



Traffic Impact Analysis

BullStreet Mixed Use Development Columbia, SC

Prepared for:

BSD, LLC

Kimley»»Horn

**BullStreet Mixed-Use Development
Traffic Impact Analysis
Columbia, South Carolina**

Prepared for:

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Greenville, South Carolina**

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**DRAFT
Traffic Impact Analysis
for
Municipality and Agency
Review**

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1.0 Executive Summary

The purpose of this Traffic Impact Analysis (TIA) is to review vehicular traffic impacts as a result of the proposed BullStreet mixed-use development. The objectives of the study are:

- To estimate trip generation and distribution for the proposed development.
- To perform capacity analyses for the identified study area.
- To determine the potential traffic impacts of the proposed development.
- To develop recommendations for needed roadway and operational improvements to accommodate the proposed development's traffic impacts while being sensitive to the existing land uses, roadway network and surrounding neighborhoods.

The proposed BullStreet mixed-use development is located in Columbia, South Carolina bound by Colonial Drive to the north, Harden Street to the east, Calhoun Street to the south, and Bull Street to the west. As currently envisioned, the proposed 181 acre site will be constructed in two initial phases with buildout of the site occurring as the site develops. Each phase is proposed to consist of the following:

Initial Project Development

- 8,500 seat sports venue
- 26,250 square feet of general retail space
- 78,750 square feet of general office space

The Commons at BullStreet Project Development

- 69,050 square feet of general office space
- 263,300 square feet of town center space
- 22,438 square feet of high turnover sit down restaurant space
- 55,4362 square feet of quality restaurant space
- 10 Screen movie theater
- 479 multi-family units
- 165 room hotel
- 25,000 square feet of health/fitness club space
- 25,000 square feet of sporting goods

Potential Project Buildout

- 500,000 square feet of research facility space
- 100,000 square feet of general retail space
- 300 units of continuing care facility
- 500,000 square feet of general office space
- 1,315 multi-family units

It should be noted that this phased analysis approach, specifically for project buildout (phase 3), is an endeavor to understand the future market demand and represents the potential buildout. The development scenario outlined above represents the development potential of the BullStreet project based on the market conditions and influencers known at this time. With any development that is built out to a horizon year, there is the potential for change to the development program, especially in the final buildout phase. The development scenario evaluated in this traffic impact analysis represents a comprehensive evaluation of the existing and projected traffic conditions as well as the traffic mitigation plan for this development.

The initial project development portion of this master planned development is expected to be completed (built-out) in 2016. Access to the site is proposed via the following locations:

- Elmwood Avenue at Bull Street (existing signalized)
- Calhoun Street at Gregg Street (existing unsignalized)
- Colonial Drive at Gregg Street (existing unsignalized)
- Colonial Drive at Boyce Street (proposed, unsignalized)
- Bull Street and Freed Street (existing, unsignalized)
- Bull Street and Williams Drive (existing, unsignalized)
- Calhoun Street and Barnwell Street (existing, unsignalized)

Under the initial project development and as the construction of The Commons at BullStreet is under development, final infrastructure will be brought on line such as Boyce Street and improved internal connectivity to Elmwood Avenue. During this time internal parking facilities for the sports venue may shift throughout the entirety of the project boundaries to accommodate construction. As such, the development will work with SCDOT and the City of Columbia to accommodate these changes as well as developing the necessary traffic management plan(s) for the sports venue to accommodate parking and traffic demand for events during construction as well as at buildout of the development.

The Commons at BullStreet portion of the development is expected to be completed (built-out) in 2018. Access to this phase of the development as well as for the initial development phase is projected to occur via the following locations:

- Elmwood Avenue at Bull Street (existing signalized)
- Calhoun Street at Gregg Street (existing unsignalized)
- Colonial Drive at Gregg Street (existing unsignalized)
- Calhoun Street and Barnwell Street (existing, unsignalized)
- Bull Street at Williams Drive (proposed signalized)
- Bull Street at Freed Drive (proposed unsignalized, right-in/right-out)
- Colonial Drive at Access #4 (proposed unsignalized, right-in/right-out)
- Colonial Drive at Department of Natural Resources Driveway/Access #5 (proposed unsignalized, full movement)
- Colonial Drive at Boyce Street/Access #6 (proposed unsignalized, full movement)

The potential buildout of the development is expected to be completed (built-out) in 2020. Access to the site is proposed via the following locations:

- Elmwood Avenue at Bull Street (existing signalized)
- Calhoun Street at Gregg Street (existing unsignalized)
- Colonial Drive at Gregg Street (existing unsignalized)
- Bull Street at Williams Drive (proposed signalized)
- Bull Street at Freed Drive (proposed unsignalized, right-in/right-out)
- Calhoun Street and Barnwell Street (existing, unsignalized)
- Colonial Drive at Access #4 (proposed unsignalized, right-in/right-out)
- Colonial Drive at Department of Natural Resources Driveway/Access #5 (proposed unsignalized, full movement)
- Colonial Drive at Boyce Street/Access #6 (proposed unsignalized, full movement)
- Colonial Drive at Access #7 (proposed unsignalized, full movement)
- Harden Street at Access #8 (proposed unsignalized, right-in/right-out)
- Harden Street at Access #9 (proposed unsignalized, left-over)
- Harden Street at Access #10 (proposed signalized)

- Harden Street at Access #11 (proposed unsignalized, right-in/right-out)
- Harden Street at Access #12 (proposed unsignalized, left-over)
- Calhoun Street at Barnwell Street/Access #13 (proposed unsignalized, full movement)

It is important to note that there are two additional points of access along Calhoun Street that will provide access to the proposed BullStreet development. These two access points are located within the historic wall surrounding the development along Calhoun Street and are only wide enough to accommodate a single lane of traffic (one-way). Considering that these access points cannot be modified to accommodate bi-directional (two-way) traffic because of the historic nature of the wall, they will most likely be used to accommodate active modes of transportation (bicycle and pedestrian) and not vehicular access.

The Richland County Transportation Penny Program currently has a programmed project to improve the intersection of Bull Street and Elmwood Avenue. At this time the specifics of the intersections improvements or configuration are not known. The schedule for the improvements is as follows:

- Preliminary Engineering (PE) – Calendar Year (CY) 2016
- Right of Way – CY 2017
- Construction – CY 2018

Currently the Richland Penny has \$2.5 million programmed for this intersection improvement.

Kimley-Horn was retained to determine the potential traffic impacts of this development (in accordance with the traffic study guidelines set forth by SCDOT and the City of Columbia) and to identify transportation improvements that may be required to accommodate future traffic conditions while being sensitive to the existing land uses, roadway network and surrounding neighborhoods. This report presents trip generation, distribution, capacity analyses, and recommendations for transportation improvements required to meet anticipated traffic demands.

Based on the capacity analyses contained herein, the following roadway improvements are recommended to mitigate impact of the proposed development on the adjacent street network. These improvements were developed based on the existing intersection configurations and projected intersection operations while being sensitive to the surrounding land uses and neighborhoods.

Initial Project Development

- Implement a traffic management plan for events at the sports venue to manage incoming and outgoing traffic. The traffic management plan should be created such that the plan adheres to any laneage, land-use, or travel pattern changes associated with the future development of The Commons at BullStreet and the potential final buildout of the project.
- Work with the City of Columbia and the South Carolina Department of Transportation on the development of a comprehensive wayfinding signage plan to provide guidance from SC 277 and I-126 to the development.

Calhoun Street at Barnwell Street (Node 30)

- Construction of a southbound driveway connection to the intersection of Calhoun Street and Barnwell Street
- The southbound approach should accommodate a dedicated left-turn lane and a shared through/right-turn lane.
- Restripe the existing approach of Calhoun Street to provide for a dedicated left-turn lane with 150 feet of storage into the proposed development.

Bull Street at Williams Drive (Node 20)

- Opening of the existing westbound driveway to accommodate vehicular traffic ingress and egress into the development.

Bull Street at Freed Drive (Node 4)

- Opening of the existing westbound driveway to accommodate vehicular traffic ingress and egress into the development.

Colonial Drive at Gregg Street (Node 11)

- Opening of the existing northbound driveway to accommodate vehicular traffic ingress and egress into the development.

Colonial Drive at Boyce Street (Node 23)

- Opening of the existing northbound driveway to accommodate vehicular traffic ingress and egress into the development.

It is important to note that the typical traffic loading pattern for the sports venue typically occurs outside of the traditional peak hours (AM 7-9 & PM 4-6) for the adjacent roadways. In addition, the majority of the playing season is outside USC’s typical academic calendar year with only small overlap occurring in April and the first weeks of May.

The Commons at BullStreet

Bull Street at Elmwood Avenue (Node 6)

- Convert the existing southbound right-turn lane to a channelized free flow movement from Bull Street to Elmwood Avenue.
- Install a second through lane on eastbound Elmwood Avenue.
- Install a second northbound through lane on Bull Street.
- Modify the existing signal timings, phasing and pavement markings at the intersection to accommodate the proposed geometric changes.

The additional roadway laneage at the intersection can be accommodated by:

- Utilize the available planting strip and extra wide lane width adjacent to the outside dual right-lane on the eastbound approach of Elmwood Avenue.
- Shift the existing inside northbound dual left-turn lane to the west, utilizing one of the three through lanes south of Elmwood Avenue, to add an additional northbound through lane.

A sketch of the proposed roadway improvements is attached in the Appendix. The proposed intersection improvements should be coordinated with the Richland County Transportation Penny Program due to overlap of the improvements and timing.

Boyce Street at Colonial Drive (Node 23)

- Construct a westbound left-turn lane on Colonial Drive with a minimum of 150 feet of storage and an appropriate taper length.
- Construct a northbound exit driveway with dedicated left and right-turn lanes

Bull Street at Williams Street (Node 20)

- Construct a southbound left-turn lane on Bull Street with a minimum of 150 feet of storage and an appropriate taper length.
- Construct a westbound exit driveway with dedicated left and right-turn lanes.
- Installation of a traffic signal upon meeting MUTCD warrants and according to SCDOT/City of Columbia guidelines and specifications.

BullStreet at Freed Drive (Node 4)

- Conversion of the existing full movement intersection to a Right-In/Right-Out (RIRO) intersection.

Bull Street at Jefferson Street (Node 5)

- Conversion of the existing full movement intersection to a Left-Over/RIRO intersection.

Colonial Drive at Access #4 (Node 21)

- Construct a northbound exit driveway with a dedicated right-turn lane.
- Construction of a driveway on Colonial Drive to restrict left turning movements from Colonial Drive and Access #4

Colonial Drive at Department of Natural Resources Driveway/Access #5 (Node 22)

- Construct a westbound left-turn lane on Colonial Drive with a minimum of 150 feet of storage and an appropriate taper length.
- Construct a northbound exit driveway with dedicated left and shared through/right-turn lanes

With the addition of the proposed signal on Bull Street at Williams Drive and the proposed intersection improvements at Bull Street and Elmwood Avenue, updated corridor timing plans should be developed for the Bull Street corridor. The addition of the traffic signal and geometric improvements at Bull Street and Elmwood Avenue will have a positive impact on mobility through the corridor and as such signal timings should be updated.

Potential Project Buildout

Bull Street at Williams Drive (Node 20)

- Modify the westbound approach to the intersection to include a dedicated left-turn lane and a shared left/right-turn lane.
- Modify the traffic signal, phasing and pavement markings to accommodate the proposed geometric changes.

Colonial Drive at Boyce Street (Node 23)

- Installation of a traffic signal upon meeting MUTCD warrants and according to SCDOT/City of Columbia guidelines and specifications.

Colonial Drive at Access #7 (Node 24)

- Construct a northbound exit driveway with dedicated right-turn lane
- Modify the existing median on Colonial Drive to accommodate a left-turn into Access #7 with a minimum of 150 feet of storage.

Colonial Drive at Gregg Street (Node 11)

- Construction of a westbound left-turn lane on Colonial Drive with 150 feet of storage and a left-turn lane.
- Construction of an eastbound left-turn lane on Colonial Drive with 75 feet of storage.
- Installation of a traffic signal upon meeting MUTCD warrants and according to SCDOT/City of Columbia guidelines and specifications.

The current width of Gregg Street is approximately 30 feet in width. Approximately 100 feet east of the intersection with Gregg Street is a single barrel culvert for Smith Branch. Given the close proximity of the intersection to Smith Branch and the existing width of the street, the City should work with the developer to determine an interim context sensitive solution for this intersection while working to develop a long term solution for Colonial Drive and the Smith Branch culvert.

Harden Street at Access 8 (Node 25)

- Construction of a RIRO driveway with Harden Street
- Construction of a SB right-turn lane with 100 feet of storage and appropriate taper.
- Construction of a concrete island to restrict left-turns from and onto Harden Street.

Harden Street at Access 9 (Node 26)

- Construction of a Left-In/RIRO driveway with Harden Street
- Construction of a SB right-turn lane with 100 feet of storage and appropriate taper.
- Construction of a concrete island to restrict left-turns onto Harden Street.

Harden Street at Access 10 (Node 27)

- Align the proposed driveway with the existing driveway on the eastside of Harden Street
- Construction of a full movement driveway with Harden Street
- Construction of a SB right-turn lane with 100 feet of storage and appropriate taper.
- Construction of a NB left-turn lane with 150 feet of storage and appropriate taper.
- Installation of a traffic signal upon meeting MUTCD warrants and according to SCDOT/City of Columbia guidelines and specifications.

Harden Street at Access 11 (Node 28)

- Construction of a RIRO driveway with Harden Street
- Construction of a SB right-turn lane with 100 feet of storage and appropriate taper.
- Construction of a concrete island to restrict left-turns from and onto Harden Street.

Harden Street at Access 12 (Node 29)

- Construction of a Left-In/RIRO driveway with Harden Street
- Construction of a SB right-turn lane with 100 feet of storage and appropriate taper.
- Construction of a concrete island to restrict left-turns onto Harden Street.

With the addition of the proposed signals on Colonial Drive and Harden Street in combination with the proposed intersection improvements for the corridors, updated corridor timing plans should be developed for the Harden Street and Colonial Drive corridors. The addition of the traffic signals and geometric improvements will have a positive impact on mobility through the corridor and as such signal timings should be updated.

The development scenario above represents a comprehensive evaluation of the proposed buildout (completion) of the BullStreet development and with any development is subject to change due to unforeseen market influencers. As the ultimate project build out occurs in phase 3, the mitigation measures presented in this TIA should be evaluated to determine if they are still applicable for the development that is ultimately constructed. Figure 14 shows the recommended laneage for the proposed development.

2.0 Introduction

The proposed BullStreet mixed-use development is located in Columbia, South Carolina bound by Colonial Drive to the north, Harden Street to the east, Calhoun Street to the south, and Bull Street to the west.

The initial project development is anticipated to be built-out in 2016. The Commons at BullStreet is anticipated to be built-out in 2018. The potential project buildout is anticipated to be built-out in 2020. This analysis considers the 2015 existing traffic conditions, the projected 2016 background conditions, the projected 2016 build-out conditions, the projected 2018 background conditions, the projected 2018 build-out conditions, the projected 2020 background conditions, and the 2020 build-out conditions.

As currently envisioned, the proposed site will be constructed in two initial phases with buildout of the site occurring as the site develops. Each phase is proposed to consist of the following:

Initial Project Development

- 8,500 seat sports venue
- 26,250 square feet of general retail space
- 78,750 square feet of general office space

The Commons at BullStreet Project Development

- 69,050 square feet of general office space
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Potential Project Buildout

- 500,000 square feet of research facility space
- 100,000 square feet of general retail space
- 300 units of continuing care facility
- 500,000 square feet of general office space
- 1,315 multi-family units

Kimley-Horn was retained to determine the potential traffic impacts of this development (in accordance with the traffic study guidelines set forth by SCDOT and the City of Columbia) and to identify transportation improvements that may be required to accommodate future traffic conditions. This report presents trip generation, distribution, capacity analyses, and recommendations for transportation improvements required to meet anticipated traffic demands.

The study area for this TIA includes the following intersections:

1. Bull Street at Harden Street Extension (signalized)
2. Bull Street at Confederate Avenue
3. Bull Street at Colonial Drive
4. Bull Street at Franklin Street/Freed Drive

5. Bull Street at Jefferson Street
6. Bull Street at Elmwood Avenue
7. Bull Street at Calhoun Street
8. Colonial Drive at Harden Street
9. Harden Street at Calhoun Street
10. Calhoun Street at Gregg Street
11. Gregg Street at Colonial Drive
12. Harden Street at Slighs Avenue
13. Colonial Drive at Farrow Road
14. Farrow Road at Beltline Boulevard
15. Farrow Road at 277 NB Ramps
16. Farrow Road at Lorick Avenue/ 277 SB Ramps
17. Elmwood Avenue at Assembly Street
18. Elmwood Avenue at Main Street
19. Elmwood Avenue at Sumter Street
20. Bull Street at Williams Drive/Access #3 (proposed signalized)
21. Bull Street at Freed Drive/Access #4 (proposed unsignalized, right-in/right-out)
22. Colonial Drive at Access #5 (proposed unsignalized, right-in/right-out)
23. Colonial Drive at Boyce Street (proposed signalized)
24. Colonial Drive at Access #7 (proposed unsignalized, full movement)
25. Harden Street at Access #8 (proposed unsignalized, right-in/right-out)
26. Harden Street at Access #9 (proposed unsignalized, left-over)
27. Harden Street at Access #10 (proposed signalized)
28. Harden Street at Access #11 (proposed unsignalized, right-in/right-out)
29. Harden Street at Access #12 (proposed unsignalized, left-over)
30. Calhoun Street at Barnwell Street/Access #13 (proposed unsignalized, full movement)

The study area was established during discussions with SCDOT, the City of Columbia and the project developers. **Figure 1** provides an aerial of the study area/site location. **Figure 2** shows the proposed overall BullStreet masterplan. **Figure 2A** shows the project access key.

3.0 Existing Traffic Conditions

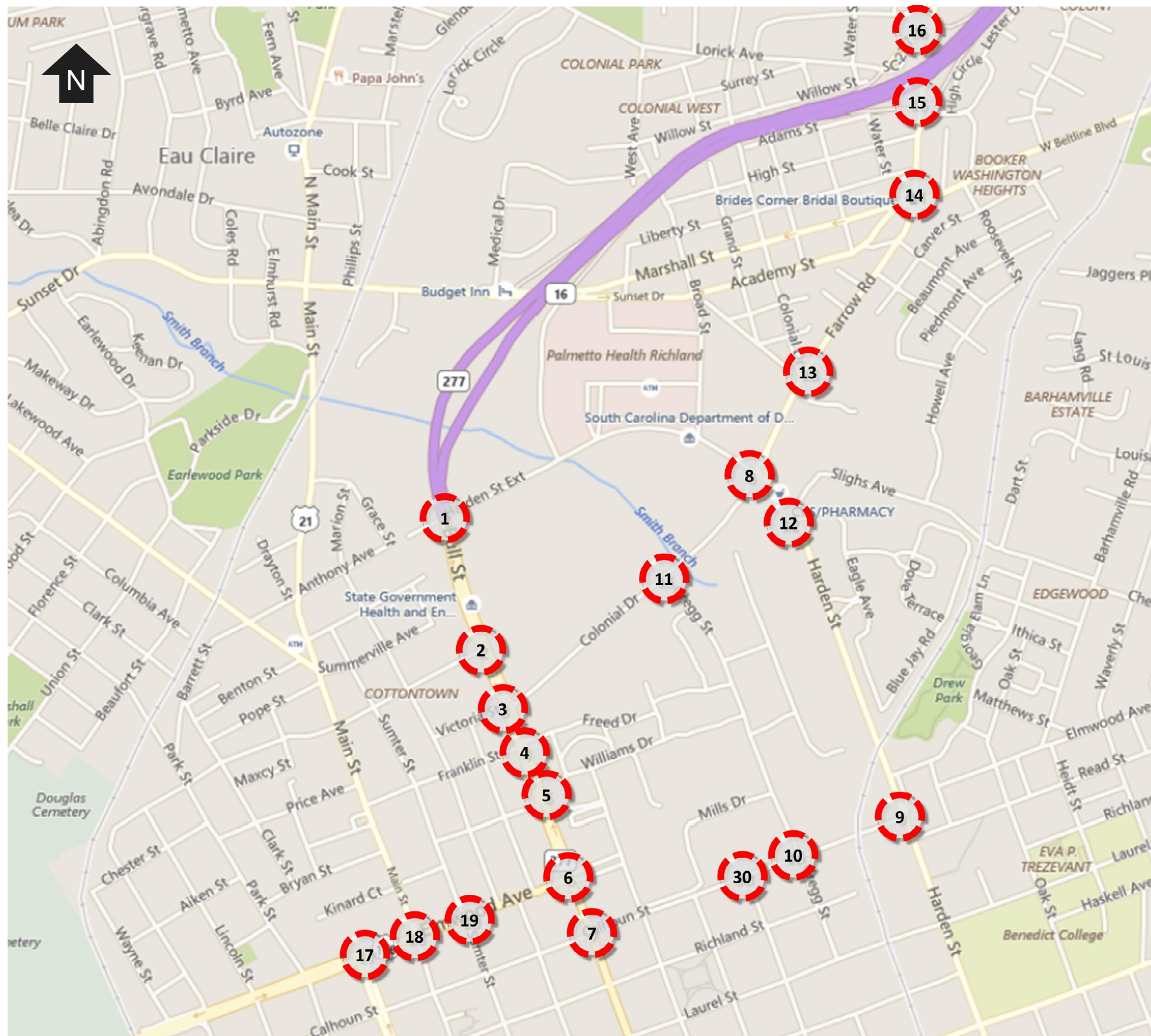
The roadway inventory for the existing study area intersections is shown below in Table 1

Table 1- Roadway Classifications in the Development Study Area			
Roadway Name	Station ID #	SCDOT 2014 AADT	Roadway Classification
SC 277	265	40,000	Freeway
Assembly St.	234	18,800	Principal Arterial
Beltline Blvd.	225	27,000	Minor Arterial
Bull St.	821	34,700	Principal Arterial
Calhoun St.	896	7,200	Major Collector
Colonial Dr.	327	5,200	Major Collector
Confederate Ave.	N/A	N/A	Local
Elmwood Ave.	151	36,900	Principal Arterial
Farrow Road	277	13,000	Minor Arterial
Franklin St./ Freed Dr.	N/A	N/A	Local
Gregg St.	N/A	N/A	Local
Harden St.	275	20,000	Minor Arterial
Harden St. Ext.	823	12,700	Minor Arterial
Jefferson St.	N/A	N/A	Local
Main St.	128	14,800	Local/Principal Arterial
Slighs Ave.	760	4,200	Local
Sumter St.	333	7,700	Minor Arterial

Traffic volumes were not balanced due to the several driveways in-between study intersections. Peak hour turning moment traffic counts and calculations are provided in **Appendix A. Figure 4** illustrates existing 2015 peak hour traffic volumes. Traffic counts were collected while Richland County Schools and USC were in session.

BullStreet Mixed-Use Development

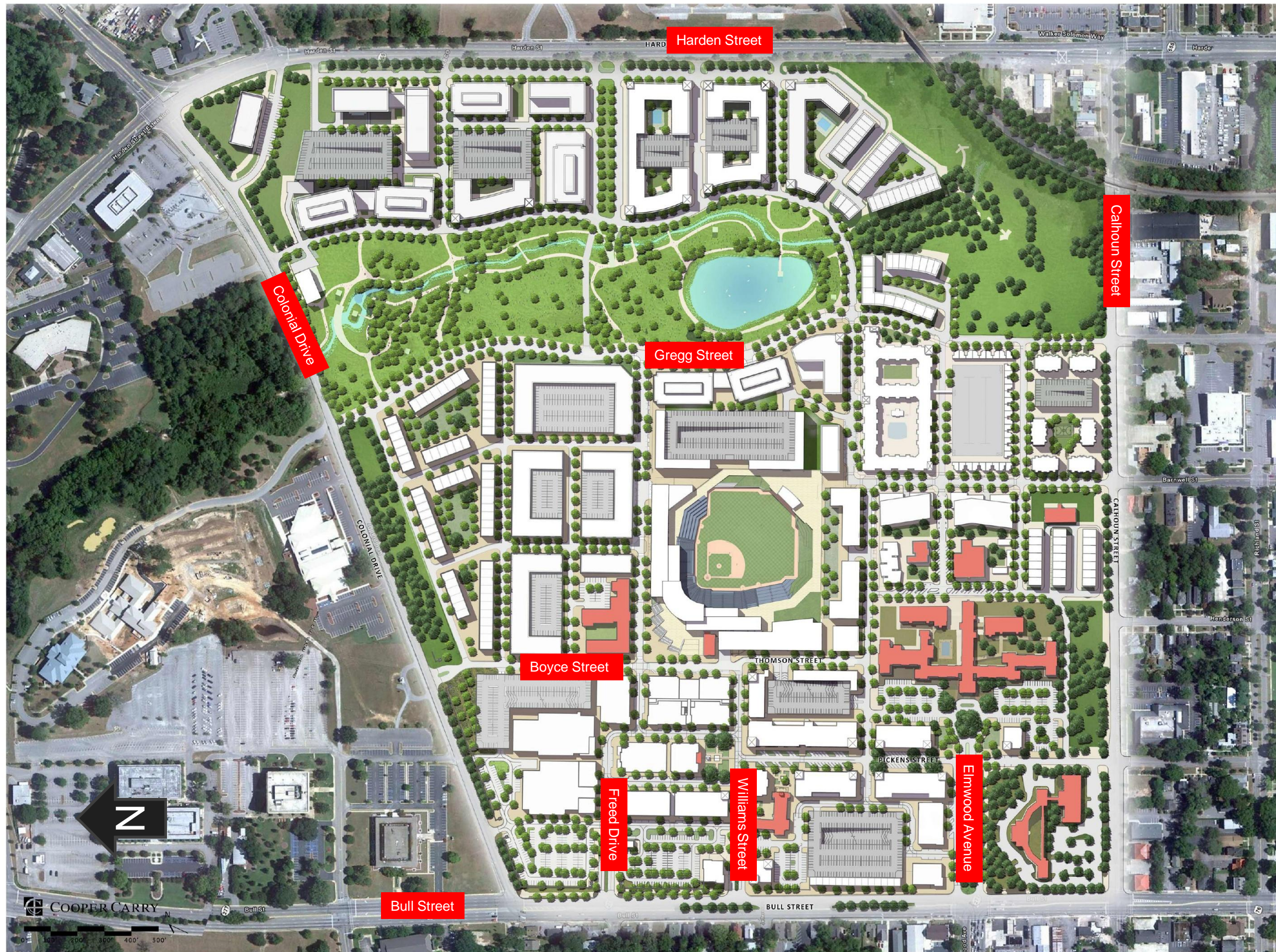
Figure 1 – Study Area/ Site Location



1. Bull Street at Harden Street Extension
2. Bull Street at Confederate Avenue
3. Bull Street at Colonial Drive
4. Bull Street at Franklin Street/Freed Drive
5. Bull Street at Jefferson Street
6. Bull Street at Elmwood Avenue
7. Bull Street at Calhoun Street
8. Colonial Drive at Harden Street
9. Harden Street at Calhoun Street
10. Calhoun Street at Gregg Street
11. Gregg Street at Colonial Drive
12. Harden Street at Slighs Avenue
13. Colonial Drive at Farrow Road
14. Farrow Road at Beltline Boulevard
15. Farrow Road at 277 NB Ramps
16. Farrow Road at Lorick Avenue/ 277 SB Ramps
17. Elmwood Avenue at Assembly Street
18. Elmwood Avenue at Main Street
19. Elmwood Avenue at Sumter Street
20. Calhoun Street at Barnwell Street

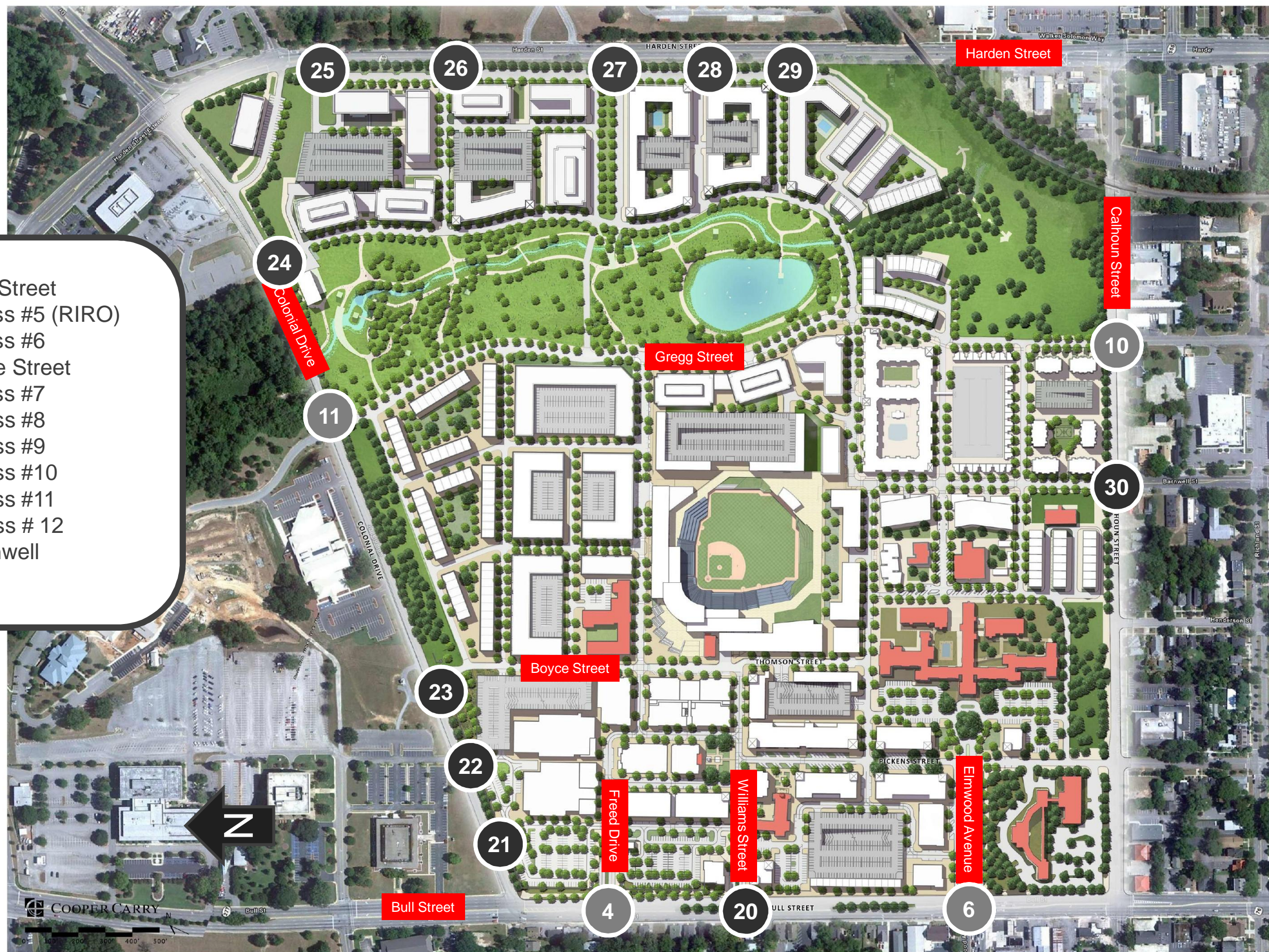
BullStreet Mixed-Use Development

Figure 2 – Site Plan



BullStreet Mixed-Use Development

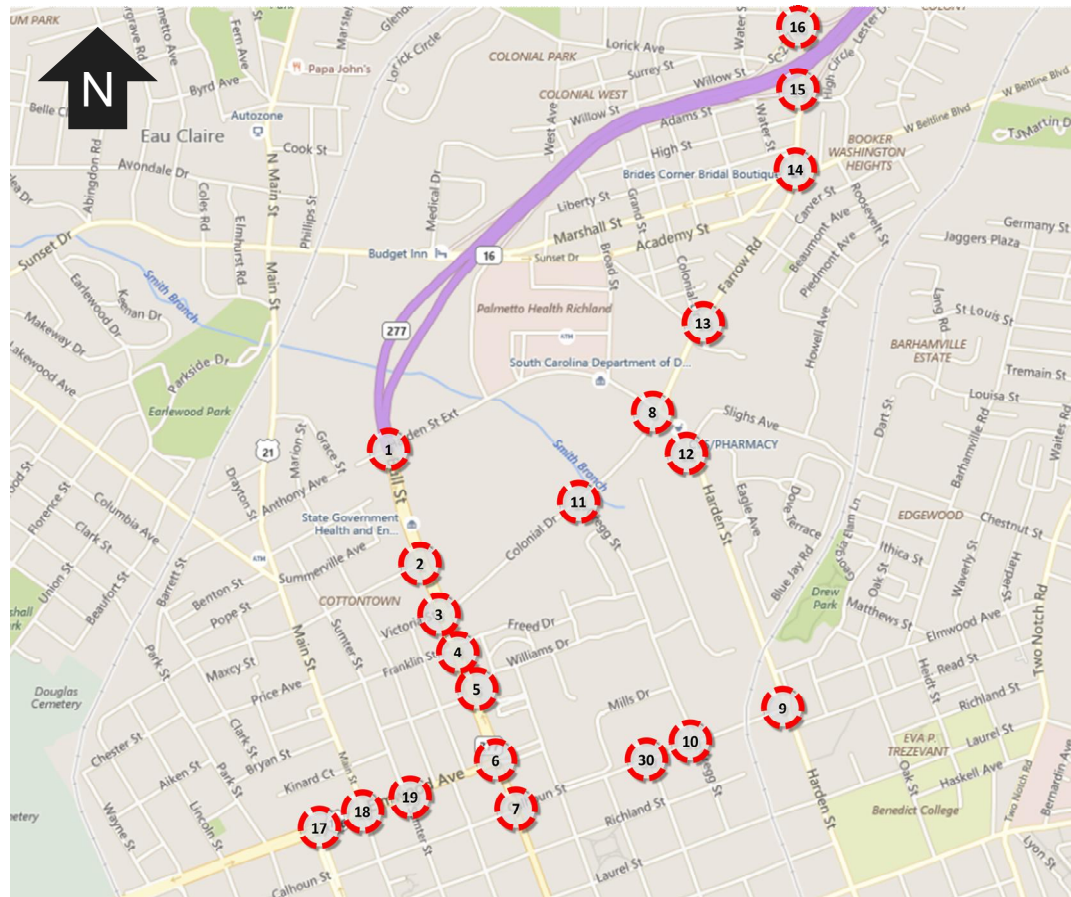
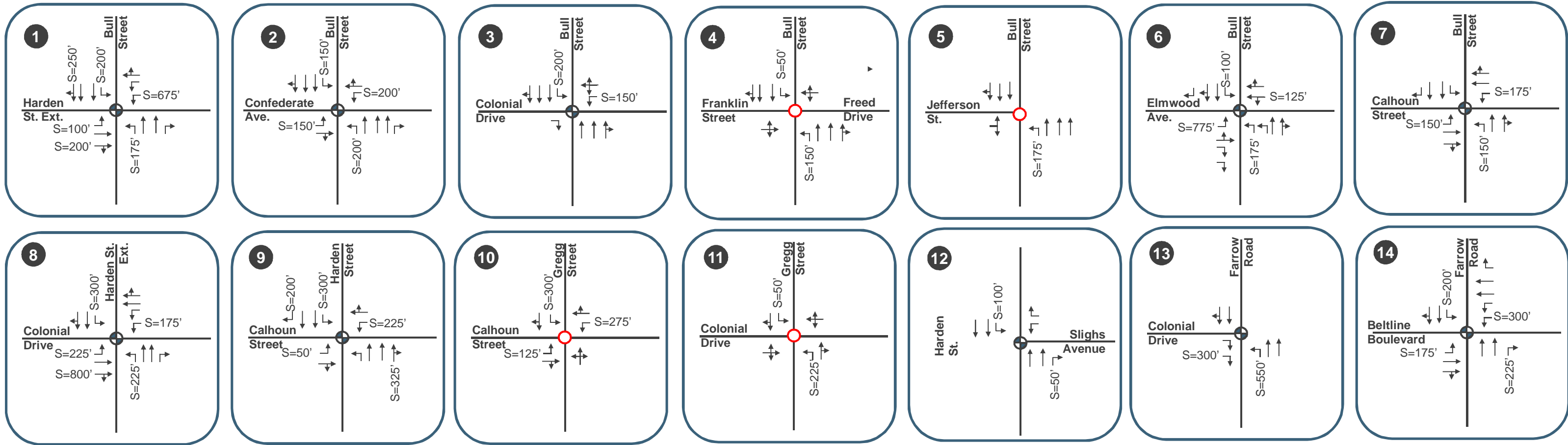
Figure 2A – Site Access Key



- 20. Bull Street at Williams Street
- 21. Colonial Drive at Access #5 (RIRO)
- 22. Colonial Drive at Access #6
- 23. Colonial Drive at Boyce Street
- 24. Colonial Drive at Access #7
- 25. Harden Street at Access #8
- 26. Harden Street at Access #9
- 27. Harden Street at Access #10
- 28. Harden Street at Access #11
- 29. Harden Street at Access # 12
- 30. Calhoun Street at Barnwell Street/Access # 13

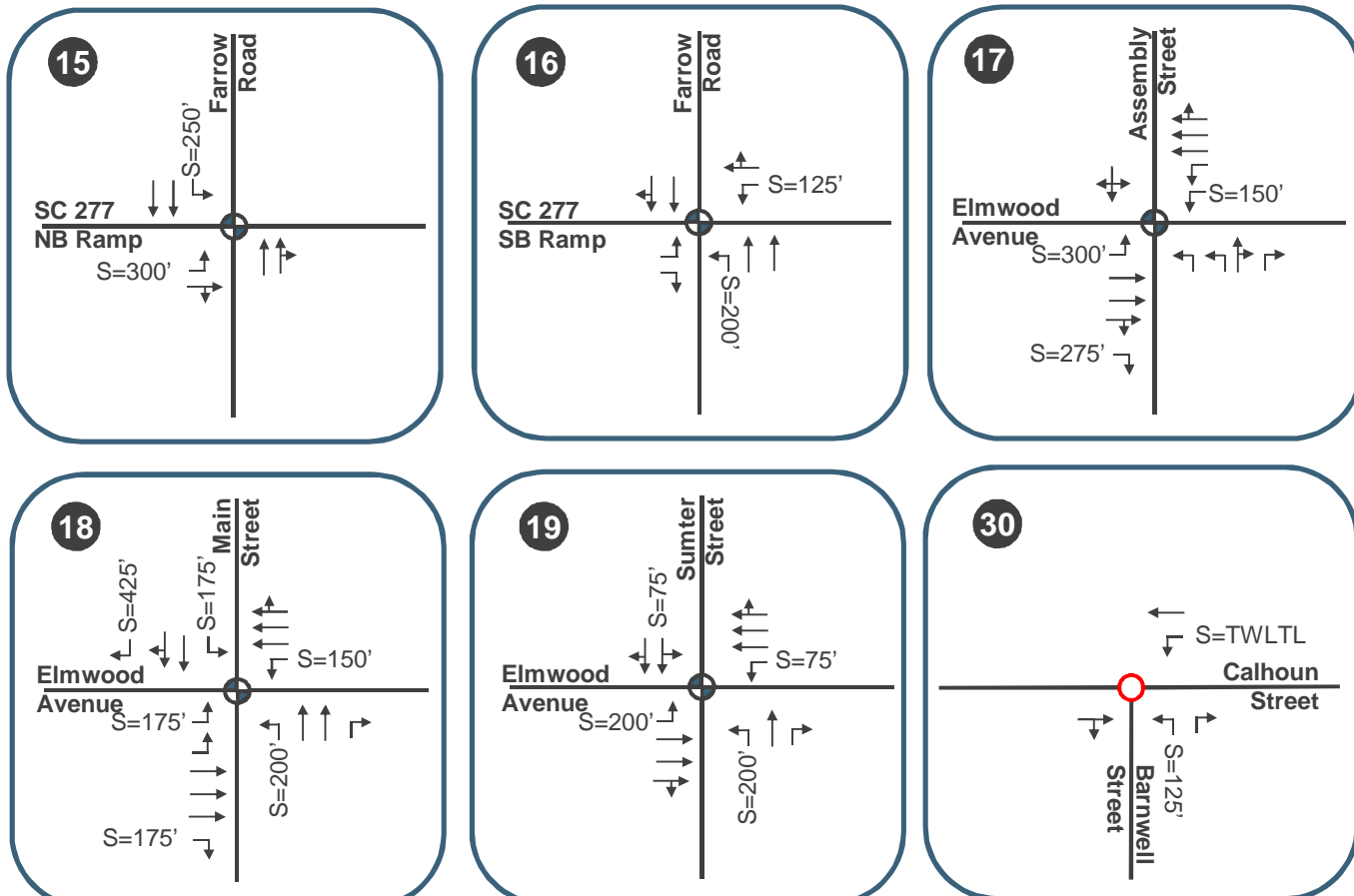
BullStreet Mixed-Use Development

Figure 3 – Existing Roadway Laneage



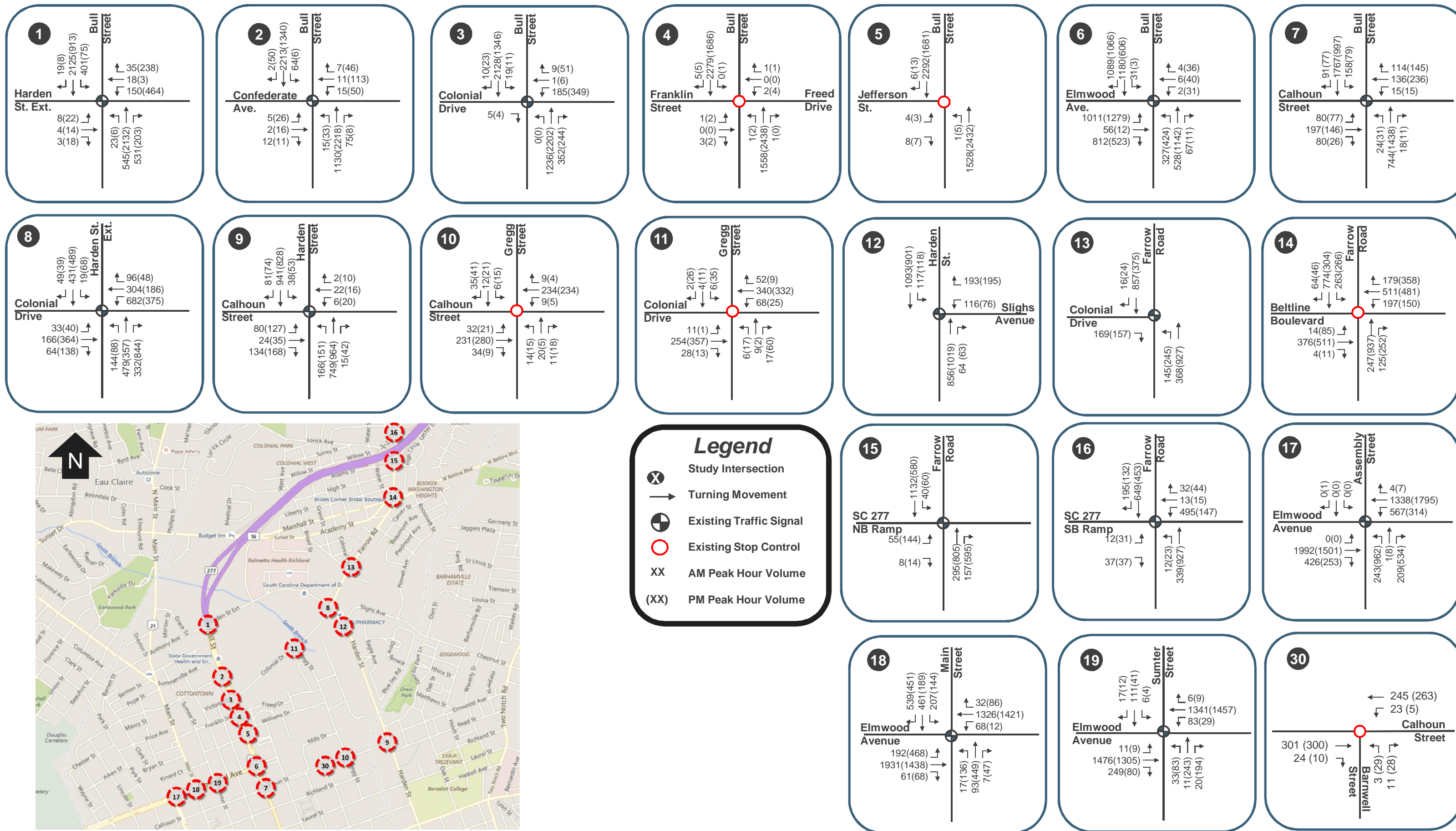
Legend

- X Study Intersection
- Existing Roadway Laneage
- ⊕ Existing Traffic Signal
- Existing Stop Control
- S=XX' Approximate Existing Storage Length



BullStreet Mixed-Use Development

Figure 4 – 2015 Existing Traffic Volumes

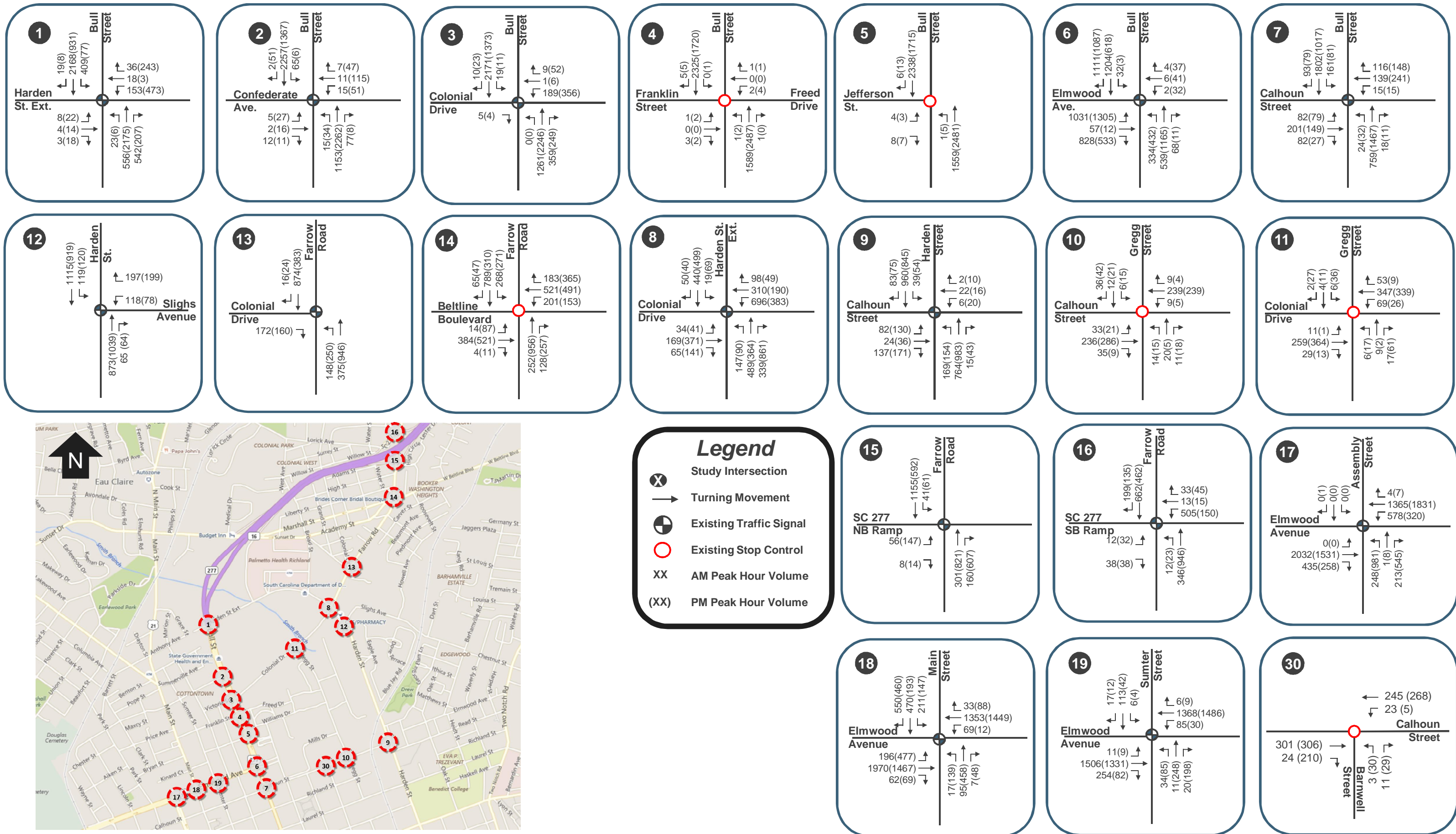


4.0 Projected Background (Non-Project) Traffic

Projected background (non-project) traffic is defined as expected traffic on the roadway network in the future year(s) absent the construction and opening of the proposed project, plus any approved adjacent developments. Based on discussions with the City of Columbia and SCDOT, no permitted or constructed developments were identified that would impact traffic in the study area. The existing 2015 peak hour traffic volumes were grown at 2% per year to account for the expected background growth in traffic. 2016 background conditions do not include traffic volumes associated with the BullStreet mixed-use development. 2018 background conditions include volumes and any improvements, if applicable, from the initial project development of the project. 2020 background conditions include volumes and any improvements, if applicable, from the initial project development and the Commons at Bull Street phases of the development. **Figures 5, 6, and 7** show the 2016, 2018, and 2020 background traffic volumes, respectively.

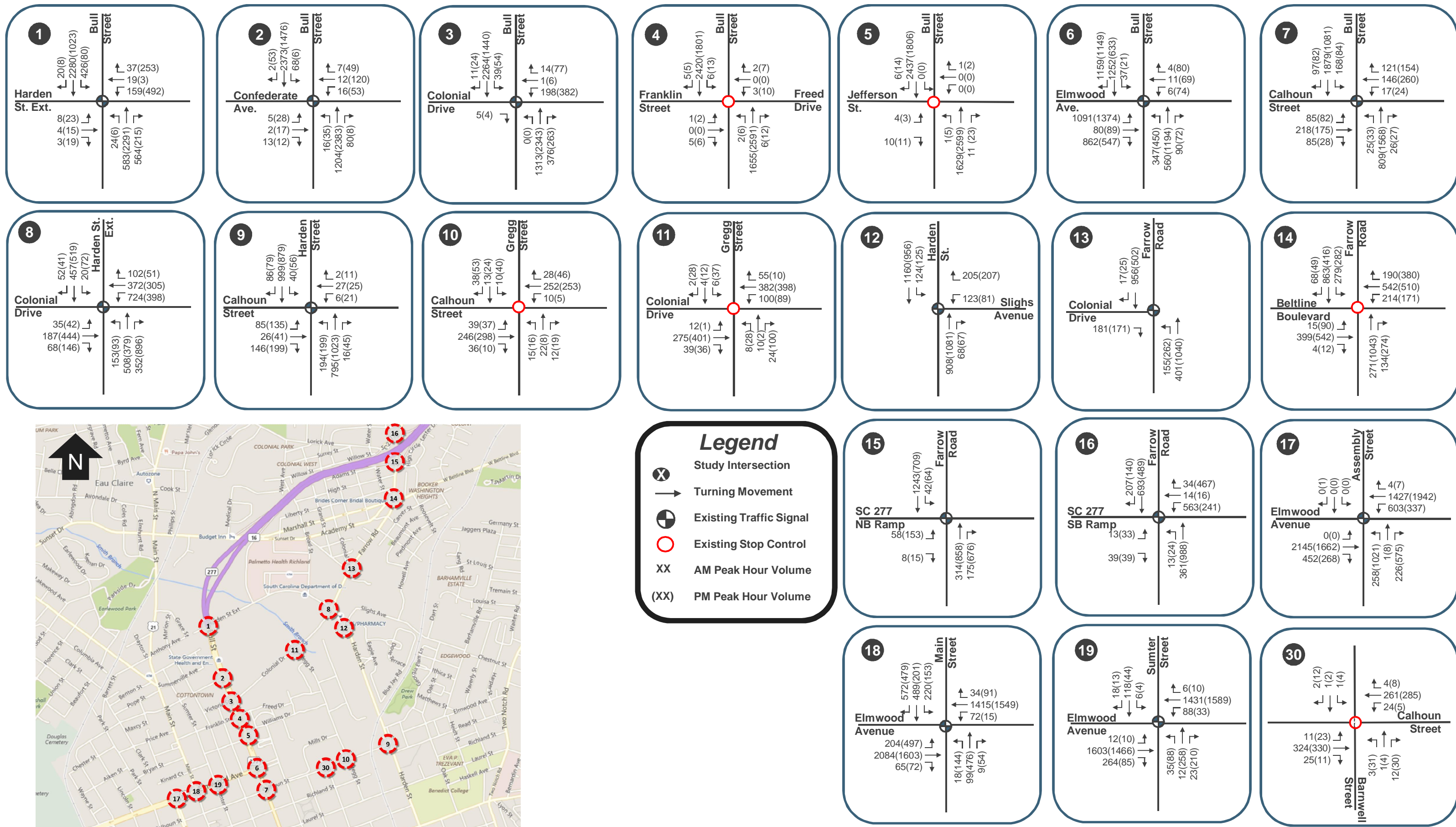
BullStreet Mixed-Use Development

Figure 5 – 2016 Background Traffic Volumes



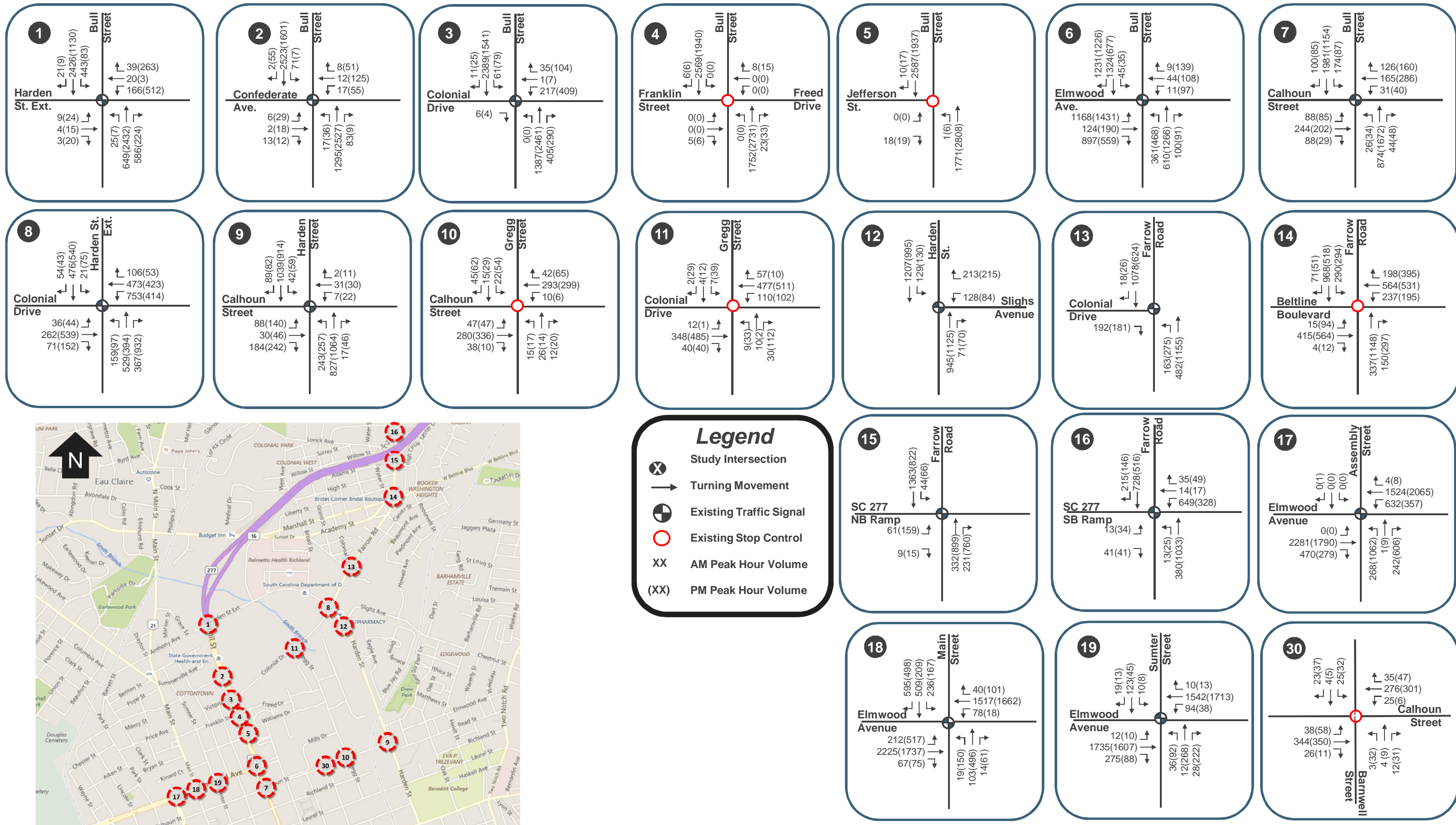
BullStreet Mixed-Use Development

Figure 6 – 2018 Background Traffic Volumes



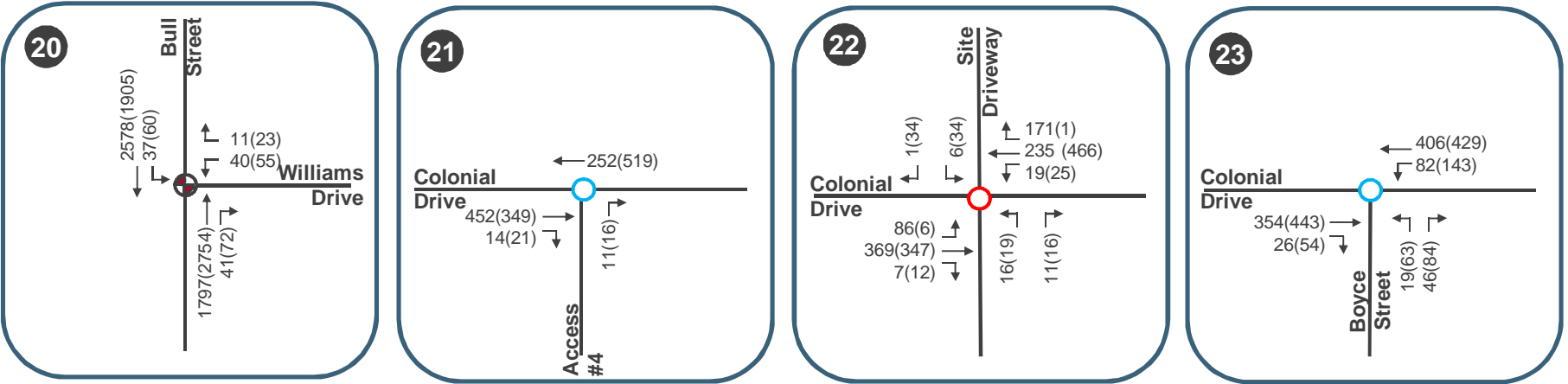
BullStreet Mixed-Use Development

Figure 7 – 2020 Background Traffic Volumes



BullStreet Mixed-Use Development

Figure 7 (cont.) – 2020 Background Traffic Volumes at Site Driveways



Legend

- X Study Intersection
- Turning Movement
- ⊕ Proposed Traffic Signal
- Proposed stop control
- XX AM Peak Hour Volume
- (XX) PM Peak Hour Volume

5.0 Project Traffic

Project traffic used in this analysis is defined as the vehicle trips expected to be generated by the development, distribution, and assignment of that traffic over the study roadway network.

5.1 PROJECT SITE ACCESS

Access to the proposed BullStreet development are planned to be located and operate as follows:

The initial project development portion of this master planned development is expected to be completed (built-out) in 2016. Access to the site is proposed via the following locations:

- Elmwood Avenue at Bull Street (existing signalized)
- Calhoun Street at Gregg Street (existing unsignalized)
- Colonial Drive at Gregg Street (existing unsignalized)
- Colonial Drive at Boyce Street (proposed, unsignalized)

Under the initial project development and as the construction of The Commons at BullStreet is under development, final infrastructure will be brought on line such as Boyce Street and improved internal connectivity to Elmwood Avenue. During this time internal parking facilities for special events may shift throughout the entirety of the project boundaries to accommodate this construction. As such the development will work with SCDOT and the City of Columbia to accommodate these changes as well as developing the necessary traffic management plan for special events.

The Commons at BullStreet portion of the development is expected to be completed (built-out) in 2018. Access to this phase of the development as well as for the initial development phase is projected to occur via the following locations:

- Elmwood Avenue at Bull Street (existing signalized)
- Calhoun Street at Gregg Street (existing unsignalized)
- Colonial Drive at Gregg Street (existing unsignalized)
- Bull Street at Williams Drive (proposed signalized)
- Bull Street at Freed Drive (proposed unsignalized, right-in/right-out)
- Colonial Drive at Access #4 (proposed unsignalized, right-in/right-out)
- Colonial Drive at Department of Natural Resources Driveway/Access #5 (proposed unsignalized, full movement)
- Colonial Drive at Boyce Street/Access #6 (proposed unsignalized, full movement)

The potential buildout of the development is expected to be completed (built-out) in 2020. Access to the site is proposed via the following locations:

- Elmwood Avenue at Bull Street (existing signalized)
- Calhoun Street at Gregg Street (existing unsignalized)
- Colonial Drive at Gregg Street (existing unsignalized)
- Bull Street at Williams Drive (proposed signalized)
- Bull Street at Freed Drive (proposed unsignalized, right-in/right-out)
- Colonial Drive at Access #4 (proposed unsignalized, right-in/right-out)
- Colonial Drive at Department of Natural Resources Driveway/Access #5 (proposed unsignalized, full movement)
- Colonial Drive at Boyce Street/Access #6 (proposed unsignalized, full movement)

- Colonial Drive at Access #7 (proposed unsignalized, full movement)
- Harden Street at Access #8 (proposed unsignalized, right-in/right-out)
- Harden Street at Access #9 (proposed unsignalized, left-over)
- Harden Street at Access #10 (proposed signalized)
- Harden Street at Access #11 (proposed unsignalized, right-in/right-out)
- Harden Street at Access #12 (proposed unsignalized, left-over)
- Calhoun Street at Barnwell Street/Access #13 (proposed unsignalized, full movement)

5.2 TRAFFIC GENERATION

The traffic generation potential of the proposed development was determined using the trip generation rates published in *Trip Generation* (Institute of Transportation Engineers, Ninth Edition, 2012). Please note the trips for the proposed baseball stadium are not available to be generated from ITE, therefore engineering judgement and assumptions were used for the Baseball Stadium. Copies of the trip generation calculations and additional documentation are contained in **Appendix B**. The trip generation for all three phases and the baseball stadium are shown in this section. As currently envisioned, the proposed site will ultimately consist of the following land uses:

Initial Project Development

- 8,500 seat sports venue
- 26,250 square feet of general retail space
- 78,750 square feet of general office space

The Commons at BullStreet Project Development

- 69,050 square feet of general office space
- 263,300 square feet of town center space
- 22,438 square feet of high turnover sit down restaurant space
- 55,4362 square feet of quality restaurant space
- 10 Screen movie theater
- 479 multi-family units
- 165 room hotel
- 25,000 square feet of health/fitness club space
- 25,000 square feet of sporting goods

Potential Project Buildout

- 500,000 square feet of research facility space
- 100,000 square feet of general retail space
- 300 units of continuing care facility
- 500,000 square feet of general office space
- 1,315 multi-family units

Pass-by and internal capture trips were included in this analysis due to the nature of the proposed retail, office, restaurant, entertainment, hotel, and residential land uses. The pass-by and internal capture calculations were considered for the entire site in each phase of the development of the BullStreet project. Thus the pass-by/internal capture in the Commons at BullStreet phase of the development considered the land uses in the initial project development phase, and the pass-by/internal capture in project buildout phase considered the land uses in Phases I and II.

Multimodal reductions were considered for this site due COMET routes near to the site, residential areas near the site, potential for University of South Carolina shuttles to/from the site,

and a planned shuttle system from The Vista area in Columbia to the site. From researched data and engineering judgement a total of 3% of a multimodal reduction was considered for Phase I, a 5% reduction for the land uses in Phase II (total of 8% between Phases I and II), and a 7 % reduction for the land uses in Phase III (total of 15% between Phases I, II, and III).

For the town center development, ITE Land Use Code (LUC) 823 was utilized as it best represented the development pattern and trip generation potential for the proposed development based on the available land uses contained within ITE Trip Generation.

Table 2 –Initial Project Development Trip Generation								
Land Use	Intensity	Daily	AM Peak Hour			PM Peak Hour		
			Total	In	Out	Total	In	Out
Baseball Stadium	8,500 ST	1,679	15	10	5	306	306	0
Shopping Center	26,250 SF	2,847	69	43	26	245	118	127
General Office	78,750 SF	1,095	158	139	19	167	28	139
Subtotal Phase I		5,621	242	192	50	718	452	266
Internal Capture		582	22	11	11	34	17	17
Pass-By		841	0	0	0	74	37	37
Multimodal Reduction (3%)		126	7	5	1	18	12	6
Net New External Trips		4,072	213	176	38	592	386	206

Table 3- The Commons at BullStreet Trip Generation

Table 3- The Commons at BullStreet Trip Generation										
Land Use		Intensity		Daily	AM Peak Hour			PM Peak Hour		
					Total	In	Out	Total	In	Out
Φ ₁	Baseball Stadium	8,500	ST	1,679	15	10	5	306	306	0
	Shopping Center	26,250	SF	2,847	69	43	26	245	118	127
	General Office	78,750	SF	1,095	158	139	19	167	28	139
Φ ₂	General Office	69,050	SF	991	142	125	17	156	27	129
	Town Center	263,300	SF	7,001	176	128	48	436	205	231
	High-Turnover Sit Down Restaurant	22,438	SF	2,853	243	134	109	221	133	88
	Multiplex	10	SC	1,360	0	0	0	136	61	75
	Multifamily Apartments	479	DU	3,026	238	48	190	281	183	98
	Hotel	165	RM	1,104	87	51	36	99	50	49
	Quality Restaurant	55,462	SF	4,989	45	23	22	415	278	137
	Health/Fitness Club	25,000	SF	823	35	18	17	89	51	38
	Sporting Goods Store	25,000	SF	1,180	6	5	1	118	57	61
Subtotal Phase I+II				28,948	1,214	724	490	2,669	1,497	1,172
Internal Capture				11,062	326	163	163	1,148	574	574
Pass-By				86	0	0	0	86	43	43
Multimodal Reduction Phase II (8%)				1,424	71	45	26	115	70	44
Net New External Trips Phase I+II				16,376	817	516	301	1,320	810	511
Net New External Trips Phase II (Net New II-Net New I)				12,304	604	340	263	728	424	305

Table 4 –Potential Project Buildout Trip Generation									
Land Use	Intensity	Daily	AM Peak Hour			PM Peak Hour			
			Total	In	Out	Total	In	Out	
Φ ₁	Baseball Stadium	8,500 ST	1,679	15	10	5	306	306	0
	Shopping Center	26,250 SF	2,847	69	43	26	245	118	127
	General Office	78,750 SF	1,095	158	139	19	167	28	139
Φ ₂	General Office	69,050 SF	991	142	125	17	156	27	129
	Town Center	263,300 SF	7,001	176	128	48	436	205	231
	High-Turnover Sit Down Restaurant	22,438 SF	2,853	243	134	109	221	133	88
	Multiplex	10 SC	1,360	0	0	0	136	61	75
	Multifamily Apartments	479 DU	3,026	238	48	190	281	183	98
	Hotel	165 RM	1,104	87	51	36	99	50	49
	Quality Restaurant	55,462 SF	4,989	45	23	22	415	278	137
	Health/Fitness Club	25,000 SF	823	35	18	17	89	51	38
	Sporting Goods Store	25,000 SF	1,180	6	5	1	118	57	61
Φ ₃	Research Facility	500,000 SF	3,820	527	437	90	502	75	427
	Shopping Center (Rates)	100,000 SF	4,270	96	60	36	371	178	193
	Continuing Care Facility	300 DU	1,319	56	36	20	60	23	37
	Single Family	100 DU	1,050	80	20	60	105	66	39
	General Office	500,000 SF	4,461	693	610	83	638	108	530
	Multifamily Apartments	1,315 DU	8,092	648	130	518	741	482	259
Subtotal Phase I+II+III			51,960	3,314	2,017	1,297	5,086	2,429	2,657
Internal Capture			22,294	604	302	302	1,574	787	787
Pass-By			160	0	0	0	160	80	80
Multimodal Reduction Phase III (15%)			4,426	407	257	149	503	234	269
Net New External Trips Phase I+II+III			25,080	2,303	1,458	846	2,849	1,328	1,521
Net New External Trips Phase III (Net New III-Net New II)			12,776	1,699	1,118	583	2,121	904	1,216

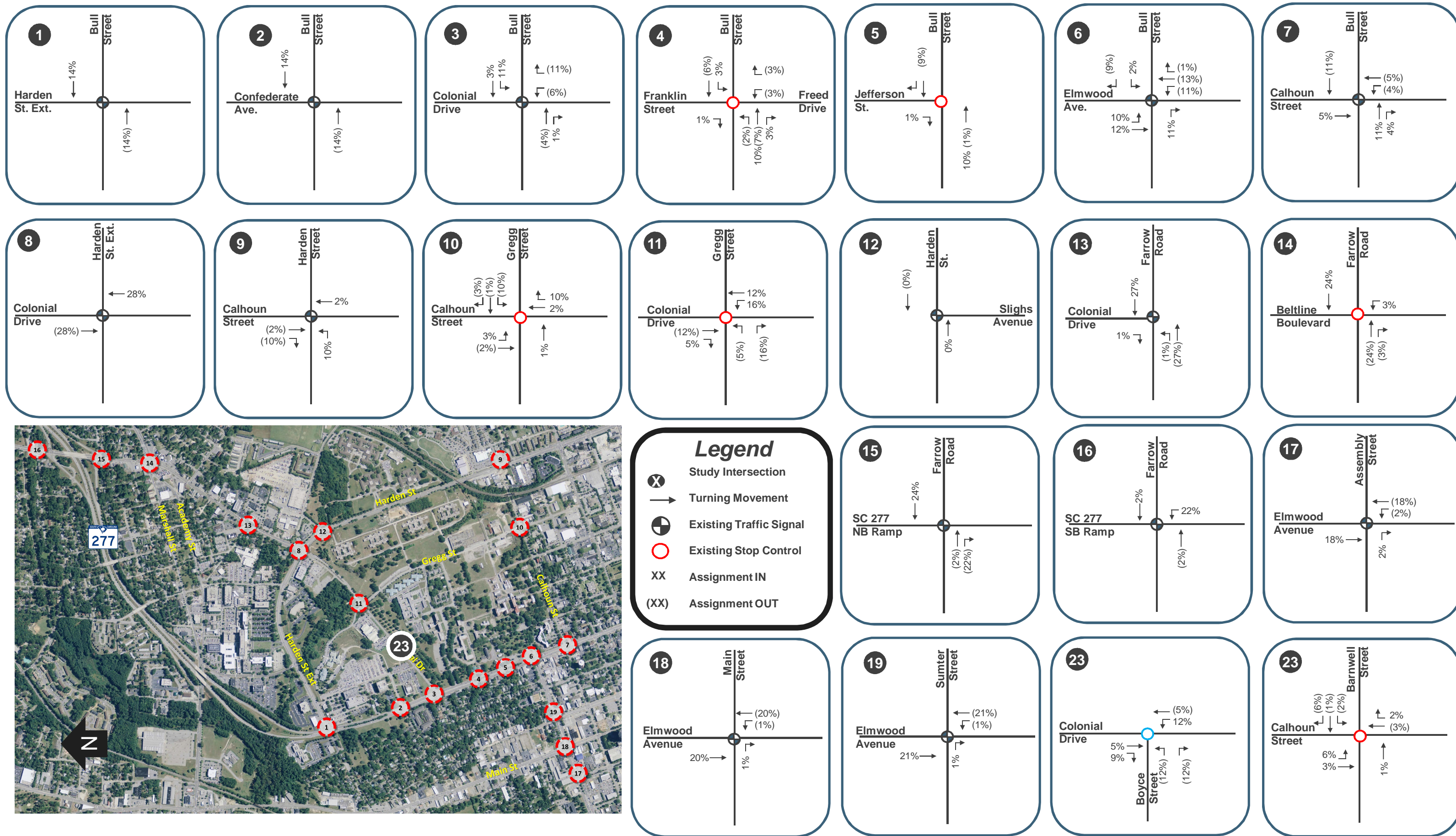
5.3 TRIP DISTRIBUTION AND ASSIGNMENT

The directional distribution and assignment of new project trips are based upon a review of land uses and population densities in the area, and the existing peak hour turning movement counts. **Figures 8, 9, and 10** show the expected distribution and assignment for each of the development phases of the BullStreet project.

Based on the trip generations from **Tables 2, 3, and 4** and the anticipated trip distribution, new project trips are assigned to the study roadway network. **Figure 11** illustrates the projected 2016 Initial Project Development AM and PM build-out traffic volumes, **Figure 12** illustrates the projected 2018 Commons at BullStreet AM and PM build-out traffic volumes, and **Figure 13** illustrates the projected 2020 potential project buildout AM and PM build-out traffic volumes. **Appendix B** provides pass-by calculations. **Appendix C** provides intersection volume worksheets for the study network.

