

Devon Square Residential Wake Forest, NC

Prepared for:

Devon Square NC, LLC

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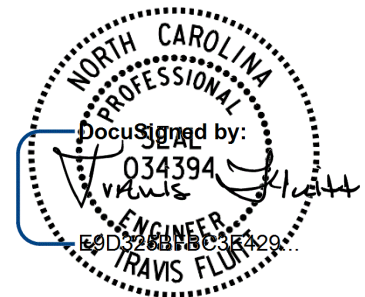
Kimley»»Horn

**Traffic Impact Analysis
for
Devon Square Residential
Wake Forest, North Carolina**

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Executive Summary

Kimley-Horn and Associates, Inc. has performed a Traffic Impact Analysis for the proposed Devon Square residential development located east of US 1 (Capital Boulevard) and south of Harris Road in Wake Forest, North Carolina. The site is currently occupied by a few single-family homes and as currently envisioned will consist of approximately 135 single family homes and 150 townhomes. The development is proposed to be accessed via one right-in/right-out driveway on US 1 and one full-movement driveway on Harris Road. Build-out of the project is anticipated in the year 2022.

This report presents trip generation, distribution, traffic analyses, and recommendations for transportation improvements required to meet anticipated traffic demands in conjunction with the development. The traffic conditions studied include the existing (2018) traffic condition as well as the projected (2022) background and build-out traffic conditions.

As shown in Table ES-1, the proposed development has the potential to generate 2,186 new trips during a typical weekday with 152 new trips during the AM peak hour and 201 new trips during the PM peak hour.

Table ES-1 ITE Traffic Generation (Vehicles)									
Land Use Code	Land Use	Intensity		Daily		AM Peak Hour		PM Peak Hour	
				In	Out	In	Out	In	Out
210	Single Family Detached	135	d.u.	685	685	25	76	86	50
221	Multifamily Housing (Townhomes)	150	d.u.	408	408	13	38	40	25
Total Net New External Trips				1,093	1,093	38	114	126	75

Capacity analyses were performed using Synchro Version 9.2 software. Table ES-2 summarizes the operation of the study intersections for the AM and PM peak hour traffic conditions.

Table ES-2 Level-of-Service Summary		
Condition	AM Peak Hour LOS (Delay)	PM Peak Hour LOS (Delay)
US 1 (Capital Boulevard) at Harris Road/Purnell Road (Signalized)		
Existing (2018) Traffic	C (27.7)	C (34.6)
Background (2022) Traffic	D (37.6)	E (59.8)
Build-out (2022) Traffic	D (40.4)	E (62.3)

Table ES-2 (cont.) Level-of-Service Summary		
Condition	AM Peak Hour LOS (Delay)	PM Peak Hour LOS (Delay)
US 1 (Capital Boulevard) at Club Villas Drive (Unsignalized)		
Existing (2018) Traffic	EB – F (92.2) NBL – C (21.5) SBU – B (14.4)	EB – F (148.4) NBL – C (19.9) SBU – D (27.3)
Background (2022) Traffic	EB – F (230.8) NBL – D (29.0) SBU – C (17.1)	EB – F (646.9) NBL – D (26.0) SBU – E (45.6)
Build-out (2022) Traffic	EB – F (257.5) NBL – D (31.2) SBU – C (17.4)	EB – F (646.9) NBL – D (27.3) SBU – F (56.6)
Harris Road at Wallridge Drive (Unsignalized)		
Existing (2018) Traffic	SB – B (12.1) EBL – A (7.8)	SB – B (13.5) EBL – A (8.0)
Background (2022) Traffic	SB – B (13.4) EBL – A (7.9)	SB – C (17.2) EBL – A (8.2)
Build-out (2022) Traffic	SB – B (14.2) EBL – A (8.0)	SB – C (18.1) EBL – A (8.3)
Harris Road at Site Driveway (Unsignalized)		
Build-out (2022) Traffic	NB – B (13.4) WBL – A (8.1)	NB – B (13.6) WBL – A (8.0)
US 1 (Capital Boulevard) at Site Driveway (Unsignalized)		
Build-out (2022) Traffic	WB – C (16.7)	WB – D (34.3)

The following roadway improvements were identified to be performed as part of this development to accommodate projected site traffic:

US 1 at Harris Road/Purnell Road:

- Extend the storage of the existing northbound left-turn lane on US 1 by approximately 100 feet to provide 400 feet of storage and appropriate tapers

US 1 at Site Driveway:

- Construct an exclusive northbound right-turn lane with 150 feet of storage on US 1

Analyses indicate that the intersections of US 1 at Club Villas Drive and US 1 at Harris Road/Purnell Road are expected to operate at an unacceptable LOS in the background and build-out conditions. All other intersections are expected to operate at acceptable levels-of-service at project build-out with the recommended improvements in place.

At the intersection of US 1 at Club Villas Drive, analyses indicate that the intersection is expected to operate with long delays on the minor street approach (Club Villas Drive) with or without the proposed development in place, and Synchro indicates that 95th percentile queues are expected to

increase by less than 10 feet with the addition of site traffic. Further, it is typical for stop sign controlled side streets and driveways intersecting major streets to experience long delays during peak hours, while the majority of the traffic moving through the intersection on the major street experiences little or no delay. This intersection is not expected to meet Manual on Uniform Traffic Control Devices (MUTCD) traffic signal warrants.

Similarly, the intersection of US 1 at Harris Road at Purnell Road is expected to operate at LOS E in the PM peak hour with or without the proposed project in place. Project site traffic is expected to account for less than 3% of the total build-out traffic volume at that intersection. SimTraffic simulations indicate that all turning movement queues will be accommodated within the available storage with the possible exception of the northbound U-turn/left-turn in the AM peak hour. However, as SimTraffic does not accurately model U-turn/right-turn interactions, this is not expected to be an issue in reality. In addition, NCDOT project U-5307 proposes to convert US 1 to a freeway and convert this intersection to an interchange starting in the year 2024.

The recommended roadway laneage is shown on **Figure ES-1**.

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1.0 Introduction

Kimley-Horn and Associates, Inc. has performed a Traffic Impact Analysis for the proposed Devon Square residential development located east of US 1 (Capital Boulevard) and south of Harris Road in Wake Forest, North Carolina. The site is currently occupied by a few single-family homes and as currently envisioned will consist of approximately 135 single family homes and 150 townhomes. The development is proposed to be accessed via one right-in/right-out driveway on US 1 and one full-movement driveway on Harris Road. Build-out of the project is anticipated in the year 2022.

This report presents trip generation, distribution, traffic analyses, and recommendations for transportation improvements required to meet anticipated traffic demands in conjunction with the development. The traffic conditions studied include the existing (2018) traffic condition and the projected (2022) background and build-out traffic conditions.

Town of Wake Forest and North Carolina Department of Transportation (NCDOT) transportation staff provided background data and were consulted regarding the elements to be covered in this analysis. The approved Memorandum of Understanding is included in the Appendix of this report.

2.0 Inventory

2.1 Study Area

The study area for this development includes the following intersections:

- US 1 (Capital Boulevard) at Harris Road/Purnell Road
- US 1 (Capital Boulevard) at Club Villas Drive
- Harris Road at Wallridge Drive
- Harris Road at Site Driveway
- US 1 (Capital Boulevard) at Site Driveway

Figure 1 shows the site location. The preliminary site plan is shown on **Figure 2**.

2.2 Existing Conditions

The proposed Devon Square residential development is proposed to be located east of US 1 (Capital Boulevard) and south of Harris Road in Wake Forest, North Carolina. Roadways in the study area include US 1 (Capital Boulevard), Harris Road, Purnell Road, Wallridge Drive, and Club Villas Drive. The existing roadway laneage is shown in **Figure 3**.

US 1 (Capital Boulevard) is a 4-lane divided principal arterial with a posted speed limit of 55 mph in the vicinity of the site. The estimated 2018 average daily traffic (ADT) volume is approximately 31,000 vehicles per day (vpd) south of Harris Road. NCDOT has plans to upgrade US 1 to a freeway as part of STIP Project #U-5307, which will include limiting access along the corridor and constructing interchanges at several intersections, including at the Harris Road/Purnell Road intersection.

Harris Road is a 2-lane undivided major collector with a posted speed limit of 45 mph in the vicinity of the site. The estimated 2018 ADT volume is approximately 5,000 vpd east of Wallridge Drive. The Town of Wake Forest's 2010 Transportation Plan indicates that Harris Road is planned as a 2-lane divided section between Capital Boulevard and Oak Avenue.

Purnell Road is a 2-lane undivided major collector with a posted speed limit of 45 mph in the vicinity of US 1. The estimated 2018 ADT volume is approximately 4,500 vpd west of US 1. The Town of Wake Forest's 2010 Transportation Plan indicates that Purnell Road is planned as a 2-lane undivided roadway between Jackson Road and Capital Boulevard.

Wallridge Drive is a 2-lane undivided roadway with a posted speed limit of 25 mph. The estimated 2018 ADT volume is approximately 2,800 vpd at Harris Road.

Club Villas Drive is a 2-lane undivided roadway with an assumed speed limit of 25 mph. The estimated 2018 ADT volume is less than 1,000 vpd.



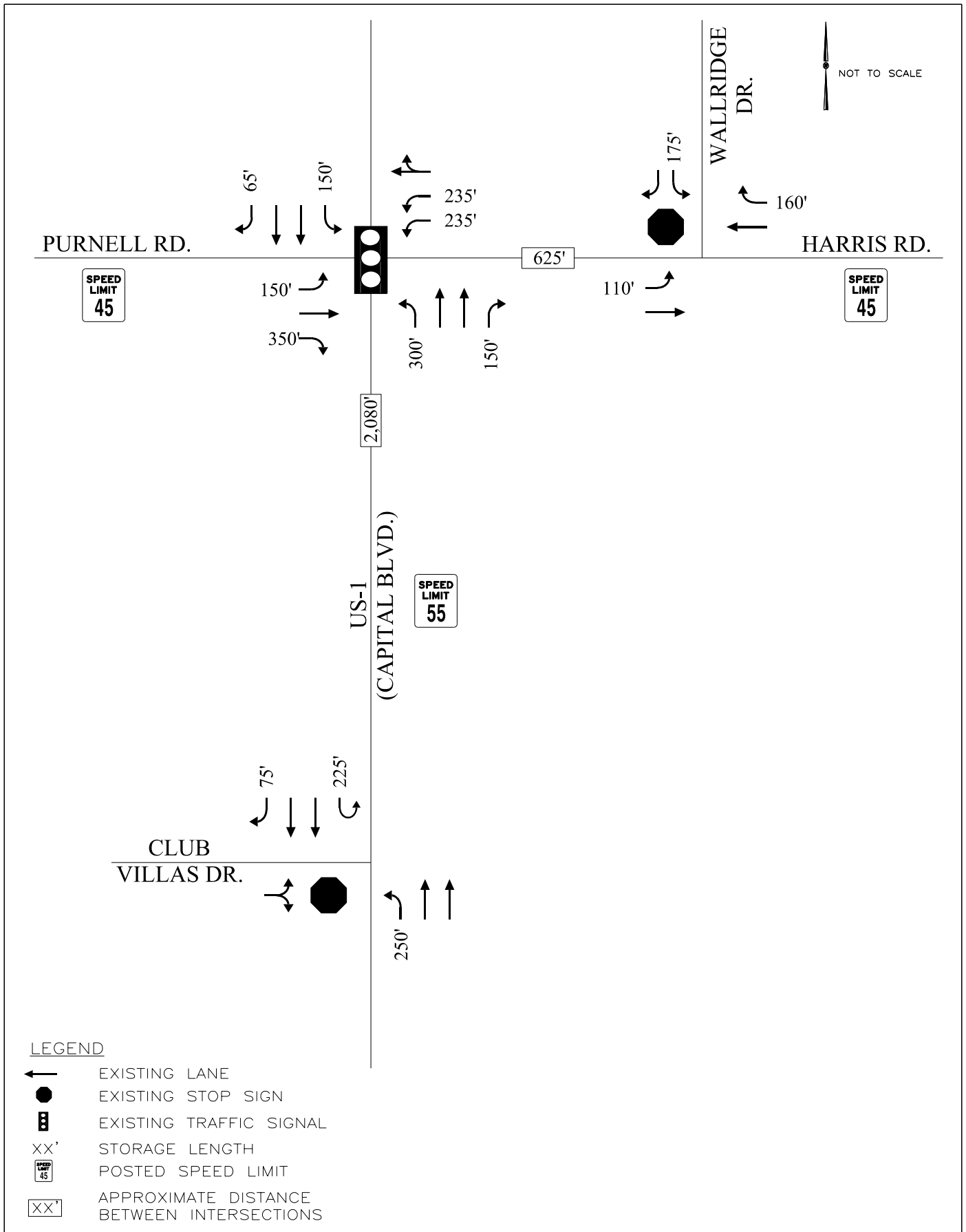
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DEVON SQUARE
WAKE FOREST, NC
TRAFFIC CAPACITY ANALYSIS

SITE LOCATION

FIGURE
1

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3.0 Traffic Generation

The traffic generation potential of the proposed development was determined using the traffic generation rates published in *Trip Generation* (Institute of Transportation Engineers, Tenth Edition, 2017). As currently envisioned the development will consist of approximately 135 single family homes and 150 townhomes. Table 3.0 summarizes the estimated traffic generation for the proposed development.

Table 3.0 ITE Traffic Generation (Vehicles)									
Land Use Code	Land Use	Intensity		Daily		AM Peak Hour		PM Peak Hour	
				In	Out	In	Out	In	Out
210	Single Family Detached	135	d.u.	685	685	25	76	86	50
221	Multifamily Housing (Townhomes)	150	d.u.	408	408	13	38	40	25
Total Net New External Trips				1,093	1,093	38	114	126	75

Table 3.0 shows the proposed development has the potential to generate 2,186 new trips during a typical weekday with 152 new trips during the AM peak hour and 201 new trips during the PM peak hour.

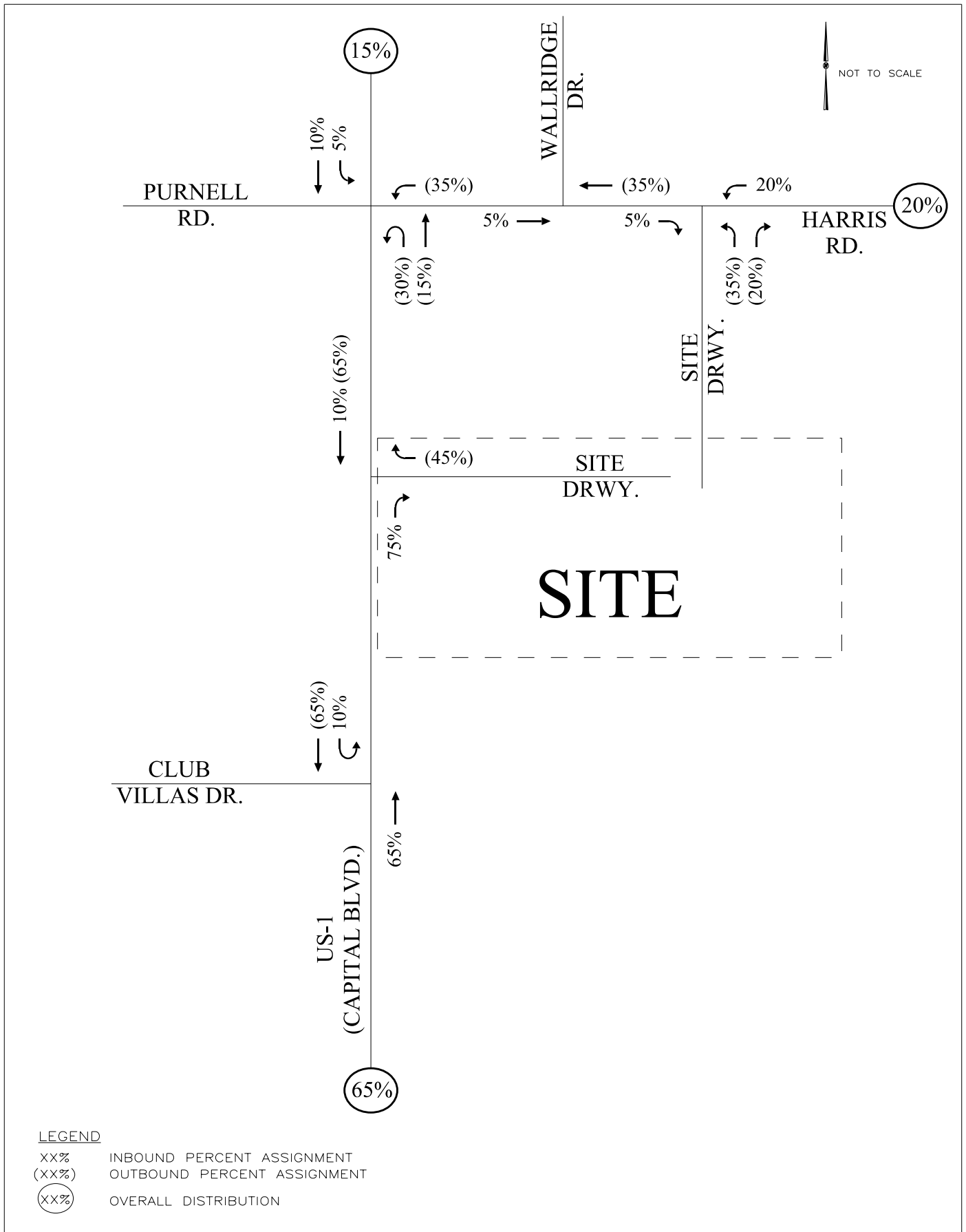
Detailed trip generation calculations are included in the Appendix of this report.

4.0 Site Traffic Distribution

The projected site-generated trips were assigned to the surrounding roadway network. The directional distribution and assignment for this development were based on a review of surrounding land uses and traffic patterns in the study area as well as a review of other traffic analyses performed in the area.

- 65% to/from the south on US 1
- 20% to/from the east on Harris Road
- 15% to/from the north on US 1

The site traffic distribution and percent assignment are shown on **Figure 4**.



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5.0 Projected Traffic Volumes

5.1 Existing Traffic

AM peak hour (6:30 to 9:00 AM) and PM peak hour (4:30 to 6:30 PM) turning movement counts were performed at the following intersections:

- US 1 (Capital Boulevard) at Harris Road/Purnell Road October 30, 2018
- US 1 (Capital Boulevard) at Club Villas Drive October 30, 2018
- Harris Road at Wallridge Drive October 30, 2018

The existing AM and PM peak hour traffic volumes are shown on **Figures 5 and 6**, and the traffic count data are included in the Appendix.

5.2 Historic Growth Traffic

Historic growth traffic is the increase in traffic due to usage increases and non-specific growth throughout the area. For this analysis, an annual growth rate of 3% was applied to the existing volumes up to the year 2022. Background growth calculations are detailed on intersection spreadsheets in the Appendix of this report.

5.3 Approved Development Traffic

Approved development traffic is generated by approved but not yet constructed projects in the vicinity of the proposed project. Based on discussions with the Town of Wake Forest, two projects were identified for inclusion in this analysis as background traffic: the Glen Oaks Residential development and the Planet Fitness in the Harris Crossing shopping center.

Per the *Glen Oaks TIA* (Ramey-Kemp, December 2017), at full build-out (projected in 2022) the Glenn Oaks Residential development will consist of approximately 225 single family homes and 73 townhomes east of US 1 across from Flex Way. All of the site traffic from that development was included in this analysis as background traffic. No geometric improvements were required of that development at any intersections analyzed as part of the Devon Square study.

A Planet Fitness is proposed to be constructed between US 1 and Wrigley Drive (adjacent to Richland Creek Elementary School) and north of the Harris Crossing shopping center. Access for this 27,718 SF fitness center will be provided through the Harris Crossing shopping center as well as to Wrigley Drive across from the Richland Creek Elementary School driveway. As no TIA was required of this project, site traffic was generated using the *ITE Trip Generation Manual* and assigned through the study area. It was assumed that this project would be in place by the year 2022.

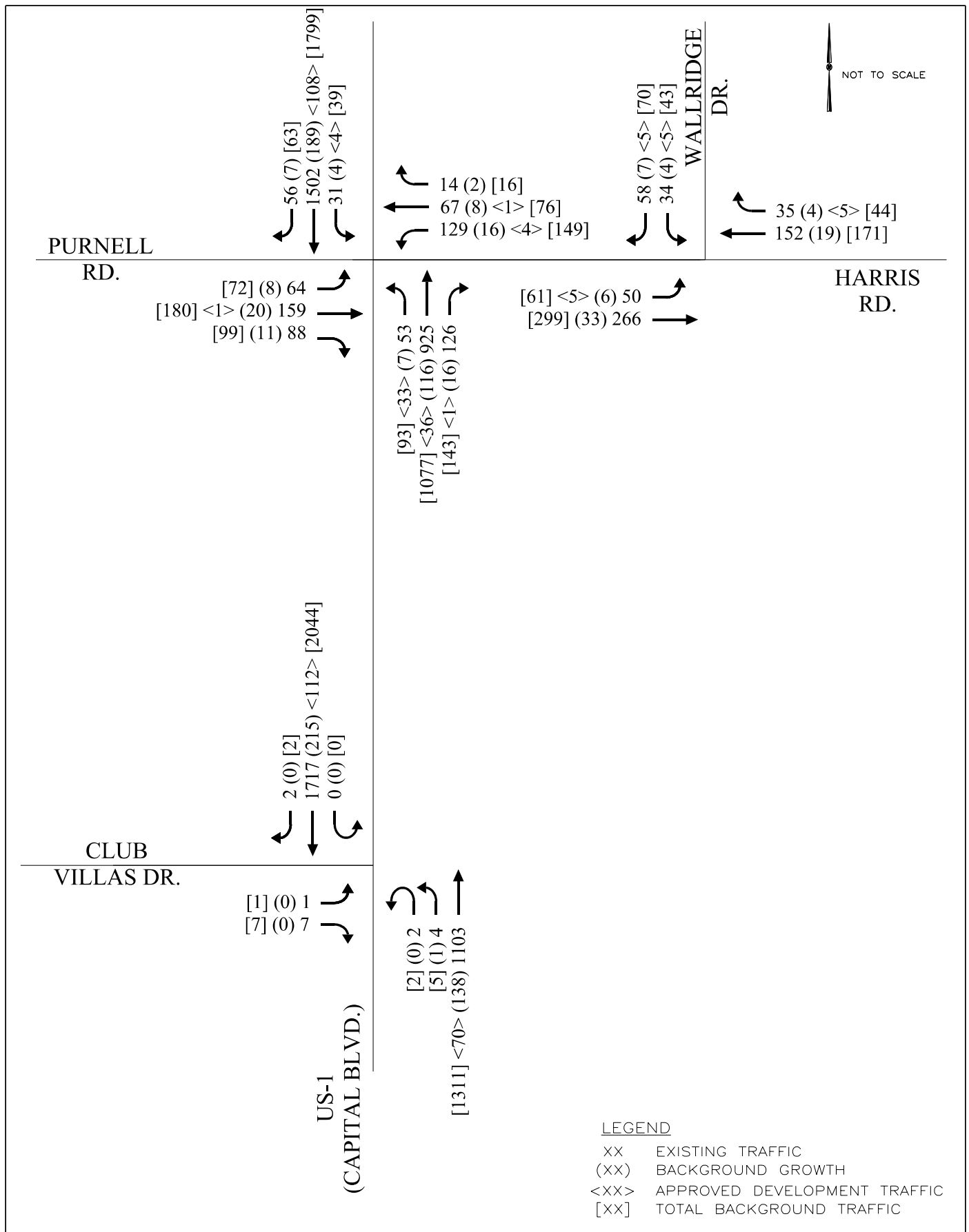
Background traffic volumes consisting of existing, historic growth, and approved development traffic, are shown on **Figures 5 and 6** for the AM and PM peak hours, respectively.

