135	5	272	277			
1145 - 1200	5	0	8	13	0	0	0	0	0	135	9	144	0	102	0	107	13	251	264			
1200 - 1215	11	0	6	17	0	0	0	0	0	153	10	163	0	110	0	113	17	276	293			
1215 - 1230	9	0	4	13	0	0	0	0	0	135	10	145	0	144	0	147	13	292	305			
1230 - 1245	5	0	6	11	0	0	0	0	0	142	7	149	0	114	0	118	11	267	278			
1245 - 1300	4	0	5	9	0	0	0	0	0	142	6	148	0	134	0	140	9	288	297			
1300 - 1315	6	0	4	10	0	0	0	0	0	138	8	146	0	142	0	147	10	293	303			
1315 - 1330	4	0	4	8	0	0	0	0	0	161	7	168	0	142	0	147	8	315	323			
1330 - 1345	6	0	2	8	0	0	0	0	0	142	10	152	0	139	0	143	8	295	303			
1345 - 1400	5	0	8	13	0	0	0	0	0	158	3	161	0	129	0	130	13	291	304			
1400 - 1415	2	0	2	4	0	0	0	0	0	156	5	161	0	150	0	155	4	316	320			
1415 - 1430	7	0	6	13	0	0	0	0	0	208	11	219	0	149	0	152	13	371	384			
1430 - 1445	6	0	1	7	0	0	0	0	0	166	10	176	0	138	0	144	7	320	327			
1445 - 1500	3	0	3	6	0	0	0	0	0	228	9	237	0	136	0	144	6	381	387			



1500 - 1515	6	0	6	12	0	0	0	0	0	233	8	241	4	146	0	150	12	391	403	1501
1515 - 1530	5	0	6	11	0	0	0	0	0	229	11	240	5	146	0	151	11	391	402	1519
1530 - 1545	5	0	5	10	0	0	0	0	0	229	10	239	2	147	0	149	10	388	398	1590
<b>1545 - 1600</b>	<b>5</b>	<b>0</b>	<b>4</b>	<b>9</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>265</b>	<b>10</b>	<b>275</b>	<b>9</b>	<b>156</b>	<b>0</b>	<b>165</b>	<b>9</b>	<b>440</b>	<b>449</b>	<b>1652</b>
<b>1600 - 1615</b>	<b>2</b>	<b>0</b>	<b>6</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>311</b>	<b>18</b>	<b>329</b>	<b>11</b>	<b>173</b>	<b>0</b>	<b>184</b>	<b>8</b>	<b>513</b>	<b>521</b>	<b>1770</b>
<b>1615 - 1630</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>293</b>	<b>21</b>	<b>314</b>	<b>3</b>	<b>158</b>	<b>0</b>	<b>161</b>	<b>6</b>	<b>475</b>	<b>481</b>	<b>1849</b>
<b>1630 - 1645</b>	<b>3</b>	<b>0</b>	<b>4</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>296</b>	<b>10</b>	<b>306</b>	<b>0</b>	<b>176</b>	<b>0</b>	<b>176</b>	<b>7</b>	<b>482</b>	<b>489</b>	<b>1940</b>
1645 - 1700	5	0	4	9	0	0	0	0	0	286	22	308	5	159	0	164	9	472	481	1972
1700 - 1715	6	0	2	8	0	0	0	0	0	304	11	315	2	167	0	169	8	484	492	1943
1715 - 1730	8	0	4	12	0	0	0	0	0	325	13	338	9	170	0	179	12	517	529	1991
1730 - 1745	8	0	5	13	0	0	0	0	0	300	10	310	2	121	0	123	13	433	446	1948
1745 - 1800	5	0	3	8	0	0	0	0	0	287	13	300	1	142	0	143	8	443	451	1918
1800 - 1815	5	0	1	6	0	0	0	0	0	276	14	290	3	135	0	138	6	428	434	1860
1815 - 1830	3	0	5	8	0	0	0	0	0	199	14	213	4	116	0	120	8	333	341	1672
1830 - 1845	3	0	1	4	0	0	0	0	0	223	14	237	1	93	0	94	4	331	335	1561
1845 - 1900	1	0	4	5	0	0	0	0	0	167	10	177	4	81	0	85	5	262	267	1377
Peak HR AM																				
0700 - 0800	25	0	9	34	0	0	0	0	0	591	35	626	35	1061	0	1096	34	1722	1756	
Peak HR PM																				
1545 - 1645	13	0	17	30	0	0	0	0	0	1165	59	1224	23	663	0	686	30	1910	1940	
AM PHF			0.850			0.000				0.926				0.907				0.950		
PM PHF			0.833		0.000				0.930					0.932				0.931		

# VEHICLE AND PEDESTRIAN VOLUME SUMMARY

COUNT LOCATION	
CITY	Harpers Ferry
STATE	WV
DATE	3/2/2019
INTERSECTION	Int 2: US 340 @ Union Street
COUNT BY	AMT

Saturday

STREET	Union Street				US 340				US 340				Total				PEAK HR		
	From North				From South				From East				From West						
	L	T	R	TOT	L	T	R	TOT	L	T	R	TOT	L	T	R	TOT		N-S	E-W
1100 - 1115	12	0	9	21	0	0	0	0	0	152	8	160	0	164	0	176	21	336	357
1115 - 1130	3	0	5	8	0	0	0	0	0	138	8	146	0	162	0	166	8	312	320
1130 - 1145	8	0	4	12	0	0	0	0	0	168	11	179	0	173	0	178	12	357	369
1145 - 1200	12	0	9	21	0	0	0	0	0	170	15	185	0	171	0	180	21	365	386
1200 - 1215	8	0	2	10	0	0	0	0	0	153	11	164	0	163	0	169	10	333	343
1215 - 1230	4	0	3	7	0	0	0	0	0	166	15	181	0	181	0	191	7	372	379
1230 - 1245	5	0	3	8	0	0	0	0	0	173	11	184	0	194	0	198	8	382	390
1245 - 1300	6	0	1	7	0	0	0	0	0	181	17	198	0	144	0	150	7	348	355
1300 - 1315	5	0	6	11	0	0	0	0	0	161	9	170	0	161	0	164	11	334	345
1315 - 1330	4	0	1	5	0	0	0	0	0	147	6	153	0	116	0	121	5	274	279
1330 - 1345	8	0	2	10	0	0	0	0	0	179	13	192	0	191	0	195	10	387	397
1345 - 1400	9	0	3	12	0	0	0	0	0	205	13	218	0	230	0	235	12	453	465
Peak HR																			
1145 - 1245	29	0	17	46	0	0	0	0	0	662	52	714	0	709	0	738	46	1452	1498
PHF	0.548				0.000				0.965				0.932				0.960		

# VEHICLE AND PEDESTRIAN VOLUME SUMMARY

<i>COUNT LOCATION</i>	
<b>CITY</b>	Harpers Ferry
<b>STATE</b>	WV
<b>DATE</b>	2/27/2019
<b>INTERSECTION</b>	Int 3: US 340 @ Washington Street/Shoreline Drive
<b>COUNT BY</b>	AMT

Wednesday

STREET	Washington St (Alt US 340)					Shoreline Drive					US 340					US 340					Total			PEAK HR			
	From North					From South					From East					From West					N-S	E-W	ALL				
TIME	L	T	R	TOT	L	T	R	TOT	L	T	R	TOT	L	T	R	TOT	L	T	R	TOT	L	T	R	TOT			
0600 - 0615	4	0	11	15	1	0	2	3	1	1	1	3	5	0	85	2	87	0	196	0	206	18	246	264	264		
0615 - 0630	6	0	17	23	1	1	3	5	0	85	2	87	5	1	109	4	114	1	253	2	266	28	353	381	381		
0630 - 0645	8	2	14	24	4	1	4	9	1	109	4	114	9	1	120	2	123	13	276	0	289	33	403	436	436		
0645 - 0700	5	0	19	24	2	0	2	4	1	120	2	123	4	1	152	0	152	19	276	1	296	28	419	447	447		
<b>0700 - 0715</b>	<b>6</b>	<b>0</b>	<b>32</b>	<b>38</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>0</b>	<b>152</b>	<b>0</b>	<b>152</b>	<b>4</b>	<b>0</b>	<b>152</b>	<b>0</b>	<b>152</b>	<b>32</b>	<b>254</b>	<b>2</b>	<b>288</b>	<b>42</b>	<b>440</b>	<b>482</b>	<b>482</b>		
<b>0715 - 0730</b>	<b>11</b>	<b>1</b>	<b>49</b>	<b>61</b>	<b>10</b>	<b>2</b>	<b>3</b>	<b>15</b>	<b>0</b>	<b>139</b>	<b>4</b>	<b>143</b>	<b>15</b>	<b>0</b>	<b>139</b>	<b>4</b>	<b>143</b>	<b>92</b>	<b>285</b>	<b>2</b>	<b>379</b>	<b>76</b>	<b>522</b>	<b>598</b>	<b>598</b>		
<b>0730 - 0745</b>	<b>8</b>	<b>0</b>	<b>68</b>	<b>76</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>5</b>	<b>1</b>	<b>145</b>	<b>4</b>	<b>150</b>	<b>5</b>	<b>0</b>	<b>145</b>	<b>4</b>	<b>150</b>	<b>80</b>	<b>241</b>	<b>2</b>	<b>323</b>	<b>81</b>	<b>473</b>	<b>554</b>	<b>554</b>		
<b>0745 - 0800</b>	<b>14</b>	<b>1</b>	<b>44</b>	<b>59</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>5</b>	<b>0</b>	<b>135</b>	<b>8</b>	<b>143</b>	<b>5</b>	<b>2</b>	<b>97</b>	<b>1</b>	<b>100</b>	<b>72</b>	<b>222</b>	<b>2</b>	<b>296</b>	<b>64</b>	<b>439</b>	<b>503</b>	<b>3665</b>		
0800 - 0815	9	0	22	31	1	2	1	4	2	97	1	100	4	1	110	4	115	29	184	2	215	35	315	350	2005		
0815 - 0830	5	1	38	44	2	0	3	5	1	110	4	115	5	1	121	4	126	26	215	0	241	49	356	405	1812		
0830 - 0845	7	2	30	39	4	2	0	6	1	121	4	126	6	1	139	1	141	29	184	4	217	45	343	388	1646		
0845 - 0900	4	1	30	35	3	1	2	6	1	139	1	141	6	0	116	2	118	28	176	3	207	41	348	389	1532		
0900 - 0915	7	0	28	35	2	3	2	7	0	116	2	118	7	3	116	2	118	16	175	2	193	42	311	363	1535		
0915 - 0930	3	1	19	23	4	0	0	4	3	116	2	118	4	1	108	2	111	23	149	1	173	27	294	321	1451		
0930 - 0945	3	1	23	27	2	3	3	8	1	108	2	111	8	0	96	1	97	24	139	2	165	35	276	311	1374		
0945 - 1000	6	2	32	40	2	1	2	5	0	96	1	97	5	0	116	2	118	36	131	3	170	45	267	312	1297		
1000 - 1015	4	1	32	37	0	1	1	2	0	116	2	118	2	0	142	3	148	39	108	22	169	39	287	326	1270		
1015 - 1030	5	0	30	35	2	2	1	5	2	142	3	148	5	3	122	4	126	35	112	4	151	40	299	339	1288		
1030 - 1045	3	1	31	35	4	3	3	10	0	122	4	126	10	0	163	4	168	22	128	2	152	45	278	323	1300		
1045 - 1100	3	2	28	33	1	3	2	6	1	163	4	168	6	2	116	3	121	24	107	0	131	39	299	338	1326		
1100 - 1115	3	4	25	32	1	3	3	7	2	116	3	121	7	2	143	2	146	24	106	2	132	39	253	292	1292		
1115 - 1130	1	1	36	38	2	2	1	5	1	143	2	146	5	1	127	5	133	24	134	1	159	43	305	348	1301		
1130 - 1145	5	0	38	43	4	2	1	7	1	127	5	133	7	1	127	1	129	23	122	2	147	50	280	330	1308		
1145 - 1200	3	1	31	35	3	0	2	5	3	127	1	129	5	1	154	3	158	29	96	4	129	40	258	298	1268		
1200 - 1215	7	2	51	60	0	3	1	4	1	154	3	158	4	1	133	3	136	37	123	5	165	64	323	387	1363		
1215 - 1230	7	3	32	42	7	4	1	12	0	133	3	136	12	0	144	2	148	29	138	4	171	54	307	361	1376		
1230 - 1245	2	1	35	38	5	0	0	5	2	144	2	148	5	2	139	1	143	33	114	5	152	43	300	343	1389		
1245 - 1300	3	2	29	34	4	0	3	7	4	139	1	143	7	3	134	2	137	26	125	0	151	41	294	335	1426		
1300 - 1315	10	1	24	35	6	2	2	10	1	134	2	137	10	1	163	3	166	25	126	4	155	45	292	337	1376		
1315 - 1330	5	1	38	44	1	3	2	6	0	163	3	166	6	0	138	2	142	42	137	4	183	50	349	399	1414		
1330 - 1345	2	3	31	36	2	0	2	4	2	138	2	142	4	2	160	2	163	23	135	0	158	40	300	340	1411		
1345 - 1400	8	0	33	41	6	1	2	9	1	160	2	163	9	1	198	2	201	35	136	0	171	50	334	384	1460		
1400 - 1415	4	0	38	42	4	1	5	10	0	160	5	165	10	0	163	6	170	31	136	8	175	52	340	392	1515		
1415 - 1430	1	2	34	37	0	1	1	2	1	198	2	201	2	1	163	6	170	46	155	1	202	39	403	442	1558		
1430 - 1445	5	2	27	34	4	0	3	7	4	163	6	170	7	1	163	6	170	69	131	5	205	41	375	416	1634		