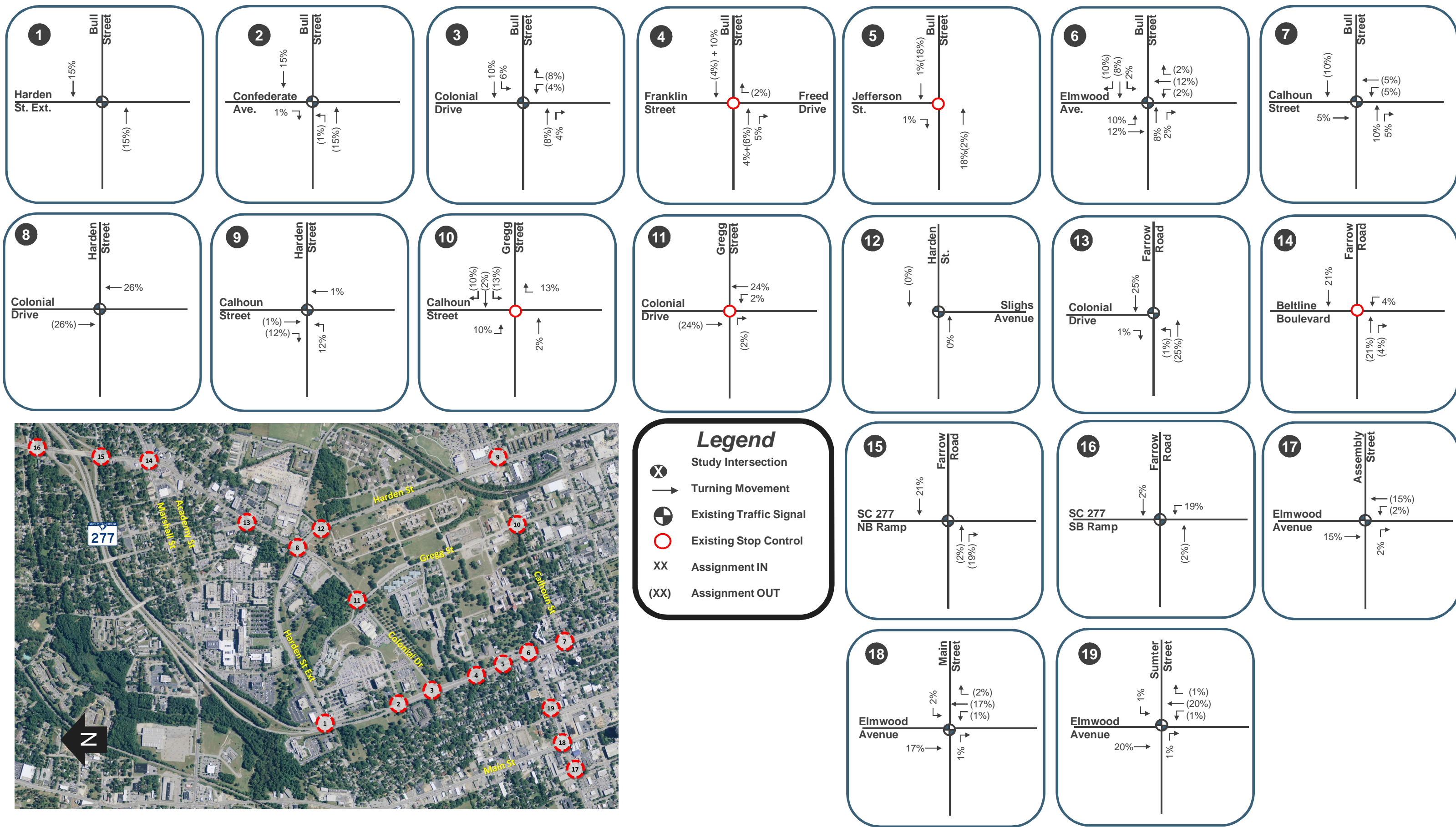
BullStreet Mixed-Use Development

Figure 8 – 2016 Initial Project Development Site Traffic Assignment



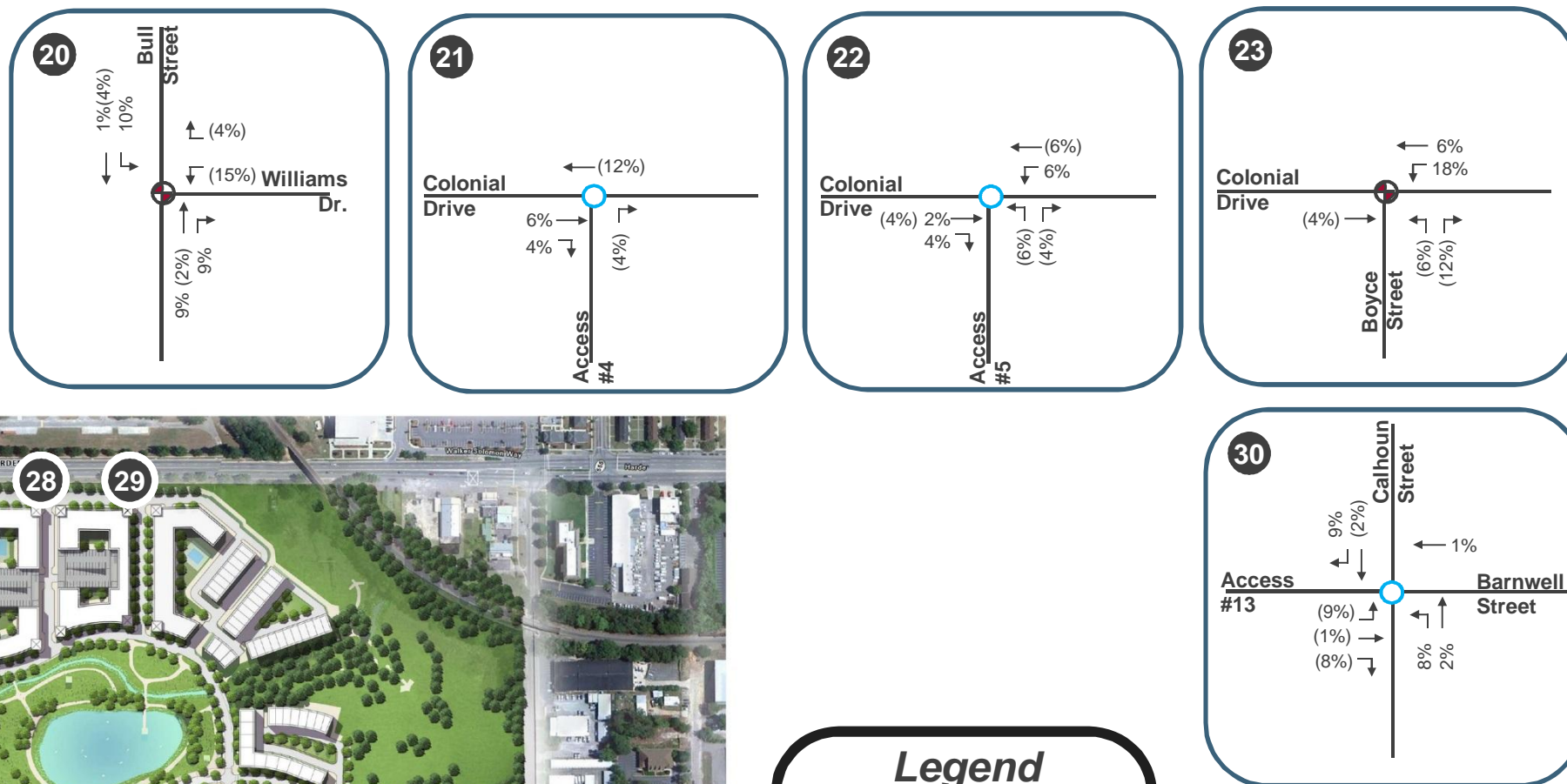
BullStreet Mixed-Use Development

Figure 9 – 2018 The Commons at BullStreet Site Traffic Assignment



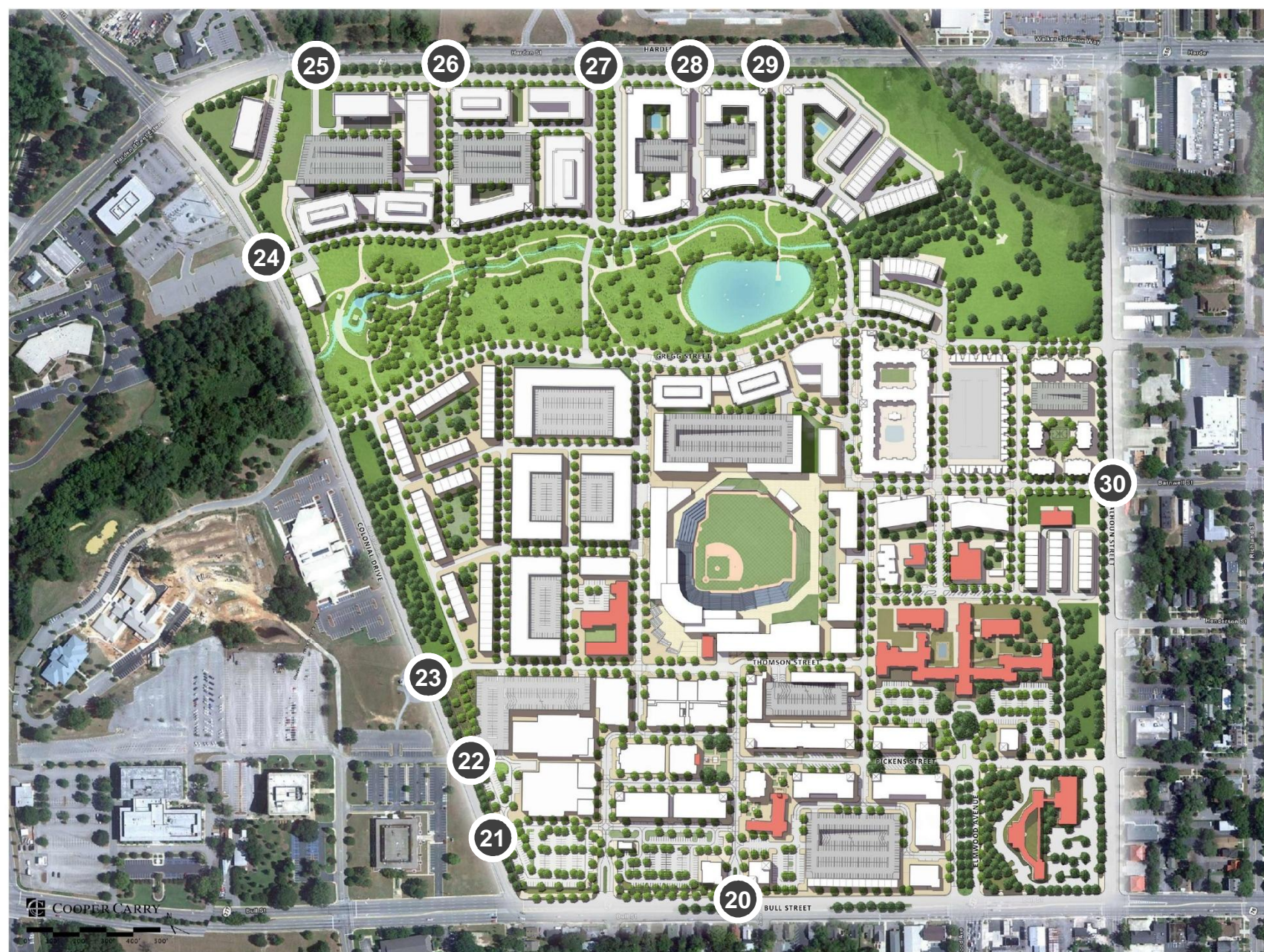
BullStreet Mixed-Use Development

Figure 9 (cont.) – 2018 The Commons at BullStreet Site Traffic Assignment at Site Driveways



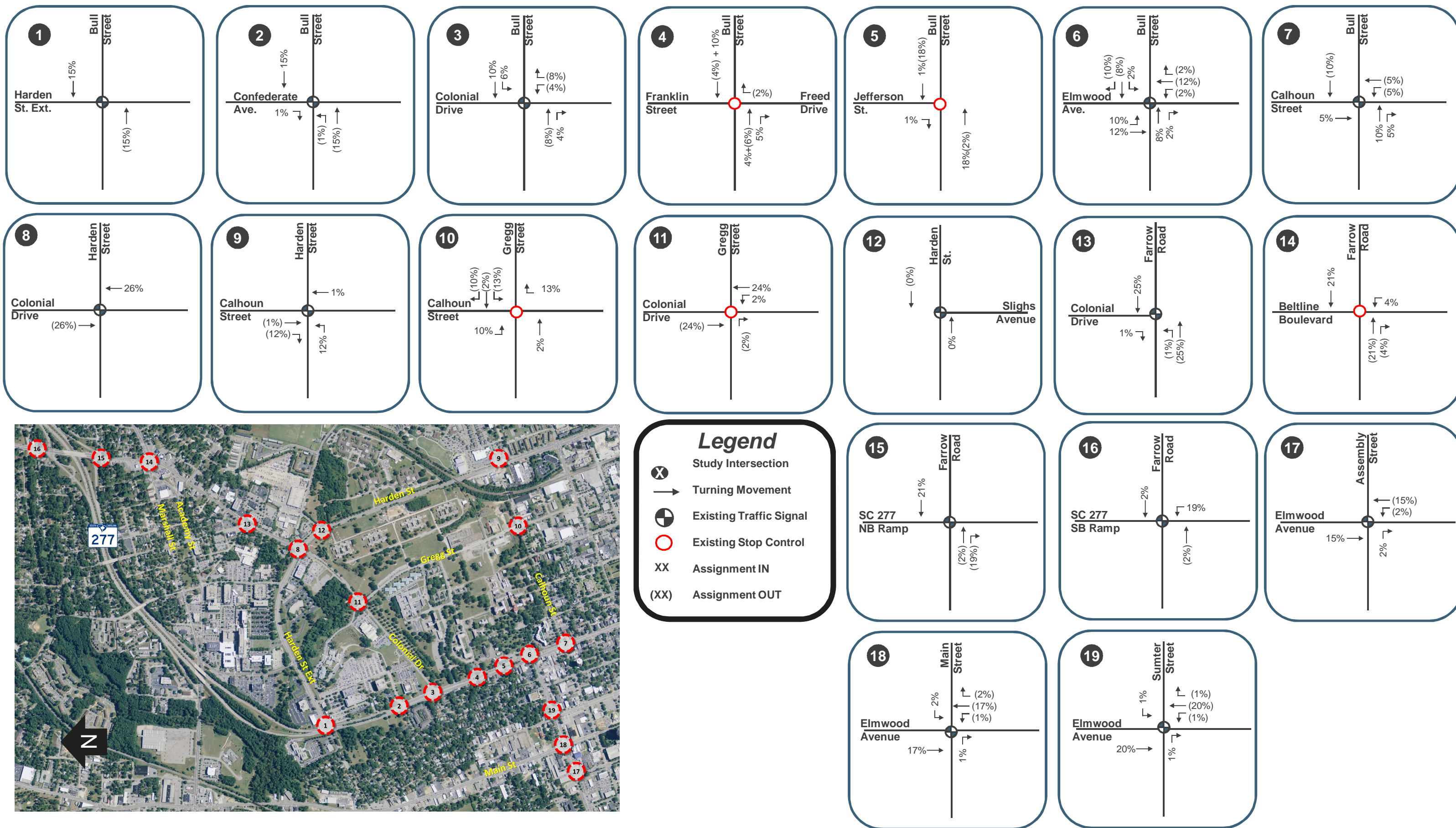
Legend

- X Study Intersection
- Turning Movement
- ⊕ Proposed Traffic Signal
- Proposed stop control
- XX Assignment IN
- (XX) Assignment OUT



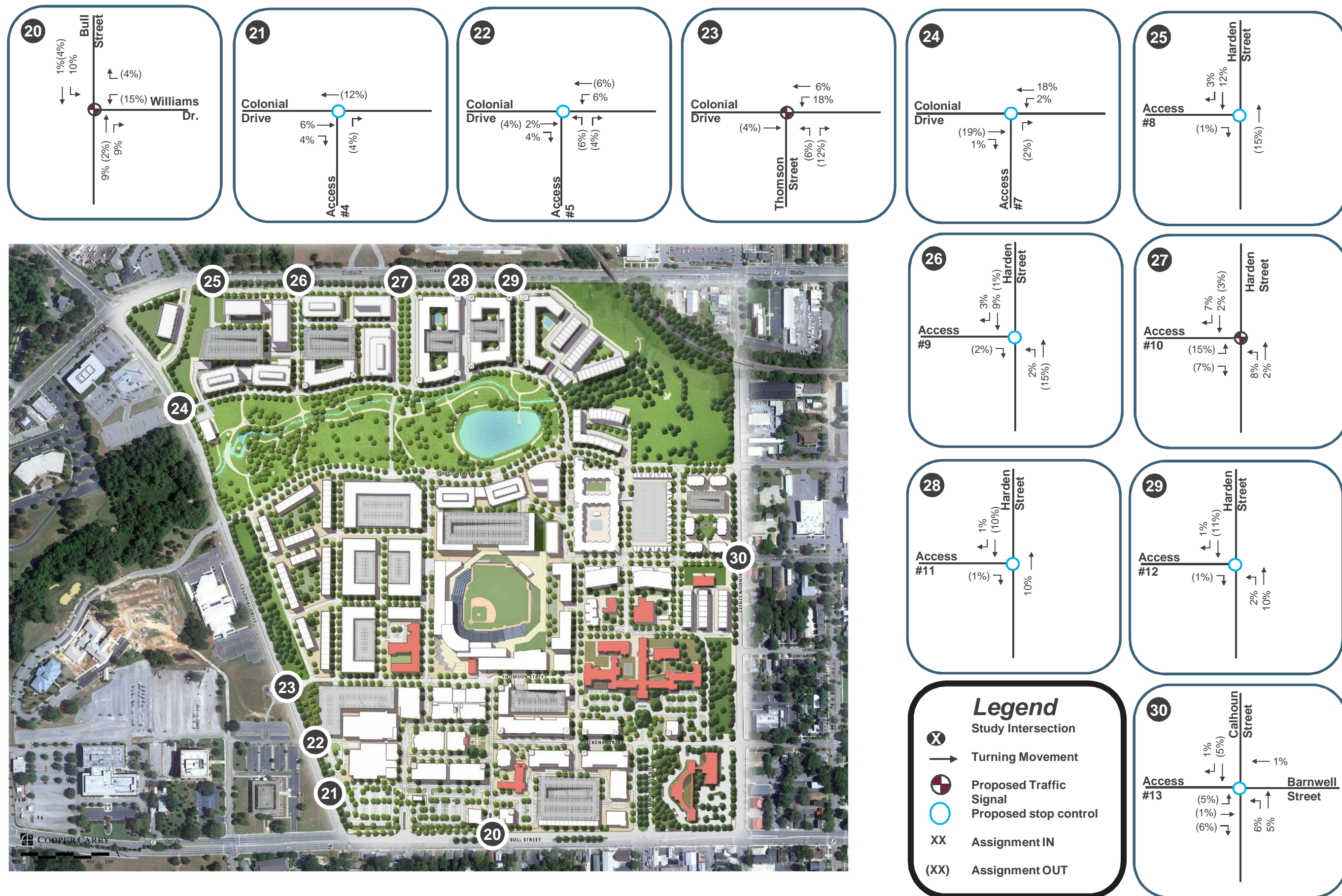
BullStreet Mixed-Use Development

Figure 10 – 2020 Potential Project Buildout Site Traffic Assignment



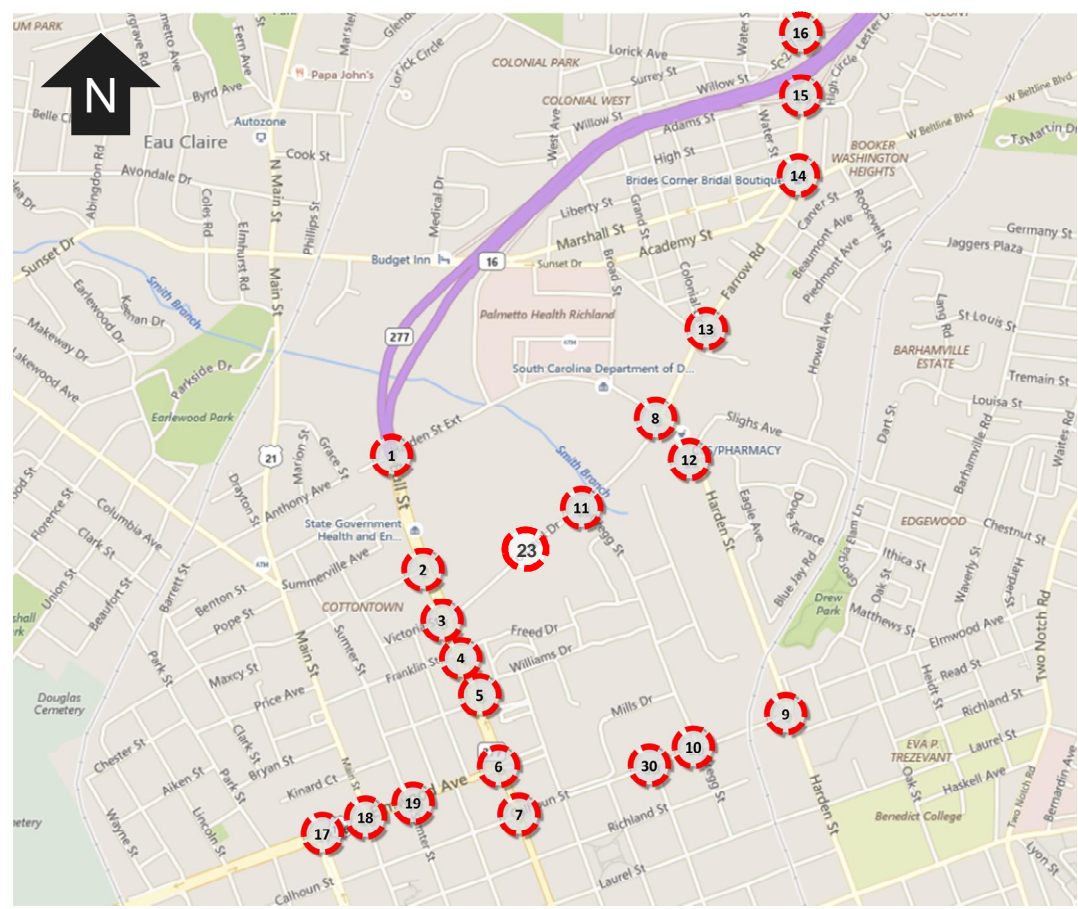
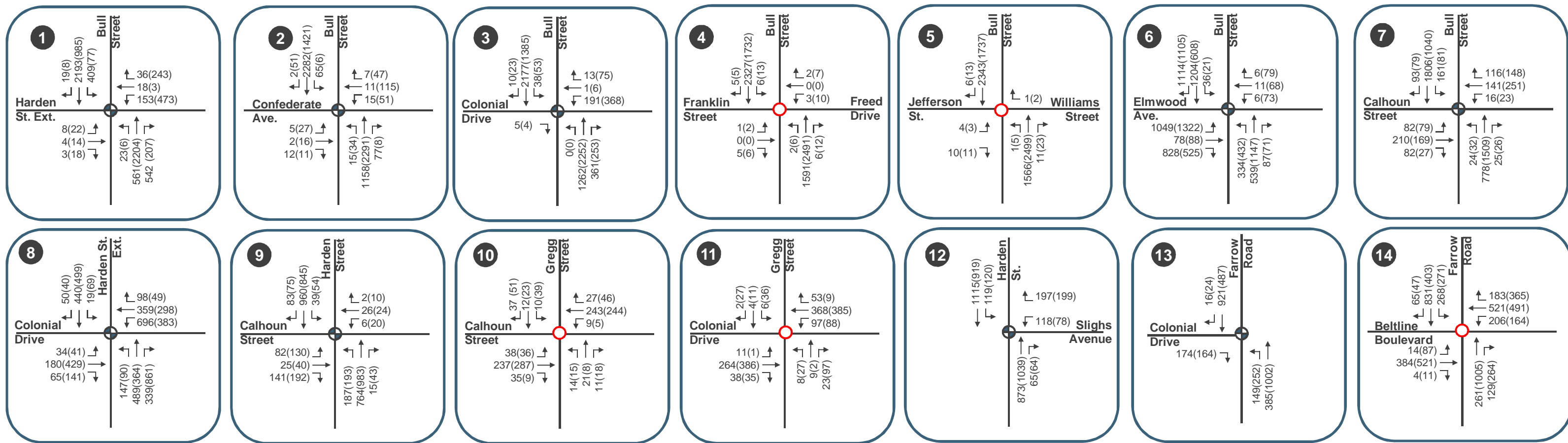
BullStreet Mixed-Use Development

Figure 10 (cont.) – 2020 Potential Project Buildout Site Traffic Assignment at Site Driveways



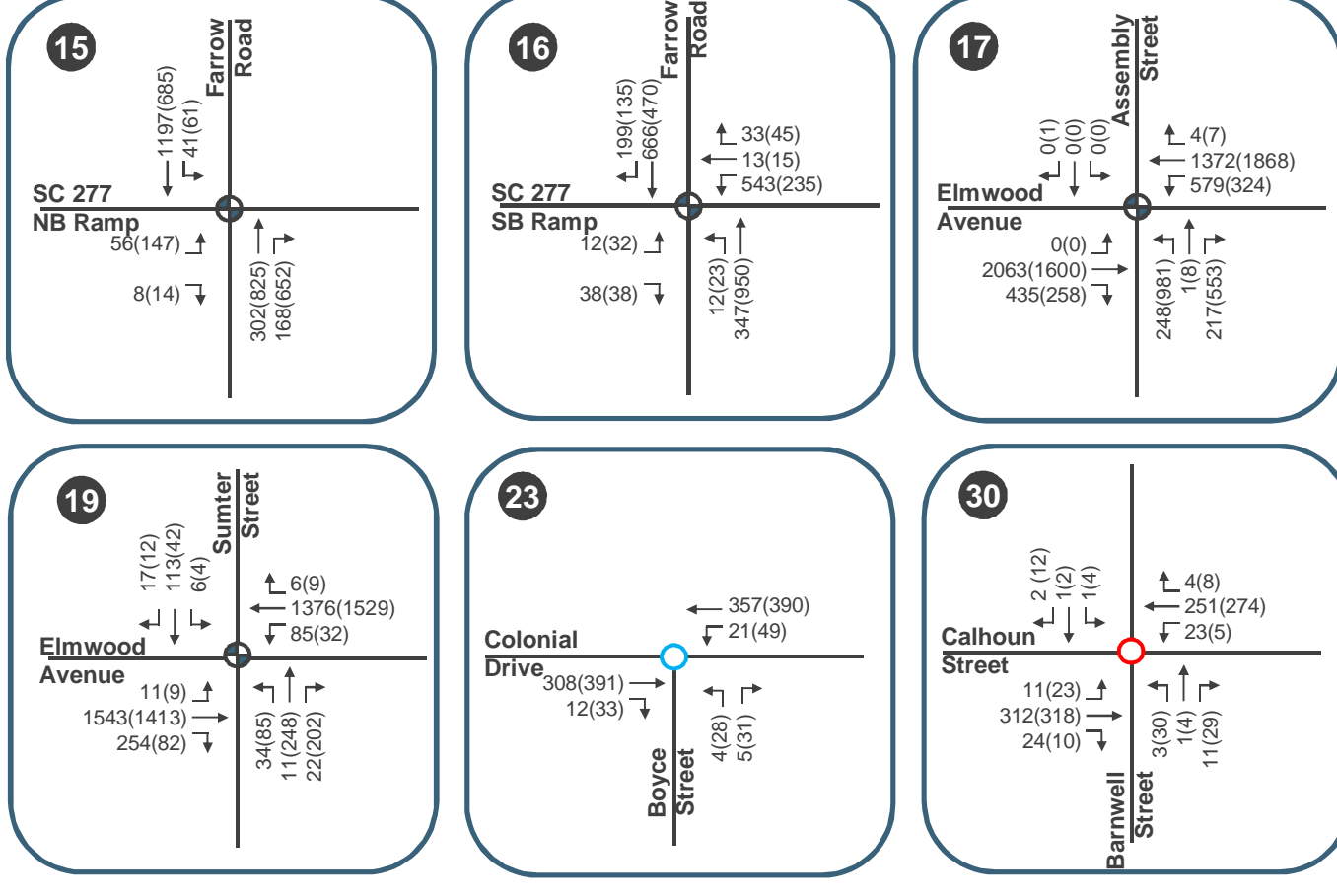
BullStreet Mixed-Use Development

Figure 11 – 2016 Initial Project Development Build-Out Traffic Volumes



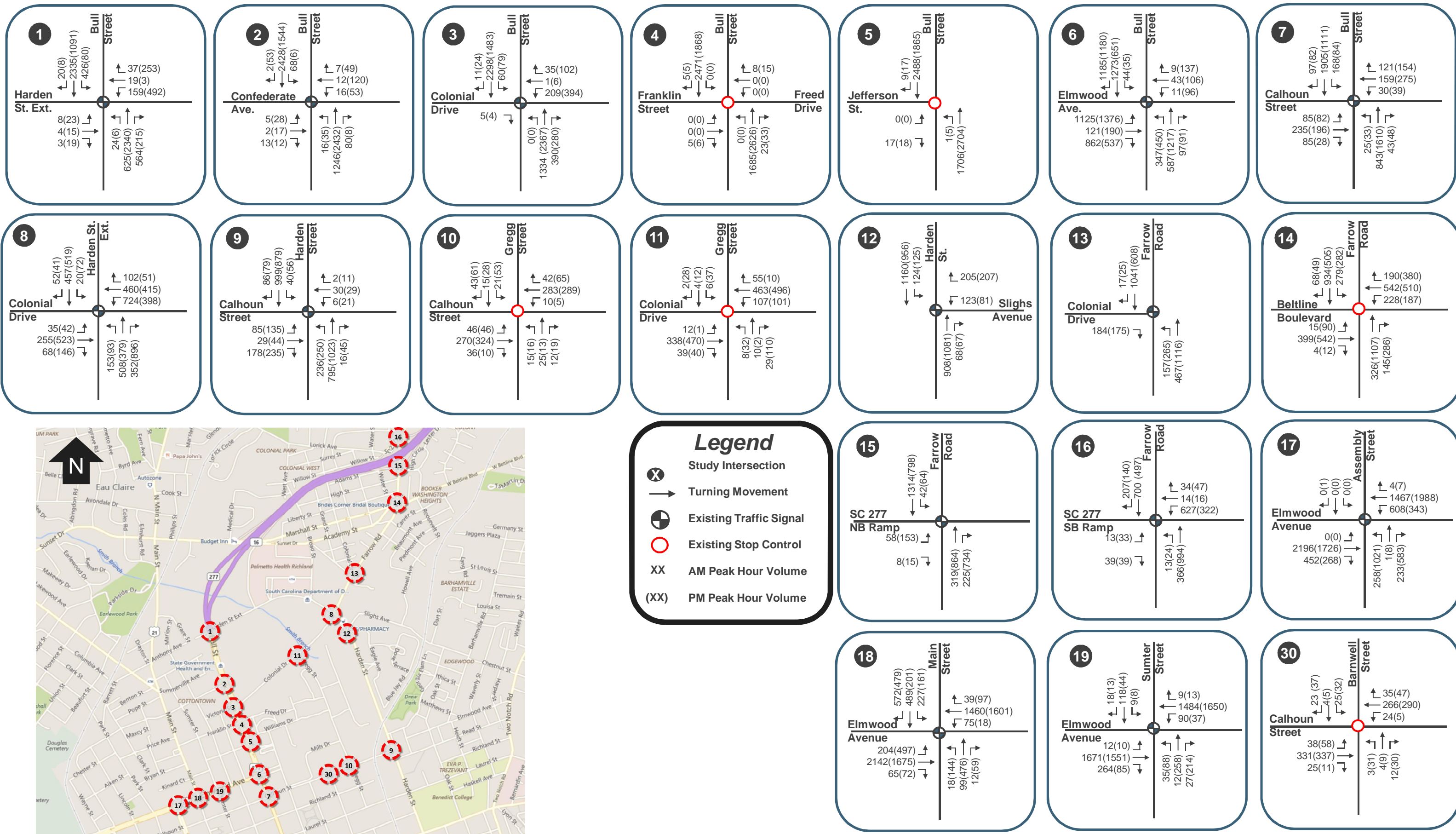
Legend

- X Study Intersection
- Turning Movement
- ⬇ Existing Traffic Signal
- Existing Stop Control
- XX AM Peak Hour Volume
- (XX) PM Peak Hour Volume



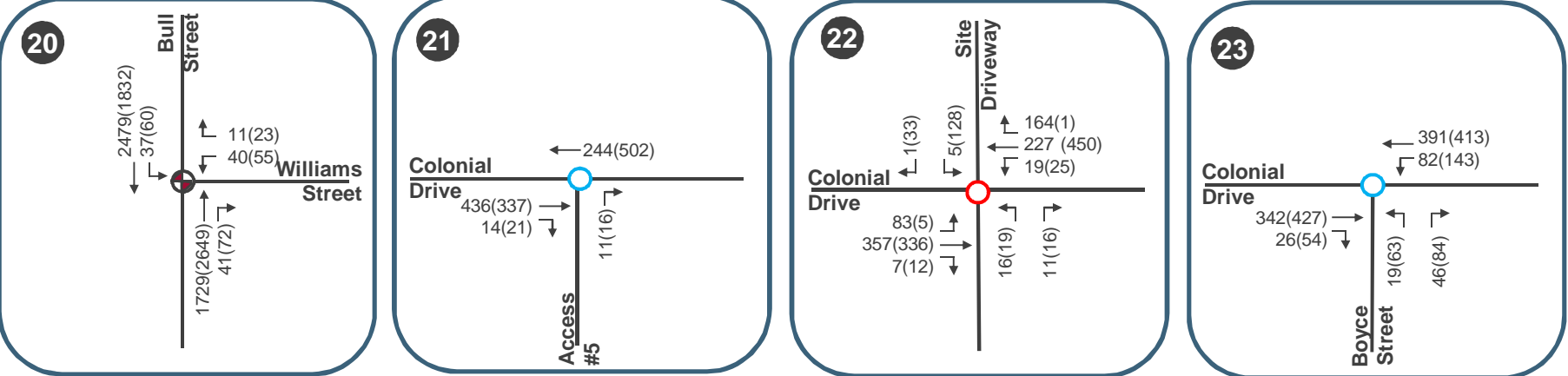
BullStreet Mixed-Use Development

Figure 12 – 2018 The Commons at BullStreet Build-Out Traffic Volumes



BullStreet Mixed-Use Development

Figure 12 (cont.) – 2018 The Commons at BullStreet Build- Out Traffic Volumes at Site Driveways

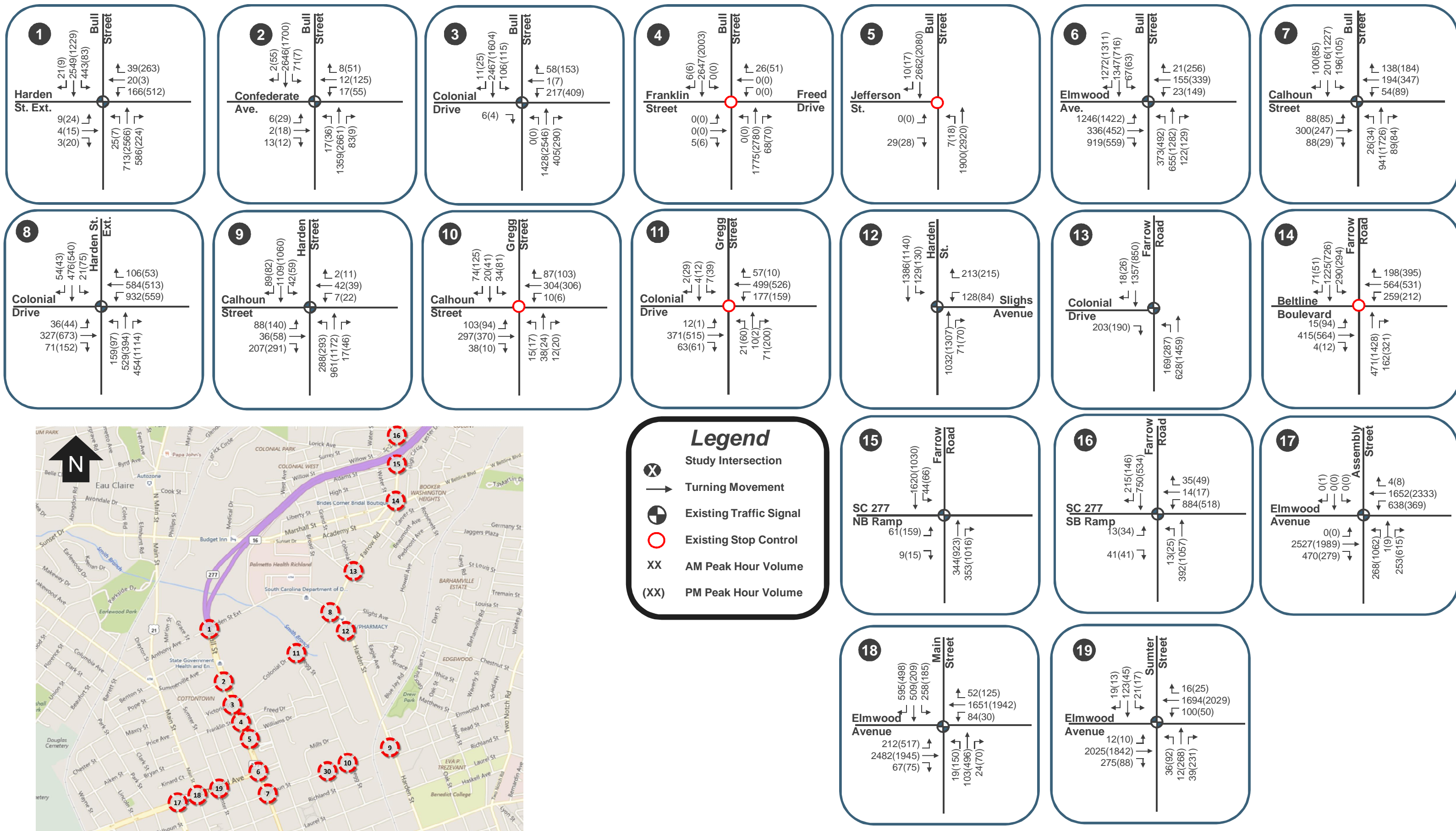


Legend

- X Study Intersection
- Turning Movement
- ⊕ Proposed Traffic Signal
- Proposed stop control
- XX AM Peak Hour Volume
- (XX) PM Peak Hour Volume

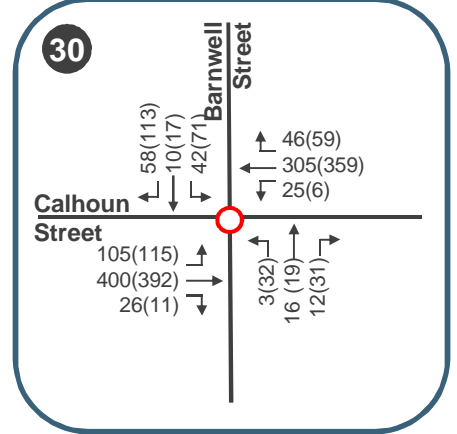
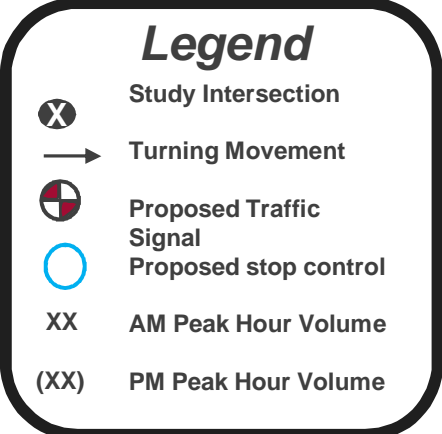
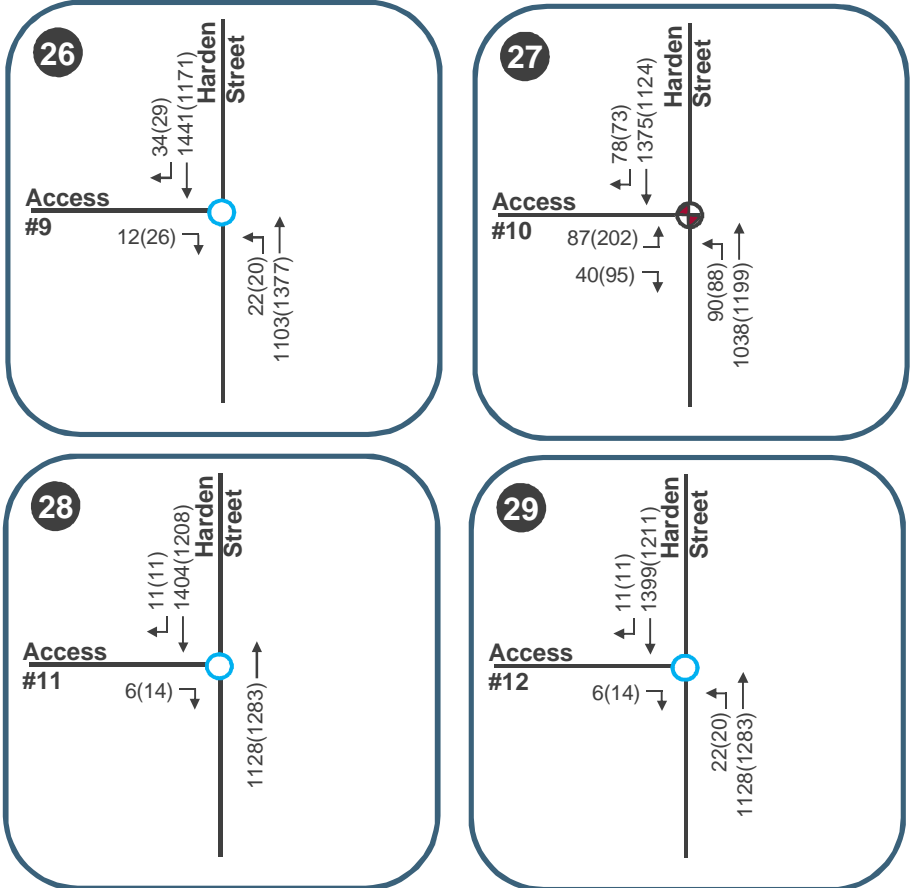
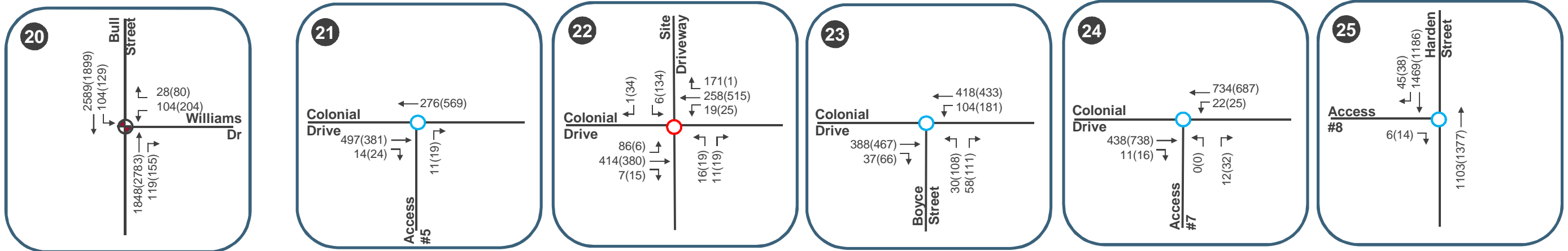
BullStreet Mixed-Use Development

Figure 13– 2020 Potential Project Build-Out Traffic Volumes



BullStreet Mixed-Use Development

Figure 13 (cont.) – 2020 Potential Project Buildout Traffic Volumes at Site Driveways



6.0 Capacity Analysis

Level-of-service determinations were made for the weekday AM and PM peak hours for the existing study network intersections and proposed access intersections using Synchro Version 9. The program uses methodologies contained in the *2000 and 2010 Highway Capacity Manual* to determine the operating characteristics of an intersection. Capacity is defined as the maximum number of vehicles that can pass over a particular road segment, or through a particular intersection, within a specified period of time under prevailing roadway, traffic, and control conditions.

Level-of-service (LOS) is used to describe the operating characteristics of a road segment or intersection in relation to its capacity. LOS is defined as a qualitative measure that describes operational conditions and motorists' perceptions of a traffic stream. The *Highway Capacity Manual* defines six levels of service, LOS A through LOS F, with A being the best and F the worst.

Levels-of-service for unsignalized intersections, with stop control on the minor street(s) only, are reported for the side street approaches. Low levels-of-service for the side street approaches are not uncommon, as vehicles may experience long delays turning onto a major roadway.

Levels-of-service for signalized intersections are reported for the intersection as a whole. One or more movements at an intersection may experience a low level-of-service, while the intersection as a whole may operate acceptably.

LOS reports generated by Synchro Version 9.1 software summarizing capacity analyses are included in the **Appendix D** and are briefly summarized for critical intersections on the following pages.

Signal timings for each of the signalized study area intersections were provided by the City of Columbia via AM and PM peak hour Synchro files. These Synchro files were used in the development of this study.

Capacity analyses were performed for the following scenarios:

- 2015 existing traffic conditions
- 2016 background traffic conditions
- 2016 build-out traffic conditions
- 2018 background traffic conditions
- 2018 build-out conditions
- 2020 background conditions
- 2020 build-out traffic conditions

Recommended storage lengths are based upon Synchro 95th queue lengths. Detailed Synchro and SimTraffic analysis results are available in **Appendix D**.

Table 5.0-A lists the LOS control delay thresholds published in the Highway Capacity Manual (HCM) for signalized intersections. Synchro Version 9 software uses the same LOS thresholds as those published in the HCM.

Table 5 A Level-of-Service Control Delay Thresholds for Signalized Intersections	
Level-of-Service	Control Delay per Vehicle [sec/veh]
A	≤ 10
B	> 10 – 20
C	> 20 – 35
D	> 35 – 55
E	> 55 – 80
F	> 80

Table 2.0-B lists the LOS control delay thresholds published in the HCM for unsignalized intersections, as well as the unsignalized operational descriptions assumed herein.

Table 5 B Level-of-Service Control Delay Thresholds for Unsignalized Intersections		
Level-of-Service	Average Control Delay per Vehicle [sec/veh]	
A	≤ 10	Short Delays
B	> 10 – 15	
C	> 15 – 25	
D	> 25 – 35	Moderate Delays
E	> 35 – 50	Long Delays
F	> 50	

6.1 STUDY AREA INTERSECTION CAPACITY RESULTS

Table 6 summarizes the overall intersection delays for each study area intersection for the 2015 existing conditions and the horizon years analyzed.

As shown in **Table 6**, the existing study area network are operating at and acceptable level of service for the AM and PM peak hour conditions except for the following intersections which operate at Level of Service (LOS) E or F if signalized or with moderate to long delays if unsignalized:

- Bull Street at Harden Street Extension (PM peak hour)
- Bull Street at Franklin Street/ Freed Drive (AM and PM peak hours)
- Bull Street at Jefferson Street (AM peak hour)
- Bull Street at Elmwood Avenue (PM Peak Hour)

These capacity issues are expected to continue at these intersections during 2016 background conditions, 2016 build-out initial project build conditions, and 2018 background conditions.

Upon built-out of The Commons at BullStreet in 2018 the following intersections are recommended to have capacity improvements due to changes in level of service between the 2018 background and 2018 build conditions:

- Bull Street at Elmwood Avenue (Node 6)
 - The intersection is projected to experience a change in LOS from D (47.0) to E (59.7) between the background and build conditions in the AM peak hour.
 - The intersection is projected to operate at LOS F for both the background and build conditions in the PM peak hour.
 - With the recommended laneage improvements in place the intersection is projected to operate at LOS D (37.1 seconds of delay) in the AM peak hour and LOS D (40.2 sec) in the PM peak hour.
- Colonial Drive at Gregg Street (Node 11)
 - The intersection is projected to experience a change in LOS from C (27.4) to D (34.2) between the background and build conditions in the AM peak hour.
 - The intersection is projected to experience a change in LOS from E (38.8) to F (124.1) between the background and build conditions in the PM peak hour.
 - With the recommended laneage improvements in place the intersection is projected to operate at LOS E (37.7) in the AM peak hour and LOS F (120.0).
 - A review of peak hour side street volumes indicate that it would not meet traffic signal warrants.

Additional roadway improvements are recommended to accommodate the Commons at BullStreet development at the proposed driveways, but are not based on capacity needs.

As background growth continues to grow within the study network in combination with the projected retail, residential, and office land uses in the potential project buildout, additional capacity improvements are needed for the 2020 Build-Out. The following intersections are recommended to have capacity improvements:

- Bull Street at Elmwood Avenue (Node 6)
 - The intersection is projected to experience a change in LOS from D (43.2) to F (85.5) between the background and build conditions in the PM peak hour.
 - Additional roadway improvements are not feasible due to the presence of historic walls, monuments and lack of available right-of-way.

- Colonial Drive at Gregg Street (Node 11)
 - For the PM peak hour the side street delay is expected to increase by 925 seconds between the background and build conditions.
 - With the signalization of intersection, the intersection is projected to operate at LOS C in the AM and PM peak hours.

- Bull Street at Williams Street (Node 20)
 - The westbound approach is anticipated to experience increased congestion and queuing with the introduction of traffic associated with the projected project buildout.
 - To mitigate the increased in congestion and delay the traffic signal should be modified to allow for dual westbound left turns.

- Colonial Drive at Boyce Street (Node 23)
 - For the PM peak hour the sides street is projected to experience long delays in the 2020 buildout conditions.
 - With the signalization of the intersection, the intersections is projected to operate at LOS C in the AM and PM peak hours.

In the 2020 horizon year with buildout of the proposed BullStreet development capacity recommendations have been made based on a review of the intersection operations. A review of the simtraffic simulation files indicates the potential for future widening of Colonial Drive. As the development of the proposed BullStreet project buildout gains additional clarity, evaluation of the potential widening of Colonial Drive should be evaluated.

Detailed intersection capacity improvements are explained in **Section 7.0- Recommendations** and are shown, by phase, on Figure 14.

Table 6.0 Overall Intersection LOS for Study Area Intersections																				
Intersection	Control Type	2015 Existing		2016 Background		2016 Build-Out Phase I		2018 Background		2018 Build-Out Phase II		2018 Build-Out Phase II Improved		2020 Background		2020 Build-Out Phase III		2020 Build-Out Phase III Improved		
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
Bull St. at Harden St. Ext.	Signal	A (9.2)	F (111.8)	A (9.7)	F (80.3)	A (9.6)	F (82.9)	B (10.2)	F (103.5)	B (11.1)	F (95.4)			B (12.0)	F (109.4)	B (14.2)	F (129.7)			
Bull St. at Confederate Ave.	Signal	A (8.9)	B (17.5)	A (7.4)	C (20.3)	A (7.2)	C (25.3)	A (9.6)	C (24.0)	B (10.9)	D (48.0)			B (11.2)	E (56.6)	B (14.1)	B (18.1)			
Bull St. at Colonial Dr.	Signal	A (7.3)	A (9.6)	A (8.3)	A (10.0)	A (8.3)	B (17.9)	A (8.5)	B (12.3)	A (7.7)	C (27.3)			A (7.4)	D (53.4)	A (8.1)	E (63.6)			
Bull St. at Franklin St/ Freed Dr.	Stop*	F (106.7)	F (155.4)	F (118.9)	F (136.6)	F (111.8)	F (297.4)	F (131.6)	F (271.9)	A (9.2)	B (10.1)			A (9.3)	B (10.8)	A (9.5)	C (15.5)			
Bull St. at Jefferson St.	Stop*	F (96.4)	C (18.0)	C (24.3)	C (16.3)	F (596.6)	F (55.9)	F (774.9)	F (51.4)	B (10.0)	C (15.9)			D (25.0)	C (16.9)	D (25.9)	C (18.3)			
Bull St. at Elmwood Ave.	Signal	D (38.5)	E (65.6)	D (36.4)	E (74.3)	D (41.3)	E (76.9)	D (47.0)	F (85.0)	E (59.7)	F (100.6)	D (37.1)	D (39.6)	D (37.7)	D (45.3)	D (46.2)	F (85.9)			
Bull St. at Calhoun St.	Signal	B (12.3)	B (15.1)	B (12.7)	B (16.4)	B (12.6)	B (17.4)	B (12.9)	B (18.6)	B (13.5)	C (23.0)			B (14.2)	C (24.6)	B (15.9)	C (30.1)			
Harden St. at Colonial Dr.	Signal	C (24.6)	C (24.8)	C (23.7)	C (25.3)	C (24.0)	C (26.7)	C (24.6)	C (26.1)	C (26.0)	C (25.6)			C (26.6)	C (26.4)	C (32.2)	C (30.3)			
Harden St. at Calhoun St.	Signal	B (15.5)	B (13.1)	B (13.7)	B (11.9)	B (13.7)	B (11.8)	B (14.1)	B (12.8)	B (15.9)	B (13.8)			B (16.4)	B (15.2)	B (18.4)	B (18.7)			
Calhoun St. at Gregg St.	Stop*	B (12.0)	B (11.9)	B (12.1)	B (12.0)	B (12.2)	B (12.9)	B (12.4)	B (13.2)	B (13.2)	B (14.4)			B (13.4)	B (14.8)	C (16.6)	C (19.7)			
Colonial Dr. at Gregg St.	Stop*/Signal	C (20.9)	C (24.3)	C (21.4)	D (25.2)	D (25.6)	C (20.3)	D (27.4)	F (56.0)	E (38.6)	F (124.1)	E (36.6)	F (111.1)	E (39.5)	F (134.9)	F (75.4)	F (629.5)	C (25.4)	C (24.1)	
Harden St. at Slighs Ave.	Signal	A (6.0)	A (9.1)	A (6.6)	A (8.9)	B (15.4)	B (13.7)	B (17.3)	B (15.1)	B (17.1)	B (14.4)			B (17.9)	B (15.1)	B (14.9)	B (12.1)			
Colonial Dr. at Farrow Rd.	Signal	A (5.5)	A (5.4)	A (6.0)	A (4.3)	A (6.3)	A (4.1)	A (6.3)	A (4.5)	A (6.1)	A (4.8)			A (6.5)	A (4.9)	A (9.7)	A (5.3)			
Beltline Blvd. at Farrow Rd.	Signal	C (27.4)	D (35.1)	C (28.7)	D (38.2)	C (28.8)	D (37.9)	C (29.3)	D (39.3)	C (30.2)	D (39.2)			C (30.7)	D (41.2)	C (31.3)	D (52.1)			
Farrow Road at SC 277 NB	Signal	A (3.3)	A (9.0)	A (4.7)	A (8.0)	A (4.6)	A (8.7)	A (4.5)	A (8.9)	A (4.3)	A (8.7)			A (4.4)	A (9.1)	A (4.0)	B (11.7)			
Farrow Road at SC 277 SB	Signal	C (24.5)	B (11.0)	C (23.5)	A (9.9)	C (24.6)	B (13.3)	C (25.1)	B (13.4)	C (26.7)	B (17.7)			C (27.7)	B (18.1)	D (47.9)	C (28.6)			
Assembly St. at Elmwood Ave.	Signal	C (21.2)	C (27.4)	C (20.1)	C (28.7)	C (20.2)	C (28.9)	C (21.0)	C (31.9)	C (21.2)	C (32.3)			C (22.6)	D (35.1)	C (25.2)	D (40.9)			
Main St. at Elmwood Ave.	Signal	C (24.2)	C (28.9)	C (25.7)	C (30.7)	C (25.2)	C (30.5)	C (26.6)	C (30.8)	C (27.1)	C (28.5)			C (29.5)	C (30.4)	C (31.2)	D (40.3)			
Sumter St. at Elmwood Ave.	Signal	A (5.0)	B (12.3)	A (4.8)	B (12.4)	A (4.8)	B (12.6)	A (4.9)	B (13.3)	A (5.1)	B (12.6)			A (6.4)	B (12.4)	B (11.5)	B (16.0)			
Calhoun St. at Barnwell St.	Stop*	B (11.0)	B (11.0)	B (11.0)	B (11.0)	B (12.0)	B (12.6)	B (12.2)	B (12.8)	B (13.5)	B (14.6)			B (13.7)	B (14.9)	C (18.8)	C (23.1)			
Bull St. at Williams St./Access #3	Signal	LOS & Delay for intersection shown in intersection #5									A (6.3)	A (8.4)			A (7.6)	B (12.0)	B (14.5)	D (47.9)	B (12.8)	C (21.0)
Colonial Dr. at Access #5	Stop									B (11.4)	B (10.6)			B (11.5)	B (10.7)	B (12.0)	B (11.0)			
Colonial Dr. at Mental Health Dwy/Access #6	Stop*	C (15.3)	C (17.1)	C (15.6)	C (17.5)	C (16.0)	C (22.0)	C (16.5)	C (23.8)	C (21.0)	C (18.4)			C (22.3)	F (55.9)	C (24.6)	F (77.6)			
Colonial Dr. at Boyce Street	Stop/Signal					C (15.4)	C (20.8)	C (15.8)	C (21.7)	C (21.1)	E (46.2)			C (21.9)	E (47.0)	D (27.0)	F (162.2)	C (27.6)	C (23.0)	
Colonial Dr. at Access #7																B (12.0)	C (20.3)			
Harden St. at Access #8	Stop*															B (10.7)	B (11.1)			
Harden St. at Access #9	Stop*															B (10.6)	B (11.7)			
Harden St. at Access #10	Signal															A (9.2)	B (10.3)			
Harden St. at Access #11	Stop*															B (12.9)	B (11.1)			
Harden St. at Access #12	Stop*															B (12.7)	B (11.1)			

LOS E OPERATIONS * worst minor street approach and/or movement
LOS F OPERATIONS Stop/Signal=currently proposed stop control then signalized in the future

7.0 Recommendations

Recommendations for improvements to intersection lane geometry and operations for intersections in the study area for this TIA are summarized in the following listing. Based on the capacity analyses contained herein, the following roadway improvements are recommended to mitigate impact of the proposed development on the adjacent street network. These improvements were developed based on the existing intersection configurations and projected intersection operations while being sensitive to the surrounding land uses and neighborhoods.

Initial Project Development

- Implement a traffic management plan for events at the sports venue to manage incoming and outgoing traffic. The traffic management plan should be created such that the plan adheres to any laneage, land-use, or travel pattern changes associated with the future development of The Commons at BullStreet and the potential final buildout of the project.
- Work with the City of Columbia and the South Carolina Department of Transportation on the development of a comprehensive wayfinding signage plan to provide guidance from SC 277 and I-126 to the development.

Calhoun Street at Barnwell Street (Node 30)

- Construction of a southbound driveway connection to the intersection of Calhoun Street and Barnwell Street
- The southbound approach should accommodate a dedicated left-turn lane and a shared through/right-turn lane.
- Restripe the existing approach of Calhoun Street to provide for a dedicated left-turn lane with 150 feet of storage into the proposed development.

Bull Street at Williams Drive (Node 20)

- Opening of the existing westbound driveway to accommodate vehicular traffic ingress and egress into the development.

Bull Street at Freed Drive (Node 4)

- Opening of the existing westbound driveway to accommodate vehicular traffic ingress and egress into the development.

Colonial Drive at Gregg Street (Node 11)

- Opening of the existing northbound driveway to accommodate vehicular traffic ingress and egress into the development.

Colonial Drive at Boyce Street (Node 23)

- Opening of the existing northbound driveway to accommodate vehicular traffic ingress and egress into the development.

It is important to note that the typical traffic loading pattern for the sports venue typically occurs outside of the traditional peak hours (AM 7-9 & PM 4-6) for the adjacent roadways with games starting around 7 pm. In addition, the majority of the playing season is outside USC's typical academic calendar year with only small overlap occurring in April and the first weeks of May.

The Commons at BullStreet

Bull Street at Elmwood Avenue (Node 6)

- Convert the existing southbound right-turn lane to a channelized free flow movement from Bull Street to Elmwood Avenue.
- Install a second through lane on eastbound Elmwood Avenue.
- Install a second northbound through lane on Bull Street.
- Modify the existing signal timings, phasing and pavement markings at the intersection to accommodate the proposed geometric changes.

The additional roadway laneage at the intersection can be accommodated by:

- Utilize the available planting strip and extra wide lane width adjacent to the outside dual right-lane on the eastbound approach of Elmwood Avenue
- Shift the existing inside northbound dual left-turn lane to the west, utilizing one of the three through lanes south of Elmwood Avenue, to add an additional northbound through lane

Considering the urban environment around the intersection of Bull Street and Elmwood Avenue, existing and potential future right-of-way will be limited. With the installation of the free-flowing right-turn lane from Bull Street to Elmwood Avenue, right-of-way in the northwest corner of the intersection will be limited due to the existing Church of God which potentially could influence the design of the improvements in a manner that prevents large (WB-50, 62, 67) trucks from using the improved right-turn lane. One potential solution would be to allow trucks to turn from the outside through lane as they currently can today. This would allow them to utilize two through lanes to turn into which is not uncharacteristic of many urban intersections in the metropolitan area. A sketch of the proposed roadway improvements is attached in the Appendix.

Boyce Street at Colonial Drive (Node 23)

- Construct a westbound left-turn lane on Colonial Drive with a minimum of 150 feet of storage and an appropriate taper length.
- Construct a northbound exit driveway with dedicated left and right-turn lanes

Bull Street at Williams Street (Node 20)

- Construct a southbound left-turn lane on Bull Street with a minimum of 150 feet of storage and an appropriate taper length.
- Construct a westbound exit driveway with dedicated left and right-turn lanes.
- Installation of a traffic signal upon meeting MUTCD warrants and according to SCDOT/City of Columbia guidelines and specifications.

BullStreet at Freed Drive (Node 4)

- Conversion of the existing full movement intersection to a Right-In/Right-Out (RIRO) intersection.

Bull Street at Jefferson Street (Node 5)

- Conversion of the existing full movement intersection to a Left-Over/RIRO intersection.

Colonial Drive at Access #4 (Node 21)

- Construct a northbound exit driveway with a dedicated right-turn lane.
- Construction of a driveway on Colonial Drive to restrict left turning movements from Colonial Drive and Access #4

Colonial Drive at Department of Natural Resources Driveway/Access #5 (Node 22)

- Construct a westbound left-turn lane on Colonial Drive with a minimum of 150 feet of storage and an appropriate taper length.
- Construct a northbound exit driveway with dedicated left and shared through/right-turn lanes

With the addition of the proposed signal on Bull Street at Williams Drive and the proposed intersection improvements at Bull Street and Elmwood Avenue, updated corridor timing plans should be developed for the Bull Street corridor. The addition of the traffic signal and geometric improvements at Bull Street and Elmwood Avenue will have a positive impact on mobility through the corridor and as such signal timings should be updated.

Potential Project Buildout

Bull Street at Williams Drive (Node 20)

- Modify the westbound approach to the intersection to include a dedicated left-turn lane and a shared left/right-turn lane.
- Modify the traffic signal, phasing and pavement markings to accommodate the proposed geometric changes.

Colonial Drive at Boyce Street (Node 23)

- Installation of a traffic signal upon meeting MUTCD warrants and according to SCDOT/City of Columbia guidelines and specifications.

Colonial Drive at Access #7 (Node 24)

- Construct a northbound exit driveway with dedicated right-turn lane
- Modify the existing median on Colonial Drive to accommodate a left-turn into Access #7 with a minimum of 150 feet of storage.

Colonial Drive at Gregg Street (Node 11)

- Construction of a westbound left-turn lane on Colonial Drive with 150 feet of storage and a left-turn lane.
- Construction of an eastbound left-turn lane on Colonial Drive with 75 feet of storage.
- Installation of a traffic signal upon meeting MUTCD warrants and according to SCDOT/City of Columbia guidelines and specifications.

The current width of Gregg Street is approximately 30 feet in width. Approximately 100 feet east of the intersection with Gregg Street is a single barrel culvert for Smith Branch. Given the close proximity of the intersection to Smith Branch and the existing width of the street, the City should work with the developer to determine an interim context sensitive solution for this intersection while working to develop a long term solution for Colonial Drive and the Smith Branch culvert.

Harden Street at Access 8 (Node 25)

- Construction of a RIRO driveway with Harden Street
- Construction of a SB right-turn lane with 100 feet of storage and appropriate taper.
- Construction of a concrete island to restrict left-turns from and onto Harden Street.

Harden Street at Access 9 (Node 26)

- Construction of a Left-In/RIRO driveway with Harden Street
- Construction of a SB right-turn lane with 100 feet of storage and appropriate taper.
- Construction of a concrete island to restrict left-turns onto Harden Street.

Harden Street at Access 10 (Node 27)

- Align the proposed driveway with the existing driveway on the eastside of Harden Street
- Construction of a full movement driveway with Harden Street
- Construction of a SB right-turn lane with 100 feet of storage and appropriate taper.
- Construction of a NB left-turn lane with 150 feet of storage and appropriate taper.
- Installation of a traffic signal upon meeting MUTCD warrants and according to SCDOT/City of Columbia guidelines and specifications.

Harden Street at Access 11 (Node 28)

- Construction of a RIRO driveway with Harden Street

- Construction of a SB right-turn lane with 100 feet of storage and appropriate taper.
- Construction of a concrete island to restrict left-turns from and onto Harden Street.

Harden Street at Access 12 (Node 29)

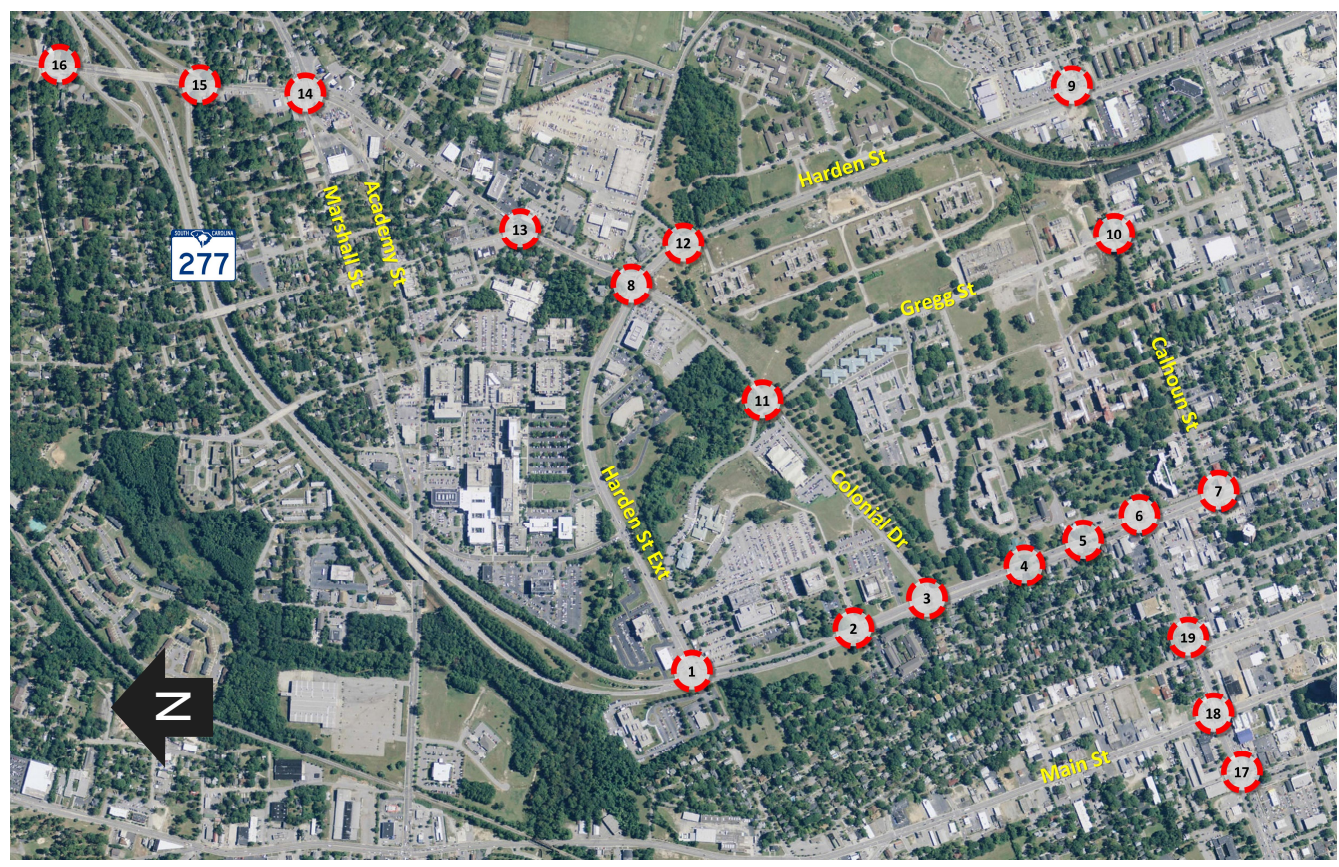
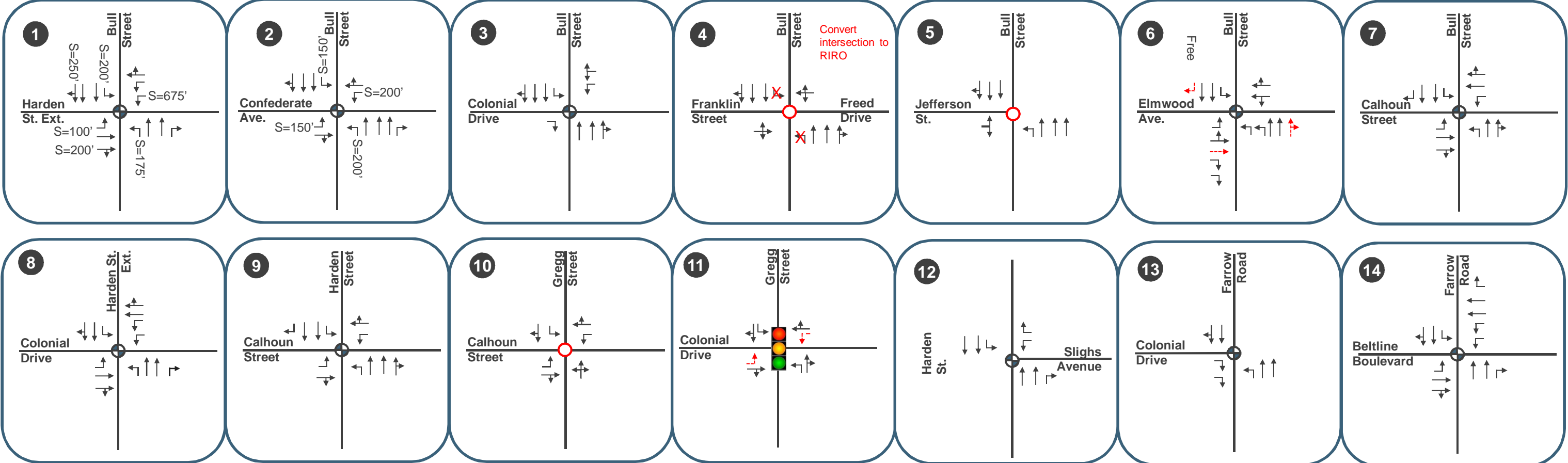
- Construction of a Left-In/RIRO driveway with Harden Street
- Construction of a SB right-turn lane with 100 feet of storage and appropriate taper.
- Construction of a concrete island to restrict left-turns onto Harden Street.

With the addition of the proposed signals on Colonial Drive and Harden Street in combination with the proposed intersection improvements for the corridors, updated corridor timing plans should be developed for the Harden Street and Colonial Drive corridors. The addition of the traffic signals and geometric improvements will have a positive impact on mobility through the corridor and as such signal timings should be updated.

The development scenario above represents a comprehensive evaluation of the proposed buildout (completion) of the BullStreet development and with any development is subject to change due to unforeseen market influencers. As the ultimate project build out occurs in phase 3, the mitigation measures presented in this TIA should be evaluated to determine if they are still applicable for the development that is ultimately constructed. Figure 14 shows the recommended laneage for the proposed development.