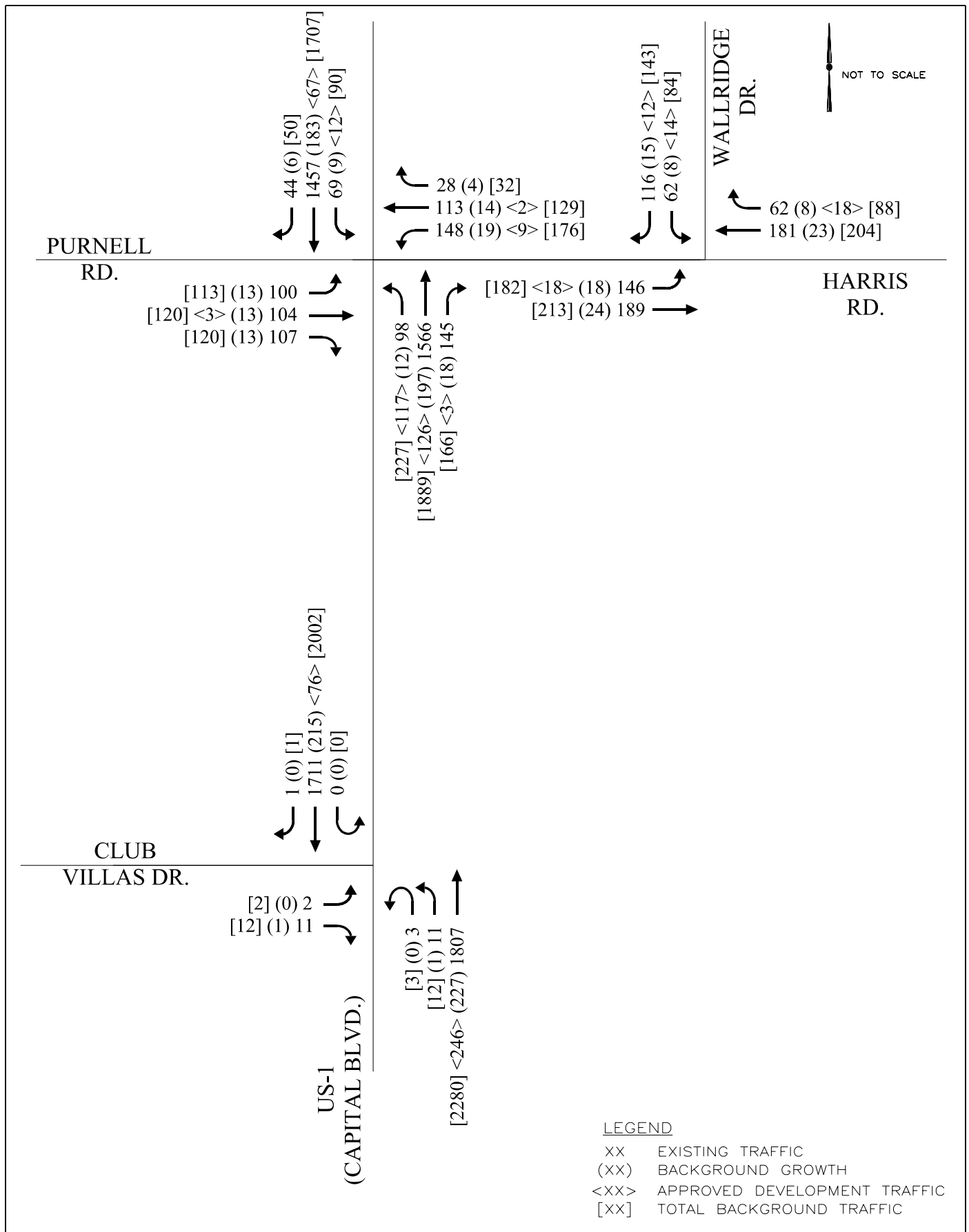
5.4 Site Traffic

Project site traffic was generated and assigned to the adjacent roadway network according to the distribution discussed previously in Section 4.0. The site traffic volumes for the AM and PM peak hours are shown in **Figures 7** and **8**, respectively.

5.5 Build-Out Traffic

To obtain the projected (2022) build-out traffic volumes, site traffic was added to the projected (2022) background traffic. Traffic volume calculations are detailed in intersection spreadsheets in the Appendix of this report. **Figures 7** and **8** show the projected (2022) AM and PM peak hour build-out traffic volumes, respectively.







NOT TO SCALE

PURNELL
RD.

[72] (0) 72
[180] (0) 180
[99] (0) 99

63 (0) [63]
1799 (4) [1803]
39 (2) [41]

16 (0) [16]
76 (0) [76]
149 (40) [189]

70 (0) [70]
43 (0) [43]

WALLRIDGE
DR.

44 (0) [44]
171 (40) [211]

215 (0) [215]
0 (7) [7]

HARRIS
RD.

[343] (0) 343
[2] (2) 0

[40] (40) 0
[23] (23) 0

[61] (0) 61
[301] (2) 299

[34] (34) 0
[93] (0) 93
[1094] (17) 1077
[143] (0) 143

2047 (78) [2125]

0 (51) [51]

SITE
DRWY.

SITE

SITE
DRWY.

CLUB
VILLAS DR.

[1] (0) 1
[8] (0) 8

2 (0) [2]
2044 (74) [2118]
0 (4) [4]

[2] (0) 2
[5] (0) 5
[1336] (25) 1311

US-1
(CAPITAL BLVD.)

LEGEND

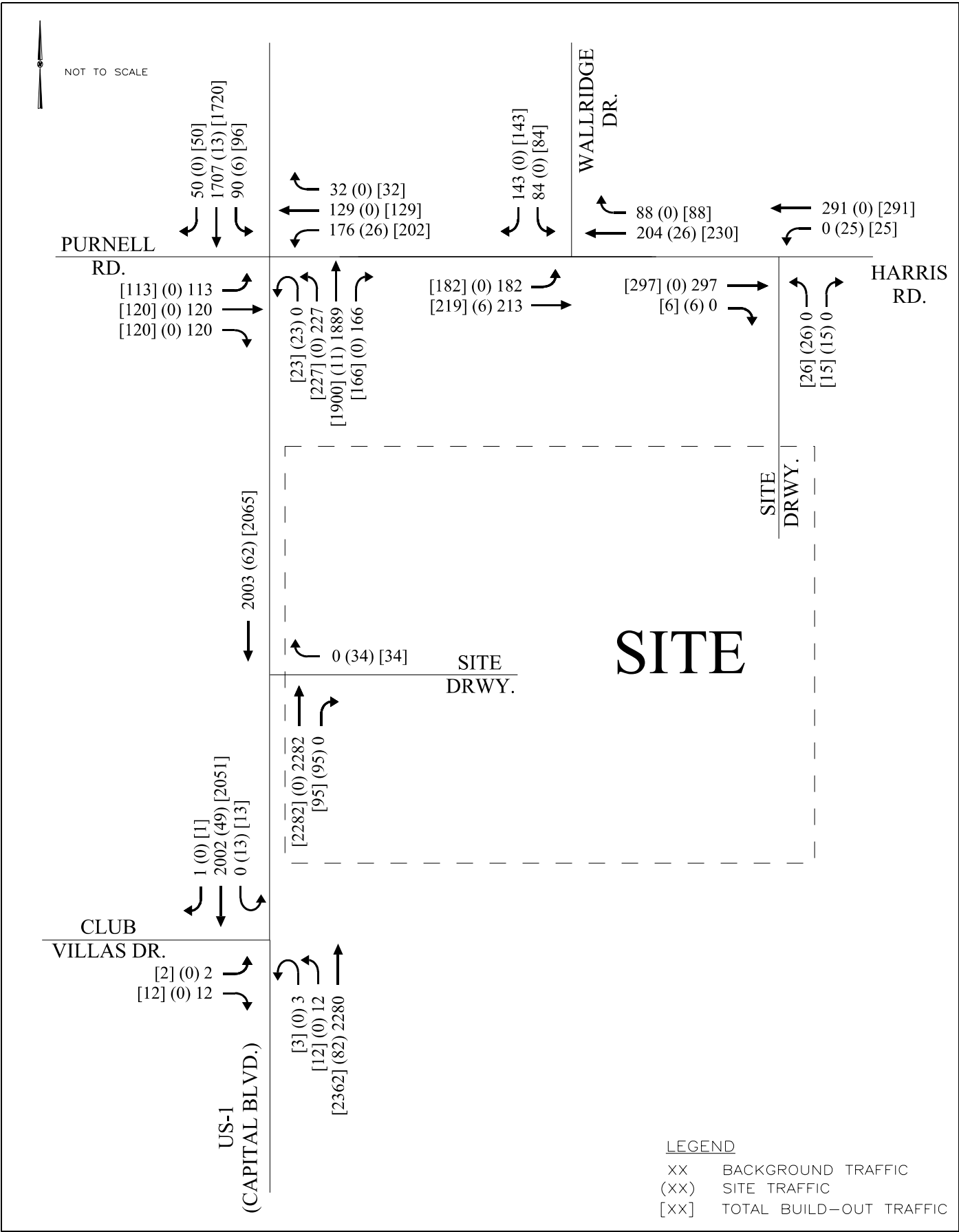
XX BACKGROUND TRAFFIC
(XX) SITE TRAFFIC
[XX] TOTAL BUILD-OUT TRAFFIC

Kimley»Horn

DEVON SQUARE
WAKE FOREST, NC
TRAFFIC CAPACITY ANALYSIS

PROJECTED (2022) BUILD-OUT
AM PEAK HOUR
TRAFFIC VOLUMES

FIGURE
7



6.0 Capacity Analysis

Capacity analyses (see Appendix) were performed for the AM and PM peak hours for the existing traffic condition and the projected (2022) background and build-out traffic conditions using Synchro Version 9.2 software to determine the operating characteristics of the adjacent road network and the impacts of the proposed project.

Capacity is defined as the maximum number of vehicles that can pass over a particular road segment or through a particular intersection within a set time duration. Capacity is combined with Level-of-Service (LOS) to describe the operating characteristics of a road segment or intersection. LOS is a qualitative measure that describes operational conditions and motorist perceptions within a traffic stream. The *Highway Capacity Manual* defines six levels of service, LOS A through LOS F, with A representing the shortest average delays and F representing the longest average delays. LOS D is the typically accepted standard for signalized intersections in urbanized areas. For signalized intersections, LOS is defined for the overall intersection operation.

For unsignalized intersections, only the movements that must yield right-of-way experience control delay. Therefore, LOS criteria for the overall intersection is not reported by Synchro Version 9.2 or computable using methodology published in the *Highway Capacity Manual*. It is typical for stop sign controlled side streets and driveways intersecting major streets to experience long delays during peak hours, while the majority of the traffic moving through the intersection on the major street experiences little or no delay. Table 6.0-A lists the LOS control delay thresholds published in the *Highway Capacity Manual* for signalized and unsignalized intersections.

Table 6.0-A		
Level-of-Service Control Delay Thresholds		
Level-of-Service	Signalized Intersections – Control Delay Per Vehicle [sec/veh]	Unsignalized Intersections – Average Control Delay [sec/veh]
A	≤ 10	≤ 10
B	> 10 – 20	> 10 – 15
C	> 20 – 35	> 15 – 25
D	> 35 – 55	> 25 – 35
E	> 55 – 80	> 35 – 50
F	> 80	> 50

Existing peak hour factors (PHF) were used at all existing intersections for all conditions except at new intersections, where a PHF of 0.90 was used. Existing signal timings, which were obtained during a field visit with NCDOT approval, were not adjusted as part of this analysis, and right-turns on red were allowed where currently allowed today.

Capacity analyses were performed for the existing (2018) traffic condition and the projected (2022) background and build-out traffic conditions for the following intersections:

- US 1 (Capital Boulevard) at Harris Road/Purnell Road
- US 1 (Capital Boulevard) at Club Villas Drive
- Harris Road at Wallridge Drive
- Harris Road at Site Driveway
- US 1 (Capital Boulevard) at Site Driveway

Table 6.0-B summarizes the LOS and delay (seconds per vehicle) for all of the study intersections for the existing (2018) traffic condition and the projected (2022) background and build-out traffic conditions. All capacity analyses are included in the Appendix and are briefly summarized in the following sub-sections.

Table 6.0-B Level-of-Service Summary		
Condition	AM Peak Hour LOS (Delay)	PM Peak Hour LOS (Delay)
US 1 (Capital Boulevard) at Harris Road/Purnell Road (Signalized)		
Existing (2018) Traffic	C (27.7)	C (34.6)
Background (2022) Traffic	D (37.6)	E (59.8)
Build-out (2022) Traffic	D (40.4)	E (62.3)
US 1 (Capital Boulevard) at Club Villas Drive (Unsignalized)		
Existing (2018) Traffic	EB – F (92.2) NBL – C (21.5) SBU – B (14.4)	EB – F (148.4) NBL – C (19.9) SBU – D (27.3)
Background (2022) Traffic	EB – F (230.8) NBL – D (29.0) SBU – C (17.1)	EB – F (646.9) NBL – D (26.0) SBU – E (45.6)
Build-out (2022) Traffic	EB – F (257.5) NBL – D (31.2) SBU – C (17.4)	EB – F (646.9) NBL – D (27.3) SBU – F (56.6)
Harris Road at Wallridge Drive (Unsignalized)		
Existing (2018) Traffic	SB – B (12.1) EBL – A (7.8)	SB – B (13.5) EBL – A (8.0)
Background (2022) Traffic	SB – B (13.4) EBL – A (7.9)	SB – C (17.2) EBL – A (8.2)
Build-out (2022) Traffic	SB – B (14.2) EBL – A (8.0)	SB – C (18.1) EBL – A (8.3)
Harris Road at Site Driveway (Unsignalized)		
Build-out (2022) Traffic	NB – B (13.4) WBL – A (8.1)	NB – B (13.6) WBL – A (8.0)

Table 6.0-B Level-of-Service Summary (cont.)		
Condition	AM Peak Hour LOS (Delay)	PM Peak Hour LOS (Delay)
US 1 (Capital Boulevard) at Site Driveway (Unsignalized)		
Build-out (2022) Traffic	WB – C (16.7)	WB – D (34.3)

6.1 US 1 (Capital Boulevard) at Harris Road/Purnell Road

Analyses indicate that the signalized intersection of US 1 (Capital Boulevard) at Harris Road/Purnell Road operates at LOS C in both the AM and PM peak hours. The intersection is expected to operate at LOS D in the AM peak hour and LOS E in the PM peak hour in the background traffic condition.

The following roadway improvements were identified to be performed as part of this development to accommodate projected site traffic:

- Extend the storage of the existing northbound left-turn lane on US 1 by approximately 100 feet to provide 400 feet of storage and appropriate tapers

At project build-out, the intersection is expected to continue to operate at LOS D in the AM peak hour and LOS E in the PM peak hour with only minor increases in overall intersection delay. Site traffic is expected to account for less than 4% of the total intersection volume at project build-out. SimTraffic simulations indicate that all turning movement queues will be accommodated within the available storage with the possible exception of the northbound U-turn/left-turn in the AM peak hour. However, as SimTraffic does not accurately model U-turn/right-turn interactions, this is not expected to be an issue in reality. In addition, NCDOT STIP Project U-5307 proposed to convert US 1 to a freeway section with an interchange at the intersection with Harris Road/Purnell Road starting in the year 2024. Therefore, no additional roadway improvements are recommended to accommodate projected site traffic.

Table 6.1 summarizes the operation of the intersection of US 1 (Capital Boulevard) at Harris Road/Purnell Road for the existing (2018) and projected (2022) background and build-out traffic conditions.

Table 6.1 Level-of-Service US 1 (Capital Boulevard) at Harris Road/Purnell Road (Signalized)		
Condition	AM Peak Hour LOS (Delay)	PM Peak Hour LOS (Delay)
Existing (2018) Traffic	C (27.7)	C (34.6)
Background (2022) Traffic	D (37.6)	E (59.8)
Build-out (2022) Traffic	D (40.4)	E (62.3)

6.2 US 1 (Capital Boulevard) at Club Villas Drive

Analyses indicate that the unsignalized intersection of US 1 (Capital Boulevard) at Club Villas Drive currently operates with long delays on the minor street approach (Club Villas Drive) in both the AM and PM peak hours. The intersection is expected to continue to operate with long delays in the year 2022 with or without the proposed project in place. Synchro indicates that 95th percentile queues are expected to increase by less than 10 feet with the addition of site traffic. It is typical for stop sign controlled side streets and driveways intersecting major streets to experience long delays during peak hours, while the majority of the traffic moving through the intersection on the major street experiences little or no delay. This intersection is not expected to meet MUTCD traffic signal warrants.

No roadway improvements are recommended at this intersection.

Table 6.2 summarizes the operation of the intersection of US 1 (Capital Boulevard) at Club Villas Drive for the existing (2018) and projected (2022) background and build-out traffic conditions.

Table 6.2 Level-of-Service US 1 (Capital Boulevard) at Club Villas Drive (Unsignalized)		
Condition	AM Peak Hour LOS (Delay)	PM Peak Hour LOS (Delay)
Existing (2018) Traffic	EB – F (92.2) NBL – C (21.5) SBU – B (14.4)	EB – F (148.4) NBL – C (19.9) SBU – D (27.3)
Background (2022) Traffic	EB – F (230.8) NBL – D (29.0) SBU – C (17.1)	EB – F (646.9) NBL – D (26.0) SBU – E (45.6)
Build-out (2022) Traffic	EB – F (257.5) NBL – D (31.2) SBU – C (17.4)	EB – F (646.9) NBL – D (27.3) SBU – F (56.6)

6.3 Harris Road at Wallridge Ridge

Analyses indicate that the unsignalized intersection of Harris Road at Wallridge Drive currently operates with short delays on the minor street approach (Wallridge Drive) in both the AM and PM peak hours. The intersection is expected to continue to operate with short delays in the year 2022 with or without the proposed project in place. No roadway improvements are recommended to be performed at this intersection.

Table 6.3 summarizes the operation of the intersection of Harris Road at Wallridge Drive for the existing (2018) and projected (2022) background and build-out traffic conditions.

Table 6.3 Level-of-Service Harris Road at Wallridge Drive (Unsignalized)		
Condition	AM Peak Hour LOS (Delay)	PM Peak Hour LOS (Delay)
Existing (2018) Traffic	SB – B (12.1) EBL – A (7.8)	SB – B (13.5) EBL – A (8.0)
Background (2022) Traffic	SB – B (13.4) EBL – A (7.9)	SB – C (17.2) EBL – A (8.2)
Build-out (2022) Traffic	SB – B (14.2) EBL – A (8.0)	SB – C (18.1) EBL – A (8.3)

6.4 Harris Road at Site Driveway

A full-movement site driveway is proposed on Harris Road approximately 1,250 feet east of Wallridge Drive. Analyses indicate that the intersection will operate with short delays on the minor street approach (Site Driveway) at project build-out. No roadway improvements are recommended to be constructed as part of this development.

Table 6.4 summarizes the operation of the intersection of Harris Road at the Site Driveway for the projected (2022) build-out traffic condition.

Table 6.4 Level-of-Service Harris Road at Site Driveway (Unsignalized)		
Condition	AM Peak Hour LOS (Delay)	PM Peak Hour LOS (Delay)
Build-out (2022) Traffic	NB – B (13.4) WBL – A (8.1)	NB – B (13.6) WBL – A (8.0)

6.5 US 1 (Capital Boulevard) at Site Driveway

A right-in/right-out site driveway is proposed to be constructed on US 1 (Capital Boulevard) approximately 200 feet north of Club Villas Drive. The following roadway improvement is recommended to be constructed as part of this development:

- Construct an exclusive northbound right-turn lane with 150 feet of storage on US 1

Analyses indicate that with the recommended improvement in place the intersection will operate with short to moderate delays on the minor street approach (Site Driveway) at project build-out.

Table 6.5 summarizes the operation of the intersection of US 1 (Capital Boulevard) at the Site Driveway for the projected (2022) build-out traffic condition.