1445 - 1500	5	2	72	79	6	5	2	13	2	236	5	243	51	138	0	189	92	432	524	1774
1500 - 1515	7	1	83	91	2	3	1	6	4	217	4	225	49	135	3	187	97	412	509	1891
1515 - 1530	4	2	56	62	5	1	4	10	1	226	6	233	36	140	5	181	72	414	486	1935
1530 - 1545	4	2	52	58	5	1	1	7	2	227	2	231	37	150	5	192	65	423	488	2007
<b>1545 - 1600</b>	<b>3</b>	<b>1</b>	<b>51</b>	<b>55</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>11</b>	<b>1</b>	<b>259</b>	<b>1</b>	<b>261</b>	<b>56</b>	<b>145</b>	<b>6</b>	<b>207</b>	<b>66</b>	<b>468</b>	<b>534</b>	<b>2017</b>
<b>1600 - 1615</b>	<b>8</b>	<b>1</b>	<b>57</b>	<b>66</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>9</b>	<b>1</b>	<b>301</b>	<b>8</b>	<b>310</b>	<b>50</b>	<b>166</b>	<b>3</b>	<b>219</b>	<b>75</b>	<b>529</b>	<b>604</b>	<b>2112</b>
<b>1615 - 1630</b>	<b>4</b>	<b>2</b>	<b>57</b>	<b>63</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>7</b>	<b>1</b>	<b>302</b>	<b>9</b>	<b>312</b>	<b>46</b>	<b>159</b>	<b>7</b>	<b>212</b>	<b>70</b>	<b>524</b>	<b>594</b>	<b>2220</b>
<b>1630 - 1645</b>	<b>9</b>	<b>1</b>	<b>83</b>	<b>93</b>	<b>1</b>	<b>4</b>	<b>1</b>	<b>6</b>	<b>2</b>	<b>289</b>	<b>6</b>	<b>297</b>	<b>44</b>	<b>176</b>	<b>3</b>	<b>223</b>	<b>99</b>	<b>520</b>	<b>619</b>	<b>2351</b>
1645 - 1700	3	4	43	50	4	3	0	7	4	285	4	293	28	145	9	182	57	475	532	2349
1700 - 1715	7	1	52	60	5	1	0	6	2	307	2	311	36	173	12	221	66	532	598	2343
1715 - 1730	3	1	33	37	6	2	0	8	0	200	1	201	20	111	4	135	45	336	381	2130
1730 - 1745	4	4	46	54	5	1	0	6	4	364	5	373	38	155	12	205	60	578	638	2149
1745 - 1800	6	4	55	65	7	0	3	10	5	335	2	342	47	169	8	224	75	566	641	2258
1800 - 1815	3	2	33	38	7	0	2	9	2	307	2	311	24	125	4	153	47	464	511	2171
1815 - 1830	2	1	25	28	4	0	1	5	0	200	1	201	23	110	11	144	33	345	378	2168
1830 - 1845	0	1	26	27	10	1	1	12	4	364	5	373	24	92	7	123	39	496	535	2065
1845 - 1900	1	1	14	16	1	0	0	1	5	335	2	342	30	83	4	117	17	459	476	1900
Peak HR AM																				
0700 - 0800	<b>39</b>	<b>2</b>	<b>193</b>	<b>234</b>	<b>16</b>	<b>4</b>	<b>9</b>	<b>29</b>	<b>1</b>	<b>571</b>	<b>16</b>	<b>588</b>	<b>276</b>	<b>1002</b>	<b>8</b>	<b>1286</b>	<b>263</b>	<b>1874</b>	<b>2137</b>	
Peak HR PM																				
1545 - 1645	<b>24</b>	<b>5</b>	<b>248</b>	<b>277</b>	<b>11</b>	<b>14</b>	<b>8</b>	<b>33</b>	<b>5</b>	<b>1151</b>	<b>24</b>	<b>1180</b>	<b>196</b>	<b>646</b>	<b>19</b>	<b>861</b>	<b>310</b>	<b>2041</b>	<b>2351</b>	
AM PHF			<b>0.770</b>				<b>0.483</b>			<b>0.967</b>					<b>0.848</b>			<b>0.893</b>		
PM PHF			<b>0.745</b>				<b>0.750</b>			<b>0.946</b>					<b>0.965</b>			<b>0.950</b>		

## VEHICLE AND PEDESTRIAN VOLUME SUMMARY

COUNT LOCATION	
CITY	Harpers Ferry
STATE	WV
DATE	3/2/2019
INTERSECTION	Int 3: US 340 @ Washington Street/Shoreline Drive
COUNT BY	AMT

Saturday

STREET	Washington St (Alt US 340)						Shoreline Drive						US 340						Total			PEAK HR		
	From North			From South			From East			From West			N-S	E-W	ALL									
	L	T	R	TOT	L	T	R	TOT	L	T	R	TOT				L	T	R	TOT					
1100 - 1115	4	2	35	41	8	5	6	19	8	154	3	165	32	158	0	190	60	355	415	415				
1115 - 1130	3	2	37	42	4	2	4	10	5	133	3	141	28	164	3	195	52	336	388	803				
1130 - 1145	3	4	45	52	2	2	7	11	5	165	3	173	29	166	5	200	63	373	436	1239				
1145 - 1200	6	1	35	42	5	2	6	13	4	161	4	169	30	167	5	202	55	371	426	1665				
1200 - 1215	1	4	22	27	4	4	4	12	5	140	4	149	35	158	6	199	39	348	387	1637				
1215 - 1230	2	1	49	52	4	1	8	13	0	165	4	169	37	188	5	230	65	399	464	1713				
1230 - 1245	8	1	35	44	8	3	6	17	5	177	2	184	32	166	7	205	61	389	450	1727				
1245 - 1300	6	1	37	44	0	4	2	6	5	187	2	194	24	129	3	156	50	350	400	1701				
1300 - 1315	8	2	20	30	2	1	2	5	0	166	2	168	23	175	4	202	35	370	405	1719				
1315 - 1330	6	3	23	32	9	5	6	20	4	193	3	200	19	161	5	185	52	385	437	1692				
1330 - 1345	8	1	56	65	1	0	2	3	4	163	6	173	35	172	5	212	68	385	453	1695				
1345 - 1400	3	0	26	29	4	3	3	10	4	160	5	169	26	188	9	223	39	392	431	1726				
Peak HR																								
1145 - 1245	17	7	141	165	21	10	24	55	14	643	14	671	134	679	23	836	220	1507	1727					
PHF																								
	0.793						0.809						0.912						0.909			0.930		

# VEHICLE AND PEDESTRIAN VOLUME SUMMARY

<b>COUNT LOCATION</b>	
<b>CITY</b>	Harpers Ferry
<b>STATE</b>	WV
<b>DATE</b>	8/28/2020
<b>INTERSECTION</b>	Int 4: Washington Street @ Union Street/Franklin Street
<b>COUNT BY</b>	AMT

Friday

STREET	Franklin Street From North					Union Street From South					Washington Street From East					Washington Street From West					Total			PEAK HR
	L	T	R	TOT		L	T	R	TOT		L	T	R	TOT		L	T	R	TOT		N-S	E-W	ALL	
0700 - 0715	0	1	2	3	7	4	0	3	7		2	3	0	5		0	3	2	5		10	10	20	20
0715 - 0730	0	0	1	1	5	4	0	1	5		1	3	0	4		0	7	2	9		6	13	19	39
0730 - 0745	1	1	0	2	13	6	0	7	13		5	4	0	9		0	9	4	13		15	22	37	76
0745 - 0800	0	1	1	2	12	9	0	3	12		2	7	1	10		0	6	3	9		14	19	33	109
0800 - 0815	1	5	2	8	5	2	0	3	5		2	8	1	11		1	2	0	3		13	14	27	116
0815 - 0830	1	1	2	4	19	7	0	12	19		0	1	0	1		0	7	4	11		23	12	35	132
0830 - 0845	0	0	1	1	11	6	0	5	11		3	13	1	17		1	7	4	12		12	29	41	136
0845 - 0900	0	0	2	2	21	7	0	14	21		3	10	1	14		0	13	1	14		23	28	51	154
1500 - 1515	5	1	10	16	22	13	0	9	22		7	20	0	27		1	19	3	23		38	50	88	88
1515 - 1530	1	4	7	12	24	8	1	15	24		10	16	1	27		2	21	2	25		36	52	88	176
1530 - 1545	4	1	9	14	30	18	1	11	30		1	14	1	16		1	11	3	15		44	31	75	251
1545 - 1600	3	1	5	9	18	8	1	9	18		3	11	3	17		2	13	6	21		27	38	65	316
1600 - 1615	3	2	7	12	26	15	2	9	26		8	16	1	25		0	20	3	23		38	48	86	314
1615 - 1630	1	0	3	4	23	13	3	7	23		11	17	0	28		1	19	3	23		27	51	78	304
1630 - 1645	0	1	2	3	14	5	0	9	14		4	15	0	19		1	14	3	18		17	37	54	283
1645 - 1700	0	1	5	6	19	9	1	9	19		3	16	0	19		0	12	4	16		25	35	60	278
1700 - 1715	0	1	1	2	24	15	2	7	24		10	33	2	45		0	18	5	23		26	68	94	286
1715 - 1730	0	0	0	0	12	5	2	5	12		4	21	0	25		0	11	5	16		12	41	53	261
1730 - 1745	4	0	3	7	20	7	1	12	20		3	13	0	16		2	4	8	14		27	30	57	264
1745 - 1800	3	2	4	9	21	12	0	9	21		6	12	2	20		1	13	3	17		30	37	67	271
Peak HR AM																								
0700 - 0800	1	3	4	8	37	23	0	14	37		10	17	1	28		0	25	11	36		45	64	109	
Peak HR PM																								
1545 - 1645	7	4	17	28	81	41	6	34	81		26	59	4	89		4	66	15	85		109	174	283	
AM PHF						0.712					0.700					0.692					0.736			
PM PHF						0.779					0.795					0.924					0.823			



# VEHICLE AND PEDESTRIAN VOLUME SUMMARY

<b>COUNT LOCATION</b>	
<b>CITY</b>	Harpers Ferry
<b>STATE</b>	WV
<b>DATE</b>	8/29/2020
<b>INTERSECTION</b>	Int 4: Washington Street @ Union Street/Franklin Street
<b>COUNT BY</b>	AMT

Saturday

STREET	Franklin Street From North				Union Street From South				Washington Street From East				Washington Street From West				Total				PEAK HR
	L	T	R	TOT	L	T	R	TOT	L	T	R	TOT	L	T	R	TOT	N-S	E-W	ALL		
1100 - 1115	3	4	8	15	9	0	15	24	4	13	1	18	0	15	3	18	39	36	75		
1115 - 1130	1	5	9	15	12	1	7	20	0	11	0	11	0	14	8	22	35	33	68		
1130 - 1145	1	6	3	10	8	2	15	25	5	10	0	15	2	15	2	19	35	34	69		
1145 - 1200	2	0	6	8	9	0	5	14	3	8	0	11	0	14	5	19	22	30	52		
1200 - 1215	3	0	7	10	6	0	13	19	3	8	2	13	1	12	3	16	29	29	58		
1215 - 1230	1	0	4	5	10	0	10	20	1	13	0	14	0	14	5	19	25	33	58		
1230 - 1245	1	1	4	6	6	0	6	12	3	8	1	12	0	6	6	12	18	24	42		
1245 - 1300	4	0	5	9	9	0	9	18	2	7	1	10	1	10	3	14	27	24	51		
1300 - 1315	1	0	2	3	7	0	9	16	1	7	0	8	1	14	8	23	19	31	50		
1315 - 1330	1	0	2	3	7	1	17	25	2	12	1	15	1	12	3	16	28	31	59		
1330 - 1345	2	0	4	6	0	1	21	22	1	21	1	23	1	10	4	15	28	38	66		
1345 - 1400	4	3	2	9	3	0	16	19	5	17	0	22	0	21	3	24	28	46	74		
Peak HR																					
1145 - 1245	7	1	21	29	31	0	34	65	10	37	3	50	1	46	19	66	94	116	210		
PHF																					
	0.725				0.813				0.893				0.868				0.905				

## VEHICLE AND PEDESTRIAN VOLUME SUMMARY

COUNT LOCATION	
CITY	Harpers Ferry
STATE	WV
DATE	8/28/2020
INTERSECTION	Int 5: Washington Street @ Columbia Street
COUNT BY	AMT

Friday

STREET	Columbia Street From North				Columbia Street From South				Washington Street From East				Washington Street From West				Total			PEAK HR
	L	T	R	TOT	L	T	R	TOT	L	T	R	TOT	L	T	R	TOT	N-S	E-W	ALL	
0700 - 0715	0	0	0	0	0	0	0	0	0	2	0	2	0	3	0	3	0	5	5	5
0715 - 0730	0	0	0	0	1	0	0	1	0	2	0	2	0	4	0	4	1	6	7	12
0730 - 0745	0	0	0	0	0	0	0	0	0	9	0	9	0	9	0	9	0	18	18	30
0745 - 0800	0	0	0	0	1	0	0	1	0	3	0	3	0	7	0	7	1	10	11	41
0800 - 0815	0	0	0	0	0	0	0	0	0	6	0	6	0	8	0	8	0	14	14	50
0815 - 0830	0	0	0	0	0	0	0	0	0	8	0	8	0	18	1	19	0	27	27	70
0830 - 0845	0	0	0	0	0	0	0	0	0	8	0	8	0	6	0	6	0	14	14	66
0845 - 0900	0	0	0	0	0	0	0	0	0	7	0	7	0	18	0	18	0	25	25	80
1500 - 1515	0	0	2	2	1	0	0	1	0	19	0	19	1	17	1	19	3	38	41	41
1515 - 1530	0	0	0	0	1	0	0	1	1	10	0	11	0	22	2	24	1	35	36	77
1530 - 1545	0	0	1	1	0	0	1	1	0	10	0	10	0	13	0	13	2	23	25	102
1545 - 1600	0	0	2	2	0	0	0	0	0	13	0	13	0	18	0	18	2	31	33	135
1600 - 1615	0	0	1	1	1	0	0	1	0	16	0	16	0	13	2	15	2	31	33	127
1615 - 1630	0	0	1	1	0	0	0	0	1	14	0	15	0	19	0	19	1	34	35	126
1630 - 1645	0	0	0	0	0	0	0	0	0	6	0	6	0	13	0	13	0	19	19	120
1645 - 1700	0	0	0	0	0	0	0	0	0	10	0	10	1	9	1	11	0	21	21	108
1700 - 1715	0	0	0	0	0	0	0	0	0	16	1	17	3	18	1	22	0	39	39	114
1715 - 1730	0	0	0	0	0	0	0	0	0	14	0	14	0	10	0	10	0	24	24	103
1730 - 1745	0	0	0	0	0	0	0	0	0	14	0	14	0	17	0	17	0	31	31	115
1745 - 1800	1	0	0	1	0	0	0	0	0	13	1	14	1	14	0	15	1	29	30	124
Peak HR AM																				
0700 - 0800	0	0	0	0	2	0	0	2	0	16	0	16	0	23	0	23	2	39	41	
Peak HR PM																				
1545 - 1645	0	0	4	4	1	0	0	1	1	49	0	50	0	63	2	65	5	115	120	
AM PHF	0.000				0.500				0.444				0.639				0.569			
PM PHF	0.500				0.250				0.781				0.855				0.857			