BullStreet Mixed-Use Development

Figure 14 – Recommended Laneage

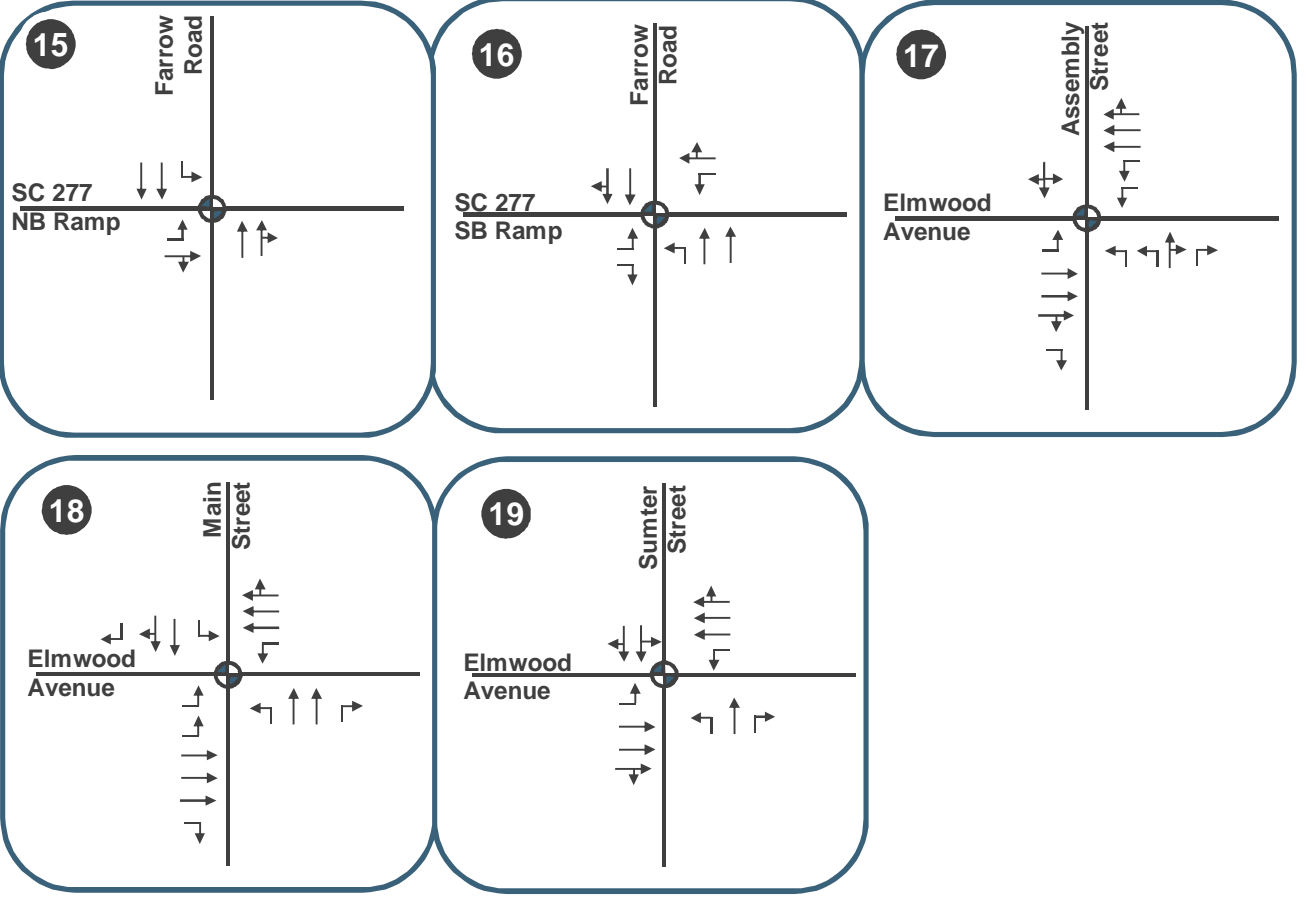


Legend

- X Study Intersection
- Existing Roadway Laneage
- Existing Traffic Signal
- Proposed Traffic Signal
- Existing Stop Control

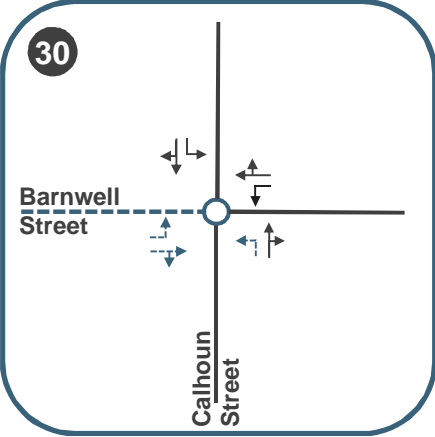
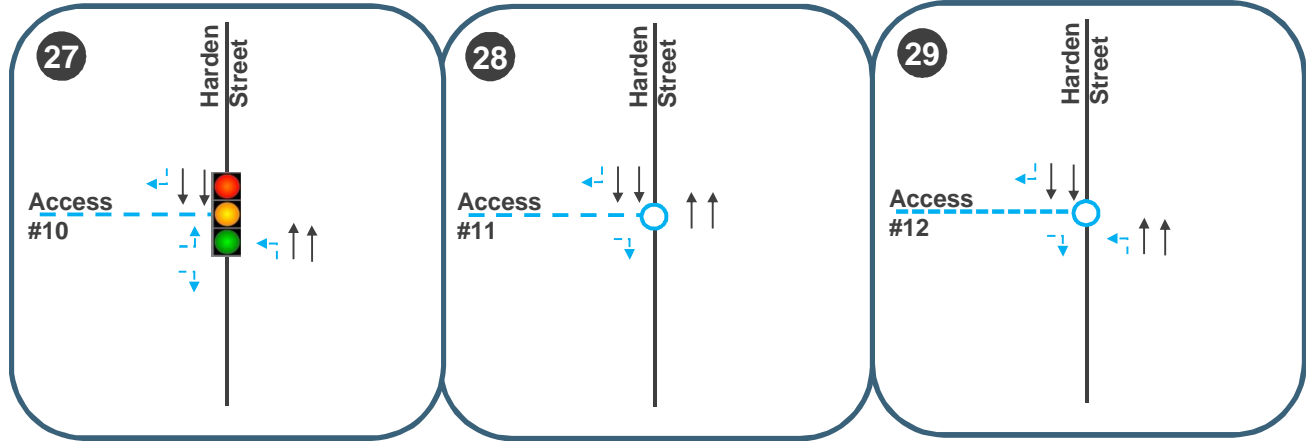
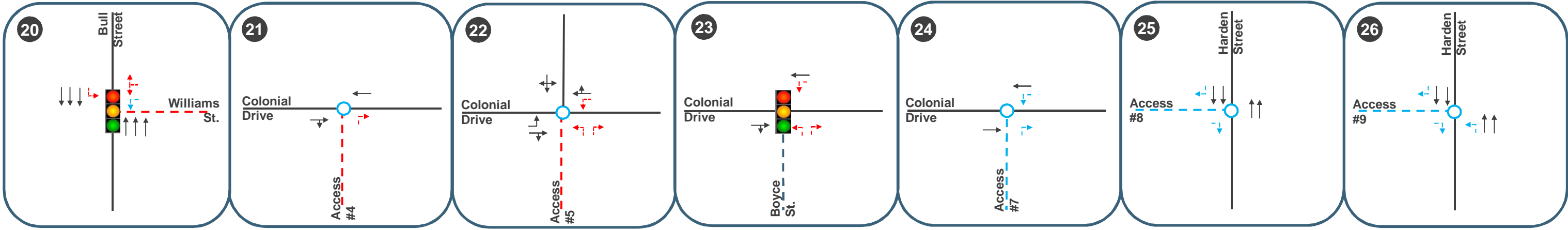
Phase Legend Improvements

- Phase 1
- Phase 2
- Phase 3



BullStreet Mixed-Use Development

Figure 14 (cont.) – Recommended Laneage at Site Driveways



Legend

- X Study Intersection
- Turning Movement
- 🚦 Proposed Traffic Signal
- Proposed stop control
- XX AM Peak Hour Volume
- (XX) PM Peak Hour Volume

Phase Legend Improvements

- Phase 1
- Phase 2
- Phase 3

TURNING MOVEMENT COUNTS

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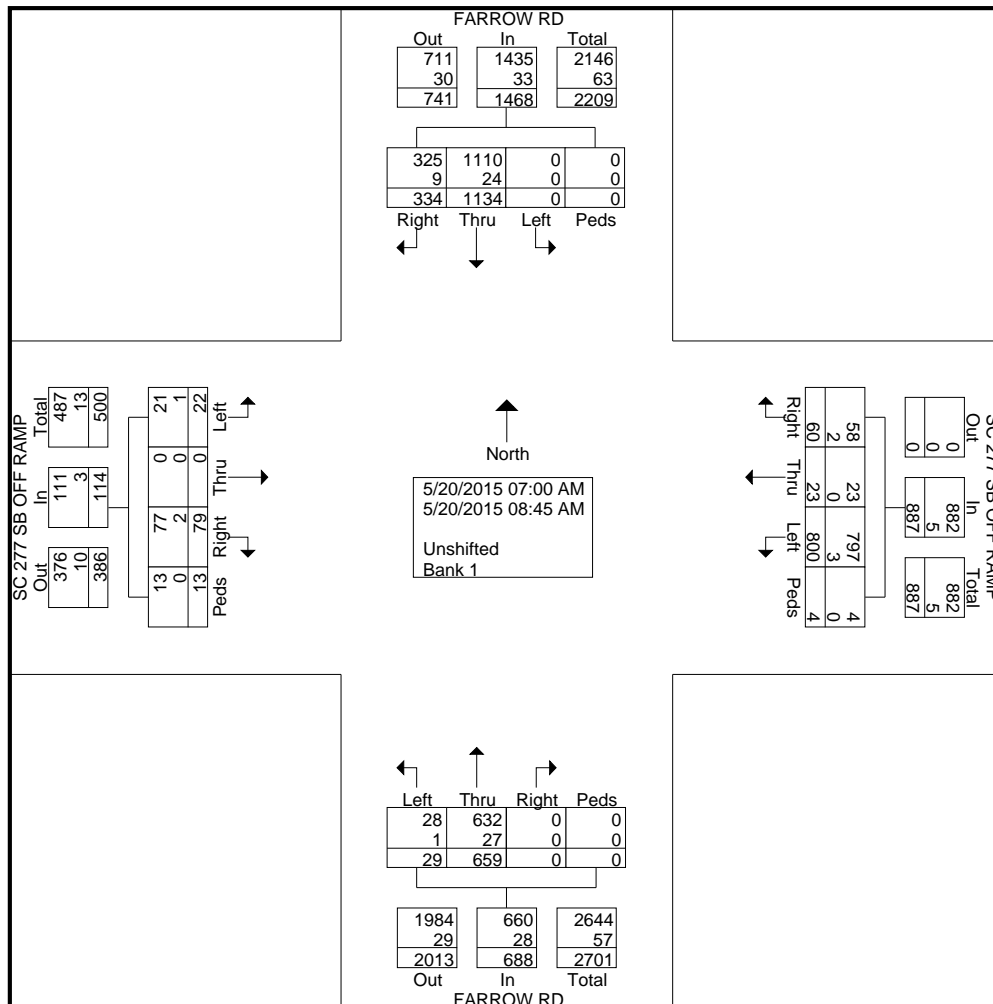
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Start Date : 5/20/2015

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07:00 AM	37	107	0	0	144	3	5	58	0	66	0	60	2	0	62	6	0	3	3	12	284
07:15 AM	36	107	0	0	143	9	2	87	1	99	0	75	5	0	80	19	0	5	0	24	346
07:30 AM	45	150	0	0	195	6	4	114	0	124	0	94	4	0	98	13	0	5	1	19	436
07:45 AM	58	165	0	0	223	12	4	129	3	148	0	91	3	0	94	10	0	3	4	17	482
Total	176	529	0	0	705	30	15	388	4	437	0	320	14	0	334	48	0	16	8	72	1548
08:00 AM	49	176	0	0	225	5	1	134	0	140	0	89	2	0	91	4	0	2	0	6	462
08:15 AM	49	172	0	0	221	10	4	120	0	134	0	74	3	0	77	11	0	2	1	14	446
08:30 AM	29	121	0	0	150	4	1	81	0	86	0	89	3	0	92	8	0	1	4	13	341
08:45 AM	31	136	0	0	167	11	2	77	0	90	0	87	7	0	94	8	0	1	0	9	360
Total	158	605	0	0	763	30	8	412	0	450	0	339	15	0	354	31	0	6	5	42	1609
Grand Total	334	1134	0	0	1468	60	23	800	4	887	0	659	29	0	688	79	0	22	13	114	3157
Apprch %	22.8	77.2	0	0		6.8	2.6	90.2	0.5		0	95.8	4.2	0		69.3	0	19.3	11.4		
Total %	10.6	35.9	0	0	46.5	1.9	0.7	25.3	0.1	28.1	0	20.9	0.9	0	21.8	2.5	0	0.7	0.4	3.6	
Unshifted	325	1110																			
% Unshifted	97.3	97.9	0	0	97.8	96.7	100	99.6	100	99.4	0	95.9	96.6	0	95.9	97.5	0	95.5	100	97.4	97.8
Bank 1	9	24	0	0	33	2	0	3	0	5	0	27	1	0	28	2	0	1	0	3	69
% Bank 1	2.7	2.1	0	0	2.2	3.3	0	0.4	0	0.6	0	4.1	3.4	0	4.1	2.5	0	4.5	0	2.6	2.2



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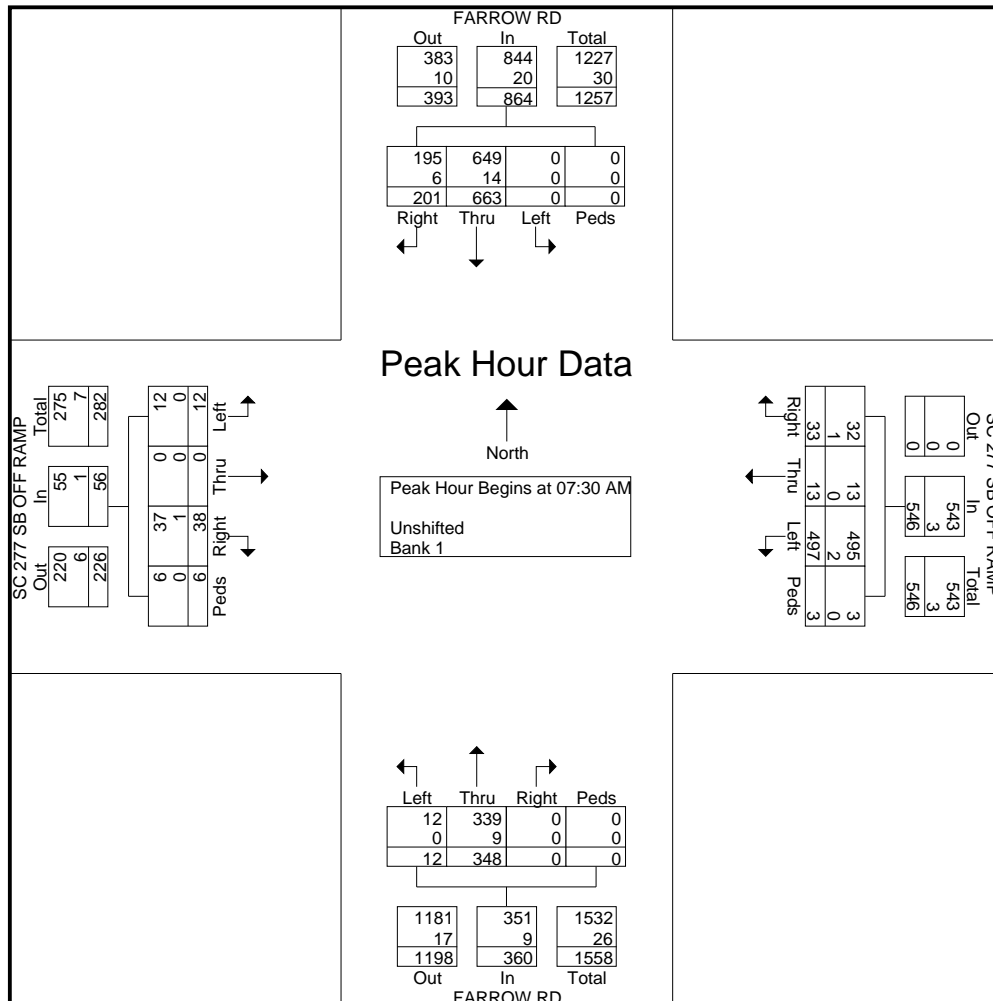
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Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:30 AM

07:30 AM	45	150	0	0	195	6	4	114	0	124	0	94	4	0	98	13	0	5	1	19	436
07:45 AM	58	165	0	0	223	12	4	129	3	148	0	91	3	0	94	10	0	3	4	17	482
08:00 AM	49	176	0	0	225	5	1	134	0	140	0	89	2	0	91	4	0	2	0	6	462
08:15 AM	49	172	0	0	221	10	4	120	0	134	0	74	3	0	77	11	0	2	1	14	446
Total Volume	201	663	0	0	864	33	13	497	3	546	0	348	12	0	360	38	0	12	6	56	1826
% App. Total	23.3	76.7	0	0		6	2.4	91	0.5		0	96.7	3.3	0		67.9	0	21.4	10.7		
PHF	.866	.942	.000	.000	.960	.688	.813	.927	.250	.922	.000	.926	.750	.000	.918	.731	.000	.600	.375	.737	.947
Unshifted	195	649	0	0	844	32	13	495	3	543	0	339	12	0	351	37	0	12	6	55	1793
% Unshifted	97.0	97.9	0	0	97.7	97.0	100	99.6	100	99.5	0	97.4	100	0	97.5	97.4	0	100	100	98.2	98.2
Bank 1	6	14	0	0	20	1	0	2	0	3	0	9	0	0	9	1	0	0	0	1	33
% Bank 1	3.0	2.1	0	0	2.3	3.0	0	0.4	0	0.5	0	2.6	0	0	2.5	2.6	0	0	0	1.8	1.8



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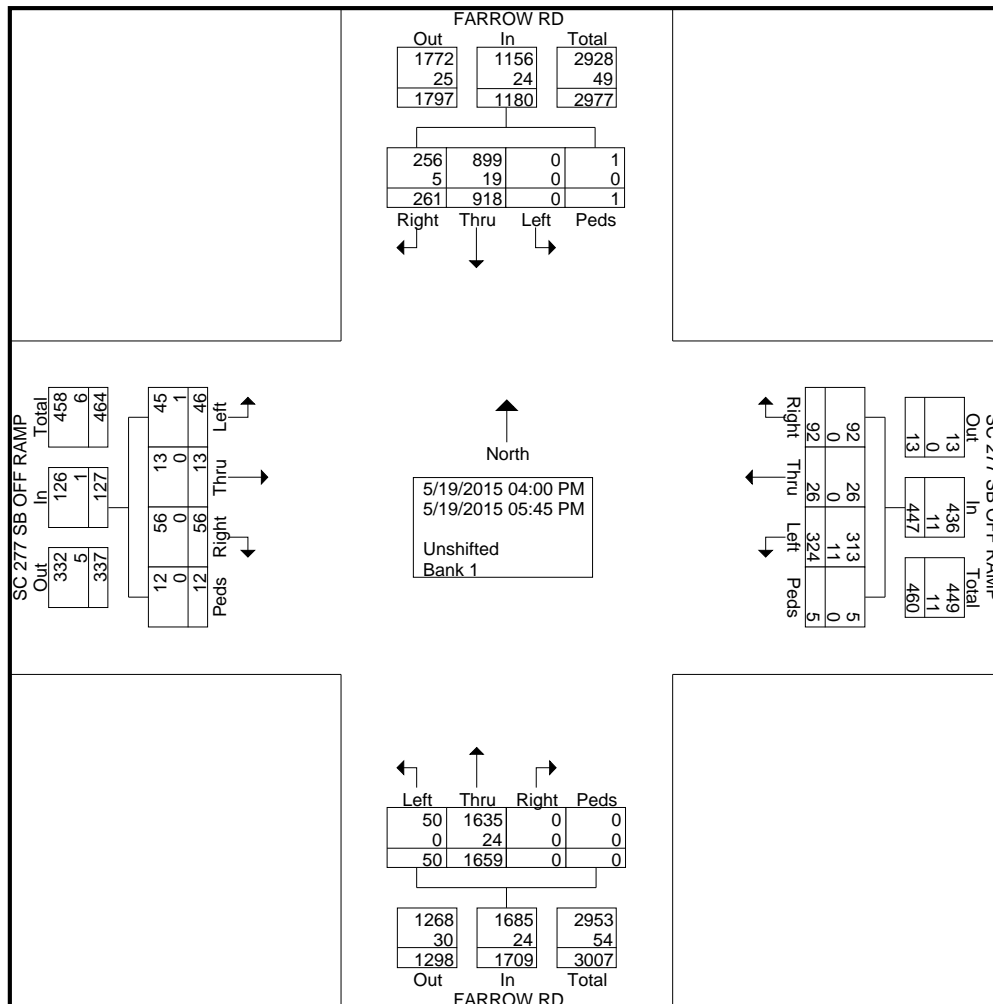
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04:15 PM	29	100	0	0	129	16	2	56	0	74	0	198	10	0	208	1	0	6	0	7	418
04:30 PM	38	136	0	0	174	10	3	46	0	59	0	188	9	0	197	8	0	9	1	18	448
04:45 PM	27	117	0	0	144	4	0	40	0	44	0	223	7	0	230	5	0	4	2	11	429
Total	131	469	0	0	600	41	9	182	3	235	0	769	28	0	797	18	0	22	5	45	1677
05:00 PM	34	101	0	0	135	8	2	46	0	56	0	220	5	0	225	5	0	6	2	13	429
05:15 PM	39	115	0	1	155	13	6	37	1	57	0	269	4	0	273	8	3	10	3	24	509
05:30 PM	32	129	0	0	161	19	7	30	0	56	0	223	7	0	230	14	7	6	0	27	474
05:45 PM	25	104	0	0	129	11	2	29	1	43	0	178	6	0	184	11	3	2	2	18	374
Total	130	449	0	1	580	51	17	142	2	212	0	890	22	0	912	38	13	24	7	82	1786
Grand Total	261	918	0	1	1180	92	26	324	5	447	0	1659	50	0	1709	56	13	46	12	127	3463
Apprch %	22.1	77.8	0	0.1		20.6	5.8	72.5	1.1		0	97.1	2.9	0		44.1	10.2	36.2	9.4		
Total %	7.5	26.5	0	0	34.1	2.7	0.8	9.4	0.1	12.9	0	47.9	1.4	0	49.4	1.6	0.4	1.3	0.3	3.7	
Unshifted	256	899	0	1	1156	92	26	313	5	436	0	1635									
% Unshifted	98.1	97.9	0	100	98	100	100	96.6	100	97.5	0	98.6	100	0	98.6	100	100	97.8	100	99.2	98.3
Bank 1	5	19	0	0	24	0	0	11	0	11	0	24	0	0	24	0	0	1	0	1	60
% Bank 1	1.9	2.1	0	0	2	0	0	3.4	0	2.5	0	1.4	0	0	1.4	0	0	2.2	0	0.8	1.7



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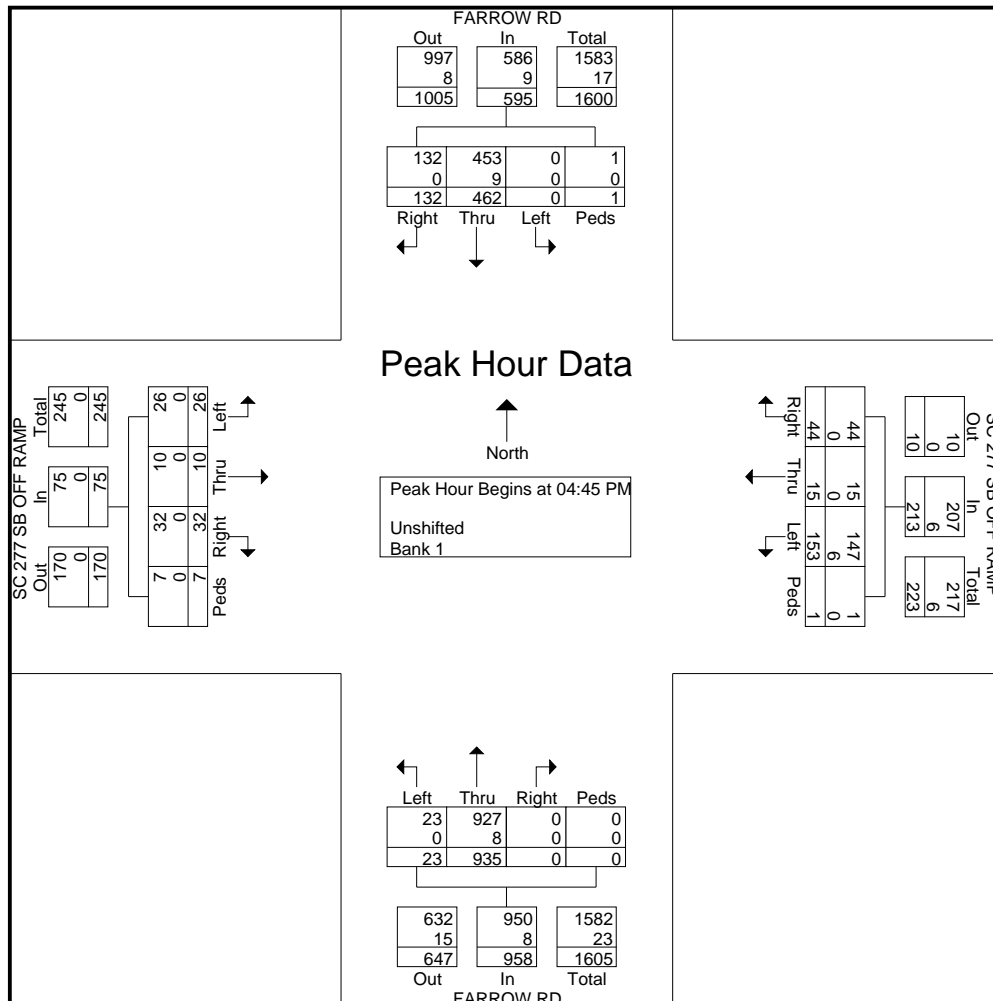
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Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:45 PM

04:45 PM	27	117	0	0	144	4	0	40	0	44	0	223	7	0	230	5	0	4	2	11	429
05:00 PM	34	101	0	0	135	8	2	46	0	56	0	220	5	0	225	5	0	6	2	13	429
05:15 PM	39	115	0	1	155	13	6	37	1	57	0	269	4	0	273	8	3	10	3	24	509
05:30 PM	32	129	0	0	161	19	7	30	0	56	0	223	7	0	230	14	7	6	0	27	474
Total Volume	132	462	0	1	595	44	15	153	1	213	0	935	23	0	958	32	10	26	7	75	1841
% App. Total	22.2	77.6	0	0.2		20.7	7	71.8	0.5		0	97.6	2.4	0		42.7	13.3	34.7	9.3		
PHF	.846	.895	.000	.250	.924	.579	.536	.832	.250	.934	.000	.869	.821	.000	.877	.571	.357	.650	.583	.694	.904
Unshifted	132	453	0	1	586	44	15	147	1	207	0	927	23	0	950	32	10	26	7	75	1818
% Unshifted		98.1	0	100	98.5	100	100	96.1	100	97.2	0	99.1	100	0	99.2	100	100	100	100	100	98.8
Bank 1	0	9	0	0	9	0	0	6	0	6	0	8	0	0	8	0	0	0	0	0	23
% Bank 1	0	1.9	0	0	1.5	0	0	3.9	0	2.8	0	0.9	0	0	0.8	0	0	0	0	0	1.2



All Traffic Data Services, Inc.

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File Name : #229 FARROW&277NBRAMPSAM

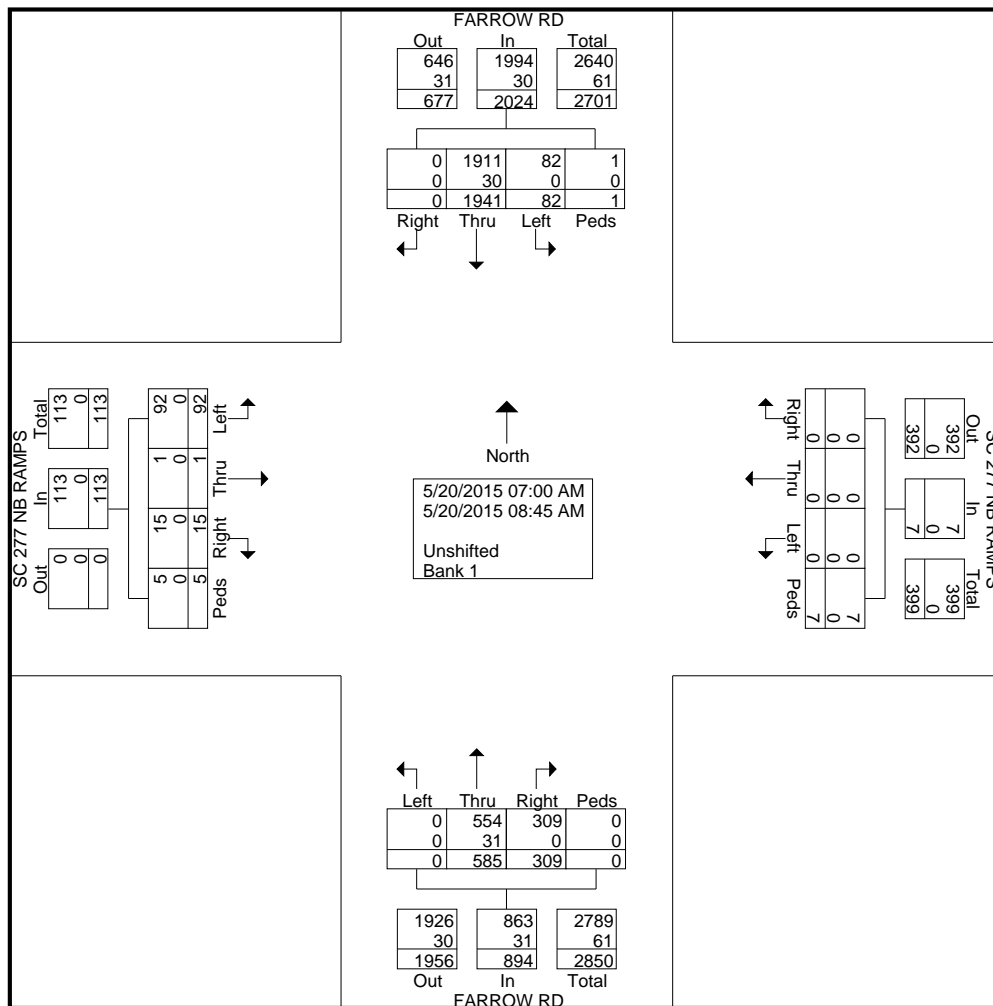
Site Code : 229

Start Date : 5/20/2015

Page No : 1

Groups Printed- Unshifted - Bank 1

Start Time	FARROW RD Southbound					SC 277 NB RAMPS Westbound					FARROW RD Northbound					SC 277 NB RAMPS Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
07:00 AM	0	157	8	0	165	0	0	0	0	0	24	52	0	0	76	1	0	9	1	11	252
07:15 AM	0	205	14	0	219	0	0	0	1	1	37	70	0	0	107	3	0	9	0	12	339
07:30 AM	0	260	14	0	274	0	0	0	2	2	42	86	0	0	128	1	0	13	1	15	419
07:45 AM	0	285	9	1	295	0	0	0	3	3	38	79	0	0	117	3	0	14	1	18	433
Total	0	907	45	1	953	0	0	0	6	6	141	287	0	0	428	8	0	45	3	56	1443
08:00 AM	0	305	8	0	313	0	0	0	0	0	47	77	0	0	124	1	0	15	0	16	453
08:15 AM	0	298	9	0	307	0	0	0	0	0	30	62	0	0	92	3	0	13	2	18	417
08:30 AM	0	215	11	0	226	0	0	0	1	1	34	75	0	0	109	2	0	12	0	14	350
08:45 AM	0	216	9	0	225	0	0	0	0	0	57	84	0	0	141	1	1	7	0	9	375
Total	0	1034	37	0	1071	0	0	0	1	1	168	298	0	0	466	7	1	47	2	57	1595
Grand Total	0	1941	82	1	2024	0	0	0	7	7	309	585	0	0	894	15	1	92	5	113	3038
Apprch %	0	95.9	4.1	0		0	0	0	100		34.6	65.4	0	0		13.3	0.9	81.4	4.4		
Total %	0	63.9	2.7	0	66.6	0	0	0	0.2	0.2	10.2	19.3	0	0	29.4	0.5	0	3	0.2	3.7	
Unshifted	0	1911																			
% Unshifted	0	98.5	100	100	98.5	0	0	0	100	100	100	94.7	0	0	96.5	100	100	100	100	100	98
Bank 1	0	30	0	0	30	0	0	0	0	0	0	31	0	0	31	0	0	0	0	0	61
% Bank 1	0	1.5	0	0	1.5	0	0	0	0	0	0	5.3	0	0	3.5	0	0	0	0	0	2



All Traffic Data Services, Inc.

1336 Farmer Rd
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File Name : #229 FARROW&277NBRAMPSSAM

Site Code : 229

Start Date : 5/20/2015

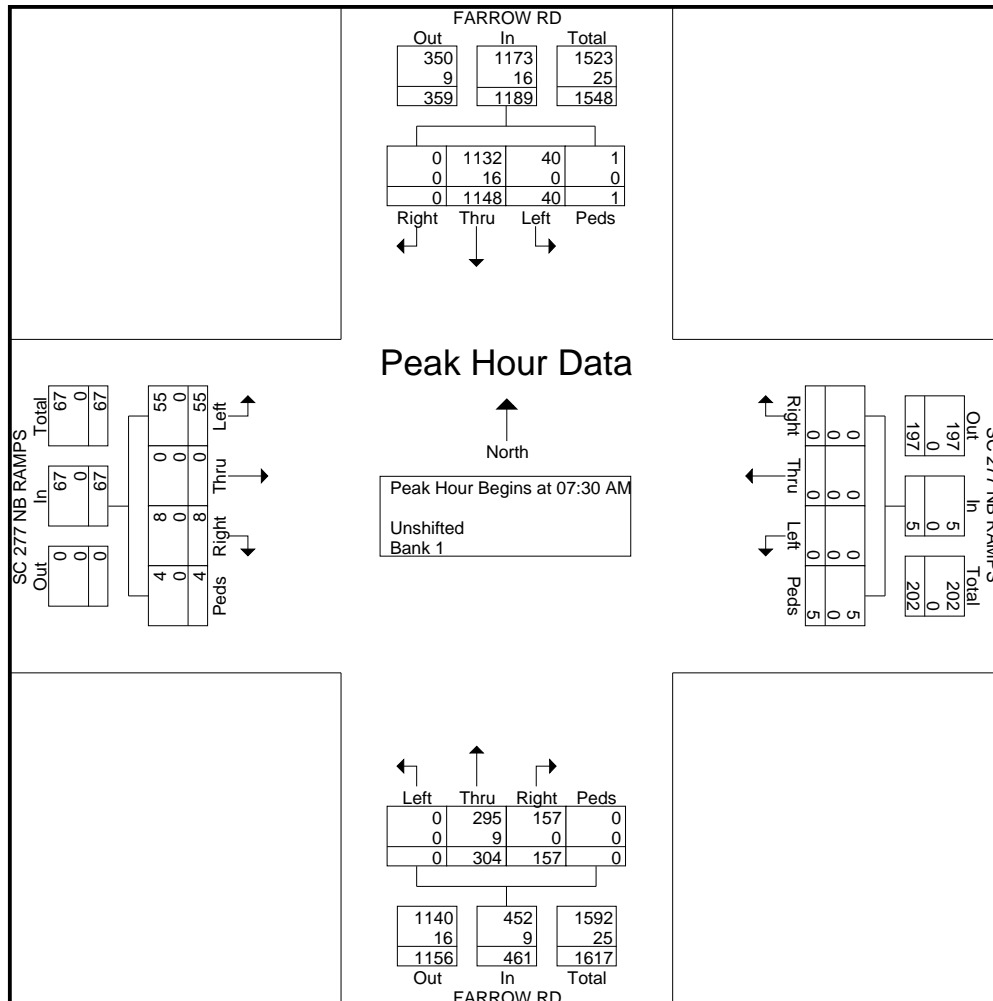
Page No : 2

Start Time	FARROW RD Southbound					SC 277 NB RAMPS Westbound					FARROW RD Northbound					SC 277 NB RAMPS Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:30 AM

07:30 AM	0	260	14	0	274	0	0	0	2	2	42	86	0	0	128	1	0	13	1	15	419
07:45 AM	0	285	9	1	295	0	0	0	3	3	38	79	0	0	117	3	0	14	1	18	433
08:00 AM	0	305	8	0	313	0	0	0	0	0	47	77	0	0	124	1	0	15	0	16	453
08:15 AM	0	298	9	0	307	0	0	0	0	0	30	62	0	0	92	3	0	13	2	18	417
Total Volume	0	1148	40	1	1189	0	0	0	5	5	157	304	0	0	461	8	0	55	4	67	1722
% App. Total	0	96.6	3.4	0.1		0	0	0	100		34.1	65.9	0	0		11.9	0	82.1	6		
PHF	.000	.941	.714	.250	.950	.000	.000	.000	.417	.417	.835	.884	.000	.000	.900	.667	.000	.917	.500	.931	.950
Unshifted	0	1132				0	0	0	100	100	100	97.0	0	0	98.0	100	0	100	100	100	98.5
% Unshifted	0	98.6	100	100	98.7																
Bank 1	0	16	0	0	16	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	25
% Bank 1	0	1.4	0	0	1.3						0	3.0	0	0	2.0	0	0	0	0	0	1.5



All Traffic Data Services, Inc.

1336 Farmer Rd
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File Name : #229 FARROW&277NBRAMPSPM

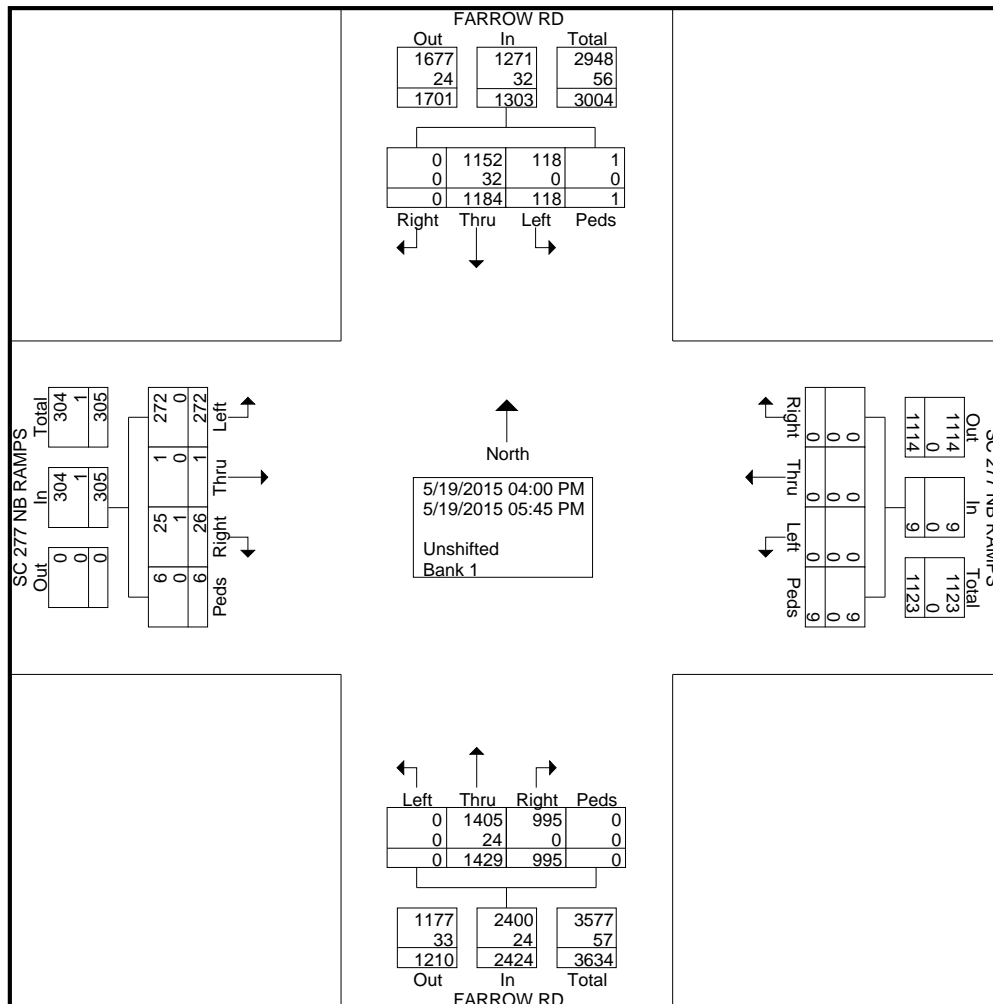
Site Code : 229

Start Date : 5/19/2015

Page No : 1

Groups Printed- Unshifted - Bank 1

Start Time	FARROW RD Southbound					SC 277 NB RAMPS Westbound					FARROW RD Northbound					SC 277 NB RAMPS Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
04:00 PM	0	142	10	0	152	0	0	0	1	1	98	140	0	0	238	2	0	25	0	27	418
04:15 PM	0	143	11	1	155	0	0	0	1	1	102	168	0	0	270	4	0	37	0	41	467
04:30 PM	0	173	20	0	193	0	0	0	1	1	120	162	0	0	282	4	0	33	1	38	514
04:45 PM	0	141	18	0	159	0	0	0	0	0	162	187	0	0	349	4	0	38	2	44	552
Total	0	599	59	1	659	0	0	0	3	3	482	657	0	0	1139	14	0	133	3	150	1951
05:00 PM	0	146	14	0	160	0	0	0	2	2	151	197	0	0	348	5	0	31	1	37	547
05:15 PM	0	148	14	0	162	0	0	0	1	1	154	233	0	0	387	3	0	46	0	49	599
05:30 PM	0	161	14	0	175	0	0	0	2	2	128	197	0	0	325	2	1	29	0	32	534
05:45 PM	0	130	17	0	147	0	0	0	1	1	80	145	0	0	225	2	0	33	2	37	410
Total	0	585	59	0	644	0	0	0	6	6	513	772	0	0	1285	12	1	139	3	155	2090
Grand Total	0	1184	118	1	1303	0	0	0	9	9	995	1429	0	0	2424	26	1	272	6	305	4041
Apprch %	0	90.9	9.1	0.1		0	0	0	100		41	59	0	0		8.5	0.3	89.2	2		
Total %	0	29.3	2.9	0	32.2	0	0	0	0.2	0.2	24.6	35.4	0	0	60	0.6	0	6.7	0.1	7.5	
Unshifted	0	1152									1405										
% Unshifted	0	97.3	100	100	97.5	0	0	0	100	100	100	98.3	0	0	99	96.2	100	100	100	99.7	98.6
Bank 1	0	32	0	0	32	0	0	0	0	0	0	24	0	0	24	1	0	0	0	1	57
% Bank 1	0	2.7	0	0	2.5	0	0	0	0	0	0	1.7	0	0	1	3.8	0	0	0	0.3	1.4



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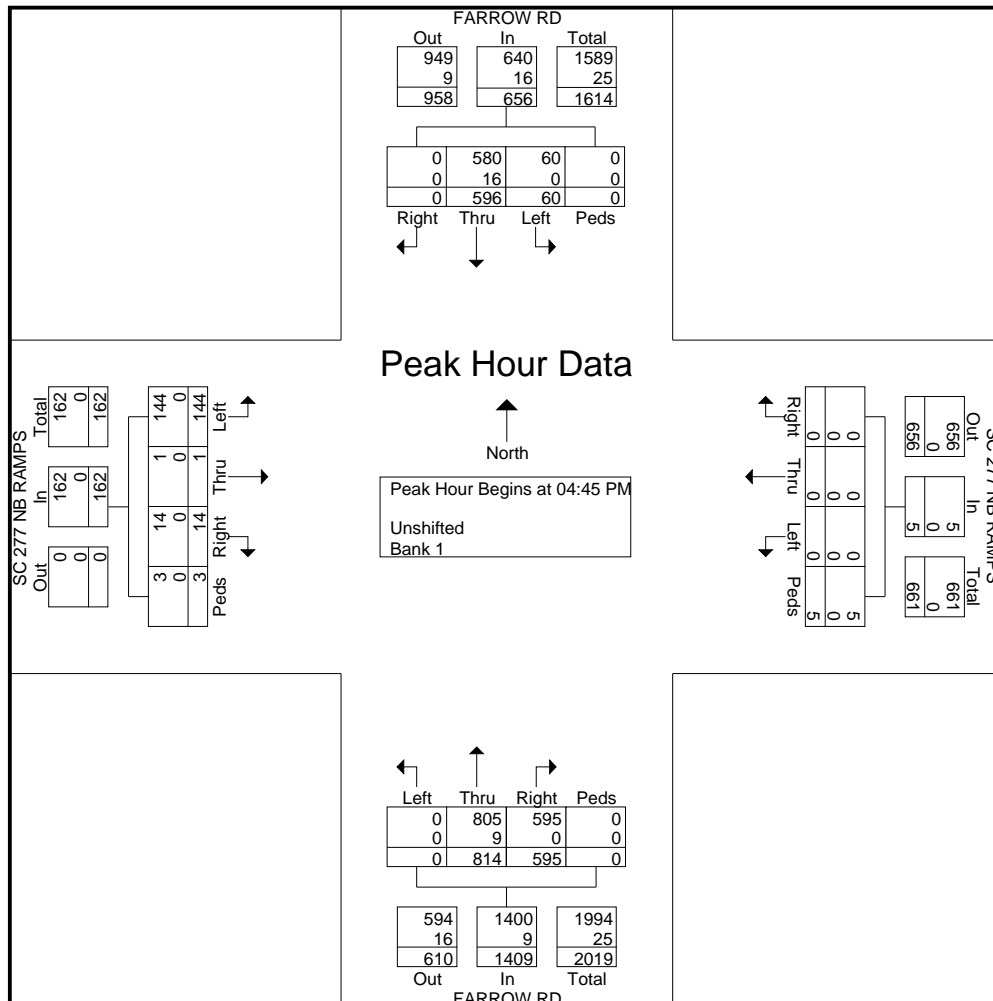
File Name : #229 FARROW&277NBRAMPSPM

Site Code : 229

Start Date : 5/19/2015

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Start Time	FARROW RD Southbound					SC 277 NB RAMPS Westbound					FARROW RD Northbound					SC 277 NB RAMPS Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	0	141	18	0	159	0	0	0	0	0	162	187	0	0	349	4	0	38	2	44	552
05:00 PM	0	146	14	0	160	0	0	0	2	2	151	197	0	0	348	5	0	31	1	37	547
05:15 PM	0	148	14	0	162	0	0	0	1	1	154	233	0	0	387	3	0	46	0	49	599
05:30 PM	0	161	14	0	175	0	0	0	2	2	128	197	0	0	325	2	1	29	0	32	534
Total Volume	0	596	60	0	656	0	0	0	5	5	595	814	0	0	1409	14	1	144	3	162	2232
% App. Total	0	90.9	9.1	0		0	0	0	100		42.2	57.8	0	0		8.6	0.6	88.9	1.9		
PHF	.000	.925	.833	.000	.937	.000	.000	.000	.625	.625	.918	.873	.000	.000	.910	.700	.250	.783	.375	.827	.932
Unshifted	0	580	60	0	640	0	0	0	5	5	595	805	0	0	1400	14	1	144	3	162	2207
% Unshifted		97.3	100	0	97.6	0	0	0	100	100	100	98.9	0	0	99.4	100	100	100	100	100	98.9
Bank 1	0	16	0	0	16	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	25
% Bank 1	0	2.7	0	0	2.4	0	0	0	0	0	0	1.1	0	0	0.6	0	0	0	0	0	1.1



All Traffic Data Services, Inc.

1336 Farmer Rd
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File Name : #230 FARROW&WESTBELTAM

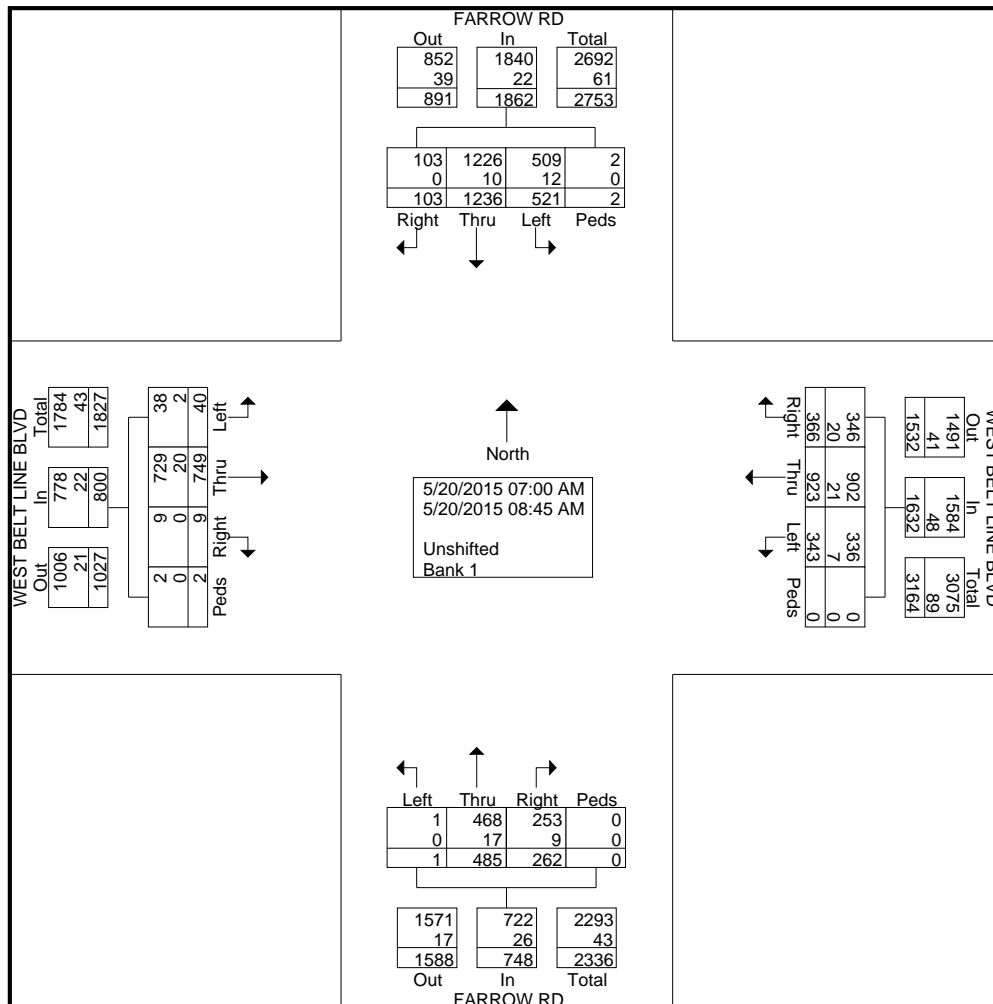
Site Code : 230

Start Date : 5/20/2015

Page No : 1

Groups Printed- Unshifted - Bank 1

Start Time	FARROW RD Southbound					WEST BELT LINE BLVD Westbound					FARROW RD Northbound					WEST BELT LINE BLVD Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
07:00 AM	7	85	67	0	159	32	80	28	0	140	27	35	0	0	62	0	68	5	1	74	435
07:15 AM	15	139	58	0	212	55	104	32	0	191	28	64	0	0	92	1	86	3	0	90	585
07:30 AM	21	176	75	0	272	49	134	34	0	217	29	60	0	0	89	2	111	4	0	117	695
07:45 AM	22	190	58	0	270	50	149	56	0	255	28	73	0	0	101	0	85	5	0	90	716
Total	65	590	258	0	913	186	467	150	0	803	112	232	0	0	344	3	350	17	1	371	2431
08:00 AM	11	199	77	1	288	47	125	52	0	224	37	63	1	0	101	1	97	4	0	102	715
08:15 AM	10	215	62	1	288	40	116	56	0	212	36	58	0	0	94	1	96	1	1	99	693
08:30 AM	9	127	50	0	186	43	121	49	0	213	37	59	0	0	96	4	117	7	0	128	623
08:45 AM	8	105	74	0	187	50	94	36	0	180	40	73	0	0	113	0	89	11	0	100	580
Total	38	646	263	2	949	180	456	193	0	829	150	253	1	0	404	6	399	23	1	429	2611
Grand Total	103	1236	521	2	1862	366	923	343	0	1632	262	485	1	0	748	9	749	40	2	800	5042
Apprch %	5.5	66.4	28	0.1		22.4	56.6	21	0		35	64.8	0.1	0		1.1	93.6	5	0.2		
Total %	2	24.5	10.3	0	36.9	7.3	18.3	6.8	0	32.4	5.2	9.6	0	0	14.8	0.2	14.9	0.8	0	15.9	
Unshifted	103	1226																			
% Unshifted	100	99.2	97.7	100	98.8	94.5	97.7	98	0	97.1	96.6	96.5	100	0	96.5	100	97.3	95	100	97.2	97.7
Bank 1	0	10	12	0	22	20	21	7	0	48	9	17	0	0	26	0	20	2	0	22	118
% Bank 1	0	0.8	2.3	0	1.2	5.5	2.3	2	0	2.9	3.4	3.5	0	0	3.5	0	2.7	5	0	2.8	2.3



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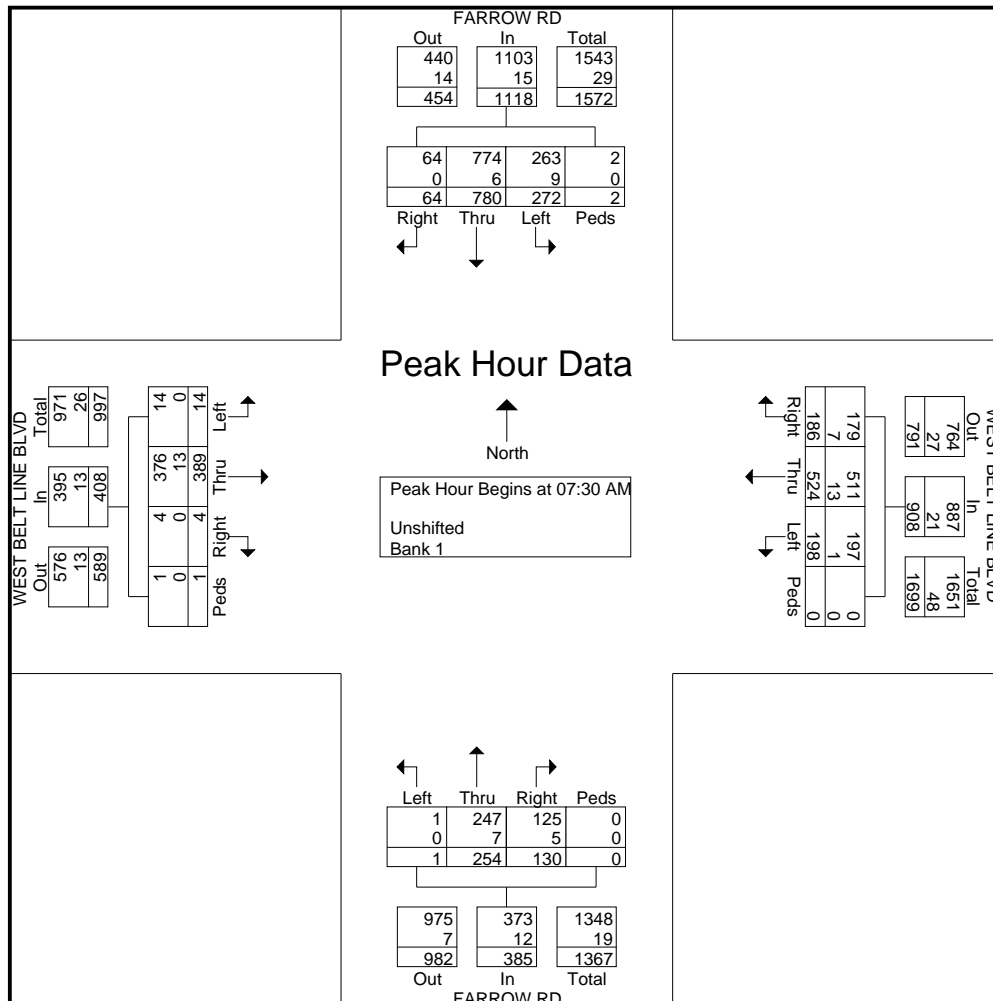
File Name : #230 FARROW&WESTBELTAM

Site Code : 230

Start Date : 5/20/2015

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Start Time	FARROW RD Southbound					WEST BELT LINE BLVD Westbound					FARROW RD Northbound					WEST BELT LINE BLVD Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	21	176	75	0	272	49	134	34	0	217	29	60	0	0	89	2	111	4	0	117	695
07:45 AM	22	190	58	0	270	50	149	56	0	255	28	73	0	0	101	0	85	5	0	90	716
08:00 AM	11	199	77	1	288	47	125	52	0	224	37	63	1	0	101	1	97	4	0	102	715
08:15 AM	10	215	62	1	288	40	116	56	0	212	36	58	0	0	94	1	96	1	1	99	693
Total Volume	64	780	272	2	1118	186	524	198	0	908	130	254	1	0	385	4	389	14	1	408	2819
% App. Total	5.7	69.8	24.3	0.2		20.5	57.7	21.8	0		33.8	66	0.3	0		1	95.3	3.4	0.2		
PHF	.727	.907	.883	.500	.970	.930	.879	.884	.000	.890	.878	.870	.250	.000	.953	.500	.876	.700	.250	.872	.984
Unshifted	64	774	263	2	1103	179	511	197	0	887	125	247	1	0	373	4	376	14	1	395	2758
% Unshifted		99.2	96.7	100	98.7	96.2	97.5	99.5	0	97.7	96.2	97.2	100	0	96.9	100	96.7	100	100	96.8	97.8
Bank 1	0	6	9	0	15	7	13	1	0	21	5	7	0	0	12	0	13	0	0	13	61
% Bank 1	0	0.8	3.3	0	1.3	3.8	2.5	0.5	0	2.3	3.8	2.8	0	0	3.1	0	3.3	0	0	3.2	2.2



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File Name : #230 FARROW&WESTBELTPM

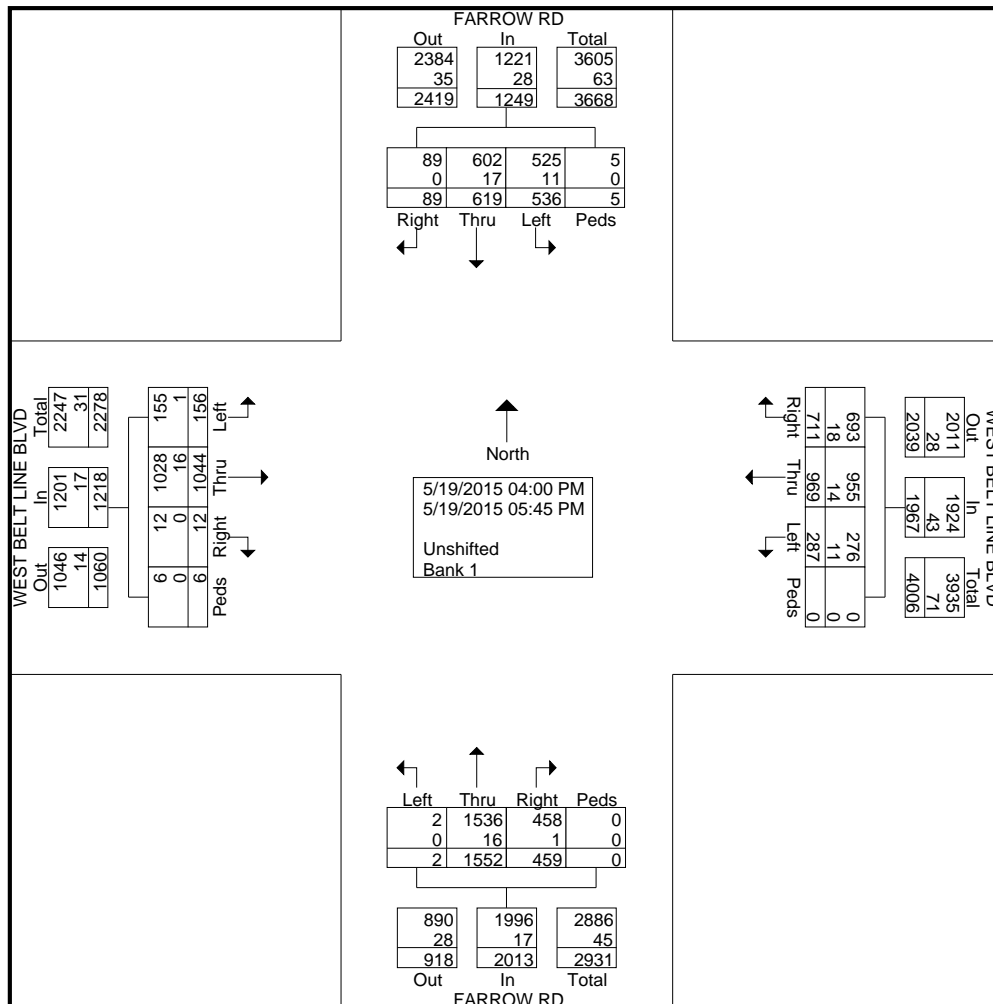
Site Code : 230

Start Date : 5/19/2015

Page No : 1

Groups Printed- Unshifted - Bank 1

Start Time	FARROW RD Southbound					WEST BELT LINE BLVD Westbound					FARROW RD Northbound					WEST BELT LINE BLVD Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
04:00 PM	12	65	70	1	148	72	136	38	0	246	62	137	2	0	201	0	149	12	1	162	757
04:15 PM	13	90	56	0	159	96	117	45	0	258	50	166	0	0	216	0	127	17	0	144	777
04:30 PM	18	93	69	1	181	77	131	39	0	247	63	210	0	0	273	1	128	20	1	150	851
04:45 PM	14	74	65	0	153	96	123	31	0	250	65	223	0	0	288	3	135	19	1	158	849
Total	57	322	260	2	641	341	507	153	0	1001	240	736	2	0	978	4	539	68	3	614	3234
05:00 PM	5	73	63	1	142	108	138	48	0	294	66	241	0	0	307	1	144	17	0	162	905
05:15 PM	9	76	73	1	159	87	96	37	0	220	58	271	0	0	329	6	112	30	0	148	856
05:30 PM	13	67	72	0	152	101	122	24	0	247	50	181	0	0	231	1	137	19	2	159	789
05:45 PM	5	81	68	1	155	74	106	25	0	205	45	123	0	0	168	0	112	22	1	135	663
Total	32	297	276	3	608	370	462	134	0	966	219	816	0	0	1035	8	505	88	3	604	3213
Grand Total	89	619	536	5	1249	711	969	287	0	1967	459	1552	2	0	2013	12	1044	156	6	1218	6447
Apprch %	7.1	49.6	42.9	0.4		36.1	49.3	14.6	0		22.8	77.1	0.1	0		1	85.7	12.8	0.5		
Total %	1.4	9.6	8.3	0.1	19.4	11	15	4.5	0	30.5	7.1	24.1	0	0	31.2	0.2	16.2	2.4	0.1	18.9	
Unshifted	89	602	525	5	1221	693	955	276	0	1924	458	1536								1028	
% Unshifted	100	97.3	97.9	100	97.8	97.5	98.6	96.2	0	97.8	99.8	99	100	0	99.2	100	98.5	99.4	100	98.6	98.4
Bank 1	0	17	11	0	28	18	14	11	0	43	1	16	0	0	17	0	16	1	0	17	105
% Bank 1	0	2.7	2.1	0	2.2	2.5	1.4	3.8	0	2.2	0.2	1	0	0	0.8	0	1.5	0.6	0	1.4	1.6



All Traffic Data Services, Inc.

1336 Farmer Rd
Conyers, GA 30012

File Name : #230 FARROW&WESTBELTPM

Site Code : 230

Start Date : 5/19/2015

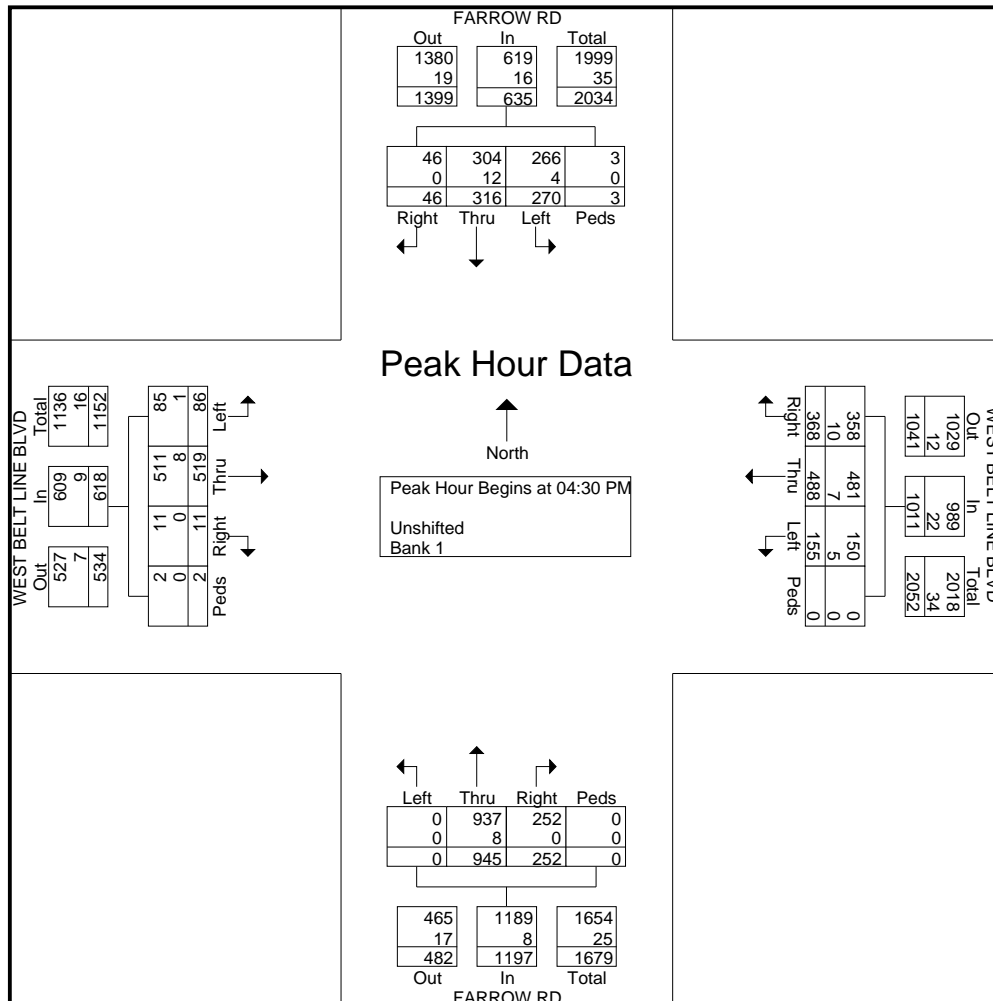
Page No : 2

Start Time	FARROW RD Southbound					WEST BELT LINE BLVD Westbound					FARROW RD Northbound					WEST BELT LINE BLVD Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:30 PM

04:30 PM	18	93	69	1	181	77	131	39	0	247	63	210	0	0	273	1	128	20	1	150	851
04:45 PM	14	74	65	0	153	96	123	31	0	250	65	223	0	0	288	3	135	19	1	158	849
05:00 PM	5	73	63	1	142	108	138	48	0	294	66	241	0	0	307	1	144	17	0	162	905
05:15 PM	9	76	73	1	159	87	96	37	0	220	58	271	0	0	329	6	112	30	0	148	856
Total Volume	46	316	270	3	635	368	488	155	0	1011	252	945	0	0	1197	11	519	86	2	618	3461
% App. Total	7.2	49.8	42.5	0.5		36.4	48.3	15.3	0		21.1	78.9	0	0		1.8	84	13.9	0.3		
PHF	.639	.849	.925	.750	.877	.852	.884	.807	.000	.860	.955	.872	.000	.000	.910	.458	.901	.717	.500	.954	.956
Unshifted	46	304	266	3	619	358	481	150	0	989	252	937	0	0	1189	11	511	85	2	609	3406
% Unshifted	96.2	96.2	98.5	100	97.5	97.3	98.6	96.8	0	97.8	100	99.2	0	0	99.3	100	98.5	98.8	100	98.5	98.4
Bank 1	0	12	4	0	16	10	7	5	0	22	0	8	0	0	8	0	8	1	0	9	55
% Bank 1	0	3.8	1.5	0	2.5	2.7	1.4	3.2	0	2.2	0	0.8	0	0	0.7	0	1.5	1.2	0	1.5	1.6



SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: **Richland** City: **Columbia** Date: **5/6/2015**

Major Rt: **Elmwood Ave** Minor Rt: **Assembly St**
* Not on State System * Not on State System

Day of Week: **Wednesday** Weather: **Clear** Office: **Short Counts** **JMS**

Type of Control: **Signal** Speed Limit (major st) **45**

Direction of Minor Street: **N-S** Intersection ADT - **53750** (Calc)

Number of Lanes (major st)* **3** Number of Lanes (minor st)* **3**
* Each Direction

INTERSECTION VOLUME SUMMARY

	From N Assembly St				From S Assembly St				From E Elmwood Ave				From W Elmwood Ave				Total Vol	Total Peds
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT		
7:00 - 7:15	0	0	0	0	40	0	27	67	84	226	0	310	0	411	68	479	856	9
7:15 - 7:30	0	0	0	0	46	0	41	87	121	298	2	421	0	475	112	587	1095	12
7:30 - 7:45	0	0	0	0	48	1	47	96	128	324	1	453	0	492	101	593	1142	8
7:45 - 8:00	0	0	0	0	66	0	50	116	137	339	0	476	0	509	92	601	1193	8
8:00 - 8:15	0	0	0	0	64	0	61	125	147	325	2	474	0	498	112	610	1209	2
8:15 - 8:30	0	0	0	0	65	0	51	116	155	350	1	506	0	493	121	614	1236	2
8:30 - 8:45	0	0	0	0	63	0	50	113	143	325	1	469	0	454	105	559	1141	16
8:45 - 9:00	0	0	0	0	85	0	47	132	129	303	1	433	0	430	91	521	1086	10
11:00 - 11:15	0	0	0	0	88	1	64	153	77	342	1	420	0	356	61	417	990	1
11:15 - 11:30	0	0	0	0	104	0	71	175	74	296	4	374	0	348	59	407	956	6
11:30 - 11:45	0	0	0	0	88	1	81	170	80	361	1	442	0	391	57	448	1060	2
11:45 - 12:00	0	0	0	0	132	1	75	208	95	365	2	462	0	333	64	397	1067	2
12:00 - 12:15	1	0	1	2	128	1	94	223	91	336	5	432	1	372	70	443	1100	6
12:15 - 12:30	0	0	2	2	149	0	69	218	78	349	1	428	0	324	63	387	1035	3
12:30 - 12:45	0	0	2	2	128	1	103	232	85	355	2	442	0	410	78	488	1164	5
12:45 - 13:00	0	0	0	0	136	0	111	247	81	330	3	414	0	378	66	444	1105	7
14:00 - 14:15	0	0	1	1	137	2	98	237	74	336	2	412	0	378	74	452	1102	5
14:15 - 14:30	0	0	1	1	124	3	106	233	65	335	3	403	0	329	48	377	1014	9
14:30 - 14:45	0	0	1	1	139	1	94	234	63	352	0	415	0	386	71	457	1107	5
14:45 - 15:00	0	0	1	1	111	5	99	215	78	365	1	444	0	375	70	445	1105	2
15:00 - 15:15	0	0	0	0	140	4	83	227	83	397	3	483	0	386	61	447	1157	4
15:15 - 15:30	0	0	1	1	146	4	91	241	72	369	1	442	0	359	57	416	1100	5
15:30 - 15:45	0	0	0	0	169	6	104	279	66	421	1	488	0	408	66	474	1241	3
15:45 - 16:00	0	0	0	0	175	2	108	285	84	395	2	481	0	352	47	399	1165	3
16:00 - 16:15	0	0	0	0	209	1	118	328	83	414	3	500	0	343	47	390	1218	8
16:15 - 16:30	0	0	0	0	199	3	110	312	71	486	0	557	0	353	57	410	1279	2
16:30 - 16:45	0	0	0	0	220	0	116	336	72	431	0	503	0	337	52	389	1228	3
16:45 - 17:00	0	0	0	0	248	5	126	379	80	487	1	568	0	365	58	423	1370	3
17:00 - 17:15	0	0	1	1	260	1	154	415	70	438	0	508	0	398	56	454	1378	3
17:15 - 17:30	0	0	0	0	217	0	123	340	77	467	3	547	0	365	69	434	1321	3
17:30 - 17:45	0	0	0	0	237	2	131	370	87	403	3	493	0	373	70	443	1306	3
17:45 - 18:00	0	0	0	0	200	1	128	329	111	412	0	523	0	379	62	441	1293	3
TOTAL	1	0	11	12	4361	46	2831	7238	2941	11732	50	14723	1	12560	2285	14846	36819	163
Trucks	0	0	0	0	29	0	48	77	40	138	1	179	0	111	21	132	388	1.1%
School Buses	0	0	0	0	32	0	3	35	7	39	2	48	0	61	1	62	145	0.4%

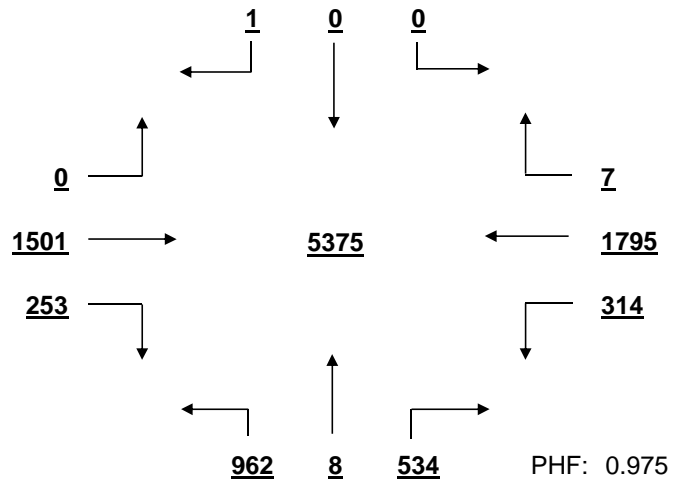
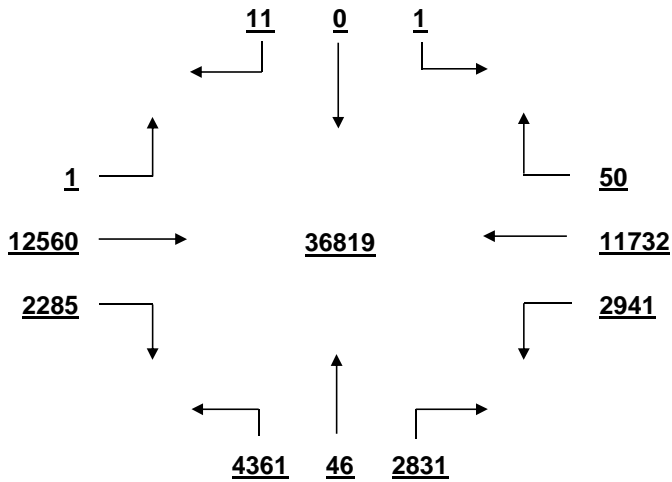
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Elmwood Ave AT Assembly St

Date: 5/6/2015

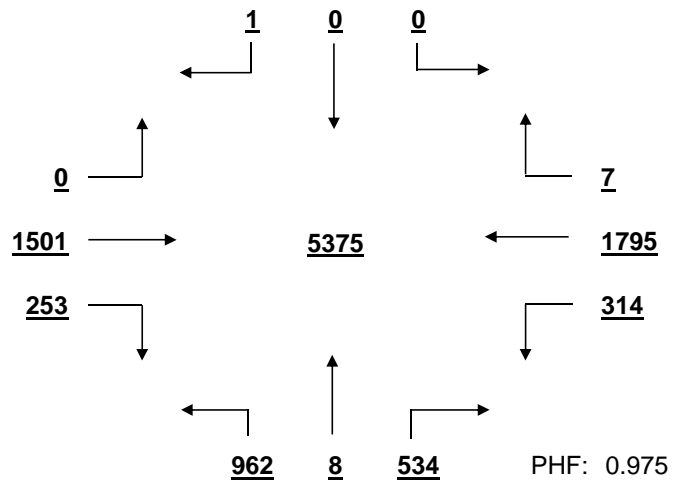
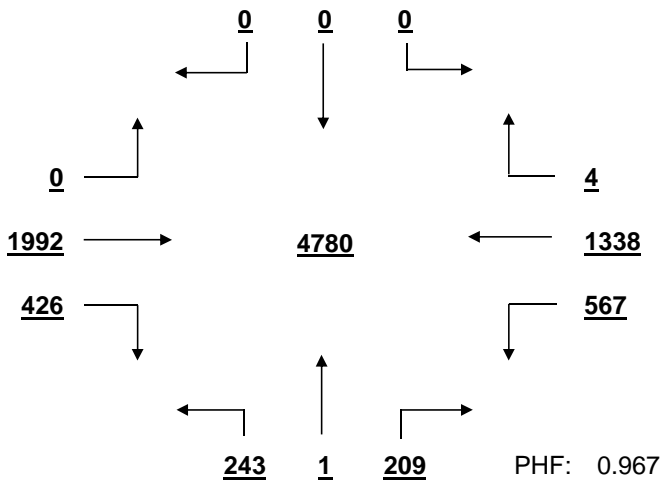
8.0 HOUR TOTAL VOLUME
FROM 7:00 TO 18:00

OVERALL PEAK HOUR VOLUME
FROM 16:45 TO 17:45



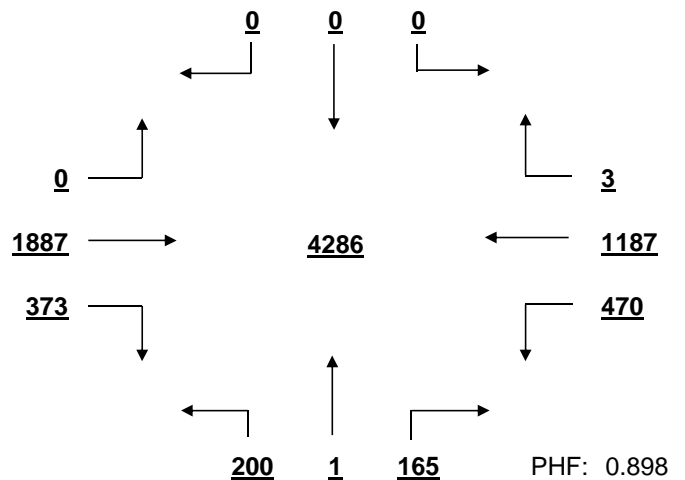
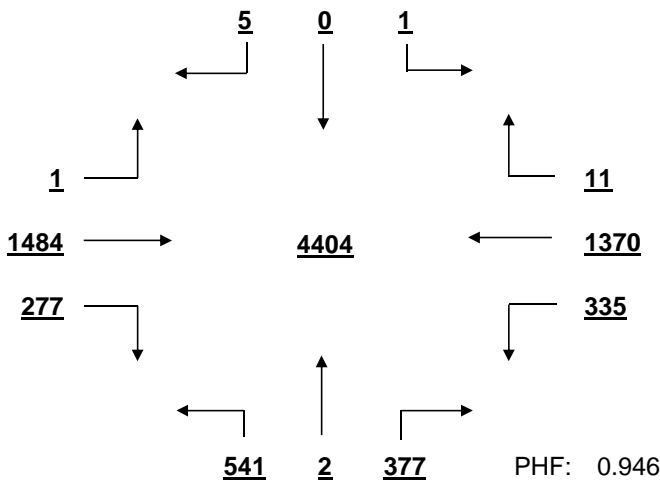
AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:45 TO 17:45



MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:00 TO 13:00

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: **Richland** City: **Columbia** Date: **5/6/2015**

Major Rt: **Elmwood Ave** Minor Rt: **Main St**
* Not on State System * Not on State System

Day of Week: **Wednesday** Weather: **Clear** Office: **Short Counts** **JMS**

Type of Control: **Signal** Speed Limit (major st) **45**

Direction of Minor Street: **N-S** Intersection ADT - **49340** (Calc)

Number of Lanes (major st)* **3** Number of Lanes (minor st)* **2**
* Each Direction