Table 6.5 Level-of-Service US 1 (Capital Boulevard) at Site Driveway (Unsignalized)		
Condition	AM Peak Hour LOS (Delay)	PM Peak Hour LOS (Delay)
Build-out (2022) Traffic	WB – C (16.7)	WB – D (34.3)

7.0 Recommendations

The following roadway improvements were identified to be performed as part of this development to accommodate projected site traffic:

US 1 at Harris Road/Purnell Road:

- Extend the storage of the existing northbound left-turn lane on US 1 by approximately 100 feet to provide 400 feet of storage and appropriate tapers

US 1 at Site Driveway:

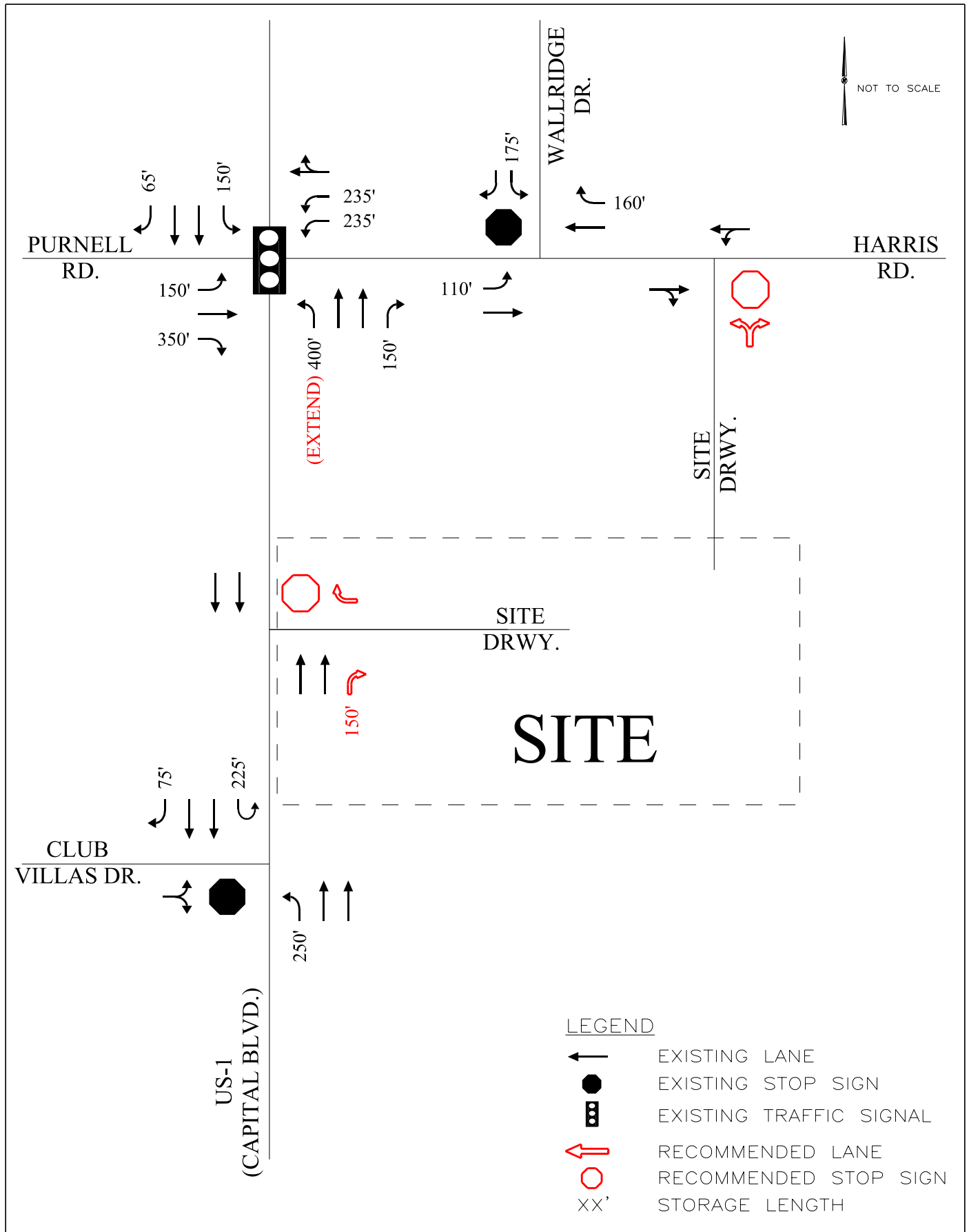
- Construct an exclusive northbound right-turn lane with 150 feet of storage on US 1

Analyses indicate that the intersections of US 1 at Club Villas Drive and US 1 at Harris Road/Purnell Road are expected to operate at an unacceptable LOS in the background and build-out conditions. All other intersections are expected to operate at acceptable levels-of-service at project build-out with the recommended improvements in place.

At the intersection of US 1 at Club Villas Drive, analyses indicate that the intersection is expected to operate with long delays on the minor street approach (Club Villas Drive) with or without the proposed development in place, and Synchro indicates that 95th percentile queues are expected to increase by less than 10 feet with the addition of site traffic. Further, it is typical for stop sign controlled side streets and driveways intersecting major streets to experience long delays during peak hours, while the majority of the traffic moving through the intersection on the major street experiences little or no delay. This intersection is not expected to meet Manual on Uniform Traffic Control Devices (MUTCD) traffic signal warrants.

Similarly, the intersection of US 1 at Harris Road at Purnell Road is expected to operate at LOS E in the PM peak hour with or without the proposed project in place. Project site traffic is expected to account for less than 3% of the total build-out traffic volume at that intersection. SimTraffic simulations indicate that all turning movement queues will be accommodated within the available storage with the possible exception of the northbound U-turn/left-turn in the AM peak hour. However, as SimTraffic does not accurately model U-turn/right-turn interactions, this is not expected to be an issue in reality. In addition, NCDOT project U-5307 proposes to convert US 1 to a freeway and convert this intersection to an interchange starting in the year 2024.

The recommended roadway laneage is shown on **Figure 9**.



Appendix

Appendix A:
Assumptions Memorandum

**Preliminary Assumptions
Devon Square Residential - Traffic Impact Analysis
Wake Forest, North Carolina**

KHA will perform analyses for the residential portion of the proposed Devon Square development, located south of Harris Road and east of US 1 in Wake, North Carolina. The following assumptions will be used in the analysis of the site:

The study area will consist of the following intersections:

- US 1 (Capital Boulevard) at Harris Road/Purnell Road
- US 1 (Capital Boulevard) at Club Villas Drive
- Harris Road at Wallridge Drive
- Harris Road at Site Driveway
- US 1 (Capital Boulevard) at Site Driveway

Based on other traffic counts performed in this part of Wake Forest, traffic counts will be performed at the existing intersections for the hours of 6:30-8:30 AM and 4:30-6:30 PM in order to capture the peak commuter traffic.

The study scenarios will consist of:

- Existing (2018)
- Background (2022)
- Build-out (2022)

No analyses will be performed with Capital Boulevard converted to a freeway since the freeway conversion project (NCDOT Project U-5307) is not expected to reach this area until the year 2024.

Based on discussions with the Town of Wake Forest and the North Carolina Department of Transportation (NCDOT), there are two approved developments in the study area that were identified for inclusion as background traffic: the proposed Planet Fitness project and the Glen Oaks Residential development. In addition to the approved development traffic, an annual growth rate of 3% will also be applied to the existing traffic volumes up to the year 2022.

The following directional distribution will be used for the site based on a review of surrounding land uses (see attached distribution figure):

- 65% to/from the south on US 1
- 20% to/from the east on Harris Road
- 15% to/from the north on US 1

The property is currently vacant, and as currently envisioned the residential portion of the development will consist of approximately 126 single family dwelling units and 149 townhomes, which are anticipated to be 3 stories. Trips will be generated using ITE Trip Generation 10th Edition rates. See attached trip generation table.

No analysis will be performed for the commercial portion of the property at this time. A separate TIA will be required for that development at the time it moves forward.

Devon Square - Distribution



<div>Devon Square</div> <div>Table 1 - Trip Generation</div>											
Land Use Code	Land Use	Intensity	Daily			AM Peak Hour			PM Peak Hour		
			Total	In	Out	Total	In	Out	Total	In	Out
210	Single Family Detached Housing	126 d.u.	1,286	643	643	94	24	70	127	80	47
221	Multifamily Housing (Mid-Rise)	149 d.u.	810	405	405	51	13	38	65	40	25
Total Net New External Trips			2,096	1,048	1,048	145	37	108	192	120	72

Appendix B:

Trip Generation

Devon Square

Table 1 - Trip Generation

Land Use Code	Land Use	Intensity	Daily			AM Peak Hour			PM Peak Hour		
			Total	In	Out	Total	In	Out	Total	In	Out
210	Single Family Detached Housing	135 d.u.	1,370	685	685	101	25	76	136	86	50
221	Multifamily Housing (Mid-Rise)	150 d.u.	816	408	408	51	13	38	65	40	25
Total Net New External Trips			2,186	1,093	1,093	152	38	114	201	126	75

Appendix C:

Traffic Count Data

US 1 and Purnell Road/Harris Road AM and PM Peak Hour Traffic Count

Count Performed: Tuesday, October 30, 2018

Start Time	US 1			Harris Road			US 1			Purnell Road			Intersection Volume
	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
6:30	5	422	6	34	3	3	3	161	13	8	23	21	702
6:45	11	511	16	32	13	2	11	203	36	16	65	24	940
7:00	5	322	13	47	9	2	9	213	54	23	59	27	783
7:15	7	349	16	29	20	7	17	242	21	9	19	21	757
7:30	8	320	11	21	25	3	16	267	15	16	16	16	734
7:45	5	371	16	36	18	4	25	251	14	12	24	21	797
8:00	10	353	17	32	23	6	23	250	25	8	12	26	785
8:15	10	316	10	45	16	1	16	234	36	15	23	23	745

16:30	14	398	16	33	23	4	23	389	42	17	19	15	993
16:45	18	359	8	38	25	9	17	391	35	23	36	22	981
17:00	17	367	9	40	27	8	23	388	35	27	24	22	987
17:15	18	379	15	38	35	6	26	358	39	28	30	30	1,002
17:30	16	352	12	32	26	5	32	429	36	22	14	33	1,009
17:45	12	297	13	39	28	13	21	401	57	29	37	33	980
18:00	12	342	10	28	26	3	29	396	47	21	19	23	956
18:15	10	261	11	38	21	8	26	343	29	25	29	24	825

Peak Hour	SBL	SBT	SBR	WBL	WBT	WBR	NBL	NBT	NBR	EBL	EBT	EBR	Volume
6:30 - 7:30	28	1,604	51	142	45	14	40	819	124	56	166	93	3,182
6:45 - 7:45	31	1,502	56	129	67	14	53	925	126	64	159	88	3,214
7:00 - 8:00	25	1,362	56	133	72	16	67	973	104	60	118	85	3,071
7:15 - 8:15	30	1,393	60	118	86	20	81	1,010	75	45	71	84	3,073
7:30 - 8:30	33	1,360	54	134	82	14	80	1,002	90	51	75	86	3,061

Peak Hour	SBL	SBT	SBR	WBL	WBT	WBR	NBL	NBT	NBR	EBL	EBT	EBR	Volume
16:30 - 17:30	67	1,503	48	149	110	27	89	1,526	151	95	109	89	3,963
16:45 - 17:45	69	1,457	44	148	113	28	98	1,566	145	100	104	107	3,979
17:00 - 18:00	63	1,395	49	149	116	32	102	1,576	167	106	105	118	3,978
17:15 - 18:15	58	1,370	50	137	115	27	108	1,584	179	100	100	119	3,947
17:30 - 18:30	50	1,252	46	137	101	29	108	1,569	169	97	99	113	3,770

Peak-Hour Traffic Volumes													
Peak Hour	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Volume
6:45 - 7:45	53	925	126	31	1,502	56	64	159	88	129	67	14	3,214
16:45 - 17:45	98	1,566	145	69	1,457	44	100	104	107	148	113	28	3,979

Peak-Hour Factor by Movement													
Peak Hour	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	PHF
6:45 - 7:45	0.779	0.866	0.583	0.705	0.735	0.875	0.696	0.612	0.815	0.686	0.670	0.500	0.855
16:45 - 17:45	0.766	0.913	0.929	0.958	0.961	0.733	0.792	0.722	0.811	0.925	0.807	0.778	0.986

Peak-Hour Factor by Approach					
Peak Hour	NB	SB	EB	WB	PHF
6:45 - 7:45	0.93	0.74	0.71	0.91	0.86
16:45 - 17:45	0.91	0.95	0.88	0.92	0.99

Heavy Vehicle Percentage by Movement													
Peak Hour	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	%HV
6:45 - 7:45	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
16:45 - 17:45	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Heavy Vehicle Percentage by Approach					
Peak Hour	NB	SB	EB	WB	%HV
6:45 - 7:45	0%	0%	0%	0%	0%
16:45 - 17:45	0%	0%	0%	0%	0%

US 1 and Club Villas Drive/ AM and PM Peak Hour Traffic Count

Count Performed: Tuesday, October 30, 2018

Start Time	US 1			0			US 1			Club Villas Drive			Intersection Volume
	Southbound			Westbound			Northbound			Eastbound			
	U-Turn	Thru	Right	Left	Thru	Right	U-Turn	Left	Thru	Left	Thru	Right	
6:30	0		0	0	0	0	2	0		0	0	2	4
6:45	0		0	0	0	0	0	0		0	0	3	3
7:00	0		0	0	0	0	1	0		0	0	3	4
7:15	0		1	0	0	0	0	0		0	0	1	2
7:30	0		0	0	0	0	0	1		0	0	0	1
7:45	0		1	0	0	0	1	3		1	0	3	9
8:00	1		0	0	0	0	1	0		1	0	0	3
8:15	0		0	0	0	0	0	0		0	0	0	0

16:30	0		0	0	0	0	0	0		2	0	5	7
16:45	0		1	0	0	0	1	3		0	0	1	6
17:00	0		0	0	0	0	2	2		0	0	5	9
17:15	0		0	0	0	0	0	6		0	0	0	6
17:30	0		3	0	0	0	0	1		1	0	1	6
17:45	1		1	0	0	0	2	0		0	0	0	4
18:00	1		0	0	0	0	0	2		0	0	4	7
18:15	0		0	0	0	0	4	2		0	0	4	10

Peak Hour	SBU	SBT	SBR	WBL	WBT	WBR	NBU	NBL	NBT	EBL	EBT	EBR	Volume
6:30 - 7:30	0	0	1	0	0	0	3	0	0	0	0	9	13
6:45 - 7:45	0	0	1	0	0	0	1	1	0	0	0	7	10
7:00 - 8:00	0	0	2	0	0	0	2	4	0	1	0	7	16
7:15 - 8:15	1	0	2	0	0	0	2	4	0	2	0	4	15
7:30 - 8:30	1	0	1	0	0	0	2	4	0	2	0	3	13

Peak Hour	SBU	SBT	SBR	WBL	WBT	WBR	NBU	NBL	NBT	EBL	EBT	EBR	Volume
16:30 - 17:30	0	0	1	0	0	0	3	11	0	2	0	11	28
16:45 - 17:45	0	0	4	0	0	0	3	12	0	1	0	7	27
17:00 - 18:00	1	0	4	0	0	0	4	9	0	1	0	6	25
17:15 - 18:15	2	0	4	0	0	0	2	9	0	1	0	5	23
17:30 - 18:30	2	0	4	0	0	0	6	5	0	1	0	9	27

Peak-Hour Traffic Volumes													
Peak Hour	NBU	NBL	NBT	SBU	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Volume
7:00 - 8:00	2	4	0	0	0	2	1	0	7	0	0	0	16
16:30 - 17:30	3	11	0	0	0	1	2	0	11	0	0	0	28

Peak-Hour Factor by Movement													
Peak Hour	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	PHF
7:00 - 8:00	0.333	-	#REF!	#REF!	-	0.500	0.250	-	0.583	-	-	-	0.444
16:30 - 17:30	0.458	-	#REF!	#REF!	-	0.250	0.250	-	0.550	-	-	-	0.778

Peak-Hour Factor by Approach					
Peak Hour	NB	SB	EB	WB	PHF
7:00 - 8:00	0.38	0.50	0.50	-	0.44
16:30 - 17:30	0.58	0.25	0.46	-	0.78

Heavy Vehicle Percentage by Movement													
Peak Hour	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	%HV
7:00 - 8:00	0%	0%	#REF!	#REF!	0%	0%	0%	0%	0%	0%	0%	0%	0%
16:30 - 17:30	0%	0%	#REF!	#REF!	0%	0%	0%	0%	0%	0%	0%	0%	0%

Heavy Vehicle Percentage by Approach					
Peak Hour	NB	SB	EB	WB	%HV
7:00 - 8:00	#REF!	#REF!	0%	0%	0%
16:30 - 17:30	#REF!	#REF!	0%	0%	0%

Wallridge Drive and Harris Road AM and PM Peak Hour Traffic Count
 Count Performed: Tuesday, October 30, 2018

Start Time	Wallridge Drive			Harris Road			0			Harris Road			Intersection Volume
	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
6:30	1	0	5	0	35	3	0	0	0	4	37	0	85
6:45	7	0	8	0	39	6	0	0	0	13	99	0	172
7:00	22	0	21	0	37	9	0	0	0	13	105	0	207
7:15	2	0	10	0	46	6	0	0	0	15	32	0	111
7:30	3	0	19	0	30	14	0	0	0	9	30	0	105
7:45	6	0	16	0	42	7	0	0	0	12	31	0	114
8:00	2	0	13	0	48	10	0	0	0	20	27	0	120
8:15	2	0	16	0	46	9	0	0	0	27	42	0	142

16:30	18	0	36	0	24	9	0	0	0	33	42	0	162
16:45	10	0	37	0	35	16	0	0	0	37	52	0	187
17:00	15	0	27	0	48	15	0	0	0	26	50	0	181
17:15	14	0	33	0	46	9	0	0	0	39	48	0	189
17:30	18	0	23	0	40	16	0	0	0	32	34	0	163
17:45	15	0	33	0	47	22	0	0	0	49	57	0	223
18:00	16	0	35	0	22	12	0	0	0	26	52	0	163
18:15	26	0	32	0	35	11	0	0	0	35	33	0	172

Peak Hour	SBL	SBT	SBR	WBL	WBT	WBR	NBL	NBT	NBR	EBL	EBT	EBR	Volume
6:30 - 7:30	32	0	44	0	157	24	0	0	0	45	273	0	575
6:45 - 7:45	34	0	58	0	152	35	0	0	0	50	266	0	595
7:00 - 8:00	33	0	66	0	155	36	0	0	0	49	198	0	537
7:15 - 8:15	13	0	58	0	166	37	0	0	0	56	120	0	450
7:30 - 8:30	13	0	64	0	166	40	0	0	0	68	130	0	481

Peak Hour	SBL	SBT	SBR	WBL	WBT	WBR	NBL	NBT	NBR	EBL	EBT	EBR	Volume
16:30 - 17:30	57	0	133	0	153	49	0	0	0	135	192	0	719
16:45 - 17:45	57	0	120	0	169	56	0	0	0	134	184	0	720
17:00 - 18:00	62	0	116	0	181	62	0	0	0	146	189	0	756
17:15 - 18:15	63	0	124	0	155	59	0	0	0	146	191	0	738
17:30 - 18:30	75	0	123	0	144	61	0	0	0	142	176	0	721

Peak-Hour Traffic Volumes													
Peak Hour	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Volume
6:45 - 7:45	0	0	0	34	0	58	50	266	0	0	152	35	595
17:00 - 18:00	0	0	0	62	0	116	146	189	0	0	181	62	756

Peak-Hour Factor by Movement													
Peak Hour	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	PHF
6:45 - 7:45	-	-	-	0.386	-	0.690	0.833	0.633	-	-	0.826	0.625	0.719
17:00 - 18:00	-	-	-	0.861	-	0.879	0.582	0.829	-	-	0.943	0.705	0.848

Peak-Hour Factor by Approach					
Peak Hour	NB	SB	EB	WB	PHF
6:45 - 7:45	-	0.54	0.67	0.90	0.72
17:00 - 18:00	-	0.93	0.79	0.88	0.85

Heavy Vehicle Percentage by Movement													
Peak Hour	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	%HV
6:45 - 7:45	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
17:00 - 18:00	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Heavy Vehicle Percentage by Approach					
Peak Hour	NB	SB	EB	WB	%HV
6:45 - 7:45	0%	0%	0%	0%	0%
17:00 - 18:00	0%	0%	0%	0%	0%

Appendix D:
Approved Development Data

APP DEVELOPMENT - PLANET FITNESS

Table 1 - Trip Generation

Land Use Code	Land Use	Intensity	Daily			AM Peak Hour			PM Peak Hour		
			Total	In	Out	Total	In	Out	Total	In	Out
492	Health/Fitness Club ²	27,718 s.f.	710	355	355	36	18	18	106	60	46

INTERSECTION ANALYSIS SHEET

Project: APP DEVELOPMENT - PLANET FITNESS
Location: Wake Forest, NC
Ct. Date 10/30/2018
N/S Street: US 1 (Capital Boulevard)
E/W Street: Harris Road/Purnell Road

Net New Trips:

AM In	AM Out	PM In	PM Out
18	18	60	46

Annual Growth Rate: 3.0%
Growth Factor: 0.125509
Existing Year: 2018
Buildout Year: 2022

AM PEAK HOUR AM PHF = 0.86

Description	Purnell Road <u>Eastbound</u>			Harris Road <u>Westbound</u>			US 1 (Capital Boulevard) <u>Northbound</u>				US 1 (Capital Boulevard) <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	U-Turn	Left	Through	Right	Left	Through	Right
Project Traffic													
Percent Assignment Inbound	0%	5%	0%	0%	0%	0%	0%	0%	15%	5%	20%	0%	0%
Inbound Project Traffic	0	1	0	0	0	0	0	0	3	1	4	0	0
Percent Assignment Outbound	0%	0%	0%	20%	5%	0%	0%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	4	1	0	0	0	0	0	0	0	0
Total Project Traffic	0	1	0	4	1	0	0	0	3	1	4	0	0