# VEHICLE AND PEDESTRIAN VOLUME SUMMARY

COUNT LOCATION	
CITY	Harpers Ferry
STATE	WV
DATE	8/29/2020
INTERSECTION	Int 5: Washington Street @ Columbia Street
COUNTY BY	AMT

Saturday

STREET	Columbia Street From North				Columbia Street From South				Washington Street From East				Washington Street From West				Total			PEAK HR											
	L	T	R	TOT	L	T	R	TOT	L	T	R	TOT	L	T	R	TOT	N-S	E-W	ALL												
1100 - 1115	0	0	0	0	0	0	0	0	0	14	0	14	0	14	0	14	1	24	1	26	0	40	40	40							
1115 - 1130	0	0	0	0	0	0	1	1	0	8	0	8	0	8	0	8	0	19	0	19	1	27	28	68							
1130 - 1145	0	0	0	0	0	0	0	0	0	12	0	12	0	12	0	12	0	23	0	23	0	35	35	103							
1145 - 1200	0	0	0	0	1	0	0	1	0	7	0	7	0	7	0	7	0	18	0	18	1	25	26	129							
1200 - 1215	0	0	0	0	0	0	0	0	0	7	0	7	0	7	0	7	0	13	0	13	0	20	20	109							
1215 - 1230	0	0	0	0	0	0	0	0	1	9	0	10	0	9	0	9	0	16	1	17	0	27	27	108							
1230 - 1245	0	0	0	0	0	0	1	1	0	8	0	8	0	8	0	8	0	13	0	13	1	21	22	95							
1245 - 1300	0	0	0	0	2	0	0	2	0	9	0	9	0	9	0	9	1	17	0	18	2	27	29	98							
1300 - 1315	0	0	1	1	1	0	0	1	0	7	0	7	0	7	0	7	1	17	1	19	2	26	28	106							
1315 - 1330	0	0	0	0	0	0	0	0	0	8	0	8	0	8	0	8	0	21	0	21	0	29	29	108							
1330 - 1345	0	0	0	0	0	0	0	0	0	11	2	13	0	11	2	13	0	32	0	32	0	45	45	131							
1345 - 1400	0	0	0	0	1	0	1	2	0	11	0	11	0	11	0	11	0	33	1	34	2	45	47	149							
Peak HR																															
1145 - 1245	0	0	0	0	1	0	1	2	1	31	0	32	0	60	1	61	2	93	95												
PHF																	0.000			0.500			0.800			0.847			0.880		

# **Appendix C**

## **Synchro Outputs**

# **Appendix C-1**

**2020 Existing Conditions  
AM Peak**

HCM 6th TWSC  
1: US 340 & Shenandoah Street

Hilltop Hotel TIS

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	1	5	1054	624	3
Future Vol, veh/h	3	1	5	1054	624	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	125	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	8	13	2
Mvmt Flow	3	1	5	1146	678	3

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1836	680	681	0	-	0
Stage 1	680	-	-	-	-	-
Stage 2	1156	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	83	451	912	-	-	-
Stage 1	503	-	-	-	-	-
Stage 2	300	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	83	451	912	-	-	-
Mov Cap-2 Maneuver	83	-	-	-	-	-
Stage 1	500	-	-	-	-	-
Stage 2	300	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	41.1	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	912	-	104	-	-
HCM Lane V/C Ratio	0.006	-	0.042	-	-
HCM Control Delay (s)	9	-	41.1	-	-
HCM Lane LOS	A	-	E	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

HCM 6th TWSC  
2: US 340 & Union Street

Hilltop Hotel TIS

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔	↑	↑	↔
Traffic Vol, veh/h	25	9	36	1034	589	36
Future Vol, veh/h	25	9	36	1034	589	36
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	200	-	-	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	8	13	2
Mvmt Flow	26	9	38	1088	620	38

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1784	620	658	0	-	0
Stage 1	620	-	-	-	-	-
Stage 2	1164	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	90	488	930	-	-	-
Stage 1	536	-	-	-	-	-
Stage 2	297	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	86	488	930	-	-	-
Mov Cap-2 Maneuver	86	-	-	-	-	-
Stage 1	514	-	-	-	-	-
Stage 2	297	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	52.8	0.3	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	930	-	110	-	-
HCM Lane V/C Ratio	0.041	-	0.325	-	-
HCM Control Delay (s)	9	-	52.8	-	-
HCM Lane LOS	A	-	F	-	-
HCM 95th %tile Q(veh)	0.1	-	1.3	-	-



# HCM 6th Signalized Intersection Summary

## 3: US 340 & Washington Street/Shoreline Drive

Hilltop Hotel TIS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗	↖	↕↕	↗	↖	↕↕	↗
Traffic Volume (veh/h)	40	2	197	16	4	9	281	1021	8	1	581	16
Future Volume (veh/h)	40	2	197	16	4	9	281	1021	8	1	581	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1688	1772	1772	1617	1772
Adj Flow Rate, veh/h	45	2	221	18	4	10	316	1147	9	1	653	18
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	8	2	2	13	2
Cap, veh/h	89	2	450	82	10	450	354	1563	732	2	854	417
Arrive On Green	0.30	0.30	0.30	0.30	0.30	0.30	0.21	0.49	0.49	0.00	0.28	0.28
Sat Flow, veh/h	3	7	1502	2	33	1502	1688	3207	1502	1688	3073	1502
Grp Volume(v), veh/h	47	0	221	22	0	10	316	1147	9	1	653	18
Grp Sat Flow(s),veh/h/ln	10	0	1502	36	0	1502	1688	1603	1502	1688	1537	1502
Q Serve(g_s), s	0.1	0.0	9.7	0.1	0.0	0.4	14.6	22.9	0.2	0.0	15.6	0.7
Cycle Q Clear(g_c), s	24.0	0.0	9.7	24.0	0.0	0.4	14.6	22.9	0.2	0.0	15.6	0.7
Prop In Lane	0.96		1.00	0.82		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	91	0	450	92	0	450	354	1563	732	2	854	417
V/C Ratio(X)	0.52	0.00	0.49	0.24	0.00	0.02	0.89	0.73	0.01	0.47	0.76	0.04
Avail Cap(c_a), veh/h	91	0	450	93	0	450	422	2965	1388	422	2841	1388
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.0	0.0	23.0	29.4	0.0	19.8	30.7	16.4	10.6	40.0	26.5	21.1
Incr Delay (d2), s/veh	5.0	0.0	0.8	1.3	0.0	0.0	18.4	0.7	0.0	112.7	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	3.5	0.5	0.0	0.1	7.3	7.1	0.1	0.1	5.3	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.0	0.0	23.8	30.7	0.0	19.8	49.1	17.1	10.6	152.7	28.0	21.2
LnGrp LOS	D	A	C	C	A	B	D	B	B	F	C	C
Approach Vol, veh/h		268			32			1472				672
Approach Delay, s/veh		27.4			27.3			23.9				28.0
Approach LOS		C			C			C				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	21.8	28.3		30.0	5.0	45.1		30.0				
Change Period (Y+Rc), s	5.0	6.0		6.0	5.0	6.0		6.0				
Max Green Setting (Gmax), s	20.0	74.0		14.0	20.0	74.0		24.0				
Max Q Clear Time (g_c+I1), s	16.6	17.6		26.0	2.0	24.9		26.0				
Green Ext Time (p_c), s	0.3	4.7		0.0	0.0	10.0		0.0				

### Intersection Summary

HCM 6th Ctrl Delay	25.4
HCM 6th LOS	C

### Notes

User approved pedestrian interval to be less than phase max green.

Intersection												
Int Delay, s/veh	4.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	25	11	10	17	1	23	0	14	1	3	4
Future Vol, veh/h	0	25	11	10	17	1	23	0	14	1	3	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	74	74	74	74	74	74	74	74	74	74	74	74
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	34	15	14	23	1	31	0	19	1	4	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	24	0	0	49	0	0	98	94	42	103	101	24
Stage 1	-	-	-	-	-	-	42	42	-	52	52	-
Stage 2	-	-	-	-	-	-	56	52	-	51	49	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1591	-	-	1558	-	-	884	796	1029	877	789	1052
Stage 1	-	-	-	-	-	-	972	860	-	961	852	-
Stage 2	-	-	-	-	-	-	956	852	-	962	854	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1591	-	-	1558	-	-	870	789	1029	855	782	1052
Mov Cap-2 Maneuver	-	-	-	-	-	-	870	789	-	855	782	-
Stage 1	-	-	-	-	-	-	972	860	-	961	844	-
Stage 2	-	-	-	-	-	-	938	844	-	944	854	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			2.6			9.1			9		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	924	1591	-	-	1558	-	-	908
HCM Lane V/C Ratio	0.054	-	-	-	0.009	-	-	0.012
HCM Control Delay (s)	9.1	0	-	-	7.3	0	-	9
HCM Lane LOS	A	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0

HCM 6th TWSC  
5: Columbia Street & Washington Street

Hilltop House Hotel TIS

Intersection												
Int Delay, s/veh	0.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	23	0	0	16	0	2	0	0	0	0	0
Future Vol, veh/h	0	23	0	0	16	0	2	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	57	57	57	57	57	57	57	57	57	57	57	57
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	40	0	0	28	0	4	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	28	0	0	40	0	0	68	68	40	68	68	28
Stage 1	-	-	-	-	-	-	40	40	-	28	28	-
Stage 2	-	-	-	-	-	-	28	28	-	40	40	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1585	-	-	1570	-	-	925	823	1031	925	823	1047
Stage 1	-	-	-	-	-	-	975	862	-	989	872	-
Stage 2	-	-	-	-	-	-	989	872	-	975	862	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1585	-	-	1570	-	-	925	823	1031	925	823	1047
Mov Cap-2 Maneuver	-	-	-	-	-	-	925	823	-	925	823	-
Stage 1	-	-	-	-	-	-	975	862	-	989	872	-
Stage 2	-	-	-	-	-	-	989	872	-	975	862	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	8.9	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	925	1585	-	-	1570	-	-	-
HCM Lane V/C Ratio	0.004	-	-	-	-	-	-	-
HCM Control Delay (s)	8.9	0	-	-	0	-	-	0
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	-

# **Appendix C-2**

**2020 Existing Conditions  
PM Peak**

HCM 6th TWSC  
1: US 340 & Shenandoah Street

Hilltop Hotel TIS

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	16	7	673	1229	4
Future Vol, veh/h	8	16	7	673	1229	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	125	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	10	13	2
Mvmt Flow	9	17	7	716	1307	4

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2039	1309	1311	0	-	0
Stage 1	1309	-	-	-	-	-
Stage 2	730	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	62	195	528	-	-	-
Stage 1	253	-	-	-	-	-
Stage 2	477	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	61	195	528	-	-	-
Mov Cap-2 Maneuver	61	-	-	-	-	-
Stage 1	250	-	-	-	-	-
Stage 2	477	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	45.9	0.1	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	528	-	113	-	-
HCM Lane V/C Ratio	0.014	-	0.226	-	-
HCM Control Delay (s)	11.9	-	45.9	-	-
HCM Lane LOS	B	-	E	-	-
HCM 95th %tile Q(veh)	0	-	0.8	-	-

HCM 6th TWSC  
2: US 340 & Union Street

Hilltop Hotel TIS

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔	↑	↑	↔
Traffic Vol, veh/h	13	17	23	667	1185	60
Future Vol, veh/h	13	17	23	667	1185	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	200	-	-	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	10	13	2
Mvmt Flow	14	18	25	717	1274	65

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2041	1274	1339	0	-	0
Stage 1	1274	-	-	-	-	-
Stage 2	767	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	62	204	515	-	-	-
Stage 1	263	-	-	-	-	-
Stage 2	458	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	59	204	515	-	-	-
Mov Cap-2 Maneuver	59	-	-	-	-	-
Stage 1	250	-	-	-	-	-
Stage 2	458	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	58	0.4	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	515	-	99	-	-
HCM Lane V/C Ratio	0.048	-	0.326	-	-
HCM Control Delay (s)	12.3	-	58	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.2	-	1.3	-	-

# HCM 6th Signalized Intersection Summary

## 3: US 340 & Washington Street/Shoreline Drive

Hilltop Hotel TIS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗	↘	↕↕	↗	↘	↕↕	↗
Traffic Volume (veh/h)	24	5	253	11	14	8	200	658	19	5	1173	24
Future Volume (veh/h)	24	5	253	11	14	8	200	658	19	5	1173	24
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1660	1772	1772	1617	1772
Adj Flow Rate, veh/h	25	5	266	12	15	8	211	693	20	5	1235	25
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	10	2	2	13	2
Cap, veh/h	256	44	244	143	154	244	249	2012	958	5	1516	741
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.15	0.64	0.64	0.00	0.49	0.49
Sat Flow, veh/h	1104	271	1502	513	952	1502	1688	3153	1502	1688	3073	1502
Grp Volume(v), veh/h	30	0	266	27	0	8	211	693	20	5	1235	25
Grp Sat Flow(s),veh/h/ln	1376	0	1502	1465	0	1502	1688	1577	1502	1688	1537	1502
Q Serve(g_s), s	1.1	0.0	14.0	0.0	0.0	0.4	10.5	8.8	0.4	0.3	29.4	0.7
Cycle Q Clear(g_c), s	2.2	0.0	14.0	1.1	0.0	0.4	10.5	8.8	0.4	0.3	29.4	0.7
Prop In Lane	0.83		1.00	0.44		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	300	0	244	298	0	244	249	2012	958	5	1516	741
V/C Ratio(X)	0.10	0.00	1.09	0.09	0.00	0.03	0.85	0.34	0.02	1.00	0.81	0.03
Avail Cap(c_a), veh/h	300	0	244	460	0	417	391	2703	1287	391	2634	1287
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.3	0.0	36.2	30.8	0.0	30.5	35.8	7.3	5.7	43.0	18.5	11.3
Incr Delay (d2), s/veh	0.1	0.0	84.5	0.1	0.0	0.1	9.7	0.1	0.0	188.4	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	10.8	0.5	0.0	0.1	4.7	2.3	0.1	0.4	9.1	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.4	0.0	120.7	30.9	0.0	30.5	45.5	7.4	5.7	231.4	19.7	11.3
LnGrp LOS	C	A	F	C	A	C	D	A	A	F	B	B
Approach Vol, veh/h		296			35			924			1265	
Approach Delay, s/veh		111.6			30.8			16.0			20.3	
Approach LOS		F			C			B			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	17.8	48.6		20.0	5.3	61.1		20.0				
Change Period (Y+Rc), s	5.0	6.0		6.0	5.0	6.0		6.0				
Max Green Setting (Gmax), s	20.0	74.0		14.0	20.0	74.0		24.0				
Max Q Clear Time (g_c+I1), s	12.5	31.4		16.0	2.3	10.8		3.1				
Green Ext Time (p_c), s	0.3	11.2		0.0	0.0	5.1		0.1				

### Intersection Summary

HCM 6th Ctrl Delay	29.6
HCM 6th LOS	C

### Notes

User approved pedestrian interval to be less than phase max green.