INTERSECTION VOLUME SUMMARY

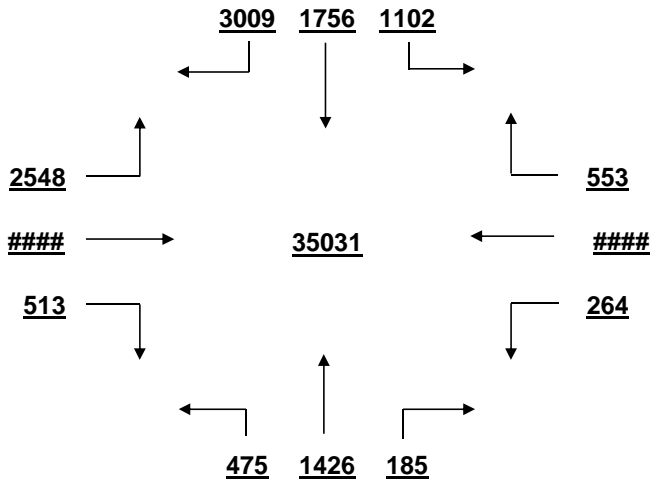
	From N Main St				From S Main St				From E Elmwood Ave				From W Elmwood Ave				Total Vol	Total Peds
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT		
7:00 - 7:15	23	36	46	105	3	10	0	13	8	241	9	258	41	381	11	433	809	7
7:15 - 7:30	23	45	86	154	4	14	1	19	0	324	6	330	39	488	10	537	1040	4
7:30 - 7:45	35	92	97	224	9	14	0	23	3	308	10	321	33	476	11	520	1088	3
7:45 - 8:00	58	98	127	283	6	20	1	27	12	321	11	344	37	518	17	572	1226	5
8:00 - 8:15	53	117	126	296	3	16	2	21	23	335	8	366	53	488	21	562	1245	15
8:15 - 8:30	51	124	143	318	0	21	1	22	13	341	6	360	46	499	9	554	1254	11
8:30 - 8:45	45	122	143	310	8	36	3	47	20	329	7	356	56	426	14	496	1209	11
8:45 - 9:00	49	83	100	232	6	30	4	40	14	335	2	351	63	426	18	507	1130	9
11:00 - 11:15	37	38	72	147	13	30	3	46	14	320	19	353	59	347	12	418	964	4
11:15 - 11:30	33	38	60	131	13	36	7	56	6	305	30	341	70	356	16	442	970	4
11:30 - 11:45	29	31	73	133	4	28	9	41	12	356	11	379	78	355	17	450	1003	8
11:45 - 12:00	35	39	95	169	14	37	4	55	8	327	18	353	79	338	18	435	1012	10
12:00 - 12:15	36	34	94	164	15	41	7	63	13	324	12	349	69	370	19	458	1034	6
12:15 - 12:30	33	32	85	150	10	38	8	56	17	315	21	353	77	316	16	409	968	16
12:30 - 12:45	29	45	85	159	12	24	3	39	12	356	16	384	64	402	28	494	1076	19
12:45 - 13:00	34	48	83	165	12	38	8	58	8	286	21	315	76	397	22	495	1033	8
14:00 - 14:15	30	56	72	158	11	35	7	53	8	306	22	336	73	355	11	439	986	6
14:15 - 14:30	28	40	76	144	15	48	5	68	4	310	21	335	68	375	24	467	1014	14
14:30 - 14:45	39	39	83	161	9	46	3	58	5	316	20	341	78	384	15	477	1037	10
14:45 - 15:00	33	48	88	169	17	45	5	67	9	308	21	338	92	405	7	504	1078	5
15:00 - 15:15	37	47	79	163	18	28	3	49	3	371	19	393	94	364	15	473	1078	6
15:15 - 15:30	22	35	64	121	11	49	8	68	2	345	17	364	86	318	15	419	972	12
15:30 - 15:45	23	58	78	159	20	31	4	55	7	375	6	388	95	391	17	503	1105	8
15:45 - 16:00	30	42	107	179	19	50	4	73	2	350	35	387	112	382	9	503	1142	10
16:00 - 16:15	35	50	76	161	20	43	8	71	7	365	21	393	99	343	26	468	1093	26
16:15 - 16:30	20	53	102	175	23	47	5	75	10	413	22	445	114	365	14	493	1188	4
16:30 - 16:45	34	46	101	181	26	68	19	113	5	375	34	414	83	370	17	470	1178	4
16:45 - 17:00	44	50	113	207	32	99	7	138	5	374	25	404	115	369	18	502	1251	3
17:00 - 17:15	37	49	104	190	39	104	13	156	2	338	24	364	103	360	15	478	1188	7
17:15 - 17:30	30	45	125	200	33	156	15	204	3	360	16	379	128	360	13	501	1284	5
17:30 - 17:45	33	45	109	187	32	90	12	134	2	349	21	372	122	349	22	493	1186	13
17:45 - 18:00	24	31	117	172	18	54	6	78	7	364	22	393	146	385	16	547	1190	8
TOTAL	1102	1756	3009	5867	475	1426	185	2086	264	10742	553	11559	2548	12458	513	15519	35031	281
Trucks	11	15	50	76	0	6	0	6	2	113	15	130	19	77	4	100	312	0.9%
School Buses	4	19	14	37	1	23	0	24	5	45	2	52	7	31	24	62	175	0.5%

TOTAL AND PEAK HOUR VOLUME DIAGRAMS

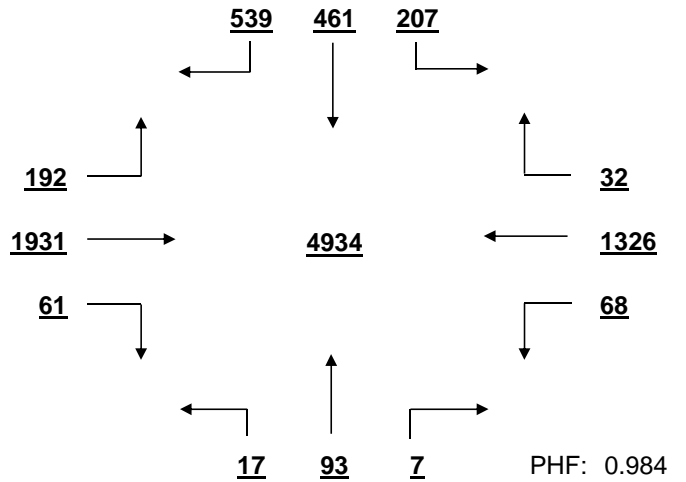
Elmwood Ave AT Main St

Date: 5/6/2015

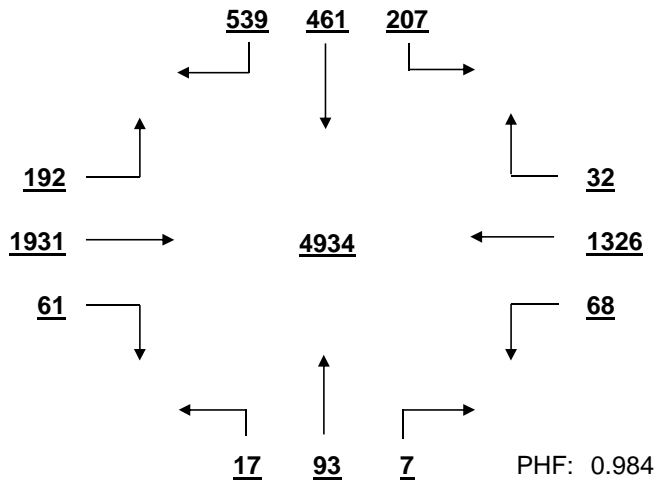
8.0 HOUR TOTAL VOLUME
FROM 7:00 TO 18:00



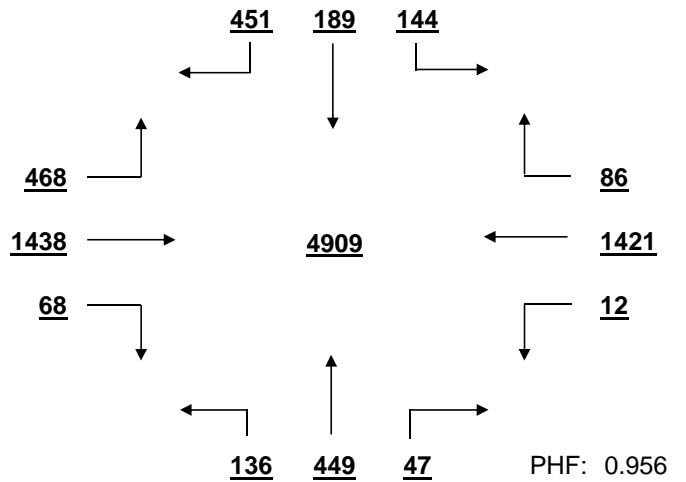
OVERALL PEAK HOUR VOLUME
FROM 7:45 TO 8:45



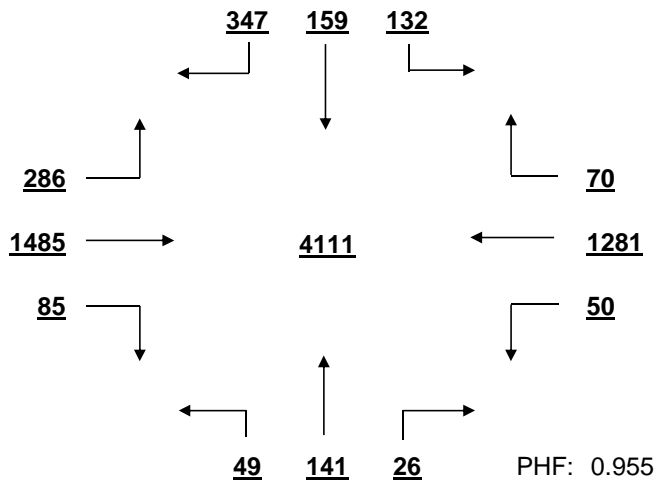
AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:45 TO 8:45



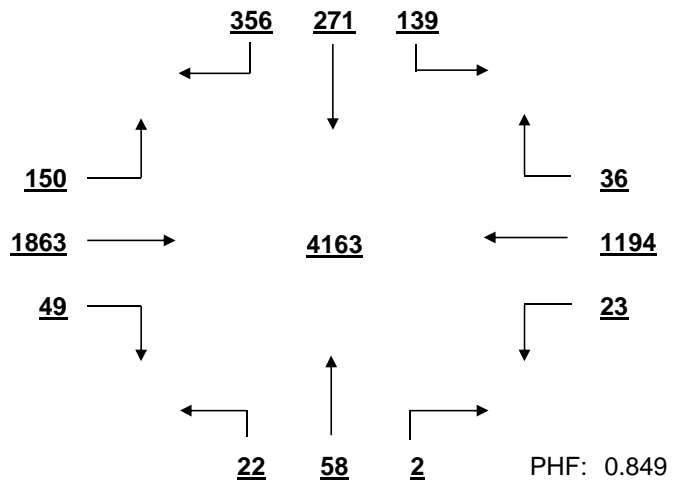
PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:45 TO 17:45



MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:00 TO 13:00



OTHER HOUR VOLUME
FROM 7:00 TO 8:00



SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: **Richland** City: **Columbia** Date: **5/7/2015**

Major Rt: **Elmwood Ave** Minor Rt: **Sumter St**
* Not on State System * Not on State System

Day of Week: **Thursday** Weather: **Clear** Office: **Short Counts** **JMS**

Type of Control: **Signal** Speed Limit (major st) **45**

Direction of Minor Street: **N-S** Intersection ADT - **34660** (Calc)

Number of Lanes (major st)* **3** Number of Lanes (minor st)* **2**
* Each Direction

INTERSECTION VOLUME SUMMARY

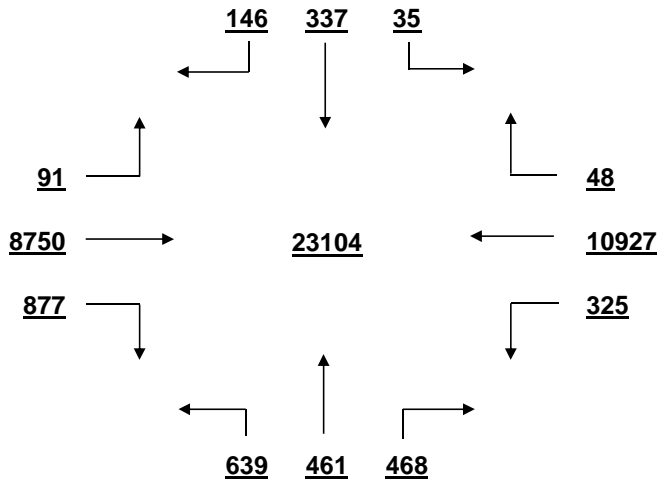
	From N Sumter St				From S Sumter St				From E Elmwood Ave				From W Elmwood Ave				Total Vol	Total Peds
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT		
7:00 - 7:15	3	4	3	10	16	5	5	26	6	228	1	235	3	352	49	404	675	1
7:15 - 7:30	2	5	3	10	14	11	7	32	10	318	2	330	4	347	39	390	762	1
7:30 - 7:45	2	9	2	13	8	0	4	12	11	336	2	349	3	382	57	442	816	2
7:45 - 8:00	1	26	8	35	6	2	4	12	17	354	1	372	4	390	78	472	891	1
8:00 - 8:15	1	41	4	46	12	4	8	24	22	340	1	363	2	384	66	452	885	2
8:15 - 8:30	2	35	3	40	7	5	4	16	33	311	2	346	2	320	48	370	772	1
8:30 - 8:45	1	45	4	50	18	9	9	36	22	302	0	324	0	327	55	382	792	6
8:45 - 9:00	4	19	3	26	0	0	0	0	17	332	0	349	0	0	0	0	375	5
11:00 - 11:15	1	4	1	6	16	6	8	30	14	317	2	333	0	178	14	192	561	1
11:15 - 11:30	2	3	2	7	19	7	9	35	3	313	1	317	0	255	22	277	636	3
11:30 - 11:45	0	5	2	7	32	14	14	60	11	318	1	330	4	259	23	286	683	0
11:45 - 12:00	0	7	3	10	10	1	6	17	6	303	0	309	3	271	25	299	635	3
12:00 - 12:15	0	2	7	9	15	5	7	27	9	370	2	381	5	279	24	308	725	5
12:15 - 12:30	3	13	5	21	31	9	9	49	5	354	2	361	4	260	28	292	723	1
12:30 - 12:45	1	7	3	11	26	7	3	36	14	322	1	337	3	406	26	435	819	2
12:45 - 13:00	3	10	5	18	54	10	13	77	15	344	4	363	8	323	26	357	815	1
14:00 - 14:15	2	6	5	13	27	11	6	44	8	273	1	282	2	255	30	287	626	2
14:15 - 14:30	0	7	4	11	16	4	5	25	8	331	1	340	1	180	9	190	566	4
14:30 - 14:45	0	8	8	16	26	3	16	45	10	332	1	343	0	304	22	326	730	3
14:45 - 15:00	1	7	6	14	34	7	15	56	10	337	3	350	2	320	21	343	763	0
15:00 - 15:15	0	7	7	14	27	9	12	48	9	303	1	313	11	292	25	328	703	0
15:15 - 15:30	1	3	12	16	12	7	7	26	3	341	1	345	8	208	17	233	620	2
15:30 - 15:45	0	3	11	14	38	12	15	65	10	396	1	407	0	234	16	250	736	1
15:45 - 16:00	0	3	3	6	25	10	10	45	5	387	1	393	0	272	32	304	748	1
16:00 - 16:15	1	5	10	16	25	26	27	78	1	421	2	424	0	248	10	258	776	1
16:15 - 16:30	0	7	5	12	17	7	27	51	4	396	2	402	6	149	13	168	633	1
16:30 - 16:45	0	3	5	8	25	27	24	76	8	385	2	395	7	250	22	279	758	1
16:45 - 17:00	0	11	10	21	27	19	21	67	4	342	6	352	2	251	30	283	723	1
17:00 - 17:15	0	12	1	13	20	66	76	162	4	353	0	357	4	346	10	360	892	2
17:15 - 17:30	4	11	0	15	11	50	44	105	11	390	0	401	1	329	22	352	873	1
17:30 - 17:45	0	7	1	8	25	108	53	186	10	372	3	385	2	379	18	399	978	0
17:45 - 18:00	0	2	0	2	0	0	0	0	5	406	1	412	0	0	0	0	414	0
TOTAL	35	337	146	518	639	461	468	1568	325	10927	48	11300	91	8750	877	9718	23104	55
Trucks	2	3	0	5	0	1	0	1	0	130	0	130	0	17	0	17	153	0.7%
School Buses	0	1	1	2	0	0	0	0	2	41	0	43	0	6	0	6	51	0.2%

TOTAL AND PEAK HOUR VOLUME DIAGRAMS

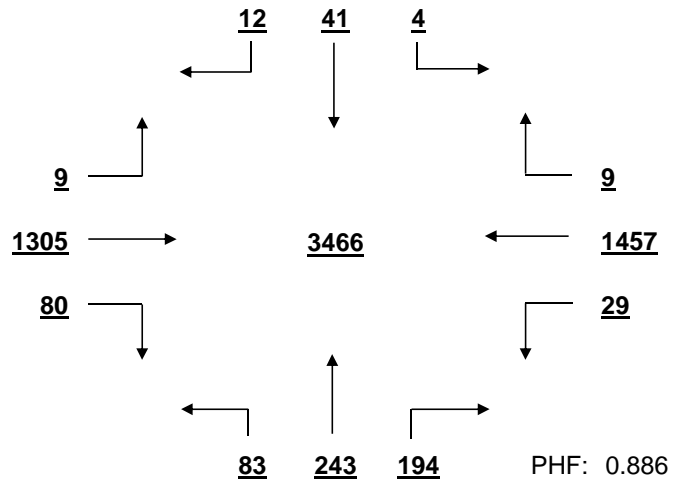
Elmwood Ave AT Sumter St

Date: 5/7/2015

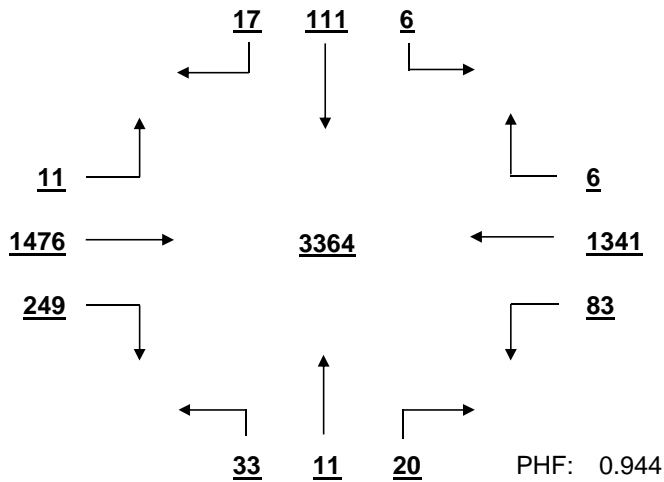
8.0 HOUR TOTAL VOLUME
FROM 7:00 TO 18:00



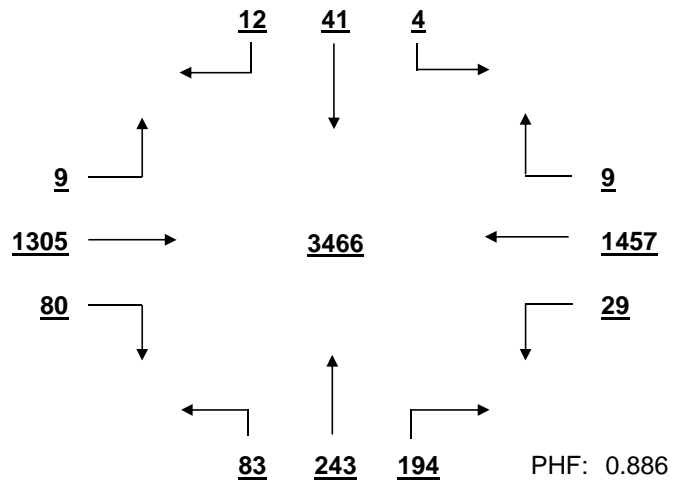
OVERALL PEAK HOUR VOLUME
FROM 16:45 TO 17:45



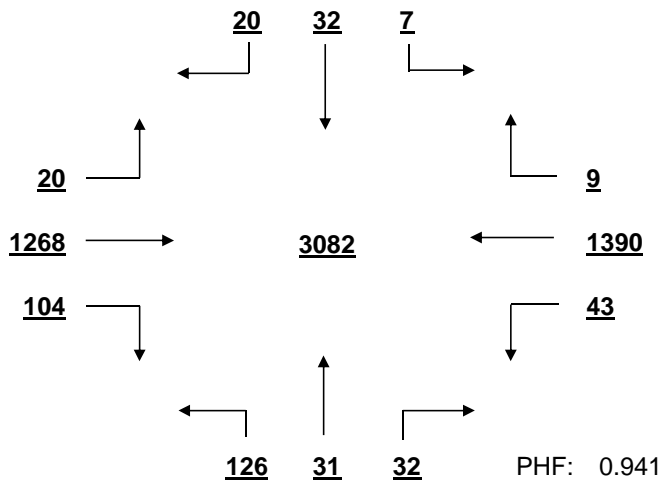
AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



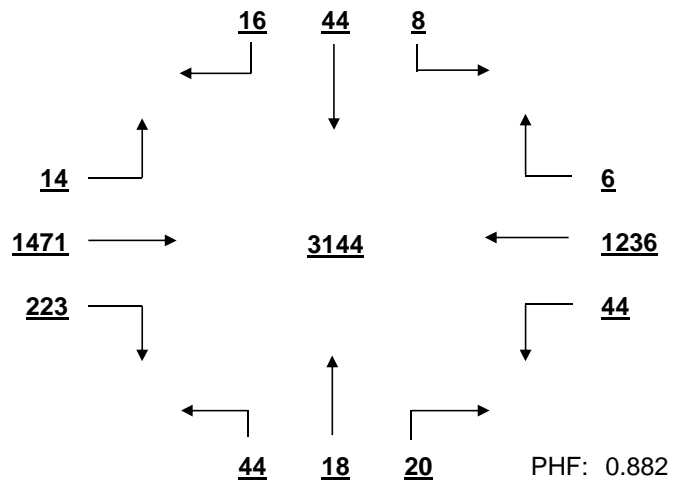
PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:45 TO 17:45



MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:00 TO 13:00



OTHER HOUR VOLUME
FROM 7:00 TO 8:00



APPENDIX B: TRAFFIC VOLUME COUNT INTERSECTION TALLY SHEET

AM Summary Sheet

Intersection Volume Count

Cars=passenger cars, station wagons, motorcycles, and pick-up trucks
Trucks=other trucks and buses. (Record school buses with SB.)

N/S Street BARNWELL Time _____ to _____
 E/W Street CALHAN Date _____
 Intersection Control _____ Weather _____
 Observer _____


Approach	Trucks	Cars
North (Barnwell)		301
South (Barnwell)		24
East (Calhan)	245	
West (Calhan)	23	
Left (Barnwell)	3	
Right (Barnwell)		11

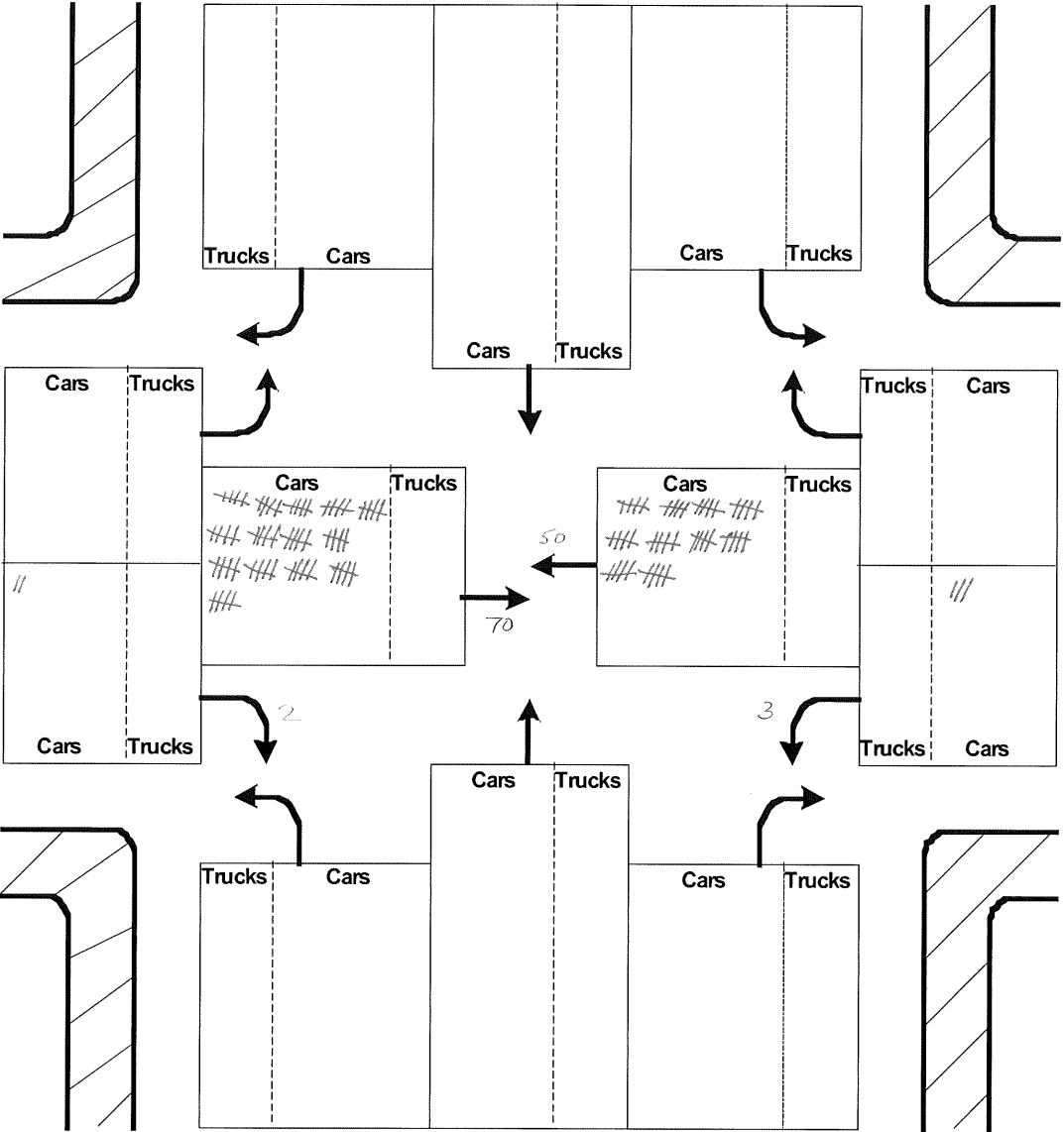
APPENDIX B: TRAFFIC VOLUME COUNT INTERSECTION TALLY SHEET

Intersection Volume Count

Cars=passenger cars, station wagons, motorcycles, and pick-up trucks
Trucks=other trucks and buses. (Record school buses with SB.)

N/S Street BIRDALWELL Time 7:15 to ~~7:15~~ 7:30
 Date 2-23-2014

EW Street CALHOUN Weather CLOUDY 
 Intersection Control STOP Observer JLG



Approach	Trucks	Cars
North (Left Turn)		
North (Through)		
North (Right Turn)		
West (Left Turn)		50
West (Through)		70
West (Right Turn)		2
East (Left Turn)		
East (Through)		
East (Right Turn)		3
South (Left Turn)		
South (Through)		
South (Right Turn)		

APPENDIX B: TRAFFIC VOLUME COUNT INTERSECTION TALLY SHEET

Cars=passenger cars, station wagons, motorcycles, and pick-up trucks
Trucks=other trucks and buses. (Record school buses with SB.)

Intersection Volume Count

N/S Street BARNWELL Date _____
 EW Street CALHOUN Weather _____
 Intersection Control _____ Observer _____

Time 6:30 to 7:45

The diagram shows a four-way intersection with the following tally sheets and counts:

- North Approach (Barnwell St):** Trucks: 0, Cars: 0
- East Approach (Calhoun St):** Cars: 0, Trucks: 0
- South Approach (Barnwell St):** Trucks: 1, Cars: 0
- West Approach (Calhoun St):** Cars: 1, Trucks: 0

Central Intersection Tally:

Direction	Cars	Trucks
North to South	### ##-###-### ###-### ##-### ###-### ##-### ###-### ##-###	
South to North	### ##-###-### ###-### ##-### ###-### ##-### ###-### ##-###	
East to West	### ##-###-### ###-### ##-### ###-### ##-### ###-### ##-###	1
West to East	### ##-###-### ###-### ##-### ###-### ##-### ###-### ##-###	###

Handwritten circled numbers in the center: (58) and (84).

APPENDIX B: TRAFFIC VOLUME COUNT INTERSECTION TALLY SHEET

Intersection Volume Count

Cars=passenger cars, station wagons, motorcycles, and pick-up trucks
 Trucks=other trucks and buses. (Record school buses with SB.)

Time 7:45 to 8:00

N/S Street BARNWELL Date _____

EW Street CALHOUN Weather _____


Intersection Control _____ Observer _____

Approach	Trucks	Cars	Total
Top (Barnwell St)	1	32	33
Bottom (Calhoun St)	1	78	79
Left	2	9	11
Right	10	4	14

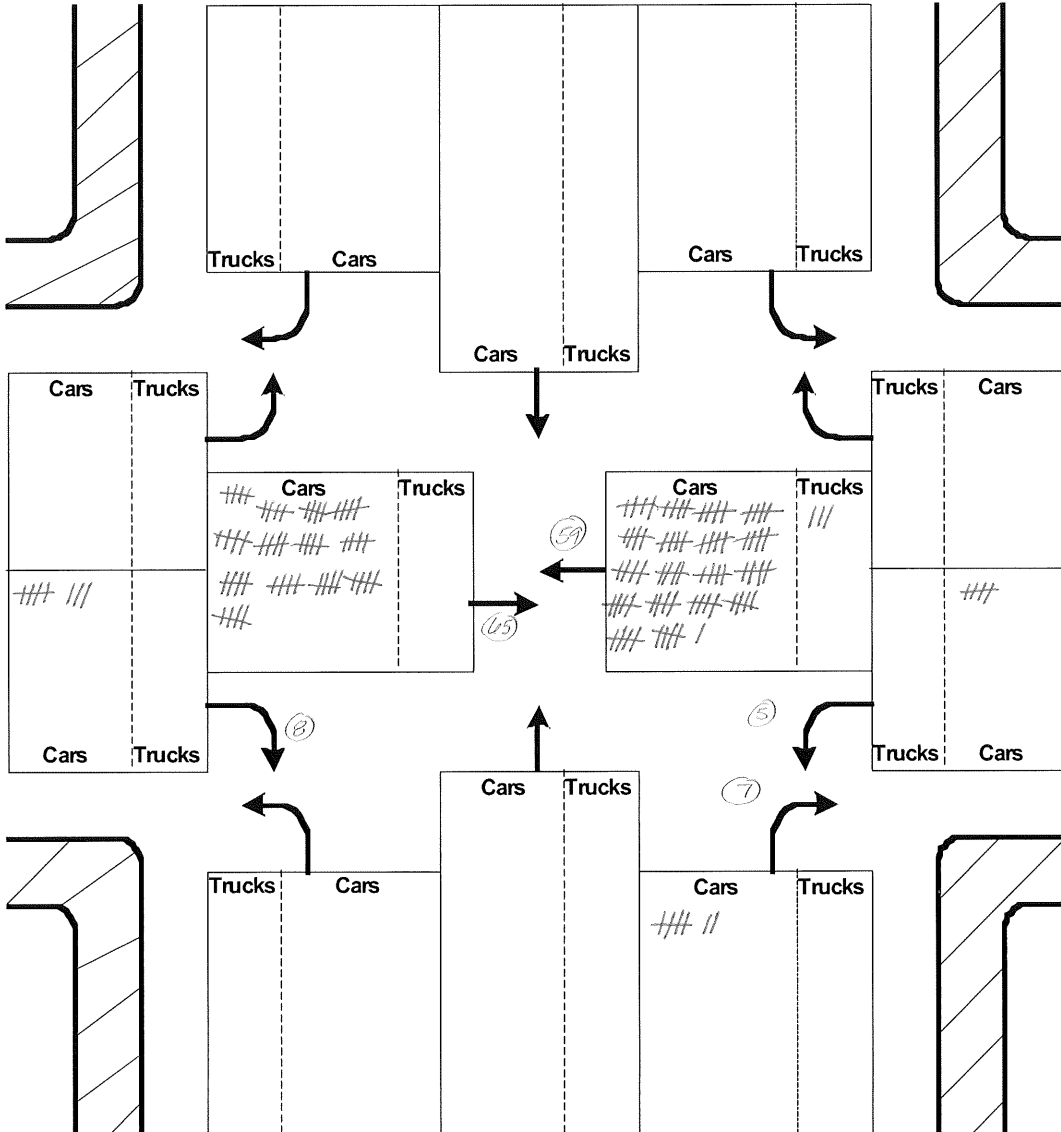
APPENDIX B: TRAFFIC VOLUME COUNT INTERSECTION TALLY SHEET

Intersection Volume Count

Cars=passenger cars, station wagons, motorcycles, and pick-up trucks
 Trucks=other trucks and buses. (Record school buses with SB.)

Time 8:00 to 9:15
 Date _____
 Weather _____ 
 Observer _____

N/S Street BARNWELL
 E/W Street CALHOUN
 Intersection Control STOP



Top-Left Approach		Top-Middle Approach		Top-Right Approach	
Trucks	Cars	Cars	Trucks	Cars	Trucks
Middle-Left Approach		Middle-Right Approach			
Cars	Trucks	Cars	Trucks		
Bottom-Left Approach		Bottom-Middle Approach		Bottom-Right Approach	
Trucks	Cars	Cars	Trucks	Cars	Trucks

APPENDIX B: TRAFFIC VOLUME COUNT INTERSECTION TALLY SHEET

PMA SUMMARY

Intersection Volume Count

Cars=passenger cars, station wagons, motorcycles, and pick-up trucks
 Trucks=other trucks and buses. (Record school buses with SB.)

N/S Street BARNWELL Time _____ to _____
 Date _____
 EW Street CALHOUN Weather _____
 Intersection Control _____ Observer _____

The diagram shows a four-way intersection with traffic volume counts for cars and trucks in each direction. The counts are as follows:

Direction	Cars	Trucks
Northbound (from South)	300	
Southbound (to North)	263	
Eastbound (from West)	29	
Westbound (to East)	28	
Left Turn (from Northbound)	10	
Right Turn (from Northbound)		5

APPENDIX B: TRAFFIC VOLUME COUNT INTERSECTION TALLY SHEET

Intersection Volume Count

Cars=passenger cars, station wagons, motorcycles, and pick-up trucks
 Trucks=other trucks and buses. (Record school buses with SB.)

N/S Street BARNHILL ST Date 5:00 to 5:15
 EW Street CALHOUN ST Weather _____
 Intersection Control _____ Observer _____

Approach	Trucks	Cars
Northbound (Left Lane)	11	1
Northbound (Right Lane)	11	1
Southbound (Left Lane)	11	1
Southbound (Right Lane)	11	1
Eastbound (Left Lane)	11	1
Eastbound (Right Lane)	11	1
Westbound (Left Lane)	11	1
Westbound (Right Lane)	11	1

Handwritten numbers in circles: 3, 105, 3, 9, 18, 11

APPENDIX B: TRAFFIC VOLUME COUNT INTERSECTION TALLY SHEET

Intersection Volume Count

Cars=passenger cars, station wagons, motorcycles, and pick-up trucks
 Trucks=other trucks and buses. (Record school buses with SB.)

N/S Street BARNWELL ST Date _____ Time 5:15 to 5:30
 E/W Street CALITOWN ST Weather _____
 Intersection Control STOP ON BARNWELL Observer JR/4

	Trucks Cars		Cars Trucks
Cars Trucks	Cars Trucks	Cars Trucks	Trucks Cars
Cars Trucks	Cars Trucks	Cars Trucks	Trucks Cars
Trucks Cars	Cars Trucks	Cars Trucks	Trucks Cars

← → 1

APPENDIX B: TRAFFIC VOLUME COUNT INTERSECTION TALLY SHEET

Intersection Volume Count

Cars=passenger cars, station wagons, motorcycles, and pick-up trucks
 Trucks=other trucks and buses. (Record school buses with SB.)

Time 5:30 to 5:45
 Date _____
 Weather _____
 Observer JLG

N/S Street BARNWELL ST
 EW Street CANTON ST
 Intersection Control STOP ON BARNWELL

Approach	Cars	Trucks
North (from Barnwell St)	6	0
South (to Barnwell St)	0	1
West (from Canton St)	2	0
East (to Canton St)	6	0

Handwritten tally marks in the diagram:

- West approach (Cars): 11 tally marks
- East approach (Cars): 11 tally marks
- South approach (Trucks): 1 tally mark
- North approach (Cars): 11 tally marks

Central circle: 50

APPENDIX B: TRAFFIC VOLUME COUNT INTERSECTION TALLY SHEET

Intersection Volume Count

Cars=passenger cars, stationwagons, motorcycles, and pick-up trucks
 Trucks=other trucks and buses. (Record school buses with SB.)

N/S Street BARNWELL ST Date Time 5:45 to 6:00

E/W Street CALHOUN ST Weather _____

Intersection Control STOP ON BARNWELL Observer JR9

Approach	Trucks	Cars
West (Barnwell St)		1
South (Calhoun St)	33	38
East (Barnwell St)	1	
North (Calhoun St)	3	

Bull St and Harden St Extension , Columbia

Date: 5/14/2015

Day: Thursday

Project #: 15-9191-001

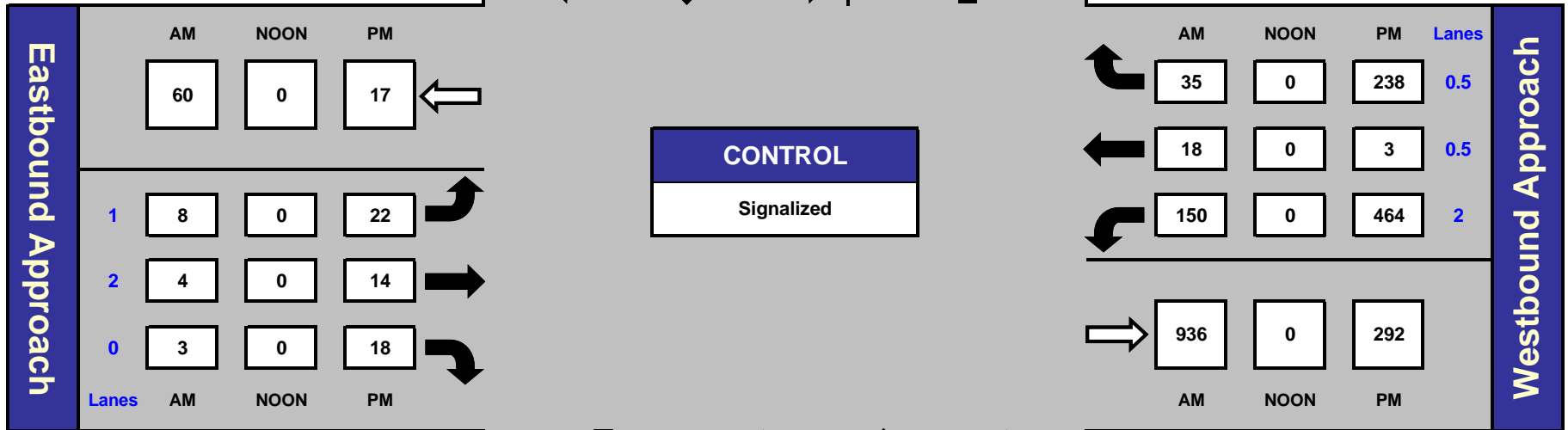
City: Columbia



Peak Hour Summary						
Southbound Approach						
Lanes	0	3	1			
AM	19	2125	401	588	AM	
NOON	0	0	0	0	NOON	
PM	8	913	75	2392	PM	

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	430 PM

Harden St Extension



Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		

AM	2278	23	545	531	AM
NOON	0	0	0	0	NOON
PM	1395	6	2132	203	PM

PM	4:00 PM	6:00 PM
----	---------	---------

	1	2	1	Lanes
Northbound Approach				

Total Ins & Outs

			North Leg				
			2545	588	AM		
			0	0	NOON		
			996	2392	PM		
			↓	↑			
AM	NOON	PM	East Leg				
60	0	17	203	0	705		
15	0	54	936	0	292		
West Leg					AM NOON PM		
			2278	1099	AM		
			0	0	NOON		
			1395	2341	PM		
			South Leg				

Total Volume Per Leg

			North Leg				
			3133	AM			
			0	NOON			
			3388	PM			
AM	NOON	PM	West Leg		East Leg		
75	0	71			1139	0	997
West Leg					AM NOON PM		
			3377	AM			
			0	NOON			
			3736	PM			
			South Leg				

Project ID: 15-9191-001
 Location: Bull St & Harden St Extension
 City: Columbia

Day: Thursday
 Date: 5/14/2015

Peak Start Times	
AM	7:00 AM
MD	12:00 AM
PM	4:00 PM

Groups Printed - Cars, PU, Vans - Heavy Trucks

Start Time	Bull St Northbound					Bull St Southbound					Harden St Extension Eastbound					Harden St Extension Westbound					Int. Total
	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	
7:00 AM	5	129	97	0	231	30	299	3	0	332	3	1	1	0	5	25	3	6	0	34	602
7:15 AM	2	136	114	0	252	41	443	3	0	487	0	0	1	0	1	45	2	9	0	56	796
7:30 AM	2	146	133	0	281	77	504	1	0	582	1	0	0	0	1	30	3	7	0	40	904
7:45 AM	4	145	167	0	316	116	575	7	0	698	5	0	1	0	6	34	8	11	0	53	1073
Total	13	556	511	0	1080	264	1821	14	0	2099	9	1	3	0	13	134	16	33	0	183	3375
8:00 AM	6	141	131	0	278	102	504	6	1	612	2	3	2	0	7	51	4	9	0	64	961
8:15 AM	11	113	100	0	224	106	542	5	0	653	0	1	0	0	1	35	3	8	0	46	924
8:30 AM	7	120	109	0	236	93	483	2	0	578	0	0	1	0	1	31	10	13	0	54	869
8:45 AM	5	140	92	0	237	53	388	3	0	444	0	0	1	0	1	63	9	16	0	88	770
Total	29	514	432	0	975	354	1917	16	1	2287	2	4	4	0	10	180	26	46	0	252	3524
BREAK																					
4:00 PM	2	377	55	0	434	18	183	1	0	202	6	3	5	0	14	145	3	61	0	209	859
4:15 PM	1	404	66	0	471	17	219	1	0	237	0	2	4	0	6	126	2	41	0	169	883
4:30 PM	1	473	52	0	526	17	198	1	0	216	9	3	3	0	15	144	0	53	0	197	954
4:45 PM	3	552	56	0	611	18	229	3	0	250	1	3	2	0	6	114	3	44	0	161	1028
Total	7	1806	229	0	2042	70	829	6	0	905	16	11	14	0	41	529	8	199	0	736	3724
5:00 PM	1	524	45	0	570	23	243	3	0	269	7	6	10	0	23	129	0	93	0	222	1084
5:15 PM	1	583	50	0	634	17	243	1	0	261	5	2	3	0	10	77	0	48	0	125	1030
5:30 PM	0	539	44	0	583	23	232	0	0	255	3	5	4	0	12	52	0	34	0	86	936
5:45 PM	1	388	44	0	433	12	250	0	0	262	1	2	4	0	7	46	0	32	0	78	780
Total	3	2034	183	0	2220	75	968	4	0	1047	16	15	21	0	52	304	0	207	0	511	3830
Grand Total	52	4910	1355	0	6317	763	5535	40	1	6338	43	31	42	0	116	1147	50	485	0	1682	14453
Apprch %	0.8	77.7	21.5	0.0		12.0	87.3	0.6	0.0		37.1	26.7	36.2	0.0		68.2	3.0	28.8	0.0		
Total %	0.4	34.0	9.4	0.0	43.7	5.3	38.3	0.3	0.0	43.9	0.3	0.2	0.3	0.0	0.8	7.9	0.3	3.4	0.0	11.6	
Cars, PU, Vans	52	4895	1355	0	6302	763	5512	40	1	6315	43	31	42	0	116	1146	50	484	0	1680	14413
% Cars, PU, Vans	###	99.7	###	0.0	99.8	###	99.6	100.0	###	99.6	###	100.0	###	0.0	100.0	99.9	100.0	99.8	0.0	99.9	99.7
Heavy Trucks	0	15	0		15	0	23	0		23	0	0	0		0	1	0	1		2	40
%Heavy Trucks	0.0	0.3	0.0	0.0	0.2	0.0	0.4	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.0	0.1	0.3

ITM Peak Hour Summary

Prepared by:

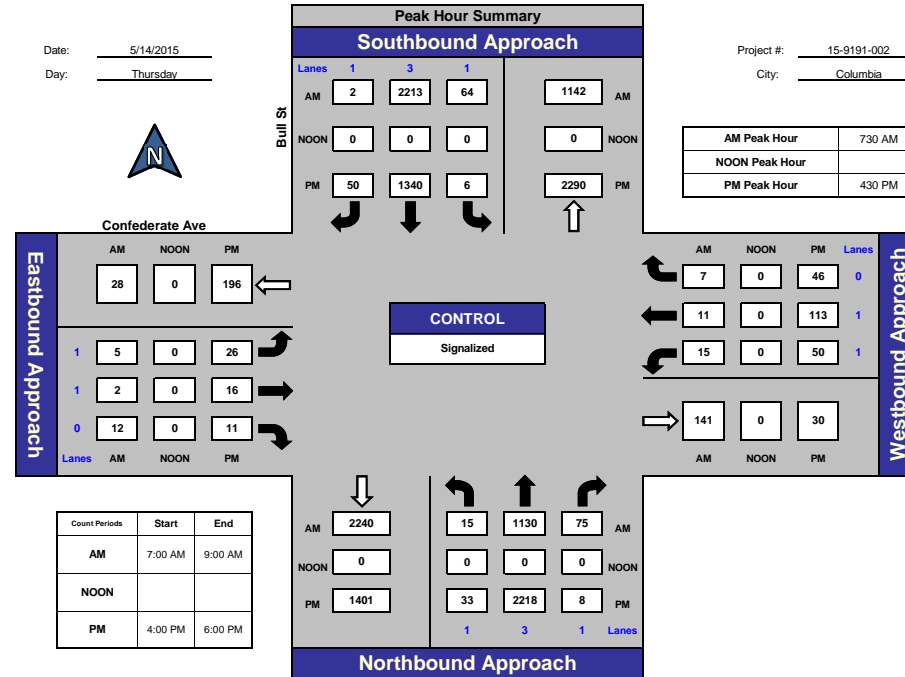


National Data & Surveying Services

Bull St and Confederate Ave, Columbia

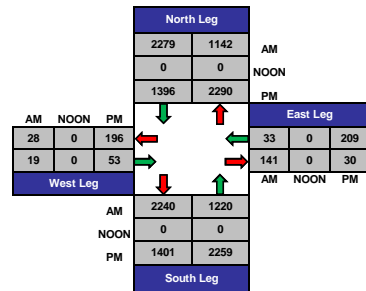
Date: 5/14/2015
Day: Thursday

Project #: 15-9191-002
City: Columbia

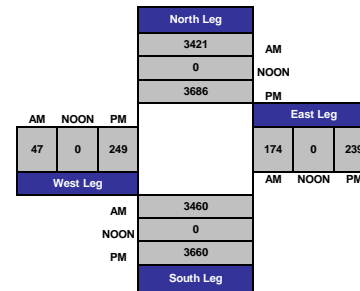


AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	430 PM

Total Ins & Outs



Total Volume Per Leg



ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 15-9191-002
 N/S Street: Bull St
 E/W Street: Confederate Ave
 DATE: 5/14/2015
 CITY: Columbia

DAY: Thursday

A M

PEDESTRIANS

T I M E	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
7:00 AM	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	1	0	0
7:45 AM	0	0	3	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	1	0	0
8:45 AM	0	0	0	0	0	0	0	0
TOTALS	0	0	3	0	0	2	0	0

BIKES

T I M E	NB			SB			EB			WB		
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	1	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	2	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	1	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	1	0	0	0	0	0	3	0	0	0	0

P M

PEDESTRIANS

T I M E	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
4:00 PM	0	0	0	0	0	1	0	0
4:15 PM	0	0	0	0	0	0	0	0
4:30 PM	0	1	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	1	0	0	0	0
5:15 PM	0	0	0	0	0	1	0	0
5:30 PM	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0
TOTALS	0	1	0	1	0	2	0	2

BIKES

T I M E	NB			SB			EB			WB		
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	1	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	1	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	1	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	1	0	0	1	0	0	1	0	0	0	0
TOTALS	0	1	0	0	1	0	0	1	0	0	3	0

ITM Peak Hour Summary

Prepared by:

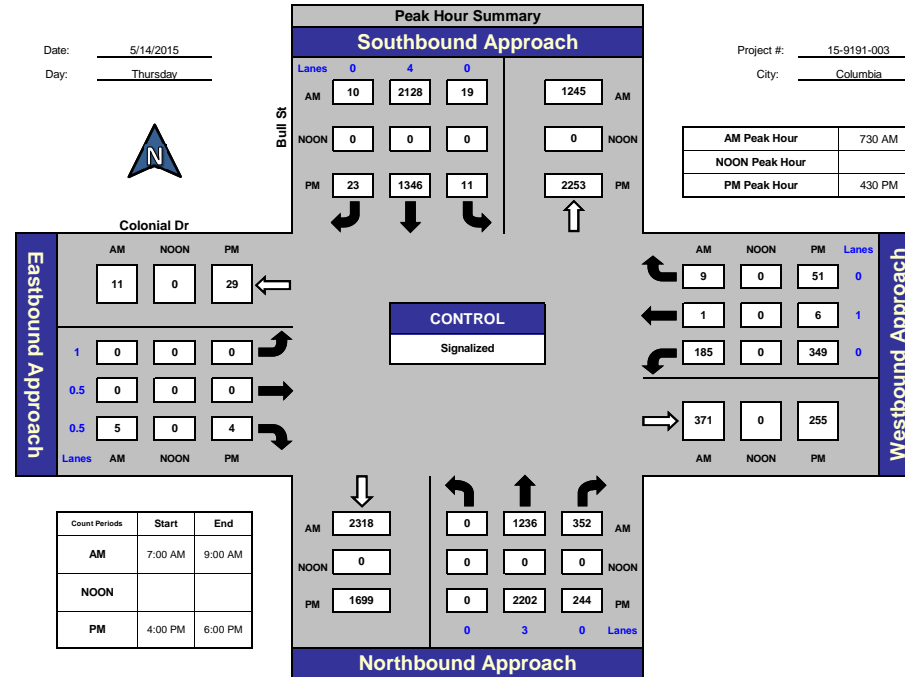


National Data & Surveying Services

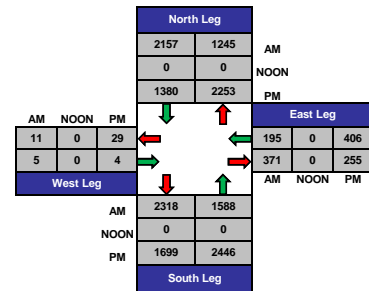
Bull St and Colonial Dr, Columbia

Date: 5/14/2015
Day: Thursday

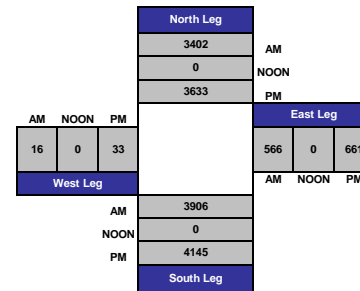
Project #: 15-9191-003
City: Columbia



Total Ins & Outs



Total Volume Per Leg



ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Project ID: 15-9191-003
 Location: Bull St & Colonial Dr
 City: Columbia

Day: Thursday
 Date: 5/14/2015

Peak Start Times	
AM	7:00 AM
MD	12:00 AM
PM	4:00 PM

Groups Printed - Cars, PU, Vans - Heavy Trucks

Start Time	Bull St Northbound				Bull St Southbound				Colonial Dr Eastbound				Colonial Dr Westbound				Int. Total				
	Left	Thru	Rgt	Peds	Left	Thru	Rgt	Peds	Left	Thru	Rgt	Peds	Left	Thru	Rgt	Peds					
7:00 AM	0	248	52	0	300	3	312	1	0	316	0	0	1	0	1	39	0	3	0	42	659
7:15 AM	0	272	58	0	330	1	482	0	0	483	0	0	1	0	1	52	0	3	0	55	869
7:30 AM	0	306	83	0	389	5	519	4	0	528	0	0	1	1	1	40	0	1	1	41	959
7:45 AM	0	324	87	0	411	4	571	2	0	577	0	0	0	0	0	52	1	5	0	58	1046
Total	0	1150	280	0	1430	13	1884	7	0	1904	0	0	3	1	3	183	1	12	1	196	3533
8:00 AM	0	325	90	0	415	1	522	0	0	523	0	0	2	0	2	46	0	2	1	48	988
8:15 AM	0	281	92	0	373	9	516	4	0	529	0	0	2	1	2	47	0	1	1	48	952
8:30 AM	0	279	81	0	360	18	518	3	0	539	2	0	3	2	5	37	1	4	0	42	946
8:45 AM	1	266	73	1	340	3	437	1	0	441	0	0	3	0	3	50	0	9	0	59	843
Total	1	1151	336	1	1488	31	1993	8	0	2032	2	0	10	3	12	180	1	16	2	197	3729
BREAK																					
4:00 PM	0	459	63	0	522	6	325	0	0	331	1	0	0	1	1	102	2	11	0	115	969
4:15 PM	0	453	70	0	523	7	332	1	0	340	1	0	0	1	1	73	1	10	0	84	948
4:30 PM	0	517	52	0	569	2	333	5	0	340	0	0	0	0	0	119	1	11	0	131	1040
4:45 PM	0	553	54	0	607	3	328	7	0	338	0	0	2	0	2	75	2	10	0	87	1034
Total	0	1982	239	0	2221	18	1318	13	0	1349	2	0	2	2	4	369	6	42	0	417	3991
5:00 PM	0	562	52	0	614	0	358	6	0	364	0	0	1	0	1	99	3	18	0	120	1099
5:15 PM	0	570	86	0	656	6	327	5	0	338	0	0	1	0	1	56	0	12	1	68	1063
5:30 PM	0	548	47	0	595	4	275	2	0	281	1	0	1	1	2	56	1	9	0	66	944
5:45 PM	0	422	51	0	473	10	277	0	0	287	0	0	0	0	0	45	1	7	0	53	813
Total	0	2102	236	0	2338	20	1237	13	0	1270	1	0	3	1	4	256	5	46	1	307	3919
Grand Total	1	6385	1091	1	7477	82	6432	41	0	6555	5	0	18	7	23	988	13	116	4	1117	15172
Approch %	0.0	85.4	14.6	0.0		1.3	98.1	0.6	0.0		21.7	0.0	78.3	30.4		88.5	1.2	10.4	0.4		
Total %	0.0	42.1	7.2	0.0	49.3	0.5	42.4	0.3	0.0	43.2	0.0	0.0	0.1	0.0	0.2	6.5	0.1	0.8	0.0	7.4	
Cars, PU, Vans	1	6370	1090	1	7461	82	6409	41	0	6532	5	0	18	7	23	984	13	115	4	1112	15128
% Cars, PU, Vans	###	99.8	99.9	100.0	99.8	###	99.6	100.0	0.0	99.6	###	0.0	###	###	100.0	99.6	100.0	99.1	###	99.6	99.7
Heavy Trucks	0	15	1	0	16	0	23	0	0	23	0	0	0	0	0	4	0	1	0	5	44
% Heavy Trucks	0.0	0.2	0.1	0.0	0.2	0.0	0.4	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.9	0.0	0.4	0.3

Project ID: 15-9191-003
 Location: Bull St & Colonial Dr
 City: Columbia

Day: Thursday
 Date: 5/14/2015

PEAK HOURS

Start Time	Bull St Northbound				Bull St Southbound				Colonial Dr Eastbound				Colonial Dr Westbound				Int. Total
	Left	Thru	Rgt	Peds	Left	Thru	Rgt	Peds	Left	Thru	Rgt	Peds	Left	Thru	Rgt	Peds	
Peak Hour Analysis from 07:00 AM to 09:00 AM																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
7:30 AM	0	306	83	389	5	519	4	528	0	0	1	1	40	0	1	41	959
7:45 AM	0	324	87	411	4	571	2	577	0	0	0	0	52	1	5	58	1046
8:00 AM	0	325	90	415	1	522	0	523	0	0	2	2	46	0	2	48	988
8:15 AM	0	281	92	373	9	516	4	529	0	0	2	2	47	0	1	48	952
Total Volume	0	1236	352	1588	19	2128	10	2157	0	0	5	5	185	1	9	195	3945
% App. Total	0.0	77.8	22.2	100	0.9	98.7	0.5	100	0.0	0.0	###	100	94.9	0.5	4.6	100	
PHF				0.957				0.935					0.625			0.841	
Cars, PU, Vans	0	1232	352	1584	19	2118	10	2147	0	0	5	5	184	1	9	194	3930
% Cars, PU, Vans	0.0	99.7	###	99.7	100.0	99.5	###	99.5	0.0	0.0	###	100.0	99.5	###	100.0	99.5	99.6
Heavy Trucks	0	4	0	4	0	10	0	10	0	0	0	0	1	0	0	1	15
% Heavy Trucks	0.0	0.3	0.0	0.3	0.0	0.5	0.0	0.5	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.5	0.4
Peak Hour Analysis from 04:00 PM to 06:00 PM																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
4:30 PM	0	517	52	569	2	333	5	340	0	0	0	0	119	1	11	131	1040
4:45 PM	0	553	54	607	3	328	7	338	0	0	2	2	75	2	10	87	1034
5:00 PM	0	562	52	614	0	358	6	364	0	0	1	1	99	3	18	120	1099
5:15 PM	0	570	86	656	6	327	5	338	0	0	1	1	56	0	12	68	1063
Total Volume	0	2202	244	2446	11	1346	23	1360	0	0	4	4	349	6	51	406	4236
% App. Total	0.0	90.0	10.0	100	0.8	97.5	1.7	100	0.0	0.0	###	100	86.0	1.5	12.6	100	
PHF				0.932				0.948					0.500			0.775	
Cars, PU, Vans	0	2197	244	2441	11	1342	23	1376	0	0	4	4	348	6	50	404	4225
% Cars, PU, Vans	0.0	99.8	###	99.8	100.0	99.7	###	99.7	0.0	0.0	###	100.0	99.7	###	98.0	99.5	99.7
Heavy Trucks	0	5	0	5	0	4	0	4	0	0	0	0	1	0	1	2	11
% Heavy Trucks	0.0	0.2	0.0	0.2	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.0	0.3	0.0	2.0	0.5	0.3

ITM Peak Hour Summary

Prepared by:

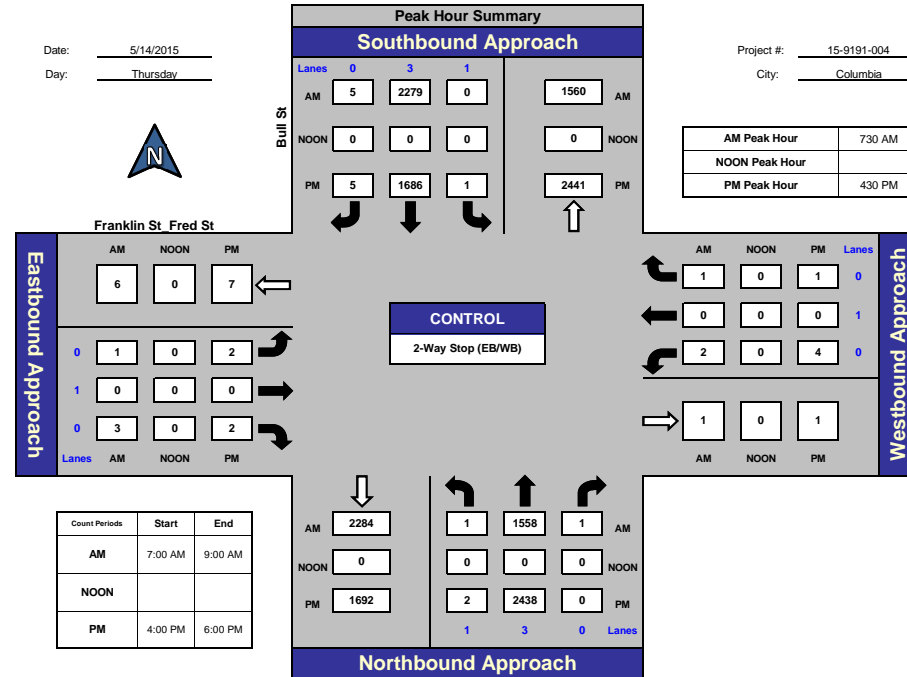


National Data & Surveying Services

Bull St and Franklin St Fred St, Columbia

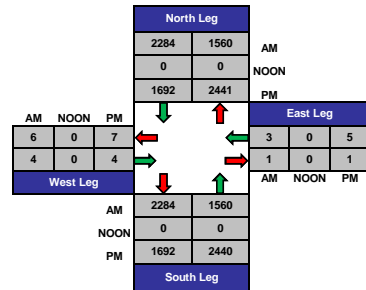
Date: 5/14/2015
Day: Thursday

Project #: 15-9191-004
City: Columbia

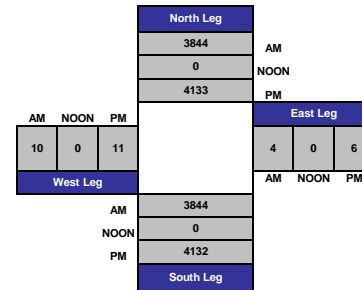


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 15-9191-004
 N/S Street: Bull St
 E/W Street: Franklin St_Fred St
 DATE: 5/14/2015
 CITY: Columbia

DAY: Thursday

A M

PEDESTRIANS

T I M E	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
7:00 AM	0	0	0	0	0	0	0	1
7:15 AM	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	1	0	0	0
8:45 AM	0	0	0	0	1	0	0	0
TOTALS	0	0	0	0	2	0	0	1

BIKES

T I M E	NB			SB			EB			WB		
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
7:00 AM	0	0	0	0	1	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	1	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	1	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	1	0	0	2	0	0	0	0	0	0	0

P M

PEDESTRIANS

T I M E	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
4:00 PM	0	0	1	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	1
4:30 PM	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	1	0
5:00 PM	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	1	0
TOTALS	0	0	1	0	0	0	2	1

BIKES

T I M E	NB			SB			EB			WB		
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	1	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	1	0	0	0	0	0	1	0	0
TOTALS	0	0	0	1	1	0	0	0	0	1	0	0

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Project ID: 15-9191-004
Location: Bull St & Franklin St, Fred St
City: Columbia

Day: Thursday
Date: 5/14/2015

Peak Start Times	
AM	7:00 AM
MD	12:00 AM
PM	4:00 PM

Groups Printed - Cars, PU, Vans - Heavy Trucks

Start Time	Bull St Northbound					Bull St Southbound					Franklin St, Fred St Eastbound					Franklin St, Fred St Westbound					Int. Total	
	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total		
7:00 AM	1	293	1	0	295	1	358	0	0	359	1	0	0	1	1	0	0	0	0	0	0	655
7:15 AM	0	315	0	0	315	1	536	0	0	537	4	0	3	0	7	0	0	0	0	0	0	859
7:30 AM	1	375	0	0	376	0	555	0	0	555	1	0	1	0	2	1	0	0	0	0	1	934
7:45 AM	0	411	0	0	411	0	589	2	0	591	0	0	2	0	2	1	0	0	0	0	1	1005
Total	2	1394	1	0	1397	2	2038	2	0	2042	6	0	6	1	12	2	0	0	0	0	2	3453
8:00 AM	0	389	1	0	390	0	578	1	0	579	0	0	0	0	0	0	0	1	0	0	1	970
8:15 AM	0	383	0	0	383	0	557	2	0	559	0	0	0	0	0	0	0	0	0	0	0	942
8:30 AM	0	350	1	0	351	0	558	3	0	561	0	0	1	0	1	0	0	1	1	1	1	914
8:45 AM	0	322	0	0	322	0	507	6	0	513	0	0	2	0	2	0	0	0	1	0	1	837
Total	0	1444	2	0	1446	0	2200	12	0	2212	0	0	3	0	3	0	0	2	2	2	2	3663
BREAK																						
4:00 PM	2	515	0	1	517	1	419	4	0	424	1	0	0	0	1	0	0	0	0	0	0	942
4:15 PM	1	517	2	0	520	0	408	2	0	410	0	0	0	1	0	0	0	0	0	0	0	930
4:30 PM	0	568	0	0	568	0	450	2	0	452	0	0	0	0	0	0	0	0	0	0	0	1020
4:45 PM	0	602	0	0	602	0	417	1	0	418	1	0	2	1	3	4	4	0	0	0	4	1027
Total	3	2202	2	1	2207	1	1694	9	0	1704	2	0	2	2	4	4	4	0	0	0	4	3919
5:00 PM	2	621	0	0	623	0	430	2	0	432	1	0	0	0	1	0	0	0	0	0	0	1056
5:15 PM	0	647	0	0	647	1	389	0	0	390	0	0	0	0	0	0	0	1	0	0	1	1038
5:30 PM	2	605	0	0	607	0	329	0	0	329	1	0	1	0	2	0	0	2	0	0	2	940
5:45 PM	0	471	0	0	471	1	328	0	0	329	0	0	1	1	1	1	0	0	1	0	1	802
Total	4	2344	0	0	2348	2	1476	2	0	1480	2	0	2	1	4	1	0	0	4	0	4	3836
Grand Total	9	7384	5	1	7388	5	7408	25	0	7438	10	0	13	4	23	6	0	6	2	12	12	14871
Approch %	0.1	99.8	0.1	0.0		0.1	99.6	0.3	0.0		43.5	0.0	56.5	17.4		50.0	0.0	50.0	16.7			
Total %	0.1	49.7	0.0	0.0	49.7	0.0	49.8	0.2	0.0	50.0	0.1	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.1		
Cars, PU, Vans	9	7368	4	1	7381	5	7382	25	0	7412	10	0	13	4	23	6	0	6	2	12	12	14828
% Cars, PU, Vans	###	99.8	80.0	100.0	99.8	###	99.6	100.0	0.0	99.7	###	0.0	###	###	100.0	100.0	0.0	###	###	100.0	99.7	
Heavy Trucks	0	16	1	0	17	0	26	0	0	26	0	0	0	0	0	0	0	0	0	0	0	43
% Heavy Trucks	0.0	0.2	20.0	0.0	0.2	0.0	0.4	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3

Project ID: 15-9191-004
Location: Bull St & Franklin St, Fr
City: Columbia

Day: Thursday
Date: 5/14/2015

PEAK HOURS

AM

Start Time	Bull St Northbound					Bull St Southbound					Franklin St, Fred St Eastbound					Franklin St, Fred St Westbound					Int. Total		
	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total			
Peak Hour Analysis from 07:00 AM to 09:00 AM																							
Peak Hour for Entire Intersection Begins at 07:30 AM																							
7:30 AM	1	375	0	0	376	0	555	0	0	555	1	0	1	2	2	1	0	0	0	0	1	934	
7:45 AM	0	411	0	0	411	0	589	2	0	591	0	0	2	2	2	1	0	0	0	0	1	1005	
8:00 AM	0	389	1	0	390	0	578	1	0	579	0	0	0	0	0	0	0	0	1	0	1	970	
8:15 AM	0	383	0	0	383	0	557	2	0	559	0	0	0	0	0	0	0	0	0	0	0	942	
Total Volume	1	1558	1	0	1560	0	2279	5	0	2284	1	0	3	4	2	2	0	1	0	1	3	3851	
% App. Total	0.1	99.9	0.1	0.0	100.0	0.0	99.8	0.2	0.0	100.0	25.0	0.0	75.0	100.0	66.7	0.0	33.3	100.0					
PHF	0.949					0.966					0.500					0.750							
Cars, PU, Vans	1	1553	1	0	1555	0	2269	5	0	2274	1	0	3	4	2	2	0	1	0	1	3	3836	
% Cars, PU, Vans	###	99.7	###	###	99.7	0.0	99.6	###	99.6	###	0.0	###	###	100.0	###	0.0	100.0	100.0	99.6				
Heavy Trucks	0	5	0	0	5	0	10	0	0	10	0	0	0	0	0	0	0	0	0	0	0	15	
% Heavy Trucks	0.0	0.3	0.0	0.0	0.3	0.0	0.4	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4		

PM

Start Time	Bull St Northbound					Bull St Southbound					Franklin St, Fred St Eastbound					Franklin St, Fred St Westbound					Int. Total		
	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total			
Peak Hour Analysis from 04:00 PM to 06:00 PM																							
Peak Hour for Entire Intersection Begins at 04:30 PM																							
4:30 PM	0	568	0	0	568	0	450	2	0	452	0	0	0	0	0	0	0	0	0	0	0	1020	
4:45 PM	0	602	0	0	602	0	417	1	0	418	1	0	2	3	3	4	0	0	0	0	4	1027	
5:00 PM	2	621	0	0	623	0	430	2	0	432	1	0	0	1	0	0	0	0	0	0	0	1056	
5:15 PM	0	647	0	0	647	1	389	0	0	390	0	0	0	0	0	0	0	1	0	0	1	1038	
Total Volume	2	2438	0	0	2440	1	1686	5	0	1692	2	0	2	4	4	4	0	1	0	1	5	4141	
% App. Total	0.1	99.9	0.0	0.0	100.0	0.1	99.6	0.3	0.0	100.0	50.0	0.0	50.0	100.0	80.0	0.0	20.0	100.0					
PHF	0.943					0.936					0.333					0.313							
Cars, PU, Vans	2	2433	0	0	2435	1	1681	5	0	1687	2	0	2	4	4	4	0	1	0	1	5	4131	
% Cars, PU, Vans	###	99.8	0.0	0.0	99.8	100.0	99.7	###	99.7	###	0.0	###	###	100.0	###	0.0	100.0	100.0	99.8				
Heavy Trucks	0	5	0	0	5	0	5	0	0	5	0	0	0	0	0	0	0	0	0	0	0	10	
% Heavy Trucks	0.0	0.2	0.0	0.0	0.2	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2		

ITM Peak Hour Summary

Prepared by:

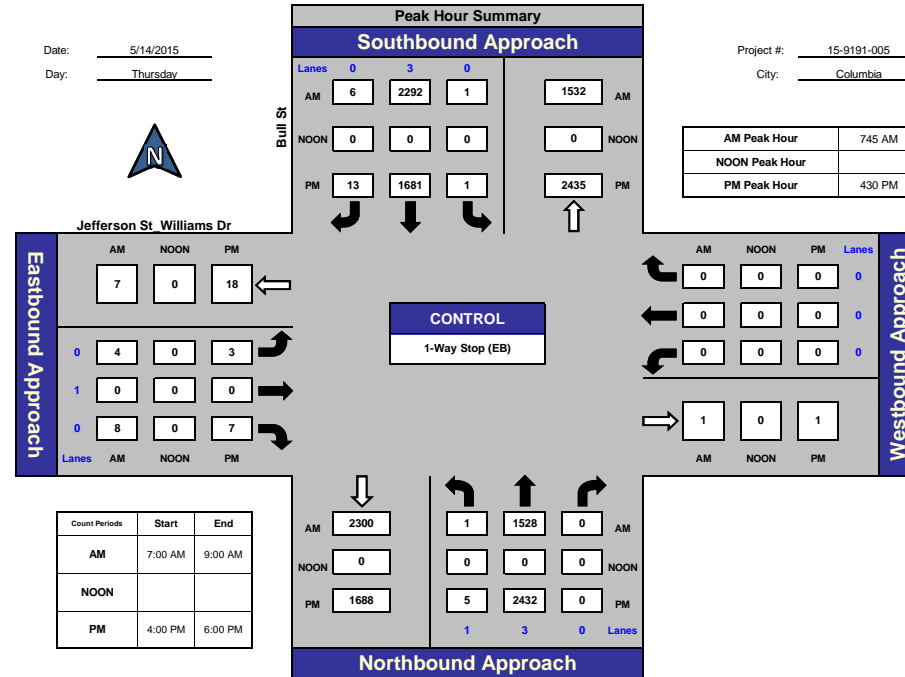


National Data & Surveying Services

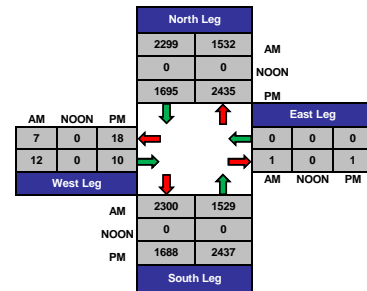
Bull St and Jefferson St, Williams Dr., Columbia

Date: 5/14/2015
Day: Thursday

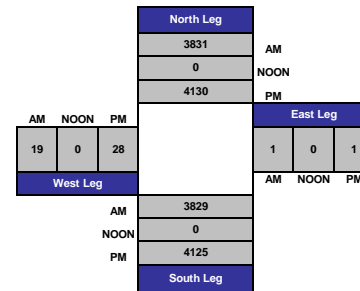
Project #: 15-9191-005
City: Columbia



Total Ins & Outs



Total Volume Per Leg



ITM Peak Hour Summary

Prepared by:

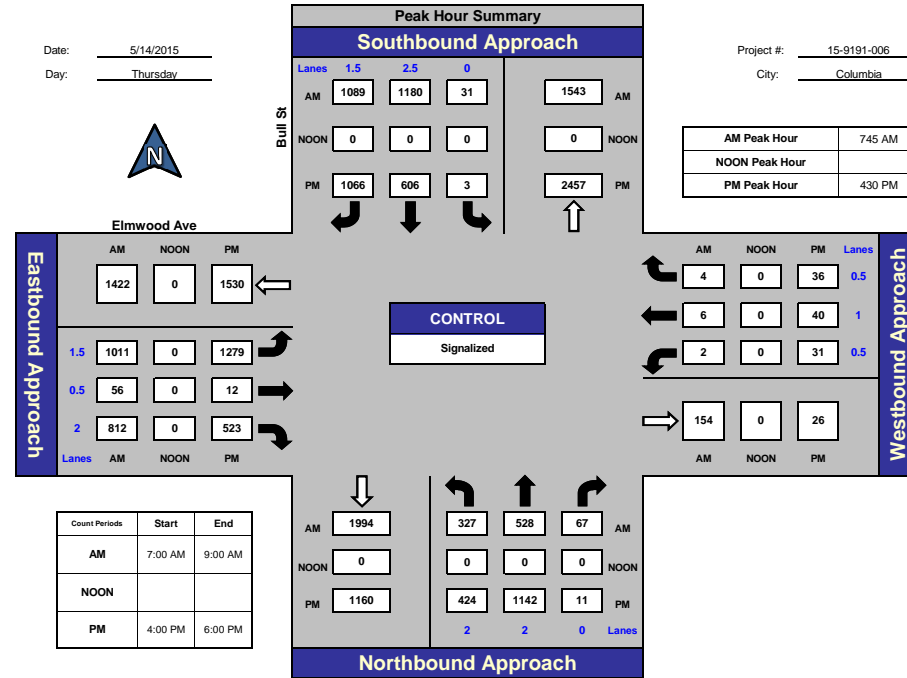


National Data & Surveying Services

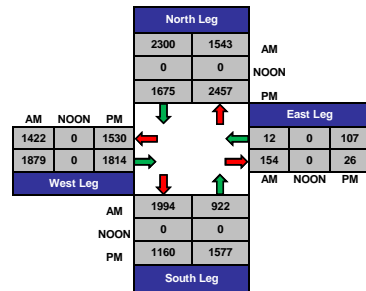
Bull St and Elmwood Ave, Columbia

Date: 5/14/2015
Day: Thursday

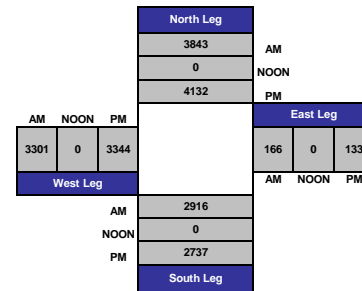
Project #: 15-9191-006
City: Columbia



Total Ins & Outs



Total Volume Per Leg



ITM Peak Hour Summary

Prepared by:

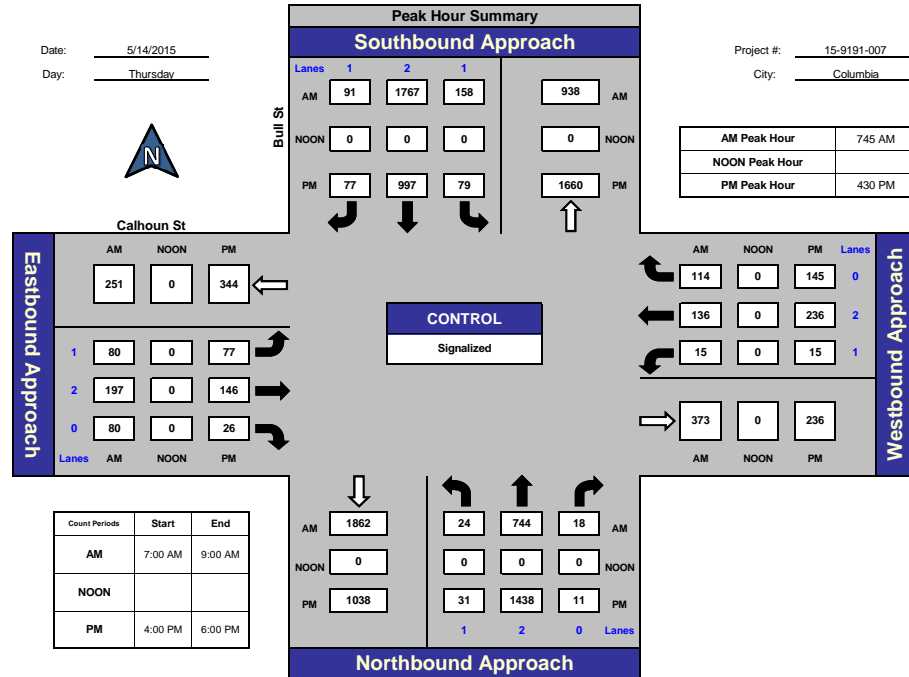


National Data & Surveying Services

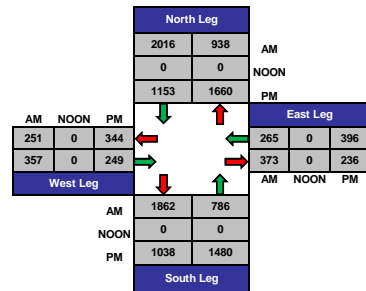
Bull St and Calhoun St, Columbia

Date: 5/14/2015
Day: Thursday

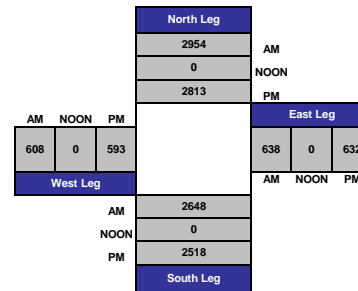
Project #: 15-9191-007
City: Columbia



Total Ins & Outs



Total Volume Per Leg



ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 15-9191-007
 N/S Street: Bull St
 E/W Street: Calhoun St
 DATE: 5/14/2015
 CITY: Columbia