PM PEAK HOUR PM PHF = .99

Description	Purnell Road <u>Eastbound</u>			Harris Road <u>Westbound</u>			US 1 (Capital Boulevard) <u>Northbound</u>				US 1 (Capital Boulevard) <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	U-Turn	Through	Through	Right	Left	Through	Right
Project Traffic													
Percent Assignment Inbound	0%	5%	0%	0%	0%	0%	0%	0%	15%	5%	20%	0%	0%
Inbound Project Traffic	0	3	0	0	0	0	0	0	9	3	12	0	0
Percent Assignment Outbound	0%	0%	0%	20%	5%	0%	0%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	9	2	0	0	0	0	0	0	0	0
Total Project Traffic	0	3	0	9	2	0	0	0	9	3	12	0	0

INTERSECTION ANALYSIS SHEET

Project: APP DEVELOPMENT - PLANET FITNESS
Location: Wake Forest, NC
Ct. Date 10/30/2018
N/S Street: US 1 (Capital Boulevard)
E/W Street: Club Villas Drive

Net New Trips:

AM In	AM Out	PM In	PM Out
18	18	60	46

Annual Growth Rate: 3.0%
Growth Factor: 0.125509

Existing Year: 2018
Buildout Year: 2022

AM PEAK HOUR AM PHF =

Description	Club Villas Drive <u>Eastbound</u>			Club Villas Drive <u>Westbound</u>			US 1 (Capital Boulevard) <u>Northbound</u>				US 1 (Capital Boulevard) <u>Southbound</u>			
	Left	Through	Right	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Through	Right	
Project Traffic														
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	0%	20%	0%	0%	0%	0%	
Inbound Project Traffic	0	0	0	0	0	0	0	0	4	0	0	0	0	
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	20%	0%	
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	0	4	0	
Total Project Traffic	0	0	0	0	0	0	0	0	4	0	0	4	0	

PM PEAK HOUR PM PHF =

Description	Club Villas Drive <u>Eastbound</u>			Club Villas Drive <u>Westbound</u>			US 1 (Capital Boulevard) <u>Northbound</u>				US 1 (Capital Boulevard) <u>Southbound</u>			
	Left	Through	Right	Left	Through	Right	Left	Through	Right		Left	Through	Right	
Project Traffic														
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	0%	20%	0%	0%	0%	0%	
Inbound Project Traffic	0	0	0	0	0	0	0	0	12	0	0	0	0	
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	20%	0%	
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	0	9	0	
Total Project Traffic	0	0	0	0	0	0	0	0	12	0	0	9	0	

INTERSECTION ANALYSIS SHEET

Project: APP DEVELOPMENT - PLANET FITNESS
Location: Wake Forest, NC
Ct. Date 10/30/2018
N/S Street: Wallridge Drive
E/W Street: Harris Road

Net New Trips:

AM In	AM Out	PM In	PM Out
18	18	60	46

Annual Growth Rate: 3.0%
Growth Factor: 0.125509
Existing Year: 2018
Buildout Year: 2022

AM PEAK HOUR AM PHF = 0.72

Description	Harris Road <u>Eastbound</u>			Harris Road <u>Westbound</u>			Wallridge Drive <u>Northbound</u>			Wallridge Drive <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
Percent Assignment Inbound	30%	0%	0%	0%	0%	30%	0%	0%	0%	0%	0%	0%
Inbound Project Traffic	5	0	0	0	0	5	0	0	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	30%	0%	25%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	5	0	5
Total Project Traffic	5	0	0	0	0	5	0	0	0	5	0	5

PM PEAK HOUR PM PHF = 0.85

Description	Harris Road <u>Eastbound</u>			Harris Road <u>Westbound</u>			Wallridge Drive <u>Northbound</u>			Wallridge Drive <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
Percent Assignment Inbound	30%	0%	0%	0%	0%	30%	0%	0%	0%	0%	0%	0%
Inbound Project Traffic	18	0	0	0	0	18	0	0	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	30%	0%	25%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	14	0	12
Total Project Traffic	18	0	0	0	0	18	0	0	0	14	0	12

INTERSECTION ANALYSIS SHEET

Project: APP DEVELOPMENT - PLANET FITNESS
Location: Wake Forest, NC
Ct. Date: Balanced
N/S Street: Site Driveway
E/W Street: Harris Road

Net New Trips:

AM In	AM Out	PM In	PM Out
18	18	60	46

Annual Growth Rate: 3.0%
Growth Factor: 0.125509
Existing Year: 2018
Buildout Year: 2022

AM PEAK HOUR AM PHF = 0.90

Description	Harris Road <u>Eastbound</u>			Harris Road <u>Westbound</u>			Site Driveway <u>Northbound</u>			Site Driveway <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
Percent Assignment Inbound	0%	0%	0%	0%	30%	0%	0%	0%	0%	0%	0%	0%
Inbound Project Traffic	0	0	0	0	5	0	0	0	0	0	0	0
Percent Assignment Outbound	0%	30%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	5	0	0	0	0	0	0	0	0	0	0
Total Project Traffic	0	5	0	0	5	0	0	0	0	0	0	0

PM PEAK HOUR PM PHF = 0.90

Description	Harris Road <u>Eastbound</u>			Harris Road <u>Westbound</u>			Site Driveway <u>Northbound</u>			Site Driveway <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
Percent Assignment Inbound	0%	0%	0%	0%	30%	0%	0%	0%	0%	0%	0%	0%
Inbound Project Traffic	0	0	0	0	18	0	0	0	0	0	0	0
Percent Assignment Outbound	0%	30%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	14	0	0	0	0	0	0	0	0	0	0
Total Project Traffic	0	14	0	0	18	0	0	0	0	0	0	0

INTERSECTION ANALYSIS SHEET

Project: APP DEVELOPMENT - PLANET FITNESS
Location: Wake Forest, NC
Ct. Date Balanced
N/S Street: US 1 (Capital Boulevard)
E/W Street: Site Driveway

Net New Trips:

AM In	AM Out	PM In	PM Out
18	18	60	46

Annual Growth Rate: 3.0%
Growth Factor: 0.125509
Existing Year: 2018
Buildout Year: 2022

AM PEAK HOUR AM PHF = 0.90

Description	Site Driveway <u>Eastbound</u>			Site Driveway <u>Westbound</u>			US 1 (Capital Boulevard) <u>Northbound</u>			US 1 (Capital Boulevard) <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	20%	0%	0%	0%	0%
Inbound Project Traffic	0	0	0	0	0	0	0	4	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	20%	0%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	4	0
Total Project Traffic	0	0	0	0	0	0	0	4	0	0	4	0

PM PEAK HOUR PM PHF = 0.90

Description	Site Driveway <u>Eastbound</u>			Site Driveway <u>Westbound</u>			US 1 (Capital Boulevard) <u>Northbound</u>			US 1 (Capital Boulevard) <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	20%	0%	0%	0%	0%
Inbound Project Traffic	0	0	0	0	0	0	0	12	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	20%	0%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	9	0
Total Project Traffic	0	0	0	0	0	0	0	12	0	0	9	0

k:\ral_fpto_traffic\018772001 devon square\14 - analysis\appdev-planetfitness.xls\int. #5

12/3/18

TRAFFIC IMPACT ANALYSIS

FOR

GLEN OAKS

LOCATED

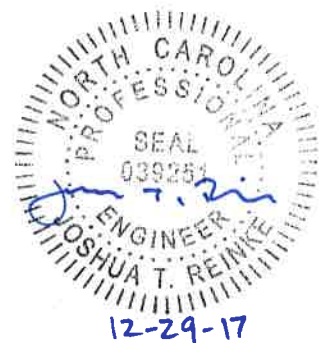
IN

WAKE FOREST, NORTH CAROLINA

Prepared For:
GREENPOINTE, LLC
7201 Creedmoor Road, Suite 140
Raleigh, NC 27613

Prepared By:
Ramey Kemp & Associates, Inc.
5808 Faringdon Place, Suite 100
Raleigh, NC 27609
License #C-0910

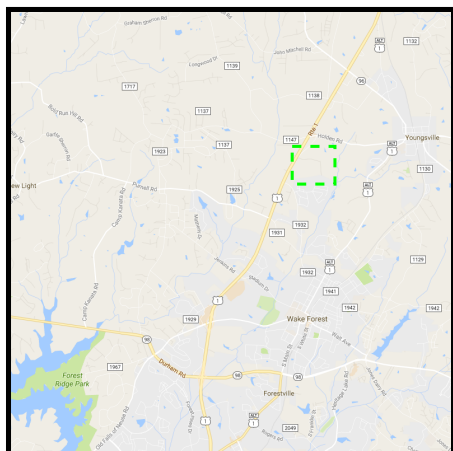
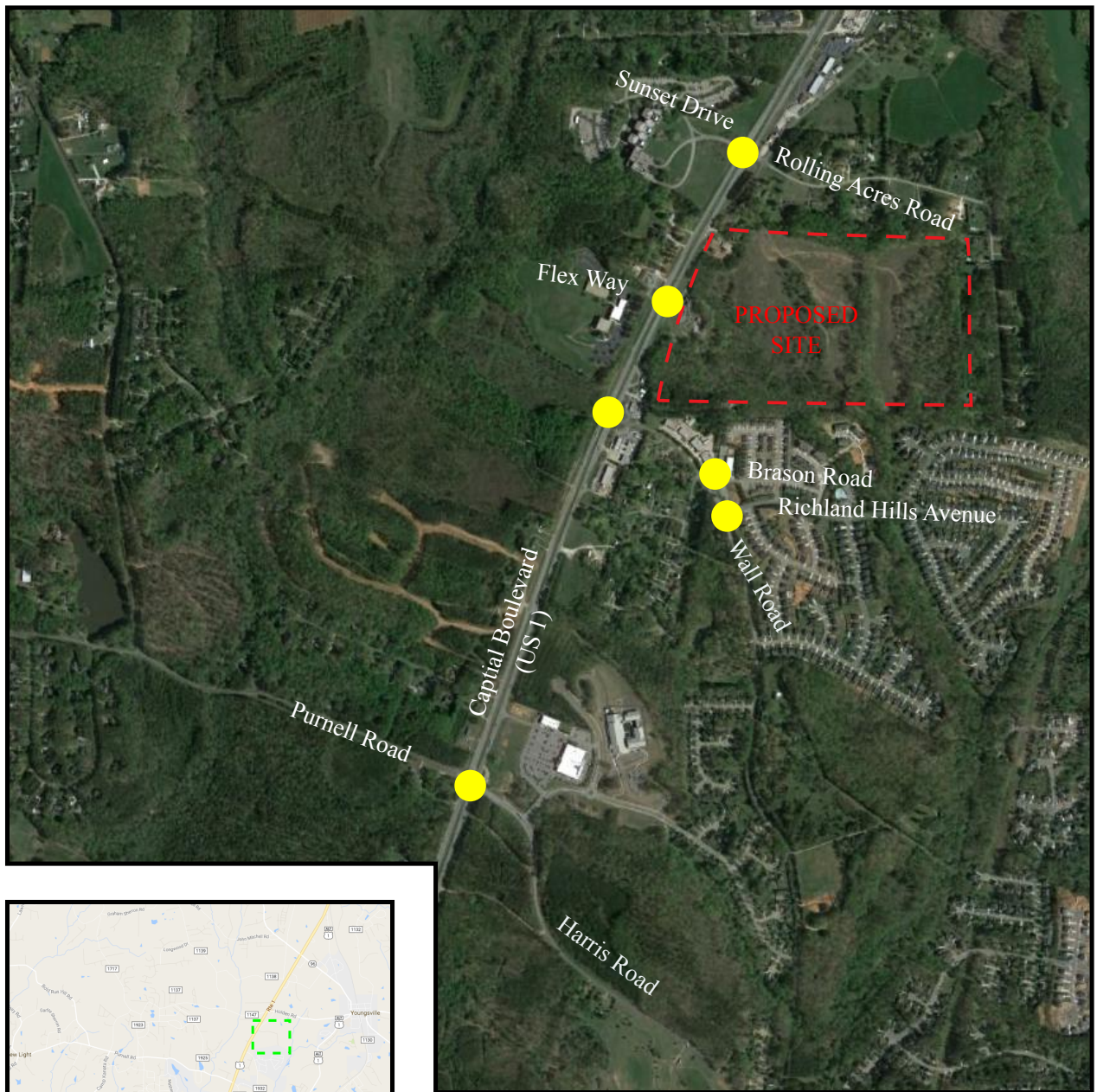
December 2017



RKA Project No. 16200

Prepared By: DL

Reviewed By: JR



LEGEND

- Proposed Site Location
- Study Intersection
- Study Area



Glen Oaks
Wake Forest, NC

Site Location Map

Scale: Not to Scale

Figure 1

4. SITE TRIP GENERATION AND DISTRIBUTION

4.1. Trip Generation

The proposed development was studied in two phases; Phase 1 is expected to be completed in 2019 with 108 single-family homes and 33 townhomes, while Phase 2 (full build-out) is expected to be completed in 2022 with a total of 225 single-family homes and 73 townhomes. Average weekday daily, AM peak hour, and PM peak hour trips for the proposed development were estimated using methodology contained within the *ITE Trip Generation Manual*, 9th Edition. Tables 1 and 2 provides a summary of the trip generation potential for the site under Phase 1 and Phase 2, respectively.

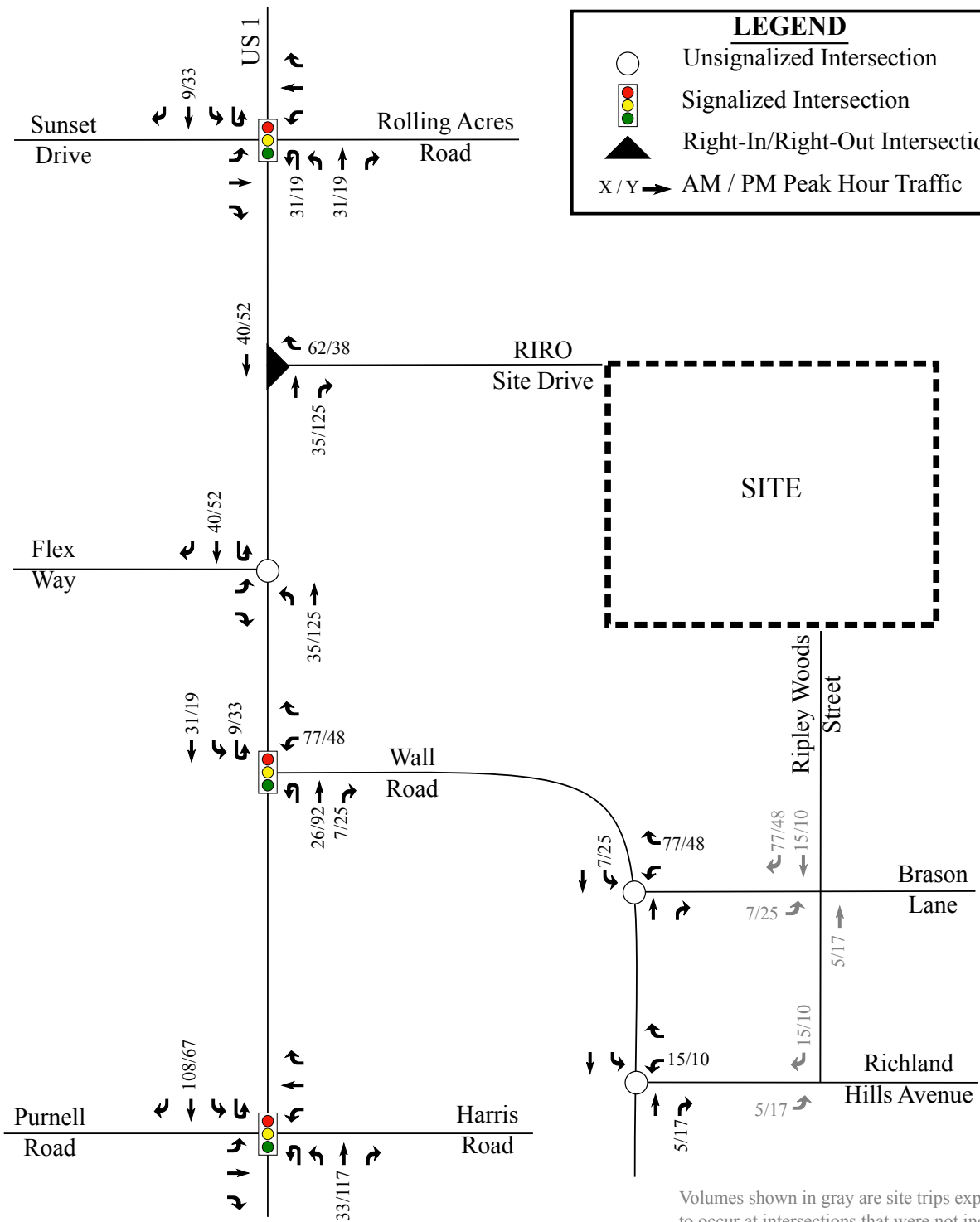
Table 1: Trip Generation Summary –Phase 1

Land Use (ITE Code)	Intensity	Daily Traffic (vpd)	AM Peak Hour Trips (vph)		PM Peak Hour Trips (vph)	
			Enter	Exit	Enter	Exit
Single Family Detached Housing (210)	108 dwellings	1,030	20	61	68	40
Residential Condo / Townhouse (230)	33 dwellings	190	3	12	12	6
Total Trips		1,220	23	73	80	46

It is estimated that once Phase 1 is complete, the proposed development will generate approximately 1,220 total site trips on the roadway network during a typical 24-hour weekday period. Of the daily traffic volume, it is anticipated that 96 trips (23 entering and 73 exiting) will occur during the AM peak hour and 126 (80 entering and 46 exiting) will occur during the PM peak hour.

Table 2: Trip Generation Summary –Phase 2

Land Use (ITE Code)	Intensity	Daily Traffic (vpd)	AM Peak Hour Trips (vph)		PM Peak Hour Trips (vph)	
			Enter	Exit	Enter	Exit
Single Family Detached Housing (210)	225 dwellings	2,140	42	127	142	83
Residential Condo / Townhouse (230)	73 dwellings	430	5	27	25	13
Total Trips		2,570	47	154	167	96



Volumes shown in gray are site trips expected to occur at intersections that were not included in the study area. Minimal impact is expected.

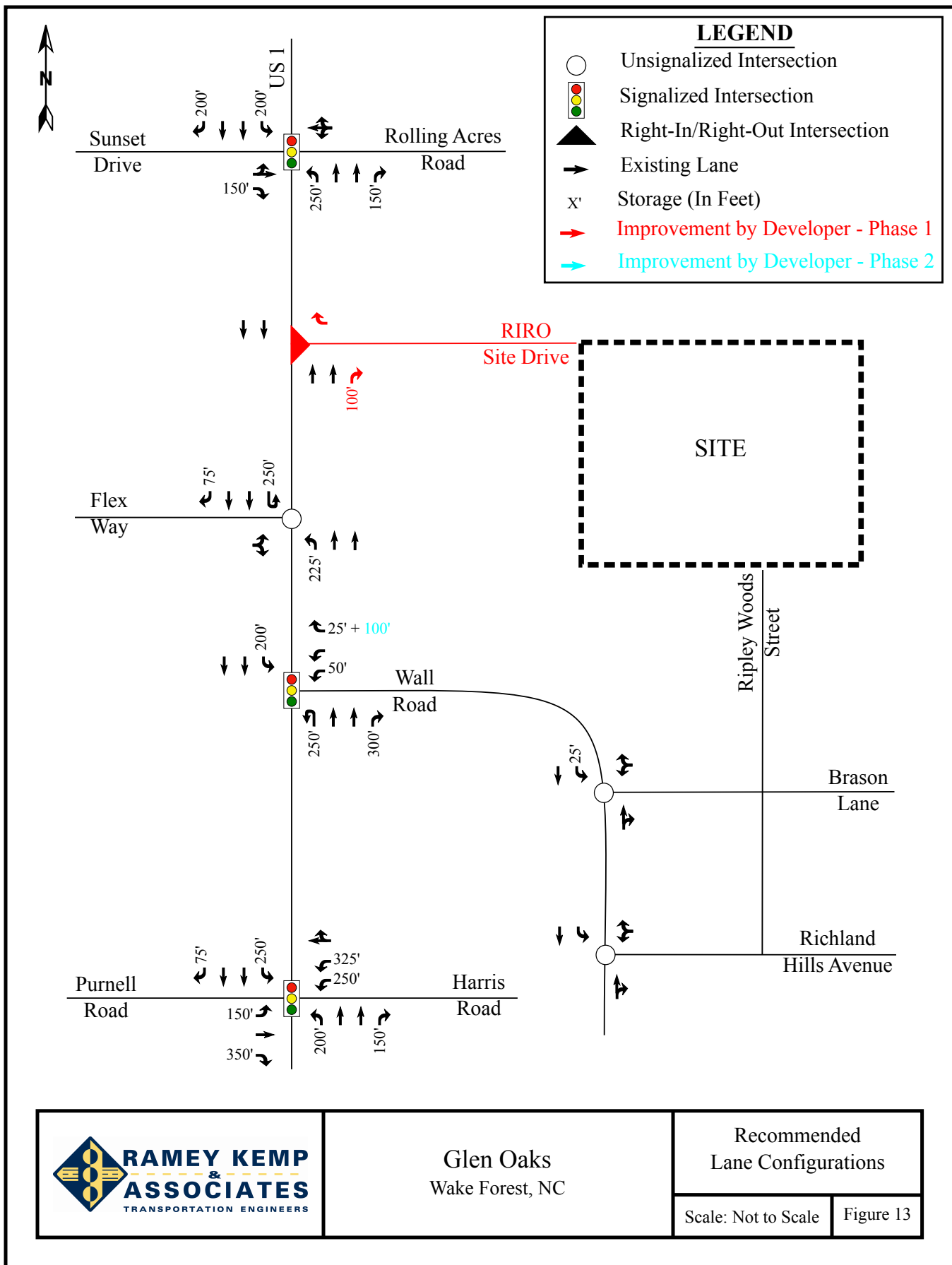


Glen Oaks
Wake Forest, NC

Site Trip Assignment
Phase 2

Scale: Not to Scale

Figure 10



Glen Oaks
Wake Forest, NC

Recommended
Lane Configurations

Scale: Not to Scale

Figure 13

Appendix E:

Intersection Spreadsheets

INTERSECTION ANALYSIS SHEET

Project: **Devon Square**
 Location: **Wake Forest, NC**
 Ct. Date: **10/30/2018**
 N/S Street: **US 1 (Capital Boulevard)**
 E/W Street: **Harris Road/Purnell Road**

Net New Trips:

AM In	AM Out	PM In	PM Out
38	114	126	75

Annual Growth Rate:

3.0%

 Existing Year:

2018

 Growth Factor:

0.125509

 Buildout Year:

2022

AM PEAK HOUR AM PHF = 0.86

Description	Purnell Road <u>Eastbound</u>			Harris Road <u>Westbound</u>			US 1 (Capital Boulevard) <u>Northbound</u>				US 1 (Capital Boulevard) <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	U-Turn	Left	Through	Right	Left	Through	Right
2018 Traffic Count	64	159	88	129	67	14	0	53	925	126	31	1502	56
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0
2018 Existing Traffic	64	159	88	129	67	14	0	53	925	126	31	1502	56
Growth Factor (0.03 per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2022 Background Growth	8	20	11	16	8	2	0	7	116	16	4	189	7
Committed Projects													
Planet Fitness	0	1	0	4	1	0	0	0	3	1	4	0	0
Glen Oaks Residential	0	0	0	0	0	0	0	33	33	0	0	108	0
Total Committed Traffic	0	1	0	4	1	0	0	33	36	1	4	108	0
2022 Background Traffic	72	180	99	149	76	16	0	93	1077	143	39	1799	63
Project Traffic													
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%	10%	0%
Inbound Project Traffic	0	0	0	0	0	0	0	0	0	0	2	4	0
Percent Assignment Outbound	0%	0%	0%	35%	0%	0%	30%	0%	15%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	40	0	0	34	0	17	0	0	0	0
Total Project Traffic	0	0	0	40	0	0	34	0	17	0	2	4	0
2022 Buildout Total	72	180	99	189	76	16	34	93	1094	143	41	1803	63
Percent Impact (Approach)	0.0%			14.2%			3.7%				0.3%		

Overall Percent Impact 2.5%

PM PEAK HOUR PM PHF = .99

Description	Purnell Road <u>Eastbound</u>			Harris Road <u>Westbound</u>			US 1 (Capital Boulevard) <u>Northbound</u>				US 1 (Capital Boulevard) <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	U-Turn	Through	Through	Right	Left	Through	Right
2018 Traffic Count	100	104	107	148	113	28	0	98	1566	145	69	1457	44
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0
2018 Existing Traffic	100	104	107	148	113	28	0	98	1566	145	69	1457	44
Growth Factor (0.03 per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2022 Background Growth	13	13	13	19	14	4	0	12	197	18	9	183	6
Committed Projects													
Planet Fitness	0	3	0	9	2	0	0	0	9	3	12	0	0
Glen Oaks Residential	0	0	0	0	0	0	0	117	117	0	0	67	0
Total Committed Traffic	0	3	0	9	2	0	0	117	126	3	12	67	0
2022 Background Traffic	113	120	120	176	129	32	0	227	1889	166	90	1707	50
Project Traffic													
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%	10%	0%
Inbound Project Traffic	0	0	0	0	0	0	0	0	0	0	6	13	0
Percent Assignment Outbound	0%	0%	0%	35%	0%	0%	30%	0%	15%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	26	0	0	23	0	11	0	0	0	0
Total Project Traffic	0	0	0	26	0	0	23	0	11	0	6	13	0
2022 Buildout Total	113	120	120	202	129	32	23	227	1900	166	96	1720	50
Percent Impact (Approach)	0.0%			7.2%			1.5%				1.0%		

Overall Percent Impact 1.6%

INTERSECTION ANALYSIS SHEET

Project: **Devon Square**
 Location: **Wake Forest, NC**
 Ct. Date: **10/30/2018**
 N/S Street: **US 1 (Capital Boulevard)**
 E/W Street: **Club Villas Drive**

Net New Trips: **AM In** 38 **AM Out** 114 **PM In** 126 **PM Out** 75

Annual Growth Rate: **3.0%** Existing Year: **2018**
 Growth Factor: **0.125509** Buildout Year: **2022**

AM PEAK HOUR AM PHF = 0.90

Description		Club Villas Drive			Westbound			US 1 (Capital Boulevard)				US 1 (Capital Boulevard)		
		Eastbound						Northbound				Southbound		
		Left	Through	Right	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Through	Right
2018	Traffic Count	1	0	7	0	0	0	2	4	0	0	0	0	2
Count	Balancing	0	0	0	0	0	0	0	0	1103	0	0	1717	0
2018	Existing Traffic	1	0	7	0	0	0	2	4	1103	0	0	1717	2
Growth Factor (0.03 per year)		0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2022	Background Growth	0	0	1	0	0	0	0	1	138	0	0	215	0
Committed Projects														
	Planet Fitness	0	0	0	0	0	0	0	0	4	0	0	4	0
	Glen Oaks Residential	0	0	0	0	0	0	0	0	66	0	0	108	0
Total Committed Traffic		0	0	0	0	0	0	0	0	70	0	0	112	0
2022	Background Traffic	1	0	8	0	0	0	2	5	1311	0	0	2044	2
Project Traffic														
Percent Assignment Inbound		0%	0%	0%	0%	0%	0%	0%	0%	65%	0%	10%	0%	0%
Inbound Project Traffic		0	0	0	0	0	0	0	0	25	0	4	0	0
Percent Assignment Outbound		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	65%	0%
Outbound Project Traffic		0	0	0	0	0	0	0	0	0	0	0	74	0
Total Project Traffic		0	0	0	0	0	0	0	0	25	0	4	74	0
2022	Buildout Total	1	0	8	0	0	0	2	5	1336	0	4	2118	2
Percent Impact (Approach)		0.0%			-			1.9%				3.7%		

PM PEAK HOUR PM PHF = 0.90

Description		Club Villas Drive			Westbound			US 1 (Capital Boulevard)				US 1 (Capital Boulevard)			
		Eastbound						Northbound				Southbound			
		Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right		
2018	Traffic Count	2	0	11	0	0	0	3	11	0	0	0	0	1	
	Count Balancing	0	0	0	0	0	0	0	0	1807	0	0	1711	0	
2018	Existing Traffic	2	0	11	0	0	0	3	11	1807	0	0	1711	1	
Growth Factor (0.03 per year)		0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	
2022	Background Growth	0	0	1	0	0	0	0	1	227	0	0	215	0	
Committed Projects															
	Planet Fitness	0	0	0	0	0	0	0	0	12	0	0	9	0	
	Glen Oaks Residential	0	0	0	0	0	0	0	0	234	0	0	67	0	
Total Committed Traffic		0	0	0	0	0	0	0	0	246	0	0	76	0	
2022	Background Traffic	2	0	12	0	0	0	3	12	2280	0	0	2002	1	
Project Traffic															
Percent Assignment Inbound		0%	0%	0%	0%	0%	0%	0%	0%	65%	0%	10%	0%	0%	
Inbound Project Traffic		0	0	0	0	0	0	0	0	82	0	13	0	0	
Percent Assignment Outbound		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	65%	0%	
Outbound Project Traffic		0	0	0	0	0	0	0	0	0	0	0	49	0	
Total Project Traffic		0	0	0	0	0	0	0	0	82	0	13	49	0	
2022	Buildout Total	2	0	12	0	0	0	3	12	2362	0	13	2051	1	
Percent Impact (Approach)		0.0%			-			3.4%				3.0%			

INTERSECTION ANALYSIS SHEET

Project: **Devon Square**
 Location: **Wake Forest, NC**
 Ct. Date: **10/30/2018**
 N/S Street: **Wallridge Drive**
 E/W Street: **Harris Road**

Net New Trips:

AM In	AM Out	PM In	PM Out
38	114	126	75

Annual Growth Rate:

3.0%

 Growth Factor:

0.125509

 Existing Year:

2018

 Buildout Year:

2022

AM PEAK HOUR AM PHF = 0.72

Description	Harris Road <u>Eastbound</u>			Harris Road <u>Westbound</u>			Wallridge Drive <u>Northbound</u>			Wallridge Drive <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2018 Traffic Count	50	266	0	0	152	35	0	0	0	34	0	58
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0
2018 Existing Traffic	50	266	0	0	152	35	0	0	0	34	0	58
Growth Factor (0.03 per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2022 Background Growth	6	33	0	0	19	4	0	0	0	4	0	7
Committed Projects												
Planet Fitness	5	0	0	0	0	5	0	0	0	5	0	5
Glen Oaks Residential	0	0	0	0	0	0	0	0	0	0	0	0
Total Committed Traffic	5	0	0	0	0	5	0	0	0	5	0	5
2022 Background Traffic	61	299	0	0	171	44	0	0	0	43	0	70
Project Traffic												
Percent Assignment Inbound	0%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Inbound Project Traffic	0	2	0	0	0	0	0	0	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	35%	0%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	40	0	0	0	0	0	0	0
Total Project Traffic	0	2	0	0	40	0	0	0	0	0	0	0
2022 Buildout Total	61	301	0	0	211	44	0	0	0	43	0	70
Percent Impact (Approach)		0.6%			15.7%		-			0.0%		
Overall Percent Impact	5.8%											

PM PEAK HOUR PM PHF = 0.85

Description	Harris Road <u>Eastbound</u>			Harris Road <u>Westbound</u>			Wallridge Drive <u>Northbound</u>			Wallridge Drive <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2018 Traffic Count	146	189	0	0	181	62	0	0	0	62	0	116
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0
2018 Existing Traffic	146	189	0	0	181	62	0	0	0	62	0	116
Growth Factor (0.03 per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2022 Background Growth	18	24	0	0	23	8	0	0	0	8	0	15
Committed Projects												
Planet Fitness	18	0	0	0	0	18	0	0	0	14	0	12
Glen Oaks Residential	0	0	0	0	0	0	0	0	0	0	0	0
Total Committed Traffic	18	0	0	0	0	18	0	0	0	14	0	12
2022 Background Traffic	182	213	0	0	204	88	0	0	0	84	0	143
Project Traffic												
Percent Assignment Inbound	0%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Inbound Project Traffic	0	6	0	0	0	0	0	0	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	35%	0%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	26	0	0	0	0	0	0	0
Total Project Traffic	0	6	0	0	26	0	0	0	0	0	0	0
2022 Buildout Total	182	219	0	0	230	88	0	0	0	84	0	143
Percent Impact (Approach)		1.5%			8.2%		-			0.0%		
Overall Percent Impact	3.4%											

INTERSECTION ANALYSIS SHEET

Project:	Devon Square
Location:	Wake Forest, NC
Ct. Date	Balanced
N/S Street:	Site Driveway
E/W Street:	Harris Road

	AM In	AM Out	PM In	PM Out
Net New Trips:	38	114	126	75

Annual Growth Rate:	3.0%	Existing Year:	2018
Growth Factor:	0.125509	Buildout Year:	2022

AM PEAK HOUR AM PHF = 0.90

Description	Harris Road Eastbound			Harris Road Westbound			Site Driveway Northbound			Site Driveway Southbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2018 Traffic Count	0	0	0	0	0	0	0	0	0	0	0	0
Count Balancing	0	300	0	0	187	0	0	0	0	0	0	0
2018 Existing Traffic	0	300	0	0	187	0	0	0	0	0	0	0
Growth Factor (0.03 per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2022 Background Growth	0	38	0	0	23	0	0	0	0	0	0	0
Committed Projects												
Planet Fitness	0	5	0	0	5	0	0	0	0	0	0	0
Glen Oaks Residential	0	0	0	0	0	0	0	0	0	0	0	0
Total Committed Traffic	0	5	0	0	5	0	0	0	0	0	0	0
2022 Background Traffic	0	343	0	0	215	0	0	0	0	0	0	0
Project Traffic												
Percent Assignment Inbound	0%	0%	5%	20%	0%	0%	0%	0%	0%	0%	0%	0%
Inbound Project Traffic	0	0	2	7	0	0	0	0	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	35%	0%	20%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	0	0	40	0	23	0	0	0
Total Project Traffic	0	0	2	7	0	0	40	0	23	0	0	0
2022 Buildout Total	0	343	2	7	215	0	40	0	23	0	0	0
Percent Impact (Approach)		0.6%			3.2%			100.0%			-	
Overall Percent Impact	11.4%											

PM PEAK HOUR PM PHF = 0.90

Description	Harris Road Eastbound			Harris Road Westbound			Site Driveway Northbound			Site Driveway Southbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2018 Traffic Count	0	0	0	0	0	0	0	0	0	0	0	0
Count Balancing	0	251	0	0	243	0	0	0	0	0	0	0
2018 Existing Traffic	0	251	0	0	243	0	0	0	0	0	0	0
Growth Factor (0.03 per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2022 Background Growth	0	32	0	0	30	0	0	0	0	0	0	0
Committed Projects												
Planet Fitness	0	14	0	0	18	0	0	0	0	0	0	0
Glen Oaks Residential	0	0	0	0	0	0	0	0	0	0	0	0
Total Committed Traffic	0	14	0	0	18	0	0	0	0	0	0	0
2022 Background Traffic	0	297	0	0	291	0	0	0	0	0	0	0
Project Traffic												
Percent Assignment Inbound	0%	0%	5%	20%	0%	0%	0%	0%	0%	0%	0%	0%
Inbound Project Traffic	0	0	6	25	0	0	0	0	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	35%	0%	20%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	0	0	26	0	15	0	0	0
Total Project Traffic	0	0	6	25	0	0	26	0	15	0	0	0
2022 Buildout Total	0	297	6	25	291	0	26	0	15	0	0	0
Percent Impact (Approach)		2.0%			7.9%			100.0%			-	
Overall Percent Impact	10.9%											

INTERSECTION ANALYSIS SHEET

Project: **Devon Square**
 Location: **Wake Forest, NC**
 Ct. Date: **Balanced**
 N/S Street: **US 1 (Capital Boulevard)**
 E/W Street: **Site Driveway**

Net New Trips:

AM In	AM Out	PM In	PM Out
38	114	126	75

Annual Growth Rate:

3.0%

 Growth Factor:

0.125509

 Existing Year:

2018

 Buildout Year:

2022

AM PEAK HOUR AM PHF = 0.90

Description	Site Driveway Eastbound			Site Driveway Westbound			US 1 (Capital Boulevard) Northbound			US 1 (Capital Boulevard) Southbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2018 Traffic Count	0	0	0	0	0	0	0	0	0	0	0	0
Count Balancing	0	0	0	0	0	0	0	1104	0	0	1719	0
2018 Existing Traffic	0	0	0	0	0	0	0	1104	0	0	1719	0
Growth Factor (0.03 per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2022 Background Growth	0	0	0	0	0	0	0	139	0	0	216	0
Committed Projects												
Planet Fitness	0	0	0	0	0	0	0	4	0	0	4	0
Glen Oaks Residential	0	0	0	0	0	0	0	66	0	0	108	0
Total Committed Traffic	0	0	0	0	0	0	0	70	0	0	112	0
2022 Background Traffic	0	0	0	0	0	0	0	1313	0	0	2047	0
Project Traffic												
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	0%	75%	0%	10%	0%
Inbound Project Traffic	0	0	0	0	0	0	0	0	29	0	4	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	45%	0%	0%	0%	0%	65%	0%
Outbound Project Traffic	0	0	0	0	0	51	0	0	0	0	74	0
Total Project Traffic	0	0	0	0	0	51	0	0	29	0	78	0
2022 Buildout Total	0	0	0	0	0	51	0	1313	29	0	2125	0
Percent Impact (Approach)		-				100.0%		2.2%			3.7%	
Overall Percent Impact	4.5%											
























PM PEAK HOUR PM PHF = 0.90

Description	Site Driveway Eastbound			Site Driveway Westbound			US 1 (Capital Boulevard) Northbound			US 1 (Capital Boulevard) Southbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2018 Traffic Count	0	0	0	0	0	0	0	0	0	0	0	0
Count Balancing	0	0	0	0	0	0	0	1809	0	0	1712	0
2018 Existing Traffic	0	0	0	0	0	0	0	1809	0	0	1712	0
Growth Factor (0.03 per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2022 Background Growth	0	0	0	0	0	0	0	227	0	0	215	0
Committed Projects												
Planet Fitness	0	0	0	0	0	0	0	12	0	0	9	0
Glen Oaks Residential	0	0	0	0	0	0	0	234	0	0	67	0
Total Committed Traffic	0	0	0	0	0	0	0	246	0	0	76	0
2022 Background Traffic	0	0	0	0	0	0	0	2282	0	0	2003	0
Project Traffic												
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	0%	75%	0%	10%	0%
Inbound Project Traffic	0	0	0	0	0	0	0	0	95	0	13	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	45%	0%	0%	0%	0%	65%	0%
Outbound Project Traffic	0	0	0	0	0	34	0	0	0	0	49	0
Total Project Traffic	0	0	0	0	0	34	0	0	95	0	62	0
2022 Buildout Total	0	0	0	0	0	34	0	2282	95	0	2065	0
Percent Impact (Approach)		-				100.0%		4.0%			3.0%	
Overall Percent Impact	4.3%											

Appendix F:
Synchro Output:
Existing (2018)

Devon Square Residential
1: US 1 (Capital Blvd.) & Harris Road

Existing AM
11/20/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	159	88	129	67	14	53	925	126	31	1502	56
Future Volume (vph)	64	159	88	129	67	14	53	925	126	31	1502	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-2%			8%			0%			0%	
Storage Length (ft)	150		350	235		0	300		150	150		65
Storage Lanes	1		1	2		0	1		1	1		1
Taper Length (ft)	100			200			100			100		
Satd. Flow (prot)	1787	1881	1599	3296	1742	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.608			0.950			0.048			0.208		
Satd. Flow (perm)	1144	1881	1599	3296	1742	0	89	3539	1583	387	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			132		6				147			83
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		697			582			2066			1251	
Travel Time (s)		10.6			8.8			25.6			15.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	74	185	102	150	94	0	62	1076	147	36	1747	65
Turn Type	D.P+P	NA	pm+ov	Prot	NA		D.P+P	NA	pm+ov	D.P+P	NA	pm+ov
Protected Phases	7	4	5	3	8		5	2	3	1	6	7
Permitted Phases	8		4				6		2	2		6
Detector Phase	7	4	5	3	8		5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	14.0	7.0	7.0	14.0	7.0
Minimum Split (s)	13.0	14.0	14.0	14.0	14.0		14.0	21.0	14.0	14.0	21.0	13.0
Total Split (s)	15.0	20.0	15.0	15.0	20.0		15.0	90.0	15.0	15.0	90.0	15.0
Total Split (%)	10.7%	14.3%	10.7%	10.7%	14.3%		10.7%	64.3%	10.7%	10.7%	64.3%	10.7%
Yellow Time (s)	3.0	4.7	3.0	3.0	4.7		3.0	5.2	3.0	3.0	5.2	3.0
All-Red Time (s)	2.9	2.0	3.3	3.2	2.0		3.3	1.7	3.2	3.9	1.7	2.9
Lost Time Adjust (s)	-0.9	-1.7	-1.3	-1.2	-1.7		-1.3	-1.9	-1.2	-1.9	-1.9	-0.9
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lag	Lag	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max	None	None	C-Max	None
Act Effect Green (s)	25.0	15.1	25.1	9.9	15.5		95.0	88.8	103.8	96.0	85.0	94.5
Actuated g/C Ratio	0.18	0.11	0.18	0.07	0.11		0.68	0.63	0.74	0.69	0.61	0.68
v/c Ratio	0.30	0.92	0.26	0.64	0.47		0.34	0.48	0.12	0.10	0.81	0.06
Control Delay	48.8	105.9	4.0	76.5	63.6		32.6	14.8	1.1	6.6	25.3	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.8	105.9	4.0	76.5	63.6		32.6	14.8	1.1	6.6	25.3	0.5
LOS	D	F	A	E	E		C	B	A	A	C	A
Approach Delay		65.4			71.5			14.1			24.1	
Approach LOS		E			E			B			C	
Queue Length 50th (ft)	56	170	0	69	77		15	271	0	9	618	0
Queue Length 95th (ft)	98	#293	18	103	131		45	304	16	18	658	4
Internal Link Dist (ft)		617			502			1986			1171	
Turn Bay Length (ft)	150		350	235			300		150	150		65
Base Capacity (vph)	254	202	394	235	198		180	2245	1211	366	2148	1100
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.92	0.26	0.64	0.47		0.34	0.48	0.12	0.10	0.81	0.06

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 119 (85%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.92

Devon Square Residential
1: US 1 (Capital Blvd.) & Harris Road

Existing AM
11/20/2018

Intersection Signal Delay: 27.7
Intersection Capacity Utilization 70.7%

Intersection LOS: C
ICU Level of Service C















Analysis Period (min) 15

Description: 05-1930

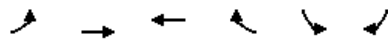
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: US 1 (Capital Blvd.) & Harris Road



								
Lane Group	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	4	7	4	4	1103	4	1717	4
Future Volume (vph)	4	7	4	4	1103	4	1717	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12
Grade (%)	0%				0%		0%	
Storage Length (ft)	0	0		250		225		75
Storage Lanes	1	0		1		1		1
Taper Length (ft)	25			100		100		
Satd. Flow (prot)	1668	0	0	1770	3539	1770	3539	1583
Flt Permitted	0.984			0.950		0.950		
Satd. Flow (perm)	1668	0	0	1770	3539	1770	3539	1583
Link Speed (mph)	25				55		55	
Link Distance (ft)	716				691		2066	
Travel Time (s)	19.5				8.6		25.6	
Confl. Peds. (#/hr)								
Confl. Bikes (#/hr)								
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0
Parking (#/hr)								
Mid-Block Traffic (%)	0%				0%		0%	
Shared Lane Traffic (%)								
Lane Group Flow (vph)	12	0	0	8	1226	4	1908	4
Sign Control	Stop				Free		Free	
Intersection Summary								
Area Type:	Other							
Control Type:	Unsignalized							
Intersection Capacity Utilization 57.5%	ICU Level of Service B							
Analysis Period (min) 15								