HCM 6th TWSC

4: Union Street/Franklin Street & Washington Street

Hilltop House Hotel TIS

Intersection												
Int Delay, s/veh	4.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	66	15	26	59	4	41	6	34	7	4	17
Future Vol, veh/h	4	66	15	26	59	4	41	6	34	7	4	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	80	18	32	72	5	50	7	41	9	5	21

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	77	0	0	98	0	0	251	240	89	262	247	75
Stage 1	-	-	-	-	-	-	99	99	-	139	139	-
Stage 2	-	-	-	-	-	-	152	141	-	123	108	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1522	-	-	1495	-	-	702	661	969	691	655	986
Stage 1	-	-	-	-	-	-	907	813	-	864	782	-
Stage 2	-	-	-	-	-	-	850	780	-	881	806	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1522	-	-	1495	-	-	670	644	969	643	639	986
Mov Cap-2 Maneuver	-	-	-	-	-	-	670	644	-	643	639	-
Stage 1	-	-	-	-	-	-	904	811	-	861	765	-
Stage 2	-	-	-	-	-	-	809	763	-	833	804	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			2.2			10.4			9.6		
HCM LOS							B			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	767	1522	-	-	1495	-	-	814
HCM Lane V/C Ratio	0.129	0.003	-	-	0.021	-	-	0.042
HCM Control Delay (s)	10.4	7.4	0	-	7.5	0	-	9.6
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.4	0	-	-	0.1	-	-	0.1

HCM 6th TWSC  
 5: Columbia Street & Washington Street

Hilltop House Hotel TIS

Intersection												
Int Delay, s/veh	0.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	63	2	1	49	0	1	0	0	0	0	4
Future Vol, veh/h	0	63	2	1	49	0	1	0	0	0	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	73	2	1	57	0	1	0	0	0	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	57	0	0	75	0	0	136	133	74	133	134	57
Stage 1	-	-	-	-	-	-	74	74	-	59	59	-
Stage 2	-	-	-	-	-	-	62	59	-	74	75	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1547	-	-	1524	-	-	835	758	988	839	757	1009
Stage 1	-	-	-	-	-	-	935	833	-	953	846	-
Stage 2	-	-	-	-	-	-	949	846	-	935	833	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1547	-	-	1524	-	-	831	757	988	838	756	1009
Mov Cap-2 Maneuver	-	-	-	-	-	-	831	757	-	838	756	-
Stage 1	-	-	-	-	-	-	935	833	-	953	845	-
Stage 2	-	-	-	-	-	-	944	845	-	935	833	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.1			9.3			8.6		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	831	1547	-	-	1524	-	-	1009
HCM Lane V/C Ratio	0.001	-	-	-	0.001	-	-	0.005
HCM Control Delay (s)	9.3	0	-	-	7.4	0	-	8.6
HCM Lane LOS	A	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

# **Appendix C-3**

**2020 Existing Conditions  
SAT Peak**

HCM 6th TWSC  
 1: US 340 & Shenandoah Street

Hilltop House Hotel TIS

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	10	12	721	719	28
Future Vol, veh/h	11	10	12	721	719	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	125	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	10	13	2
Mvmt Flow	11	10	13	751	749	29

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1541	764	778	0	-	0
Stage 1	764	-	-	-	-	-
Stage 2	777	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	127	404	839	-	-	-
Stage 1	460	-	-	-	-	-
Stage 2	453	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	125	404	839	-	-	-
Mov Cap-2 Maneuver	125	-	-	-	-	-
Stage 1	453	-	-	-	-	-
Stage 2	453	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	26.9	0.2	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	839	-	186	-	-
HCM Lane V/C Ratio	0.015	-	0.118	-	-
HCM Control Delay (s)	9.4	-	26.9	-	-
HCM Lane LOS	A	-	D	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

HCM 6th TWSC  
2: US 340 & Union Street

Hilltop House Hotel TIS

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔	↑	↑	↔
Traffic Vol, veh/h	30	17	30	703	676	53
Future Vol, veh/h	30	17	30	703	676	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	200	-	-	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	10	13	2
Mvmt Flow	31	18	31	732	704	55

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1498	704	759	0	-	0
Stage 1	704	-	-	-	-	-
Stage 2	794	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	135	437	852	-	-	-
Stage 1	490	-	-	-	-	-
Stage 2	445	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	130	437	852	-	-	-
Mov Cap-2 Maneuver	130	-	-	-	-	-
Stage 1	472	-	-	-	-	-
Stage 2	445	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	33.6	0.4	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	852	-	174	-	-
HCM Lane V/C Ratio	0.037	-	0.281	-	-
HCM Control Delay (s)	9.4	-	33.6	-	-
HCM Lane LOS	A	-	D	-	-
HCM 95th %tile Q(veh)	0.1	-	1.1	-	-

# HCM 6th Signalized Intersection Summary

## 3: US 340 & Washington Street/Shoreline Drive

Hilltop House Hotel TIS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗	↖	↕↕	↗	↖	↕↕	↗
Traffic Volume (veh/h)	17	7	144	21	10	24	137	692	23	14	665	14
Future Volume (veh/h)	17	7	144	21	10	24	137	692	23	14	665	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1660	1772	1772	1617	1772
Adj Flow Rate, veh/h	18	7	153	22	11	26	146	736	24	15	707	15
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	10	2	2	13	2
Cap, veh/h	273	82	214	246	94	214	191	1453	692	15	1096	536
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.11	0.46	0.46	0.01	0.36	0.36
Sat Flow, veh/h	925	576	1502	770	660	1502	1688	3153	1502	1688	3073	1502
Grp Volume(v), veh/h	25	0	153	33	0	26	146	736	24	15	707	15
Grp Sat Flow(s),veh/h/ln	1501	0	1502	1429	0	1502	1688	1577	1502	1688	1537	1502
Q Serve(g_s), s	0.0	0.0	4.3	0.0	0.0	0.7	3.7	7.2	0.4	0.4	8.4	0.3
Cycle Q Clear(g_c), s	0.5	0.0	4.3	0.7	0.0	0.7	3.7	7.2	0.4	0.4	8.4	0.3
Prop In Lane	0.72		1.00	0.67		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	355	0	214	340	0	214	191	1453	692	15	1096	536
V/C Ratio(X)	0.07	0.00	0.72	0.10	0.00	0.12	0.76	0.51	0.03	0.97	0.65	0.03
Avail Cap(c_a), veh/h	614	0	480	894	0	822	770	5322	2535	770	5187	2535
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.4	0.0	18.0	16.4	0.0	16.4	18.9	8.3	6.5	21.7	11.8	9.2
Incr Delay (d2), s/veh	0.1	0.0	4.4	0.1	0.0	0.3	6.2	0.3	0.0	99.0	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	1.6	0.3	0.0	0.2	1.5	1.5	0.1	0.6	2.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.4	0.0	22.4	16.6	0.0	16.7	25.1	8.6	6.5	120.7	12.4	9.2
LnGrp LOS	B	A	C	B	A	B	C	A	A	F	B	A
Approach Vol, veh/h		178			59			906			737	
Approach Delay, s/veh		21.5			16.6			11.2			14.6	
Approach LOS		C			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	21.6		12.2	5.4	26.2		12.2				
Change Period (Y+Rc), s	5.0	6.0		6.0	5.0	6.0		6.0				
Max Green Setting (Gmax), s	20.0	74.0		14.0	20.0	74.0		24.0				
Max Q Clear Time (g_c+I1), s	5.7	10.4		6.3	2.4	9.2		2.7				
Green Ext Time (p_c), s	0.3	5.2		0.3	0.0	5.5		0.2				

### Intersection Summary

HCM 6th Ctrl Delay	13.7
HCM 6th LOS	B

### Notes

User approved pedestrian interval to be less than phase max green.

Intersection												
Int Delay, s/veh	4.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	46	19	10	37	3	31	0	34	7	1	21
Future Vol, veh/h	1	46	19	10	37	3	31	0	34	7	1	21
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	51	21	11	41	3	34	0	37	8	1	23

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	44	0	0	72	0	0	141	130	62	147	139	43
Stage 1	-	-	-	-	-	-	64	64	-	65	65	-
Stage 2	-	-	-	-	-	-	77	66	-	82	74	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1564	-	-	1528	-	-	829	761	1003	821	752	1027
Stage 1	-	-	-	-	-	-	947	842	-	946	841	-
Stage 2	-	-	-	-	-	-	932	840	-	926	833	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1564	-	-	1528	-	-	804	755	1003	786	746	1027
Mov Cap-2 Maneuver	-	-	-	-	-	-	804	755	-	786	746	-
Stage 1	-	-	-	-	-	-	946	841	-	945	835	-
Stage 2	-	-	-	-	-	-	903	834	-	891	832	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1.5			9.4			8.9		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	897	1564	-	-	1528	-	-	945
HCM Lane V/C Ratio	0.08	0.001	-	-	0.007	-	-	0.034
HCM Control Delay (s)	9.4	7.3	0	-	7.4	0	-	8.9
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.1



HCM 6th TWSC  
5: Columbia Street & Washington Street

Hilltop House Hotel TIS

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	60	1	1	31	0	1	0	1	0	0	0
Future Vol, veh/h	0	60	1	1	31	0	1	0	1	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	68	1	1	35	0	1	0	1	0	0	0

Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	35	0	0	69	0	0	106	106	69	106	106	35
Stage 1	-	-	-	-	-	-	69	69	-	37	37	-
Stage 2	-	-	-	-	-	-	37	37	-	69	69	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1576	-	-	1532	-	-	873	784	994	873	784	1038
Stage 1	-	-	-	-	-	-	941	837	-	978	864	-
Stage 2	-	-	-	-	-	-	978	864	-	941	837	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1576	-	-	1532	-	-	872	783	994	871	783	1038
Mov Cap-2 Maneuver	-	-	-	-	-	-	872	783	-	871	783	-
Stage 1	-	-	-	-	-	-	941	837	-	978	863	-
Stage 2	-	-	-	-	-	-	977	863	-	940	837	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	8.9	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	929	1576	-	-	1532	-	-	-
HCM Lane V/C Ratio	0.002	-	-	-	0.001	-	-	-
HCM Control Delay (s)	8.9	0	-	-	7.4	0	-	0
HCM Lane LOS	A	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	-

# **Appendix C-4**

**2022 No Build Conditions  
AM Peak**

HCM 6th TWSC  
 1: US 340 & Shenandoah Street

Hilltop House Hotel TIS

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔	↑	↑	
Traffic Vol, veh/h	3	1	5	1094	648	3
Future Vol, veh/h	3	1	5	1094	648	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	125	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	8	13	2
Mvmt Flow	3	1	5	1189	704	3

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1905	706	707	0	-	0
Stage 1	706	-	-	-	-	-
Stage 2	1199	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	75	436	891	-	-	-
Stage 1	489	-	-	-	-	-
Stage 2	286	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	75	436	891	-	-	-
Mov Cap-2 Maneuver	75	-	-	-	-	-
Stage 1	486	-	-	-	-	-
Stage 2	286	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	44.7	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	891	-	95	-	-
HCM Lane V/C Ratio	0.006	-	0.046	-	-
HCM Control Delay (s)	9.1	-	44.7	-	-
HCM Lane LOS	A	-	E	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

HCM 6th TWSC  
2: US 340 & Union Street

Hilltop House Hotel TIS

Intersection						
Int Delay, s/veh	1.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔	↑	↑	↔
Traffic Vol, veh/h	26	9	37	1073	612	37
Future Vol, veh/h	26	9	37	1073	612	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	200	-	-	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	8	13	2
Mvmt Flow	27	9	39	1129	644	39

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1851	644	683	0	-	0
Stage 1	644	-	-	-	-	-
Stage 2	1207	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	82	473	910	-	-	-
Stage 1	523	-	-	-	-	-
Stage 2	283	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	78	473	910	-	-	-
Mov Cap-2 Maneuver	78	-	-	-	-	-
Stage 1	501	-	-	-	-	-
Stage 2	283	-	-	-	-	-























Approach	EB	NB	SB
HCM Control Delay, s	61.5	0.3	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	910	-	99	-	-
HCM Lane V/C Ratio	0.043	-	0.372	-	-
HCM Control Delay (s)	9.1	-	61.5	-	-
HCM Lane LOS	A	-	F	-	-
HCM 95th %tile Q(veh)	0.1	-	1.5	-	-

# HCM 6th Signalized Intersection Summary

## 3: US 340 & Washington Street/Shoreline Drive

Hilltop House Hotel TIS

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	2	204	17	4	9	292	1059	8	1	603	17
Future Volume (veh/h)	42	2	204	17	4	9	292	1059	8	1	603	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1688	1772	1772	1617	1772
Adj Flow Rate, veh/h	47	2	229	19	4	10	328	1190	9	1	678	19
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	8	2	2	13	2
Cap, veh/h	86	2	438	80	9	438	365	1609	753	2	879	430
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.22	0.50	0.50	0.00	0.29	0.29
Sat Flow, veh/h	1	6	1502	0	31	1502	1688	3207	1502	1688	3073	1502
Grp Volume(v), veh/h	49	0	229	23	0	10	328	1190	9	1	678	19
Grp Sat Flow(s),veh/h/ln	7	0	1502	32	0	1502	1688	1603	1502	1688	1537	1502
Q Serve(g_s), s	0.0	0.0	10.5	0.0	0.0	0.4	15.6	24.2	0.2	0.0	16.6	0.8
Cycle Q Clear(g_c), s	24.0	0.0	10.5	24.0	0.0	0.4	15.6	24.2	0.2	0.0	16.6	0.8
Prop In Lane	0.96		1.00	0.83		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	88	0	438	89	0	438	365	1609	753	2	879	430
V/C Ratio(X)	0.56	0.00	0.52	0.26	0.00	0.02	0.90	0.74	0.01	0.49	0.77	0.04
Avail Cap(c_a), veh/h	88	0	438	89	0	438	410	2881	1349	410	2761	1349
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.3	0.0	24.4	31.8	0.0	20.8	31.4	16.3	10.3	41.1	26.9	21.3
Incr Delay (d2), s/veh	7.8	0.0	1.1	1.5	0.0	0.0	20.8	0.7	0.0	119.2	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	3.8	0.5	0.0	0.1	7.9	7.6	0.1	0.1	5.7	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.0	0.0	25.5	33.3	0.0	20.8	52.2	16.9	10.3	160.4	28.4	21.3
LnGrp LOS	D	A	C	C	A	C	D	B	B	F	C	C
Approach Vol, veh/h		278			33			1527			698	
Approach Delay, s/veh		29.5			29.5			24.5			28.4	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	22.8	29.6		30.0	5.0	47.3		30.0				
Change Period (Y+Rc), s	5.0	6.0		6.0	5.0	6.0		6.0				
Max Green Setting (Gmax), s	20.0	74.0		14.0	20.0	74.0		24.0				
Max Q Clear Time (g_c+I1), s	17.6	18.6		26.0	2.0	26.2		26.0				
Green Ext Time (p_c), s	0.3	4.9		0.0	0.0	10.6		0.0				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			26.2									
HCM 6th LOS			C									
<b>Notes</b>												
User approved pedestrian interval to be less than phase max green.												