DAY: Thursday

A M

PEDESTRIANS

T I M E	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
7:00 AM	0	3	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0
7:30 AM	0	0	2	0	0	0	0	0
7:45 AM	0	1	0	0	0	0	0	0
8:00 AM	2	0	1	0	1	0	0	2
8:15 AM	0	0	2	0	0	0	0	0
8:30 AM	0	1	1	0	1	0	0	0
8:45 AM	1	2	1	0	0	0	0	0
TOTALS	3	7	7	0	2	0	0	2

BIKES

T I M E	NB			SB			EB			WB		
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	1	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	3	0	0	0	0	0	3	0	0	0	0
8:30 AM	0	0	0	0	1	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	3	0	0	2	0	0	3	0	0	0	0

P M

PEDESTRIANS

T I M E	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
4:00 PM	1	0	1	0	0	0	0	1
4:15 PM	0	0	0	0	0	0	0	0
4:30 PM	1	0	0	1	0	0	1	0
4:45 PM	0	2	0	0	0	1	0	0
5:00 PM	0	0	0	0	0	0	1	0
5:15 PM	1	1	2	0	0	0	3	1
5:30 PM	1	1	0	0	0	0	0	1
5:45 PM	1	2	0	1	0	0	0	0
TOTALS	5	6	3	2	0	1	5	3

BIKES

T I M E	NB			SB			EB			WB		
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	1	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	1	0	0	0	0	0	0	0
5:00 PM	0	1	0	0	0	0	0	0	0	0	1	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	1	0	0	1	0	0	1	0	0	1	0

ITM Peak Hour Summary

Prepared by:

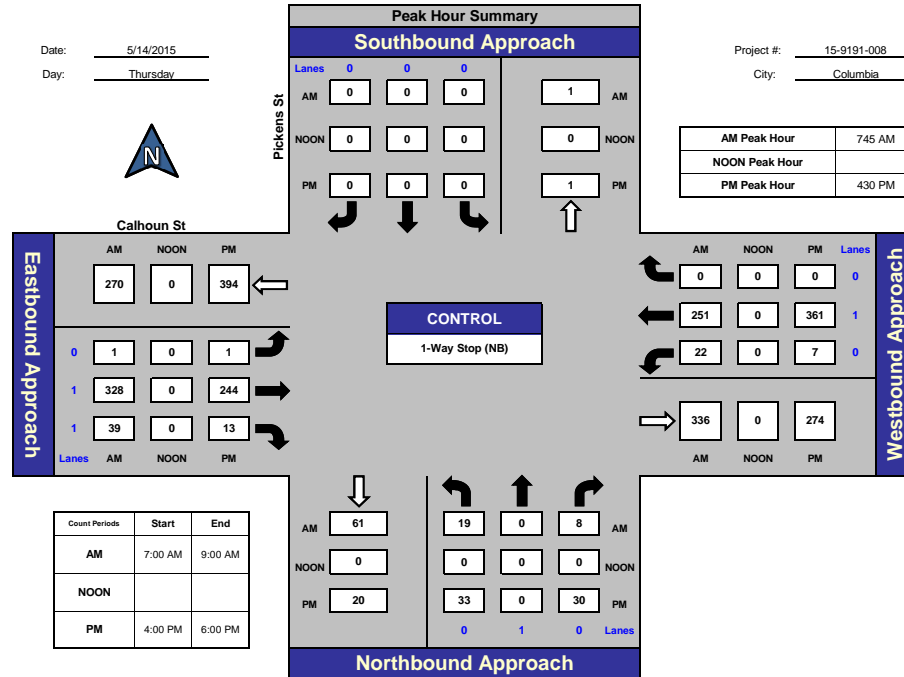


National Data & Surveying Services

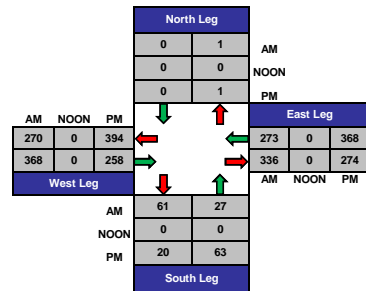
Pickens St and Calhoun St, Columbia

Date: 5/14/2015
Day: Thursday

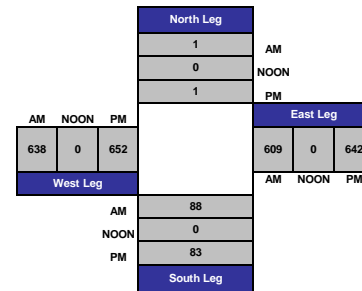
Project #: 15-9191-008
City: Columbia



Total Ins & Outs



Total Volume Per Leg



ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 15-9191-008
 N/S Street: Pickens St
 E/W Street: Calhoun St
 DATE: 5/14/2015
 CITY: Columbia

DAY: Thursday

A M

PEDESTRIANS

T I M E	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
7:00 AM	1	0	1	0	0	0	0	0
7:15 AM	0	1	2	3	1	0	0	0
7:30 AM	0	2	2	1	0	0	0	0
7:45 AM	1	1	7	0	0	0	0	0
8:00 AM	2	0	2	0	0	0	0	0
8:15 AM	2	0	3	1	0	0	0	0
8:30 AM	0	0	2	1	0	0	0	0
8:45 AM	1	0	1	0	0	0	0	0
TOTALS	7	4	20	6	1	0	0	0

BIKES

T I M E	NB			SB			EB			WB		
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	2	0	0	0	0
7:30 AM	1	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	1	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	1	0	0	0	1	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	1	0	0	0	1	0	0	3	1	0	0	0

P M

PEDESTRIANS

T I M E	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
4:00 PM	0	0	2	0	0	0	0	0
4:15 PM	2	0	0	1	0	0	0	0
4:30 PM	1	1	0	4	0	0	0	0
4:45 PM	1	0	0	3	0	0	1	0
5:00 PM	0	1	0	1	0	0	0	0
5:15 PM	0	0	0	5	0	0	0	0
5:30 PM	1	0	0	1	0	0	0	0
5:45 PM	1	0	0	0	0	0	0	0
TOTALS	6	2	2	15	0	0	1	0

BIKES

T I M E	NB			SB			EB			WB		
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	2	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	1	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	3	0
5:15 PM	0	0	0	0	0	0	0	1	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	1	0	0	0
TOTALS	0	0	0	0	0	0	0	4	1	0	3	0

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Project ID: 15-9191-008
 Location: Pickens St & Calhoun St
 City: Columbia

Day: Thursday
 Date: 5/14/2015

Peak Start Times	
AM	7:00 AM
MD	12:00 AM
PM	4:00 PM

Groups Printed - Cars, PU, Vans - Heavy Trucks

Start Time	Pickens St Northbound				Pickens St Southbound				Calhoun St Eastbound				Calhoun St Westbound				Int. Total		
	Left	Thru	Rgt	App. Total	Left	Thru	Rgt	App. Total	Left	Thru	Rgt	App. Total	Left	Thru	Rgt	App. Total			
7:00 AM	1	0	1	2	0	0	0	0	0	45	4	0	49	0	23	0	0	23	74
7:15 AM	2	0	0	2	0	0	0	0	0	68	5	0	73	2	44	0	1	46	121
7:30 AM	1	0	1	2	0	0	0	0	0	72	7	0	79	1	55	0	0	56	137
7:45 AM	4	0	3	7	7	0	0	2	0	90	12	0	102	3	63	0	0	66	175
Total	8	0	5	13	0	0	0	6	0	275	28	0	303	6	185	0	1	191	507
8:00 AM	3	0	3	6	0	0	0	0	0	74	10	0	84	6	57	0	0	63	153
8:15 AM	6	0	1	7	0	0	0	0	0	76	9	0	85	7	68	0	0	75	167
8:30 AM	6	0	1	7	0	0	0	0	0	88	8	0	96	6	63	0	0	69	173
8:45 AM	0	0	1	1	0	0	0	0	0	76	4	0	80	4	60	0	0	64	145
Total	15	0	6	21	0	0	0	5	0	314	31	0	346	23	248	0	0	271	638
BREAK																			
4:00 PM	4	0	2	6	0	0	0	0	0	43	5	0	48	1	75	0	0	76	130
4:15 PM	1	0	3	4	0	0	0	0	0	35	2	0	37	0	65	0	0	65	106
4:30 PM	7	0	5	12	0	0	0	0	0	49	2	0	51	2	98	0	0	100	163
4:45 PM	8	0	6	14	0	0	0	0	0	62	3	1	66	0	77	0	0	77	156
Total	20	0	16	36	0	0	0	5	0	189	12	1	201	3	315	0	0	318	555
5:00 PM	11	0	12	23	0	0	0	0	0	74	5	0	80	3	108	0	0	111	214
5:15 PM	7	0	7	14	0	0	0	0	0	59	3	0	62	2	78	0	0	80	156
5:30 PM	2	0	6	8	0	0	0	0	0	57	3	0	60	0	71	0	0	71	139
5:45 PM	3	0	0	3	0	0	0	0	0	50	1	0	51	1	51	0	0	52	106
Total	23	0	25	48	0	0	0	3	0	240	12	0	253	6	308	0	0	314	615
Grand Total	66	0	52	118	0	0	0	19	0	21018	83	1	1103	38	1056	0	1	1094	2315
Approch %	55.9	0.0	44.1	36.4	0.0	0.0	0.0	0.0	0.0	92.3	7.5	0.1	3.5	96.5	0.0	0.1			
Total %	2.9	0.0	2.2	1.9	5.1	0.0	0.0	0.0	0.8	0.0	0.1	44.0	3.6	0.0	47.6	1.6	45.6	0.0	47.3
Cars, PU, Vans	66	0	52	118	0	0	0	19	0	21016	82	1	1100	38	1056	0	1	1094	2312
% Cars, PU, Vans	###	0.0	###	100.0	0.0	0.0	0.0	###	0.0	###	99.8	98.8	###	99.7	100.0	0.0	###	100.0	99.9
Heavy Trucks	0	0	0	0	0	0	0	0	0	2	1	0	3	0	0	0	0	0	3
% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.2	0.0	0.3	0.0	0.0	0.0	0.0	0.1

Project ID: 15-9191-008
 Location: Pickens St & Calhoun St
 City: Columbia

Day: Thursday
 Date: 5/14/2015

PEAK HOURS

Start Time	Pickens St Northbound				Pickens St Southbound				Calhoun St Eastbound				Calhoun St Westbound				Int. Total
	Left	Thru	Rgt	App. Total	Left	Thru	Rgt	App. Total	Left	Thru	Rgt	App. Total	Left	Thru	Rgt	App. Total	
Peak Hour Analysis from 07:00 AM to 09:00 AM																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
7:45 AM	4	0	3	7	0	0	0	0	0	90	12	102	3	63	0	66	175
8:00 AM	3	0	3	6	0	0	0	0	0	74	10	84	6	57	0	63	153
8:15 AM	6	0	1	7	0	0	0	0	0	76	9	85	7	68	0	75	167
8:30 AM	6	0	1	7	0	0	0	0	0	88	8	96	6	63	0	69	173
Total Volume	19	0	8	27	0	0	0	0	1	328	39	368	22	251	0	273	668
% App. Total	70.4	0.0	29.6	100	0.0	0.0	0.0	0.3	0.3	89.1	10.6	100	8.1	91.9	0.0	100	
PHF	0.964				0.000				0.902				0.910				
Cars, PU, Vans	19	0	8	27	0	0	0	0	0	327	38	366	22	251	0	273	666
% Cars, PU, Vans	###	0.0	###	100.0	0.0	0.0	0.0	0.0	###	99.7	97.4	99.5	###	###	0.0	100.0	99.7
Heavy Trucks	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	2
% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.6	0.5	0.0	0.0	0.0	0.0	0.3
PM																	
Start Time	Pickens St Northbound				Pickens St Southbound				Calhoun St Eastbound				Calhoun St Westbound				Int. Total
	Left	Thru	Rgt	App. Total	Left	Thru	Rgt	App. Total	Left	Thru	Rgt	App. Total	Left	Thru	Rgt	App. Total	
Peak Hour Analysis from 04:00 PM to 06:00 PM																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
4:30 PM	7	0	5	12	0	0	0	0	0	49	2	51	2	98	0	100	163
4:45 PM	8	0	6	14	0	0	0	0	0	62	3	65	0	77	0	77	156
5:00 PM	11	0	12	23	0	0	0	0	1	74	5	80	3	108	0	111	214
5:15 PM	7	0	7	14	0	0	0	0	0	59	3	62	2	78	0	80	156
Total Volume	33	0	30	63	0	0	0	0	1	244	13	258	7	361	0	368	689
% App. Total	52.4	0.0	47.6	100	0.0	0.0	0.0	0.4	0.4	94.6	5.0	100	1.9	98.1	0.0	100	
PHF	0.685				0.000				0.806				0.829				
Cars, PU, Vans	33	0	30	63	0	0	0	0	0	243	13	257	7	361	0	368	688
% Cars, PU, Vans	###	0.0	###	100.0	0.0	0.0	0.0	0.0	###	99.6	###	99.6	###	###	0.0	100.0	99.9
Heavy Trucks	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.4	0.0	0.0	0.0	0.0	0.1

ITM Peak Hour Summary

Prepared by:

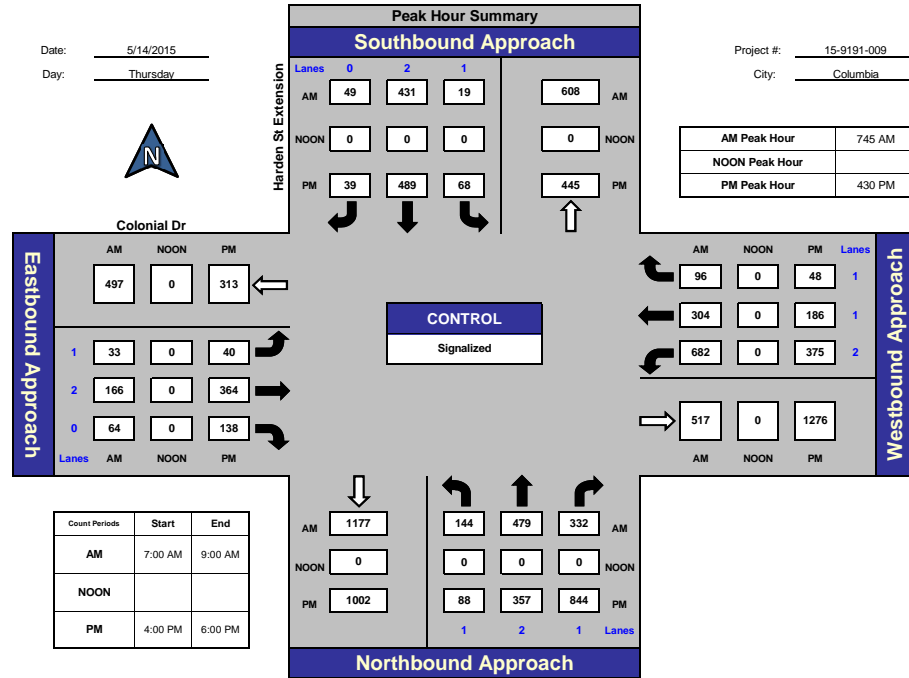


National Data & Surveying Services

Harden St Extension and Colonial Dr., Columbia

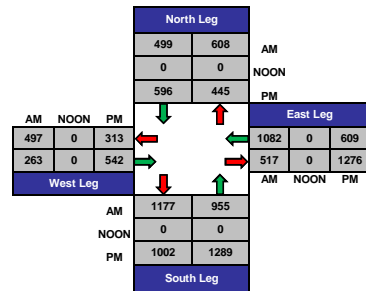
Date: 5/14/2015
Day: Thursday

Project #: 15-9191-009
City: Columbia

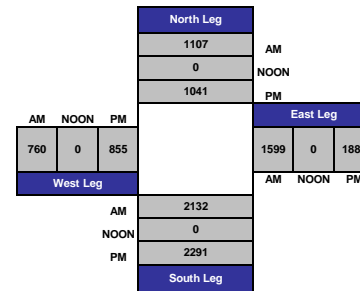


AM Peak Hour	745 AM
NOON Peak Hour	
PM Peak Hour	430 PM

Total Ins & Outs



Total Volume Per Leg



ITM Peak Hour Summary

Prepared by:

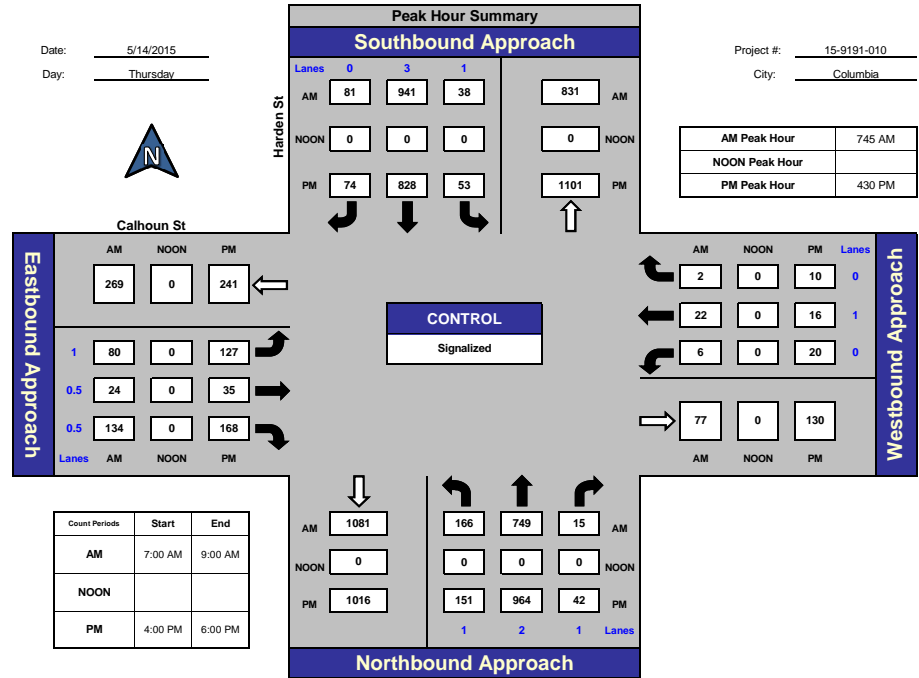


National Data & Surveying Services

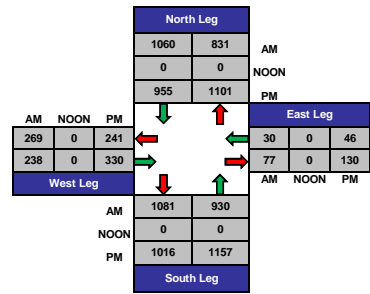
Harden St and Calhoun St, Columbia

Date: 5/14/2015
Day: Thursday

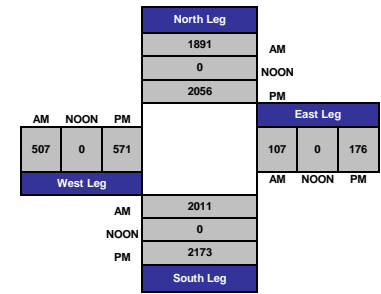
Project #: 15-9191-010
City: Columbia



Total Ins & Outs



Total Volume Per Leg



ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 15-9191-010
 N/S Street: Harden St
 E/W Street: Calhoun St
 DATE: 5/14/2015
 CITY: Columbia

DAY: Thursday

A M

PEDESTRIANS

T I M E	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
7:00 AM	0	0	0	0	0	0	0	0
7:15 AM	0	1	0	1	0	0	0	0
7:30 AM	0	0	1	0	0	2	0	0
7:45 AM	0	0	2	1	0	1	0	0
8:00 AM	0	0	2	2	0	0	1	2
8:15 AM	0	0	2	6	0	1	3	3
8:30 AM	0	0	0	3	0	1	0	0
8:45 AM	1	0	0	2	0	0	2	2
TOTALS	1	1	7	15	0	5	6	7

BIKES

T I M E	NB			SB			EB			WB		
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	1	0	0	0	0	0	0	0
7:45 AM	0	1	0	0	0	0	0	0	0	0	1	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	1	0	0	1	0	0	0	0	0	1	0

P M

PEDESTRIANS

T I M E	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
4:00 PM	0	3	2	9	0	0	2	1
4:15 PM	1	0	3	3	0	0	0	1
4:30 PM	0	0	0	4	0	0	2	1
4:45 PM	0	0	2	2	0	0	0	3
5:00 PM	2	0	5	8	0	0	1	1
5:15 PM	0	0	2	5	0	0	0	1
5:30 PM	0	0	2	2	0	0	0	2
5:45 PM	2	0	4	2	1	0	1	3
TOTALS	5	3	20	35	1	0	6	13

BIKES

T I M E	NB			SB			EB			WB		
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
4:00 PM	0	0	0	0	1	0	0	0	0	0	1	0
4:15 PM	0	1	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	2	0
4:45 PM	0	0	0	0	0	0	0	2	0	0	0	0
5:00 PM	0	1	0	2	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	2	0
5:30 PM	0	0	0	0	0	0	0	1	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	1	0
TOTALS	0	2	0	2	1	0	0	3	0	0	6	0

ITM Peak Hour Summary

Prepared by:

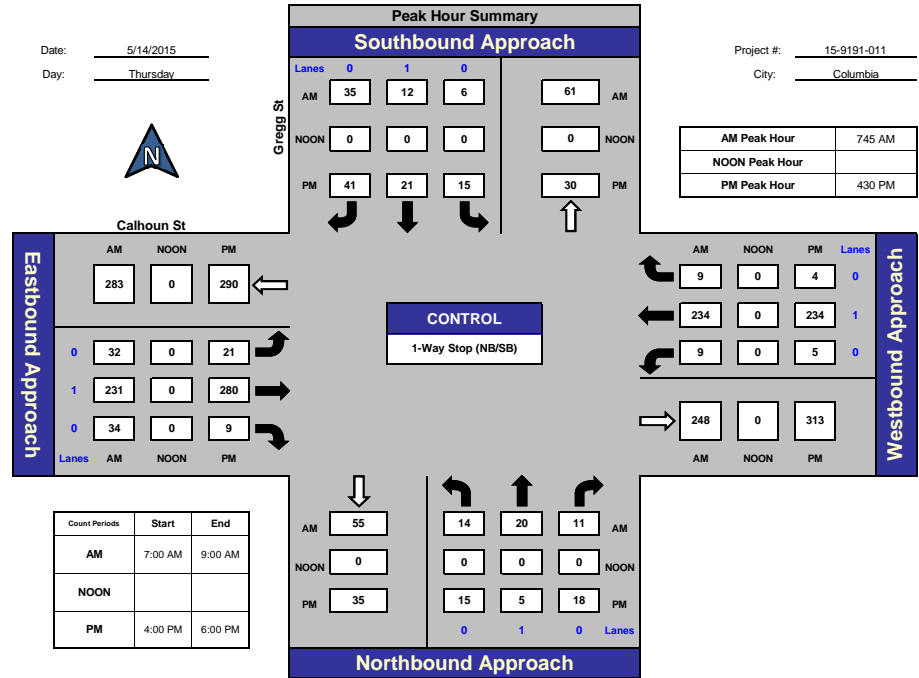


National Data & Surveying Services

Gregg St and Calhoun St, Columbia

Date: 5/14/2015
Day: Thursday

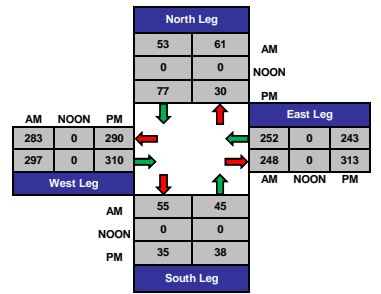
Project #: 15-9191-011
City: Columbia



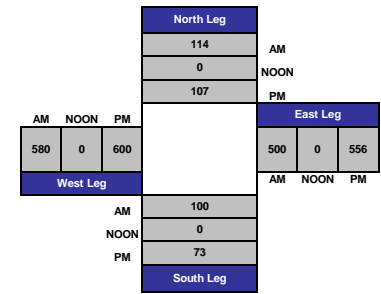
AM Peak Hour	745 AM
NOON Peak Hour	
PM Peak Hour	430 PM

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 15-9191-011
 N/S Street: Gregg St
 E/W Street: Calhoun St
 DATE: 5/14/2015
 CITY: Columbia

DAY: Thursday

A M

PEDESTRIANS

T I M E	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
7:00 AM	0	0	2	2	0	0	0	0
7:15 AM	0	0	0	1	0	0	0	0
7:30 AM	0	2	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0
8:00 AM	1	0	0	0	0	0	0	0
8:15 AM	4	0	1	0	0	0	0	0
8:30 AM	0	0	1	0	0	0	0	0
8:45 AM	0	1	0	0	0	0	0	0
TOTALS	5	3	4	3	0	0	0	0

BIKES

T I M E	NB			SB			EB			WB		
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	2	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	1	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	0	0	0	0	0	0	3	0	0	0	0

P M

PEDESTRIANS

T I M E	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
4:00 PM	0	0	2	0	0	0	0	0
4:15 PM	1	0	1	0	0	0	0	0
4:30 PM	0	1	0	1	0	0	0	0
4:45 PM	1	0	0	0	0	0	0	0
5:00 PM	0	1	0	1	0	0	0	0
5:15 PM	0	0	0	1	0	0	0	0
5:30 PM	1	0	0	0	0	1	1	0
5:45 PM	0	1	0	0	0	0	0	0
TOTALS	3	3	3	3	0	1	1	0

BIKES

T I M E	NB			SB			EB			WB		
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
4:00 PM	0	1	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	2	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	1	0	0	2	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	1	0
5:15 PM	0	0	0	0	0	0	0	2	0	0	0	0
5:30 PM	0	0	1	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	1	1	0	0	0	0	5	0	0	3	0

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Project ID: 15-9191-011
 Location: Gregg St & Calhoun St
 City: Columbia

Day: Thursday
 Date: 5/14/2015

Peak Start Times	
AM	7:00 AM
MD	12:00 AM
PM	4:00 PM

Groups Printed - Cars, PU, Vans - Heavy Trucks

Start Time	Gregg St Northbound					Gregg St Southbound					Calhoun St Eastbound					Calhoun St Westbound					Int. Total
	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	
7:00 AM	1	0	7	4	8	0	0	1	0	1	4	42	2	0	48	4	19	3	0	26	83
7:15 AM	2	0	2	1	4	2	1	3	0	6	3	48	4	0	55	1	46	2	0	49	114
7:30 AM	2	2	1	0	5	0	1	5	2	6	7	57	8	0	72	6	48	1	0	55	138
7:45 AM	1	1	3	0	5	2	2	8	0	12	7	59	10	0	76	0	66	4	0	70	163
Total	6	3	13	5	22	4	4	17	2	25	21	206	24	0	251	11	179	10	0	200	498
8:00 AM	8	3	0	0	11	3	2	7	1	12	8	69	6	0	83	1	44	1	0	46	152
8:15 AM	2	8	4	1	14	0	4	9	4	13	11	45	12	0	68	3	64	3	0	70	165
8:30 AM	3	8	4	1	15	1	4	11	0	16	6	58	6	0	70	5	60	1	0	66	157
8:45 AM	3	4	5	0	12	1	2	2	1	5	2	56	9	0	67	4	56	5	0	65	149
Total	16	23	13	2	52	5	12	29	6	46	27	228	33	0	288	13	224	10	0	247	633
BREAK																					
4:00 PM	10	2	7	2	19	1	1	2	0	4	5	47	0	0	52	1	51	1	0	53	128
4:15 PM	5	1	4	1	10	4	1	7	1	12	3	36	1	0	40	1	49	1	0	51	113
4:30 PM	4	1	4	1	9	7	3	10	1	20	6	52	4	0	62	1	66	2	0	69	160
4:45 PM	3	1	4	0	8	1	6	8	1	15	2	63	4	0	69	1	52	0	0	53	145
Total	22	5	19	4	46	13	11	27	3	51	16	198	9	0	223	4	218	4	0	226	546
5:00 PM	5	1	4	1	10	4	8	16	1	28	8	92	0	0	100	1	63	2	0	66	204
5:15 PM	3	2	6	1	11	3	4	7	0	14	5	73	1	0	79	2	53	0	0	55	159
5:30 PM	6	0	3	0	9	6	1	2	1	9	0	64	1	1	65	4	54	0	1	58	141
5:45 PM	3	2	0	0	5	1	1	0	1	2	2	51	0	0	53	1	43	1	0	45	105
Total	17	5	13	2	35	14	14	25	3	53	15	280	2	1	297	8	213	3	1	224	609
Grand Total	61	36	58	13	155	36	41	98	14	175	79	912	68	1	1059	36	834	27	1	897	2286
Approch %	39.4	23.2	37.4	8.4	20.6	23.4	56.0	8.0	7.5	86.1	6.4	0.1	4.0	93.0	3.0	0.1					
Total %	2.7	1.6	2.5	0.6	6.8	1.6	1.8	4.3	0.6	7.7	3.5	39.9	3.0	0.0	46.3	1.6	36.5	1.2	0.0	39.2	
Cars, PU, Vans	61	36	58	13	155	36	41	98	14	175	79	911	67	1	1057	36	834	27	1	897	2284
% Cars, PU, Vans	###	###	###	###	100.0	###	###	###	###	100.0	###	99.9	98.5	###	99.8	100.0	100.0	###	###	100.0	99.9
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	2
% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.5	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.1

Project ID: 15-9191-011
 Location: Gregg St & Calhoun St
 City: Columbia

Day: Thursday
 Date: 5/14/2015

PEAK HOURS

Start Time	Gregg St Northbound					Gregg St Southbound					Calhoun St Eastbound					Calhoun St Westbound					Int. Total
	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	
Peak Hour Analysis from 07:00 AM to 09:00 AM																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
7:45 AM	1	1	3	5		2	2	8	12		7	59	10	76		0	66	4	70		163
8:00 AM	8	3	0	11		3	2	7	12		8	69	6	83		1	44	1	46		152
8:15 AM	2	8	4	14		0	4	9	13		11	45	12	68		3	64	3	70		165
8:30 AM	3	8	4	15		1	4	11	16		6	58	6	70		5	60	1	66		167
Total Volume	14	20	11	45		6	12	35	53		32	231	34	297		9	234	9	252		647
% App. Total	31.1	44.4	24.4	100		11.3	22.6	66.0	100		10.8	77.8	11.4	100		3.6	92.9	3.6	100		
PHF	0.750					0.828					0.895					0.900					
Cars, PU, Vans	14	20	11	45		6	12	35	53		32	230	34	296		9	234	9	252		646
% Cars, PU, Vans	###	###	###	100.0		100.0	###	###	100.0		###	99.6	###	99.7		###	###	100.0	100.0		99.8
Heavy Trucks	0	0	0	0		0	0	0	0		0	1	0	1		0	0	0	0		1
% Heavy Trucks	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.4	0.0	0.3		0.0	0.0	0.0	0.0		0.2
PM																					
Start Time	Gregg St Northbound					Gregg St Southbound					Calhoun St Eastbound					Calhoun St Westbound					Int. Total
	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	
Peak Hour Analysis from 04:00 PM to 06:00 PM																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
4:30 PM	4	1	4	9		7	3	10	20		6	52	4	62		1	66	2	69		160
4:45 PM	3	1	4	8		1	6	8	15		2	63	4	69		1	52	0	53		145
5:00 PM	5	1	4	10		4	8	16	28		8	92	0	100		1	63	2	66		204
5:15 PM	3	2	6	11		3	4	7	14		5	73	1	79		2	53	0	55		159
Total Volume	15	5	18	38		15	21	41	77		21	280	9	310		5	234	4	243		668
% App. Total	39.5	13.2	47.4	100		19.5	27.3	53.2	100		6.8	90.3	2.9	100		2.1	96.3	1.6	100		
PHF	0.864					0.688					0.775					0.880					
Cars, PU, Vans	15	5	18	38		15	21	41	77		21	280	8	309		5	234	4	243		667
% Cars, PU, Vans	###	###	###	100.0		100.0	###	###	100.0		###	100.0	88.9	99.7		###	###	100.0	100.0		99.9
Heavy Trucks	0	0	0	0		0	0	0	0		0	0	1	1		0	0	0	0		1
% Heavy Trucks	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	11.1	0.3		0.0	0.0	0.0	0.0		0.1

ITM Peak Hour Summary

Prepared by:

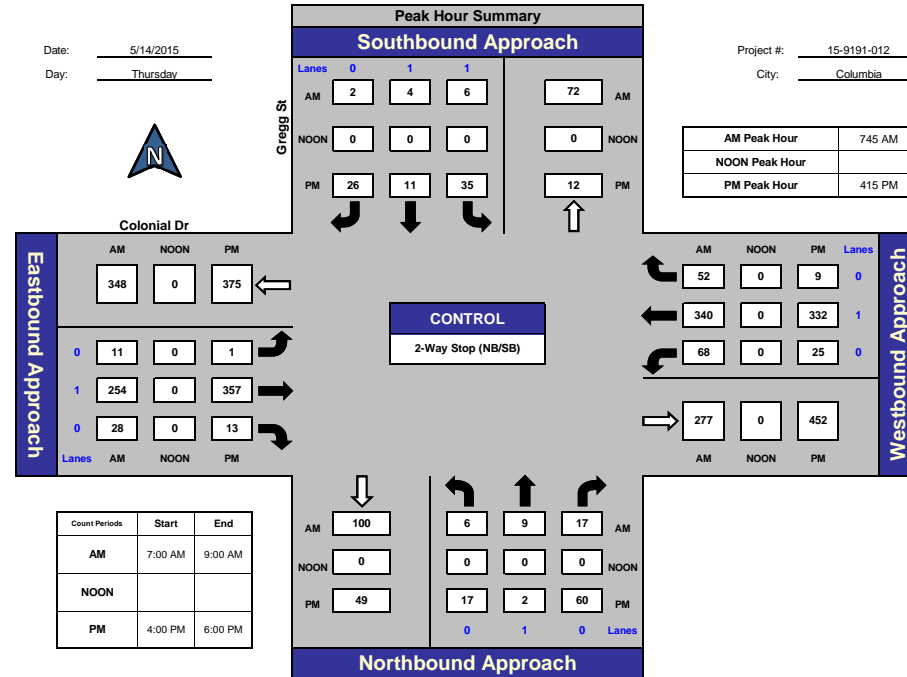


National Data & Surveying Services

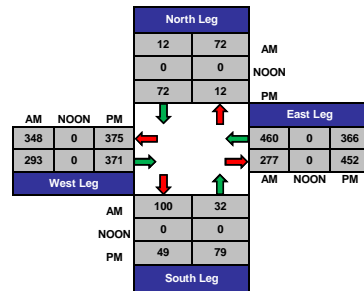
Gregg St and Colonial Dr., Columbia

Date: 5/14/2015
Day: Thursday

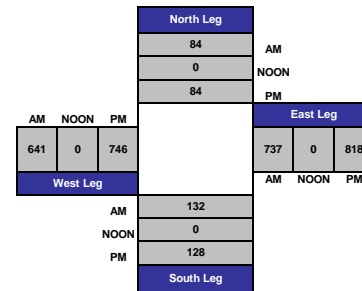
Project #: 15-9191-012
City: Columbia



Total Ins & Outs



Total Volume Per Leg



ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 15-9191-012
 N/S Street: Gregg St
 E/W Street: Colonial Dr
 DATE: 5/14/2015
 CITY: Columbia

DAY: Thursday

A M

PEDESTRIANS

T I M E	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
7:00 AM	0	0	0	0	0	0	0	0
7:15 AM	0	0	1	0	0	0	0	0
7:30 AM	1	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	1	0
8:45 AM	0	0	0	0	0	0	0	0
TOTALS	1	0	1	0	0	0	1	0

BIKES

T I M E	NB			SB			EB			WB		
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	0	0	0	0	0	0	0	0	0	0	0

P M

PEDESTRIANS

T I M E	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
4:00 PM	0	0	0	0	0	0	0	0
4:15 PM	0	0	1	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0
5:30 PM	1	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0
TOTALS	1	0	1	0	0	0	0	0

BIKES

T I M E	NB			SB			EB			WB		
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	1	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	0	0	0	0	0	0	0	0	0	1	0

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Project ID: 15-9191-012
Location: Gregg St & Colonial Dr
City: Columbia

Day: Thursday
Date: 5/14/2015

Peak Start Times	
AM	7:00 AM
MD	12:00 AM
PM	4:00 PM

Groups Printed - Cars, PU, Vans - Heavy Trucks

Start Time	Gregg St Northbound					Gregg St Southbound					Colonial Dr Eastbound					Colonial Dr Westbound					Int. Total
	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	
7:00 AM	0	1	5	0	6	0	0	0	0	0	1	45	5	0	51	13	45	0	0	58	115
7:15 AM	4	1	1	1	6	0	1	1	0	2	0	50	1	0	51	4	59	0	0	63	122
7:30 AM	1	0	5	0	6	1	0	0	1	1	3	68	4	0	75	13	66	2	0	81	163
7:45 AM	1	1	7	0	9	0	1	0	0	1	0	77	6	0	83	14	85	5	0	104	197
Total	6	3	18	1	27	1	2	1	1	4	4	240	16	0	260	44	255	7	0	306	597
8:00 AM	1	1	3	0	5	1	2	1	0	4	4	58	3	0	65	11	86	8	0	105	179
8:15 AM	2	3	6	0	11	4	1	0	0	5	3	63	6	0	72	22	92	24	0	138	226
8:30 AM	2	4	1	0	7	1	0	1	0	2	4	56	13	1	73	21	77	15	0	113	195
8:45 AM	1	0	6	0	7	1	2	0	0	3	7	52	6	0	65	7	82	6	0	95	170
Total	6	8	16	0	30	7	5	2	0	14	18	229	28	1	275	61	337	53	0	451	770

BREAK

4:00 PM	3	3	12	0	18	11	0	3	0	14	1	91	2	0	94	4	82	6	0	92	218
4:15 PM	3	1	12	1	16	3	3	6	0	12	0	88	2	0	90	5	76	4	0	85	203
4:30 PM	9	0	14	0	23	5	3	6	0	14	1	87	3	0	91	4	106	2	0	112	240
4:45 PM	1	0	7	0	8	9	3	5	0	17	0	76	2	0	78	7	63	1	0	71	174
Total	16	4	45	1	65	28	9	20	0	57	2	342	9	0	353	20	327	13	0	360	835
5:00 PM	4	1	27	0	32	18	2	9	0	29	0	106	6	0	112	9	87	2	0	98	271
5:15 PM	2	1	11	0	14	5	3	1	0	9	0	106	4	0	110	2	66	1	0	69	202
5:30 PM	3	2	6	0	11	2	1	2	1	5	1	72	2	0	75	2	66	3	0	71	162
5:45 PM	2	0	6	0	8	6	1	2	0	9	0	68	0	0	68	1	58	1	0	60	145
Total	11	4	50	0	65	31	7	14	1	52	1	352	12	0	365	14	277	7	0	298	780

Grand Total	39	19	129	2	187	67	23	37	2	127	25	1163	65	1	1253	139	1196	80	0	1415	2982
Apprch %	20.9	10.2	69.0	1.1		52.8	18.1	29.1	1.6		2.0	92.8	5.2	0.1		9.8	84.5	5.7	0.0		
Total %	1.3	0.6	4.3	0.1	6.3	2.2	0.8	1.2	0.1	4.3	0.8	39.0	2.2	0.0	42.0	4.7	40.1	2.7	0.0	47.5	
Cars, PU, Vans	38	19	129	2	186	67	23	37	2	127	25	1162	64	1	1251	139	1193	80	0	1412	2976
% Cars, PU, Vans	97.4	###	###	100.0	99.5	###	###	###	100.0	###	100.0	###	99.9	98.5	###	99.8	100.0	99.7	###	0.0	99.8
Heavy Trucks	1	0	0	0	1	0	0	0	0	0	0	0	1	1	2	0	3	0	0	3	6
% Heavy Trucks	2.6	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.5	0.0	0.2	0.0	0.3	0.0	0.0	0.2	0.2

Project ID: 15-9191-012
Location: Gregg St & Colonial Dr
City: Columbia

Day: Thursday
Date: 5/14/2015

PEAK HOURS

Start Time	Gregg St Northbound					Gregg St Southbound					Colonial Dr Eastbound					Colonial Dr Westbound					Int. Total
	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	
Peak Hour Analysis from 07:00 AM to 09:00 AM																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
7:45 AM	1	1	7	9		0	1	0	1		0	77	6	83		14	85	5	104		197
8:00 AM	1	1	3	5		1	2	1	4		4	58	3	65		11	86	8	105		179
8:15 AM	2	3	6	11		4	1	0	5		3	63	6	72		22	92	24	138		226
8:30 AM	2	4	1	7		1	0	1	2		4	56	13	73		21	77	15	113		195
Total Volume	6	9	17	32		6	4	2	12		11	254	28	293		68	340	52	460		797
% App. Total	18.8	28.1	53.1	100		50.0	33.3	16.7	100		3.8	86.7	9.6	100		14.8	73.9	11.3	100		
PHF	0.727					0.600					0.883					0.833					
Cars, PU, Vans	6	9	17	32		6	4	2	12		11	254	28	293		68	339	52	459		796
% Cars, PU, Vans	###	###	###	100.0		100.0	###	###	100.0		###	100.0	###	100.0		###	99.7	100.0	99.8		99.9
Heavy Trucks	0	0	0	0		0	0	0	0		0	0	0	0		0	1	0	1		1
% Heavy Trucks	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.3	0.0	0.2		0.1

Start Time	Gregg St Northbound					Gregg St Southbound					Colonial Dr Eastbound					Colonial Dr Westbound					Int. Total
	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	
Peak Hour Analysis from 04:00 PM to 06:00 PM																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
4:15 PM	3	1	12	16		3	3	6	12		0	88	2	90		5	76	4	85		203
4:30 PM	9	0	14	23		5	3	6	14		1	87	3	91		4	106	2	112		240
4:45 PM	1	0	7	8		9	3	5	17		0	76	2	78		7	63	1	71		174
5:00 PM	4	1	27	32		18	2	9	29		0	106	6	112		9	87	2	98		271
Total Volume	17	2	60	79		35	11	26	72		1	357	13	371		25	332	9	366		888
% App. Total	21.5	2.5	75.9	100		48.6	15.3	36.1	100		0.3	96.2	3.5	100		6.8	90.7	2.5	100		
PHF	0.617					0.621					0.828					0.817					
Cars, PU, Vans	16	2	60	78		35	11	26	72		1	357	12	370		25	331	9	365		885
% Cars, PU, Vans	94.1	###	###	98.7		100.0	###	###	100.0		###	100.0	92.3	99.7		###	99.7	100.0	99.7		99.7
Heavy Trucks	1	0	0	1		0	0	0	0		0	0	1	1		0	1	0	1		3
% Heavy Trucks	5.9	0.0	0.0	1.3		0.0	0.0	0.0	0.0		0.0	0.0	7.7	0.3		0.0	0.3	0.0	0.3		0.3

ITM Peak Hour Summary

Prepared by:

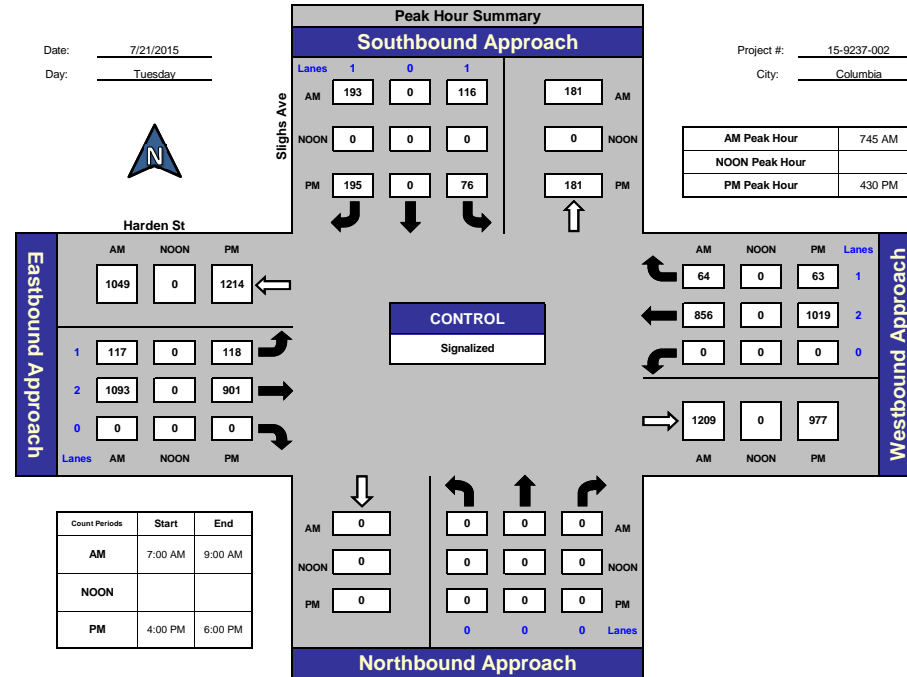


National Data & Surveying Services

Slighs Ave and Harden St, Columbia

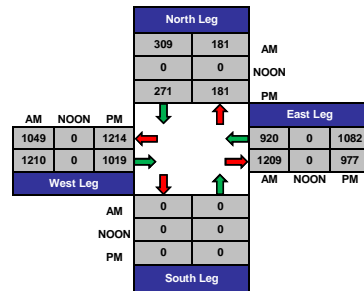
Date: 7/21/2015
Day: Tuesday

Project #: 15-9237-002
City: Columbia

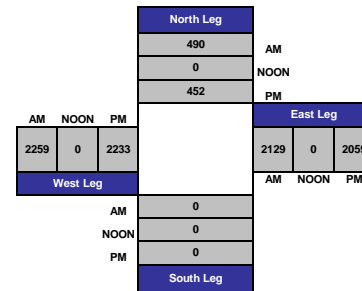


AM Peak Hour	745 AM
NOON Peak Hour	
PM Peak Hour	430 PM

Total Ins & Outs



Total Volume Per Leg



ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Project ID: 15-9237-002
Location: Slighs Ave & Harden St
City: Columbia

Day: Tuesday
Date: 7/21/2015

Peak Start Times	
AM	7:00 AM
MD	12:00 AM
PM	4:00 PM

Groups Printed - Cars, PU, Vans - Heavy Trucks

Start Time	Slighs Ave Eastbound				Slighs Ave Westbound				Harden St Southbound				Harden St Northbound				Int. Total			
	Left	Thru	Rgt	App. Total	Left	Thru	Rgt	App. Total	Left	Thru	Rgt	App. Total	Left	Thru	Rgt	App. Total				
7:00 AM	0	0	0	0	10	0	27	4	37	23	122	0	0	145	0	77	12	0	89	271
7:15 AM	0	0	0	0	7	0	33	0	40	33	153	0	0	186	0	125	13	0	138	364
7:30 AM	0	0	0	0	13	0	19	0	32	42	200	0	0	242	0	171	11	0	182	456
7:45 AM	0	0	0	0	15	0	32	0	47	49	260	0	0	309	0	200	16	0	216	572
Total	0	0	0	0	45	0	111	4	156	147	735	0	0	882	0	573	52	0	625	1663
8:00 AM	0	0	0	0	16	0	69	0	85	23	288	0	0	311	0	172	17	0	189	585
8:15 AM	0	0	0	0	49	0	51	1	100	21	285	0	0	306	0	255	12	1	267	673
8:30 AM	0	0	0	0	36	0	41	2	77	24	260	0	0	284	0	229	19	0	248	609
8:45 AM	0	0	0	0	20	0	27	0	47	29	249	0	0	278	0	166	14	0	180	505
Total	0	0	0	0	121	0	188	3	309	97	1082	0	0	1179	0	822	62	1	884	2372
BREAK																				
4:00 PM	0	0	0	0	10	0	66	0	76	56	189	0	0	245	0	231	13	0	244	565
4:15 PM	0	0	0	0	7	0	45	0	52	45	168	0	0	213	0	202	12	0	214	479
4:30 PM	0	0	0	0	35	0	83	0	118	38	248	0	0	286	0	197	30	0	227	631
4:45 PM	0	0	0	0	12	0	41	0	53	35	213	0	0	248	0	208	12	0	220	521
Total	0	0	0	0	64	0	235	0	299	174	818	0	0	992	0	838	67	0	905	2196
5:00 PM	0	0	0	0	22	0	36	0	58	31	218	0	0	249	0	291	14	0	305	612
5:15 PM	0	0	0	0	7	0	35	0	42	14	222	0	0	236	0	323	7	0	330	608
5:30 PM	0	0	0	0	6	0	22	0	28	22	196	0	0	218	0	230	8	0	238	484
5:45 PM	0	0	0	0	6	0	27	1	33	22	148	0	0	170	0	162	3	0	165	368
Total	0	0	0	0	41	0	120	1	161	89	784	0	0	873	0	1006	32	0	1038	2072
Grand Total	0	0	0	0	271	0	654	8	925	507	3419	0	0	3926	0	3239	213	1	3452	8303
Approch %	0.0	0.0	0.0	0.0	29.3	0.0	70.7	0.9	12.9	87.1	0.0	0.0	0.0	93.8	6.2	0.0				
Total %	0.0	0.0	0.0	0.0	3.3	0.0	7.9	0.1	11.1	6.1	41.2	0.0	0.0	47.3	0.0	39.0	2.6	0.0	41.6	
Cars, PU, Vans	0	0	0	0	262	0	628	8	890	496	3415	0	0	3911	0	3231	204	1	3435	8236
% Cars, PU, Vans	0.0	0.0	0.0	0.0	96.7	0.0	96.0	###	96.2	97.8	99.9	0.0	0.0	99.6	0.0	99.8	95.8	###	99.5	99.2
Heavy Trucks	0	0	0	0	9	0	26	0	35	11	4	0	0	15	0	8	9	0	17	67
% Heavy Trucks	0.0	0.0	0.0	0.0	3.3	0.0	4.0	0.0	3.8	2.2	0.1	0.0	0.0	0.4	0.0	0.2	4.2	0.0	0.5	0.8

Project ID: 15-9237-002
Location: Slighs Ave & Harden St
City: Columbia

Day: Tuesday
Date: 7/21/2015

PEAK HOURS

Start Time	Slighs Ave Eastbound				Slighs Ave Westbound				Harden St Southbound				Harden St Northbound				Int. Total
	Left	Thru	Rgt	App. Total	Left	Thru	Rgt	App. Total	Left	Thru	Rgt	App. Total	Left	Thru	Rgt	App. Total	
AM																	
Peak Hour Analysis from 07:00 AM to 09:00 AM																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
7:45 AM	0	0	0	0	15	0	32	47	49	260	0	309	0	200	16	216	572
8:00 AM	0	0	0	0	16	0	69	85	23	288	0	311	0	172	17	189	585
8:15 AM	0	0	0	0	49	0	51	100	21	285	0	306	0	255	12	267	673
8:30 AM	0	0	0	0	36	0	41	77	24	260	0	284	0	229	19	248	609
Total Volume	0	0	0	0	116	0	193	309	117	1093	0	1210	0	856	64	920	2439
% App. Total	0.0	0.0	0.0	0.0	37.5	0.0	62.5	100	9.7	90.3	0.0	100	0.0	93.0	7.0	100	
PHF				0.000				0.773				0.973				0.861	
Cars, PU, Vans	0	0	0	0	108	0	176	284	117	1090	0	1207	0	854	63	917	2408
% Cars, PU, Vans	0.0	0.0	0.0	0.0	93.1	0.0	91.2	91.9	###	99.7	0.0	99.8	0.0	99.8	98.4	99.7	98.7
Heavy Trucks	0	0	0	0	8	0	17	25	0	3	0	3	0	2	1	3	31
% Heavy Trucks	0.0	0.0	0.0	0.0	6.9	0.0	8.8	8.1	0.0	0.3	0.0	0.2	0.0	0.2	1.6	0.3	1.3
PM																	
Peak Hour Analysis from 04:00 PM to 06:00 PM																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
4:30 PM	0	0	0	0	35	0	83	118	38	248	0	286	0	197	30	227	631
4:45 PM	0	0	0	0	12	0	41	53	35	213	0	248	0	208	12	220	521
5:00 PM	0	0	0	0	22	0	36	58	31	218	0	249	0	291	14	305	612
5:15 PM	0	0	0	0	7	0	35	42	14	222	0	236	0	323	7	330	608
Total Volume	0	0	0	0	76	0	195	271	118	901	0	1019	0	1019	63	1082	2372
% App. Total	0.0	0.0	0.0	0.0	28.0	0.0	72.0	100	11.6	88.4	0.0	100	0.0	94.2	5.8	100	
PHF				0.000				0.574				0.891				0.820	
Cars, PU, Vans	0	0	0	0	76	0	195	271	113	901	0	1014	0	1019	58	1077	2362
% Cars, PU, Vans	0.0	0.0	0.0	0.0	100.0	0.0	###	100.0	95.8	100.0	0.0	99.5	0.0	###	92.1	99.5	99.6
Heavy Trucks	0	0	0	0	0	0	0	0	5	0	0	5	0	0	5	5	10
% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	0.0	0.0	0.5	0.0	0.0	7.9	0.5	0.4

ITM Peak Hour Summary

Prepared by:

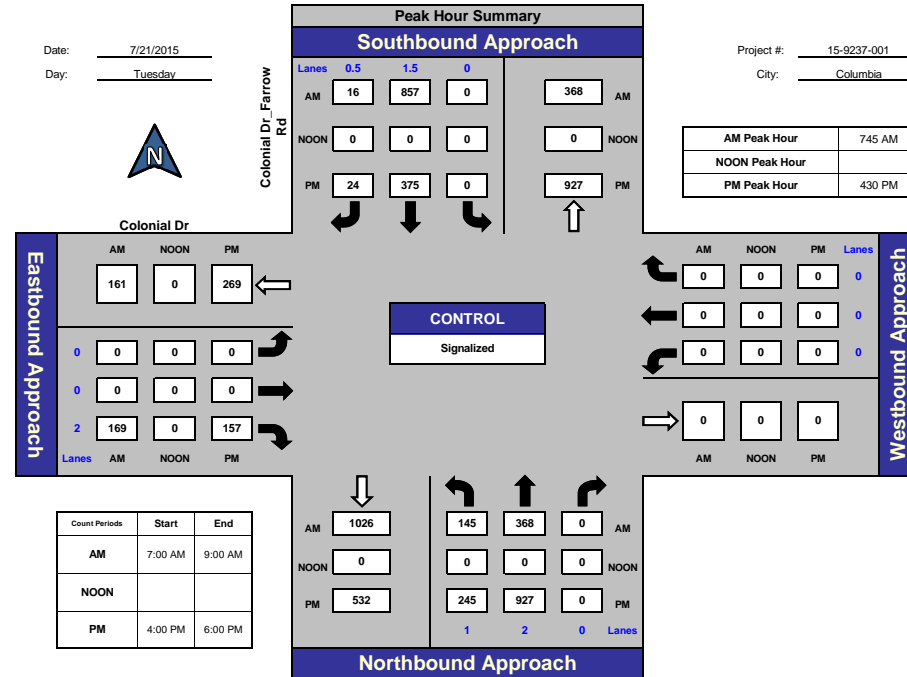


National Data & Surveying Services

Colonial Dr. Farrow Rd and Colonial Dr., Columbia

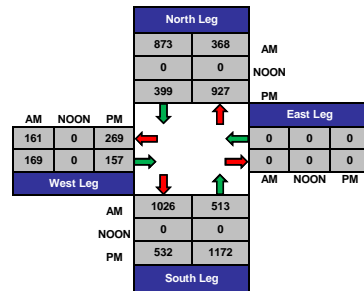
Date: 7/21/2015
Day: Tuesday

Project #: 15-9237-001
City: Columbia

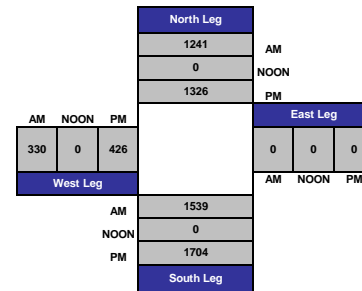


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Project ID: 15-9237-001
 Location: Colonial Dr_Farrow Rd & Colonial Dr
 City: Columbia

Day: Tuesday
 Date: 7/21/2015

Peak Start Times	
AM	7:00 AM
MD	12:00 AM
PM	4:00 PM

Groups Printed - Cars, PU, Vans - Heavy Trucks

Start Time	Colonial Dr_Farrow Rd Northbound					Colonial Dr_Farrow Rd Southbound					Colonial Dr Eastbound					Colonial Dr Westbound					Int. Total
	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	
7:00 AM	16	55	0	0	71	0	88	1	0	89	0	0	20	0	20	0	0	0	0	0	180
7:15 AM	22	62	0	0	84	0	132	3	1	135	0	0	21	0	21	0	0	0	0	0	240
7:30 AM	39	70	0	2	109	0	179	3	0	182	0	0	43	1	43	0	0	0	0	0	334
7:45 AM	26	75	0	0	101	0	194	5	1	199	0	0	52	1	52	0	0	0	0	0	352
Total	103	262	0	2	365	0	593	12	2	605	0	0	136	2	136	0	0	0	0	0	1106
8:00 AM	34	95	0	1	129	0	224	4	2	228	0	0	39	1	39	0	0	0	0	0	396
8:15 AM	46	96	0	0	142	0	236	4	2	240	0	0	40	0	40	0	0	0	0	0	422
8:30 AM	39	102	0	0	141	0	203	3	2	206	0	0	38	0	38	0	0	0	0	0	385
8:45 AM	28	91	0	1	119	0	160	2	1	162	0	0	48	0	48	0	0	0	0	0	329
Total	147	384	0	2	531	0	823	13	7	836	0	0	165	1	165	0	0	0	0	0	1532
BREAK																					
4:00 PM	45	204	0	1	249	0	103	5	0	108	0	0	46	0	46	0	0	0	0	0	403
4:15 PM	53	182	0	0	235	0	97	4	0	101	0	0	38	0	38	0	0	0	0	0	374
4:30 PM	62	210	0	0	272	0	85	7	0	92	0	0	51	0	51	0	0	0	0	0	415
4:45 PM	58	192	0	1	250	0	98	5	0	103	0	0	31	0	31	0	0	0	0	0	384
Total	218	788	0	2	1006	0	383	21	0	404	0	0	166	0	166	0	0	0	0	0	1576
5:00 PM	64	270	0	0	334	0	90	5	0	95	0	0	35	0	35	0	0	0	0	0	464
5:15 PM	61	255	0	0	316	0	102	7	0	109	0	0	40	0	40	0	0	0	0	0	465
5:30 PM	59	185	0	0	244	0	93	4	0	97	0	0	41	0	41	0	0	0	0	0	382
5:45 PM	35	141	0	0	176	0	66	3	0	69	0	0	25	0	25	0	0	0	0	0	270
Total	219	851	0	0	1070	0	351	19	0	370	0	0	141	0	141	0	0	0	0	0	1581
Grand Total	687	2285	0	6	2972	0	2150	65	9	2215	0	0	608	3	608	0	0	0	0	0	5795
Apprch %	23.1	76.9	0.0	0.2		0.0	97.1	2.9	0.4		0.0	0.0	###	0.5		0.0	0.0	0.0	0.0	0.0	
Total %	11.9	39.4	0.0	0.1	51.3	0.0	37.1	1.1	0.2	38.2	0.0	0.0	10.5	0.1	10.5	0.0	0.0	0.0	0.0	0.0	
Cars, PU, Vans	682	2265	0	6	2947	0	2138	65	9	2203	0	0	605	3	605	0	0	0	0	0	5755
% Cars, PU, Vans	99.3	99.1	0.0	100.0	99.2	0.0	99.4	100.0	###	99.5	0.0	0.0	99.5	###	99.5	0.0	0.0	0.0	0.0	0.0	99.3
Heavy Trucks	5	20	0	0	25	0	12	0	0	12	0	0	3	0	3	0	0	0	0	0	40
% Heavy Trucks	0.7	0.9	0.0	0.0	0.8	0.0	0.6	0.0	0.0	0.5	0.0	0.0	0.5	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.7

Project ID: 15-9237-001
 Location: Colonial Dr_Farrow Rd i
 City: Columbia

PEAK HOURS

Day: Tuesday
 Date: 7/21/2015

Start Time	Colonial Dr_Farrow Rd Northbound					Colonial Dr_Farrow Rd Southbound					Colonial Dr Eastbound					Colonial Dr Westbound					Int. Total
	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	
Peak Hour Analysis from 07:00 AM to 09:00 AM																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
7:45 AM	26	75	0	0	101	0	194	5	1	199	0	0	52	1	52	0	0	0	0	0	352
8:00 AM	34	95	0	1	129	0	224	4	2	228	0	0	39	1	39	0	0	0	0	0	396
8:15 AM	46	96	0	0	142	0	236	4	2	240	0	0	40	0	40	0	0	0	0	0	422
8:30 AM	39	102	0	0	141	0	203	3	2	206	0	0	38	0	38	0	0	0	0	0	385
Total Volume	145	368	0	1	513	0	857	16	7	873	0	0	169	1	169	0	0	0	0	0	1555
% App. Total	28.3	71.7	0.0	0.0	100	0.0	98.2	1.8	1.0	100	0.0	0.0	###	100	0.0	0.0	0.0	0.0	0.0	0.0	0
PHF					0.903					0.909					0.813						0.000
Cars, PU, Vans	142	360	0	0	502	0	855	16	7	871	0	0	167	1	167	0	0	0	0	0	1540
% Cars, PU, Vans	97.9	97.8	0.0	0.0	97.9	0.0	99.8	###	99.8	0.0	0.0	98.8	98.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	99.0
Heavy Trucks	3	8	0	0	11	0	2	0	0	2	0	0	2	0	2	0	0	0	0	0	15
% Heavy Trucks	2.1	2.2	0.0	0.0	2.1	0.0	0.2	0.0	0.2	0.2	0.0	0.0	1.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	1.0
PM																					
Start Time	Colonial Dr_Farrow Rd Northbound					Colonial Dr_Farrow Rd Southbound					Colonial Dr Eastbound					Colonial Dr Westbound					Int. Total
	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	
Peak Hour Analysis from 04:00 PM to 06:00 PM																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
4:30 PM	62	210	0	0	272	0	85	7	0	92	0	0	51	0	51	0	0	0	0	0	415
4:45 PM	58	192	0	0	250	0	98	5	0	103	0	0	31	0	31	0	0	0	0	0	384
5:00 PM	64	270	0	0	334	0	90	5	0	95	0	0	35	0	35	0	0	0	0	0	464
5:15 PM	61	255	0	0	316	0	102	7	0	109	0	0	40	0	40	0	0	0	0	0	465
Total Volume	245	527	0	0	1172	0	375	24	0	399	0	0	157	0	157	0	0	0	0	0	1728
% App. Total	20.9	79.1	0.0	0.0	100	0.0	94.0	6.0	0.0	100	0.0	0.0	###	100	0.0	0.0	0.0	0.0	0.0	0.0	0
PHF					0.877					0.915					0.770						0.000
Cars, PU, Vans	245	527	0	0	1172	0	371	24	0	395	0	0	156	0	156	0	0	0	0	0	1723
% Cars, PU, Vans	###	###	0.0	100.0	###	0.0	98.9	###	99.0	0.0	0.0	99.4	99.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	99.7
Heavy Trucks	0	0	0	0	0	0	4	0	0	4	0	0	1	0	1	0	0	0	0	0	5
% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	1.0	1.0	0.0	0.0	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.3

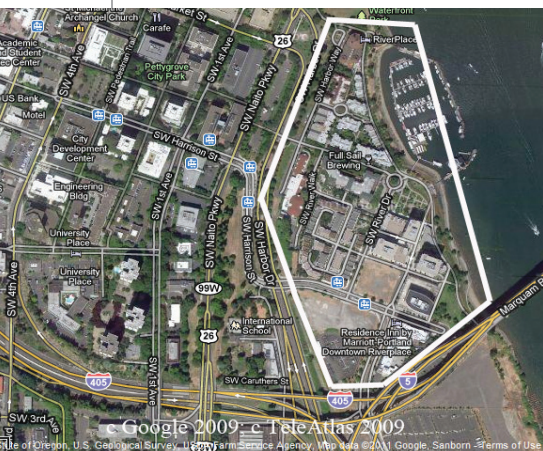
TRIP GENERATION, PASS-BY, AND INTERNAL CAPTURE CALCULATIONS

The Commons at Bull Street Ballpark Trip Generation		
8,500 Stadium Capacity		
5000 Average Capacity		5000
6% Pedestrians		4700
2.8 Vehicle Capacity		1679
150 employees		1529
Employee Arrival AM		
In	Out	This assumes all employees will show during the AM peak hour
150	0	
Arrival Times for 7 PM Game		
5-6 PM	20%	306
6-7 PM	70%	1070
7-8 PM	10%	153
Departure Time for 7 PM Game		
Assume 3 Hr Game		
9-10 PM	5%	76
10-11 PM	95%	1453

RESEARCH YOU CAN USE

Traffic Generated by MXD: New Prediction Methods Ahead

Mixed use development is a signature feature of smart growth, new urbanism, and other contemporary land-use movements aimed at reducing the dominance of the private automobile in suburban America. By putting residences, offices, shops, restaurants, and other codependent activities close to each other, MXD shortens trips and thus allows what might otherwise be car trips to external destinations to become internal walking, cycling, or transit trips.



RiverPlace in Context

Stakeholders interested in the traffic impacts of MXD are quite a diverse group. Developers seeking to minimize the need for traffic mitigation measures are constantly debating ways to increase internal capture rates for trips between land uses. Local governments are always looking for ways to protect existing residents from the impact of increased traffic. Planners generally favor mixed use developments for a wide variety of reasons. Then there are the traffic engineers, who are skeptical about the traffic benefits of MXDs.

Communities face a dilemma: Should they err on the liberal side and approve an MXD—and risk unmitigated traffic impacts? Or should they err on the conservative side and discourage potentially worthwhile projects? To make a wise decision, they need a reliable trip

generation methodology—which is largely unavailable.

Current methods of traffic impact analysis rely on rates and adjustments set by the Institute of Transportation Engineers. But ITE's methodology is widely believed to understate the traffic benefits of MXDs, and a decision based on it could lead to higher impact fees, exactions, and negotiated payments than should be the case. Such a decision could well preclude the development of otherwise desirable projects.

A better way

To address this dilemma, a dream team of land-use and transportation researchers has developed a new methodology for predicting the traffic impacts of MXDs. The team includes Michael Greenwald, Ming Zhang, AICP, Robert Cervero, Jerry Walters, Mark Feldman, Larry Frank, and John Thomas. (Full disclosure: I had some involvement with the effort as well.) Their work will appear in the next issue of the *Journal of Urban Planning and Development*, a publication of the American Society of Civil Engineers that caters to traffic engineers.

These researchers have access to integrated travel and development databases for six diverse regions: Atlanta, Boston, Houston, Sacramento, Seattle, and Portland, Oregon. The databases provide the precise coordinates of each trip's point of origin and destination, along with parcel-level land-use data. That allows the researchers to analyze travel to, from, and within small MXDs. The study's total sample includes about 36,000 trip origins and destinations for a broad array of MXD types and settings across the U.S.

One of the 239 MXDs in the study is RiverPlace, a new urbanist neighborhood immediately adjacent to downtown Portland. The internal capture rate of this 32-acre development is a surprisingly high 36 percent. Of the external trips, 14 percent are made by walking and nine percent by transit. The development's external auto trips average 7.7 miles, somewhat shorter than the average for the Portland region. On balance, the traffic impact of RiverPlace is a fraction of that generated by single-use suburban developments of comparable size and composition.

The study is one of the first in planning to use hierarchical modeling methods, which are common in public health and education research. Hierarchical modeling is necessary because all of the trips to, from, and within a given MXD share the characteristics of the development and of the region in which it is located—that is, they are dependent on those characteristics. This interdependence violates the assumption of independence that underlies ordinary least squares (“OLS”) regression analysis, the technique we learned in our basic statistics course.

The researchers found that the internalization of trips within MXDs is significantly related to the development's land area, employment, jobs-population balance, and density of its intersections. The two strongest influences on external walking trips are intersection density and a concentration of jobs within a mile of the MXD boundary. The most significant environmental influences on transit use are intersection density, the number of jobs reachable within 30 minutes by transit, and the presence of a transit stop within a quarter-mile. These results, which are consistent with the literature on this topic, suggest that MXDs that concentrate residents, workers, and retail shops in close proximity to one another can “de-generate” automobile trips.

The length of external trips by private vehicle is related to regional accessibility: How many jobs can be reached within 20 or 30 minutes by automobile? The length of vehicle trips is also related to the jobs-population balance. When the number of nearby jobs increases, the length of auto trips on average decreases.

To validate their models, the researchers compared their predictions with traffic counts taken in 22 MXDs in four states. At 15 of the sites, they found that the models came within 20 percent of the actual vehicle counts. At four sites, the models came within 30 percent, and at one within 40 percent. Only two sites were off by more than 40 percent. When compared with the ITE method for estimating trip generation, the models improved the prediction of vehicle counts at 16 of the 22 validation sites.

Based on the validation results, two of the coauthors—Walters and Thomas—are

strongly promoting the new methodology. It has been applied to MXDs in San Diego, Seattle, Virginia, and elsewhere. And now Ryan Hales, a traffic engineer in Salt Lake City, has convinced the Utah Transit Authority to use the new methodology in planning for transit-oriented developments. Maybe someday traffic engineers will be as enthusiastic about mixed use development as planners already are.

Reid Ewing

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TRIP GENERATION FOR SMART GROWTH

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INTRODUCTION AND STUDY FINDINGS

BACKGROUND

Smart growth developments are generally perceived to generate fewer vehicle trips and less demand for parking as compared to conventional suburban developments due to an increased number of trips via transit, walking, or bicycling. However, there has been a lack of empirical data to demonstrate this in the San Diego region. Current trip generation and parking supply guidelines are based on conventional suburban development, perhaps imposing a burden on developers and jurisdictions to provide more roadway and parking capacity than is necessary in smart growth environments. Application of identified trip generation and parking demand rates appropriate for smart growth development could result in cost savings for jurisdictions, developers, homebuyers, and renters.

SANDAG'S *Regional Comprehensive Plan (RCP)*, adopted in 2004, offers a vision for change in the San Diego region that strongly emphasizes sustainability and smart growth. *Trip Generation for Smart Growth: Planning Tools for the San Diego Region* is called for as a strategic initiative of the RCP and is a component of the SANDAG Smart Growth Toolbox; it is intended to be a resource for local agencies as they implement smart growth development.

The results of the study are intended to provide a richer, more accurate accounting of vehicle trip reduction associated with mixed-use and transit-oriented development (TOD) in smart growth environments, compared to current local and national methods of calculating trip generation. This information is intended to supplement data in the *San Diego Traffic Generators Manual*, published by SANDAG in 2000, and the accompanying *Not-so-Brief-Guide to Trip Generation*, published by SANDAG in 2002. Whereas the *Not-so-Brief-Guide* suggests application of generic vehicle trip reductions of 5 percent for locations within one-quarter mile of transit and 10 percent for mixed-use, the method outlined in this study accounts for the uniqueness of each smart growth development site and proposes reductions based on the specific context in which each site is situated.

STUDY CONTENTS

This study presents an overview of a mixed-use development trip generation method (Mixed-Use Method) recently developed by a team led by Fehr & Peers to improve vehicle trip generation forecasts for mixed-use developments. This method was applied to a series of smart growth sites in the San Diego area. The results are presented in this study.

This study is accompanied by a spreadsheet tool designed for estimation of trip generation in smart growth settings. The spreadsheet tool applies the Mixed-Use Method described within this study. The spreadsheet tool, as well as the study, are available as a resource for local jurisdictions if they choose to use it. Local jurisdictions are under no obligation to use the tool or the study in their development approval processes.

STUDY FINDINGS

The study found that at both the site level and at the Smart Growth Opportunity Area (SGOA) level, reductions in vehicle trips were observed for smart growth development, relative to the number of trips that would be expected to occur in typical suburban developments. These findings suggest that trip generation will generally be overestimated at smart growth developments if appropriate trip reductions are not included in the calculations.

The study also identified and validated a method to account for the amounts of trip reduction attributable to smart growth development forms. This Mixed Use Method, initially developed for the United States Environmental Protection Agency (EPA) and the Institute of Transportation Engineers, accounts for the degree to which mixed-use sites internally capture travel and the extent to which smart growth site design and context result in walking, biking, and transit use. The study validated the Mixed-Use Method for use within the San Diego region by comparing the method's trip generation estimates to actual travel data from twenty of the region's SGOAs and six smaller mixed-use/transit-oriented development (TOD) sites.

It should be noted that use of this method was validated with data collected at sixteen smart growth sites nationwide, as well as with data from the sites in the San Diego region mentioned above. At the time of printing, smart growth sites suitable for data collection could not be identified in the rural, coastal, and North County areas of the region. Further data collection in a variety of smart growth settings throughout the region would help to enhance understanding about trip generation in smart growth areas, particularly among coastal communities where smart growth development takes place, and in those SGOAs designated as Rural Villages.

The Method represents a dramatic improvement over current methods of estimating trip generation for smart growth developments. The method produces reliable, though still somewhat conservative, estimates of trip generation that are highly sensitive to the context of any given development. Specifically, the trip generation method accounts for the degree to which a development can be considered "smart growth," by measuring discrete characteristics of that site such as nearby transit frequency and level of service, walkability, development density, and mix of uses. In contrast, the *San Diego Traffic Generators Manual* currently recommends generic, across-the-board trip reduction percentages of 5% for location within ¼ mile of transit, and 10% for mixed use – regardless of the frequency or level of service of the nearby transit, density, and walkability of the site in question.

THE MIXED-USE METHOD: CALCULATING TRIP GENERATION FOR SMART GROWTH SETTINGS

BACKGROUND

Development that integrates multiple land use types on a single site has become increasingly common. However, the data presented in The Institute of Transportation Engineers (ITE's) *Trip Generation* informational report and in the *San Diego Traffic Generators Manual* is primarily collected at single-use, free-standing sites. This defining characteristic limits the applicability of these "standard" trip rates to mixed-use or multi-use development projects and smart growth environments. While the number of person trips generated by individual uses may be similar to free-standing sites, the potential for interaction among on-site activities can significantly reduce the total number of vehicle trips. Additionally, mixed-use projects located in areas with a variety of nearby destinations and high-quality transit access will produce fewer vehicle trips due to a larger share of trips entering and exiting the site on foot, on bicycle, or by transit.

The SANDAG Smart Growth Concept Map provides a definition for smart growth in terms of its place type thresholds. These are as follow:

Place Type	Minimum Residential Target	Minimum Employment Target	Minimum Transit Service Characteristics
Metropolitan Center	75 du/ac	80 emp/ac	Commuter Rail/BRT
Urban Center	40 du/ac	50 emp/ac	Light Rail/Rapid Bus
Town Center	20 du/ac	30 emp/ac	Light Rail/Rapid Bus
Community Center	20 du/ac	N/A	High Frequency Local Bus w/in Transit Priority Areas
Rural Village	10.9 du/ac	N/A	N/A
Special Use Center	Optional	45 emp/ac	Light Rail/Rapid Bus
Mixed Use Transit Corridor	25 du/ac	N/A	High Frequency Local Bus

Development of the Mixed-Use Method

In order to provide a straightforward and empirically validated method of estimating vehicle trip generation at mixed-use developments, the United States EPA (under review by the ITE) sponsored a national study of the trip generation characteristics of multi-use sites. Travel survey data was gathered from 239 mixed-use developments (MXDs) in six major metropolitan regions, correlated with the characteristics of the sites and their surroundings, and validated through cordon traffic counts at 16 additional sites. The findings indicate that the amount of external traffic generated is affected by a wide variety of factors, each pertaining to one or more of the following “D” characteristics: density, diversity, design, destination accessibility, development scale, demographics, and distance to transit. It should be noted that the “D” characteristics are a simple way of summarizing the characteristics that influence trip generation in smart growth settings. The actual quantification of the “D” characteristics for the purpose of the Mixed-Use Method results in a richer set of variables with which to measure a development site. For instance, the variables listed in the “Probabilities” section below capture two characteristics that could be related back to the “D”s: walkability, and transit frequency and level of service. The following illustration demonstrates the relationship among these characteristics:

Characteristics	Corresponding “D”s	Quantified Variables (How to Measure the “D”s)
Walkability	Design	Intersection Density
Transit Frequency/ Level of Service	Destination Accessibility	Employment within a 30 minute transit trip

The “D” characteristics were related statistically to the vehicle trip reductions observed in these developments. Vehicle Trip reduction is defined as a percentage reduction that can be applied to trip generation estimates for individual land uses to account for trips internal to the site and trips taken to nearby sites by walking, bicycling, or by transit. The statistical relationships between the “D” characteristics and the trip reductions observed in the surveys produced equations, collectively known as the Mixed-Use Method, which allow the user to predict the vehicle trip reduction as a function of the D characteristics.