Intersection								
Int Delay, s/veh	0.4							
Movement	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations	↔			↔	↕	↔	↕	↔
Traffic Vol, veh/h	4	7	4	4	1103	4	1717	4
Future Vol, veh/h	4	7	4	4	1103	4	1717	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	-	None
Storage Length	0	-	-	250	-	225	-	75
Veh in Median Storage, #	0	-	-	-	0	-	0	-
Grade, %	0	-	-	-	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2
Mvmt Flow	4	8	4	4	1226	4	1908	4
Major/Minor	Minor2	Major1			Major2			
Conflicting Flow All	2548	954	1392	1908	0	894	-	0
Stage 1	1917	-	-	-	-	-	-	-
Stage 2	631	-	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.44	4.14	-	6.44	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.52	2.22	-	2.52	-	-
Pot Cap-1 Maneuver	22	259	185	307	-	388	-	-
Stage 1	101	-	-	-	-	-	-	-
Stage 2	492	-	-	-	-	-	-	-
Platoon blocked, %					-	-	-	-
Mov Cap-1 Maneuver	22	259	227	227	-	388	-	-
Mov Cap-2 Maneuver	22	-	-	-	-	-	-	-
Stage 1	101	-	-	-	-	-	-	-
Stage 2	492	-	-	-	-	-	-	-
Approach	EB	NB			SB			
HCM Control Delay, s	92.2	0.2			0			
HCM LOS	F							
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBU	SBT	SBR		
Capacity (veh/h)	227	-	53	388	-	-		
HCM Lane V/C Ratio	0.039	-	0.231	0.011	-	-		
HCM Control Delay (s)	21.5	-	92.2	14.4	-	-		
HCM Lane LOS	C	-	F	B	-	-		
HCM 95th %tile Q(veh)	0.1	-	0.8	0	-	-		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	50	266	152	35	34	58
Future Volume (vph)	50	266	152	35	34	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	110			160	175	0
Storage Lanes	1			1	1	1
Taper Length (ft)	100				100	
Satd. Flow (prot)	1770	1863	1863	1583	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Link Speed (mph)		45	45		25	
Link Distance (ft)		582	1003		715	
Travel Time (s)		8.8	15.2		19.5	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	69	369	211	49	47	81
Sign Control		Free	Free		Stop	

Intersection Summary







Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 24.7%
























ICU Level of Service A

Analysis Period (min) 15

Intersection						
Int Delay, s/veh	2.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	50	266	152	35	34	58
Future Vol, veh/h	50	266	152	35	34	58
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	110	-	-	160	175	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	72	72	72	72	72	72
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	69	369	211	49	47	81
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	211	0	-	0	719	211
Stage 1	-	-	-	-	211	-
Stage 2	-	-	-	-	508	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1360	-	-	-	395	829
Stage 1	-	-	-	-	824	-
Stage 2	-	-	-	-	604	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1360	-	-	-	375	829
Mov Cap-2 Maneuver	-	-	-	-	375	-
Stage 1	-	-	-	-	824	-
Stage 2	-	-	-	-	573	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.2	0		12.1		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1360	-	-	-	375	829
HCM Lane V/C Ratio	0.051	-	-	-	0.126	0.097
HCM Control Delay (s)	7.8	-	-	-	16	9.8
HCM Lane LOS	A	-	-	-	C	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0.4	0.3

Devon Square Residential
1: US 1 (Capital Blvd.) & Harris Road

Existing PM
11/20/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	104	107	148	113	28	98	1566	145	69	1457	44
Future Volume (vph)	100	104	107	148	113	28	98	1566	145	69	1457	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-2%			8%			0%			0%	
Storage Length (ft)	150		350	235		0	300		150	150		65
Storage Lanes	1		1	2		0	1		1	1		1
Taper Length (ft)	100			200			100			100		
Satd. Flow (prot)	1787	1881	1599	3296	1735	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.493			0.950			0.062			0.061		
Satd. Flow (perm)	928	1881	1599	3296	1735	0	115	3539	1583	114	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			132		7				129			83
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		697			582			2066			1251	
Travel Time (s)		10.6			8.8			25.6			15.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	101	105	108	149	142	0	99	1582	146	70	1472	44
Turn Type	D.P+P	NA	pm+ov	Prot	NA		D.P+P	NA	pm+ov	D.P+P	NA	pm+ov
Protected Phases	7	4	5	3	8		5	2	3	1	6	7
Permitted Phases	8		4				6		2	2		6
Detector Phase	7	4	5	3	8		5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	14.0	7.0	7.0	14.0	7.0
Minimum Split (s)	13.0	14.0	14.0	14.0	14.0		14.0	21.0	14.0	14.0	21.0	13.0
Total Split (s)	30.0	25.0	25.0	20.0	15.0		25.0	75.0	20.0	20.0	70.0	30.0
Total Split (%)	21.4%	17.9%	17.9%	14.3%	10.7%		17.9%	53.6%	14.3%	14.3%	50.0%	21.4%
Yellow Time (s)	3.0	4.7	3.0	3.0	4.7		3.0	5.2	3.0	3.0	5.2	3.0
All-Red Time (s)	2.9	2.0	3.3	3.2	2.0		3.3	1.7	3.2	3.9	1.7	2.9
Lost Time Adjust (s)	-0.9	-1.7	-1.3	-1.2	-1.7		-1.3	-1.9	-1.2	-1.9	-1.9	-0.9
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lag	Lag	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max	None	None	C-Max	None
Act Effect Green (s)	33.3	20.6	40.6	12.6	20.8		86.7	79.4	97.1	87.7	66.7	79.2
Actuated g/C Ratio	0.24	0.15	0.29	0.09	0.15		0.62	0.57	0.69	0.63	0.48	0.57
v/c Ratio	0.34	0.38	0.19	0.50	0.54		0.32	0.79	0.13	0.37	0.87	0.05
Control Delay	42.2	58.5	2.8	66.3	61.2		35.7	28.8	2.1	17.7	40.1	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.2	58.5	2.8	66.3	61.2		35.7	28.8	2.1	17.7	40.1	0.2
LOS	D	E	A	E	E		D	C	A	B	D	A
Approach Delay		34.1			63.8			27.0			38.0	
Approach LOS		C			E			C			D	
Queue Length 50th (ft)	71	87	0	67	115		31	599	5	22	625	0
Queue Length 95th (ft)	120	149	22	103	193		86	758	29	53	747	1
Internal Link Dist (ft)		617			502			1986			1171	
Turn Bay Length (ft)	150		350	235			300		150	150		65
Base Capacity (vph)	407	277	557	353	263		307	2008	1161	251	1686	1065
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.38	0.19	0.42	0.54		0.32	0.79	0.13	0.28	0.87	0.04

Intersection Summary

Area Type: Other
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 25 (18%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.87

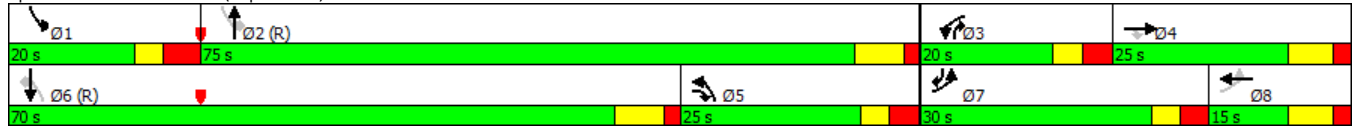
Devon Square Residential
1: US 1 (Capital Blvd.) & Harris Road

Existing PM
11/20/2018

Intersection Signal Delay: 34.6
Intersection Capacity Utilization 79.3%
Analysis Period (min) 15
Description: 05-1930















Intersection LOS: C
ICU Level of Service D

Splits and Phases: 1: US 1 (Capital Blvd.) & Harris Road

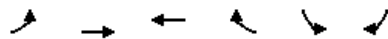


Devon Square Residential
2: US 1 (Capital Blvd.) & Club Villas Drive

Existing PM
11/20/2018

								
Lane Group	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	4	11	4	11	1807	4	1711	4
Future Volume (vph)	4	11	4	11	1807	4	1711	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12
Grade (%)	0%				0%		0%	
Storage Length (ft)	0	0		250		225		75
Storage Lanes	1	0		1		1		1
Taper Length (ft)	25			100		100		
Satd. Flow (prot)	1655	0	0	1770	3539	1770	3539	1583
Flt Permitted	0.988			0.950		0.950		
Satd. Flow (perm)	1655	0	0	1770	3539	1770	3539	1583
Link Speed (mph)	25				55		55	
Link Distance (ft)	716				691		2066	
Travel Time (s)	19.5				8.6		25.6	
Confl. Peds. (#/hr)								
Confl. Bikes (#/hr)								
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0
Parking (#/hr)								
Mid-Block Traffic (%)	0%				0%		0%	
Shared Lane Traffic (%)								
Lane Group Flow (vph)	16	0	0	16	2008	4	1901	4
Sign Control	Stop				Free		Free	
Intersection Summary								
Area Type:	Other							
Control Type:	Unsignalized							
Intersection Capacity Utilization 60.0%	ICU Level of Service B							
Analysis Period (min) 15								

Intersection								
Int Delay, s/veh	0.8							
Movement	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations	↔			↔	↕	↔	↕	↔
Traffic Vol, veh/h	4	11	4	11	1807	4	1711	4
Future Vol, veh/h	4	11	4	11	1807	4	1711	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	-	None
Storage Length	0	-	-	250	-	225	-	75
Veh in Median Storage, #	0	-	-	-	0	-	0	-
Grade, %	0	-	-	-	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2
Mvmt Flow	4	12	4	12	2008	4	1901	4
Major/Minor	Minor2	Major1			Major2			
Conflicting Flow All	2947	951	1388	1901	0	1465	-	0
Stage 1	1910	-	-	-	-	-	-	-
Stage 2	1037	-	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.44	4.14	-	6.44	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.52	2.22	-	2.52	-	-
Pot Cap-1 Maneuver	12	260	186	309	-	166	-	-
Stage 1	102	-	-	-	-	-	-	-
Stage 2	303	-	-	-	-	-	-	-
Platoon blocked, %					-	-	-	-
Mov Cap-1 Maneuver	12	260	258	258	-	166	-	-
Mov Cap-2 Maneuver	12	-	-	-	-	-	-	-
Stage 1	102	-	-	-	-	-	-	-
Stage 2	303	-	-	-	-	-	-	-
Approach	EB	NB			SB			
HCM Control Delay, s	148.4	0.2			0.1			
HCM LOS	F							
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBU	SBT	SBR		
Capacity (veh/h)	258	-	40	166	-	-		
HCM Lane V/C Ratio	0.065	-	0.417	0.027	-	-		
HCM Control Delay (s)	19.9	-	148.4	27.3	-	-		
HCM Lane LOS	C	-	F	D	-	-		
HCM 95th %tile Q(veh)	0.2	-	1.4	0.1	-	-		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	146	189	181	62	62	116
Future Volume (vph)	146	189	181	62	62	116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	110			160	175	0
Storage Lanes	1			1	1	1
Taper Length (ft)	100				100	
Satd. Flow (prot)	1770	1863	1863	1583	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Link Speed (mph)		45	45		25	
Link Distance (ft)		582	1003		715	
Travel Time (s)		8.8	15.2		19.5	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	172	222	213	73	73	136
Sign Control		Free	Free		Stop	

Intersection Summary







Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 31.0%

ICU Level of Service A
























Analysis Period (min) 15

Intersection						
Int Delay, s/veh	4.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	146	189	181	62	62	116
Future Vol, veh/h	146	189	181	62	62	116
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	110	-	-	160	175	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	172	222	213	73	73	136
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	213	0	-	0	779	213
Stage 1	-	-	-	-	213	-
Stage 2	-	-	-	-	566	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1357	-	-	-	364	827
Stage 1	-	-	-	-	823	-
Stage 2	-	-	-	-	568	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1357	-	-	-	318	827
Mov Cap-2 Maneuver	-	-	-	-	318	-
Stage 1	-	-	-	-	823	-
Stage 2	-	-	-	-	496	-
Approach	EB	WB		SB		
HCM Control Delay, s	3.5	0		13.5		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1357	-	-	-	318	827
HCM Lane V/C Ratio	0.127	-	-	-	0.229	0.165
HCM Control Delay (s)	8	-	-	-	19.7	10.2
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.4	-	-	-	0.9	0.6

Appendix G:
Synchro Output:
Background (2022)

Devon Square Residential
1: US 1 (Capital Blvd.) & Harris Road

Background AM
11/20/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	180	99	149	76	16	93	1077	143	39	1799	63
Future Volume (vph)	72	180	99	149	76	16	93	1077	143	39	1799	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-2%			8%			0%			0%	
Storage Length (ft)	150		350	235		0	300		150	150		65
Storage Lanes	1		1	2		0	1		1	1		1
Taper Length (ft)	100			200			100			100		
Satd. Flow (prot)	1787	1881	1599	3296	1740	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.552			0.950			0.048			0.158		
Satd. Flow (perm)	1039	1881	1599	3296	1740	0	89	3539	1583	294	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			132		6				159			83
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		697			582			2066			1251	
Travel Time (s)		10.6			8.8			25.6			15.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	84	209	115	173	107	0	108	1252	166	45	2092	73
Turn Type	D.P+P	NA	pm+ov	Prot	NA		D.P+P	NA	pm+ov	D.P+P	NA	pm+ov
Protected Phases	7	4	5	3	8		5	2	3	1	6	7
Permitted Phases	8		4				6		2	2		6
Detector Phase	7	4	5	3	8		5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	14.0	7.0	7.0	14.0	7.0
Minimum Split (s)	13.0	14.0	14.0	14.0	14.0		14.0	21.0	14.0	14.0	21.0	13.0
Total Split (s)	15.0	20.0	15.0	15.0	20.0		15.0	90.0	15.0	15.0	90.0	15.0
Total Split (%)	10.7%	14.3%	10.7%	10.7%	14.3%		10.7%	64.3%	10.7%	10.7%	64.3%	10.7%
Yellow Time (s)	3.0	4.7	3.0	3.0	4.7		3.0	5.2	3.0	3.0	5.2	3.0
All-Red Time (s)	2.9	2.0	3.3	3.2	2.0		3.3	1.7	3.2	3.9	1.7	2.9
Lost Time Adjust (s)	-0.9	-1.7	-1.3	-1.2	-1.7		-1.3	-1.9	-1.2	-1.9	-1.9	-0.9
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lag	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max	None	None	C-Max	None
Act Effect Green (s)	25.0	15.0	25.0	10.0	15.4		95.0	88.8	103.8	96.0	85.0	94.6
Actuated g/C Ratio	0.18	0.11	0.18	0.07	0.11		0.68	0.63	0.74	0.69	0.61	0.68
v/c Ratio	0.36	1.04	0.29	0.74	0.55		0.60	0.56	0.14	0.15	0.97	0.07
Control Delay	50.2	133.5	5.8	82.3	67.0		53.1	16.3	1.2	7.1	40.9	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.2	133.5	5.8	82.3	67.0		53.1	16.3	1.2	7.1	40.9	0.7
LOS	D	F	A	F	E		D	B	A	A	D	A
Approach Delay		80.4			76.5			17.3			38.8	
Approach LOS		F			E			B			D	
Queue Length 50th (ft)	64	~205	0	80	89		43	340	2	11	917	0
Queue Length 95th (ft)	108	#346	27	#122	146		102	377	19	22	956	6
Internal Link Dist (ft)		617			502			1986			1171	
Turn Bay Length (ft)	150		350	235			300		150	150		65
Base Capacity (vph)	241	201	393	235	196		180	2243	1214	308	2148	1100
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.35	1.04	0.29	0.74	0.55		0.60	0.56	0.14	0.15	0.97	0.07

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 119 (85%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.04

Devon Square Residential
1: US 1 (Capital Blvd.) & Harris Road

Background AM
11/20/2018

Intersection Signal Delay: 37.6

Intersection LOS: D

Intersection Capacity Utilization 87.5%

ICU Level of Service E

Analysis Period (min) 15

Description: 05-1930

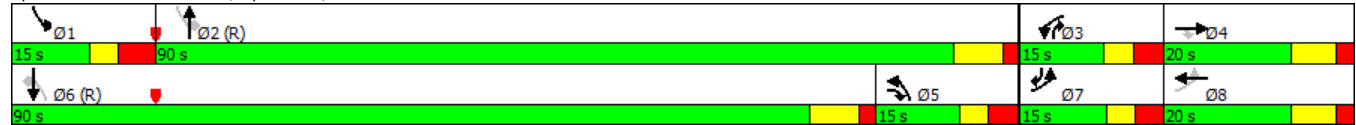
~ Volume exceeds capacity, queue is theoretically infinite.















Queue shown is maximum after two cycles.







95th percentile volume exceeds capacity, queue may be longer.

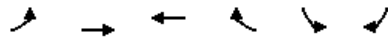
Queue shown is maximum after two cycles.

Splits and Phases: 1: US 1 (Capital Blvd.) & Harris Road



								
Lane Group	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	4	8	4	5	1311	4	2044	4
Future Volume (vph)	4	8	4	5	1311	4	2044	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12
Grade (%)	0%				0%		0%	
Storage Length (ft)	0	0		250		225		75
Storage Lanes	1	0		1		1		1
Taper Length (ft)	25			100		100		
Satd. Flow (prot)	1664	0	0	1770	3539	1770	3539	1583
Flt Permitted	0.985			0.950		0.950		
Satd. Flow (perm)	1664	0	0	1770	3539	1770	3539	1583
Link Speed (mph)	25				55		55	
Link Distance (ft)	716				691		2066	
Travel Time (s)	19.5				8.6		25.6	
Confl. Peds. (#/hr)								
Confl. Bikes (#/hr)								
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0
Parking (#/hr)								
Mid-Block Traffic (%)	0%				0%		0%	
Shared Lane Traffic (%)								
Lane Group Flow (vph)	13	0	0	10	1457	4	2271	4
Sign Control	Stop				Free		Free	
Intersection Summary								
Area Type:	Other							
Control Type:	Unsignalized							
Intersection Capacity Utilization 66.5%	ICU Level of Service C							
Analysis Period (min) 15								

Intersection								
Int Delay, s/veh	0.9							
Movement	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Traffic Vol, veh/h	4	8	4	5	1311	4	2044	4
Future Vol, veh/h	4	8	4	5	1311	4	2044	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	-	None
Storage Length	0	-	-	250	-	225	-	75
Veh in Median Storage, #	0	-	-	-	0	-	0	-
Grade, %	0	-	-	-	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2
Mvmt Flow	4	9	4	6	1457	4	2271	4
Major/Minor	Minor2	Major1			Major2			
Conflicting Flow All	3028	1136	1658	2271	0	1063	-	0
Stage 1	2280	-	-	-	-	-	-	-
Stage 2	748	-	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.44	4.14	-	6.44	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.52	2.22	-	2.52	-	-
Pot Cap-1 Maneuver	10	196	124	221	-	302	-	-
Stage 1	63	-	-	-	-	-	-	-
Stage 2	429	-	-	-	-	-	-	-
Platoon blocked, %					-	-	-	-
Mov Cap-1 Maneuver	10	196	160	160	-	302	-	-
Mov Cap-2 Maneuver	10	-	-	-	-	-	-	-
Stage 1	63	-	-	-	-	-	-	-
Stage 2	429	-	-	-	-	-	-	-
Approach	EB	NB			SB			
HCM Control Delay, s	230.8	0.2			0			
HCM LOS	F							
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBU	SBT	SBR		
Capacity (veh/h)	160	-	27	302	-	-		
HCM Lane V/C Ratio	0.063	-	0.494	0.015	-	-		
HCM Control Delay (s)	29	-	230.8	17.1	-	-		
HCM Lane LOS	D	-	F	C	-	-		
HCM 95th %tile Q(veh)	0.2	-	1.5	0	-	-		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	61	299	171	44	43	70
Future Volume (vph)	61	299	171	44	43	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	110			160	175	0
Storage Lanes	1			1	1	1
Taper Length (ft)	100				100	
Satd. Flow (prot)	1770	1863	1863	1583	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Link Speed (mph)		45	45		25	
Link Distance (ft)		582	1003		715	
Travel Time (s)		8.8	15.2		19.5	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	85	415	238	61	60	97
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 25.7%
























ICU Level of Service A

Analysis Period (min) 15

Intersection						
Int Delay, s/veh	2.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Traffic Vol, veh/h	61	299	171	44	43	70
Future Vol, veh/h	61	299	171	44	43	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	110	-	-	160	175	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	72	72	72	72	72	72
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	85	415	238	61	60	97
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	238	0	-	0	823	238
Stage 1	-	-	-	-	238	-
Stage 2	-	-	-	-	585	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1329	-	-	-	343	801
Stage 1	-	-	-	-	802	-
Stage 2	-	-	-	-	557	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1329	-	-	-	321	801
Mov Cap-2 Maneuver	-	-	-	-	321	-
Stage 1	-	-	-	-	802	-
Stage 2	-	-	-	-	521	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.3	0		13.4		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1329	-	-	-	321	801
HCM Lane V/C Ratio	0.064	-	-	-	0.186	0.121
HCM Control Delay (s)	7.9	-	-	-	18.8	10.1
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.7	0.4