Intersection												
Int Delay, s/veh	4.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	26	11	10	18	1	24	0	15	1	3	4
Future Vol, veh/h	0	26	11	10	18	1	24	0	15	1	3	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	74	74	74	74	74	74	74	74	74	74	74	74
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	35	15	14	24	1	32	0	20	1	4	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	25	0	0	50	0	0	100	96	43	106	103	25
Stage 1	-	-	-	-	-	-	43	43	-	53	53	-
Stage 2	-	-	-	-	-	-	57	53	-	53	50	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1589	-	-	1557	-	-	881	794	1027	873	787	1051
Stage 1	-	-	-	-	-	-	971	859	-	960	851	-
Stage 2	-	-	-	-	-	-	955	851	-	960	853	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1589	-	-	1557	-	-	867	787	1027	850	780	1051
Mov Cap-2 Maneuver	-	-	-	-	-	-	867	787	-	850	780	-
Stage 1	-	-	-	-	-	-	971	859	-	960	843	-
Stage 2	-	-	-	-	-	-	937	843	-	941	853	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			2.5			9.1			9		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	922	1589	-	-	1557	-	-	906
HCM Lane V/C Ratio	0.057	-	-	-	0.009	-	-	0.012
HCM Control Delay (s)	9.1	0	-	-	7.3	0	-	9
HCM Lane LOS	A	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0

HCM 6th TWSC  
 5: Columbia Street & Washington Street

Hilltop House Hotel TIS

Intersection												
Int Delay, s/veh	0.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	23	0	0	16	0	2	0	0	0	0	0
Future Vol, veh/h	0	23	0	0	16	0	2	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	57	57	57	57	57	57	57	57	57	57	57	57
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	40	0	0	28	0	4	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	28	0	0	40	0	0	68	68	40	68	68	28
Stage 1	-	-	-	-	-	-	40	40	-	28	28	-
Stage 2	-	-	-	-	-	-	28	28	-	40	40	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1585	-	-	1570	-	-	925	823	1031	925	823	1047
Stage 1	-	-	-	-	-	-	975	862	-	989	872	-
Stage 2	-	-	-	-	-	-	989	872	-	975	862	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1585	-	-	1570	-	-	925	823	1031	925	823	1047
Mov Cap-2 Maneuver	-	-	-	-	-	-	925	823	-	925	823	-
Stage 1	-	-	-	-	-	-	975	862	-	989	872	-
Stage 2	-	-	-	-	-	-	989	872	-	975	862	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0			8.9			0		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	925	1585	-	-	1570	-	-	-
HCM Lane V/C Ratio	0.004	-	-	-	-	-	-	-
HCM Control Delay (s)	8.9	0	-	-	0	-	-	0
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	-

# **Appendix C-5**

**2022 No Build Conditions  
PM Peak**

HCM 6th TWSC  
 1: US 340 & Shenandoah Street

Hilltop House Hotel TIS

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	17	7	698	1275	4
Future Vol, veh/h	8	17	7	698	1275	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	125	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	10	13	2
Mvmt Flow	9	18	7	743	1356	4

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2115	1358	1360	0	-	0
Stage 1	1358	-	-	-	-	-
Stage 2	757	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	56	182	505	-	-	-
Stage 1	239	-	-	-	-	-
Stage 2	463	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	55	182	505	-	-	-
Mov Cap-2 Maneuver	55	-	-	-	-	-
Stage 1	236	-	-	-	-	-
Stage 2	463	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	50.5	0.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	505	-	105	-	-
HCM Lane V/C Ratio	0.015	-	0.253	-	-
HCM Control Delay (s)	12.2	-	50.5	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0	-	0.9	-	-

HCM 6th TWSC  
2: US 340 & Union Street

Hilltop House Hotel TIS

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘↗		↘	↑	↑	↘
Traffic Vol, veh/h	13	18	24	692	1230	62
Future Vol, veh/h	13	18	24	692	1230	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	200	-	-	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	10	13	2
Mvmt Flow	14	19	26	744	1323	67

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2119	1323	1390	0	-	0
Stage 1	1323	-	-	-	-	-
Stage 2	796	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	55	191	492	-	-	-
Stage 1	249	-	-	-	-	-
Stage 2	444	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	52	191	492	-	-	-
Mov Cap-2 Maneuver	52	-	-	-	-	-
Stage 1	236	-	-	-	-	-
Stage 2	444	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	66.8	0.4	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	492	-	90	-	-
HCM Lane V/C Ratio	0.052	-	0.37	-	-
HCM Control Delay (s)	12.7	-	66.8	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.2	-	1.5	-	-

# HCM 6th Signalized Intersection Summary

## 3: US 340 & Washington Street/Shoreline Drive

Hilltop House Hotel TIS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗	↘	↕↕	↗	↘	↕↕	↗
Traffic Volume (veh/h)	25	5	263	11	15	8	208	683	20	6	1217	25
Future Volume (veh/h)	25	5	263	11	15	8	208	683	20	6	1217	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1660	1772	1772	1617	1772
Adj Flow Rate, veh/h	26	5	277	12	16	8	219	719	21	6	1281	26
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	10	2	2	13	2
Cap, veh/h	100	13	239	66	63	239	254	2050	976	6	1546	755
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.15	0.65	0.65	0.00	0.50	0.50
Sat Flow, veh/h	168	79	1502	57	398	1502	1688	3153	1502	1688	3073	1502
Grp Volume(v), veh/h	31	0	277	28	0	8	219	719	21	6	1281	26
Grp Sat Flow(s),veh/h/ln	247	0	1502	456	0	1502	1688	1577	1502	1688	1537	1502
Q Serve(g_s), s	1.5	0.0	14.4	0.2	0.0	0.4	11.5	9.4	0.5	0.3	32.3	0.8
Cycle Q Clear(g_c), s	13.9	0.0	14.4	13.3	0.0	0.4	11.5	9.4	0.5	0.3	32.3	0.8
Prop In Lane	0.84		1.00	0.43		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	112	0	239	129	0	239	254	2050	976	6	1546	755
V/C Ratio(X)	0.28	0.00	1.16	0.22	0.00	0.03	0.86	0.35	0.02	0.99	0.83	0.03
Avail Cap(c_a), veh/h	112	0	239	277	0	397	372	2570	1224	372	2505	1224
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.0	0.0	38.2	33.2	0.0	32.3	37.6	7.2	5.6	45.2	19.2	11.4
Incr Delay (d2), s/veh	1.3	0.0	108.4	0.8	0.0	0.1	12.9	0.1	0.0	168.3	1.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	12.4	0.6	0.0	0.2	5.4	2.5	0.1	0.4	10.1	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.3	0.0	146.5	34.1	0.0	32.3	50.5	7.3	5.6	213.5	20.5	11.4
LnGrp LOS	D	A	F	C	A	C	D	A	A	F	C	B
Approach Vol, veh/h		308			36			959			1313	
Approach Delay, s/veh		136.0			33.7			17.1			21.2	
Approach LOS		F			C			B			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	18.7	51.8		20.9	5.3	65.2		20.9				
Change Period (Y+Rc), s	5.0	6.0		6.0	5.0	6.0		6.0				
Max Green Setting (Gmax), s	20.0	74.0		14.0	20.0	74.0		24.0				
Max Q Clear Time (g_c+I1), s	13.5	34.3		16.4	2.3	11.4		15.3				
Green Ext Time (p_c), s	0.3	11.7		0.0	0.0	5.3		0.1				

### Intersection Summary

HCM 6th Ctrl Delay	33.4
HCM 6th LOS	C

### Notes

User approved pedestrian interval to be less than phase max green.



HCM 6th TWSC

4: Union Street/Franklin Street & Washington Street

Hilltop House Hotel TIS

Intersection												
Int Delay, s/veh	4.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	68	16	27	61	4	43	6	35	7	4	18
Future Vol, veh/h	4	68	16	27	61	4	43	6	35	7	4	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	83	20	33	74	5	52	7	43	9	5	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	79	0	0	103	0	0	259	248	93	271	256	77
Stage 1	-	-	-	-	-	-	103	103	-	143	143	-
Stage 2	-	-	-	-	-	-	156	145	-	128	113	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1519	-	-	1489	-	-	694	655	964	682	648	984
Stage 1	-	-	-	-	-	-	903	810	-	860	779	-
Stage 2	-	-	-	-	-	-	846	777	-	876	802	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1519	-	-	1489	-	-	661	638	964	634	631	984
Mov Cap-2 Maneuver	-	-	-	-	-	-	661	638	-	634	631	-
Stage 1	-	-	-	-	-	-	900	808	-	857	761	-
Stage 2	-	-	-	-	-	-	803	759	-	827	800	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			2.2			10.5			9.6		
HCM LOS							B			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	758	1519	-	-	1489	-	-	813
HCM Lane V/C Ratio	0.135	0.003	-	-	0.022	-	-	0.044
HCM Control Delay (s)	10.5	7.4	0	-	7.5	0	-	9.6
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.5	0	-	-	0.1	-	-	0.1

HCM 6th TWSC  
 5: Columbia Street & Washington Street

Hilltop House Hotel TIS

Intersection												
Int Delay, s/veh	0.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	65	2	1	51	0	1	0	0	0	0	4
Future Vol, veh/h	0	65	2	1	51	0	1	0	0	0	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	76	2	1	59	0	1	0	0	0	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	59	0	0	78	0	0	141	138	77	138	139	59
Stage 1	-	-	-	-	-	-	77	77	-	61	61	-
Stage 2	-	-	-	-	-	-	64	61	-	77	78	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1545	-	-	1520	-	-	829	753	984	833	752	1007
Stage 1	-	-	-	-	-	-	932	831	-	950	844	-
Stage 2	-	-	-	-	-	-	947	844	-	932	830	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1545	-	-	1520	-	-	825	752	984	832	751	1007
Mov Cap-2 Maneuver	-	-	-	-	-	-	825	752	-	832	751	-
Stage 1	-	-	-	-	-	-	932	831	-	950	843	-
Stage 2	-	-	-	-	-	-	942	843	-	932	830	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.1			9.4			8.6		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	825	1545	-	-	1520	-	-	1007
HCM Lane V/C Ratio	0.001	-	-	-	0.001	-	-	0.005
HCM Control Delay (s)	9.4	0	-	-	7.4	0	-	8.6
HCM Lane LOS	A	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

# **Appendix C-6**

**2022 No Build Conditions  
SAT Peak**

HCM 6th TWSC  
1: US 340 & Shenandoah Street

Hilltop House Hotel TIS

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	10	12	748	746	29
Future Vol, veh/h	11	10	12	748	746	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	125	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	10	13	2
Mvmt Flow	11	10	13	779	777	30

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1597	792	807	0	-	0
Stage 1	792	-	-	-	-	-
Stage 2	805	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	117	389	818	-	-	-
Stage 1	446	-	-	-	-	-
Stage 2	440	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	115	389	818	-	-	-
Mov Cap-2 Maneuver	115	-	-	-	-	-
Stage 1	439	-	-	-	-	-
Stage 2	440	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	28.8	0.1	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	818	-	173	-	-
HCM Lane V/C Ratio	0.015	-	0.126	-	-
HCM Control Delay (s)	9.5	-	28.8	-	-
HCM Lane LOS	A	-	D	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

HCM 6th TWSC  
2: US 340 & Union Street

Hilltop House Hotel TIS

Intersection						
Int Delay, s/veh	1.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	31	18	31	730	702	55
Future Vol, veh/h	31	18	31	730	702	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	200	-	-	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	10	13	2
Mvmt Flow	32	19	32	760	731	57

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1555	731	788	0	-	0
Stage 1	731	-	-	-	-	-
Stage 2	824	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	124	422	831	-	-	-
Stage 1	476	-	-	-	-	-
Stage 2	431	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	119	422	831	-	-	-
Mov Cap-2 Maneuver	119	-	-	-	-	-
Stage 1	457	-	-	-	-	-
Stage 2	431	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	37.1	0.4	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	831	-	162	-	-
HCM Lane V/C Ratio	0.039	-	0.315	-	-
HCM Control Delay (s)	9.5	-	37.1	-	-
HCM Lane LOS	A	-	E	-	-
HCM 95th %tile Q(veh)	0.1	-	1.3	-	-