In practice, the Mixed-Use Method is implemented in two steps: first, one computes the theoretical vehicle counts in and out of the site from an external source of standard trip rates or equations (the product of this calculation is known as raw trips). Typically this source is the ITE *Trip Generation* informational report, but in this SANDAG-specific study, the source is the *San Diego Traffic Generators* manual. Then, one applies the predicted trip reduction percentage to the initial raw trips calculation to produce an estimate for the number of vehicle trips traveling in or out of the site.

Method Structure and Outputs

The Mixed-Use Method consists of four steps to achieve an estimate of daily vehicle trips on external roadways generated by the mixed-use development. The four steps and outputs are:

1. Compute daily trip estimates using standard rates or equations from an external source (raw trips). These estimates do not assume any internalization, and only minimal trips made by walking and/or transit modes.
2. Compute the probability of a trip staying internal to the mixed-use development.
3. Compute the probability an external trip will be made by walking or bicycling.
4. Compute the probability an external trip will be made by transit.

Mathematically, if we call the above probabilities generated in steps 2-4 above P_{internal} , P_{walkbike} , and P_{transit} , respectively, the desired result of number of external vehicle trips generated by mixed-use/TOD is illustrated in the following equation:

$$\text{External Vehicle Trips Generated by Mixed-Use/TOD Development} = \text{Raw Trips} * (1 - P_{\text{internal}}) * (1 - P_{\text{walkbike}} - P_{\text{transit}})$$

It should be noted that although the result of the above equation (the net number of external vehicle trips) has been formally validated, the component probabilities have not, largely due to lack of data for validation.

Probabilities: Accounting for the “D” Characteristics in the Method

The three probability models (P_{internal} , P_{walkbike} , and P_{transit}) depend on variables that are characteristics of the MXD, either input or calculated by the spreadsheet. Each of these variables provides a means of quantifying each of the “D” characteristics that influence trip generation in smart growth settings.

For example,

The variables for P_{internal} are:

- Employment
- Land area
- Jobs/population diversity (a measure of land use balance)
- Number of intersections per square mile (a measure of walkability and connectedness among land uses)
- Average household size
- Vehicles owned per capita

The variables for P_{walkbike} are:

- Land area
- Jobs/population diversity
- Retail jobs/population diversity
- Employment within one mile (walking distance)
- Population + employment per square mile
- Number of intersections per square mile

- ▶ Average household size
- ▶ Vehicles owned per capita

The variables for $P_{transit}$ are:

- ▶ Employment
- ▶ Number of intersections per square mile
- ▶ Employment within a 30-minute trip by transit
- ▶ Average household size
- ▶ Vehicles owned per capita

These variables are all examples of the "7Ds" that are known to influence travel behavior: density, diversity, design, destination accessibility, development scale, demographics, and distance to transit.

Mixed-Use Method Validation

In the initial validation of the Mixed-Use Method, a set of 16 independent mixed-use sites that were not included in the initial analysis were tested to help validate the method. Validation sites were comprised of mixed-use developments and areas ranging in size from approximately 5 acres to over 1,000 acres, located in diverse regions across the United States, including Florida, Northern and Southern California, Georgia, and Texas.

The validation tests produced two types of performance measures: root mean squared error (RMSE) and pseudo R-squared. RMSE is a measure of the percentage by which the trip generation estimates produced by the method deviate from the actual trip generation counted at each of the study sites. The lower the RMSE deviation, the more accurate is the prediction method. R-squared is a measure of how well the prediction method accounts for the degree of variation in trip generation from one site to another, with a value of 0.5 indicating an ability to explain 50 percent of the variation among cases and a value of 1.0 indicating a perfect ability to capture the variation in trips from one site to another.

Among the validation sites, use of the Mixed-Use Method produced a significantly better root mean squared error (RMSE) and pseudo-R squared than traditional methods when comparing estimated to observed external vehicle trips. Estimates from the ITE *Trip Generation* manual had an RMSE of 40 percent and pseudo-R squared of 0.58, and modified estimates using ITE's traditional trip internalization techniques had an RMSE of 32 percent and pseudo-R squared of 0.73. Estimates produced by the Mixed-Use Method had an RMSE of only 26 percent and pseudo-R squared of 0.82. This means that the Mixed-Use Method explains roughly 82 percent of the variation in trip generation among the 16 sites, with the remaining 18 percent attributable to variables not included in the method.

APPLICATION OF THE MIXED-USE METHOD FOR SAN DIEGO SITES

To ground-truth the Mixed-Use Method for use in the San Diego region, a series of tests were performed comparing the method's estimations with actual traffic count data from a number of sites within the region. This included comparisons at both large SGOAs and smaller mixed-use and TOD sites.

Study Areas

Smart Growth Opportunity Areas

The SANDAG Smart Growth Concept Map identifies a list of SGOAs classified into one of seven place types (Metropolitan Center, Urban Center, Town Center, Community Center, Rural Village, Mixed-Use Transit Corridor, and Special Use Center). Depending on whether the areas meet land use and transit service requirements for their place type, they are identified as either existing or potential SGOAs. SANDAG identified a list of 57 existing SGOAs to be studied in this analysis. These 57 SGOAs were chosen by virtue of having residential and employment densities on the ground that currently meet the prescribed thresholds for their place types.

Travel data for a representative group of SGOAs was compiled from the SANDAG 2006 *Regional Household Travel Behavior Survey*. The large size of the SGOAs, multiple access points, and potential for through trips made it unfeasible to count vehicle trip generation for these SGOAs explicitly. As a substitute for actual counts, data from the SANDAG 2006 *Regional Household Travel Behavior Survey* was used for these sites to generate comparisons for results obtained in the Mixed-Use Method. Of the 57 selected SGOAs, 20 were found to have enough trip records from the *Travel Behavior Survey* to be considered suitable for analysis (at least 100). These are discussed in more detail below under the heading "Analysis: SGOAs." Appendix B contains more detailed information about the SGOAs that had enough trip records in the survey data to be analyzed. Appendix D contains the data sources for the SGOA land use data.

Small Mixed-Use/TOD Sites

Six additional smaller mixed-use/TOD sites were identified for comparing the Mixed-Use Method estimates to actual counts of vehicles entering and exiting each site. The selected sites were:

- ▶ Station Village at Rio Vista Trolley Station, bounded by Camino Del Este, Rio San Diego Drive, Qualcomm Way, and the trolley tracks (residential and retail; trolley station and local bus)
- ▶ La Mesa Village Plaza, bounded by La Mesa Boulevard, Acacia Avenue, Orange Avenue, and the train tracks (residential, retail, and office; trolley station)
- ▶ The Uptown Center in the Hillcrest neighborhood, bound by University Avenue, Cleveland Avenue, Richmond Street, Washington Street, and SR-163 (residential and retail; high frequency local bus)
- ▶ The Village at Morena Linda Vista Trolley Station, bound by Morena Boulevard, Linda Vista Road, Napa Street, and the train tracks (residential and retail; trolley station)
- ▶ Hazard Center, bound by SR-163, Friars Road, Frazee Road, and Hazard Center Drive (retail and office; trolley station)

- Heritage Town Center at Otay Ranch in Chula Vista, bound by Santa Rita Street, Palomar Street, Santa Andrea Street, and the southern end of the parking lot, not including the houses on Fieldbrook Street (residential, retail, and medical office).

Appendix A shows a set of maps illustrating the sites' locations and the locations where traffic counts were taken.

Data Collection

Continuous 24-hour traffic counts were conducted at the six small mixed-use/TOD sites on typical midweek weekdays: Tuesday, Wednesday, or Thursday. Counts were conducted in October of 2008 for Otay Ranch, and in May and early June of 2009 (prior to the end of the K-12 school year) for all other sites at the site entrances shown in Appendix A.

Analysis: SGOAs

The Mixed-Use Method starts with a reliable local source of suburban single-use trip generation data, such as *San Diego Traffic Generators*. It then accounts for vehicle trip reductions attributable to the mix of land uses on the site, the development density, walking and transit options, and site context and regional accessibility. The resulting trip reduction percentage produces a predicted count of vehicles entering or exiting the site. The effectiveness of the method can be tested by comparing the observed counts to the method's prediction. For most of the SGOAs, obtaining traffic counts entering and exiting the areas was not feasible due to the inability to filter out through trips; however, it also is possible to test the trip reduction percentage itself. Data from the *SANDAG Regional Household Travel Behavior Survey* was used to collect observed trip reduction percentages, which could be compared to the Mixed-Use Method's predicted trip reduction percentages.

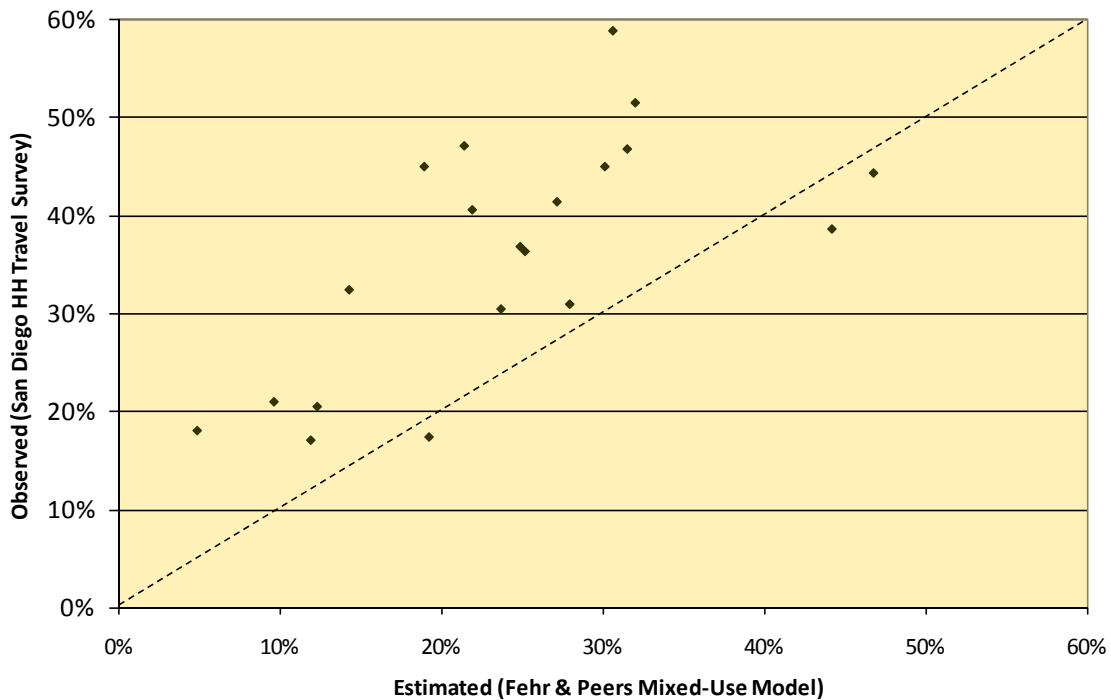
SANDAG staff provided Fehr & Peers with a data set of "flags" identifying which trips from the survey began and/or ended in one of the SGOAs. The trip data also included travel modes and party sizes. From this information, the total number of origins, destinations, and internalized trips (trips that begin and end in the same SGOA) by auto, walk, bicycle, and transit modes was computed for each SGOA. This was translated into observed values of PInternal, PWalkbike, and PTransit, as defined in the Mixed-Use Method Overview section above.

The analysis was performed for each of the 20 SGOAs that had at least 100 trips recorded in the survey. A cutoff of 100 trip records was chosen because in general, a sample size of between at least 30 to 40 is necessary for meaningful sample probabilities that are unlikely to vary significantly from their true values, and we are drawing three sample probabilities for each record (Pinternal, Pwalkbike, and Ptransit).

Figure 1 shows the estimated and observed trip reduction percentages for the 20 SGOAs. Vehicle trip reduction at the SGOA level averaged 24 percent relative to raw trip calculations and ranged from as high as 47 percent in downtown San Diego, to 32 percent in North Park/City Heights, and as low as 5 percent in Mira Mesa.

The dotted line represents an ideal model fit for comparison purposes. Overall, the Mixed-Use Method is a conservative predictor of trip reduction, underestimating trip reduction by about 10 percent on average, but the estimated and observed trip reductions are highly correlated.

Figure 1
Net Vehicle Trip Reduction for SGOAs With Greater Than 100 Survey Records



Analysis: Small Mixed-Use/TOD Sites With Counts

For the small mixed-use/TOD sites, preliminary estimates of site trip generation were calculated from *San Diego Traffic Generators* trip rates and site land uses. These estimates of raw trips use suburban trip generation rates for single use sites and do not consider the effects of mixed-use development or transit access. The Mixed-Use Method was applied to each site and the trip reduction percentages were applied to the raw trips to obtain Mixed-Use Method net trips.

SANDAG staff provided site land uses and values for most of the Mixed-Use Method input variables. Some of the variables were determined by estimation methods, as follows:

- ▶ Due to confidentiality restrictions associated with California Employment Development Department data, employment levels for some sites were not always reflective of current land uses in the SANDAG databases; in those cases, they were determined from the building areas and jobs per 1,000 square foot conversion ratios.
- ▶ VRPA Technologies performed an independent set of land use data checks, collecting data from traffic studies wherever possible, and estimated building occupancy. Those estimates were taken into account in the calculation of raw trips.
- ▶ Vehicle ownership per capita was calculated from 2000 Census data using the census block group(s) that most closely matched the sites’ locations.
- ▶ SANDAG staff estimated employment within 30 minutes by transit using their regional travel demand model.

Table 1 shows the SANDAG raw trips, the Mixed-Use Method’s count predictions, and the actual external vehicle trip counts. Detail behind the SANDAG raw trips calculations is provided in Appendix B.

Table 1
Mixed-Use Method Analysis for SANDAG Sites

Site Name	Location	SANDAG Raw Trips ¹	Mixed-Use Method Trip Reduction Percentage	Mixed-Use Method Net Trips ²	External Vehicle Trip Counts ³	Percent Deviation between Mixed-Use Method and External Vehicle Counts
Rio Vista Station Village	San Diego	6,689	17%	5,538	5,307	4%
La Mesa Village Plaza	La Mesa	5,681	20%	4,539	4,280	6%
Uptown Center	San Diego	20,214	15%	17,097	16,886	1%
The Village at Morena Linda Vista	San Diego	6,375	26%	5,251	4,712	11%
Hazard Center	San Diego	15,051	12%	13,214	11,644	13%
Heritage Center at Otay Ranch	Chula Vista	10,505	7%	9,730	7,935	23%

(1) Using San Diego *Traffic Generators* Trip Rates; see Appendix B for details

(2) Application of Fehr & Peers Mixed Use Trip Generation Reduction Percentages to (1)

(3) Actual counts

Source: Fehr & Peers, 2009

Based on the results shown in the table above, the Mixed-Use Method is an excellent predictor of external vehicle trips generated by smart growth development, tending to be slightly conservative, but without overestimating smart growth trips to the same degree as conventional trip generation methods. In all cases listed in Table 1, the Mixed-Use Method results in an estimation of external vehicle trips that is below the levels of estimated trip generation using raw trips alone and at or above the level of trips that were determined through actual counts. On average, the *San Diego Traffic Generators* trip generation rates for suburban development would overestimate traffic from the six sites by 29 percent, while the Mixed-Use Method reduces the average overestimate to 9 percent.

Additional Comments

The 20 larger SGOA sites analyzed in Figure 1 provide data for both validation of the Mixed-Use Method and for future refinements. It should be noted that the method’s underestimation of trip reduction is most noticeable when it comes to the transit trips component, and additional data could help improve future versions of the Mixed-Use Method. Data collection at additional sites in urban locations with high transit usage is recommended in order to uncover statistically significant variables that are related to the “distance to transit” characteristic. This will help subsequent versions of the method to do a better job of capturing the beneficial aspects of a TOD site’s proximity to transit.

It is noteworthy that at four of the six sites where actual counts were taken, the Mixed-Use Method predicts vehicle traffic generated within 10 percent of actual counts, and the average percent overestimation is 9 percent. By comparison, the best alternative method of estimating trip generation within the region, the *San Diego Traffic Generators* manual, would overestimate trip generation at the six sites by an average of 29 percent.

Participants in the study process have noted that the study was conducted during a downturn in the national and local economy. Consideration was given to adjusting the results of the study to account for reduced economic activity; however, it was decided that the results would not be adjusted to account for this factor. Historically, nationwide and local trip-generation counts have not been adjusted for the state of the economy at the time of the counts. Instead, the counts are averaged over a variety of economic conditions to produce an average trip generation rate. In the case of this study, much of the data that was used to calibrate and validate the Mixed-Use Method was collected prior to the current downturn. This includes the nationwide data on which the method was based, as well as the local data collected at SGOA sites. Data collected at the small mixed-use/TOD sites was collected during the economic downturn.

However, efforts were made to adjust the analysis to account for any unusually high vacancy rates found at the study sites. As a result, the comparison of actual traffic counts with estimates produced by the Mixed-Use Method take into account both the economy's influence on occupancies and the relative accuracy of the method for estimating traffic at a site with a given level of occupancy. Overall, the entire dataset used in the analysis reflects data collected during a variety of economic conditions.

Finally, the method has not been fully validated for application to single-use developments in smart growth settings or large auto-oriented, mixed-use developments. The following comments apply to these types of developments:

- ▶ The Mixed-Use Method was explicitly developed for the analysis of mixed-use developments. It has not been formally validated for analyzing single-use developments within mixed-use areas. For analysis of single-use development within a mixed-use area, two possible approaches are suggested:
 1. Define a mixed-use area surrounding the proposed development (and all associated input variables) and run the method with and without the development. The difference in trips between the two calculations represents the net change in the number of external trips generated by the proposed development.
 2. Select one of the SGOAs or counted sites that are documented in these guidelines that most closely resembles the area in which the development project is proposed, and use the external trip reductions from the SGOA or counted site to estimate trip reductions for the proposed development.

APPENDICES

Appendix A

Locations of Counted Sites



Smart Growth Trip Generation and Parking Demand Guidelines

STATION VILLAGE AT RIO VISTA STATION



Smart Growth Trip Generation and Parking Demand Guidelines

LA MESA VILLAGE PLAZA

fp
FEHR & PEERS
 TRANSPORTATION CONSULTANTS
 November 2009



Smart Growth Trip Generation and Parking Demand Guidelines



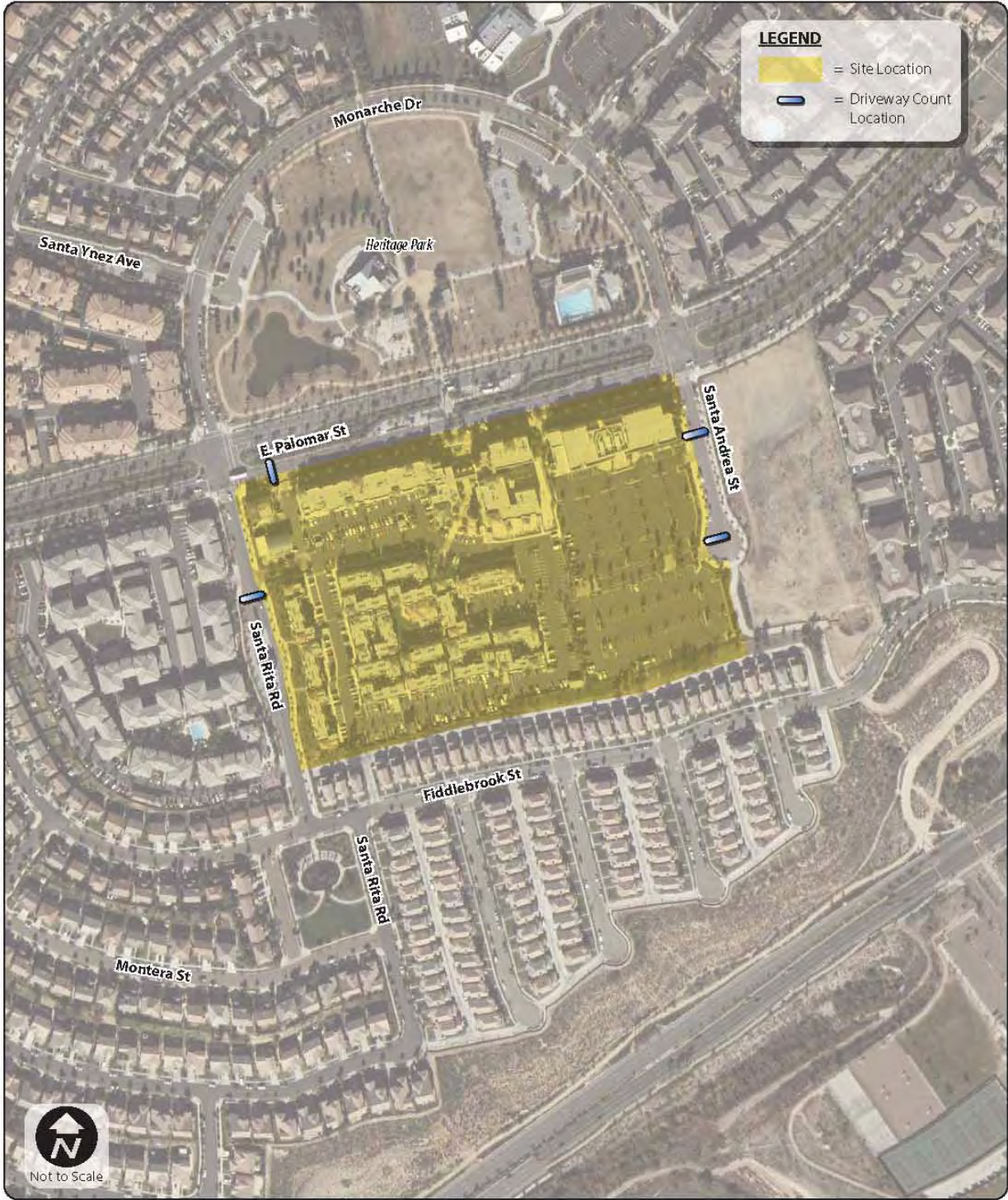
Smart Growth Trip Generation and Parking Demand Guidelines

MORENDA LINDA VISTA STATION



Smart Growth Trip Generation and Parking Demand Guidelines

HAZARD CENTER



Smart Growth Trip Generation and Parking Demand Guidelines

Appendix B

SANDAG Raw Trips Calculation Backup and Site Characteristics

APPENDIX B – SANDAG RAW TRIPS CALCULATION BACKUP

To calculate “raw trips” as shown in Table 1, the recommended rates from *San Diego Traffic Generators* were applied to land uses as provided by SANDAG staff and through VRPA Technologies’ independent data checking. The tables below show the detail for each of the six sites. Some of the rates used were modified from the *(Not so) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region* report, as follows:

- The *(Not so) Brief Guide of Vehicular Traffic Generation Rates* has a rate of 1.8 trips / seat for theaters. The trip rate for the theater at Hazard Center was scaled down to 50% 0.9 to reflect the unique characteristics of this theater, consistent with the Hazard Center Traffic Impact Analysis done by Urban Systems in July of 2009.
- The Starbucks cafes at three of the sites were treated as fast food restaurants, and their building areas were estimated from street views.
- The supermarkets at Uptown Center (Ralph’s and Trader Joe’s) were separated out from the general neighborhood shopping center rate, and their building areas were estimated from aerials.

Rio Vista Station Village (Transit: Light Rail)					
Land Use	Units	Amount	Occupied	Daily Trip Rate	Daily Trips
Apartment	d.u.	970.0	95%	6	5,529
Specialty Retail	1,000 s.f.	13.0	100%	40	520
Sit Down, High Turnover Restaurant	1,000 s.f.	4.0	100%	160	640
Total Trips					6,689

La Mesa Village Plaza (Transit: Light Rail)					
Land Use	Units	Amount	Occupied	Daily Trip Rate	Daily Trips
Office	1,000 s.f.	14.3	95%	Equation ¹	373
Sit Down High Turn Over Restaurant	1,000 s.f.	20.2	90%	160	2,906
Fast Food Restaurant (Starbucks)	1,000 s.f.	2.0	100%	700	1,400
Specialty Retail	1,000 s.f.	8.0	90%	40	288
Condominium	d.u.	94.0	95%	8	714
Total Trips					5,681

¹ $\ln(T) = 0.756 \ln(x) + 3.95$

Uptown Center (Transit: High Frequency Local Bus)

Land Use	Units	Amount	Occupied	Daily Trip Rate	Daily Trips
Condominium	d.u.	311.0	95%	8	2,364
Neighborhood Shopping Center	1,000 s.f.	67.2	90%	120	7,260
Supermarket	1,000 s.f.	70.0	100%	150	10,500
Government Office	1,000 s.f.	3.0	100%	30	90
Total Trips					20,214

The Village at Morena Linda Vista (Transit: Light Rail)

Land Use	Units	Amount	Occupied	Daily Trip Rate	Daily Trips
Apartment	d.u.	185.0	95%	6	1,055
Sit-Down, High Turnover Restaurant	1,000 s.f.	14.0	100%	160	2,240
Fast Food Restaurant (Starbucks)	1,000 s.f.	3.0	100%	700	2,100
Specialty Retail	1,000 s.f.	8.0	100%	40	320
Transit Station	Occupied Parking	165.0	100%	4	660
Total Trips					6,375

Hazard Center (Transit: Light Rail)

Land Use	Units	Amount	Occupied	Daily Trip Rate	Daily Trips
Specialty Retail	1,000 s.f.	98.7	90%	40	3,553
Sit-Down, High Turnover Restaurant	1,000 s.f.	18.0	100%	160	2,880
Fast Food Restaurant (Starbucks)	1,000 s.f.	2.0	100%	700	1,400
Office	1,000 s.f.	284.0	90%	Equation ¹	3,432
Hotel	Rooms	300.0	80%	10	2,400
Theater	Seat	1,540.0	100%	0.9	1,386
Total Trips					15,051

¹ Ln(T) = 0.756 ln(x) + 3.95

Heritage Center at Otay Ranch (Transit: Planned BRT and High Frequency Local Bus)

Land Use	Units	Amount	Occupied	Daily Trip Rate	Daily Trips
Apartment	d.u.	271.0	90%	6	1,463
Gas Station With Food Mart	Fueling Station	8.0	100%	160	1,280
Medical Office	1,000 s.f.	67.4	95%	50	3,202
Neighborhood Shopping Center	1,000 s.f.	38.0	100%	120	4,560
Total Trips					15,505

Appendix C

Vehicle Trip Reduction for SGOAs

Site Short Name ¹	Community Name	Place Type ²	Area (acres)	Dwelling Units		Non-Residential Building Area (1,000 square feet)				Number of Intersections	Jobs Within One mile	Jobs Within 30 Minutes by Transit	Trip Reduction	
				Single Family	Multifamily	Retail	Office	Public	Indus-trial				Modeled	Surveyed
SD UN-2	Eastgate Mall Road, I-805, UCSD, Nobel Drive	Urban Center	818	120	11,389	2,408	6,234	112	42	37	23,510	237,386	14%	32%
SD CC-1C	Centre City Community Plan Area	Metropolitan Center ³	389	9	5,576	2,732	7,508	2,565	23	120	71,350	324,431	47%	44%
SD UP-6	Pennsylvania Avenue/Robinson Avenue, Park Boulevard, Washington Street	Urban Center	383	703	4,070	1,922	552	68	2	160	13,950	333,063	25%	36%
ES-1	Downtown Specific Plan/Mercado Area Plan	Town Center	452	176	648	2,285	566	18	126	165	12,660	80,713	24%	30%
SD UP-1	4th Street & 5th Street from DateStreet to Pennsylvania Avenue	Mixed-Use Transit Corridor	352	317	4,384	622	1,887	113	0	151	81,240	275,189	28%	31%
SD CH-3B	University Avenue from Park Boulevard to 54th Street	Mixed-Use Transit Corridor ³	447	1,582	3,943	798	524	85	35	200	15,440	275,848	32%	51%
SD CH-1	Meade Avenue, Wightman Street, 40th Street	Town Center	381	1,279	3,251	765	535	55	0	172	5,420	263,272	31%	59%
SD NV-1	I-8, Friars Road, San Diego River, Mission Gorge Road in the east	Town Center	244	2	432	756	511	0	984	26	13,240	282,833	10%	21%
SD NH-1	Park Boulevard at Meade Avenue continuing along Adams Avenue	Mixed-Use Transit Corridor	501	1,993	4,213	586	57	44	0	243	19,020	202,215	32%	47%
SD MV-3	I-8, SR 163, I-805, Community Boundary	Urban Center	531	122	3,188	3,975	2,389	147	73	29	8,910	365,333	12%	17%
SD CC-1E	Centre City Community Plan Area	Metropolitan Center ³	290	0	4,492	1,004	383	46	338	47	50,890	269,903	22%	41%
SD PB-1	Grand Avenue & Garnet Avenue from Mission Boulevard to Olney Street	Mixed-Use Transit Corridor	502	1,496	4,175	1,479	135	9	0	210	12,210	206,276	25%	37%
CO-1	Downtown Coronado Town Center	Town Center	307	554	2,941	2,051	117	13	0	122	6,270	97,223	21%	47%
SD LJ-1	Prospect Street, Pearl Street, Fay Avenue, Ivanhoe Avenue	Town Center	220	170	1,585	2,220	537	95	0	89	10,830	91,444	19%	45%
SD CC-1D	Centre City Community Plan Area	Metropolitan Center ³	346	77	6,078	1,739	259	235	1,007	133	44,610	408,616	44%	39%

Site Short Name ¹	Community Name	Place Type ²	Area (acres)	Dwelling Units		Non-Residential Building Area (1,000 square feet)				Number of Intersections	Jobs Within One mile	Jobs Within 30 Minutes by Transit	Trip Reduction	
				Single Family	Multifamily	Retail	Office	Public	Indus-trial				Modeled	Surveyed
SD CH-3A	University Avenue from Park Boulevard to 54th Street	Mixed-Use Transit Corridor	254	735	3,888	770	151	94	32	153	16,640	263,125	30%	45%
SD UN-1	I-5, La Jolla Village Drive, Gilman Drive	Town Center	216	0	2,841	1,137	203	0	0	20	8,640	147,394	12%	20%
SD NP-2G	El Cajon Boulevard from Park Boulevard to 79th Street	Mixed-Use Transit Corridor ³	319	785	1,519	1,039	115	44	0	102	12,360	107,950	19%	17%
SD NP-1	30th Street from Adams Avenue to Upas	Mixed-Use Transit Corridor	290	1,086	3,310	886	119	89	41	141	11,760	252,990	27%	41%
SD MM-1	Westview Parkway from Capricorn Way to Hillery Drive & Mira Mesa Boulevard from Black Mountain Road to I-15	Town Center	158	0	412	1,189	4	0	0	4	5,940	117,403	5%	18%

(1) Complete descriptions of the sites can be found in the SANDAG *Smart Growth Concept Map Site Descriptions* document, dated October 27, 2006

(2) As identified by the San Diego Regional Comprehensive Plan (RCP).

(3) Divided

Appendix D

Data Sources for SGOA Land Use Data

APPENDIX D – DATA SOURCES FOR SGOA LAND USE DATA

The following SANDAG data sources were used as inputs into the MXD model:

- ▶ Current Population Estimates, SANDAG 2008
- ▶ ES-202 and QCEW Industry Employment and Quarterly Wage Data, California Employment Development Department Labor Market Information, 2005
- ▶ SANDAG Land Use Database, 2008
- ▶ SANGIS Road Network, Q2 2008 (excludes non-pedestrian features such as freeways, but includes alleys and dedicated foot paths)
- ▶ SANDAG Transit Stop Inventory, 2008
- ▶ SANDAG Smart Growth Concept Map, 2008

Smart Growth Opportunity Areas (SGOAs) were drawn as 2 versions:

1. Using official boundaries as drawn on Smart Growth Concept Map
2. With a ½ mile walkable buffer from the center street for Mixed Use Transit Corridors, and from the SGOA center point for other place types.

Canyons, freeways, rivers, coastline, and other such impediments were clipped out of the SGOA boundaries.

INTERSECTION VOLUME DEVELOPMENT WORKSHEETS

INTERSECTION VOLUME DEVELOPMENT

**Bull Street and Harden Street Extension
AM PEAK HOUR**

Description	Bull Street Northbound			Bull Street Southbound			Harden Street Extension Eastbound			Harden Street Extension Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	23	545	531	401	2,125	19	8	4	3	150	18	35
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	23	545	531	401	2,125	19	8	4	3	150	18	35
PHF	0.90	0.93	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	23	556	542	409	2,168	19	8	4	3	153	18	36
2018 Background Traffic (w/ Phase 1)	24	583	564	426	2,280	20	8	4	3	159	19	37
2020 Background Traffic (W/ Phases 1 & 2)	25	649	586	443	2,426	21	9	4	3	166	20	39
Percent Inbound Assignment	0%	0%	0%	0%	14%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	14%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 1 Project Trips	0	5	0	0	25	0	0	0	0	0	0	0
Phase 1 Project Trips (Total)	0	5	0	0	25	0	0	0	0	0	0	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	16%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	16%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 2 Project Trips	0	42	0	0	54	0	0	0	0	0	0	0
Phase 2 Project Trips (Total)	0	42	0	0	54	0	0	0	0	0	0	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	11%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	11%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 3 Project Trips	0	64	0	0	123	0	0	0	0	0	0	0
Phase 3 Project Trips (Total)	0	64	0	0	123	0	0	0	0	0	0	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	23	561	542	409	2,193	19	8	4	3	153	18	36
2018 Buildout Total	24	625	564	426	2,335	20	8	4	3	159	19	37
2020 Buildout Total	25	713	586	443	2,549	21	9	4	3	166	20	39

PM PEAK HOUR

Description	Bull Street Northbound			Bull Street Southbound			Harden Street Extension Eastbound			Harden Street Extension Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	6	2,132	203	75	913	8	22	14	18	464	3	238
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	6	2,132	203	75	913	8	22	14	18	464	3	238
PHF	0.90	0.91	0.91	0.90	0.94	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	6	2,175	207	77	931	8	22	14	18	473	3	243
2018 Background Traffic (w/ Phase 1)	6	2,291	215	80	1,023	8	23	15	19	492	3	253
2020 Background Traffic (W/ Phases 1 & 2)	7	2,432	224	83	1,130	9	24	15	20	512	3	263
Percent Inbound Assignment	0%	0%	0%	0%	14%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	14%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 1 Project Trips	0	29	0	0	54	0	0	0	0	0	0	0
Phase 1 Project Trips (Total)	0	29	0	0	54	0	0	0	0	0	0	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	16%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	16%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 2 Project Trips	0	49	0	0	68	0	0	0	0	0	0	0
Phase 2 Project Trips (Total)	0	49	0	0	68	0	0	0	0	0	0	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	11%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	11%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 3 Project Trips	0	134	0	0	99	0	0	0	0	0	0	0
Phase 3 Project Trips (Total)	0	134	0	0	99	0	0	0	0	0	0	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	6	2,204	207	77	985	8	22	14	18	473	3	243
2018 Buildout Total	6	2,340	215	80	1,091	8	23	15	19	492	3	253
2020 Buildout Total	7	2,566	224	83	1,229	9	24	15	20	512	3	263

INTERSECTION VOLUME DEVELOPMENT

**Bull Street and Confederate Avenue
AM PEAK HOUR**

Description	Bull Street Northbound			Bull Street Southbound			Confederate Avenue Eastbound			Confederate Avenue Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	15	1,130	75	64	2,213	2	5	2	12	15	11	7
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	15	1,130	75	64	2,213	2	5	2	12	15	11	7
PHF	0.90	0.94	0.90	0.90	0.94	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	15	1,153	77	65	2,257	2	5	2	12	15	11	7
2018 Background Traffic (w/ Phase 1)	16	1,204	80	68	2,373	2	5	2	13	16	12	7
2020 Background Traffic (W/ Phases 1 & 2)	17	1,295	83	71	2,523	2	6	2	13	17	12	8
Percent Inbound Assignment	0%	0%	0%	0%	14%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	14%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 1 Project Trips	0	5	0	0	25	0	0	0	0	0	0	0
Phase 1 Project Trips (Total)	0	5	0	0	25	0	0	0	0	0	0	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	16%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	16%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 2 Project Trips	0	42	0	0	54	0	0	0	0	0	0	0
Phase 2 Project Trips (Total)	0	42	0	0	55	0	0	0	0	0	0	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	11%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	11%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 3 Project Trips	0	64	0	0	123	0	0	0	0	0	0	0
Phase 3 Project Trips (Total)	0	64	0	0	123	0	0	0	0	0	0	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	15	1,158	77	65	2,282	2	5	2	12	15	11	7
2018 Buildout Total	16	1,246	80	68	2,428	2	5	2	13	16	12	7
2020 Buildout Total	17	1,359	83	71	2,646	2	6	2	13	17	12	8

PM PEAK HOUR

Description	Bull Street Northbound			Bull Street Southbound			Confederate Avenue Eastbound			Confederate Avenue Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	33	2,218	8	6	1,340	50	26	16	11	50	113	46
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	33	2,218	8	6	1,340	50	26	16	11	50	113	46
PHF	0.90	0.95	0.90	0.90	0.93	0.96	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	34	2,262	8	6	1,367	51	27	16	11	51	115	47
2018 Background Traffic (w/ Phase 1)	35	2,383	8	6	1,476	53	28	17	12	53	120	49
2020 Background Traffic (W/ Phases 1 & 2)	36	2,527	9	7	1,601	55	29	18	12	55	125	51
Percent Inbound Assignment	0%	0%	0%	0%	14%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	14%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 1 Project Trips	0	29	0	0	54	0	0	0	0	0	0	0
Phase 1 Project Trips (Total)	0	29	0	0	54	0	0	0	0	0	0	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	16%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	16%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 2 Project Trips	0	49	0	0	68	0	0	0	0	0	0	0
Phase 2 Project Trips (Total)	0	49	0	0	68	0	0	0	0	0	0	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	11%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	11%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 3 Project Trips	0	134	0	0	99	0	0	0	0	0	0	0
Phase 3 Project Trips (Total)	0	134	0	0	99	0	0	0	0	0	0	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	34	2,291	8	6	1,421	51	27	16	11	51	115	47
2018 Buildout Total	35	2,432	8	6	1,544	53	28	17	12	53	120	49
2020 Buildout Total	36	2,661	9	7	1,700	55	29	18	12	55	125	51

INTERSECTION VOLUME DEVELOPMENT

**Bull Street and Colonial Drive
AM PEAK HOUR**

Description	Bull Street Northbound			Bull Street Southbound			Colonial Drive Eastbound			Colonial Drive Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	0	1,236	352	19	2,128	10	0	0	5	185	1	9
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	0	1,236	352	19	2,128	10	0	0	5	185	1	9
PHF	0.90	0.95	0.96	0.90	0.93	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	1,261	359	19	2,171	10	0	0	5	189	1	9
2018 Background Traffic (w/ Phase 1)	0	1,313	376	39	2,264	11	0	0	5	198	1	14
2020 Background Traffic (W/ Phases 1 & 2)	0	1,387	405	61	2,389	11	0	0	6	217	1	35
Percent Inbound Assignment	0%	0%	1%	11%	3%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	3%	0%	0%	0%	0%	0%	0%	0%	6%	0%	11%
Phase 1 Project Trips	0	1	2	19	5	0	0	0	0	2	0	4
Phase 1 Project Trips (Total)	0	1	2	19	6	0	0	0	0	2	0	4
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	4%	6%	10%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	8%	0%	0%	0%	0%	0%	0%	0%	4%	0%	8%
Phase 2 Project Trips	0	21	14	20	34	0	0	0	0	11	0	21
Phase 2 Project Trips (Total)	0	21	14	21	34	0	0	0	0	11	0	21
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	4%	7%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	7%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%
Phase 3 Project Trips	0	41	0	45	78	0	0	0	0	0	0	23
Phase 3 Project Trips (Total)	0	41	0	45	78	0	0	0	0	0	0	23
Phase 3 Pass-By Traffic												
2016 Buildout Total	0	1,262	361	38	2,177	10	0	0	5	191	1	13
2018 Buildout Total	0	1,334	390	60	2,298	11	0	0	5	209	1	35
2020 Buildout Total	0	1,428	405	106	2,467	11	0	0	6	217	1	58

PM PEAK HOUR

Description	Bull Street Northbound			Bull Street Southbound			Colonial Drive Eastbound			Colonial Drive Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	0	2,202	244	11	1,346	23	0	0	4	349	6	51
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	0	2,202	244	11	1,346	23	0	0	4	349	6	51
PHF	0.90	0.97	0.90	0.90	0.94	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	2,246	249	11	1,373	23	0	0	4	356	6	52
2018 Background Traffic (w/ Phase 1)	0	2,343	263	54	1,440	24	0	0	4	382	6	77
2020 Background Traffic (W/ Phases 1 & 2)	0	2,461	290	79	1,541	25	0	0	4	409	7	104
Percent Inbound Assignment	0%	0%	1%	11%	3%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	3%	0%	0%	0%	0%	0%	0%	0%	6%	0%	11%
Phase 1 Project Trips	0	6	4	42	12	0	0	0	0	12	0	23
Phase 1 Project Trips (Total)	0	6	4	42	12	0	0	0	0	12	0	23
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	4%	6%	10%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	8%	0%	0%	0%	0%	0%	0%	0%	4%	0%	8%
Phase 2 Project Trips	0	24	17	25	42	0	0	0	0	12	0	24
Phase 2 Project Trips (Total)	0	24	17	25	43	0	0	0	0	12	0	25
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	4%	7%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	7%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%
Phase 3 Project Trips	0	85	0	36	63	0	0	0	0	0	0	49
Phase 3 Project Trips (Total)	0	85	0	36	63	0	0	0	0	0	0	49
Phase 3 Pass-By Traffic												
2016 Buildout Total	0	2,252	253	53	1,385	23	0	0	4	368	6	75
2018 Buildout Total	0	2,367	280	79	1,483	24	0	0	4	394	6	102
2020 Buildout Total	0	2,546	290	115	1,604	25	0	0	4	409	7	153

INTERSECTION VOLUME DEVELOPMENT

**Bull Street and Franklin Street/Freed Drive
AM PEAK HOUR**

Description	Bull Street Northbound			Bull Street Southbound			Franklin Street Eastbound			Freed Drive Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	1	1,558	1	0	2,279	5	1	0	3	2	0	1
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	1	1,558	1	0	2,279	5	1	0	3	2	0	1
PHF	0.90	0.95	0.90	0.90	0.97	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	1	1,589	1	0	2,325	5	1	0	3	2	0	1
2018 Background Traffic (w/ Phase 1)	2	1,655	6	6	2,420	5	1	0	5	3	0	2
2020 Background Traffic (W/ Phases 1 & 2)	0	1,752	23	0	2,569	6	0	0	5	0	0	8
Percent Inbound Assignment	0%	1%	3%	3%	0%	0%	0%	0%	1%	0%	0%	0%
Percent Outbound Assignment	2%	0%	0%	0%	6%	0%	0%	0%	0%	3%	0%	3%
Phase 1 Project Trips	1	2	5	5	2	0	0	0	2	1	0	1
Phase 1 Project Trips (Total)	1	2	5	6	2	0	0	0	2	1	0	1
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	4%	5%	0%	10%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	6%	0%	0%	4%	0%	0%	0%	0%	0%	0%	2%
Phase 2 Project Trips	0	29	17	0	45	0	0	0	0	0	0	5
Phase 2 Project Trips (Total)	0	30	17	0	45	0	0	0	0	0	0	5
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	4%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%
Phase 3 Project Trips	0	23	45	0	78	0	0	0	0	0	0	17
Phase 3 Project Trips (Total)	0	23	45	0	78	0	0	0	0	0	0	18
Phase 3 Pass-By Traffic												
2016 Buildout Total	2	1,591	6	6	2,327	5	1	0	5	3	0	2
2018 Buildout Total	0	1,685	23	0	2,471	5	0	0	5	0	0	8
2020 Buildout Total	0	1,775	68	0	2,647	6	0	0	5	0	0	26

PM PEAK HOUR

Description	Bull Street Northbound			Bull Street Southbound			Franklin Street Eastbound			Freed Drive Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	2	2,438	0	1	1,686	5	2	0	2	4	0	1
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	2	2,438	0	1	1,686	5	2	0	2	4	0	1
PHF	0.90	0.94	0.90	0.90	0.94	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	2	2,487	0	1	1,720	5	2	0	2	4	0	1
2018 Background Traffic (w/ Phase 1)	6	2,591	12	13	1,801	5	2	0	6	10	0	7
2020 Background Traffic (W/ Phases 1 & 2)	0	2,731	33	0	1,940	6	0	0	6	0	0	15
Percent Inbound Assignment	0%	1%	3%	3%	0%	0%	0%	0%	1%	0%	0%	0%
Percent Outbound Assignment	2%	0%	0%	0%	6%	0%	0%	0%	0%	3%	0%	3%
Phase 1 Project Trips	4	4	12	12	12	0	0	0	4	6	0	6
Phase 1 Project Trips (Total)	4	4	12	12	12	0	0	0	4	6	0	6
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	4%	5%	0%	10%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	6%	0%	0%	4%	0%	0%	0%	0%	0%	0%	2%
Phase 2 Project Trips	0	35	21	0	55	0	0	0	0	0	0	6
Phase 2 Project Trips (Total)	0	35	21	0	55	0	0	0	0	0	0	6
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	4%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%
Phase 3 Project Trips	0	49	36	0	63	0	0	0	0	0	0	36
Phase 3 Project Trips (Total)	0	49	37	0	63	0	0	0	0	0	0	36
Phase 3 Pass-By Traffic												
2016 Buildout Total	6	2,491	12	13	1,732	5	2	0	6	10	0	7
2018 Buildout Total	0	2,626	33	0	1,868	5	0	0	6	0	0	15
2020 Buildout Total	0	2,780	70	0	2,003	6	0	0	6	0	0	51

INTERSECTION VOLUME DEVELOPMENT

**Bull Street and /Williams Drive
AM PEAK HOUR**

Description	Bull Street Northbound			Bull Street Southbound			Jefferson Eastbound			Williams Drive Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	1	1,528	0	1	2,292	6	4	0	8	0	0	0
Balanced Volumes	0	0	0	-1	0	0	0	0	0	0	0	0
2015 Existing Traffic	1	1,528	0	0	2,292	6	4	0	8	0	0	0
PHF	0.90	0.94	0.90	0.90	0.97	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	1	1,559	0	0	2,338	6	4	0	8	0	0	0
2018 Background Traffic (w/ Phase 1)	1	1,629	11	0	2,437	6	4	0	10	0	0	1
2020 Background Traffic (W/ Phases 1 & 2)	1	1,771	0	0	2,587	10	0	0	18	0	0	0
Percent Inbound Assignment	0%	4%	6%	0%	1%	0%	0%	0%	1%	0%	0%	0%
Percent Outbound Assignment	0%	1%	0%	0%	9%	0%	0%	0%	0%	0%	0%	1%
Phase 1 Project Trips	0	7	11	0	5	0	0	0	2	0	0	0
Phase 1 Project Trips (Total)	0	7	11	0	5	0	0	0	2	0	0	1
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	18%	0%	0%	1%	0%	0%	0%	1%	0%	0%	0%
Percent Outbound Assignment	0%	2%	0%	0%	18%	1%	0%	0%	0%	0%	0%	0%
Phase 2 Project Trips	0	66	0	0	51	3	0	0	3	0	0	0
Phase 2 Project Trips (Total)	0	66	0	0	51	3	0	0	3	0	0	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	11%	0%	0%	1%	0%	0%	0%	1%	0%	0%	0%
Percent Outbound Assignment	1%	1%	0%	0%	11%	0%	0%	0%	0%	0%	0%	0%
Phase 3 Project Trips	6	129	0	0	75	0	0	0	11	0	0	0
Phase 3 Project Trips (Total)	6	129	0	0	75	0	0	0	11	0	0	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	1	1,566	11	0	2,343	6	4	0	10	0	0	1
2018 Buildout Total	1	1,706	0	0	2,488	9	0	0	17	0	0	0
2020 Buildout Total	7	1,900	0	0	2,662	10	0	0	29	0	0	0

PM PEAK HOUR

Description	Bull Street Northbound			Bull Street Southbound			Jefferson Eastbound			Williams Drive Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	5	2,432	0	1	1,681	13	3	0	7	0	0	0
Balanced Volumes	0	0	0	-1	0	0	0	0	0	0	0	0
2015 Existing Traffic	5	2,432	0	0	1,681	13	3	0	7	0	0	0
PHF	0.90	0.95	0.90	0.90	0.96	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	5	2,481	0	0	1,715	13	3	0	7	0	0	0
2018 Background Traffic (w/ Phase 1)	5	2,599	23	0	1,806	14	3	0	11	0	0	2
2020 Background Traffic (W/ Phases 1 & 2)	6	2,808	0	0	1,937	17	0	0	19	0	0	0
Percent Inbound Assignment	0%	4%	6%	0%	1%	0%	0%	0%	1%	0%	0%	0%
Percent Outbound Assignment	0%	1%	0%	0%	9%	0%	0%	0%	0%	0%	0%	1%
Phase 1 Project Trips	0	18	23	0	22	0	0	0	4	0	0	2
Phase 1 Project Trips (Total)	0	18	23	0	22	0	0	0	4	0	0	2
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	18%	0%	0%	1%	0%	0%	0%	1%	0%	0%	0%
Percent Outbound Assignment	0%	2%	0%	0%	18%	1%	0%	0%	0%	0%	0%	0%
Phase 2 Project Trips	0	82	0	0	59	3	0	0	4	0	0	0
Phase 2 Project Trips (Total)	0	82	0	0	59	3	0	0	4	0	0	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	11%	0%	0%	1%	0%	0%	0%	1%	0%	0%	0%
Percent Outbound Assignment	1%	1%	0%	0%	11%	0%	0%	0%	0%	0%	0%	0%
Phase 3 Project Trips	12	112	0	0	143	0	0	0	9	0	0	0
Phase 3 Project Trips (Total)	12	112	0	0	143	0	0	0	9	0	0	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	5	2,499	23	0	1,737	13	3	0	11	0	0	2
2018 Buildout Total	5	2,704	0	0	1,865	17	0	0	18	0	0	0
2020 Buildout Total	18	2,920	0	0	2,080	17	0	0	28	0	0	0

INTERSECTION VOLUME DEVELOPMENT

**Bull Street and Elmwood Avenue
AM PEAK HOUR**

Description	Bull Street Northbound			Bull Street Southbound			Elmwood Avenue Eastbound			Elmwood Avenue Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	327	528	67	31	1,180	1,089	1,011	56	812	2	6	4
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	327	528	67	31	1,180	1,089	1,011	56	812	2	6	4
PHF	0.91	0.90	0.90	0.90	0.94	0.97	0.97	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	334	539	68	32	1,204	1,111	1,031	57	828	2	6	4
2018 Background Traffic (w/ Phase 1)	347	560	90	37	1,252	1,159	1,091	80	862	6	11	4
2020 Background Traffic (W/ Phases 1 & 2)	361	610	100	45	1,324	1,231	1,168	124	897	11	44	9
Percent Inbound Assignment	0%	0%	11%	2%	0%	0%	10%	12%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	9%	0%	0%	0%	11%	13%	1%
Phase 1 Project Trips	0	0	19	4	0	3	18	21	0	4	5	0
Phase 1 Project Trips (Total)	0	0	19	4	0	3	18	21	0	4	5	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	8%	2%	2%	0%	0%	10%	12%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	8%	10%	0%	0%	0%	2%	12%	2%
Phase 2 Project Trips	0	27	7	7	21	26	34	41	0	5	32	5
Phase 2 Project Trips (Total)	0	27	7	7	21	26	34	41	0	5	32	5
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	4%	2%	2%	0%	0%	7%	19%	2%	0%	0%	0%
Percent Outbound Assignment	2%	0%	0%	0%	4%	7%	0%	0%	0%	2%	19%	2%
Phase 3 Project Trips	12	45	22	22	23	41	78	212	22	12	111	12
Phase 3 Project Trips (Total)	12	45	22	22	23	41	78	212	22	12	111	12
Phase 3 Pass-By Traffic												
2016 Buildout Total	334	539	87	36	1,204	1,114	1,049	78	828	6	11	4
2018 Buildout Total	347	587	97	44	1,273	1,185	1,125	121	862	11	43	9
2020 Buildout Total	373	655	122	67	1,347	1,272	1,246	336	919	23	155	21

PM PEAK HOUR

Description	Bull Street Northbound			Bull Street Southbound			Elmwood Avenue Eastbound			Elmwood Avenue Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	424	1,142	11	3	606	1,066	1,279	12	523	31	40	36
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	424	1,142	11	3	606	1,066	1,279	12	523	31	40	36
PHF	0.91	0.90	0.90	0.90	0.90	0.90	0.98	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	432	1,165	11	3	618	1,087	1,305	12	533	32	41	37
2018 Background Traffic (w/ Phase 1)	450	1,194	72	21	633	1,149	1,374	89	547	74	69	80
2020 Background Traffic (W/ Phases 1 & 2)	468	1,266	91	35	677	1,226	1,431	190	559	97	108	139
Percent Inbound Assignment	0%	0%	11%	2%	0%	0%	10%	12%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	9%	0%	0%	0%	11%	13%	1%
Phase 1 Project Trips	0	0	42	8	0	19	39	46	0	23	27	2
Phase 1 Project Trips (Total)	0	0	42	8	0	18	39	46	0	23	27	2
Phase 1 Pass-By Traffic		-18	18	10	-10		-22	30	-8	18		40
Percent Inbound Assignment	0%	8%	2%	2%	0%	0%	10%	12%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	8%	10%	0%	0%	0%	2%	12%	2%
Phase 2 Project Trips	0	34	8	8	24	31	42	51	0	6	37	6
Phase 2 Project Trips (Total)	0	34	8	8	24	31	42	51	0	6	37	6
Phase 2 Pass-By Traffic		-11	11	6	-6		-40	50	-10	16		51
Percent Inbound Assignment	0%	4%	2%	2%	0%	0%	7%	19%	2%	0%	0%	0%
Percent Outbound Assignment	2%	0%	0%	0%	4%	7%	0%	0%	0%	2%	19%	2%
Phase 3 Project Trips	24	36	18	18	49	85	63	172	18	24	231	24
Phase 3 Project Trips (Total)	24	36	18	18	49	85	63	172	18	24	231	25
Phase 3 Pass-By Traffic		-20	20	10	-10		-72	90	-18	28		92
2016 Buildout Total	432	1,147	71	21	608	1,105	1,322	88	525	73	68	79
2018 Buildout Total	450	1,217	91	35	651	1,180	1,376	190	537	96	106	137
2020 Buildout Total	492	1,282	129	63	716	1,311	1,422	452	559	149	339	256

INTERSECTION VOLUME DEVELOPMENT

**Bull Street and Calhoun Street
AM PEAK HOUR**

Description	Bull Street Northbound			Bull Street Southbound			Calhoun Street Eastbound			Calhoun Street Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	24	744	18	158	1,767	91	80	197	80	15	136	114
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	24	744	18	158	1,767	91	80	197	80	15	136	114
PHF	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.90	0.90	0.90	0.92	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	24	759	18	161	1,802	93	82	201	82	15	139	116
2018 Background Traffic (w/ Phase 1)	25	809	26	168	1,879	97	85	218	85	17	146	121
2020 Background Traffic (W/ Phases 1 & 2)	26	874	44	174	1,981	100	88	244	88	31	165	126
Percent Inbound Assignment	0%	11%	4%	0%	0%	0%	0%	5%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	11%	0%	0%	0%	0%	4%	5%	0%
Phase 1 Project Trips	0	19	7	0	4	0	0	9	0	2	2	0
Phase 1 Project Trips (Total)	0	19	7	0	4	0	0	9	0	1	2	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	10%	5%	0%	0%	0%	0%	5%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	10%	0%	0%	0%	0%	5%	5%	0%
Phase 2 Project Trips	0	34	17	0	26	0	0	17	0	13	13	0
Phase 2 Project Trips (Total)	0	34	17	0	26	0	0	17	0	13	13	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	6%	4%	2%	0%	0%	0%	5%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	6%	0%	0%	0%	0%	4%	5%	2%
Phase 3 Project Trips	0	67	45	22	35	0	0	56	0	23	29	12
Phase 3 Project Trips (Total)	0	67	45	22	35	0	0	56	0	23	29	12
Phase 3 Pass-By Traffic												
2016 Buildout Total	24	778	25	161	1,806	93	82	210	82	16	141	116
2018 Buildout Total	25	843	43	168	1,905	97	85	235	85	30	159	121
2020 Buildout Total	26	941	89	196	2,016	100	88	300	88	54	194	138

PM PEAK HOUR

Description	Bull Street Northbound			Bull Street Southbound			Calhoun Street Eastbound			Calhoun Street Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	31	1,438	11	79	997	77	77	146	26	15	236	145
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	31	1,438	11	79	997	77	77	146	26	15	236	145
PHF	0.90	0.93	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	32	1,467	11	81	1,017	79	79	149	27	15	241	148
2018 Background Traffic (w/ Phase 1)	33	1,568	27	84	1,081	82	82	175	28	24	260	154
2020 Background Traffic (W/ Phases 1 & 2)	34	1,672	48	87	1,154	85	85	202	29	40	286	160
Percent Inbound Assignment	0%	11%	4%	0%	0%	0%	0%	5%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	11%	0%	0%	0%	0%	4%	5%	0%
Phase 1 Project Trips	0	42	15	0	23	0	0	19	0	8	10	0
Phase 1 Project Trips (Total)	0	42	15	0	23	0	0	20	0	8	10	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	10%	5%	0%	0%	0%	0%	5%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	10%	0%	0%	0%	0%	5%	5%	0%
Phase 2 Project Trips	0	42	21	0	31	0	0	21	0	15	15	0
Phase 2 Project Trips (Total)	0	42	21	0	30	0	0	21	0	15	15	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	6%	4%	2%	0%	0%	0%	5%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	6%	0%	0%	0%	0%	4%	5%	2%
Phase 3 Project Trips	0	54	36	18	73	0	0	45	0	49	61	24
Phase 3 Project Trips (Total)	0	54	36	18	73	0	0	45	0	49	61	24
Phase 3 Pass-By Traffic												
2016 Buildout Total	32	1,509	26	81	1,040	79	79	169	27	23	251	148
2018 Buildout Total	33	1,610	48	84	1,111	82	82	196	28	39	275	154
2020 Buildout Total	34	1,726	84	105	1,227	85	85	247	29	89	347	184

INTERSECTION VOLUME DEVELOPMENT

**Harden Street /Harden Street Extension and Colonial Drive
AM PEAK HOUR**

Description	Harden Street Northbound			Harden Street Extension Southbound			Colonial Drive Eastbound			Colonial Drive Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	144	479	332	19	431	49	33	166	64	682	304	96
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	144	479	332	19	431	49	33	166	64	682	304	96
PHF	0.90	0.94	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	147	489	339	19	440	50	34	169	65	696	310	98
2018 Background Traffic (w/ Phase 1)	153	508	352	20	457	52	35	187	68	724	372	102
2020 Background Traffic (W/ Phases 1 & 2)	159	529	367	21	476	54	36	262	71	753	473	106
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	28%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	28%	0%	0%	0%	0%
Phase 1 Project Trips	0	0	0	0	0	0	0	11	0	0	49	0
Phase 1 Project Trips (Total)	0	0	0	0	0	0	0	11	0	0	49	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	26%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	26%	0%	0%	0%	0%
Phase 2 Project Trips	0	0	0	0	0	0	0	68	0	0	88	0
Phase 2 Project Trips (Total)	0	0	0	0	0	0	0	68	0	0	88	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	16%	10%	0%
Percent Outbound Assignment	0%	0%	15%	0%	0%	0%	0%	11%	0%	0%	0%	0%
Phase 3 Project Trips	0	0	87	0	0	0	0	64	0	179	112	0
Phase 3 Project Trips (Total)	0	0	87	0	0	0	0	64	0	179	112	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	147	489	339	19	440	50	34	180	65	696	359	98
2018 Buildout Total	153	508	352	20	457	52	35	255	68	724	460	102
2020 Buildout Total	159	529	454	21	476	54	36	327	71	932	584	106

PM PEAK HOUR

Description	Harden Street Northbound			Harden Street Extension Southbound			Colonial Drive Eastbound			Colonial Drive Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	88	357	844	68	489	39	40	364	138	375	186	48
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	88	357	844	68	489	39	40	364	138	375	186	48
PHF	0.90	0.90	0.95	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	90	364	861	69	499	40	41	371	141	383	190	49
2018 Background Traffic (w/ Phase 1)	93	379	896	72	519	41	42	444	146	398	305	51
2020 Background Traffic (W/ Phases 1 & 2)	97	394	932	75	540	43	44	539	152	414	423	53
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	28%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	28%	0%	0%	0%	0%
Phase 1 Project Trips	0	0	0	0	0	0	0	58	0	0	108	0
Phase 1 Project Trips (Total)	0	0	0	0	0	0	0	58	0	0	108	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	26%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	26%	0%	0%	0%	0%
Phase 2 Project Trips	0	0	0	0	0	0	0	79	0	0	110	0
Phase 2 Project Trips (Total)	0	0	0	0	0	0	0	79	0	0	110	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	16%	10%	0%
Percent Outbound Assignment	0%	0%	15%	0%	0%	0%	0%	11%	0%	0%	0%	0%
Phase 3 Project Trips	0	0	182	0	0	0	0	134	0	145	90	0
Phase 3 Project Trips (Total)	0	0	182	0	0	0	0	134	0	145	90	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	90	364	861	69	499	40	41	429	141	383	298	49
2018 Buildout Total	93	379	896	72	519	41	42	523	146	398	415	51
2020 Buildout Total	97	394	1,114	75	540	43	44	673	152	559	513	53

INTERSECTION VOLUME DEVELOPMENT

**Harden Street and Calhoun Street
AM PEAK HOUR**

Description	Harden Street Northbound			Harden Street Southbound			Calhoun Street Eastbound			Calhoun Street Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	166	749	15	38	941	81	80	24	134	6	22	2
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	166	749	15	38	941	81	80	24	134	6	22	2
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	169	764	15	39	960	83	82	24	137	6	22	2
2018 Background Traffic (w/ Phase 1)	194	795	16	40	999	86	85	26	146	6	27	2
2020 Background Traffic (W/ Phases 1 & 2)	243	827	17	42	1,039	89	88	30	184	7	31	2
Percent Inbound Assignment	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	2%	10%	0%	0%	0%
Phase 1 Project Trips	18	0	0	0	0	0	0	1	4	0	4	0
Phase 1 Project Trips (Total)	18	0	0	0	0	0	0	1	4	0	4	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	12%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	1%	12%	0%	0%	0%
Phase 2 Project Trips	41	0	0	0	0	0	0	3	32	0	3	0
Phase 2 Project Trips (Total)	42	0	0	0	0	0	0	3	32	0	3	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	4%	12%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Percent Outbound Assignment	0%	0%	0%	0%	12%	0%	0%	1%	4%	0%	0%	0%
Phase 3 Project Trips	45	134	0	0	70	0	0	6	23	0	11	0
Phase 3 Project Trips (Total)	45	134	0	0	70	0	0	6	23	0	11	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	187	764	15	39	960	83	82	25	141	6	26	2
2018 Buildout Total	236	795	16	40	999	86	85	29	178	6	30	2
2020 Buildout Total	288	961	17	42	1,109	89	88	36	207	7	42	2

PM PEAK HOUR

Description	Harden Street Northbound			Harden Street Southbound			Calhoun Street Eastbound			Calhoun Street Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	151	964	42	53	828	74	127	35	168	20	16	10
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	151	964	42	53	828	74	127	35	168	20	16	10
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	154	983	43	54	845	75	130	36	171	20	16	10
2018 Background Traffic (w/ Phase 1)	199	1,023	45	56	879	79	135	41	199	21	25	11
2020 Background Traffic (W/ Phases 1 & 2)	257	1,064	46	59	914	82	140	46	242	22	30	11
Percent Inbound Assignment	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	2%	10%	0%	0%	0%
Phase 1 Project Trips	39	0	0	0	0	0	0	4	21	0	8	0
Phase 1 Project Trips (Total)	39	0	0	0	0	0	0	4	21	0	8	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	12%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	1%	12%	0%	0%	0%
Phase 2 Project Trips	51	0	0	0	0	0	0	3	37	0	4	0
Phase 2 Project Trips (Total)	51	0	0	0	0	0	0	3	36	0	4	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	4%	12%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Percent Outbound Assignment	0%	0%	0%	0%	12%	0%	0%	1%	4%	0%	0%	0%
Phase 3 Project Trips	36	108	0	0	146	0	0	12	49	0	9	0
Phase 3 Project Trips (Total)	36	108	0	0	146	0	0	12	49	0	9	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	193	983	43	54	845	75	130	40	192	20	24	10
2018 Buildout Total	250	1,023	45	56	879	79	135	44	235	21	29	11
2020 Buildout Total	293	1,172	46	59	1,060	82	140	58	291	22	39	11

INTERSECTION VOLUME DEVELOPMENT

**Gregg Street and Calhoun Street
AM PEAK HOUR**

Description	Gregg Street Northbound			Gregg Street Southbound			Calhoun Street Eastbound			Calhoun Street Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	14	20	11	6	12	35	32	231	34	9	234	9
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	14	20	11	6	12	35	32	231	34	9	234	9
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	14	20	11	6	12	36	33	236	35	9	239	9
2018 Background Traffic (w/ Phase 1)	15	22	12	10	13	38	39	246	36	10	252	28
2020 Background Traffic (W/ Phases 1 & 2)	15	26	12	22	15	45	47	280	38	10	293	42
Percent Inbound Assignment	0%	1%	0%	0%	0%	0%	3%	0%	0%	0%	2%	10%
Percent Outbound Assignment	0%	0%	0%	10%	1%	3%	0%	2%	0%	0%	0%	0%
Phase 1 Project Trips	0	2	0	4	0	1	5	1	0	0	4	18
Phase 1 Project Trips (Total)	0	1	0	4	0	1	5	1	0	0	4	18
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	1%	0%	0%	0%	0%	2%	0%	0%	0%	9%	4%
Percent Outbound Assignment	0%	0%	0%	4%	1%	2%	0%	9%	0%	0%	0%	0%
Phase 2 Project Trips	0	3	0	11	3	5	7	24	0	0	31	14
Phase 2 Project Trips (Total)	0	3	0	11	2	5	7	24	0	0	31	14
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	1%	0%	0%	0%	0%	5%	0%	0%	0%	1%	4%
Percent Outbound Assignment	0%	0%	0%	2%	1%	5%	0%	3%	0%	0%	0%	0%
Phase 3 Project Trips	0	11	0	12	6	29	56	17	0	0	11	45
Phase 3 Project Trips (Total)	0	12	0	12	5	29	56	17	0	0	11	45
Phase 3 Pass-By Traffic												
2016 Buildout Total	14	21	11	10	12	37	38	237	35	9	243	27
2018 Buildout Total	15	25	12	21	15	43	46	270	36	10	283	42
2020 Buildout Total	15	38	12	34	20	74	103	297	38	10	304	87

PM PEAK HOUR

Description	Gregg Street Northbound			Gregg Street Southbound			Calhoun Street Eastbound			Calhoun Street Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	15	5	18	15	21	41	21	280	9	5	234	4
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	15	5	18	15	21	41	21	280	9	5	234	4
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	11%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	15	5	18	15	21	42	21	286	9	5	239	4
2018 Background Traffic (w/ Phase 1)	16	8	19	40	24	53	37	298	10	5	253	46
2020 Background Traffic (W/ Phases 1 & 2)	17	14	20	54	29	62	47	336	10	6	299	65
Percent Inbound Assignment	0%	1%	0%	0%	0%	0%	3%	0%	0%	0%	2%	10%
Percent Outbound Assignment	0%	0%	0%	10%	1%	3%	0%	2%	0%	0%	0%	0%
Phase 1 Project Trips	0	4	0	21	2	6	12	4	0	0	8	39
Phase 1 Project Trips (Total)	0	3	0	21	2	6	12	4	0	0	8	39
Phase 1 Pass-By Traffic				3	3	3	3	-3		-3	3	
Percent Inbound Assignment	0%	1%	0%	0%	0%	0%	2%	0%	0%	0%	9%	4%
Percent Outbound Assignment	0%	0%	0%	4%	1%	2%	0%	9%	0%	0%	0%	0%
Phase 2 Project Trips	0	4	0	12	3	6	8	27	0	0	38	17
Phase 2 Project Trips (Total)	0	5	0	12	4	6	8	27	0	0	38	17
Phase 2 Pass-By Traffic				1	2	1	1	-1		-2	2	
Percent Inbound Assignment	0%	1%	0%	0%	0%	0%	5%	0%	0%	0%	1%	4%
Percent Outbound Assignment	0%	0%	0%	2%	1%	5%	0%	3%	0%	0%	0%	0%
Phase 3 Project Trips	0	9	0	24	12	61	45	36	0	0	9	36
Phase 3 Project Trips (Total)	0	10	0	25	12	61	45	36	0	0	9	36
Phase 3 Pass-By Traffic				2	2	2	2	-2		-2	2	
2016 Buildout Total	15	8	18	39	23	51	36	287	9	5	244	46
2018 Buildout Total	16	13	19	53	28	61	46	324	10	5	289	65
2020 Buildout Total	17	24	20	81	41	125	94	370	10	6	306	103

INTERSECTION VOLUME DEVELOPMENT

**Gregg Street and Colonial Drive
AM PEAK HOUR**

Description	Gregg Street Northbound			Gregg Street Southbound			Colonial Drive Eastbound			Colonial Drive Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	6	9	17	6	4	2	11	254	28	68	340	52
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	6	9	17	6	4	2	11	254	28	68	340	52
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	6	9	17	6	4	2	11	259	29	69	347	53
2018 Background Traffic (w/ Phase 1)	8	10	24	6	4	2	12	275	39	100	382	55
2020 Background Traffic (W/ Phases 1 & 2)	9	10	30	7	4	2	12	348	40	110	477	57
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	5%	16%	12%	0%
Percent Outbound Assignment	5%	0%	16%	0%	0%	0%	0%	12%	0%	0%	0%	0%
Phase 1 Project Trips	2	0	6	0	0	0	0	5	9	28	21	0
Phase 1 Project Trips (Total)	2	0	6	0	0	0	0	5	9	28	21	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	24%	0%
Percent Outbound Assignment	0%	0%	2%	0%	0%	0%	0%	24%	0%	0%	0%	0%
Phase 2 Project Trips	0	0	5	0	0	0	0	63	0	7	82	0
Phase 2 Project Trips (Total)	0	0	5	0	0	0	0	63	0	7	81	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	1%	2%	6%	2%	0%
Percent Outbound Assignment	2%	0%	7%	0%	0%	0%	0%	2%	0%	0%	0%	0%
Phase 3 Project Trips	12	0	41	0	0	0	0	23	22	67	22	0
Phase 3 Project Trips (Total)	12	0	41	0	0	0	0	23	23	67	22	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	8	9	23	6	4	2	11	264	38	97	368	53
2018 Buildout Total	8	10	29	6	4	2	12	338	39	107	463	55
2020 Buildout Total	21	10	71	7	4	2	12	371	63	177	499	57

PM PEAK HOUR

Description	Gregg Street Northbound			Gregg Street Southbound			Colonial Drive Eastbound			Colonial Drive Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	17	2	60	35	11	26	1	357	13	25	332	9
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	17	2	60	35	11	26	1	357	13	25	332	9
PHF	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	6%	2%	2%	2%	2%	2%	2%	2%	8%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	17	2	61	36	11	27	1	364	13	26	339	9
2018 Background Traffic (w/ Phase 1)	28	2	100	37	12	28	1	401	36	89	398	10
2020 Background Traffic (W/ Phases 1 & 2)	33	2	112	39	12	29	1	485	40	102	511	10
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	5%	16%	12%	0%
Percent Outbound Assignment	5%	0%	16%	0%	0%	0%	0%	12%	0%	0%	0%	0%
Phase 1 Project Trips	10	0	33	0	0	0	0	25	19	62	46	0
Phase 1 Project Trips (Total)	10	0	33	0	0	0	0	25	19	62	46	0
Phase 1 Pass-By Traffic			3					-3	3			
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	24%	0%
Percent Outbound Assignment	0%	0%	2%	0%	0%	0%	0%	24%	0%	0%	0%	0%
Phase 2 Project Trips	0	0	6	0	0	0	0	73	0	8	102	0
Phase 2 Project Trips (Total)	0	0	6	0	0	0	0	73	0	8	102	0
Phase 2 Pass-By Traffic	4		4					-4	4	4	-4	
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	1%	2%	6%	2%	0%
Percent Outbound Assignment	2%	0%	7%	0%	0%	0%	0%	2%	0%	0%	0%	0%
Phase 3 Project Trips	24	0	85	0	0	0	0	33	18	54	18	0
Phase 3 Project Trips (Total)	24	0	85	0	0	0	0	33	18	54	18	0
Phase 3 Pass-By Traffic	3		3					-3	3	3	-3	
2016 Buildout Total	27	2	97	36	11	27	1	386	35	88	385	9
2018 Buildout Total	32	2	110	37	12	28	1	470	40	101	496	10
2020 Buildout Total	60	2	200	39	12	29	1	515	61	159	526	10

INTERSECTION VOLUME DEVELOPMENT

**Harden Street and Slights Avenue
AM PEAK HOUR**

Description	Harden Street Northbound			Harden Street Southbound			Access #9 Eastbound			Slights Avenue Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	0	856	64	117	1,093	0	0	0	0	116	0	193
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	0	856	64	117	1,093	0	0	0	0	116	0	193
PHF	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	7%	2%	9%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	873	65	119	1,115	0	0	0	0	118	0	197
2018 Background Traffic (w/ Phase 1)	0	908	68	124	1,160	0	0	0	0	123	0	205
2020 Background Traffic (W/ Phases 1 & 2)	0	945	71	129	1,207	0	0	0	0	128	0	213
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 1 Project Trips	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Project Trips (Total)	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 2 Project Trips	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Project Trips (Total)	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	16%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	15%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 3 Project Trips	0	87	0	0	179	0	0	0	0	0	0	0
Phase 3 Project Trips (Total)	0	87	0	0	179	0	0	0	0	0	0	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	0	873	65	119	1,115	0	0	0	0	118	0	197
2018 Buildout Total	0	908	68	124	1,160	0	0	0	0	123	0	205
2020 Buildout Total	0	1,032	71	129	1,386	0	0	0	0	128	0	213

PM PEAK HOUR

Description	Harden Street Northbound			Harden Street Southbound			Access #9 Eastbound			Slights Avenue Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	0	1,019	63	118	901	0	0	0	0	76	0	195
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	0	1,019	63	118	901	0	0	0	0	76	0	195
PHF	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	8%	4%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	1,039	64	120	919	0	0	0	0	78	0	199
2018 Background Traffic (w/ Phase 1)	0	1,081	67	125	956	0	0	0	0	81	0	207
2020 Background Traffic (W/ Phases 1 & 2)	0	1,125	70	130	995	0	0	0	0	84	0	215
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 1 Project Trips	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Project Trips (Total)	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 2 Project Trips	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Project Trips (Total)	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	16%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	15%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 3 Project Trips	0	182	0	0	145	0	0	0	0	0	0	0
Phase 3 Project Trips (Total)	0	182	0	0	145	0	0	0	0	0	0	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	0	1,039	64	120	919	0	0	0	0	78	0	199
2018 Buildout Total	0	1,081	67	125	956	0	0	0	0	81	0	207
2020 Buildout Total	0	1,307	70	130	1,140	0	0	0	0	84	0	215