Devon Square Residential
1: US 1 (Capital Blvd.) & Harris Road

Background PM
11/20/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	120	120	176	129	32	227	1889	166	90	1707	50
Future Volume (vph)	113	120	120	176	129	32	227	1889	166	90	1707	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-2%			8%			0%			0%	
Storage Length (ft)	150		350	235		0	300		150	150		65
Storage Lanes	1		1	2		0	1		1	1		1
Taper Length (ft)	100			200			100			100		
Satd. Flow (prot)	1787	1881	1599	3296	1735	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.445			0.950			0.062			0.054		
Satd. Flow (perm)	837	1881	1599	3296	1735	0	115	3539	1583	101	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			132		7				129			83
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		697			582			2066			1251	
Travel Time (s)		10.6			8.8			25.6			15.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	114	121	121	178	162	0	229	1908	168	91	1724	51
Turn Type	D.P+P	NA	pm+ov	Prot	NA		D.P+P	NA	pm+ov	D.P+P	NA	pm+ov
Protected Phases	7	4	5	3	8		5	2	3	1	6	7
Permitted Phases	8		4				6		2	2		6
Detector Phase	7	4	5	3	8		5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	14.0	7.0	7.0	14.0	7.0
Minimum Split (s)	13.0	14.0	14.0	14.0	14.0		14.0	21.0	14.0	14.0	21.0	13.0
Total Split (s)	30.0	25.0	25.0	20.0	15.0		25.0	75.0	20.0	20.0	70.0	30.0
Total Split (%)	21.4%	17.9%	17.9%	14.3%	10.7%		17.9%	53.6%	14.3%	14.3%	50.0%	21.4%
Yellow Time (s)	3.0	4.7	3.0	3.0	4.7		3.0	5.2	3.0	3.0	5.2	3.0
All-Red Time (s)	2.9	2.0	3.3	3.2	2.0		3.3	1.7	3.2	3.9	1.7	2.9
Lost Time Adjust (s)	-0.9	-1.7	-1.3	-1.2	-1.7		-1.3	-1.9	-1.2	-1.9	-1.9	-0.9
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lag	Lag	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max	None	None	C-Max	None
Act Effect Green (s)	35.0	21.6	41.6	13.4	21.7		85.0	73.9	92.3	85.0	65.0	78.3
Actuated g/C Ratio	0.25	0.15	0.30	0.10	0.16		0.61	0.53	0.66	0.61	0.46	0.56
v/c Ratio	0.38	0.42	0.21	0.57	0.59		0.75	1.02	0.15	0.47	1.05	0.06
Control Delay	42.4	59.2	3.9	67.5	63.0		62.7	59.4	2.9	27.2	73.0	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.4	59.2	3.9	67.5	63.0		62.7	59.4	2.9	27.2	73.0	0.4
LOS	D	E	A	E	E		E	E	A	C	E	A
Approach Delay		35.0			65.3			55.6			68.8	
Approach LOS		D			E			E			E	
Queue Length 50th (ft)	80	102	0	80	133		149	-914	11	29	-897	0
Queue Length 95th (ft)	133	169	30	120	#243		#264	#1153	39	86	#1035	3
Internal Link Dist (ft)		617			502			1986			1171	
Turn Bay Length (ft)	150		350	235			300		150	150		65
Base Capacity (vph)	408	289	567	353	275		306	1867	1103	242	1643	1047
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.42	0.21	0.50	0.59		0.75	1.02	0.15	0.38	1.05	0.05

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 25 (18%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.05

Devon Square Residential
1: US 1 (Capital Blvd.) & Harris Road

Background PM
11/20/2018

Intersection Signal Delay: 59.8

Intersection LOS: E

Intersection Capacity Utilization 91.4%

ICU Level of Service F

Analysis Period (min) 15

Description: 05-1930

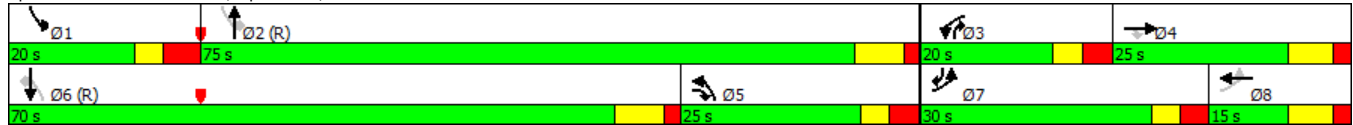
~ Volume exceeds capacity, queue is theoretically infinite.















Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

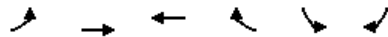
Queue shown is maximum after two cycles.

Splits and Phases: 1: US 1 (Capital Blvd.) & Harris Road



								
Lane Group	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	4	12	4	12	2280	4	2002	4
Future Volume (vph)	4	12	4	12	2280	4	2002	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12
Grade (%)	0%				0%		0%	
Storage Length (ft)	0	0		250		225		75
Storage Lanes	1	0		1		1		1
Taper Length (ft)	25			100		100		
Satd. Flow (prot)	1651	0	0	1770	3539	1770	3539	1583
Flt Permitted	0.988			0.950		0.950		
Satd. Flow (perm)	1651	0	0	1770	3539	1770	3539	1583
Link Speed (mph)	25				55		55	
Link Distance (ft)	716				691		2066	
Travel Time (s)	19.5				8.6		25.6	
Confl. Peds. (#/hr)								
Confl. Bikes (#/hr)								
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0
Parking (#/hr)								
Mid-Block Traffic (%)	0%				0%		0%	
Shared Lane Traffic (%)								
Lane Group Flow (vph)	17	0	0	17	2533	4	2224	4
Sign Control	Stop				Free		Free	
Intersection Summary								
Area Type:	Other							
Control Type:	Unsignalized							
Intersection Capacity Utilization 73.0%	ICU Level of Service D							
Analysis Period (min) 15								

Intersection								
Int Delay, s/veh	2.5							
Movement	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations	↔			↔	↕	↔	↕	↗
Traffic Vol, veh/h	4	12	4	12	2280	4	2002	4
Future Vol, veh/h	4	12	4	12	2280	4	2002	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	-	None
Storage Length	0	-	-	250	-	225	-	75
Veh in Median Storage, #	0	-	-	-	0	-	0	-
Grade, %	0	-	-	-	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2
Mvmt Flow	4	13	4	13	2533	4	2224	4
Major/Minor	Minor2	Major1		Major2				
Conflicting Flow All	3535	1112	1624	2224	0	1849	-	0
Stage 1	2233	-	-	-	-	-	-	-
Stage 2	1302	-	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.44	4.14	-	6.44	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.52	2.22	-	2.52	-	-
Pot Cap-1 Maneuver	~ 4	203	131	231	-	93	-	-
Stage 1	67	-	-	-	-	-	-	-
Stage 2	219	-	-	-	-	-	-	-
Platoon blocked, %					-		-	-
Mov Cap-1 Maneuver	~ 4	203	189	189	-	93	-	-
Mov Cap-2 Maneuver	~ 4	-	-	-	-	-	-	-
Stage 1	67	-	-	-	-	-	-	-
Stage 2	219	-	-	-	-	-	-	-
Approach	EB	NB		SB				
HCM Control Delay, s	\$ 646.9	0.2		0.1				
HCM LOS	F							
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBU	SBT	SBR		
Capacity (veh/h)	189	-	15	93	-	-		
HCM Lane V/C Ratio	0.094	-	1.185	0.048	-	-		
HCM Control Delay (s)	26	-	\$ 646.9	45.6	-	-		
HCM Lane LOS	D	-	F	E	-	-		
HCM 95th %tile Q(veh)	0.3	-	2.8	0.1	-	-		
Notes								
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon								



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	182	213	204	88	84	143
Future Volume (vph)	182	213	204	88	84	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	110			160	175	0
Storage Lanes	1			1	1	1
Taper Length (ft)	100				100	
Satd. Flow (prot)	1770	1863	1863	1583	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Link Speed (mph)		45	45		25	
Link Distance (ft)		582	1003		715	
Travel Time (s)		8.8	15.2		19.5	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	214	251	240	104	99	168
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

























Intersection Capacity Utilization 35.5%

ICU Level of Service A

Analysis Period (min) 15

Intersection						
Int Delay, s/veh	5.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Traffic Vol, veh/h	182	213	204	88	84	143
Future Vol, veh/h	182	213	204	88	84	143
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	110	-	-	160	175	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	214	251	240	104	99	168
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	240	0	-	0	919	240
Stage 1	-	-	-	-	240	-
Stage 2	-	-	-	-	679	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1327	-	-	-	301	799
Stage 1	-	-	-	-	800	-
Stage 2	-	-	-	-	504	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1327	-	-	-	252	799
Mov Cap-2 Maneuver	-	-	-	-	252	-
Stage 1	-	-	-	-	800	-
Stage 2	-	-	-	-	423	-
Approach	EB	WB		SB		
HCM Control Delay, s	3.8	0		17.2		
HCM LOS				C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1327	-	-	-	252	799
HCM Lane V/C Ratio	0.161	-	-	-	0.392	0.211
HCM Control Delay (s)	8.2	-	-	-	28.2	10.7
HCM Lane LOS	A	-	-	-	D	B
HCM 95th %tile Q(veh)	0.6	-	-	-	1.8	0.8

Appendix H:
Synchro Output:
Build-out (2022)

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	72	180	99	189	76	16	34	93	1094	143	41	1803	63
Future Volume (vph)	72	180	99	189	76	16	34	93	1094	143	41	1803	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-2%			8%				0%			0%	
Storage Length (ft)	150		350	235		0		400		150	150		65
Storage Lanes	1		1	2		0		1		1	1		1
Taper Length (ft)	100			200				100			100		
Satd. Flow (prot)	1787	1881	1599	3296	1740	0	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.552			0.950				0.048			0.153		
Satd. Flow (perm)	1039	1881	1599	3296	1740	0	0	89	3539	1583	285	3539	1583
Right Turn on Red			Yes			Yes				Yes			Yes
Satd. Flow (RTOR)			132		6					156			83
Link Speed (mph)		45			45				55			55	
Link Distance (ft)		697			582				1860			1251	
Travel Time (s)		10.6			8.8				23.1			15.5	
Confl. Peds. (#/hr)													
Confl. Bikes (#/hr)													
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.90	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)													
Mid-Block Traffic (%)		0%			0%				0%			0%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	84	209	115	220	107	0	0	146	1272	166	48	2097	73
Turn Type	D.P+P	NA	pm+ov	Prot	NA		D.P+P	D.P+P	NA	pm+ov	D.P+P	NA	pm+ov
Protected Phases	7	4	5!	3	8		5!	5	2	3	1	6	7
Permitted Phases	8		4				6	6		2	2		6
Detector Phase	7	4	5	3	8		5	5	2	3	1	6	7
Switch Phase													
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0	14.0	7.0	7.0	14.0	7.0
Minimum Split (s)	13.0	14.0	14.0	14.0	14.0		14.0	14.0	21.0	14.0	14.0	21.0	13.0
Total Split (s)	15.0	20.0	15.0	15.0	20.0		15.0	15.0	90.0	15.0	15.0	90.0	15.0
Total Split (%)	10.7%	14.3%	10.7%	10.7%	14.3%		10.7%	10.7%	64.3%	10.7%	10.7%	64.3%	10.7%
Yellow Time (s)	3.0	4.7	3.0	3.0	4.7		3.0	3.0	5.2	3.0	3.0	5.2	3.0
All-Red Time (s)	2.9	2.0	3.3	3.2	2.0		3.3	3.3	1.7	3.2	3.9	1.7	2.9
Lost Time Adjust (s)	-0.9	-1.7	-1.3	-1.2	-1.7		-1.3	-1.9	-1.2	-1.9	-1.9	-1.9	-0.9
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lag	Lag	Lag	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	None	C-Max	None	None	C-Max	None
Act Effect Green (s)	25.0	15.0	25.0	10.0	15.4			95.0	88.7	103.7	96.0	85.0	94.6
Actuated g/C Ratio	0.18	0.11	0.18	0.07	0.11			0.68	0.63	0.74	0.69	0.61	0.68
v/c Ratio	0.36	1.04	0.29	0.94	0.55			0.81	0.57	0.14	0.16	0.98	0.07
Control Delay	50.2	133.5	5.8	108.2	67.0			76.2	16.5	1.3	7.3	41.3	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.2	133.5	5.8	108.2	67.0			76.2	16.5	1.3	7.3	41.3	0.7
LOS	D	F	A	F	E			E	B	A	A	D	A
Approach Delay		80.4			94.7				20.4			39.3	
Approach LOS		F			F				C			D	
Queue Length 50th (ft)	64	~205	0	104	89			80	347	2	12	922	0
Queue Length 95th (ft)	108	#346	27	#173	146			#178	387	20	23	961	6
Internal Link Dist (ft)		617			502				1780			1171	
Turn Bay Length (ft)	150		350	235				400		150	150		65
Base Capacity (vph)	241	201	393	235	196			180	2243	1213	302	2148	1100
Starvation Cap Reductn	0	0	0	0	0			0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0			0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0			0	0	0	0	0	0
Reduced v/c Ratio	0.35	1.04	0.29	0.94	0.55			0.81	0.57	0.14	0.16	0.98	0.07

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 119 (85%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green

Natural Cycle: 120

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.04

Devon Square Residential
1: US 1 (Capital Blvd.) & Harris Road

Build AM
12/04/2018

Intersection Signal Delay: 40.4

Intersection LOS: D

Intersection Capacity Utilization 88.8%

ICU Level of Service E

Analysis Period (min) 15

Description: 05-1930

~ Volume exceeds capacity, queue is theoretically infinite.

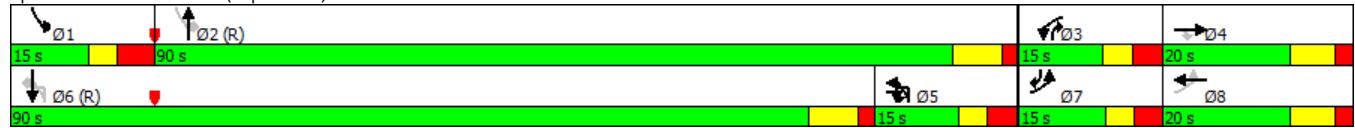
Queue shown is maximum after two cycles.















95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

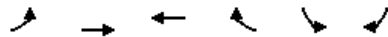
! Phase conflict between lane groups.

Splits and Phases: 1: US 1 (Capital Blvd.) & Harris Road



								
Lane Group	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	4	8	4	5	1336	4	2118	4
Future Volume (vph)	4	8	4	5	1336	4	2118	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12
Grade (%)	0%				0%		0%	
Storage Length (ft)	0	0		250		225		75
Storage Lanes	1	0		1		1		1
Taper Length (ft)	25			100		100		
Satd. Flow (prot)	1664	0	0	1770	3539	1770	3539	1583
Flt Permitted	0.985			0.950		0.950		
Satd. Flow (perm)	1664	0	0	1770	3539	1770	3539	1583
Link Speed (mph)	25				55		55	
Link Distance (ft)	716				691		207	
Travel Time (s)	19.5				8.6		2.6	
Confl. Peds. (#/hr)								
Confl. Bikes (#/hr)								
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0
Parking (#/hr)								
Mid-Block Traffic (%)	0%				0%		0%	
Shared Lane Traffic (%)								
Lane Group Flow (vph)	13	0	0	10	1484	4	2353	4
Sign Control	Stop				Free		Free	
Intersection Summary								
Area Type:	Other							
Control Type:	Unsignalized							
Intersection Capacity Utilization 68.5%	ICU Level of Service C							
Analysis Period (min) 15								

Intersection								
Int Delay, s/veh	1							
Movement	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations	↔			↔	↕	↔	↕	↔
Traffic Vol, veh/h	4	8	4	5	1336	4	2118	4
Future Vol, veh/h	4	8	4	5	1336	4	2118	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	-	None
Storage Length	0	-	-	250	-	225	-	75
Veh in Median Storage, #	0	-	-	-	0	-	0	-
Grade, %	0	-	-	-	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2
Mvmt Flow	4	9	4	6	1484	4	2353	4
Major/Minor	Minor2	Major1		Major2				
Conflicting Flow All	3124	1177	1718	2353	0	1083	-	0
Stage 1	2362	-	-	-	-	-	-	-
Stage 2	762	-	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.44	4.14	-	6.44	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.52	2.22	-	2.52	-	-
Pot Cap-1 Maneuver	9	184	114	205	-	294	-	-
Stage 1	57	-	-	-	-	-	-	-
Stage 2	421	-	-	-	-	-	-	-
Platoon blocked, %					-		-	-
Mov Cap-1 Maneuver	9	184	147	147	-	294	-	-
Mov Cap-2 Maneuver	9	-	-	-	-	-	-	-
Stage 1	57	-	-	-	-	-	-	-
Stage 2	421	-	-	-	-	-	-	-
Approach	EB	NB		SB				
HCM Control Delay, s	257.5	0.2		0				
HCM LOS	F							
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBU	SBT	SBR		
Capacity (veh/h)	147	-	25	294	-	-		
HCM Lane V/C Ratio	0.068	-	0.533	0.015	-	-		
HCM Control Delay (s)	31.2	-	257.5	17.4	-	-		
HCM Lane LOS	D	-	F	C	-	-		
HCM 95th %tile Q(veh)	0.2	-	1.6	0	-	-		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	61	301	211	44	43	70
Future Volume (vph)	61	301	211	44	43	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	110			160	175	0
Storage Lanes	1			1	1	1
Taper Length (ft)	100				100	
Satd. Flow (prot)	1770	1863	1863	1583	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Link Speed (mph)		45	45		25	
Link Distance (ft)		582	1249		715	
Travel Time (s)		8.8	18.9		19.5	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	85	418	293	61	60	97
Sign Control		Free	Free		Stop	

Intersection Summary







Area Type: Other

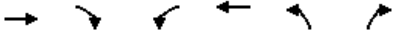



Control Type: Unsignalized




Intersection Capacity Utilization 27.8%











ICU Level of Service A

Analysis Period (min) 15

























Intersection						
Int Delay, s/veh	2.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	61	301	211	44	43	70
Future Vol, veh/h	61	301	211	44	43	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	110	-	-	160	175	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	72	72	72	72	72	72
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	85	418	293	61	60	97
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	293	0	-	0	881	293
Stage 1	-	-	-	-	293	-
Stage 2	-	-	-	-	588	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1269	-	-	-	317	746
Stage 1	-	-	-	-	757	-
Stage 2	-	-	-	-	555	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1269	-	-	-	296	746
Mov Cap-2 Maneuver	-	-	-	-	296	-
Stage 1	-	-	-	-	757	-
Stage 2	-	-	-	-	518	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.4	0		14.2		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1269	-	-	-	296	746
HCM Lane V/C Ratio	0.067	-	-	-	0.202	0.13
HCM Control Delay (s)	8	-	-	-	20.2	10.5
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.7	0.4

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	343	4	7	215	40	23
Future Volume (vph)	343	4	7	215	40	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		1	0
Taper Length (ft)			100		25	
Satd. Flow (prot)	1861	0	0	1859	1717	0
Flt Permitted				0.998	0.970	
Satd. Flow (perm)	1861	0	0	1859	1717	0
Link Speed (mph)	45			45	25	
Link Distance (ft)	1249			503	515	
Travel Time (s)	18.9			7.6	14.0	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	385	0	0	247	70	0
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 28.6%	ICU Level of Service A					
Analysis Period (min) 15						

Intersection						
Int Delay, s/veh	1.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	343	4	7	215	40	23
Future Vol, veh/h	343	4	7	215	40	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	381	4	8	239	44	26
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	386	0	637	383
Stage 1	-	-	-	-	383	-
Stage 2	-	-	-	-	254	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1172	-	441	664
Stage 1	-	-	-	-	689	-
Stage 2	-	-	-	-	788	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1172	-	437	664
Mov Cap-2 Maneuver	-	-	-	-	437	-
Stage 1	-	-	-	-	689	-
Stage 2	-	-	-	-	782	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	0.3		13.4		
HCM LOS	B					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	499	-	-	1172	-	
HCM Lane V/C Ratio	0.14	-	-	0.007	-	
HCM Control Delay (s)	13.4	-	-	8.1	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.5	-	-	0	-	

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	51	1313	29	0	2125
Future Volume (vph)	0	51	1313	29	0	2125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		150	0	
Storage Lanes	0	1		1	0	
Taper Length (ft)	25				25	
Satd. Flow (prot)	0	1611	3539	1583	0	3539
Flt Permitted						
Satd. Flow (perm)	0	1611	3539	1583	0	3539
Link Speed (mph)	25		55			55
Link Distance (ft)	823		207			1860
Travel Time (s)	22.4		2.6			23.1
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	57	1459	32	0	2361
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 62.1%	ICU Level of Service B					
Analysis Period (min) 15						

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↗↗	↗		↗↗
Traffic Vol, veh/h	0	51	1313	29	0	2125
Future Vol, veh/h	0	51	1313	29	0	2125
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	-	150	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	57	1459	32	0	2361
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	-	729	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	365	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	365	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	16.7	0	0			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT		
Capacity (veh/h)	-	-	365	-		
HCM Lane V/C Ratio	-	-	0.155	-		
HCM Control Delay (s)	-	-	16.7	-		
HCM Lane LOS	-	-	C	-		
HCM 95th %tile Q(veh)	-	-	0.5	-		

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	113	120	120	202	129	32	23	227	1900	166	96	1720	50
Future Volume (vph)	113	120	120	202	129	32	23	227	1900	166	96	1720	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-2%			8%				0%			0%	
Storage Length (ft)	150		350	235		0		400		150	150		65
Storage Lanes	1		1	2		0		1		1	1		1
Taper Length (ft)	100			200				100			100		
Satd. Flow (prot)	1787	1881	1599	3296	1735	0	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.445			0.950				0.062			0.054		
Satd. Flow (perm)	837	1881	1599	3296	1735	0	0	115	3539	1583	101	3539	1583
Right Turn on Red			Yes			Yes				Yes			Yes
Satd. Flow (RTOR)			132		7					129			83
Link Speed (mph)		45			45				55			55	
Link Distance (ft)		697			582				1856			1251	
Travel Time (s)		10.6			8.8				23.0			15.5	
Confl. Peds. (#/hr)													
Confl. Bikes (#/hr)													
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)													
Mid-Block Traffic (%)		0%			0%				0%			0%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	114	121	121	204	162	0	0	252	1919	168	97	1737	51
Turn Type	D.P+P	NA	pm+ov	Prot	NA		D.P+P	D.P+P	NA	pm+ov	D.P+P	NA	pm+ov
Protected Phases	7	4	5!	3	8		5!	5	2	3	1	6	7
Permitted Phases	8		4				6	6		2	2		6
Detector Phase	7	4	5	3	8		5	5	2	3	1	6	7
Switch Phase													
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0	14.0	7.0	7.0	14.0	7.0
Minimum Split (s)	13.0	14.0	14.0	14.0	14.0		14.0	14.0	21.0	14.0	14.0	21.0	13.0
Total Split (s)	30.0	25.0	25.0	20.0	15.0		25.0	25.0	75.0	20.0	20.0	70.0	30.0
Total Split (%)	21.4%	17.9%	17.9%	14.3%	10.7%		17.9%	17.9%	53.6%	14.3%	14.3%	50.0%	21.4%
Yellow Time (s)	3.0	4.7	3.0	3.0	4.7		3.0	3.0	5.2	3.0	3.0	5.2	3.0
All-Red Time (s)	2.9	2.0	3.3	3.2	2.0		3.3	3.3	1.7	3.2	3.9	1.7	2.9
Lost Time Adjust (s)	-0.9	-1.7	-1.3	-1.2	-1.7		-1.3	-1.9	-1.2	-1.9	-1.9	-1.9	-0.9
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lag	Lag	Lag	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	None	C-Max	None	None	C-Max	None
Act Effect Green (s)	35.0	21.0	41.0	14.0	21.7			85.0	73.7	92.6	85.0	65.0	78.3
Actuated g/C Ratio	0.25	0.15	0.29	0.10	0.16			0.61	0.53	0.66	0.61	0.46	0.56
v/c Ratio	0.38	0.43	0.22	0.62	0.59			0.82	1.03	0.15	0.49	1.06	0.06
Control Delay	42.4	59.9	3.9	69.0	63.0			70.2	62.1	2.9	29.3	75.6	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.4	59.9	3.9	69.0	63.0			70.2	62.1	2.9	29.3	75.6	0.4
LOS	D	E	A	E	E			E	E	A	C	E	A
Approach Delay		35.3			66.3				58.7			71.2	
Approach LOS		D			E				E			E	
Queue Length 50th (ft)	80	102	0	92	133			172	-974	11	33	-910	0
Queue Length 95th (ft)	133	169	30	136	#243			#314	#1164	39	92	#1049	3
Internal Link Dist (ft)		617			502				1776			1171	
Turn Bay Length (ft)	150		350	235				400		150	150		65
Base Capacity (vph)	408	282	561	353	275			306	1862	1101	242	1643	1047
Starvation Cap Reductn	0	0	0	0	0			0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0			0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0			0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.43	0.22	0.58	0.59			0.82	1.03	0.15	0.40	1.06	0.05

Intersection Summary

Area Type: Other
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 25 (18%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.06

Devon Square Residential
1: US 1 (Capital Blvd.) & Harris Road

Build PM
12/04/2018

Intersection Signal Delay: 62.3

Intersection LOS: E

Intersection Capacity Utilization 93.1%

ICU Level of Service F

Analysis Period (min) 15

Description: 05-1930

~ Volume exceeds capacity, queue is theoretically infinite.