# HCM 6th Signalized Intersection Summary

## 3: US 340 & Washington Street/Shoreline Drive

Hilltop House Hotel TIS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗	↗	↕↕	↗	↗	↕↕	↗
Traffic Volume (veh/h)	18	7	149	22	10	25	142	718	24	15	690	15
Future Volume (veh/h)	18	7	149	22	10	25	142	718	24	15	690	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1660	1772	1772	1617	1772
Adj Flow Rate, veh/h	19	7	159	23	11	27	151	764	26	16	734	16
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	10	2	2	13	2
Cap, veh/h	275	79	219	248	91	219	197	1484	707	17	1118	546
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.12	0.47	0.47	0.01	0.36	0.36
Sat Flow, veh/h	944	542	1502	789	626	1502	1688	3153	1502	1688	3073	1502
Grp Volume(v), veh/h	26	0	159	34	0	27	151	764	26	16	734	16
Grp Sat Flow(s),veh/h/ln	1486	0	1502	1415	0	1502	1688	1577	1502	1688	1537	1502
Q Serve(g_s), s	0.0	0.0	4.6	0.0	0.0	0.7	4.0	7.7	0.4	0.4	9.1	0.3
Cycle Q Clear(g_c), s	0.8	0.0	4.6	0.8	0.0	0.7	4.0	7.7	0.4	0.4	9.1	0.3
Prop In Lane	0.73		1.00	0.68		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	354	0	219	339	0	219	197	1484	707	17	1118	546
V/C Ratio(X)	0.07	0.00	0.73	0.10	0.00	0.12	0.77	0.51	0.04	0.96	0.66	0.03
Avail Cap(c_a), veh/h	589	0	462	856	0	792	741	5125	2441	741	4995	2441
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.8	0.0	18.6	16.9	0.0	16.9	19.5	8.4	6.5	22.5	12.1	9.3
Incr Delay (d2), s/veh	0.1	0.0	4.5	0.1	0.0	0.2	6.1	0.3	0.0	93.1	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	1.7	0.3	0.0	0.2	1.6	1.6	0.1	0.6	2.3	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.9	0.0	23.1	17.1	0.0	17.2	25.6	8.7	6.5	115.7	12.8	9.3
LnGrp LOS	B	A	C	B	A	B	C	A	A	F	B	A
Approach Vol, veh/h		185			61			941				766
Approach Delay, s/veh		22.2			17.1			11.3				14.9
Approach LOS		C			B			B				B
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.3	22.6		12.6	5.4	27.4		12.6				
Change Period (Y+Rc), s	5.0	6.0		6.0	5.0	6.0		6.0				
Max Green Setting (Gmax), s	20.0	74.0		14.0	20.0	74.0		24.0				
Max Q Clear Time (g_c+I1), s	6.0	11.1		6.6	2.4	9.7		2.8				
Green Ext Time (p_c), s	0.3	5.5		0.4	0.0	5.8		0.2				

### Intersection Summary

HCM 6th Ctrl Delay	13.9
HCM 6th LOS	B

### Notes

User approved pedestrian interval to be less than phase max green.



Intersection												
Int Delay, s/veh	4.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	48	20	10	38	3	32	0	35	7	1	22
Future Vol, veh/h	1	48	20	10	38	3	32	0	35	7	1	22
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	53	22	11	42	3	35	0	38	8	1	24

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	45	0	0	75	0	0	144	133	64	151	143	44
Stage 1	-	-	-	-	-	-	66	66	-	66	66	-
Stage 2	-	-	-	-	-	-	78	67	-	85	77	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1563	-	-	1524	-	-	825	758	1000	816	748	1026
Stage 1	-	-	-	-	-	-	945	840	-	945	840	-
Stage 2	-	-	-	-	-	-	931	839	-	923	831	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1563	-	-	1524	-	-	799	752	1000	780	742	1026
Mov Cap-2 Maneuver	-	-	-	-	-	-	799	752	-	780	742	-
Stage 1	-	-	-	-	-	-	944	839	-	944	834	-
Stage 2	-	-	-	-	-	-	902	833	-	887	830	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1.4			9.4			9		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	893	1563	-	-	1524	-	-	944
HCM Lane V/C Ratio	0.082	0.001	-	-	0.007	-	-	0.035
HCM Control Delay (s)	9.4	7.3	0	-	7.4	0	-	9
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.1

HCM 6th TWSC  
5: Columbia Street & Washington Street

Hilltop House Hotel TIS

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	62	1	1	32	0	1	0	1	0	0	0
Future Vol, veh/h	0	62	1	1	32	0	1	0	1	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	70	1	1	36	0	1	0	1	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	36	0	0	71	0	0	109	109	71	109	109	36
Stage 1	-	-	-	-	-	-	71	71	-	38	38	-
Stage 2	-	-	-	-	-	-	38	38	-	71	71	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1575	-	-	1529	-	-	870	781	991	870	781	1037
Stage 1	-	-	-	-	-	-	939	836	-	977	863	-
Stage 2	-	-	-	-	-	-	977	863	-	939	836	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1575	-	-	1529	-	-	869	780	991	868	780	1037
Mov Cap-2 Maneuver	-	-	-	-	-	-	869	780	-	868	780	-
Stage 1	-	-	-	-	-	-	939	836	-	977	862	-
Stage 2	-	-	-	-	-	-	976	862	-	938	836	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.2			8.9			0		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	926	1575	-	-	1529	-	-	-
HCM Lane V/C Ratio	0.002	-	-	-	0.001	-	-	-
HCM Control Delay (s)	8.9	0	-	-	7.4	0	-	0
HCM Lane LOS	A	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	-

# **Appendix C-7**

**2022 Full Build Conditions  
AM Peak**

HCM 6th TWSC  
 1: US 340 & Shenandoah Street

Hilltop House Hotel TIS

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	6	5	1107	659	7
Future Vol, veh/h	3	6	5	1107	659	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	125	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	8	13	2
Mvmt Flow	3	7	5	1203	716	8

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1933	720	724	0	-	0
Stage 1	720	-	-	-	-	-
Stage 2	1213	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	73	428	879	-	-	-
Stage 1	482	-	-	-	-	-
Stage 2	281	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	73	428	879	-	-	-
Mov Cap-2 Maneuver	73	-	-	-	-	-
Stage 1	479	-	-	-	-	-
Stage 2	281	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	28.5	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	879	-	163	-	-
HCM Lane V/C Ratio	0.006	-	0.06	-	-
HCM Control Delay (s)	9.1	-	28.5	-	-
HCM Lane LOS	A	-	D	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

HCM 6th TWSC  
2: US 340 & Union Street

Hilltop House Hotel TIS

Intersection						
Int Delay, s/veh	1.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔	↑	↑	↔
Traffic Vol, veh/h	29	14	41	1083	617	48
Future Vol, veh/h	29	14	41	1083	617	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	125	-	-	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	8	13	2
Mvmt Flow	31	15	43	1140	649	51

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1875	649	700	0	-	0
Stage 1	649	-	-	-	-	-
Stage 2	1226	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	79	470	897	-	-	-
Stage 1	520	-	-	-	-	-
Stage 2	277	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	75	470	897	-	-	-
Mov Cap-2 Maneuver	75	-	-	-	-	-
Stage 1	495	-	-	-	-	-
Stage 2	277	-	-	-	-	-























Approach	EB	NB	SB
HCM Control Delay, s	64.9	0.3	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	897	-	103	-	-
HCM Lane V/C Ratio	0.048	-	0.439	-	-
HCM Control Delay (s)	9.2	-	64.9	-	-
HCM Lane LOS	A	-	F	-	-
HCM 95th %tile Q(veh)	0.2	-	1.9	-	-

# HCM 6th Signalized Intersection Summary

## 3: US 340 & Washington Street/Shoreline Drive

Hilltop House Hotel TIS

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	2	214	17	4	9	311	1063	8	1	613	17
Future Volume (veh/h)	52	2	214	17	4	9	311	1063	8	1	613	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1688	1772	1772	1617	1772
Adj Flow Rate, veh/h	58	2	240	19	4	10	349	1194	9	1	689	19
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	8	2	2	13	2
Cap, veh/h	89	2	339	82	9	339	393	1315	813	2	952	465
Arrive On Green	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.54	0.54	0.00	0.31	0.31
Sat Flow, veh/h	0	7	1502	0	41	1502	1688	2430	1502	1688	3073	1502
Grp Volume(v), veh/h	60	0	240	23	0	10	349	1194	9	1	689	19
Grp Sat Flow(s),veh/h/ln	7	0	1502	41	0	1502	1688	1215	1502	1688	1537	1502
Q Serve(g_s), s	0.0	0.0	11.8	0.0	0.0	0.4	16.0	35.4	0.2	0.0	15.9	0.7
Cycle Q Clear(g_c), s	18.0	0.0	11.8	18.0	0.0	0.4	16.0	35.4	0.2	0.0	15.9	0.7
Prop In Lane	0.97		1.00	0.83		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	90	0	339	92	0	339	393	1315	813	2	952	465
V/C Ratio(X)	0.66	0.00	0.71	0.25	0.00	0.03	0.89	0.91	0.01	0.43	0.72	0.04
Avail Cap(c_a), veh/h	90	0	339	92	0	339	529	1477	913	106	1117	546
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.4	0.0	28.5	32.7	0.0	24.1	29.6	16.5	8.4	39.8	24.5	19.2
Incr Delay (d2), s/veh	16.9	0.0	6.7	1.4	0.0	0.0	13.5	7.9	0.0	93.3	1.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	4.8	0.5	0.0	0.1	7.4	9.2	0.1	0.1	5.5	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.3	0.0	35.1	34.1	0.0	24.1	43.1	24.4	8.5	133.1	26.4	19.3
LnGrp LOS	E	A	D	C	A	C	D	C	A	F	C	B
Approach Vol, veh/h		300			33			1552			709	
Approach Delay, s/veh		39.4			31.1			28.5			26.4	
Approach LOS		D			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	24.6	31.2		24.0	6.1	49.7		24.0				
Change Period (Y+Rc), s	6.0	* 6.5		6.0	6.0	6.5		6.0				
Max Green Setting (Gmax), s	25.0	* 29		18.0	5.0	48.5		18.0				
Max Q Clear Time (g_c+I1), s	18.0	17.9		20.0	2.0	37.4		20.0				
Green Ext Time (p_c), s	0.6	3.3		0.0	0.0	5.8		0.0				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			29.2									
HCM 6th LOS			C									
<b>Notes</b>												
User approved pedestrian interval to be less than phase max green.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												



Intersection												
Int Delay, s/veh	4.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	45	11	18	37	1	24	0	30	1	3	4
Future Vol, veh/h	0	45	11	18	37	1	24	0	30	1	3	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	49	12	20	40	1	26	0	33	1	3	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	41	0	0	61	0	0	139	136	55	153	142	41
Stage 1	-	-	-	-	-	-	55	55	-	81	81	-
Stage 2	-	-	-	-	-	-	84	81	-	72	61	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1568	-	-	1542	-	-	831	755	1012	814	749	1030
Stage 1	-	-	-	-	-	-	957	849	-	927	828	-
Stage 2	-	-	-	-	-	-	924	828	-	938	844	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1568	-	-	1542	-	-	817	745	1012	780	739	1030
Mov Cap-2 Maneuver	-	-	-	-	-	-	817	745	-	780	739	-
Stage 1	-	-	-	-	-	-	957	849	-	927	817	-
Stage 2	-	-	-	-	-	-	905	817	-	908	844	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			2.4			9.2			9.2		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	915	1568	-	-	1542	-	-	867
HCM Lane V/C Ratio	0.064	-	-	-	0.013	-	-	0.01
HCM Control Delay (s)	9.2	0	-	-	7.4	0	-	9.2
HCM Lane LOS	A	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0

HCM 6th TWSC  
5: Columbia Street & Washington Street

Hilltop House Hotel TIS

Intersection												
Int Delay, s/veh	4.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	34	24	0	0	17	4	2	0	0	5	0	27
Future Vol, veh/h	34	24	0	0	17	4	2	0	0	5	0	27
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	37	26	0	0	18	4	2	0	0	5	0	29

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	22	0	0	26	0	0	135	122	26	120	120	20
Stage 1	-	-	-	-	-	-	100	100	-	20	20	-
Stage 2	-	-	-	-	-	-	35	22	-	100	100	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1593	-	-	1588	-	-	836	768	1050	855	770	1058
Stage 1	-	-	-	-	-	-	906	812	-	999	879	-
Stage 2	-	-	-	-	-	-	981	877	-	906	812	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1593	-	-	1588	-	-	798	750	1050	840	752	1058
Mov Cap-2 Maneuver	-	-	-	-	-	-	798	750	-	840	752	-
Stage 1	-	-	-	-	-	-	884	793	-	975	879	-
Stage 2	-	-	-	-	-	-	954	877	-	884	793	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	4.3	0	9.5	8.7
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	798	1593	-	-	1588	-	-	1017
HCM Lane V/C Ratio	0.003	0.023	-	-	-	-	-	0.034
HCM Control Delay (s)	9.5	7.3	0	-	0	-	-	8.7
HCM Lane LOS	A	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.1

# **Appendix C-8**

**2022 Full Build Conditions  
PM Peak**

HCM 6th TWSC  
 1: US 340 & Shenandoah Street

Hilltop House Hotel TIS

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	22	7	711	1289	9
Future Vol, veh/h	8	22	7	711	1289	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	125	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	10	13	2
Mvmt Flow	9	23	7	756	1371	10

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2146	1376	1381	0	-	0
Stage 1	1376	-	-	-	-	-
Stage 2	770	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	53	178	496	-	-	-
Stage 1	234	-	-	-	-	-
Stage 2	457	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	52	178	496	-	-	-
Mov Cap-2 Maneuver	52	-	-	-	-	-
Stage 1	231	-	-	-	-	-
Stage 2	457	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	51.7	0.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	496	-	108	-	-
HCM Lane V/C Ratio	0.015	-	0.296	-	-
HCM Control Delay (s)	12.4	-	51.7	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0	-	1.1	-	-

HCM 6th TWSC  
2: US 340 & Union Street

Hilltop House Hotel TIS

Intersection						
Int Delay, s/veh	1.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘		↘	↑	↑	↘
Traffic Vol, veh/h	16	23	29	702	1235	76
Future Vol, veh/h	16	23	29	702	1235	76
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	125	-	-	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	10	13	2
Mvmt Flow	17	25	31	755	1328	82

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2145	1328	1410	0	-	0
Stage 1	1328	-	-	-	-	-
Stage 2	817	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	53	190	484	-	-	-
Stage 1	247	-	-	-	-	-
Stage 2	434	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	50	190	484	-	-	-
Mov Cap-2 Maneuver	50	-	-	-	-	-
Stage 1	231	-	-	-	-	-
Stage 2	434	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	78.6	0.5	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	484	-	88	-	-
HCM Lane V/C Ratio	0.064	-	0.477	-	-
HCM Control Delay (s)	12.9	-	78.6	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.2	-	2	-	-