INTERSECTION VOLUME DEVELOPMENT

**Farrow Road and Colonial Drive
AM PEAK HOUR**

Description	Farrow Road Northbound			Farrow Road Southbound			Colonial Drive Eastbound			- Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	145	368	0	0	857	16	0	0	169	0	0	0
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	145	368	0	0	857	16	0	0	169	0	0	0
PHF	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	148	375	0	0	874	16	0	0	172	0	0	0
2018 Background Traffic (w/ Phase 1)	155	401	0	0	956	17	0	0	181	0	0	0
2020 Background Traffic (W/ Phases 1 & 2)	163	482	0	0	1,078	18	0	0	192	0	0	0
Percent Inbound Assignment	0%	0%	0%	0%	27%	0%	0%	0%	1%	0%	0%	0%
Percent Outbound Assignment	1%	27%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 1 Project Trips	0	10	0	0	48	0	0	0	2	0	0	0
Phase 1 Project Trips (Total)	1	10	0	0	47	0	0	0	2	0	0	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	25%	0%	0%	0%	1%	0%	0%	0%
Percent Outbound Assignment	1%	25%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 2 Project Trips	3	66	0	0	85	0	0	0	3	0	0	0
Phase 2 Project Trips (Total)	2	66	0	0	85	0	0	0	3	0	0	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	25%	0%	0%	0%	1%	0%	0%	0%
Percent Outbound Assignment	1%	25%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 3 Project Trips	6	146	0	0	280	0	0	0	11	0	0	0
Phase 3 Project Trips (Total)	6	146	0	0	279	0	0	0	11	0	0	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	149	385	0	0	921	16	0	0	174	0	0	0
2018 Buildout Total	157	467	0	0	1,041	17	0	0	184	0	0	0
2020 Buildout Total	169	628	0	0	1,357	18	0	0	203	0	0	0

PM PEAK HOUR

Description	Farrow Road Northbound			Farrow Road Southbound			Colonial Drive Eastbound			- Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	245	927	0	0	375	24	0	0	157	0	0	0
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	245	927	0	0	375	24	0	0	157	0	0	0
PHF	0.96	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	250	946	0	0	383	24	0	0	160	0	0	0
2018 Background Traffic (w/ Phase 1)	262	1,040	0	0	502	25	0	0	171	0	0	0
2020 Background Traffic (W/ Phases 1 & 2)	275	1,155	0	0	624	26	0	0	181	0	0	0
Percent Inbound Assignment	0%	0%	0%	0%	27%	0%	0%	0%	1%	0%	0%	0%
Percent Outbound Assignment	1%	27%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 1 Project Trips	2	56	0	0	104	0	0	0	4	0	0	0
Phase 1 Project Trips (Total)	2	56	0	0	104	0	0	0	4	0	0	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	25%	0%	0%	0%	1%	0%	0%	0%
Percent Outbound Assignment	1%	25%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 2 Project Trips	3	76	0	0	106	0	0	0	4	0	0	0
Phase 2 Project Trips (Total)	3	76	0	0	106	0	0	0	4	0	0	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	25%	0%	0%	0%	1%	0%	0%	0%
Percent Outbound Assignment	1%	25%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 3 Project Trips	12	304	0	0	226	0	0	0	9	0	0	0
Phase 3 Project Trips (Total)	12	304	0	0	226	0	0	0	9	0	0	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	252	1,002	0	0	487	24	0	0	164	0	0	0
2018 Buildout Total	265	1,116	0	0	608	25	0	0	175	0	0	0
2020 Buildout Total	287	1,459	0	0	850	26	0	0	190	0	0	0

INTERSECTION VOLUME DEVELOPMENT

**Farrow Road and Beltline Blvd.
AM PEAK HOUR**

Description	Farrow Road Northbound			Farrow Road Southbound			Beltline Blvd. Eastbound			Beltline Blvd. Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	1	247	125	263	774	64	14	376	4	197	511	179
Balanced Volumes	-1	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	0	247	125	263	774	64	14	376	4	197	511	179
PHF	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	252	128	268	789	65	14	384	4	201	521	183
2018 Background Traffic (w/ Phase 1)	0	271	134	279	863	68	15	399	4	214	542	190
2020 Background Traffic (W/ Phases 1 & 2)	0	337	150	290	968	71	15	415	4	237	564	198
Percent Inbound Assignment	0%	0%	0%	0%	24%	0%	0%	0%	0%	3%	0%	0%
Percent Outbound Assignment	0%	24%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 1 Project Trips	0	9	1	0	42	0	0	0	0	5	0	0
Phase 1 Project Trips (Total)	0	9	1	0	42	0	0	0	0	5	0	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	21%	0%	0%	0%	0%	4%	0%	0%
Percent Outbound Assignment	0%	21%	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 2 Project Trips	0	55	11	0	71	0	0	0	0	14	0	0
Phase 2 Project Trips (Total)	0	55	11	0	71	0	0	0	0	14	0	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	23%	0%	0%	0%	0%	2%	0%	0%
Percent Outbound Assignment	0%	23%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 3 Project Trips	0	134	12	0	257	0	0	0	0	22	0	0
Phase 3 Project Trips (Total)	0	134	12	0	257	0	0	0	0	22	0	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	0	261	129	268	831	65	14	384	4	206	521	183
2018 Buildout Total	0	326	145	279	934	68	15	399	4	228	542	190
2020 Buildout Total	0	471	162	290	1,225	71	15	415	4	259	564	198

PM PEAK HOUR

Description	Farrow Road Northbound			Farrow Road Southbound			Beltline Blvd. Eastbound			Beltline Blvd. Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	0	937	252	266	304	46	85	511	11	150	481	358
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	0	937	252	266	304	46	85	511	11	150	481	358
PHF	0.90	0.90	0.96	0.94	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	956	257	271	310	47	87	521	11	153	491	365
2018 Background Traffic (w/ Phase 1)	0	1,043	274	282	416	49	90	542	12	170	510	380
2020 Background Traffic (W/ Phases 1 & 2)	0	1,148	297	294	518	51	94	564	12	194	531	395
Percent Inbound Assignment	0%	0%	0%	0%	24%	0%	0%	0%	0%	3%	0%	0%
Percent Outbound Assignment	0%	24%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 1 Project Trips	0	49	6	0	93	0	0	0	0	12	0	0
Phase 1 Project Trips (Total)	0	49	7	0	93	0	0	0	0	11	0	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	21%	0%	0%	0%	0%	4%	0%	0%
Percent Outbound Assignment	0%	21%	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 2 Project Trips	0	64	12	0	89	0	0	0	0	17	0	0
Phase 2 Project Trips (Total)	0	64	12	0	89	0	0	0	0	17	0	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	23%	0%	0%	0%	0%	2%	0%	0%
Percent Outbound Assignment	0%	23%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 3 Project Trips	0	280	24	0	208	0	0	0	0	18	0	0
Phase 3 Project Trips (Total)	0	280	24	0	208	0	0	0	0	18	0	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	0	1,005	264	271	403	47	87	521	11	164	491	365
2018 Buildout Total	0	1,107	286	282	505	49	90	542	12	187	510	380
2020 Buildout Total	0	1,428	321	294	726	51	94	564	12	212	531	395

INTERSECTION VOLUME DEVELOPMENT

**Farrow Road and SC 277 NB Ramps
AM PEAK HOUR**

Description	Farrow Road Northbound			Farrow Road Southbound			SC 277 NB Ramps Eastbound			- Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	0	295	157	40	1,132	0	55	0	8	0	0	0
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	0	295	157	40	1,132	0	55	0	8	0	0	0
PHF	0.90	0.90	0.90	0.90	0.94	0.90	0.92	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	301	160	41	1,155	0	56	0	8	0	0	0
2018 Background Traffic (w/ Phase 1)	0	314	175	42	1,243	0	58	0	8	0	0	0
2020 Background Traffic (W/ Phases 1 & 2)	0	332	231	44	1,363	0	61	0	9	0	0	0
Percent Inbound Assignment	0%	0%	0%	0%	24%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	2%	22%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 1 Project Trips	0	1	8	0	42	0	0	0	0	0	0	0
Phase 1 Project Trips (Total)	0	1	8	0	42	0	0	0	0	0	0	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	21%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	2%	19%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 2 Project Trips	0	5	50	0	71	0	0	0	0	0	0	0
Phase 2 Project Trips (Total)	0	5	50	0	71	0	0	0	0	0	0	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	23%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	2%	21%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 3 Project Trips	0	12	122	0	257	0	0	0	0	0	0	0
Phase 3 Project Trips (Total)	0	12	122	0	257	0	0	0	0	0	0	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	0	302	168	41	1,197	0	56	0	8	0	0	0
2018 Buildout Total	0	319	225	42	1,314	0	58	0	8	0	0	0
2020 Buildout Total	0	344	353	44	1,620	0	61	0	9	0	0	0

PM PEAK HOUR

Description	Farrow Road Northbound			Farrow Road Southbound			SC 277 NB Ramps Eastbound			- Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	0	805	595	60	580	0	144	1	14	0	0	0
Balanced Volumes	0	0	0	0	0	0	0	-1	0	0	0	0
2015 Existing Traffic	0	805	595	60	580	0	144	0	14	0	0	0
PHF	0.90	0.90	0.92	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	821	607	61	592	0	147	0	14	0	0	0
2018 Background Traffic (w/ Phase 1)	0	858	676	64	709	0	153	0	15	0	0	0
2020 Background Traffic (W/ Phases 1 & 2)	0	899	760	66	822	0	159	0	15	0	0	0
Percent Inbound Assignment	0%	0%	0%	0%	24%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	2%	22%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 1 Project Trips	0	4	45	0	93	0	0	0	0	0	0	0
Phase 1 Project Trips (Total)	0	4	45	0	93	0	0	0	0	0	0	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	21%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	2%	19%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 2 Project Trips	0	6	58	0	89	0	0	0	0	0	0	0
Phase 2 Project Trips (Total)	0	6	58	0	89	0	0	0	0	0	0	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	23%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	2%	21%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 3 Project Trips	0	24	255	0	208	0	0	0	0	0	0	0
Phase 3 Project Trips (Total)	0	24	256	0	208	0	0	0	0	0	0	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	0	825	652	61	685	0	147	0	14	0	0	0
2018 Buildout Total	0	864	734	64	798	0	153	0	15	0	0	0
2020 Buildout Total	0	923	1,016	66	1,030	0	159	0	15	0	0	0

INTERSECTION VOLUME DEVELOPMENT

**Farrow Road and SC 277 SB Ramps
AM PEAK HOUR**

Description	Farrow Road Northbound			Farrow Road Southbound			- Eastbound			SC 277 SB Ramps Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	12	339	0	0	649	195	12	0	37	495	13	32
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	12	339	0	0	649	195	12	0	37	495	13	32
PHF	0.90	0.92	0.90	0.90	0.93	0.90	0.90	0.90	0.90	0.93	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	12	346	0	0	662	199	12	0	38	505	13	33
2018 Background Traffic (w/ Phase 1)	13	361	0	0	693	207	13	0	39	563	14	34
2020 Background Traffic (W/ Phases 1 & 2)	13	380	0	0	728	215	13	0	41	649	14	35
Percent Inbound Assignment	0%	0%	0%	0%	2%	0%	0%	0%	0%	22%	0%	0%
Percent Outbound Assignment	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 1 Project Trips	0	1	0	0	4	0	0	0	0	39	0	0
Phase 1 Project Trips (Total)	0	1	0	0	4	0	0	0	0	38	0	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	2%	0%	0%	0%	0%	19%	0%	0%
Percent Outbound Assignment	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 2 Project Trips	0	5	0	0	7	0	0	0	0	65	0	0
Phase 2 Project Trips (Total)	0	5	0	0	7	0	0	0	0	64	0	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	2%	0%	0%	0%	0%	21%	0%	0%
Percent Outbound Assignment	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 3 Project Trips	0	12	0	0	22	0	0	0	0	235	0	0
Phase 3 Project Trips (Total)	0	12	0	0	22	0	0	0	0	235	0	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	12	347	0	0	666	199	12	0	38	543	13	33
2018 Buildout Total	13	366	0	0	700	207	13	0	39	627	14	34
2020 Buildout Total	13	392	0	0	750	215	13	0	41	884	14	35

PM PEAK HOUR

Description	Farrow Road Northbound			Farrow Road Southbound			- Eastbound			SC 277 SB Ramps Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	23	927	0	0	453	132	26	10	32	147	15	44
Balanced Volumes	0	0	0	0	0	0	5	-10	5	0	0	0
2015 Existing Traffic	23	927	0	0	453	132	31	0	37	147	15	44
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	23	946	0	0	462	135	32	0	38	150	15	45
2018 Background Traffic (w/ Phase 1)	24	988	0	0	489	140	33	0	39	241	16	47
2020 Background Traffic (W/ Phases 1 & 2)	25	1,033	0	0	516	146	34	0	41	328	17	49
Percent Inbound Assignment	0%	0%	0%	0%	2%	0%	0%	0%	0%	22%	0%	0%
Percent Outbound Assignment	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 1 Project Trips	0	4	0	0	8	0	0	0	0	85	0	0
Phase 1 Project Trips (Total)	0	4	0	0	8	0	0	0	0	85	0	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	2%	0%	0%	0%	0%	19%	0%	0%
Percent Outbound Assignment	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 2 Project Trips	0	6	0	0	8	0	0	0	0	81	0	0
Phase 2 Project Trips (Total)	0	6	0	0	8	0	0	0	0	81	0	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	2%	0%	0%	0%	0%	21%	0%	0%
Percent Outbound Assignment	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 3 Project Trips	0	24	0	0	18	0	0	0	0	190	0	0
Phase 3 Project Trips (Total)	0	24	0	0	18	0	0	0	0	190	0	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	23	950	0	0	470	135	32	0	38	235	15	45
2018 Buildout Total	24	994	0	0	497	140	33	0	39	322	16	47
2020 Buildout Total	25	1,057	0	0	534	146	34	0	41	518	17	49

INTERSECTION VOLUME DEVELOPMENT

**Assembly Street and Elmwood Avenue
AM PEAK HOUR**

Description	Assembly Street Northbound			Assembly Street Southbound			Elmwood Avenue Eastbound			Elmwood Avenue Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	243	1	209	0	0	0	0	1,992	426	567	1,338	4
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	243	1	209	0	0	0	0	1,992	426	567	1,338	4
PHF	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.98	0.90	0.92	0.96	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	248	1	213	0	0	0	0	2,032	435	578	1,365	4
2018 Background Traffic (w/ Phase 1)	258	1	226	0	0	0	0	2,145	452	603	1,427	4
2020 Background Traffic (W/ Phases 1 & 2)	268	1	242	0	0	0	0	2,281	470	632	1,524	4
Percent Inbound Assignment	0%	0%	2%	0%	0%	0%	0%	18%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	18%	0%
Phase 1 Project Trips	0	0	4	0	0	0	0	32	0	1	7	0
Phase 1 Project Trips (Total)	0	0	4	0	0	0	0	31	0	1	7	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	2%	0%	0%	0%	0%	15%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	15%	0%
Phase 2 Project Trips	0	0	7	0	0	0	0	51	0	5	39	0
Phase 2 Project Trips (Total)	0	0	7	0	0	0	0	51	0	5	40	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	1%	0%	0%	0%	0%	22%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	22%	0%
Phase 3 Project Trips	0	0	11	0	0	0	0	246	0	6	128	0
Phase 3 Project Trips (Total)	0	0	11	0	0	0	0	246	0	6	128	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	248	1	217	0	0	0	0	2,063	435	579	1,372	4
2018 Buildout Total	258	1	233	0	0	0	0	2,196	452	608	1,467	4
2020 Buildout Total	268	1	253	0	0	0	0	2,527	470	638	1,652	4

PM PEAK HOUR

Description	Assembly Street Northbound			Assembly Street Southbound			Elmwood Avenue Eastbound			Elmwood Avenue Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	962	8	534	0	0	1	0	1,501	253	314	1,795	7
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	962	8	534	0	0	1	0	1,501	253	314	1,795	7
PHF	0.93	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.92	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	981	8	545	0	0	1	0	1,531	258	320	1,831	7
2018 Background Traffic (w/ Phase 1)	1,021	8	575	0	0	1	0	1,662	268	337	1,942	7
2020 Background Traffic (W/ Phases 1 & 2)	1,062	9	606	0	0	1	0	1,790	279	357	2,065	8
Percent Inbound Assignment	0%	0%	2%	0%	0%	0%	0%	18%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	18%	0%
Phase 1 Project Trips	0	0	8	0	0	0	0	69	0	4	37	0
Phase 1 Project Trips (Total)	0	0	8	0	0	0	0	69	0	4	37	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	2%	0%	0%	0%	0%	15%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	15%	0%
Phase 2 Project Trips	0	0	8	0	0	0	0	64	0	6	46	0
Phase 2 Project Trips (Total)	0	0	8	0	0	0	0	64	0	6	46	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	1%	0%	0%	0%	0%	22%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	22%	0%
Phase 3 Project Trips	0	0	9	0	0	0	0	199	0	12	268	0
Phase 3 Project Trips (Total)	0	0	9	0	0	0	0	199	0	12	268	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	981	8	553	0	0	1	0	1,600	258	324	1,868	7
2018 Buildout Total	1,021	8	583	0	0	1	0	1,726	268	343	1,988	7
2020 Buildout Total	1,062	9	615	0	0	1	0	1,989	279	369	2,333	8

INTERSECTION VOLUME DEVELOPMENT

**Main Street and Elmwood Avenue
AM PEAK HOUR**

Description	Main Street Northbound			Main Street Southbound			Elmwood Avenue Eastbound			Elmwood Avenue Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	17	93	7	207	461	539	192	1,931	61	68	1,326	32
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	17	93	7	207	461	539	192	1,931	61	68	1,326	32
PHF	0.90	0.90	0.90	0.90	0.93	0.94	0.90	0.93	0.90	0.90	0.97	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	17	95	7	211	470	550	196	1,970	62	69	1,353	33
2018 Background Traffic (w/ Phase 1)	18	99	9	220	489	572	204	2,084	65	72	1,415	34
2020 Background Traffic (W/ Phases 1 & 2)	19	103	13	236	509	595	212	2,225	67	78	1,517	40
Percent Inbound Assignment	0%	0%	1%	0%	0%	0%	0%	20%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	20%	0%
Phase 1 Project Trips	0	0	2	0	0	0	0	35	0	0	8	0
Phase 1 Project Trips (Total)	0	0	2	0	0	0	0	35	0	0	8	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	1%	2%	0%	0%	0%	17%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	17%	2%
Phase 2 Project Trips	0	0	3	7	0	0	0	58	0	3	45	5
Phase 2 Project Trips (Total)	0	0	3	7	0	0	0	58	0	3	45	5
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	1%	2%	0%	0%	0%	23%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	23%	2%
Phase 3 Project Trips	0	0	11	22	0	0	0	257	0	6	134	12
Phase 3 Project Trips (Total)	0	0	11	22	0	0	0	257	0	6	134	12
Phase 3 Pass-By Traffic												
2016 Buildout Total	17	95	9	211	470	550	196	2,005	62	69	1,361	33
2018 Buildout Total	18	99	12	227	489	572	204	2,142	65	75	1,460	39
2020 Buildout Total	19	103	24	258	509	595	212	2,482	67	84	1,651	52

PM PEAK HOUR

Description	Main Street Northbound			Main Street Southbound			Elmwood Avenue Eastbound			Elmwood Avenue Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	136	449	47	144	189	451	468	1,438	68	12	1,421	86
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	136	449	47	144	189	451	468	1,438	68	12	1,421	86
PHF	0.90	0.90	0.90	0.90	0.95	0.90	0.91	0.97	0.90	0.90	0.95	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	139	458	48	147	193	460	477	1,467	69	12	1,449	88
2018 Background Traffic (w/ Phase 1)	144	476	54	153	201	479	497	1,603	72	15	1,549	91
2020 Background Traffic (W/ Phases 1 & 2)	150	496	61	167	209	498	517	1,737	75	18	1,662	101
Percent Inbound Assignment	0%	0%	1%	0%	0%	0%	0%	20%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	20%	0%
Phase 1 Project Trips	0	0	4	0	0	0	0	77	0	2	41	0
Phase 1 Project Trips (Total)	0	0	4	0	0	0	0	77	0	2	41	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	1%	2%	0%	0%	0%	17%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	17%	2%
Phase 2 Project Trips	0	0	4	8	0	0	0	72	0	3	52	6
Phase 2 Project Trips (Total)	0	0	5	8	0	0	0	72	0	3	52	6
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	1%	2%	0%	0%	0%	23%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	23%	2%
Phase 3 Project Trips	0	0	9	18	0	0	0	208	0	12	280	24
Phase 3 Project Trips (Total)	0	0	9	18	0	0	0	208	0	12	280	24
Phase 3 Pass-By Traffic												
2016 Buildout Total	139	458	52	147	193	460	477	1,544	69	14	1,490	88
2018 Buildout Total	144	476	59	161	201	479	497	1,675	72	18	1,601	97
2020 Buildout Total	150	496	70	185	209	498	517	1,945	75	30	1,942	125

INTERSECTION VOLUME DEVELOPMENT

**Sumter Street and Elmwood Avenue
AM PEAK HOUR**

Description	Sumter Street Northbound			Sumter Street Southbound			Elmwood Avenue Eastbound			Elmwood Avenue Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	33	11	20	6	111	17	11	1,476	249	83	1,341	6
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	33	11	20	6	111	17	11	1,476	249	83	1,341	6
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.95	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	34	11	20	6	113	17	11	1,506	254	85	1,368	6
2018 Background Traffic (w/ Phase 1)	35	12	23	6	118	18	12	1,603	264	88	1,431	6
2020 Background Traffic (W/ Phases 1 & 2)	36	12	28	10	123	19	12	1,735	275	94	1,542	10
Percent Inbound Assignment	0%	0%	1%	0%	0%	0%	0%	21%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	21%	0%
Phase 1 Project Trips	0	0	2	0	0	0	0	37	0	0	8	0
Phase 1 Project Trips (Total)	0	0	2	0	0	0	0	37	0	0	8	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	1%	1%	0%	0%	0%	20%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	20%	1%
Phase 2 Project Trips	0	0	3	3	0	0	0	68	0	3	53	3
Phase 2 Project Trips (Total)	0	0	4	3	0	0	0	68	0	2	53	3
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	1%	1%	0%	0%	0%	26%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	26%	1%
Phase 3 Project Trips	0	0	11	11	0	0	0	291	0	6	152	6
Phase 3 Project Trips (Total)	0	0	11	11	0	0	0	290	0	6	152	6
Phase 3 Pass-By Traffic												
2016 Buildout Total	34	11	22	6	113	17	11	1,543	254	85	1,376	6
2018 Buildout Total	35	12	27	9	118	18	12	1,671	264	90	1,484	9
2020 Buildout Total	36	12	39	21	123	19	12	2,025	275	100	1,694	16

PM PEAK HOUR

Description	Sumter Street Northbound			Sumter Street Southbound			Elmwood Avenue Eastbound			Elmwood Avenue Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes	83	243	194	4	41	12	9	1,305	80	29	1,457	9
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2015 Existing Traffic	83	243	194	4	41	12	9	1,305	80	29	1,457	9
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	85	248	198	4	42	12	9	1,331	82	30	1,486	9
2018 Background Traffic (w/ Phase 1)	88	258	210	4	44	13	10	1,466	85	33	1,589	10
2020 Background Traffic (W/ Phases 1 & 2)	92	268	222	8	45	13	10	1,607	88	38	1,713	13
Percent Inbound Assignment	0%	0%	1%	0%	0%	0%	0%	21%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	21%	0%
Phase 1 Project Trips	0	0	4	0	0	0	0	81	0	2	43	0
Phase 1 Project Trips (Total)	0	0	4	0	0	0	0	81	0	2	43	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	1%	1%	0%	0%	0%	20%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	20%	1%
Phase 2 Project Trips	0	0	4	4	0	0	0	85	0	3	61	3
Phase 2 Project Trips (Total)	0	0	4	4	0	0	0	85	0	4	61	3
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	1%	1%	0%	0%	0%	26%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	26%	1%
Phase 3 Project Trips	0	0	9	9	0	0	0	235	0	12	316	12
Phase 3 Project Trips (Total)	0	0	9	9	0	0	0	235	0	12	316	12
Phase 3 Pass-By Traffic												
2016 Buildout Total	85	248	202	4	42	12	9	1,412	82	32	1,529	9
2018 Buildout Total	88	258	214	8	44	13	10	1,551	85	37	1,650	13
2020 Buildout Total	92	268	231	17	45	13	10	1,842	88	50	2,029	25

INTERSECTION VOLUME DEVELOPMENT

**Calhoun Street at Barnwell Street/Access #13 (Full-Movement)
AM PEAK HOUR**

Description	Barnwell Street Northbound			Access #13 (FM) Southbound			Calhoun Street Eastbound			Calhoun Street Westbound					
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right			
Observed Volumes	3		11							301	24		23	245	
Balanced Volumes	3		11							301	24		23	245	
2015 Existing Traffic	3	0	11	0	0	0	0	301	24	23	245	0			
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	3	0	11	0	0	0	0	307	24	23	250	0			
2018 Background Traffic (w/ Phase 1)	3	1	12	1	1	2	11	324	25	24	261	4			
2020 Background Traffic (W/ Phases 1 & 2)	3	4	12	25	4	23	38	344	26	25	276	35			
Percent Inbound Assignment	0%	1%	0%	0%	0%	0%	6%	3%	0%	0%	0%	2%			
Percent Outbound Assignment	0%	0%	0%	2%	1%	6%	0%	0%	0%	0%	3%	0%			
Phase 1 Project Trips	0	2	0	1	0	2	11	5	0	0	1	4			
Phase 1 Project Trips (Total)	0	1	0	1	1	2	11	5	0	0	1	4			
Phase 1 Pass-By Traffic															
Percent Inbound Assignment	0%	1%	0%	0%	0%	0%	8%	2%	0%	0%	0%	9%			
Percent Outbound Assignment	0%	0%	0%	9%	1%	8%	0%	0%	0%	0%	2%	0%			
Phase 2 Project Trips	0	3	0	24	3	21	27	7	0	0	5	31			
Phase 2 Project Trips (Total)	0	3	0	24	3	21	27	7	0	0	5	31			
Phase 2 Pass-By Traffic															
Percent Inbound Assignment	0%	1%	0%	0%	0%	0%	6%	5%	0%	0%	0%	1%			
Percent Outbound Assignment	0%	0%	0%	3%	1%	6%	0%	0%	0%	0%	5%	0%			
Phase 3 Project Trips	0	11	0	17	6	35	67	56	0	0	29	11			
Phase 3 Project Trips (Total)	0	12	0	17	6	35	67	56	0	0	29	11			
Phase 3 Pass-By Traffic															
2016 Buildout Total	3	1	11	1	1	2	11	312	24	23	251	4			
2018 Buildout Total	3	4	12	25	4	23	38	331	25	24	266	35			
2020 Buildout Total	3	16	12	42	10	58	105	400	26	25	305	46			

PM PEAK HOUR

Description	Barnwell Street Northbound			Access #13 (FM) Southbound			Calhoun Street Eastbound			Calhoun Street Westbound					
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right			
Observed Volumes	29		28							300	10		5	263	
Balanced Volumes	29		28							300	10		5	263	
2015 Existing Traffic	29	0	28	0	0	0	0	300	10	5	263	0			
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	30	0	29	0	0	0	0	306	10	5	268	0			
2018 Background Traffic (w/ Phase 1)	31	4	30	4	2	12	23	330	11	5	285	8			
2020 Background Traffic (W/ Phases 1 & 2)	32	9	31	32	5	37	58	350	11	6	301	47			
Percent Inbound Assignment	0%	1%	0%	0%	0%	0%	6%	3%	0%	0%	0%	2%			
Percent Outbound Assignment	0%	0%	0%	2%	1%	6%	0%	0%	0%	0%	3%	0%			
Phase 1 Project Trips	0	4	0	4	2	12	23	12	0	0	6	8			
Phase 1 Project Trips (Total)	0	4	0	4	2	12	23	12	0	0	6	8			
Phase 1 Pass-By Traffic															
Percent Inbound Assignment	0%	1%	0%	0%	0%	0%	8%	2%	0%	0%	0%	9%			
Percent Outbound Assignment	0%	0%	0%	9%	1%	8%	0%	0%	0%	0%	2%	0%			
Phase 2 Project Trips	0	4	0	27	3	24	34	8	0	0	6	38			
Phase 2 Project Trips (Total)	0	5	0	27	3	24	34	8	0	0	6	38			
Phase 2 Pass-By Traffic				1	1	1	1	-1			-1	1			
Percent Inbound Assignment	0%	1%	0%	0%	0%	0%	6%	5%	0%	0%	0%	1%			
Percent Outbound Assignment	0%	0%	0%	3%	1%	6%	0%	0%	0%	0%	5%	0%			
Phase 3 Project Trips	0	9	0	36	12	73	54	45	0	0	61	9			
Phase 3 Project Trips (Total)	0	10	0	36	12	73	54	45	0	0	61	9			
Phase 3 Pass-By Traffic				3	3	3	3	-3			-3	3			
2016 Buildout Total	30	4	29	4	2	12	23	318	10	5	274	8			
2018 Buildout Total	31	9	30	32	5	37	58	337	11	5	290	47			
2020 Buildout Total	32	19	31	71	17	113	115	392	11	6	359	59			

INTERSECTION VOLUME DEVELOPMENT

**Bull Street at Williams Street (Signalized)
AM PEAK HOUR**

Description	Bull Street Northbound			Bull Street Southbound			N/A Eastbound			Williams Street (signal) Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes												
Balanced Volumes												
2015 Existing Traffic		1,588			2,318							
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	1,620	0	0	2,364	0	0	0	0	0	0	0
2018 Background Traffic (w/ Phase 1)	0	1,693	0	0	2,465	0	0	0	0	0	0	0
2020 Background Traffic (W/ Phases 1 & 2)	0	1,797	41	37	2,578	0	0	0	0	40	0	11
Percent Inbound Assignment	0%	4%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	2%	0%	0%	9%	0%	0%	0%	0%	0%	0%	0%
Phase 1 Project Trips	0	8	0	0	5	0	0	0	0	0	0	0
Phase 1 Project Trips (Total)	0	8	0	0	5	0	0	0	0	0	0	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	9%	9%	9%	1%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	2%	0%	0%	4%	0%	0%	0%	0%	15%	0%	4%
Phase 2 Project Trips	0	36	31	31	14	0	0	0	0	39	0	11
Phase 2 Project Trips (Total)	0	36	30	31	14	0	0	0	0	40	0	11
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	4%	7%	6%	1%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	1%	0%	0%	0%	0%	0%	0%	0%	11%	0%	3%
Phase 3 Project Trips	0	51	78	67	11	0	0	0	0	64	0	17
Phase 3 Project Trips (Total)	0	51	78	67	11	0	0	0	0	64	0	17
Phase 3 Pass-By Traffic												
2016 Buildout Total	0	1,628	0	0	2,369	0	0	0	0	0	0	0
2018 Buildout Total	0	1,729	41	37	2,479	0	0	0	0	40	0	11
2020 Buildout Total	0	1,848	119	104	2,589	0	0	0	0	104	0	28

PM PEAK HOUR

Description	Bull Street Northbound			Bull Street Southbound			N/A Eastbound			Williams Street (signal) Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes												
Balanced Volumes												
2015 Existing Traffic		2,446			1,699							
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	2,495	0	0	1,733	0	0	0	0	0	0	0
2018 Background Traffic (w/ Phase 1)	0	2,616	0	0	1,825	0	0	0	0	0	0	0
2020 Background Traffic (W/ Phases 1 & 2)	0	2,754	72	60	1,905	0	0	0	0	55	0	23
Percent Inbound Assignment	0%	4%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	2%	0%	0%	9%	0%	0%	0%	0%	0%	0%	0%
Phase 1 Project Trips	0	20	0	0	22	0	0	0	0	0	0	0
Phase 1 Project Trips (Total)	0	20	0	0	22	0	0	0	0	0	0	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	9%	9%	9%	1%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	2%	0%	0%	4%	0%	0%	0%	0%	15%	0%	4%
Phase 2 Project Trips	0	44	38	38	16	0	0	0	0	46	0	12
Phase 2 Project Trips (Total)	0	44	38	39	16	0	0	0	0	46	0	12
Phase 2 Pass-By Traffic		-11	11	9	-9					9		11
Percent Inbound Assignment	0%	4%	7%	6%	1%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	1%	0%	0%	0%	0%	0%	0%	0%	11%	0%	3%
Phase 3 Project Trips	0	48	63	54	9	0	0	0	0	134	0	36
Phase 3 Project Trips (Total)	0	49	63	54	9	0	0	0	0	134	0	37
Phase 3 Pass-By Traffic		-20	20	15	-15					15		20
2016 Buildout Total	0	2,515	0	0	1,755	0	0	0	0	0	0	0
2018 Buildout Total	0	2,649	72	60	1,832	0	0	0	0	55	0	23
2020 Buildout Total	0	2,783	155	129	1,899	0	0	0	0	204	0	80

INTERSECTION VOLUME DEVELOPMENT

**Colonial Drive at Access #5 (RIRO)
AM PEAK HOUR**

Description	Access #5 (RIRO)			-			Colonial Drive			Colonial Drive		
	Northbound			Southbound			Eastbound			Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes												
Balanced Volumes												
2015 Existing Traffic								263			497	
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	0	0	0	0	0	0	268	0	0	507	0
2018 Background Traffic (w/ Phase 1)	0	0	0	0	0	0	0	300	0	0	533	0
2020 Background Traffic (W/ Phases 1 & 2)	0	0	11	0	0	0	0	332	14	0	587	0
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	12%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	17%	0%
Phase 1 Project Trips	0	0	0	0	0	0	0	21	0	0	6	0
Phase 1 Project Trips (Total)	0	0	0	0	0	0	0	21	0	0	6	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	6%	4%	0%	0%	0%
Percent Outbound Assignment	0%	0%	4%	0%	0%	0%	0%	0%	0%	0%	12%	0%
Phase 2 Project Trips	0	0	11	0	0	0	0	20	14	0	32	0
Phase 2 Project Trips (Total)	0	0	11	0	0	0	0	21	14	0	32	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	4%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%	0%
Phase 3 Project Trips	0	0	0	0	0	0	0	45	0	0	23	0
Phase 3 Project Trips (Total)	0	0	0	0	0	0	0	45	0	0	23	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	0	0	0	0	0	0	0	289	0	0	513	0
2018 Buildout Total	0	0	11	0	0	0	0	321	14	0	565	0
2020 Buildout Total	0	0	11	0	0	0	0	377	14	0	610	0

PM PEAK HOUR

Description	Access #5 (RIRO)			-			Colonial Drive			Colonial Drive		
	Northbound			Southbound			Eastbound			Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes												
Balanced Volumes												
2015 Existing Traffic								542			313	
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	0	0	0	0	0	0	553	0	0	319	0
2018 Background Traffic (w/ Phase 1)	0	0	0	0	0	0	0	621	0	0	367	0
2020 Background Traffic (W/ Phases 1 & 2)	0	0	16	0	0	0	0	665	21	0	418	0
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	12%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	17%	0%
Phase 1 Project Trips	0	0	0	0	0	0	0	46	0	0	35	0
Phase 1 Project Trips (Total)	0	0	0	0	0	0	0	46	0	0	35	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	6%	4%	0%	0%	0%
Percent Outbound Assignment	0%	0%	4%	0%	0%	0%	0%	0%	0%	0%	12%	0%
Phase 2 Project Trips	0	0	12	0	0	0	0	25	17	0	37	0
Phase 2 Project Trips (Total)	0	0	12	0	0	0	0	25	17	0	37	0
Phase 2 Pass-By Traffic			4					-4	4			
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	4%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%	0%
Phase 3 Project Trips	0	0	0	0	0	0	0	36	0	0	49	0
Phase 3 Project Trips (Total)	0	0	0	0	0	0	0	36	0	0	49	0
Phase 3 Pass-By Traffic			3					-3	3			
2016 Buildout Total	0	0	0	0	0	0	0	599	0	0	354	0
2018 Buildout Total	0	0	16	0	0	0	0	642	21	0	404	0
2020 Buildout Total	0	0	19	0	0	0	0	698	24	0	467	0

INTERSECTION VOLUME DEVELOPMENT

**Colonial Drive at Access #6
AM PEAK HOUR**

Description	Access #6 Northbound			Mental Health Dwy Southbound			Colonial Drive Eastbound			Colonial Drive Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes												
Balanced Volumes												
2015 Existing Traffic				5		1	78	293			193	155
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	0	0	5	0	1	80	299	0	0	197	158
2018 Background Traffic (w/ Phase 1)	0	0	0	5	0	1	83	332	0	0	211	164
2020 Background Traffic (W/ Phases 1 & 2)	16	0	11	6	0	1	86	369	7	19	235	171
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	12%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	17%	0%
Phase 1 Project Trips	0	0	0	0	0	0	0	21	0	0	6	0
Phase 1 Project Trips (Total)	0	0	0	0	0	0	0	21	0	0	6	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	4%	2%	6%	0%	0%
Percent Outbound Assignment	6%	0%	4%	0%	0%	0%	0%	4%	0%	0%	6%	0%
Phase 2 Project Trips	16	0	11	0	0	0	0	24	7	20	16	0
Phase 2 Project Trips (Total)	16	0	11	0	0	0	0	25	7	19	16	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	4%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%	0%
Phase 3 Project Trips	0	0	0	0	0	0	0	45	0	0	23	0
Phase 3 Project Trips (Total)	0	0	0	0	0	0	0	45	0	0	23	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	0	0	0	5	0	1	80	320	0	0	203	158
2018 Buildout Total	16	0	11	5	0	1	83	357	7	19	227	164
2020 Buildout Total	16	0	11	6	0	1	86	414	7	19	258	171

PM PEAK HOUR

Description	Access #6 Northbound			Mental Health Dwy Southbound			Colonial Drive Eastbound			Colonial Drive Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes												
Balanced Volumes												
2015 Existing Traffic				121		31	5	250			374	1
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	0	0	123	0	32	5	255	0	0	381	1
2018 Background Traffic (w/ Phase 1)	0	0	0	128	0	33	5	311	0	0	432	1
2020 Background Traffic (W/ Phases 1 & 2)	19	0	16	134	0	34	6	347	12	25	466	1
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	12%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	17%	0%
Phase 1 Project Trips	0	0	0	0	0	0	0	46	0	0	35	0
Phase 1 Project Trips (Total)	0	0	0	0	0	0	0	46	0	0	35	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	4%	2%	6%	0%	0%
Percent Outbound Assignment	6%	0%	4%	0%	0%	0%	0%	4%	0%	0%	6%	0%
Phase 2 Project Trips	18	0	12	0	0	0	0	29	8	25	18	0
Phase 2 Project Trips (Total)	19	0	12	0	0	0	0	29	8	25	18	0
Phase 2 Pass-By Traffic				4				-4	4			
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	4%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%	0%
Phase 3 Project Trips	0	0	0	0	0	0	0	36	0	0	49	0
Phase 3 Project Trips (Total)	0	0	0	0	0	0	0	36	0	0	49	0
Phase 3 Pass-By Traffic				3				-3	3			
2016 Buildout Total	0	0	0	123	0	32	5	301	0	0	416	1
2018 Buildout Total	19	0	16	128	0	33	5	336	12	25	450	1
2020 Buildout Total	19	0	19	134	0	34	6	380	15	25	515	1

INTERSECTION VOLUME DEVELOPMENT

**Colonial Drive at Access #6 (Boyce Street)
AM PEAK HOUR**

Description	Boyce Street Northbound			N/A Southbound			Colonial Drive Eastbound			Colonial Drive Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes												
Balanced Volumes												
2015 Existing Traffic							293			348		
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	0	0	0	0	0	0	299	0	0	355	0
2018 Background Traffic (w/ Phase 1)	4	0	5	0	0	0	0	320	12	21	371	0
2020 Background Traffic (W/ Phases 1 & 2)	19	0	46	0	0	0	0	354	26	82	406	0
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	5%	7%	12%	0%	0%
Percent Outbound Assignment	12%	0%	12%	0%	0%	0%	0%	0%	0%	0%	5%	0%
Phase 1 Project Trips	5	0	5	0	0	0	0	9	12	21	2	0
Phase 1 Project Trips (Total)	4	0	5	0	0	0	0	9	12	21	2	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	4%	18%	6%	0%
Percent Outbound Assignment	6%	0%	16%	0%	0%	0%	0%	8%	0%	0%	0%	0%
Phase 2 Project Trips	16	0	42	0	0	0	0	21	14	61	20	0
Phase 2 Project Trips (Total)	15	0	41	0	0	0	0	22	14	61	20	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	3%	1%	2%	0%	0%
Percent Outbound Assignment	2%	0%	2%	0%	0%	0%	0%	0%	0%	0%	2%	0%
Phase 3 Project Trips	12	0	12	0	0	0	0	34	11	22	12	0
Phase 3 Project Trips (Total)	11	0	12	0	0	0	0	34	11	22	12	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	4	0	5	0	0	0	0	308	12	21	357	0
2018 Buildout Total	19	0	46	0	0	0	0	342	26	82	391	0
2020 Buildout Total	30	0	58	0	0	0	0	388	37	104	418	0

PM PEAK HOUR

Description	Boyce Street Northbound			N/A Southbound			Colonial Drive Eastbound			Colonial Drive Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes												
Balanced Volumes												
2015 Existing Traffic							371			375		
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	0	0	0	0	0	0	378	0	0	383	0
2018 Background Traffic (w/ Phase 1)	28	0	31	0	0	0	0	407	33	49	405	0
2020 Background Traffic (W/ Phases 1 & 2)	63	0	84	0	0	0	0	443	54	143	429	0
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	5%	7%	12%	0%	0%
Percent Outbound Assignment	12%	0%	12%	0%	0%	0%	0%	0%	0%	0%	5%	0%
Phase 1 Project Trips	25	0	25	0	0	0	0	19	27	46	10	0
Phase 1 Project Trips (Total)	25	0	25	0	0	0	0	19	27	46	10	0
Phase 1 Pass-By Traffic	3	6						-6	6	3	-3	
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	4%	18%	6%	0%
Percent Outbound Assignment	6%	0%	16%	0%	0%	0%	0%	8%	0%	0%	0%	0%
Phase 2 Project Trips	18	0	49	0	0	0	0	24	17	76	25	0
Phase 2 Project Trips (Total)	18	0	49	0	0	0	0	24	17	77	25	0
Phase 2 Pass-By Traffic	17	4						-4	4	17	-17	
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	3%	1%	2%	0%	0%
Percent Outbound Assignment	2%	0%	2%	0%	0%	0%	0%	0%	0%	0%	2%	0%
Phase 3 Project Trips	24	0	24	0	0	0	0	27	9	18	24	0
Phase 3 Project Trips (Total)	25	0	24	0	0	0	0	27	9	18	24	0
Phase 3 Pass-By Traffic	20	3						-3	3	20	-20	
2016 Buildout Total	28	0	31	0	0	0	0	391	33	49	390	0
2018 Buildout Total	63	0	84	0	0	0	0	427	54	143	413	0
2020 Buildout Total	108	0	111	0	0	0	0	467	66	181	433	0

INTERSECTION VOLUME DEVELOPMENT

**Colonial Drive at Access #7 (Full-Movement)
AM PEAK HOUR**

Description	Access #7 Northbound			- Southbound			Colonial Drive Eastbound			Colonial Drive Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
	Observed Volumes											
Balanced Volumes												
2015 Existing Traffic								277			460	
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	0	0	0	0	0	0	283	0	0	469	0
2018 Background Traffic (w/ Phase 1)	0	0	0	0	0	0	0	305	0	0	537	0
2020 Background Traffic (W/ Phases 1 & 2)	0	0	0	0	0	0	0	385	0	0	645	0
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	28%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	28%	0%	0%	0%	0%
Phase 1 Project Trips	0	0	0	0	0	0	0	11	0	0	49	0
Phase 1 Project Trips (Total)	0	0	0	0	0	0	0	11	0	0	49	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	26%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	26%	0%	0%	0%	0%
Phase 2 Project Trips	0	0	0	0	0	0	0	68	0	0	88	0
Phase 2 Project Trips (Total)	0	0	0	0	0	0	0	68	0	0	88	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	1%	2%	8%	0%
Percent Outbound Assignment	0%	0%	2%	0%	0%	0%	0%	9%	0%	0%	0%	0%
Phase 3 Project Trips	0	0	12	0	0	0	0	52	11	22	89	0
Phase 3 Project Trips (Total)	0	0	12	0	0	0	0	53	11	22	89	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	0	0	0	0	0	0	0	294	0	0	518	0
2018 Buildout Total	0	0	0	0	0	0	0	373	0	0	625	0
2020 Buildout Total	0	0	12	0	0	0	0	438	11	22	734	0

PM PEAK HOUR

Description	Access #7 Northbound			- Southbound			Colonial Drive Eastbound			Colonial Drive Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
	Observed Volumes											
Balanced Volumes												
2015 Existing Traffic								452			366	
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	0	0	0	0	0	0	461	0	0	373	0
2018 Background Traffic (w/ Phase 1)	0	0	0	0	0	0	0	538	0	0	496	0
2020 Background Traffic (W/ Phases 1 & 2)	4	0	4	0	0	0	0	632	4	4	618	0
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	28%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	28%	0%	0%	0%	0%
Phase 1 Project Trips	0	0	0	0	0	0	0	58	0	0	108	0
Phase 1 Project Trips (Total)	0	0	0	0	0	0	0	58	0	0	108	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	26%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	26%	0%	0%	0%	0%
Phase 2 Project Trips	0	0	0	0	0	0	0	79	0	0	110	0
Phase 2 Project Trips (Total)	0	0	0	0	0	0	0	79	0	0	110	0
Phase 2 Pass-By Traffic	4		4					-4	4	4	-4	
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	1%	2%	8%	0%
Percent Outbound Assignment	0%	0%	2%	0%	0%	0%	0%	9%	0%	0%	0%	0%
Phase 3 Project Trips	0	0	24	0	0	0	0	109	9	18	72	0
Phase 3 Project Trips (Total)	0	0	25	0	0	0	0	109	9	18	72	0
Phase 3 Pass-By Traffic	3		3					-3	3	3	-3	
2016 Buildout Total	0	0	0	0	0	0	0	519	0	0	481	0
2018 Buildout Total	4	0	4	0	0	0	0	613	4	4	602	0
2020 Buildout Total	7	0	32	0	0	0	0	738	16	25	687	0

INTERSECTION VOLUME DEVELOPMENT

**Harden Street at Access #8 (RIRO)
AM PEAK HOUR**

Description	Harden Street Northbound			Harden Street Southbound			Access #8 (RIRO) Eastbound			N/A Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes												
Balanced Volumes												
2015 Existing Traffic		920			1,209							
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	938	0	0	1,233	0	0	0	0	0	0	0
2018 Background Traffic (w/ Phase 1)	0	976	0	0	1,283	0	0	0	0	0	0	0
2020 Background Traffic (W/ Phases 1 & 2)	0	1,016	0	0	1,335	0	0	0	0	0	0	0
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 1 Project Trips	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Project Trips (Total)	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 2 Project Trips	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Project Trips (Total)	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	12%	4%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	15%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%
Phase 3 Project Trips	0	87	0	0	134	45	0	0	6	0	0	0
Phase 3 Project Trips (Total)	0	87	0	0	134	45	0	0	6	0	0	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	0	938	0	0	1,233	0	0	0	0	0	0	0
2018 Buildout Total	0	976	0	0	1,283	0	0	0	0	0	0	0
2020 Buildout Total	0	1,103	0	0	1,469	45	0	0	6	0	0	0

PM PEAK HOUR

Description	Harden Street Northbound			Harden Street Southbound			Access #8 (RIRO) Eastbound			N/A Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes												
Balanced Volumes												
2015 Existing Traffic		1,082			977							
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	1,104	0	0	997	0	0	0	0	0	0	0
2018 Background Traffic (w/ Phase 1)	0	1,148	0	0	1,037	0	0	0	0	0	0	0
2020 Background Traffic (W/ Phases 1 & 2)	0	1,195	0	0	1,079	0	0	0	0	0	0	0
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 1 Project Trips	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Project Trips (Total)	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 2 Project Trips	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Project Trips (Total)	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	12%	4%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	15%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%
Phase 3 Project Trips	0	182	0	0	108	36	0	0	12	0	0	0
Phase 3 Project Trips (Total)	0	182	0	0	109	36	0	0	12	0	0	0
Phase 3 Pass-By Traffic					-2	2			2			
2016 Buildout Total	0	1,104	0	0	997	0	0	0	0	0	0	0
2018 Buildout Total	0	1,148	0	0	1,037	0	0	0	0	0	0	0
2020 Buildout Total	0	1,377	0	0	1,186	38	0	0	14	0	0	0

INTERSECTION VOLUME DEVELOPMENT

**Harden Street at Access #9 (Left-Over)
AM PEAK HOUR**

Description	Harden Street Northbound			Harden Street Southbound			Access #9 (L-O) Eastbound			N/A Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes												
Balanced Volumes												
2015 Existing Traffic		920			1,209							
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	938	0	0	1,233	0	0	0	0	0	0	0
2018 Background Traffic (w/ Phase 1)	0	976	0	0	1,283	0	0	0	0	0	0	0
2020 Background Traffic (W/ Phases 1 & 2)	0	1,016	0	0	1,335	0	0	0	0	0	0	0
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 1 Project Trips	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Project Trips (Total)	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 2 Project Trips	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Project Trips (Total)	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	2%	0%	0%	0%	9%	3%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	15%	0%	0%	1%	0%	0%	0%	2%	0%	0%	0%
Phase 3 Project Trips	22	87	0	0	106	34	0	0	12	0	0	0
Phase 3 Project Trips (Total)	22	87	0	0	106	34	0	0	12	0	0	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	0	938	0	0	1,233	0	0	0	0	0	0	0
2018 Buildout Total	0	976	0	0	1,283	0	0	0	0	0	0	0
2020 Buildout Total	22	1,103	0	0	1,441	34	0	0	12	0	0	0

PM PEAK HOUR

Description	Harden Street Northbound			Harden Street Southbound			Access #9 (L-O) Eastbound			N/A Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes												
Balanced Volumes												
2015 Existing Traffic		1,082			977							
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	1,104	0	0	997	0	0	0	0	0	0	0
2018 Background Traffic (w/ Phase 1)	0	1,148	0	0	1,037	0	0	0	0	0	0	0
2020 Background Traffic (W/ Phases 1 & 2)	0	1,195	0	0	1,079	0	0	0	0	0	0	0
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 1 Project Trips	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Project Trips (Total)	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 2 Project Trips	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Project Trips (Total)	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	2%	0%	0%	0%	9%	3%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	15%	0%	0%	1%	0%	0%	0%	2%	0%	0%	0%
Phase 3 Project Trips	18	182	0	0	94	27	0	0	24	0	0	0
Phase 3 Project Trips (Total)	18	182	0	0	94	27	0	0	24	0	0	0
Phase 3 Pass-By Traffic	2				-2	2			2			
2016 Buildout Total	0	1,104	0	0	997	0	0	0	0	0	0	0
2018 Buildout Total	0	1,148	0	0	1,037	0	0	0	0	0	0	0
2020 Buildout Total	20	1,377	0	0	1,171	29	0	0	26	0	0	0

INTERSECTION VOLUME DEVELOPMENT

**Harden Street at Access #10 (Signalized)
AM PEAK HOUR**

Description	Harden Street Northbound			Harden Street Southbound			Access # 10 (Signal) Eastbound			N/A Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes												
Balanced Volumes												
2015 Existing Traffic		920			1,209							
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	938	0	0	1,233	0	0	0	0	0	0	0
2018 Background Traffic (w/ Phase 1)	0	976	0	0	1,283	0	0	0	0	0	0	0
2020 Background Traffic (W/ Phases 1 & 2)	0	1,016	0	0	1,335	0	0	0	0	0	0	0
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 1 Project Trips	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Project Trips (Total)	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 2 Project Trips	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Project Trips (Total)	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	8%	2%	0%	0%	2%	7%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	3%	0%	15%	0%	7%	0%	0%	0%
Phase 3 Project Trips	89	22	0	0	40	78	87	0	41	0	0	0
Phase 3 Project Trips (Total)	90	22	0	0	40	78	87	0	40	0	0	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	0	938	0	0	1,233	0	0	0	0	0	0	0
2018 Buildout Total	0	976	0	0	1,283	0	0	0	0	0	0	0
2020 Buildout Total	90	1,038	0	0	1,375	78	87	0	40	0	0	0

PM PEAK HOUR

Description	Harden Street Northbound			Harden Street Southbound			Access # 10 (Signal) Eastbound			N/A Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes												
Balanced Volumes												
2015 Existing Traffic		1,082			977							
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	1,104	0	0	997	0	0	0	0	0	0	0
2018 Background Traffic (w/ Phase 1)	0	1,148	0	0	1,037	0	0	0	0	0	0	0
2020 Background Traffic (W/ Phases 1 & 2)	0	1,195	0	0	1,079	0	0	0	0	0	0	0
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 1 Project Trips	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Project Trips (Total)	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 2 Project Trips	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Project Trips (Total)	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	8%	2%	0%	0%	2%	7%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	3%	0%	15%	0%	7%	0%	0%	0%
Phase 3 Project Trips	72	18	0	0	55	63	182	0	85	0	0	0
Phase 3 Project Trips (Total)	72	18	0	0	55	63	182	0	85	0	0	0
Phase 3 Pass-By Traffic	16	-14			-10	10	20		10			
2016 Buildout Total	0	1,104	0	0	997	0	0	0	0	0	0	0
2018 Buildout Total	0	1,148	0	0	1,037	0	0	0	0	0	0	0
2020 Buildout Total	88	1,199	0	0	1,124	73	202	0	95	0	0	0

INTERSECTION VOLUME DEVELOPMENT

**Harden Street at Access #11 (RIRO)
AM PEAK HOUR**

Description	Harden Street Northbound			Harden Street Southbound			Access #11 (RIRO) Eastbound			N/A Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes												
Balanced Volumes												
2015 Existing Traffic		920			1,209							
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	938	0	0	1,233	0	0	0	0	0	0	0
2018 Background Traffic (w/ Phase 1)	0	976	0	0	1,283	0	0	0	0	0	0	0
2020 Background Traffic (W/ Phases 1 & 2)	0	1,016	0	0	1,335	0	0	0	0	0	0	0
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 1 Project Trips	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Project Trips (Total)	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 2 Project Trips	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Project Trips (Total)	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	10%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	10%	0%	0%	0%	1%	0%	0%	0%
Phase 3 Project Trips	0	112	0	0	69	11	0	0	6	0	0	0
Phase 3 Project Trips (Total)	0	112	0	0	69	11	0	0	6	0	0	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	0	938	0	0	1,233	0	0	0	0	0	0	0
2018 Buildout Total	0	976	0	0	1,283	0	0	0	0	0	0	0
2020 Buildout Total	0	1,128	0	0	1,404	11	0	0	6	0	0	0

PM PEAK HOUR

Description	Harden Street Northbound			Harden Street Southbound			Access #11 (RIRO) Eastbound			N/A Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes												
Balanced Volumes												
2015 Existing Traffic		1,082			977							
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	1,104	0	0	997	0	0	0	0	0	0	0
2018 Background Traffic (w/ Phase 1)	0	1,148	0	0	1,037	0	0	0	0	0	0	0
2020 Background Traffic (W/ Phases 1 & 2)	0	1,195	0	0	1,079	0	0	0	0	0	0	0
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 1 Project Trips	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Project Trips (Total)	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 2 Project Trips	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Project Trips (Total)	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	0%	10%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	10%	0%	0%	0%	1%	0%	0%	0%
Phase 3 Project Trips	0	90	0	0	131	9	0	0	12	0	0	0
Phase 3 Project Trips (Total)	0	90	0	0	131	9	0	0	12	0	0	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	0	1,104	0	0	997	0	0	0	0	0	0	0
2018 Buildout Total	0	1,148	0	0	1,037	0	0	0	0	0	0	0
2020 Buildout Total	0	1,283	0	0	1,208	11	0	0	14	0	0	0

INTERSECTION VOLUME DEVELOPMENT

**Harden Street at Access #12 (Left-Over)
AM PEAK HOUR**

Description	Harden Street Northbound			Harden Street Southbound			Access # 12 (L-O) Eastbound			N/A Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes												
Balanced Volumes												
2015 Existing Traffic		920			1,209							
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	938	0	0	1,233	0	0	0	0	0	0	0
2018 Background Traffic (w/ Phase 1)	0	976	0	0	1,283	0	0	0	0	0	0	0
2020 Background Traffic (W/ Phases 1 & 2)	0	1,016	0	0	1,335	0	0	0	0	0	0	0
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 1 Project Trips	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Project Trips (Total)	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 2 Project Trips	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Project Trips (Total)	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	2%	10%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	11%	0%	0%	0%	1%	0%	0%	0%
Phase 3 Project Trips	22	112	0	0	64	11	0	0	6	0	0	0
Phase 3 Project Trips (Total)	22	112	0	0	64	11	0	0	6	0	0	0
Phase 3 Pass-By Traffic												
2016 Buildout Total	0	938	0	0	1,233	0	0	0	0	0	0	0
2018 Buildout Total	0	976	0	0	1,283	0	0	0	0	0	0	0
2020 Buildout Total	22	1,128	0	0	1,399	11	0	0	6	0	0	0

PM PEAK HOUR

Description	Harden Street Northbound			Harden Street Southbound			Access # 12 (L-O) Eastbound			N/A Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Observed Volumes												
Balanced Volumes												
2015 Existing Traffic		1,082			977							
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
2016 Background Traffic (No AD)	0	1,104	0	0	997	0	0	0	0	0	0	0
2018 Background Traffic (w/ Phase 1)	0	1,148	0	0	1,037	0	0	0	0	0	0	0
2020 Background Traffic (W/ Phases 1 & 2)	0	1,195	0	0	1,079	0	0	0	0	0	0	0
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 1 Project Trips	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Project Trips (Total)	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Pass-By Traffic												
Percent Inbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Phase 2 Project Trips	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Project Trips (Total)	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Pass-By Traffic												
Percent Inbound Assignment	2%	10%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	11%	0%	0%	0%	1%	0%	0%	0%
Phase 3 Project Trips	18	90	0	0	134	9	0	0	12	0	0	0
Phase 3 Project Trips (Total)	18	90	0	0	134	9	0	0	12	0	0	0
Phase 3 Pass-By Traffic	2	-2			-2	2			2			
2016 Buildout Total	0	1,104	0	0	997	0	0	0	0	0	0	0
2018 Buildout Total	0	1,148	0	0	1,037	0	0	0	0	0	0	0
2020 Buildout Total	20	1,283	0	0	1,211	11	0	0	14	0	0	0

INTERSECTION CAPACITY ANALYSIS

2015 Existing Conditions

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2015 Existing AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗	↗	↖	↗	↗
Traffic Volume (vph)	8	4	3	150	18	35	23	545	531	401	2125	19
Future Volume (vph)	8	4	3	150	18	35	23	545	531	401	2125	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		200	675		0	175		0	200		250
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100			75			50			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt		0.936			0.901				0.850		0.999	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3313	0	3433	1668	0	1770	3539	1583	1770	5080	0
Flt Permitted	0.950			0.950			0.059			0.372		
Satd. Flow (perm)	1770	3313	0	3433	1668	0	110	3539	1583	693	5080	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			39				590		2	
Link Speed (mph)		30			40			40			45	
Link Distance (ft)		552			905			1206			1658	
Travel Time (s)		12.5			15.4			20.6			25.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.92	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	9	4	3	167	20	39	26	586	590	446	2310	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	9	7	0	167	59	0	26	586	590	446	2331	0
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	4	4		3	3			2	3	1	6	
Permitted Phases							2		2	6		
Detector Phase	4	4		3	3		2	2	3	1	6	
Switch Phase												
Minimum Initial (s)	14.0	14.0		11.0	11.0		16.0	16.0	11.0	11.0	16.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		30.0	30.0	20.0	17.0	30.0	
Total Split (s)	22.0	22.0		26.0	26.0		61.0	61.0	26.0	21.0	82.0	
Total Split (%)	16.9%	16.9%		20.0%	20.0%		46.9%	46.9%	20.0%	16.2%	63.1%	
Maximum Green (s)	16.0	16.0		20.0	20.0		55.0	55.0	20.0	15.0	76.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag	Lead	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	None	None	C-Max	
Act Effct Green (s)	18.0	18.0		17.5	17.5		81.2	81.2	100.7	100.5	100.5	
Actuated g/C Ratio	0.14	0.14		0.13	0.13		0.62	0.62	0.77	0.77	0.77	
v/c Ratio	0.04	0.02		0.36	0.23		0.38	0.27	0.43	0.66	0.59	
Control Delay	49.1	39.0		39.1	20.6		26.2	3.5	3.1	11.6	8.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	49.1	39.0		39.1	20.6		26.2	3.5	3.1	11.6	8.9	
LOS	D	D		D	C		C	A	A	B	A	
Approach Delay		44.7			34.3			3.8			9.3	

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2015 Existing AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			C			A			A	
Queue Length 50th (ft)	7	1		64	15		3	33	30	61	160	
Queue Length 95th (ft)	24	9		104	58		#66	71	99	229	486	
Internal Link Dist (ft)		472			825			1126			1578	
Turn Bay Length (ft)	100			675			175			200		
Base Capacity (vph)	272	512		633	339		68	2211	1409	693	3928	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.03	0.01		0.26	0.17		0.38	0.27	0.42	0.64	0.59	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 9.2
 Intersection Capacity Utilization 76.8%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service D

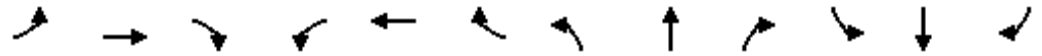
95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Bull St. & Harden St. Ext.



Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

Bull Street Commons Traffic Study
2015 Existing AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑↑	↗	↖	↑↑↑	↗
Traffic Volume (vph)	5	2	12	15	11	7	15	1130	75	64	2213	2
Future Volume (vph)	5	2	12	15	11	7	15	1130	75	64	2213	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	200		0	200		0	150		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			100			100			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Frt		0.870			0.940				0.850			
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1621	0	1770	1751	0	1770	5085	1583	1770	5085	0
Flt Permitted	0.744			0.248			0.046			0.203		
Satd. Flow (perm)	1386	1621	0	462	1751	0	86	5085	1583	378	5085	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		602			715			682			1206	
Travel Time (s)		13.7			16.3			11.6			20.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.94	0.90
Adj. Flow (vph)	6	2	13	17	12	8	17	1202	83	71	2354	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	15	0	17	20	0	17	1202	83	71	2356	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			3			2				6
Permitted Phases	4			3			2		2	6		
Detector Phase	4	4		3	3		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	16.0
Minimum Split (s)	25.0	25.0		25.0	25.0		30.0	30.0	30.0	30.0	30.0	30.0
Total Split (s)	31.0	31.0		31.0	31.0		68.0	68.0	68.0	68.0	68.0	68.0
Total Split (%)	23.8%	23.8%		23.8%	23.8%		52.3%	52.3%	52.3%	52.3%	52.3%	52.3%
Maximum Green (s)	25.0	25.0		25.0	25.0		62.0	62.0	62.0	62.0	62.0	62.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	20.0	20.0		22.5	22.5		104.3	104.3	104.3	104.3	104.3	104.3
Actuated g/C Ratio	0.15	0.15		0.17	0.17		0.80	0.80	0.80	0.80	0.80	0.80
v/c Ratio	0.03	0.06		0.21	0.07		0.25	0.29	0.07	0.23	0.58	
Control Delay	47.4	47.9		51.4	43.7		18.5	3.2	3.9	13.8	10.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	47.4	47.9		51.4	43.7		18.5	3.2	3.9	13.8	10.8	
LOS	D	D		D	D		B	A	A	B	B	
Approach Delay		47.7			47.2			3.4			10.9	
Approach LOS		D			D			A			B	

Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

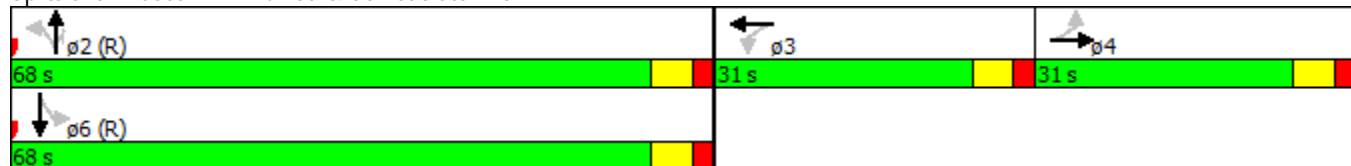


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	4	11		13	15		1	19	4	10	177	
Queue Length 95th (ft)	18	33		35	36		m8	88	25	m60	454	
Internal Link Dist (ft)		522			635			602			1126	
Turn Bay Length (ft)	150			200			200			150		
Base Capacity (vph)	309	361		103	390		69	4080	1270	303	4080	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.02	0.04		0.17	0.05		0.25	0.29	0.07	0.23	0.58	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 113 (87%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.58
 Intersection Signal Delay: 8.9
 Intersection LOS: A
 Intersection Capacity Utilization 73.2%
 ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bull St. & Confederate Ave.



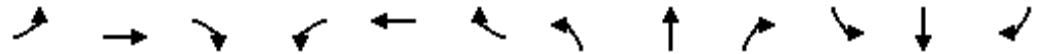
Lanes, Volumes, Timings
3: Bull St. & Colonial Drive

Bull Street Commons Traffic Study
2015 Existing AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗	↖	↔			↑↑↑		↘	↑↑↑	
Traffic Volume (vph)	0	0	5	185	1	9	0	1236	352	19	2128	10
Future Volume (vph)	0	0	5	185	1	9	0	1236	352	19	2128	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	150		0	0		0	200		0
Storage Lanes	0		1	1		0	0		0	1		0
Taper Length (ft)	25			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.865		0.986			0.967				0.999
Flt Protected				0.950	0.957					0.950		
Satd. Flow (prot)	0	0	1611	1681	1670	0	0	4917	0	1770	5080	0
Flt Permitted				0.950	0.957					0.122		
Satd. Flow (perm)	0	0	1611	1681	1670	0	0	4917	0	227	5080	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)			25		4			137				
Link Speed (mph)		35			35			40				40
Link Distance (ft)		440			745			472				682
Travel Time (s)		8.6			14.5			8.0				11.6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.96	0.90	0.93	0.90
Adj. Flow (vph)	0	0	6	206	1	10	0	1301	367	21	2288	11
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	0	0	6	109	108	0	0	1668	0	21	2299	0
Turn Type			Perm	Perm	NA			NA		Perm	NA	
Protected Phases					8			2				6
Permitted Phases			4	8						6		
Detector Phase			4	8	8			2		6		6
Switch Phase												
Minimum Initial (s)			16.0	16.0	16.0			16.0		16.0		16.0
Minimum Split (s)			30.0	30.0	30.0			30.0		30.0		30.0
Total Split (s)			35.0	35.0	35.0			95.0		95.0		95.0
Total Split (%)			26.9%	26.9%	26.9%			73.1%		73.1%		73.1%
Maximum Green (s)			29.0	29.0	29.0			89.0		89.0		89.0
Yellow Time (s)			4.0	4.0	4.0			4.0		4.0		4.0
All-Red Time (s)			2.0	2.0	2.0			2.0		2.0		2.0
Lost Time Adjust (s)			-4.0	-4.0	-4.0			-4.0		-4.0		-4.0
Total Lost Time (s)			2.0	2.0	2.0			2.0		2.0		2.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)			3.0	3.0	3.0			3.0		3.0		3.0
Recall Mode			None	None	None			C-Max		C-Max		C-Max
Act Effct Green (s)			20.6	20.6	20.6			105.4		105.4		105.4
Actuated g/C Ratio			0.16	0.16	0.16			0.81		0.81		0.81
v/c Ratio			0.02	0.41	0.40			0.42		0.11		0.56
Control Delay			0.2	40.2	38.1			7.2		2.3		4.1
Queue Delay			0.0	0.0	0.0			0.0		0.0		0.4
Total Delay			0.2	40.2	38.1			7.2		2.3		4.5
LOS			A	D	D			A		A		A
Approach Delay					39.2			7.2				4.5
Approach LOS					D			A				A

Lanes, Volumes, Timings
3: Bull St. & Colonial Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)			0	66	62			340		4	226	
Queue Length 95th (ft)			0	110	106			m156		m0	1	
Internal Link Dist (ft)		360			665			392			602	
Turn Bay Length (ft)				150						200		
Base Capacity (vph)			427	426	426			4011		184	4118	
Starvation Cap Reductn			0	0	0			0		0	1072	
Spillback Cap Reductn			0	0	0			0		0	0	
Storage Cap Reductn			0	0	0			0		0	0	
Reduced v/c Ratio			0.01	0.26	0.25			0.42		0.11	0.75	

Intersection Summary

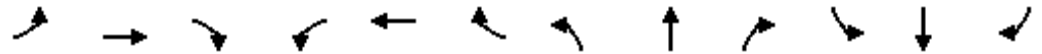
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.56
 Intersection Signal Delay: 7.3
 Intersection LOS: A
 Intersection Capacity Utilization 78.0%
 ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Bull St. & Colonial Drive



Lanes, Volumes, Timings
4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2015 Existing AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕↕↕		↕	↕↕↕	
Traffic Volume (vph)	1	0	3	2	0	1	1	1558	1	0	2279	5
Future Volume (vph)	1	0	3	2	0	1	1	1558	1	0	2279	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			75			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt		0.899			0.955							
Flt Protected		0.988			0.968		0.950					
Satd. Flow (prot)	0	1655	0	0	1722	0	1770	5085	0	1863	5085	0
Flt Permitted		0.988			0.968		0.950					
Satd. Flow (perm)	0	1655	0	0	1722	0	1770	5085	0	1863	5085	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		341			529			443			472	
Travel Time (s)		6.6			10.3			7.6			8.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.97	0.90
Adj. Flow (vph)	1	0	3	2	0	1	1	1640	1	0	2349	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	4	0	0	3	0	1	1641	0	0	2355	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	54.1%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2015 Existing AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕			↕		↕	↑↑↑		↕	↑↑↑		
Traffic Volume (veh/h)	1	0	3	2	0	1	1	1558	1	0	2279	5	
Future Volume (Veh/h)	1	0	3	2	0	1	1	1558	1	0	2279	5	
Sign Control		Stop			Stop			Free			Free		
Grade		0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.97	0.90	
Hourly flow rate (vph)	1	0	3	2	0	1	1	1640	1	0	2349	6	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type													
Median storage veh													
Upstream signal (ft)													
pX, platoon unblocked	0.84	0.84	0.84	0.84	0.84		0.84						
vC, conflicting volume	2902	3995	786	2428	3998	547	2355			1641			
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	2599	3900	84	2037	3902	547	1949			1641			
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1			
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2			
p0 queue free %	90	100	100	93	100	100	100			100			
cM capacity (veh/h)	10	3	806	28	3	481	249			391			
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4			
Volume Total	4	3	1	656	656	329	0	940	940	476			
Volume Left	1	2	1	0	0	0	0	0	0	0			
Volume Right	3	1	0	0	0	1	0	0	0	6			
cSH	39	40	249	1700	1700	1700	1700	1700	1700	1700			
Volume to Capacity	0.10	0.07	0.00	0.39	0.39	0.19	0.00	0.55	0.55	0.28			
Queue Length 95th (ft)	8	6	0	0	0	0	0	0	0	0			
Control Delay (s)	106.7	101.3	19.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Lane LOS	F	F	C										
Approach Delay (s)	106.7	101.3	0.0										
Approach LOS	F	F											
Intersection Summary													
Average Delay			0.2										
Intersection Capacity Utilization			54.1%	ICU Level of Service						A			
Analysis Period (min)			15										

Lanes, Volumes, Timings
5: Bull St. & Jefferson Street



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	4	8	1	1528	2292	6
Future Volume (vph)	4	8	1	1528	2292	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	175			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		100			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Frt	0.907					
Flt Protected	0.985		0.950			
Satd. Flow (prot)	1664	0	1770	5085	5085	0
Flt Permitted	0.985		0.950			
Satd. Flow (perm)	1664	0	1770	5085	5085	0
Link Speed (mph)	35			40	40	
Link Distance (ft)	410			712	443	
Travel Time (s)	8.0			12.1	7.6	
Peak Hour Factor	0.90	0.90	0.90	0.94	0.97	0.90
Adj. Flow (vph)	4	9	1	1626	2363	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	13	0	1	1626	2370	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	54.4%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
5: Bull St. & Jefferson Street

Bull Street Commons Traffic Study
2015 Existing AM



Movement	EBL	EBR	NBL	NBT	SBT	SBR			
Lane Configurations									
Traffic Volume (veh/h)	4	8	1	1528	2292	6			
Future Volume (Veh/h)	4	8	1	1528	2292	6			
Sign Control	Stop			Free		Free			
Grade	0%			0%		0%			
Peak Hour Factor	0.90	0.90	0.90	0.94	0.97	0.90			
Hourly flow rate (vph)	4	9	1	1626	2363	7			
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type				None	None				
Median storage veh									
Upstream signal (ft)				712	915				
pX, platoon unblocked	0.84	0.84	0.84						
vC, conflicting volume	2910	791	2370						
vC1, stage 1 conf vol									
vC2, stage 2 conf vol									
vCu, unblocked vol	2608	85	1965						
tC, single (s)	6.8	6.9	4.1						
tC, 2 stage (s)									
tF (s)	3.5	3.3	2.2						
p0 queue free %	76	99	100						
cM capacity (veh/h)	17	804	245						
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	
Volume Total	13	1	542	542	542	945	945	480	
Volume Left	4	1	0	0	0	0	0	0	
Volume Right	9	0	0	0	0	0	0	7	
cSH	52	245	1700	1700	1700	1700	1700	1700	
Volume to Capacity	0.25	0.00	0.32	0.32	0.32	0.56	0.56	0.28	
Queue Length 95th (ft)	21	0	0	0	0	0	0	0	
Control Delay (s)	96.4	19.7	0.0	0.0	0.0	0.0	0.0	0.0	
Lane LOS	F	C							
Approach Delay (s)	96.4	0.0					0.0		
Approach LOS	F								
Intersection Summary									
Average Delay			0.3						
Intersection Capacity Utilization			54.4%	ICU Level of Service				A	
Analysis Period (min)			15						

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

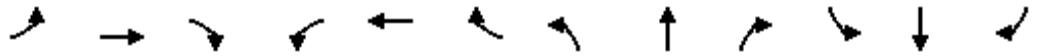
Bull Street Commons Traffic Study
2015 Existing AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1011	56	812	2	6	4	327	528	67	31	1180	1089
Future Volume (vph)	1011	56	812	2	6	4	327	528	67	31	1180	1089
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	775		0	125		0	175		0	100		0
Storage Lanes	1		2	1		0	1		0	1		1
Taper Length (ft)	50			50			125			50		
Lane Util. Factor	0.95	0.95	0.88	0.95	0.95	0.95	0.97	0.95	0.95	1.00	0.91	0.91
Frt			0.850		0.954			0.983				0.850
Flt Protected	0.950	0.957			0.992		0.950			0.950		
Satd. Flow (prot)	1681	1694	2787	0	3349	0	3433	3479	0	1770	3390	1441
Flt Permitted	0.950	0.957			0.992		0.950			0.400		
Satd. Flow (perm)	1681	1694	2787	0	3349	0	3433	3479	0	745	3390	1441
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			40	
Link Distance (ft)		1012			379			526			712	
Travel Time (s)		23.0			8.6			12.0			12.1	
Peak Hour Factor	0.97	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.90	0.94	0.97
Adj. Flow (vph)	1042	62	902	2	7	4	359	587	74	34	1255	1123
Shared Lane Traffic (%)	50%											0%
Lane Group Flow (vph)	521	583	902	0	13	0	359	661	0	34	1255	1123
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Perm	NA	pm+ov
Protected Phases	4	4	5	3	3		5	2			6	4
Permitted Phases			4							6		6
Detector Phase	4	4	5	3	3		5	2		6	6	4
Switch Phase												
Minimum Initial (s)	16.0	16.0	11.0	5.0	5.0		11.0	16.0		16.0	16.0	16.0
Minimum Split (s)	30.0	30.0	17.0	12.0	12.0		17.0	30.0		30.0	30.0	30.0
Total Split (s)	45.0	45.0	17.0	14.0	14.0		17.0	71.0		54.0	54.0	45.0
Total Split (%)	34.6%	34.6%	13.1%	10.8%	10.8%		13.1%	54.6%		41.5%	41.5%	34.6%
Maximum Green (s)	39.0	39.0	11.0	8.0	8.0		11.0	65.0		48.0	48.0	39.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0		-4.0		-4.0	-4.0		-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0		2.0		2.0	2.0		2.0	2.0	2.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max		C-Max	C-Max	None
Act Effct Green (s)	43.0	43.0	60.0		10.0		15.0	78.0		61.0	61.0	105.2
Actuated g/C Ratio	0.33	0.33	0.46		0.08		0.12	0.60		0.47	0.47	0.81
v/c Ratio	0.94	1.04	0.70		0.05		0.91	0.32		0.10	0.79	0.96
Control Delay	55.7	80.1	26.7		55.8		76.6	14.2		19.4	26.9	33.6
Queue Delay	0.0	0.0	0.1		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	55.7	80.1	26.7		55.8		76.6	14.2		19.4	26.9	33.6
LOS	E	F	C		E		E	B		B	C	C
Approach Delay		49.8			55.8			36.2			29.9	
Approach LOS		D			E			D			C	

Lanes, Volumes, Timings
 6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
 2015 Existing AM

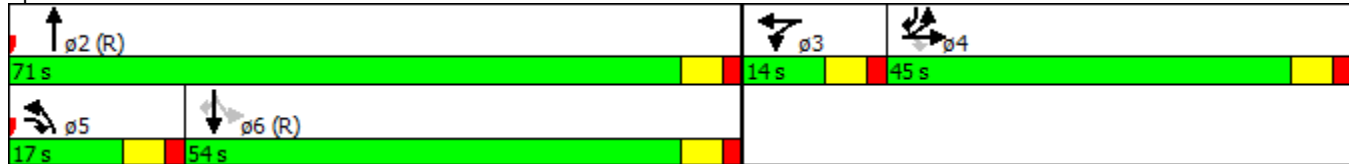


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	455	~560	361		5		158	157		9	231	1108
Queue Length 95th (ft)	#692	#813	511		16		#248	240		m22	#618	#932
Internal Link Dist (ft)		932			299			446			632	
Turn Bay Length (ft)	775						175			100		
Base Capacity (vph)	556	560	1286		309		396	2086		349	1589	1165
Starvation Cap Reductn	0	0	0		0		0	0		0	0	0
Spillback Cap Reductn	0	0	16		0		0	0		0	0	0
Storage Cap Reductn	0	0	0		0		0	0		0	0	0
Reduced v/c Ratio	0.94	1.04	0.71		0.04		0.91	0.32		0.10	0.79	0.96

Intersection Summary

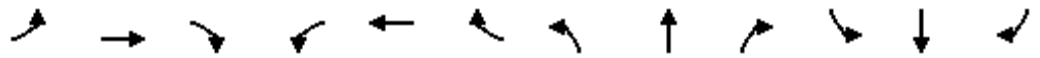
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 126 (97%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.04
 Intersection Signal Delay: 38.5
 Intersection LOS: D
 Intersection Capacity Utilization 99.7%
 ICU Level of Service F
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Bull St. & Elmwood Avenue



Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

Bull Street Commons Traffic Study
2015 Existing AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	197	80	15	136	114	24	744	18	158	1767	91
Future Volume (vph)	80	197	80	15	136	114	24	744	18	158	1767	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	50			50			75			75		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.957			0.931			0.996				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3387	0	1770	3295	0	1770	3525	0	1770	3539	1583
Flt Permitted	0.407			0.366			0.080			0.310		
Satd. Flow (perm)	758	3387	0	682	3295	0	149	3525	0	577	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		34			127			5				101
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1044			459			1901				526
Travel Time (s)		23.7			10.4			43.2				12.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.94	0.90
Adj. Flow (vph)	89	219	89	17	148	127	27	827	20	176	1880	101
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	308	0	17	275	0	27	847	0	176	1880	101
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2				6
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	16.0
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	30.0
Total Split (s)	33.0	33.0		33.0	33.0		97.0	97.0		97.0	97.0	97.0
Total Split (%)	25.4%	25.4%		25.4%	25.4%		74.6%	74.6%		74.6%	74.6%	74.6%
Maximum Green (s)	27.0	27.0		27.0	27.0		91.0	91.0		91.0	91.0	91.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	24.1	24.1		24.1	24.1		101.9	101.9		101.9	101.9	101.9
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.78	0.78		0.78	0.78	0.78
v/c Ratio	0.64	0.47		0.13	0.39		0.23	0.31		0.39	0.68	0.08
Control Delay	68.7	43.6		48.2	27.6		10.4	4.6		5.2	6.3	0.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.4	0.0
Total Delay	68.7	43.6		48.2	27.6		10.4	4.6		5.2	6.7	0.4
LOS	E	D		D	C		B	A		A	A	A
Approach Delay		49.2			28.8			4.8			6.3	
Approach LOS		D			C			A			A	

Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

Bull Street Commons Traffic Study
2015 Existing AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	71	110		12	62		5	84		40	353	3
Queue Length 95th (ft)	125	146		36	105		23	144		m49	321	m2
Internal Link Dist (ft)		964			379			1821			446	
Turn Bay Length (ft)	150			175			150			150		
Base Capacity (vph)	180	833		162	882		116	2764		452	2774	1262
Starvation Cap Reductn	0	0		0	0		0	0		0	389	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.49	0.37		0.10	0.31		0.23	0.31		0.39	0.79	0.08

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 106 (82%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 12.3 Intersection LOS: B
 Intersection Capacity Utilization 102.2% ICU Level of Service G
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Bull St. & Calhoun St.