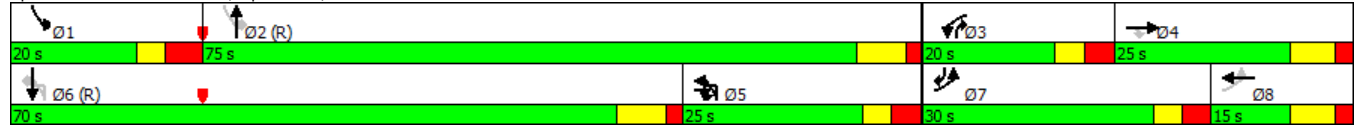
Queue shown is maximum after two cycles.















95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

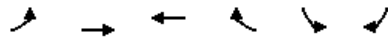
! Phase conflict between lane groups.

Splits and Phases: 1: US 1 (Capital Blvd.) & Harris Road



								
Lane Group	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	4	12	4	12	2362	13	2051	4
Future Volume (vph)	4	12	4	12	2362	13	2051	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12
Grade (%)	0%				0%		0%	
Storage Length (ft)	0	0		250		225		75
Storage Lanes	1	0		1		1		1
Taper Length (ft)	25			100		100		
Satd. Flow (prot)	1651	0	0	1770	3539	1770	3539	1583
Flt Permitted	0.988			0.950		0.950		
Satd. Flow (perm)	1651	0	0	1770	3539	1770	3539	1583
Link Speed (mph)	25				55		55	
Link Distance (ft)	716				691		210	
Travel Time (s)	19.5				8.6		2.6	
Confl. Peds. (#/hr)								
Confl. Bikes (#/hr)								
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0
Parking (#/hr)								
Mid-Block Traffic (%)	0%				0%		0%	
Shared Lane Traffic (%)								
Lane Group Flow (vph)	17	0	0	17	2624	14	2279	4
Sign Control	Stop				Free		Free	
Intersection Summary								
Area Type:	Other							
Control Type:	Unsignalized							
Intersection Capacity Utilization 75.3%	ICU Level of Service D							
Analysis Period (min) 15								

Intersection								
Int Delay, s/veh	2.6							
Movement	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations	↔			↔	↕	↔	↕	↔
Traffic Vol, veh/h	4	12	4	12	2362	13	2051	4
Future Vol, veh/h	4	12	4	12	2362	13	2051	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	-	None
Storage Length	0	-	-	250	-	225	-	75
Veh in Median Storage, #	0	-	-	-	0	-	0	-
Grade, %	0	-	-	-	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2
Mvmt Flow	4	13	4	13	2624	14	2279	4
Major/Minor	Minor2	Major1			Major2			
Conflicting Flow All	3656	1139	1663	2279	0	1916	-	0
Stage 1	2308	-	-	-	-	-	-	-
Stage 2	1348	-	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.44	4.14	-	6.44	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.52	2.22	-	2.52	-	-
Pot Cap-1 Maneuver	~ 4	195	123	220	-	84	-	-
Stage 1	61	-	-	-	-	-	-	-
Stage 2	207	-	-	-	-	-	-	-
Platoon blocked, %					-	-	-	-
Mov Cap-1 Maneuver	~ 4	195	179	179	-	84	-	-
Mov Cap-2 Maneuver	~ 4	-	-	-	-	-	-	-
Stage 1	61	-	-	-	-	-	-	-
Stage 2	207	-	-	-	-	-	-	-
Approach	EB	NB			SB			
HCM Control Delay, s	\$ 646.9	0.2			0.4			
HCM LOS	F							
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBU	SBT	SBR		
Capacity (veh/h)	179	-	15	84	-	-		
HCM Lane V/C Ratio	0.099	-	1.185	0.172	-	-		
HCM Control Delay (s)	27.3	-	\$ 646.9	56.6	-	-		
HCM Lane LOS	D	-	F	F	-	-		
HCM 95th %tile Q(veh)	0.3	-	2.8	0.6	-	-		
Notes								
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon								



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	182	219	230	88	84	143
Future Volume (vph)	182	219	230	88	84	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	110			160	175	0
Storage Lanes	1			1	1	1
Taper Length (ft)	100				100	
Satd. Flow (prot)	1770	1863	1863	1583	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Link Speed (mph)		45	45		25	
Link Distance (ft)		582	1253		715	
Travel Time (s)		8.8	19.0		19.5	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	214	258	271	104	99	168
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other










Control Type: Unsignalized




Intersection Capacity Utilization 36.8%











ICU Level of Service A

Analysis Period (min) 15

Intersection						
Int Delay, s/veh	6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Traffic Vol, veh/h	182	219	230	88	84	143
Future Vol, veh/h	182	219	230	88	84	143
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	110	-	-	160	175	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	214	258	271	104	99	168
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	271	0	-	0	957	271
Stage 1	-	-	-	-	271	-
Stage 2	-	-	-	-	686	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1292	-	-	-	286	768
Stage 1	-	-	-	-	775	-
Stage 2	-	-	-	-	500	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1292	-	-	-	239	768
Mov Cap-2 Maneuver	-	-	-	-	239	-
Stage 1	-	-	-	-	775	-
Stage 2	-	-	-	-	417	-
Approach	EB	WB		SB		
HCM Control Delay, s	3.8	0		18.1		
HCM LOS				C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1292	-	-	-	239	768
HCM Lane V/C Ratio	0.166	-	-	-	0.413	0.219
HCM Control Delay (s)	8.3	-	-	-	30.3	11
HCM Lane LOS	A	-	-	-	D	B
HCM 95th %tile Q(veh)	0.6	-	-	-	1.9	0.8

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	297	6	25	291	26	15
Future Volume (vph)	297	6	25	291	26	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		1	0
Taper Length (ft)			100		25	
Satd. Flow (prot)	1857	0	0	1855	1715	0
Flt Permitted				0.996	0.969	
Satd. Flow (perm)	1857	0	0	1855	1715	0
Link Speed (mph)	45			45	25	
Link Distance (ft)	1253			503	515	
Travel Time (s)	19.0			7.6	14.0	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	337	0	0	351	46	0
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 46.0%	ICU Level of Service A					
Analysis Period (min) 15						

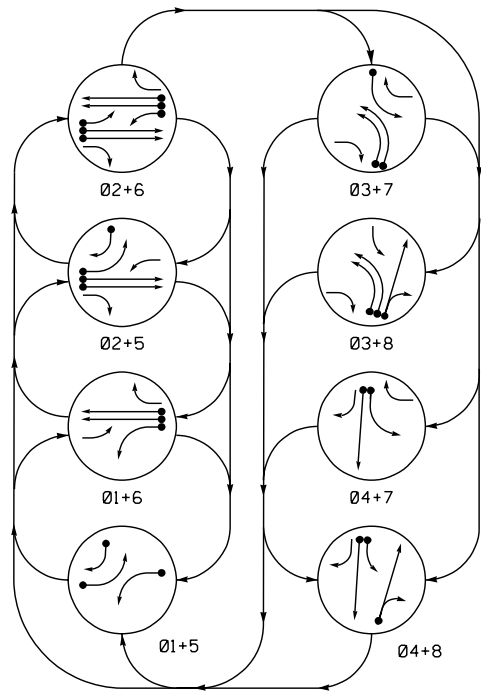
Intersection						
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	297	6	25	291	26	15
Future Vol, veh/h	297	6	25	291	26	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	330	7	28	323	29	17
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	337	0	712	333
Stage 1	-	-	-	-	333	-
Stage 2	-	-	-	-	379	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1222	-	399	709
Stage 1	-	-	-	-	726	-
Stage 2	-	-	-	-	692	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1222	-	388	709
Mov Cap-2 Maneuver	-	-	-	-	388	-
Stage 1	-	-	-	-	726	-
Stage 2	-	-	-	-	673	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.6		13.6	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	465	-	-	1222	-	
HCM Lane V/C Ratio	0.098	-	-	0.023	-	
HCM Control Delay (s)	13.6	-	-	8	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-	

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	34	2282	95	0	2065
Future Volume (vph)	0	34	2282	95	0	2065
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		150	0	
Storage Lanes	0	1		1	0	
Taper Length (ft)	25				25	
Satd. Flow (prot)	0	1611	3539	1583	0	3539
Flt Permitted						
Satd. Flow (perm)	0	1611	3539	1583	0	3539
Link Speed (mph)	25		55			55
Link Distance (ft)	823		210			1856
Travel Time (s)	22.4		2.6			23.0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	38	2536	106	0	2294
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 73.1%	ICU Level of Service D					
Analysis Period (min) 15						

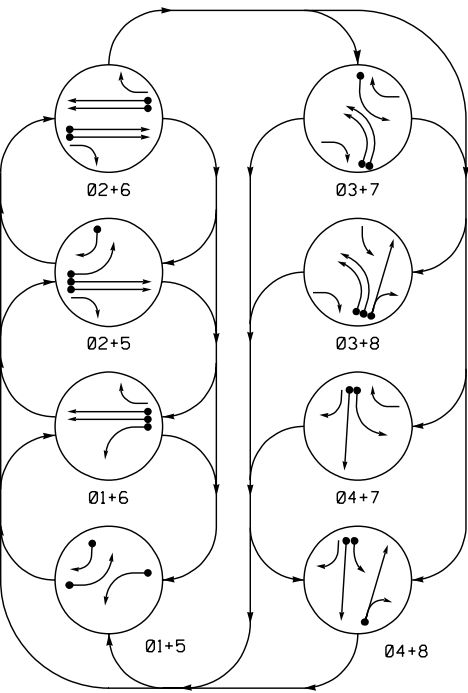
Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↗↗	↗		↗↗
Traffic Vol, veh/h	0	34	2282	95	0	2065
Future Vol, veh/h	0	34	2282	95	0	2065
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	150	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	38	2536	106	0	2294
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	-	1268	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	160	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	160	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	34.3	0	0			
HCM LOS	D					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT		
Capacity (veh/h)	-	-	160	-		
HCM Lane V/C Ratio	-	-	0.236	-		
HCM Control Delay (s)	-	-	34.3	-		
HCM Lane LOS	-	-	D	-		
HCM 95th %tile Q(veh)	-	-	0.9	-		

Appendix I:
Signal Plans & Timing Data

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE							
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8
11	---	---	---	---	---	---	---	---
21	R	R	G	G	R	R	R	R
22	R	R	G	G	R	R	R	R
31, 32	---	---	---	---	---	---	---	---
41	R	R	R	R	R	R	G	G
42	R	R	R	R	R	R	G	G
51	---	---	---	---	---	---	---	---
61	R	G	R	G	R	R	R	R
62	R	G	R	G	R	R	R	R
71	---	---	---	---	---	---	---	---
81, 82, 83	R	R	R	R	R	G	R	G

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE							
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8
11	---	---	---	---	---	---	---	---
21	R	R	G	G	R	R	R	R
22	R	R	G	G	R	R	R	R
31, 32	---	---	---	---	---	---	---	---
41	R	R	R	R	R	R	G	G
42	R	R	R	R	R	R	G	G
51	---	---	---	---	---	---	---	---
61	R	G	R	G	R	R	R	R
62	R	G	R	G	R	R	R	R
71	---	---	---	---	---	---	---	---
81, 82, 83	R	R	R	R	R	G	R	G

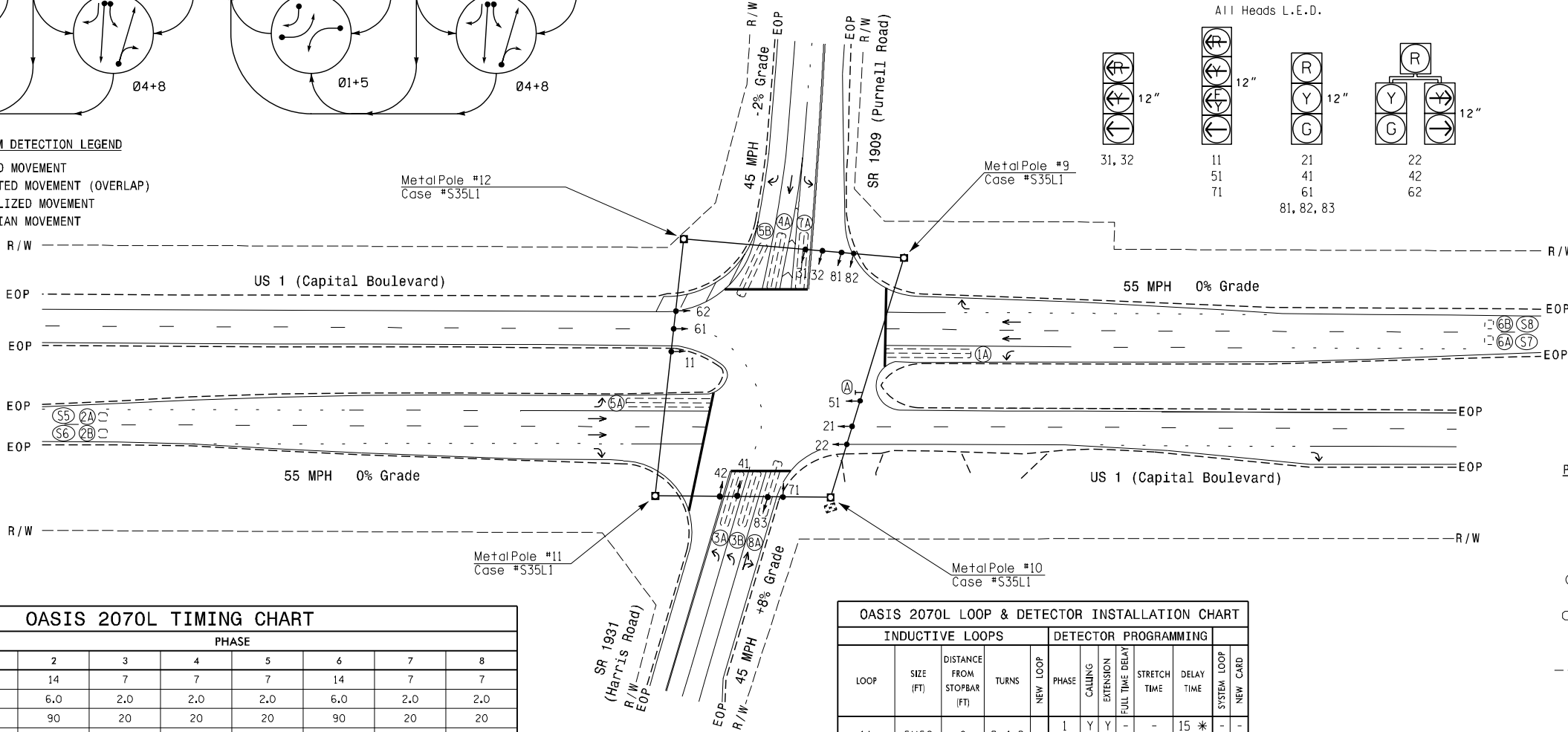
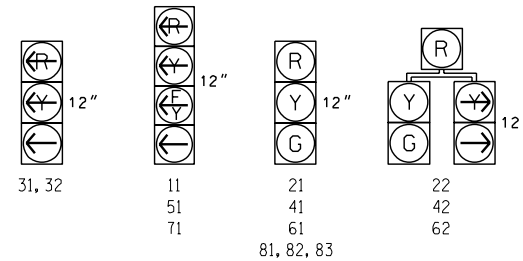
8 Phase Fully Actuated US 1 (Capital Boulevard) CLS

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Phase 3 and/or phase 7 may be lagged.
- Set all detector units to presence mode.
- In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
- Pavement markings are existing.
- The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #: 1930.

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070L TIMING CHART

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green 1 *	7	14	7	7	7	14	7	7
Extension 1 *	1.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max Green 1 *	20	90	20	20	20	90	20	20
Yellow Clearance	3.0	5.2	3.0	4.7	3.0	5.2	3.0	4.7
Red Clearance	3.9	1.7	3.3	2.0	3.4	1.7	2.9	2.0
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	-	1.5	-	-
Max Variable Initial *	-	46	-	-	-	46	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	30	-	-	-	30	-	-
Minimum Gap	-	3.4	-	-	-	3.4	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

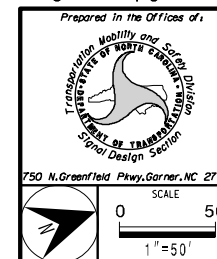
INDUCTIVE LOOPS				DETECTOR PROGRAMMING				SYSTEM LOOP CARD
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	
1A	6X60	0	2-4-2	-	1	Y	Y	15 *
2A/S5	6X6	420	EXIST	-	2	Y	Y	3
2B/S6	6X6	420	EXIST	-	2	Y	Y	Y
3A	6X40	0	2-4-2	-	3	Y	Y	3
3B	6X40	0	2-4-2	-	3	Y	Y	-
4A	6X40	0	2-4-2	-	4	Y	Y	-
5A	6X60	0	2-4-2	-	5	Y	Y	15 *
5B	6X40	+5	2-4-2	-	5	Y	Y	10
6A/S7	6X6	420	EXIST	-	6	Y	Y	Y
6B/S8	6X6	420	EXIST	-	6	Y	Y	Y
7A	6X40	0	2-4-2	-	7	Y	Y	15
8A	6X40	+5	2-4-2	-	8	Y	Y	10

* Disable Delay During Alternate Phasing Operation.
Disable Phase Call For Loop(s) During Alternate Phasing Operation.

LEGEND

- PROPOSED
- Traffic Signal Head
 - Modified Signal Head
 - Sign
 - Pedestrian Signal Head With Push Button & Sign
 - Signal Pole with Guy
 - Signal Pole with Sidewalk Guy
 - Inductive Loop Detector
 - Controller & Cabinet
 - Junction Box
 - 2-in Underground Conduit
 - Right of Way
 - Directional Arrow
 - Metal Strain Pole
 - "U-TURN YIELD TO RIGHT TURN" Sign (R10-16)
- EXISTING
- 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

Signal Upgrade



US 1 (Capital Boulevard) at SR 1909 (Purnell Road) / SR 1931 (Harris Road)

Division 5 Wake County Wake Forest

PLAN DATE: February 2018 REVIEWED BY:

PREPARED BY: RJ Ziemba RKA PROJ. NO:

REVISIONS

INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

PROFESSIONAL ENGINEER

SEAL 026486

ROBERT J. ZIEMBA

2/21/2018

SIG. INVENTORY NO. 05-1930

Field Notes - 11/9/2018

Signal ID: 05-1930

US 1 at Harris Road/Purnell Road

Phase:	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>
Extension 1:	3	6	3	3	3	6	3	3
Yellow:	3.0	5.2	3.0	4.7	3.0	5.2	3.0	4.7
Red:	3.9	1.7	3.2	2.0	3.3	1.7	2.9	2.0
Dual Entry:	-	-	-	ON	-	-	-	ON

Plan 11

Time:	6:30-9:30 AM							
Offset:	119							
Cycle:	140							
Splits:	15	90	15	20	15	90	15	30

Plan 14

Time:	2:35-8:00 PM							
Offset:	25							
Cycle:	140							
Splits:	20	70	20	25	25	70	30	15