# HCM 6th Signalized Intersection Summary

## 3: US 340 & Washington Street/Shoreline Drive

Hilltop House Hotel TIS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗	↖	↕↕	↗	↖	↕↕	↗
Traffic Volume (veh/h)	35	5	273	11	15	8	231	688	20	6	1227	25
Future Volume (veh/h)	35	5	273	11	15	8	231	688	20	6	1227	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1660	1772	1772	1617	1772
Adj Flow Rate, veh/h	37	5	287	12	16	8	243	724	21	6	1292	26
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	10	2	2	13	2
Cap, veh/h	75	5	300	57	52	300	262	1404	882	13	1352	661
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.16	0.59	0.59	0.01	0.44	0.44
Sat Flow, veh/h	0	27	1502	0	261	1502	1688	2390	1502	1688	3073	1502
Grp Volume(v), veh/h	42	0	287	28	0	8	243	724	21	6	1292	26
Grp Sat Flow(s),veh/h/ln	27	0	1502	261	0	1502	1688	1195	1502	1688	1537	1502
Q Serve(g_s), s	0.0	0.0	17.0	0.0	0.0	0.4	12.8	16.2	0.5	0.3	36.6	0.9
Cycle Q Clear(g_c), s	18.0	0.0	17.0	18.0	0.0	0.4	12.8	16.2	0.5	0.3	36.6	0.9
Prop In Lane	0.88		1.00	0.43		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	81	0	300	109	0	300	262	1404	882	13	1352	661
V/C Ratio(X)	0.52	0.00	0.96	0.26	0.00	0.03	0.93	0.52	0.02	0.46	0.96	0.04
Avail Cap(c_a), veh/h	81	0	300	109	0	300	262	1404	882	94	1363	666
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.8	0.0	35.7	30.6	0.0	29.0	37.6	11.0	7.8	44.5	24.4	14.4
Incr Delay (d2), s/veh	5.9	0.0	40.4	1.2	0.0	0.0	36.6	0.3	0.0	23.1	15.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	9.5	0.5	0.0	0.1	7.7	3.6	0.1	0.2	14.5	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.7	0.0	76.1	31.9	0.0	29.1	74.2	11.3	7.8	67.7	39.4	14.4
LnGrp LOS	D	A	E	C	A	C	E	B	A	E	D	B
Approach Vol, veh/h		329			36			988			1324	
Approach Delay, s/veh		72.6			31.2			26.7			39.1	
Approach LOS		E			C			C			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	20.0	46.2		24.0	6.7	59.5		24.0				
Change Period (Y+Rc), s	6.0	* 6.5		6.0	6.0	6.5		6.0				
Max Green Setting (Gmax), s	14.0	* 40		18.0	5.0	48.5		18.0				
Max Q Clear Time (g_c+I1), s	14.8	38.6		20.0	2.3	18.2		20.0				
Green Ext Time (p_c), s	0.0	1.0		0.0	0.0	5.1		0.0				

### Intersection Summary

HCM 6th Ctrl Delay	38.5
HCM 6th LOS	D

### Notes

User approved pedestrian interval to be less than phase max green.

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

HCM 6th TWSC

4: Union Street/Franklin Street & Washington Street

Hilltop House Hotel TIS

Intersection												
Int Delay, s/veh	4.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	91	16	35	81	4	43	6	53	7	4	18
Future Vol, veh/h	4	91	16	35	81	4	43	6	53	7	4	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	99	17	38	88	4	47	7	58	8	4	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	92	0	0	116	0	0	294	284	108	314	290	90
Stage 1	-	-	-	-	-	-	116	116	-	166	166	-
Stage 2	-	-	-	-	-	-	178	168	-	148	124	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1503	-	-	1473	-	-	658	625	946	639	620	968
Stage 1	-	-	-	-	-	-	889	800	-	836	761	-
Stage 2	-	-	-	-	-	-	824	759	-	855	793	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1503	-	-	1473	-	-	626	606	946	581	601	968
Mov Cap-2 Maneuver	-	-	-	-	-	-	626	606	-	581	601	-
Stage 1	-	-	-	-	-	-	886	798	-	833	740	-
Stage 2	-	-	-	-	-	-	781	739	-	794	791	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			2.2			10.6			9.8		
HCM LOS							B			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	758	1503	-	-	1473	-	-	778
HCM Lane V/C Ratio	0.146	0.003	-	-	0.026	-	-	0.041
HCM Control Delay (s)	10.6	7.4	0	-	7.5	0	-	9.8
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.5	0	-	-	0.1	-	-	0.1



HCM 6th TWSC  
 5: Columbia Street & Washington Street

Hilltop House Hotel TIS

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	41	65	2	1	51	5	1	0	0	5	0	32
Future Vol, veh/h	41	65	2	1	51	5	1	0	0	5	0	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	45	71	2	1	55	5	1	0	0	5	0	35

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	60	0	0	73	0	0	239	224	72	222	223	58
Stage 1	-	-	-	-	-	-	162	162	-	60	60	-
Stage 2	-	-	-	-	-	-	77	62	-	162	163	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1544	-	-	1527	-	-	715	675	990	734	676	1008
Stage 1	-	-	-	-	-	-	840	764	-	951	845	-
Stage 2	-	-	-	-	-	-	932	843	-	840	763	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1544	-	-	1527	-	-	674	654	990	716	655	1008
Mov Cap-2 Maneuver	-	-	-	-	-	-	674	654	-	716	655	-
Stage 1	-	-	-	-	-	-	815	741	-	922	844	-
Stage 2	-	-	-	-	-	-	899	842	-	815	740	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	2.8			0.1			10.4			8.9		
HCM LOS							B			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	674	1544	-	-	1527	-	-	955
HCM Lane V/C Ratio	0.002	0.029	-	-	0.001	-	-	0.042
HCM Control Delay (s)	10.4	7.4	0	-	7.4	0	-	8.9
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.1

# **Appendix C-9**

**2022 Full Build Conditions  
SAT Peak**

HCM 6th TWSC  
1: US 340 & Shenandoah Street

Hilltop House Hotel TIS

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W		W	↑	↑	
Traffic Vol, veh/h	11	16	12	765	763	34
Future Vol, veh/h	11	16	12	765	763	34
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	125	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	10	13	2
Mvmt Flow	11	17	13	797	795	35

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1636	813	830	0	-	0
Stage 1	813	-	-	-	-	-
Stage 2	823	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	111	378	802	-	-	-
Stage 1	436	-	-	-	-	-
Stage 2	431	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	109	378	802	-	-	-
Mov Cap-2 Maneuver	109	-	-	-	-	-
Stage 1	429	-	-	-	-	-
Stage 2	431	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	27.5	0.1	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	802	-	188	-	-
HCM Lane V/C Ratio	0.016	-	0.15	-	-
HCM Control Delay (s)	9.6	-	27.5	-	-
HCM Lane LOS	A	-	D	-	-
HCM 95th %tile Q(veh)	0	-	0.5	-	-

HCM 6th TWSC  
2: US 340 & Union Street

Hilltop House Hotel TIS

Intersection						
Int Delay, s/veh	1.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑	↑	Y
Traffic Vol, veh/h	35	24	36	742	708	71
Future Vol, veh/h	35	24	36	742	708	71
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	125	-	-	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	10	13	2
Mvmt Flow	36	25	38	773	738	74

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1587	738	812	0	-	0
Stage 1	738	-	-	-	-	-
Stage 2	849	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	119	418	814	-	-	-
Stage 1	473	-	-	-	-	-
Stage 2	419	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	113	418	814	-	-	-
Mov Cap-2 Maneuver	113	-	-	-	-	-
Stage 1	451	-	-	-	-	-
Stage 2	419	-	-	-	-	-























Approach	EB	NB	SB
HCM Control Delay, s	40.5	0.4	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	814	-	161	-	-
HCM Lane V/C Ratio	0.046	-	0.382	-	-
HCM Control Delay (s)	9.6	-	40.5	-	-
HCM Lane LOS	A	-	E	-	-
HCM 95th %tile Q(veh)	0.1	-	1.6	-	-

# HCM 6th Signalized Intersection Summary

## 3: US 340 & Washington Street/Shoreline Drive

Hilltop House Hotel TIS

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	7	161	22	10	25	168	723	24	15	702	15
Future Volume (veh/h)	30	7	161	22	10	25	168	723	24	15	702	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1660	1772	1772	1617	1772
Adj Flow Rate, veh/h	32	7	171	23	11	27	179	769	26	16	747	16
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	10	2	2	13	2
Cap, veh/h	194	29	240	164	54	240	224	1062	668	34	1019	498
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.13	0.44	0.44	0.02	0.33	0.33
Sat Flow, veh/h	382	182	1502	261	337	1502	1688	2390	1502	1688	3073	1502
Grp Volume(v), veh/h	39	0	171	34	0	27	179	769	26	16	747	16
Grp Sat Flow(s),veh/h/ln	564	0	1502	598	0	1502	1688	1195	1502	1688	1537	1502
Q Serve(g_s), s	0.8	0.0	5.3	0.1	0.0	0.8	5.1	13.0	0.5	0.5	10.6	0.4
Cycle Q Clear(g_c), s	6.1	0.0	5.3	5.8	0.0	0.8	5.1	13.0	0.5	0.5	10.6	0.4
Prop In Lane	0.82		1.00	0.68		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	223	0	240	218	0	240	224	1062	668	34	1019	498
V/C Ratio(X)	0.17	0.00	0.71	0.16	0.00	0.11	0.80	0.72	0.04	0.48	0.73	0.03
Avail Cap(c_a), veh/h	487	0	518	467	0	518	343	1431	899	171	1559	762
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.3	0.0	19.6	17.9	0.0	17.7	20.7	11.2	7.7	23.9	14.5	11.1
Incr Delay (d2), s/veh	0.4	0.0	3.9	0.3	0.0	0.2	7.4	1.2	0.0	10.1	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	2.0	0.3	0.0	0.3	2.1	2.5	0.1	0.3	2.9	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.6	0.0	23.5	18.3	0.0	17.9	28.1	12.4	7.8	34.0	15.6	11.1
LnGrp LOS	C	A	C	B	A	B	C	B	A	C	B	B
Approach Vol, veh/h		210			61			974			779	
Approach Delay, s/veh		23.0			18.1			15.2			15.9	
Approach LOS		C			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.6	22.9		14.1	7.0	28.4		14.1				
Change Period (Y+Rc), s	6.0	* 6.5		6.0	6.0	6.5		6.0				
Max Green Setting (Gmax), s	10.0	* 25		17.0	5.0	29.5		17.0				
Max Q Clear Time (g_c+I1), s	7.1	12.6		7.8	2.5	15.0		8.1				
Green Ext Time (p_c), s	0.1	3.8		0.1	0.0	4.3		0.5				

### Intersection Summary

HCM 6th Ctrl Delay	16.3
HCM 6th LOS	B

### Notes

User approved pedestrian interval to be less than phase max green.

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

Intersection												
Int Delay, s/veh	4.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	74	20	20	63	3	32	0	56	7	1	22
Future Vol, veh/h	1	74	20	20	63	3	32	0	56	7	1	22
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	80	22	22	68	3	35	0	61	8	1	24

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	71	0	0	102	0	0	219	208	91	238	218	70
Stage 1	-	-	-	-	-	-	93	93	-	114	114	-
Stage 2	-	-	-	-	-	-	126	115	-	124	104	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1529	-	-	1490	-	-	737	689	967	716	680	993
Stage 1	-	-	-	-	-	-	914	818	-	891	801	-
Stage 2	-	-	-	-	-	-	878	800	-	880	809	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1529	-	-	1490	-	-	710	678	967	663	669	993
Mov Cap-2 Maneuver	-	-	-	-	-	-	710	678	-	663	669	-
Stage 1	-	-	-	-	-	-	913	817	-	890	789	-
Stage 2	-	-	-	-	-	-	843	788	-	824	808	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1.7			9.7			9.3		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	855	1529	-	-	1490	-	-	877
HCM Lane V/C Ratio	0.112	0.001	-	-	0.015	-	-	0.037
HCM Control Delay (s)	9.7	7.4	0	-	7.5	0	-	9.3
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.1

HCM 6th TWSC  
 5: Columbia Street & Washington Street

Hilltop House Hotel TIS

Intersection												
Int Delay, s/veh	3.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	47	62	1	1	32	5	1	0	1	6	0	35
Future Vol, veh/h	47	62	1	1	32	5	1	0	1	6	0	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	51	67	1	1	35	5	1	0	1	7	0	38

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	40	0	0	68	0	0	229	212	68	210	210	38
Stage 1	-	-	-	-	-	-	170	170	-	40	40	-
Stage 2	-	-	-	-	-	-	59	42	-	170	170	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1570	-	-	1533	-	-	726	685	995	747	687	1034
Stage 1	-	-	-	-	-	-	832	758	-	975	862	-
Stage 2	-	-	-	-	-	-	953	860	-	832	758	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1570	-	-	1533	-	-	680	661	995	726	663	1034
Mov Cap-2 Maneuver	-	-	-	-	-	-	680	661	-	726	663	-
Stage 1	-	-	-	-	-	-	804	732	-	942	861	-
Stage 2	-	-	-	-	-	-	917	859	-	803	732	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	3.1			0.2			9.5			8.9		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	808	1570	-	-	1533	-	-	974
HCM Lane V/C Ratio	0.003	0.033	-	-	0.001	-	-	0.046
HCM Control Delay (s)	9.5	7.4	0	-	7.3	0	-	8.9
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.1



# **Appendix D**

## **SimTraffic Outputs**

# **Appendix D-1**

**2020 Existing Conditions  
AM Peak**

## Queuing and Blocking Report Hilltop House Hotel TIS

### Intersection: 1: US 340 & Shenandoah Street

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	30	27
Average Queue (ft)	5	2
95th Queue (ft)	23	15
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		125
Storage Blk Time (%)		
Queuing Penalty (veh)		

### Intersection: 2: US 340 & Union Street

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	86	56
Average Queue (ft)	23	14
95th Queue (ft)	61	40
Link Distance (ft)	1754	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		125
Storage Blk Time (%)		
Queuing Penalty (veh)		

### Intersection: 3: US 340 & Washington Street/Shoreline Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	83	101	43	15	260	190	163	9	14	182	206	26
Average Queue (ft)	29	47	10	3	135	98	28	0	1	89	96	4
95th Queue (ft)	65	84	32	12	221	167	97	5	8	149	168	20
Link Distance (ft)	809		604	604		1775	1775			750	750	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		225			650			125	200			125
Storage Blk Time (%)							0			0	2	
Queuing Penalty (veh)							0			0	0	

# Queuing and Blocking Report

## Hilltop House Hotel TIS

### Intersection: 4: Union Street/Franklin Street & Washington Street

Movement	WB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	6	35	26
Average Queue (ft)	0	12	4
95th Queue (ft)	4	26	19
Link Distance (ft)	1961	1754	568
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

### Intersection: 5: Columbia Street & Washington Street

Movement	NB
Directions Served	LTR
Maximum Queue (ft)	24
Average Queue (ft)	2
95th Queue (ft)	14
Link Distance (ft)	321
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

# **Appendix D-2**

**2020 Existing Conditions  
PM Peak**

Queuing and Blocking Report  
Hilltop House Hotel TIS

Intersection: 1: US 340 & Shenandoah Street

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	64	29
Average Queue (ft)	21	5
95th Queue (ft)	53	21
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		125
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: US 340 & Union Street

Movement	EB	NB	SB
Directions Served	LR	L	R
Maximum Queue (ft)	69	48	27
Average Queue (ft)	22	12	1
95th Queue (ft)	60	39	12
Link Distance (ft)	1754		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		125	50
Storage Blk Time (%)			0
Queuing Penalty (veh)			0

Intersection: 3: US 340 & Washington Street/Shoreline Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	64	181	54	15	209	174	141	22	25	307	360	118
Average Queue (ft)	19	93	16	3	112	82	24	3	3	183	195	10
95th Queue (ft)	51	162	44	12	185	151	87	15	16	274	298	58
Link Distance (ft)	809		604	604		1775	1775			750	750	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		225			650			125	200			125
Storage Blk Time (%)		0					0			4	17	
Queuing Penalty (veh)		0					0			0	4	

# Queuing and Blocking Report

## Hilltop House Hotel TIS

### Intersection: 4: Union Street/Franklin Street & Washington Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	16	34	50	35
Average Queue (ft)	1	2	21	16
95th Queue (ft)	7	16	41	37
Link Distance (ft)	1708	1961	1754	568
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

### Intersection: 5: Columbia Street & Washington Street

Movement	NB	SB
Directions Served	LTR	LTR
Maximum Queue (ft)	12	23
Average Queue (ft)	1	4
95th Queue (ft)	7	21
Link Distance (ft)	321	283
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		



# **Appendix D-3**

**2020 Existing Conditions  
SAT Peak**

Queuing and Blocking Report  
Hilltop House Hotel TIS

Intersection: 1: US 340 & Shenandoah Street

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	55	28
Average Queue (ft)	17	6
95th Queue (ft)	46	24
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		125
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: US 340 & Union Street

Movement	EB	NB	SB
Directions Served	LR	L	R
Maximum Queue (ft)	65	48	4
Average Queue (ft)	25	14	0
95th Queue (ft)	56	40	3
Link Distance (ft)	1754		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		125	50
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: US 340 & Washington Street/Shoreline Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	53	87	49	19	123	172	120	24	53	177	166	26
Average Queue (ft)	17	42	16	7	59	78	15	4	13	75	84	4
95th Queue (ft)	44	74	41	19	104	146	66	17	39	137	141	19
Link Distance (ft)	809		604	604		1775	1775			750	750	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		225			650			125	200			125
Storage Blk Time (%)							0			0	1	
Queuing Penalty (veh)							0			0	0	

# Queuing and Blocking Report

## Hilltop House Hotel TIS

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### Intersection: 4: Union Street/Franklin Street & Washington Street

---

Movement	WB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	6	49	35
Average Queue (ft)	0	19	15
95th Queue (ft)	4	38	36
Link Distance (ft)	1961	1754	568
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

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### Intersection: 5: Columbia Street & Washington Street

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Movement	NB
Directions Served	LTR
Maximum Queue (ft)	23
Average Queue (ft)	1
95th Queue (ft)	10
Link Distance (ft)	321
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

# **Appendix D-4**

**2022 No Build Conditions  
AM Peak**

Queuing and Blocking Report  
Hilltop House Hotel TIS

Intersection: 1: US 340 & Shenandoah Street

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	30	28
Average Queue (ft)	4	3
95th Queue (ft)	21	17
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		125
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: US 340 & Union Street

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	86	44
Average Queue (ft)	24	13
95th Queue (ft)	58	37
Link Distance (ft)	1754	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		125
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: US 340 & Washington Street/Shoreline Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	79	108	51	15	279	224	191	23	5	189	220	30
Average Queue (ft)	28	52	12	3	141	110	43	1	0	95	105	5
95th Queue (ft)	64	90	37	14	228	194	134	11	5	164	186	21
Link Distance (ft)	809		604	604		1775	1775			750	750	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		225			650			125	200			125
Storage Blk Time (%)							0			0	4	
Queuing Penalty (veh)							0			0	1	

# Queuing and Blocking Report

## Hilltop House Hotel TIS

### Intersection: 4: Union Street/Franklin Street & Washington Street

Movement	NB	SB
Directions Served	LTR	LTR
Maximum Queue (ft)	30	26
Average Queue (ft)	11	5
95th Queue (ft)	26	22
Link Distance (ft)	1754	568
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

### Intersection: 5: Columbia Street & Washington Street

Movement	NB
Directions Served	LTR
Maximum Queue (ft)	24
Average Queue (ft)	2
95th Queue (ft)	15
Link Distance (ft)	321
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

# **Appendix D-5**

**2022 No Build Conditions  
PM Peak**



Queuing and Blocking Report  
Hilltop House Hotel TIS

Intersection: 1: US 340 & Shenandoah Street

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	72	33
Average Queue (ft)	22	5
95th Queue (ft)	54	24
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		125
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: US 340 & Union Street

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	79	56
Average Queue (ft)	23	16
95th Queue (ft)	59	43
Link Distance (ft)	1754	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		125
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: US 340 & Washington Street/Shoreline Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	104	258	56	19	273	182	140	24	39	354	352	167
Average Queue (ft)	20	102	15	3	128	85	23	4	5	203	213	14
95th Queue (ft)	65	186	41	14	223	156	94	18	22	310	317	81
Link Distance (ft)	809		604	604		1775	1775			750	750	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		225			650			125	200			125
Storage Blk Time (%)	0	1					0			7	20	
Queuing Penalty (veh)	0	0					0			0	5	

# Queuing and Blocking Report

## Hilltop House Hotel TIS

### Intersection: 4: Union Street/Franklin Street & Washington Street

Movement	WB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	23	58	30
Average Queue (ft)	1	21	16
95th Queue (ft)	10	43	36
Link Distance (ft)	1961	1754	568
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

### Intersection: 5: Columbia Street & Washington Street

Movement	SB
Directions Served	LTR
Maximum Queue (ft)	29
Average Queue (ft)	4
95th Queue (ft)	19
Link Distance (ft)	283
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

# **Appendix D-6**

**2022 No Build Conditions  
SAT Peak**

Queuing and Blocking Report  
Hilltop House Hotel TIS

Intersection: 1: US 340 & Shenandoah Street

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	56	33
Average Queue (ft)	17	7
95th Queue (ft)	46	26
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		125
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: US 340 & Union Street

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	71	46
Average Queue (ft)	24	13
95th Queue (ft)	53	40
Link Distance (ft)	1754	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		125
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: US 340 & Washington Street/Shoreline Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	53	91	51	36	127	197	156	24	53	172	174	25
Average Queue (ft)	15	45	14	7	61	86	21	4	13	82	86	4
95th Queue (ft)	42	78	39	23	106	157	86	18	39	142	151	19
Link Distance (ft)	809		604	604		1775	1775			750	750	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		225			650			125	200			125
Storage Blk Time (%)							0			0	1	
Queuing Penalty (veh)							0			0	0	

# Queuing and Blocking Report

## Hilltop House Hotel TIS

### Intersection: 4: Union Street/Franklin Street & Washington Street

Movement	WB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	12	43	30
Average Queue (ft)	0	17	15
95th Queue (ft)	6	35	36
Link Distance (ft)	1961	1754	568
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

### Intersection: 5: Columbia Street & Washington Street

Movement	NB
Directions Served	LTR
Maximum Queue (ft)	23
Average Queue (ft)	2
95th Queue (ft)	12
Link Distance (ft)	321
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

# **Appendix D-7**

**2022 Full Build Conditions  
AM Peak**

# Queuing and Blocking Report

## Hilltop House Hotel TIS

### Intersection: 1: US 340 & Shenandoah Street

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	35	33
Average Queue (ft)	8	3
95th Queue (ft)	30	17
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		125
Storage Blk Time (%)		
Queuing Penalty (veh)		

### Intersection: 2: US 340 & Union Street

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	89	35
Average Queue (ft)	26	14
95th Queue (ft)	64	38
Link Distance (ft)	1754	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		125
Storage Blk Time (%)		
Queuing Penalty (veh)		

### Intersection: 3: US 340 & Washington Street/Shoreline Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	88	105	44	15	217	261	258	24	10	187	207	34
Average Queue (ft)	36	53	13	3	131	118	51	2	0	97	106	6
95th Queue (ft)	74	90	35	13	202	210	163	11	5	163	174	24
Link Distance (ft)	809		604	604		1775	1775			750	750	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		225			650			125	200			125
Storage Blk Time (%)							0			0	4	
Queuing Penalty (veh)							0			0	1	

# Queuing and Blocking Report

## Hilltop House Hotel TIS

### Intersection: 4: Union Street/Franklin Street & Washington Street

Movement	WB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	27	34	30
Average Queue (ft)	1	16	6
95th Queue (ft)	14	31	24
Link Distance (ft)	1961	1754	568
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

### Intersection: 5: Columbia Street & Washington Street

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	18	30	44
Average Queue (ft)	1	2	19
95th Queue (ft)	9	14	43
Link Distance (ft)	1961	321	283
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			



# **Appendix D-8**

**2022 Full Build Conditions  
PM Peak**

Queuing and Blocking Report  
Hilltop House Hotel TIS

Intersection: 1: US 340 & Shenandoah Street

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	74	29
Average Queue (ft)	30	5
95th Queue (ft)	70	22
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		125
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: US 340 & Union Street

Movement	EB	NB	SB
Directions Served	LR	L	R
Maximum Queue (ft)	150	63	22
Average Queue (ft)	42	18	1
95th Queue (ft)	116	50	11
Link Distance (ft)	1754		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		125	50
Storage Blk Time (%)			0
Queuing Penalty (veh)			0

Intersection: 3: US 340 & Washington Street/Shoreline Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	70	187	48	15	263	200	197	26	31	316	318	213
Average Queue (ft)	24	95	15	3	133	91	26	4	6	195	206	23
95th Queue (ft)	58	162	37	13	216	166	99	17	23	288	298	114
Link Distance (ft)	809		604	604		1775	1775			750	750	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		225			650			125	200			125
Storage Blk Time (%)		0					0			6	21	
Queuing Penalty (veh)		0					0			0	5	

Queuing and Blocking Report  
Hilltop House Hotel TIS

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Intersection: 4: Union Street/Franklin Street & Washington Street

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Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	10	39	61	38
Average Queue (ft)	1	4	25	17
95th Queue (ft)	8	22	49	38
Link Distance (ft)	1708	1961	1754	568
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

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Intersection: 5: Columbia Street & Washington Street

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Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	30	18	53
Average Queue (ft)	3	1	21
95th Queue (ft)	19	7	48
Link Distance (ft)	1961	321	283
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

# **Appendix D-9**

**2022 Full Build Conditions  
SAT Peak**

Queuing and Blocking Report  
Hilltop House Hotel TIS

Intersection: 1: US 340 & Shenandoah Street

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	52	32
Average Queue (ft)	20	7
95th Queue (ft)	47	27
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		125
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: US 340 & Union Street

Movement	EB	NB	SB
Directions Served	LR	L	R
Maximum Queue (ft)	82	47	9
Average Queue (ft)	28	15	0
95th Queue (ft)	62	40	4
Link Distance (ft)	1754		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		125	50
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: US 340 & Washington Street/Shoreline Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	62	108	52	42	146	169	128	26	50	189	227	75
Average Queue (ft)	22	48	15	9	69	87	17	5	13	85	96	8
95th Queue (ft)	50	88	40	28	118	151	75	21	37	150	170	45
Link Distance (ft)	809		604	604		1775	1775			750	750	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		225			650			125	200			125
Storage Blk Time (%)							0			0	2	
Queuing Penalty (veh)							0			0	0	

# Queuing and Blocking Report

## Hilltop House Hotel TIS

### Intersection: 4: Union Street/Franklin Street & Washington Street

Movement	WB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	48	51	35
Average Queue (ft)	3	20	16
95th Queue (ft)	21	39	37
Link Distance (ft)	1961	1754	568
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

### Intersection: 5: Columbia Street & Washington Street

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	27	23	46
Average Queue (ft)	2	2	22
95th Queue (ft)	17	14	46
Link Distance (ft)	1961	321	283
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

# **Appendix E**

## **Project Correspondence**

---

**From:** Johnson, Leland W <[Leland.W.Johnson@wv.gov](mailto:Leland.W.Johnson@wv.gov)>  
**Sent:** Tuesday, April 2, 2019 1:12 PM  
**To:** Elsayed, Gehan M <[Gehan.M.Elsayed@wv.gov](mailto:Gehan.M.Elsayed@wv.gov)>  
**Subject:** RE: US 340 - Jefferson County

Anticipated AGR for US 340 at this location is 1.875% /yr.

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**From:** Elsayed, Gehan M <[Gehan.M.Elsayed@wv.gov](mailto:Gehan.M.Elsayed@wv.gov)>  
**Sent:** Tuesday, April 2, 2019 12:48 PM  
**To:** Johnson, Leland W <[Leland.W.Johnson@wv.gov](mailto:Leland.W.Johnson@wv.gov)>  
**Subject:** FW: US 340 - Jefferson County

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**From:** Kirk, Tim <[tkirk@amtengineering.com](mailto:tkirk@amtengineering.com)>  
**Sent:** Tuesday, April 2, 2019 10:49 AM  
**To:** Elsayed, Gehan M <[Gehan.M.Elsayed@wv.gov](mailto:Gehan.M.Elsayed@wv.gov)>  
**Cc:** Brennan, Patrick B <[Patrick.B.Brennan@wv.gov](mailto:Patrick.B.Brennan@wv.gov)>  
**Subject:** US 340 - Jefferson County

Gehan – AMT is actively working on the US 340 PIE project in Jefferson County. Can you please provide the anticipated annual growth rate of traffic in this area near Harpers Ferry?