Lanes, Volumes, Timings
9: Harden Street Ext/Harden St. Ext. & Colonial Drive

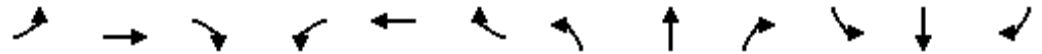
Bull Street Commons Traffic Study
2015 Existing AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	166	64	682	304	96	144	479	332	19	431	49
Future Volume (vph)	33	166	64	682	304	96	144	479	332	19	431	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		800	175		0	225		0	300		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	100			75			75			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.958			0.964				0.850		0.985	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3391	0	3433	3412	0	1770	3539	1583	1770	3486	0
Flt Permitted	0.494			0.950			0.383			0.396		
Satd. Flow (perm)	920	3391	0	3433	3412	0	713	3539	1583	738	3486	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		41			65				369		10	
Link Speed (mph)		35			35			35			40	
Link Distance (ft)		1013			300			483			2110	
Travel Time (s)		19.7			5.8			9.4			36.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.90	0.90
Adj. Flow (vph)	37	184	71	758	338	107	160	510	369	21	479	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	37	255	0	758	445	0	160	510	369	21	533	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Free	Perm	NA	
Protected Phases		8		7	4			6			2	
Permitted Phases	8						6		Free	2		
Detector Phase	8	8		7	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	16.0	16.0		11.0	16.0		16.0	16.0		16.0	16.0	
Minimum Split (s)	30.0	30.0		17.0	30.0		30.0	30.0		30.0	30.0	
Total Split (s)	34.0	34.0		51.0	85.0		45.0	45.0		45.0	45.0	
Total Split (%)	26.2%	26.2%		39.2%	65.4%		34.6%	34.6%		34.6%	34.6%	
Maximum Green (s)	28.0	28.0		45.0	79.0		39.0	39.0		39.0	39.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	20.4	20.4		39.0	61.4		64.6	64.6	130.0	64.6	64.6	
Actuated g/C Ratio	0.16	0.16		0.30	0.47		0.50	0.50	1.00	0.50	0.50	
v/c Ratio	0.26	0.45		0.74	0.27		0.45	0.29	0.23	0.06	0.31	
Control Delay	33.5	23.8		47.7	10.2		25.8	20.0	0.3	23.7	24.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	33.5	23.8		47.7	10.2		25.8	20.0	0.3	23.7	24.3	
LOS	C	C		D	B		C	B	A	C	C	
Approach Delay		25.0			33.9			13.9			24.3	
Approach LOS		C			C			B			C	

Lanes, Volumes, Timings
 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Bull Street Commons Traffic Study
 2015 Existing AM

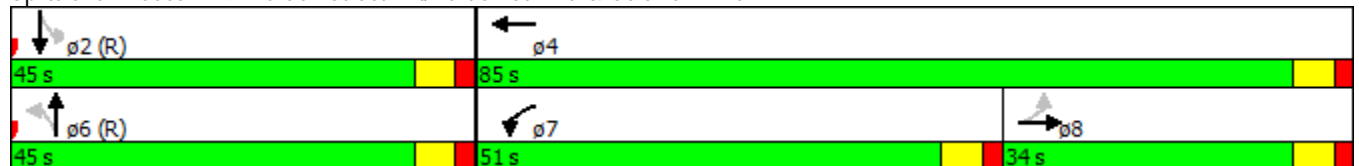


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	26	81		328	101		65	107	0	10	175	
Queue Length 95th (ft)	60	118		354	132		112	144	0	m30	304	
Internal Link Dist (ft)		933			220			403			2030	
Turn Bay Length (ft)	225			175			225			300		
Base Capacity (vph)	226	865		1293	2201		354	1759	1583	366	1737	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.16	0.29		0.59	0.20		0.45	0.29	0.23	0.06	0.31	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 121 (93%), Referenced to phase 2:SBTL and 6:NBTL, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 24.6
 Intersection LOS: C
 Intersection Capacity Utilization 72.9%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive



Lanes, Volumes, Timings
10: Harden St./Harden Street Ext & Calhoun St.

Bull Street Commons Traffic Study
2015 Existing AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	24	134	6	22	2	166	749	15	38	941	81
Future Volume (vph)	80	24	134	6	22	2	166	749	15	38	941	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	50		0	0		325	300		200
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	100			25			25			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Frt		0.873			0.988			0.997				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1626	0	1770	1840	0	1770	5070	0	1770	3539	1583
Flt Permitted	0.740			0.331			0.274			0.240		
Satd. Flow (perm)	1378	1626	0	617	1840	0	510	5070	0	447	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		149			2			3				80
Link Speed (mph)		30			35			35				35
Link Distance (ft)		820			1149			2515				440
Travel Time (s)		18.6			22.4			49.0				8.6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	89	27	149	7	24	2	184	832	17	42	1046	90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	176	0	7	26	0	184	849	0	42	1046	90
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	1 2		1	2	2
Switch Phase												
Minimum Initial (s)	1.0	1.0		11.0	11.0		9.0	14.0		9.0	14.0	14.0
Minimum Split (s)	6.5	6.5		30.0	30.0		15.0	30.0		15.0	30.0	30.0
Total Split (s)	33.0	33.0		33.0	33.0		30.0	67.0		30.0	67.0	67.0
Total Split (%)	25.4%	25.4%		25.4%	25.4%		23.1%	51.5%		23.1%	51.5%	51.5%
Maximum Green (s)	27.5	27.5		27.5	27.5		24.0	61.0		24.0	61.0	61.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.5	1.5		1.5	1.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	0.0		0.0	0.0		-3.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	2.5	5.5		5.5	5.5		3.0	3.0		6.0	3.0	3.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	17.4	14.4		14.4	14.4		77.5	64.0		104.1	90.7	90.7
Actuated g/C Ratio	0.13	0.11		0.11	0.11		0.60	0.49		0.80	0.70	0.70
v/c Ratio	0.48	0.57		0.10	0.13		0.42	0.34		0.06	0.42	0.08
Control Delay	50.1	13.2		53.0	48.7		10.6	20.5		2.1	10.3	2.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	50.1	13.2		53.0	48.7		10.6	20.5		2.1	10.3	2.5
LOS	D	B		D	D		B	C		A	B	A
Approach Delay		25.6			49.6			18.8			9.4	
Approach LOS		C			D			B			A	

Lanes, Volumes, Timings
 10: Harden St./Harden Street Ext & Calhoun St.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	75	34		5	19		37	154		4	202	10
Queue Length 95th (ft)	131	101		21	46		49	187		8	306	27
Internal Link Dist (ft)		740			1069			2435			360	
Turn Bay Length (ft)	225			50						300		200
Base Capacity (vph)	323	461		130	390		618	2497		736	2468	1128
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.28	0.38		0.05	0.07		0.30	0.34		0.06	0.42	0.08

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 78 (60%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.57
 Intersection Signal Delay: 15.5
 Intersection LOS: B
 Intersection Capacity Utilization 57.6%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 10: Harden St./Harden Street Ext & Calhoun St.



Lanes, Volumes, Timings
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2015 Existing AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	231	34	9	234	9	14	20	11	6	12	35
Future Volume (vph)	32	231	34	9	234	9	14	20	11	6	12	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	275		0	0		0	300		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	100			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.981			0.994			0.968			0.887	
Flt Protected	0.950			0.950				0.984		0.950		
Satd. Flow (prot)	1770	1827	0	1770	1852	0	0	1774	0	1770	1652	0
Flt Permitted	0.950			0.950				0.984		0.950		
Satd. Flow (perm)	1770	1827	0	1770	1852	0	0	1774	0	1770	1652	0
Link Speed (mph)		35			30			35			35	
Link Distance (ft)		679			820			504			3014	
Travel Time (s)		13.2			18.6			9.8			58.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	36	257	38	10	260	10	16	22	12	7	13	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	36	295	0	10	270	0	0	50	0	7	52	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	36.7%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2015 Existing AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	231	34	9	234	9	14	20	11	6	12	35
Future Volume (Veh/h)	32	231	34	9	234	9	14	20	11	6	12	35
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	36	257	38	10	260	10	16	22	12	7	13	39
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	TWLTL				TWLTL							
Median storage veh	2				2							
Upstream signal (ft)					820							
pX, platoon unblocked	0.98						0.98	0.98		0.98	0.98	0.98
vC, conflicting volume	270			295			674	638	276	637	652	265
vC1, stage 1 conf vol							348	348		285	285	
vC2, stage 2 conf vol							326	290		352	367	
vCu, unblocked vol	240			295			653	617	276	616	631	235
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			99			97	96	98	99	98	95
cM capacity (veh/h)	1295			1266			517	531	763	540	530	785
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total	36	295	10	270	50	7	52					
Volume Left	36	0	10	0	16	7	0					
Volume Right	0	38	0	10	12	0	39					
cSH	1295	1700	1266	1700	567	540	701					
Volume to Capacity	0.03	0.17	0.01	0.16	0.09	0.01	0.07					
Queue Length 95th (ft)	2	0	1	0	7	1	6					
Control Delay (s)	7.9	0.0	7.9	0.0	12.0	11.7	10.6					
Lane LOS	A		A		B	B	B					
Approach Delay (s)	0.9		0.3		12.0	10.7						
Approach LOS					B	B						
Intersection Summary												
Average Delay			2.2									
Intersection Capacity Utilization			36.7%		ICU Level of Service		A					
Analysis Period (min)			15									

Lanes, Volumes, Timings
12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2015 Existing AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↗	↘		↗	↘	
Traffic Volume (vph)	11	254	28	68	340	52	6	9	17	6	4	2
Future Volume (vph)	11	254	28	68	340	52	6	9	17	6	4	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		225	50		0
Storage Lanes	0		0	0		0	1		1	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.987			0.984			0.902			0.950	
Flt Protected		0.998			0.993		0.950			0.950		
Satd. Flow (prot)	0	1835	0	0	1820	0	1770	1680	0	1770	1770	0
Flt Permitted		0.998			0.993		0.950			0.950		
Satd. Flow (perm)	0	1835	0	0	1820	0	1770	1680	0	1770	1770	0
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1307			161			3014			569	
Travel Time (s)		25.5			3.1			58.7			11.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	12	282	31	76	370	58	7	10	19	7	4	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	325	0	0	504	0	7	29	0	7	6	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	55.5%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
 2015 Existing AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (veh/h)	11	254	28	68	340	52	6	9	17	6	4	2
Future Volume (Veh/h)	11	254	28	68	340	52	6	9	17	6	4	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	12	282	31	76	370	58	7	10	19	7	4	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					1174							
pX, platoon unblocked	0.91						0.91	0.91		0.91	0.91	0.91
vC, conflicting volume	428			313			876	902	298	896	888	399
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	320			313			814	841	298	836	826	288
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			94			97	96	97	97	98	100
cM capacity (veh/h)	1126			1247			251	254	742	233	259	682
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	325	504	7	29	7	6						
Volume Left	12	76	7	0	7	0						
Volume Right	31	58	0	19	0	2						
cSH	1126	1247	251	446	233	327						
Volume to Capacity	0.01	0.06	0.03	0.06	0.03	0.02						
Queue Length 95th (ft)	1	5	2	5	2	1						
Control Delay (s)	0.4	1.8	19.7	13.6	20.9	16.2						
Lane LOS	A	A	C	B	C	C						
Approach Delay (s)	0.4	1.8	14.8		18.8							
Approach LOS			B		C							
Intersection Summary												
Average Delay			2.1									
Intersection Capacity Utilization			55.5%	ICU Level of Service	B							
Analysis Period (min)			15									

Lanes, Volumes, Timings
13: Harden Street Ext & Slighs Ave.



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	116	193	856	64	117	1093
Future Volume (vph)	116	193	856	64	117	1093
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		50	100	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				50	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1687	1482	3539	1583	1770	3539
Flt Permitted	0.950				0.244	
Satd. Flow (perm)	1687	1482	3539	1583	455	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		214		19		
Link Speed (mph)	30		35			35
Link Distance (ft)	398		2546			483
Travel Time (s)	9.0		49.6			9.4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.95
Heavy Vehicles (%)	7%	9%	2%	2%	2%	2%
Adj. Flow (vph)	129	214	951	71	130	1151
Shared Lane Traffic (%)						
Lane Group Flow (vph)	129	214	951	71	130	1151
Turn Type	Prot	Over	NA	Perm	pm+pt	NA
Protected Phases	4	5	6		5	2
Permitted Phases				6	2	
Detector Phase	4	5	6	6	5	2
Switch Phase						
Minimum Initial (s)	16.0	11.0	16.0	16.0	11.0	16.0
Minimum Split (s)	30.0	17.0	30.0	30.0	17.0	30.0
Total Split (s)	45.0	32.0	53.0	53.0	32.0	85.0
Total Split (%)	34.6%	24.6%	40.8%	40.8%	24.6%	65.4%
Maximum Green (s)	39.0	26.0	47.0	47.0	26.0	79.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0	-2.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0	4.0	2.0	2.0
Lead/Lag		Lead	Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)	21.4	15.9	86.7	84.7	104.6	104.6
Actuated g/C Ratio	0.16	0.12	0.67	0.65	0.80	0.80
v/c Ratio	0.47	0.58	0.40	0.07	0.25	0.40
Control Delay	54.7	13.2	3.2	0.9	2.7	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	54.7	13.2	3.2	0.9	2.7	2.3
LOS	D	B	A	A	A	A
Approach Delay	28.8		3.0			2.4

Lanes, Volumes, Timings
 13: Harden Street Ext & Slighs Ave.



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	C		A		A	
Queue Length 50th (ft)	101	0	46	1	8	39
Queue Length 95th (ft)	159	74	48	5	22	75
Internal Link Dist (ft)	318		2466		403	
Turn Bay Length (ft)			50		100	
Base Capacity (vph)	558	506	2360	1038	669	2847
Starvation Cap Reductn	0	0	0	0	0	666
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.42	0.40	0.07	0.19	0.53

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	130
Offset:	129 (99%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
Natural Cycle:	80
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.58
Intersection Signal Delay:	6.0
Intersection LOS:	A
Intersection Capacity Utilization	56.2%
ICU Level of Service	B
Analysis Period (min)	15

Splits and Phases: 13: Harden Street Ext & Slighs Ave.



Lanes, Volumes, Timings
14: Colonial Drive & Farrow Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Lane Configurations		↗↗	↖	↑↑	↑↑		
Traffic Volume (vph)	0	169	145	368	857	16	
Future Volume (vph)	0	169	145	368	857	16	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0	330	550			0	
Storage Lanes	0	1	1			0	
Taper Length (ft)	25		125				
Lane Util. Factor	1.00	0.88	1.00	0.95	0.95	0.95	
Frt		0.850			0.997		
Flt Protected			0.950				
Satd. Flow (prot)	0	2787	1770	3539	3529	0	
Flt Permitted			0.950				
Satd. Flow (perm)	0	2787	1770	3539	3529	0	
Right Turn on Red		Yes				No	
Satd. Flow (RTOR)		163					
Link Speed (mph)	35			35	35		
Link Distance (ft)	930			699	2077		
Travel Time (s)	18.1			13.6	40.5		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.91	0.90	
Adj. Flow (vph)	0	188	161	409	942	18	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	188	161	409	960	0	
Turn Type		Over	Prot	NA	NA		
Protected Phases		8	8	8 6	2		6
Permitted Phases							
Detector Phase		8	8	8 6	2		
Switch Phase							
Minimum Initial (s)		16.0	16.0		16.0		16.0
Minimum Split (s)		30.0	30.0		30.0		30.0
Total Split (s)		30.0	30.0		35.0		35.0
Total Split (%)		46.2%	46.2%		53.8%		54%
Maximum Green (s)		24.0	24.0		29.0		29.0
Yellow Time (s)		4.0	4.0		4.0		4.0
All-Red Time (s)		2.0	2.0		2.0		2.0
Lost Time Adjust (s)		-3.0	-3.0		-4.0		
Total Lost Time (s)		3.0	3.0		2.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0	3.0		3.0		3.0
Recall Mode		None	None		C-Max		C-Max
Act Effct Green (s)		19.4	19.4	65.0	40.6		
Actuated g/C Ratio		0.30	0.30	1.00	0.62		
v/c Ratio		0.20	0.30	0.12	0.44		
Control Delay		4.9	12.4	0.1	6.7		
Queue Delay		0.0	0.0	0.0	0.0		
Total Delay		4.9	12.4	0.1	6.7		
LOS		A	B	A	A		
Approach Delay				3.5	6.7		
Approach LOS				A	A		

Lanes, Volumes, Timings
 14: Colonial Drive & Farrow Road

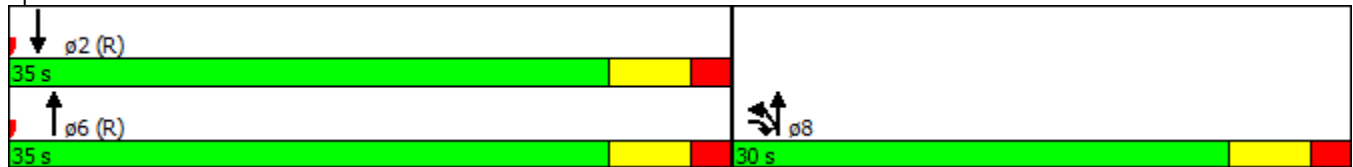


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Queue Length 50th (ft)		3	36	0	179		
Queue Length 95th (ft)		25	56	0	85		
Internal Link Dist (ft)	850			619	1997		
Turn Bay Length (ft)		330	550				
Base Capacity (vph)		1252	735	3539	2202		
Starvation Cap Reductn		0	0	0	0		
Spillback Cap Reductn		0	0	0	0		
Storage Cap Reductn		0	0	0	0		
Reduced v/c Ratio		0.15	0.22	0.12	0.44		

Intersection Summary

Area Type:	Other
Cycle Length:	65
Actuated Cycle Length:	65
Offset:	62 (95%), Referenced to phase 2:SBT and 6:NBT, Start of 1st Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.44
Intersection Signal Delay:	5.5
Intersection LOS:	A
Intersection Capacity Utilization	44.2%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 14: Colonial Drive & Farrow Road



Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
2015 Existing AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	376	4	197	511	179	0	247	125	263	774	64
Future Volume (vph)	14	376	4	197	511	179	0	247	125	263	774	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		0	300		0	0		225	200		0
Storage Lanes	1		0	2		1	0		1	1		0
Taper Length (ft)	125			100			25			125		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.999				0.850			0.850		0.988	
Flt Protected	0.950			0.950						0.950		
Satd. Flow (prot)	1770	3536	0	3433	3539	1583	0	3539	1583	1770	3497	0
Flt Permitted	0.439			0.950						0.526		
Satd. Flow (perm)	818	3536	0	3433	3539	1583	0	3539	1583	980	3497	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				199			143		9	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1518			1183			2077			914	
Travel Time (s)		29.6			23.0			40.5			17.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.90
Adj. Flow (vph)	16	418	4	219	568	199	0	274	139	292	851	71
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	422	0	219	568	199	0	274	139	292	922	0
Turn Type	Perm	NA		Prot	NA	pm+ov		NA	Free	pm+pt	NA	
Protected Phases		4		3	8	1		2		1	6	
Permitted Phases	4					8			Free	6		
Detector Phase	4	4		3	8	1		2		1	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0	5.0		15.0		5.0	15.0	
Minimum Split (s)	30.0	30.0		21.0	41.0	17.0		41.0		17.0	30.0	
Total Split (s)	35.0	35.0		26.0	61.0	22.0		47.0		22.0	69.0	
Total Split (%)	26.9%	26.9%		20.0%	46.9%	16.9%		36.2%		16.9%	53.1%	
Maximum Green (s)	30.0	30.0		21.0	56.0	17.0		42.0		17.0	64.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5		3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5	1.5		1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0		-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead		Lead		Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Recall Mode	None	None		None	None	None		C-Min		None	C-Min	
Walk Time (s)					18.0			18.0				
Flash Dont Walk (s)					5.0			5.0				
Pedestrian Calls (#/hr)					0			0				
Act Effct Green (s)	21.7	21.7		16.5	42.2	63.2		58.8	130.0	79.8	79.8	
Actuated g/C Ratio	0.17	0.17		0.13	0.32	0.49		0.45	1.00	0.61	0.61	
v/c Ratio	0.12	0.71		0.50	0.49	0.23		0.17	0.09	0.41	0.43	
Control Delay	46.1	57.9		57.2	36.4	2.3		19.0	0.1	16.5	16.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	46.1	57.9		57.2	36.4	2.3		19.0	0.1	16.5	16.0	

Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
2015 Existing AM

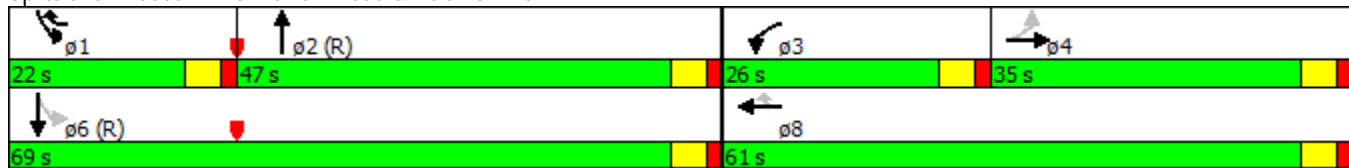


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	E		E	D	A		B	A	B	B	
Approach Delay		57.4			34.2			12.7			16.2	
Approach LOS		E			C			B			B	
Queue Length 50th (ft)	12	178		90	203	0		39	0	121	213	
Queue Length 95th (ft)	33	226		129	237	31		138	0	185	260	
Internal Link Dist (ft)		1438			1103			1997			834	
Turn Bay Length (ft)	175			300					225	200		
Base Capacity (vph)	195	843		580	1551	897		1600	1583	719	2150	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.08	0.50		0.38	0.37	0.22		0.17	0.09	0.41	0.43	

Intersection Summary

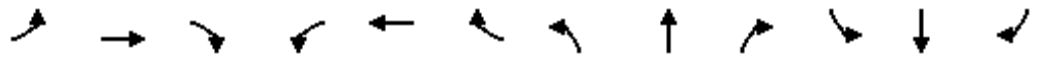
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 27.4
 Intersection Capacity Utilization 67.0%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 15: Farrow Road & Beltline Blvd



Lanes, Volumes, Timings
16: Farrow Road & 277 NB RAMPS

Bull Street Commons Traffic Study
2015 Existing AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	0	8	0	0	0	0	295	157	40	1132	0
Future Volume (vph)	55	0	8	0	0	0	0	295	157	40	1132	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	0		0	0		0	250		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			25			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.850						0.948				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1770	1583	0	0	0	0	0	3355	0	1770	3539	0
Flt Permitted	0.950									0.468		
Satd. Flow (perm)	1770	1583	0	0	0	0	0	3355	0	872	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32						99				
Link Speed (mph)		35			35			35				35
Link Distance (ft)		706			904			914				683
Travel Time (s)		13.8			17.6			17.8				13.3
Peak Hour Factor	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90
Adj. Flow (vph)	60	0	9	0	0	0	0	328	174	44	1204	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	9	0	0	0	0	0	502	0	44	1204	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						6			2	
Permitted Phases	4									2		
Detector Phase	4	4						6		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0						10.0		10.0	10.0	
Minimum Split (s)	30.0	30.0						30.0		30.0	30.0	
Total Split (s)	66.0	66.0						64.0		64.0	64.0	
Total Split (%)	50.8%	50.8%						49.2%		49.2%	49.2%	
Maximum Green (s)	61.0	61.0						59.0		59.0	59.0	
Yellow Time (s)	3.5	3.5						3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5						1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0						-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0						4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Recall Mode	None	None						C-Max		C-Max	C-Max	
Act Effct Green (s)	12.0	12.0						113.8		113.8	113.8	
Actuated g/C Ratio	0.09	0.09						0.88		0.88	0.88	
v/c Ratio	0.37	0.05						0.17		0.06	0.39	
Control Delay	61.7	0.5						0.8		1.1	1.4	
Queue Delay	0.0	0.0						0.0		0.0	0.1	
Total Delay	61.7	0.5						0.8		1.1	1.5	
LOS	E	A						A		A	A	
Approach Delay		53.7						0.8			1.5	
Approach LOS		D						A			A	

Lanes, Volumes, Timings
 16: Farrow Road & 277 NB RAMPS

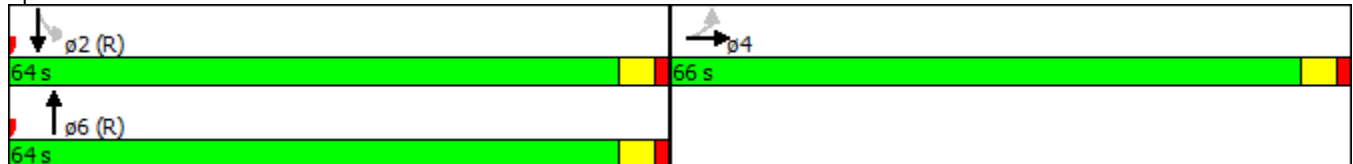


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	49	0						6		2	34	
Queue Length 95th (ft)	93	0						20		m5	72	
Internal Link Dist (ft)		626			824			834			603	
Turn Bay Length (ft)	300									250		
Base Capacity (vph)	844	771						2949		763	3098	
Starvation Cap Reductn	0	0						0		0	611	
Spillback Cap Reductn	0	0						0		0	0	
Storage Cap Reductn	0	0						0		0	0	
Reduced v/c Ratio	0.07	0.01						0.17		0.06	0.48	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.39
 Intersection Signal Delay: 3.3
 Intersection LOS: A
 Intersection Capacity Utilization 46.3%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 16: Farrow Road & 277 NB RAMPS



Lanes, Volumes, Timings
 17: Farrow Road & Lorick Avenue /277 SB Ramps

Bull Street Commons Traffic Study
 2015 Existing AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	0	37	495	13	32	12	339	0	0	649	195
Future Volume (vph)	12	0	37	495	13	32	12	339	0	0	649	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	125		0	200		0	0		0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (ft)	25			150			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850		0.892							0.964
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1770	0	1583	1770	1662	0	1770	3539	0	0	3412	0
Flt Permitted	0.724			0.950			0.243					
Satd. Flow (perm)	1349	0	1583	1770	1662	0	453	3539	0	0	3412	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			41		36							42
Link Speed (mph)		35		35			35			35		35
Link Distance (ft)		681		1031			683			835		835
Travel Time (s)		13.3		20.1			13.3			16.3		16.3
Peak Hour Factor	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.92	0.90	0.90	0.93	0.90
Adj. Flow (vph)	13	0	41	532	14	36	13	368	0	0	698	217
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	0	41	532	50	0	13	368	0	0	915	0
Turn Type	Perm		Perm	Perm	NA		Perm	NA			NA	
Protected Phases					4			2				6
Permitted Phases	8		8	4			2					
Detector Phase	8		8	4	4		2	2				6
Switch Phase												
Minimum Initial (s)	10.0		10.0	10.0	10.0		10.0	10.0				10.0
Minimum Split (s)	30.0		30.0	30.0	30.0		30.0	30.0				30.0
Total Split (s)	66.0		66.0	66.0	66.0		64.0	64.0				64.0
Total Split (%)	50.8%		50.8%	50.8%	50.8%		49.2%	49.2%				49.2%
Maximum Green (s)	61.0		61.0	61.0	61.0		59.0	59.0				59.0
Yellow Time (s)	3.5		3.5	3.5	3.5		3.5	3.5				3.5
All-Red Time (s)	1.5		1.5	1.5	1.5		1.5	1.5				1.5
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0		-1.0	-1.0				-1.0
Total Lost Time (s)	4.0		4.0	4.0	4.0		4.0	4.0				4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0				3.0
Recall Mode	None		None	None	None		C-Max	C-Max				C-Max
Act Effct Green (s)	47.6		47.6	47.6	47.6		74.4	74.4				74.4
Actuated g/C Ratio	0.37		0.37	0.37	0.37		0.57	0.57				0.57
v/c Ratio	0.03		0.07	0.82	0.08		0.05	0.18				0.46
Control Delay	22.6		6.4	47.8	9.9		13.8	12.4				17.5
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.0				0.0
Total Delay	22.6		6.4	47.8	9.9		13.8	12.4				17.5
LOS	C		A	D	A		B	B				B
Approach Delay					44.5			12.5				17.5
Approach LOS					D			B				B

Lanes, Volumes, Timings
 17: Farrow Road & Lorick Avenue /277 SB Ramps

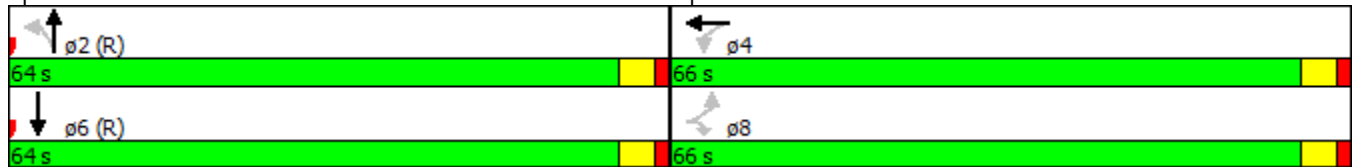


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	7		0	403	8		4	57			215	
Queue Length 95th (ft)	19		21	476	30		13	83			325	
Internal Link Dist (ft)		601			951			603			755	
Turn Bay Length (ft)				125			200					
Base Capacity (vph)	643		776	844	811		259	2025			1971	
Starvation Cap Reductn	0		0	0	0		0	0			0	
Spillback Cap Reductn	0		0	0	0		0	0			0	
Storage Cap Reductn	0		0	0	0		0	0			0	
Reduced v/c Ratio	0.02		0.05	0.63	0.06		0.05	0.18			0.46	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 24.5
 Intersection LOS: C
 Intersection Capacity Utilization 69.9%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 17: Farrow Road & Lorick Avenue /277 SB Ramps



Lanes, Volumes, Timings
18: Assembly St./Assembly & Elmwood Avenue

Bull Street Commons Traffic Study
2015 Existing AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1992	426	567	1338	4	243	1	209	0	0	0
Future Volume (vph)	0	1992	426	567	1338	4	243	1	209	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		275	150		0	0		0	0		0
Storage Lanes	1		1	1		0	2		1	0		0
Taper Length (ft)	150			75			25			25		
Lane Util. Factor	1.00	0.86	0.86	0.97	0.91	0.91	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850					0.851	0.850			
Flt Protected				0.950			0.950					
Satd. Flow (prot)	1863	4806	1362	3433	5085	0	3433	1506	1504	0	1863	0
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	1863	4806	1362	3433	5085	0	3433	1506	1504	0	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			170		1			109	77			
Link Speed (mph)		30			30			30				35
Link Distance (ft)		3707			509			546				403
Travel Time (s)		84.3			11.6			12.4				7.9
Peak Hour Factor	0.90	0.98	0.90	0.92	0.96	0.90	0.92	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	2033	473	616	1394	4	264	1	232	0	0	0
Shared Lane Traffic (%)			0%						47%			
Lane Group Flow (vph)	0	2033	473	616	1398	0	264	110	123	0	0	0
Turn Type	Perm	NA	pm+ov	Prot	NA		Split	NA	pm+ov			
Protected Phases		2	3	1	6		3	3	1	4	4	
Permitted Phases	2		2						3			
Detector Phase	2	2	3	1	6		3	3	1	4	4	
Switch Phase												
Minimum Initial (s)	16.0	16.0	6.0	11.0	16.0		6.0	6.0	11.0	4.0	4.0	
Minimum Split (s)	30.0	30.0	21.0	17.0	30.0		21.0	21.0	17.0	10.0	10.0	
Total Split (s)	60.0	60.0	22.0	38.0	98.0		22.0	22.0	38.0	10.0	10.0	
Total Split (%)	46.2%	46.2%	16.9%	29.2%	75.4%		16.9%	16.9%	29.2%	7.7%	7.7%	
Maximum Green (s)	54.0	54.0	16.0	32.0	92.0		16.0	16.0	32.0	4.0	4.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	-4.0	-4.0	-4.0	-4.0		-4.0	-2.0	-4.0		-2.0	
Total Lost Time (s)	6.0	2.0	2.0	2.0	2.0		2.0	4.0	2.0		4.0	
Lead/Lag	Lead	Lead	Lead	Lag			Lead	Lead	Lag	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes					Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max	None	None	C-Max		None	None	None	None	None	
Walk Time (s)			5.0				5.0	5.0				
Flash Dont Walk (s)			10.0				10.0	10.0				
Pedestrian Calls (#/hr)			0				0	0				
Act Effct Green (s)		68.7	90.0	36.0	106.7		19.3	17.3	57.3			
Actuated g/C Ratio		0.53	0.69	0.28	0.82		0.15	0.13	0.44			
v/c Ratio		0.80	0.48	0.65	0.34		0.52	0.37	0.17			
Control Delay		28.3	7.2	42.6	1.6		54.9	13.0	9.5			
Queue Delay		0.0	0.0	0.0	0.1		0.0	0.0	0.0			
Total Delay		28.3	7.2	42.6	1.6		54.9	13.0	9.5			

Lanes, Volumes, Timings
 18: Assembly St./Assembly & Elmwood Avenue



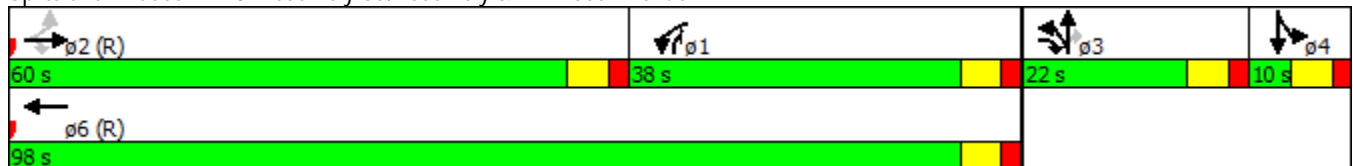
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C	A	D	A		D	B	A			
Approach Delay		24.3				14.2		34.4				
Approach LOS		C			B			C				
Queue Length 50th (ft)		531	115	271	50		106	1	23			
Queue Length 95th (ft)		601	193	340	46		152	58	63			
Internal Link Dist (ft)		3627			429			466			323	
Turn Bay Length (ft)			275	150								
Base Capacity (vph)		2539	995	950	4173		528	302	705			
Starvation Cap Reductn		0	0	0	1128		0	0	0			
Spillback Cap Reductn		0	0	0	0		0	0	0			
Storage Cap Reductn		0	0	0	0		0	0	0			
Reduced v/c Ratio		0.80	0.48	0.65	0.46		0.50	0.36	0.17			

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 14 (11%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 21.2
 Intersection Capacity Utilization 74.8%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service D

Splits and Phases: 18: Assembly St./Assembly & Elmwood Avenue



Lanes, Volumes, Timings
19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
2015 Existing AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑↑	↖	↖	↑↑↑		↖	↑↑	↖	↖	↑↑	↖
Traffic Volume (vph)	192	1931	61	68	1326	32	17	93	7	207	461	539
Future Volume (vph)	192	1931	61	68	1326	32	17	93	7	207	461	539
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		175	150		0	200		0	175		425
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	75			75			100			75		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850		0.996				0.850		0.989	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	1770	5065	0	1770	3539	1583	1770	3353	1441
Flt Permitted	0.950			0.067			0.193			0.613		
Satd. Flow (perm)	3433	5085	1583	125	5065	0	360	3539	1583	1142	3353	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			50		4				126		6	169
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		509			563			474			3675	
Travel Time (s)		11.6			12.8			10.8			83.5	
Peak Hour Factor	0.90	0.93	0.90	0.90	0.97	0.90	0.90	0.90	0.90	0.90	0.93	0.94
Adj. Flow (vph)	213	2076	68	76	1367	36	19	103	8	230	496	573
Shared Lane Traffic (%)												7%
Lane Group Flow (vph)	213	2076	68	76	1403	0	19	103	8	230	536	533
Turn Type	Prot	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	pm+ov
Protected Phases	5	2	3		6		3	8		7	4	5
Permitted Phases			2	6			8		8	4		4
Detector Phase	5	2	3	6	6		3	8	8	7	4	5
Switch Phase												
Minimum Initial (s)	11.0	16.0	11.0	16.0	16.0		11.0	16.0	16.0	11.0	16.0	11.0
Minimum Split (s)	17.0	30.0	17.0	30.0	30.0		17.0	30.0	30.0	17.0	30.0	17.0
Total Split (s)	20.0	83.0	17.0	63.0	63.0		17.0	30.0	30.0	17.0	30.0	20.0
Total Split (%)	15.4%	63.8%	13.1%	48.5%	48.5%		13.1%	23.1%	23.1%	13.1%	23.1%	15.4%
Maximum Green (s)	14.0	77.0	11.0	57.0	57.0		11.0	24.0	24.0	11.0	24.0	14.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0	-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lead	Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	C-Max	C-Max		None	None	None	None	None	None
Act Effct Green (s)	17.2	82.8	99.8	63.6	63.6		41.2	26.2	26.2	41.6	29.6	48.8
Actuated g/C Ratio	0.13	0.64	0.77	0.49	0.49		0.32	0.20	0.20	0.32	0.23	0.38
v/c Ratio	0.47	0.64	0.06	1.25	0.57		0.07	0.14	0.02	0.53	0.70	0.83
Control Delay	78.4	2.4	0.1	227.1	19.1		28.9	42.4	0.1	37.9	51.7	37.1
Queue Delay	0.0	0.2	0.0	0.0	0.1		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.4	2.5	0.1	227.1	19.2		28.9	42.4	0.1	37.9	51.7	37.1
LOS	E	A	A	F	B		C	D	A	D	D	D
Approach Delay		9.3			29.9			37.8			43.3	
Approach LOS		A			C			D			D	

Lanes, Volumes, Timings
19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
2015 Existing AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	86	39	0	~78	322		11	37	0	145	230	323
Queue Length 95th (ft)	m112	56	m0	#185	363		29	63	0	219	298	#550
Internal Link Dist (ft)		429			483			394			3595	
Turn Bay Length (ft)	175		175	150			200			175		425
Base Capacity (vph)	475	3237	1226	61	2479		276	762	439	438	772	654
Starvation Cap Reductn	0	313	0	0	278		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	0.45	0.71	0.06	1.25	0.64		0.07	0.14	0.02	0.53	0.69	0.81

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 5 (4%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.25
 Intersection Signal Delay: 24.2 Intersection LOS: C
 Intersection Capacity Utilization 79.1% ICU Level of Service D
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Main St. & Elmwood Avenue



Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2015 Existing AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕↕↕		↖	↕↕↕		↖	↕	↗		↕↕	
Traffic Volume (vph)	11	1476	249	83	1341	6	33	11	20	6	111	17
Future Volume (vph)	11	1476	249	83	1341	6	33	11	20	6	111	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	75		0	200		0	75		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			50			100			50		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.977			0.999				0.850		0.981	
Flt Protected	0.950			0.950			0.950				0.998	
Satd. Flow (prot)	1770	4968	0	1770	5080	0	1770	1863	1583	0	3465	0
Flt Permitted	0.164			0.101			0.559				0.946	
Satd. Flow (perm)	305	4968	0	188	5080	0	1041	1863	1583	0	3284	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		60			1				25		13	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		563			1012			1692			1095	
Travel Time (s)		12.8			23.0			38.5			24.9	
Peak Hour Factor	0.90	0.95	0.90	0.90	0.95	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	12	1554	277	92	1412	7	37	12	22	7	123	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	1831	0	92	1419	0	37	12	22	0	149	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		6	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	90.0	90.0		90.0	90.0		40.0	40.0	40.0	40.0	40.0	
Total Split (%)	69.2%	69.2%		69.2%	69.2%		30.8%	30.8%	30.8%	30.8%	30.8%	
Maximum Green (s)	84.0	84.0		84.0	84.0		34.0	34.0	34.0	34.0	34.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0		-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0		2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None	None	None	None	
Act Effct Green (s)	106.0	106.0		106.0	106.0		20.0	20.0	20.0		20.0	
Actuated g/C Ratio	0.82	0.82		0.82	0.82		0.15	0.15	0.15		0.15	
v/c Ratio	0.05	0.45		0.60	0.34		0.23	0.04	0.08		0.29	
Control Delay	1.5	1.7		15.6	2.5		52.6	47.5	15.9		46.1	
Queue Delay	0.0	0.1		0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	1.5	1.8		15.6	2.5		52.6	47.5	15.9		46.1	
LOS	A	A		B	A		D	D	B		D	
Approach Delay		1.8			3.3			40.4			46.1	
Approach LOS		A			A			D			D	

Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2015 Existing AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	1	41		14	77		28	9	0		53	
Queue Length 95th (ft)	m1	28		m25	m90		63	28	24		88	
Internal Link Dist (ft)		483			932			1612			1015	
Turn Bay Length (ft)	200			75			200					
Base Capacity (vph)	248	4061		153	4142		304	544	480		969	
Starvation Cap Reductn	0	528		0	0		0	0	0		0	
Spillback Cap Reductn	0	0		0	0		0	0	0		0	
Storage Cap Reductn	0	0		0	0		0	0	0		0	
Reduced v/c Ratio	0.05	0.52		0.60	0.34		0.12	0.02	0.05		0.15	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 13 (10%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.60
 Intersection Signal Delay: 5.0
 Intersection LOS: A
 Intersection Capacity Utilization 84.8%
 ICU Level of Service E
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 20: Sumter St. & Elmwood Avenue





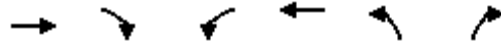
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	301	24	23	245	3	11
Future Volume (vph)	301	24	23	245	3	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	225		125	0
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.990					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1844	0	1770	1863	1770	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1844	0	1770	1863	1770	1583
Link Speed (mph)	35			35	35	
Link Distance (ft)	1129			679	637	
Travel Time (s)	22.0			13.2	12.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	334	27	26	272	3	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	361	0	26	272	3	12
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	29.1%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 21: Barnwell St. & Calhoun St.

Bull Street Commons Traffic Study
 2015 Existing AM



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻		↻	↻	↻	↻
Traffic Volume (veh/h)	301	24	23	245	3	11
Future Volume (Veh/h)	301	24	23	245	3	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	334	27	26	272	3	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		TWLTL			
Median storage veh	2					
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			361		672	348
vC1, stage 1 conf vol					348	
vC2, stage 2 conf vol					324	
vCu, unblocked vol			361		672	348
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	98
cM capacity (veh/h)			1198		600	696
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	361	26	272	3	12	
Volume Left	0	26	0	3	0	
Volume Right	27	0	0	0	12	
cSH	1700	1198	1700	600	696	
Volume to Capacity	0.21	0.02	0.16	0.00	0.02	
Queue Length 95th (ft)	0	2	0	0	1	
Control Delay (s)	0.0	8.1	0.0	11.0	10.3	
Lane LOS	A			B	B	
Approach Delay (s)	0.0	0.7		10.4		
Approach LOS				B		
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			29.1%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
 26: Colonial Drive & Mental Health Dwy



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	78	293	193	155	5	1
Future Volume (vph)	78	293	193	155	5	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.940		0.981	
Flt Protected	0.950				0.959	
Satd. Flow (prot)	1770	1863	1751	0	1752	0
Flt Permitted	0.950				0.959	
Satd. Flow (perm)	1770	1863	1751	0	1752	0
Link Speed (mph)		35	35		35	
Link Distance (ft)		745	1307		386	
Travel Time (s)		14.5	25.5		7.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	87	326	214	172	6	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	87	326	386	0	7	0
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	37.3%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 26: Colonial Drive & Mental Health Dwy

Bull Street Commons Traffic Study
 2015 Existing AM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	78	293	193	155	5	1
Future Volume (Veh/h)	78	293	193	155	5	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	87	326	214	172	6	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		745				
pX, platoon unblocked						
vC, conflicting volume	386				800	300
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	386				800	300
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				98	100
cM capacity (veh/h)	1172				328	740
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	87	326	386	7		
Volume Left	87	0	0	6		
Volume Right	0	0	172	1		
cSH	1172	1700	1700	356		
Volume to Capacity	0.07	0.19	0.23	0.02		
Queue Length 95th (ft)	6	0	0	2		
Control Delay (s)	8.3	0.0	0.0	15.3		
Lane LOS	A			C		
Approach Delay (s)	1.8		0.0	15.3		
Approach LOS				C		
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			37.3%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2015 Existing PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	14	18	464	3	238	6	2132	203	75	913	8
Future Volume (vph)	22	14	18	464	3	238	6	2132	203	75	913	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		200	675		0	175		0	200		250
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100			75			50			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt		0.917			0.852				0.850		0.999	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3245	0	3433	1587	0	1770	3539	1583	1770	5080	0
Flt Permitted	0.950			0.950			0.280			0.062		
Satd. Flow (perm)	1770	3245	0	3433	1587	0	522	3539	1583	115	5080	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			264				179		2	
Link Speed (mph)		30			40			40			45	
Link Distance (ft)		619			1038			1208			1992	
Travel Time (s)		14.1			17.7			20.6			30.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.90	0.94	0.90
Adj. Flow (vph)	24	16	20	516	3	264	7	2343	223	83	971	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	36	0	516	267	0	7	2343	223	83	980	0
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	4	4		3	3			2	3	1	6	
Permitted Phases							2		2	6		
Detector Phase	4	4		3	3		2	2	3	1	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0		11.0	11.0		16.0	16.0	11.0	11.0	16.0	
Minimum Split (s)	30.0	30.0		17.0	17.0		30.0	30.0	17.0	17.0	30.0	
Total Split (s)	20.0	20.0		36.0	36.0		56.0	56.0	36.0	18.0	74.0	
Total Split (%)	15.4%	15.4%		27.7%	27.7%		43.1%	43.1%	27.7%	13.8%	56.9%	
Maximum Green (s)	14.0	14.0		30.0	30.0		50.0	50.0	30.0	12.0	68.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag	Lead	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	None	None	C-Max	
Walk Time (s)				5.0	5.0				5.0			
Flash Dont Walk (s)				10.0	10.0				10.0			
Pedestrian Calls (#/hr)				0	0				0			
Act Effct Green (s)	18.0	18.0		29.8	29.8		63.2	63.2	95.0	80.2	80.2	
Actuated g/C Ratio	0.14	0.14		0.23	0.23		0.49	0.49	0.73	0.62	0.62	
v/c Ratio	0.10	0.08		0.66	0.47		0.03	1.36	0.19	0.32	0.31	
Control Delay	50.2	28.2		52.7	13.3		11.8	192.7	6.5	18.4	13.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	50.2	28.2		52.7	13.3		11.8	192.7	6.5	18.4	13.4	

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2015 Existing PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	C		D	B		B	F	A	B	B	
Approach Delay		37.0			39.3			176.0				13.8
Approach LOS		D			D			F				B
Queue Length 50th (ft)	18	6		227	47		3	~1464	60	29	149	
Queue Length 95th (ft)	45	23		283	126		m4	#1646	m99	71	190	
Internal Link Dist (ft)		539			958			1128				1912
Turn Bay Length (ft)	100			675			175			200		
Base Capacity (vph)	245	466		897	610		253	1720	1250	274	3135	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.08		0.58	0.44		0.03	1.36	0.18	0.30	0.31	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 119 (92%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.36
 Intersection Signal Delay: 111.8
 Intersection Capacity Utilization 88.9%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service E

~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Bull St. & Harden St. Ext.



Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

Bull Street Commons Traffic Study
2015 Existing PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	16	11	50	113	46	33	2218	8	6	1340	50
Future Volume (vph)	26	16	11	50	113	46	33	2218	8	6	1340	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	200		0	200		0	150		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			100			100			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Frt		0.940			0.957				0.850			0.995
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1751	0	1770	1783	0	1752	5085	1583	1770	5060	0
Flt Permitted	0.646			0.138			0.120			0.051		
Satd. Flow (perm)	1203	1751	0	257	1783	0	221	5085	1583	95	5060	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		602			376			654			1208	
Travel Time (s)		13.7			8.5			11.1			20.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.93	0.96
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%	2%
Adj. Flow (vph)	29	18	12	56	126	51	37	2335	9	7	1441	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	30	0	56	177	0	37	2335	9	7	1493	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			3			2				6
Permitted Phases	4			3			2		2	6		
Detector Phase	4	4		3	3		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	30.0	30.0		31.0	31.0		69.0	69.0	69.0	69.0	69.0	
Total Split (%)	23.1%	23.1%		23.8%	23.8%		53.1%	53.1%	53.1%	53.1%	53.1%	
Maximum Green (s)	24.0	24.0		25.0	25.0		63.0	63.0	63.0	63.0	63.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Act Effct Green (s)	20.0	20.0		29.0	29.0		79.4	79.4	79.4	79.4	79.4	
Actuated g/C Ratio	0.15	0.15		0.22	0.22		0.61	0.61	0.61	0.61	0.61	
v/c Ratio	0.16	0.11		0.98	0.45		0.28	0.75	0.01	0.12	0.48	
Control Delay	50.2	48.7		166.1	47.8		13.7	15.2	8.2	14.8	10.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.1	0.0	0.0	0.0	
Total Delay	50.2	48.7		166.1	47.8		13.7	15.3	8.2	14.8	10.7	
LOS	D	D		F	D		B	B	A	B	B	
Approach Delay		49.5			76.2			15.3				10.7

Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

Bull Street Commons Traffic Study
2015 Existing PM

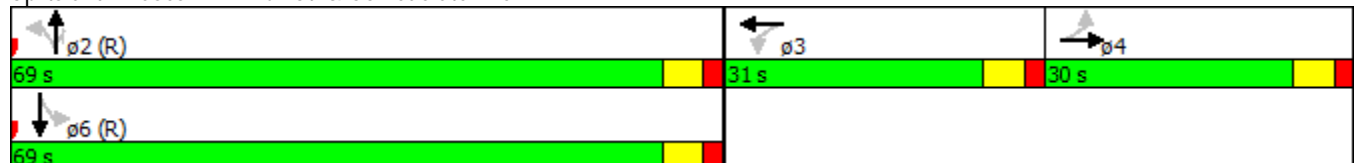


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	D			E			B			B		
Queue Length 50th (ft)	22	22		47	130		10	449	2	2	177	
Queue Length 95th (ft)	52	52		#141	204		m10	506	m2	m5	242	
Internal Link Dist (ft)		522			296			574			1128	
Turn Bay Length (ft)	150			200			200			150		
Base Capacity (vph)	259	377		57	397		134	3105	967	57	3090	
Starvation Cap Reductn	0	0		0	0		0	137	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.11	0.08		0.98	0.45		0.28	0.79	0.01	0.12	0.48	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 88 (68%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.98
 Intersection Signal Delay: 17.5
 Intersection LOS: B
 Intersection Capacity Utilization 71.1%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bull St. & Confederate Ave.



Lanes, Volumes, Timings
3: Bull St. & Colonial Drive

Bull Street Commons Traffic Study
2015 Existing PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗	↖	↔			↑↑↑		↘	↑↑↑	
Traffic Volume (vph)	0	0	4	349	6	51	0	2202	244	11	1346	23
Future Volume (vph)	0	0	4	349	6	51	0	2202	244	11	1346	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	150		0	0		0	200		0
Storage Lanes	0		1	1		0	0		0	1		0
Taper Length (ft)	25			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.865		0.958			0.984				0.997
Flt Protected				0.950	0.967					0.950		
Satd. Flow (prot)	0	0	1611	1681	1639	0	0	5004	0	1770	5070	0
Flt Permitted				0.950	0.967					0.041		
Satd. Flow (perm)	0	0	1611	1681	1639	0	0	5004	0	76	5070	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)			76		14			40				
Link Speed (mph)		35			35			40				40
Link Distance (ft)		440			736			362				654
Travel Time (s)		8.6			14.3			6.2				11.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.97	0.90	0.90	0.94	0.90
Adj. Flow (vph)	0	0	4	388	7	57	0	2270	271	12	1432	26
Shared Lane Traffic (%)				36%								
Lane Group Flow (vph)	0	0	4	248	204	0	0	2541	0	12	1458	0
Turn Type			Perm	Perm	NA			NA		Perm	NA	
Protected Phases					8			2				6
Permitted Phases			4	8						6		
Detector Phase			4	8	8			2		6		6
Switch Phase												
Minimum Initial (s)			16.0	16.0	16.0			16.0		16.0		16.0
Minimum Split (s)			30.0	30.0	30.0			30.0		30.0		30.0
Total Split (s)			35.0	35.0	35.0			95.0		95.0		95.0
Total Split (%)			26.9%	26.9%	26.9%			73.1%		73.1%		73.1%
Maximum Green (s)			29.0	29.0	29.0			89.0		89.0		89.0
Yellow Time (s)			4.0	4.0	4.0			4.0		4.0		4.0
All-Red Time (s)			2.0	2.0	2.0			2.0		2.0		2.0
Lost Time Adjust (s)			-4.0	-4.0	-4.0			-4.0		-4.0		-4.0
Total Lost Time (s)			2.0	2.0	2.0			2.0		2.0		2.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)			3.0	3.0	3.0			3.0		3.0		3.0
Recall Mode			None	None	None			C-Max		C-Max		C-Max
Act Effct Green (s)			27.6	27.6	27.6			98.4		98.4		98.4
Actuated g/C Ratio			0.21	0.21	0.21			0.76		0.76		0.76
v/c Ratio			0.01	0.69	0.57			0.67		0.21		0.38
Control Delay			0.0	59.7	50.4			5.3		13.6		2.9
Queue Delay			0.0	0.0	0.0			0.0		0.0		0.0
Total Delay			0.0	59.7	50.4			5.3		13.6		2.9
LOS			A	E	D			A		B		A
Approach Delay					55.5			5.3				3.0
Approach LOS					E			A				A

Lanes, Volumes, Timings
3: Bull St. & Colonial Drive

Bull Street Commons Traffic Study
2015 Existing PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)			0	211	157			129		1	26	
Queue Length 95th (ft)			0	297	234			m247		m3	m75	
Internal Link Dist (ft)		360			656			282			574	
Turn Bay Length (ft)				150						200		
Base Capacity (vph)			465	426	426			3796		57	3837	
Starvation Cap Reductn			0	0	0			0		0	0	
Spillback Cap Reductn			0	0	0			78		0	0	
Storage Cap Reductn			0	0	0			0		0	0	
Reduced v/c Ratio			0.01	0.58	0.48			0.68		0.21	0.38	

Intersection Summary

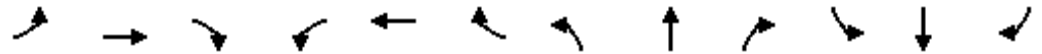
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 68 (52%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 9.6
 Intersection LOS: A
 Intersection Capacity Utilization 68.0%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Bull St. & Colonial Drive



Lanes, Volumes, Timings
4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2015 Existing PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↕↕↕		↗	↕↕↕	
Traffic Volume (vph)	2	0	2	4	0	1	2	2438	0	1	1686	5
Future Volume (vph)	2	0	2	4	0	1	2	2438	0	1	1686	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			75			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt		0.932			0.973						0.999	
Flt Protected		0.976			0.962		0.950			0.950		
Satd. Flow (prot)	0	1694	0	0	1744	0	1770	5085	0	1770	5080	0
Flt Permitted		0.976			0.962		0.950			0.950		
Satd. Flow (perm)	0	1694	0	0	1744	0	1770	5085	0	1770	5080	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		519			596			521			362	
Travel Time (s)		10.1			11.6			8.9			6.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.94	0.90
Adj. Flow (vph)	2	0	2	4	0	1	2	2594	0	1	1794	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	4	0	0	5	0	2	2594	0	1	1800	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	57.1%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2015 Existing PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕			↕		↕	↑↑↑		↕	↑↑↑		
Traffic Volume (veh/h)	2	0	2	4	0	1	2	2438	0	1	1686	5	
Future Volume (Veh/h)	2	0	2	4	0	1	2	2438	0	1	1686	5	
Sign Control		Stop			Stop			Free			Free		
Grade		0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.94	0.90	
Hourly flow rate (vph)	2	0	2	4	0	1	2	2594	0	1	1794	6	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type													
Median storage veh													
Upstream signal (ft)													
pX, platoon unblocked	0.82	0.82	0.90	0.82	0.82	0.77	0.90			0.77			
vC, conflicting volume	2669	4397	601	3200	4400	865	1800			2594			
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	1472	3585	189	2121	3588	0	1514			2025			
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1			
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2			
p0 queue free %	97	100	100	83	100	100	99			100			
cM capacity (veh/h)	72	4	743	23	4	835	395			213			
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4			
Volume Total	4	5	2	1038	1038	519	1	718	718	365			
Volume Left	2	4	2	0	0	0	1	0	0	0			
Volume Right	2	1	0	0	0	0	0	0	0	6			
cSH	131	29	395	1700	1700	1700	213	1700	1700	1700			
Volume to Capacity	0.03	0.17	0.01	0.61	0.61	0.31	0.00	0.42	0.42	0.21			
Queue Length 95th (ft)	2	13	0	0	0	0	0	0	0	0			
Control Delay (s)	33.4	155.4	14.2	0.0	0.0	0.0	22.0	0.0	0.0	0.0			
Lane LOS	D	F	B					C					
Approach Delay (s)	33.4	155.4	0.0					0.0					
Approach LOS	D	F											
Intersection Summary													
Average Delay			0.2										
Intersection Capacity Utilization			57.1%	ICU Level of Service					B				
Analysis Period (min)			15										

Lanes, Volumes, Timings
5: Bull St. & Jefferson Street



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	3	7	5	2432	1681	13
Future Volume (vph)	3	7	5	2432	1681	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	175			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		100			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Frt	0.902				0.999	
Flt Protected	0.987		0.950			
Satd. Flow (prot)	1658	0	1770	5085	5080	0
Flt Permitted	0.987		0.950			
Satd. Flow (perm)	1658	0	1770	5085	5080	0
Link Speed (mph)	35			40	40	
Link Distance (ft)	257			774	521	
Travel Time (s)	5.0			13.2	8.9	
Peak Hour Factor	0.90	0.90	0.90	0.95	0.96	0.90
Adj. Flow (vph)	3	8	6	2560	1751	14
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	0	6	2560	1765	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	57.0%
Analysis Period (min)	15
	ICU Level of Service B

HCM Unsignalized Intersection Capacity Analysis
5: Bull St. & Jefferson Street

Bull Street Commons Traffic Study
2015 Existing PM



Movement	EBL	EBR	NBL	NBT	SBT	SBR			
Lane Configurations									
Traffic Volume (veh/h)	3	7	5	2432	1681	13			
Future Volume (Veh/h)	3	7	5	2432	1681	13			
Sign Control	Stop			Free	Free				
Grade	0%			0%	0%				
Peak Hour Factor	0.90	0.90	0.90	0.95	0.96	0.90			
Hourly flow rate (vph)	3	8	6	2560	1751	14			
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type				None	None				
Median storage (veh)									
Upstream signal (ft)				774	883				
pX, platoon unblocked	0.78	0.91	0.91						
vC, conflicting volume	2623	591	1765						
vC1, stage 1 conf vol									
vC2, stage 2 conf vol									
vCu, unblocked vol	1338	215	1502						
tC, single (s)	6.8	6.9	4.1						
tC, 2 stage (s)									
tF (s)	3.5	3.3	2.2						
p0 queue free %	97	99	99						
cM capacity (veh/h)	111	720	403						
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	
Volume Total	11	6	853	853	853	700	700	364	
Volume Left	3	6	0	0	0	0	0	0	
Volume Right	8	0	0	0	0	0	0	14	
cSH	288	403	1700	1700	1700	1700	1700	1700	
Volume to Capacity	0.04	0.01	0.50	0.50	0.50	0.41	0.41	0.21	
Queue Length 95th (ft)	3	1	0	0	0	0	0	0	
Control Delay (s)	18.0	14.1	0.0	0.0	0.0	0.0	0.0	0.0	
Lane LOS	C	B							
Approach Delay (s)	18.0	0.0					0.0		
Approach LOS	C								
Intersection Summary									
Average Delay			0.1						
Intersection Capacity Utilization			57.0%	ICU Level of Service			B		
Analysis Period (min)			15						

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

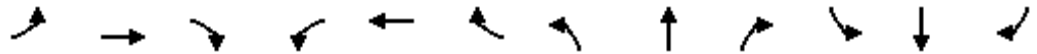
Bull Street Commons Traffic Study
2015 Existing PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1279	12	523	31	40	36	424	1142	11	3	606	1066
Future Volume (vph)	1279	12	523	31	40	36	424	1142	11	3	606	1066
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	775		0	125		0	175		0	100		0
Storage Lanes	1		2	1		0	1		0	1		1
Taper Length (ft)	50			50			125			50		
Lane Util. Factor	0.95	0.95	0.88	0.95	0.95	0.95	0.97	0.95	0.95	1.00	0.91	0.91
Frt			0.850		0.949			0.999				0.850
Flt Protected	0.950	0.953			0.986		0.950			0.950		
Satd. Flow (prot)	1681	1686	2787	0	3312	0	3433	3536	0	1770	3390	1441
Flt Permitted	0.950	0.953			0.986		0.950			0.121		
Satd. Flow (perm)	1681	1686	2787	0	3312	0	3433	3536	0	225	3390	1441
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30				40
Link Distance (ft)		1012			276			526				774
Travel Time (s)		23.0			6.3			12.0				13.2
Peak Hour Factor	0.98	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1305	13	581	34	44	40	466	1269	12	3	673	1184
Shared Lane Traffic (%)	50%											0%
Lane Group Flow (vph)	652	666	581	0	118	0	466	1281	0	3	673	1184
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Perm	NA	pm+ov
Protected Phases	4	4	5	3	3		5	2			6	4
Permitted Phases			4							6		6
Detector Phase	4	4	5	3	3		5	2		6	6	4
Switch Phase												
Minimum Initial (s)	16.0	16.0	11.0	11.0	11.0		11.0	16.0		16.0	16.0	16.0
Minimum Split (s)	30.0	30.0	17.0	17.0	17.0		17.0	30.0		30.0	30.0	30.0
Total Split (s)	54.0	54.0	24.0	17.0	17.0		24.0	59.0		35.0	35.0	54.0
Total Split (%)	41.5%	41.5%	18.5%	13.1%	13.1%		18.5%	45.4%		26.9%	26.9%	41.5%
Maximum Green (s)	48.0	48.0	18.0	11.0	11.0		18.0	53.0		29.0	29.0	48.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0		-4.0		-4.0	-4.0		-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0		2.0		2.0	2.0		2.0	2.0	2.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max		C-Max	C-Max	None
Act Effct Green (s)	52.0	52.0	76.0		15.0		22.0	57.0		33.0	33.0	85.0
Actuated g/C Ratio	0.40	0.40	0.58		0.12		0.17	0.44		0.25	0.25	0.65
v/c Ratio	0.97	0.99	0.36		0.31		0.80	0.83		0.05	0.78	1.26
Control Delay	57.9	62.0	10.5		55.2		55.2	34.6		32.3	45.4	145.9
Queue Delay	0.0	0.0	0.0		0.0		0.0	2.9		0.0	0.0	0.0
Total Delay	57.9	62.0	10.5		55.2		55.2	37.5		32.3	45.4	145.9
LOS	E	E	B		E		E	D		C	D	F
Approach Delay		44.8			55.2			42.2			109.3	
Approach LOS		D			E			D			F	

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
2015 Existing PM

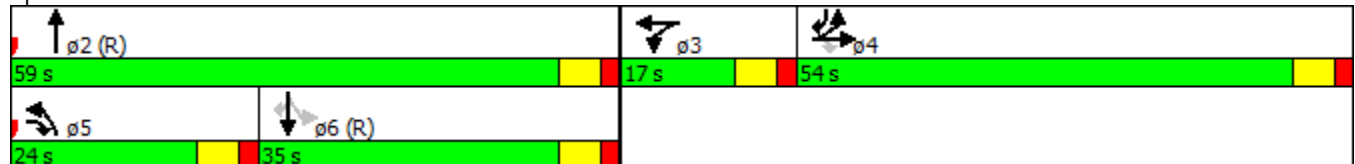


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	447	474	111		48		200	514		1	327	~1414
Queue Length 95th (ft)	#815	#843	178		80		#251	608		m4	395	#1671
Internal Link Dist (ft)		932			196			446			694	
Turn Bay Length (ft)	775						175			100		
Base Capacity (vph)	672	674	1629		382		580	1550		57	860	942
Starvation Cap Reductn	0	0	0		0		0	173		0	0	0
Spillback Cap Reductn	0	0	0		0		0	0		0	0	0
Storage Cap Reductn	0	0	0		0		0	0		0	0	0
Reduced v/c Ratio	0.97	0.99	0.36		0.31		0.80	0.93		0.05	0.78	1.26

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 100 (77%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.26
 Intersection Signal Delay: 65.6
 Intersection LOS: E
 Intersection Capacity Utilization 97.7%
 ICU Level of Service F
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Bull St. & Elmwood Avenue



Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

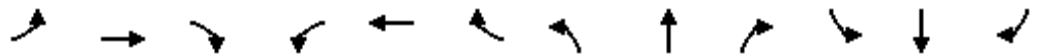
Bull Street Commons Traffic Study
2015 Existing PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	146	26	15	236	145	31	1438	11	79	997	77
Future Volume (vph)	77	146	26	15	236	145	31	1438	11	79	997	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	50			50			75			75		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.977			0.943			0.999				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3458	0	1770	3337	0	1770	3536	0	1770	3539	1583
Flt Permitted	0.272			0.536			0.230			0.124		
Satd. Flow (perm)	507	3458	0	998	3337	0	428	3536	0	231	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			61			1				86
Link Speed (mph)		30			30			30				30
Link Distance (ft)		937			677			1132				526
Travel Time (s)		21.3			15.4			25.7				12.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.92	0.90
Adj. Flow (vph)	86	162	29	17	262	161	34	1546	12	88	1084	86
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	191	0	17	423	0	34	1558	0	88	1084	86
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	16.0
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	30.0
Total Split (s)	35.0	35.0		35.0	35.0		95.0	95.0		95.0	95.0	95.0
Total Split (%)	26.9%	26.9%		26.9%	26.9%		73.1%	73.1%		73.1%	73.1%	73.1%
Maximum Green (s)	29.0	29.0		29.0	29.0		89.0	89.0		89.0	89.0	89.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	27.1	27.1		27.1	27.1		98.9	98.9		98.9	98.9	98.9
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.76	0.76		0.76	0.76	0.76
v/c Ratio	0.82	0.26		0.08	0.57		0.10	0.58		0.50	0.40	0.07
Control Delay	96.8	39.3		43.3	43.0		6.1	8.3		18.6	3.4	0.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.2		0.0	0.2	0.0
Total Delay	96.8	39.3		43.3	43.0		6.1	8.5		18.6	3.6	0.9
LOS	F	D		D	D		A	A		B	A	A
Approach Delay		57.2			43.0			8.5			4.5	
Approach LOS		E			D			A			A	

Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

Bull Street Commons Traffic Study
2015 Existing PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	69	65		11	140		7	261		17	106	2
Queue Length 95th (ft)	#148	95		33	195		20	375		m57	184	m8
Internal Link Dist (ft)		857			597			1052			446	
Turn Bay Length (ft)	150			175			150			150		
Base Capacity (vph)	128	888		253	892		325	2689		175	2691	1224
Starvation Cap Reductn	0	0		0	0		0	0		0	668	0
Spillback Cap Reductn	0	0		0	3		0	347		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.67	0.22		0.07	0.48		0.10	0.67		0.50	0.54	0.07

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	130
Offset:	72 (55%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.82
Intersection Signal Delay:	15.1
Intersection LOS:	B
Intersection Capacity Utilization	93.4%
ICU Level of Service	F
Analysis Period (min)	15
#	95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.
m	Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Bull St. & Calhoun St.



Lanes, Volumes, Timings
9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Bull Street Commons Traffic Study
2015 Existing PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	364	138	375	186	48	88	357	844	68	489	39
Future Volume (vph)	40	364	138	375	186	48	88	357	844	68	489	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		800	175		0	225		0	300		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	100			75			75			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.959			0.969				0.850		0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3394	0	3433	3429	0	1770	3539	1583	1770	3498	0
Flt Permitted	0.591			0.950			0.367			0.474		
Satd. Flow (perm)	1101	3394	0	3433	3429	0	684	3539	1583	883	3498	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		42			41				719			7
Link Speed (mph)		35			35			35				40
Link Distance (ft)		1007			292			498				1949
Travel Time (s)		19.6			5.7			9.7				33.2
Peak Hour Factor	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Adj. Flow (vph)	44	404	153	403	207	53	98	397	888	76	543	43
Shared Lane Traffic (%)												
Lane Group Flow (vph)	44	557	0	403	260	0	98	397	888	76	586	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Free	Perm	NA	
Protected Phases		8		7	4			6				2
Permitted Phases	8						6		Free	2		
Detector Phase	8	8		7	4		6	6		2		2
Switch Phase												
Minimum Initial (s)	16.0	16.0		11.0	16.0		16.0	16.0		16.0		16.0
Minimum Split (s)	30.0	30.0		17.0	30.0		30.0	30.0		30.0		30.0
Total Split (s)	39.0	39.0		37.0	76.0		54.0	54.0		54.0		54.0
Total Split (%)	30.0%	30.0%		28.5%	58.5%		41.5%	41.5%		41.5%		41.5%
Maximum Green (s)	33.0	33.0		31.0	70.0		48.0	48.0		48.0		48.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0		-4.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0		3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max		C-Max
Act Effct Green (s)	29.5	29.5		24.6	56.1		69.9	69.9	130.0	69.9		69.9
Actuated g/C Ratio	0.23	0.23		0.19	0.43		0.54	0.54	1.00	0.54		0.54
v/c Ratio	0.18	0.69		0.62	0.17		0.27	0.21	0.56	0.16		0.31
Control Delay	36.8	44.0		63.0	13.6		13.2	11.2	6.6	23.4		23.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	36.8	44.0		63.0	13.6		13.2	11.2	6.6	23.4		23.0
LOS	D	D		E	B		B	B	A	C		C
Approach Delay		43.5			43.6			8.4				23.0

Lanes, Volumes, Timings
 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Bull Street Commons Traffic Study
 2015 Existing PM

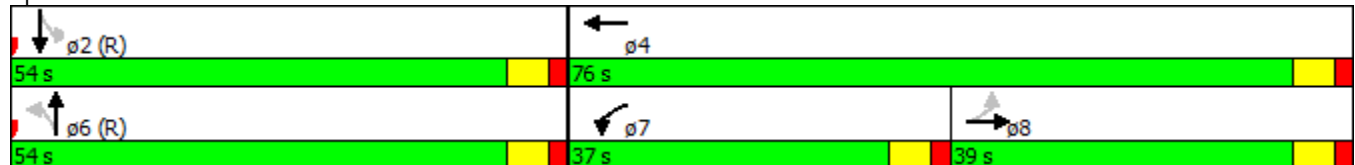


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	D			D			A			C		
Queue Length 50th (ft)	29	211		178	50		22	47	233	42	182	
Queue Length 95th (ft)	m53	255		228	64		44	70	381	95	272	
Internal Link Dist (ft)	927			212			418			1869		
Turn Bay Length (ft)	225			175			225			300		
Base Capacity (vph)	313	996		924	1969		368	1903	1583	474	1884	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.14	0.56		0.44	0.13		0.27	0.21	0.56	0.16	0.31	

Intersection Summary

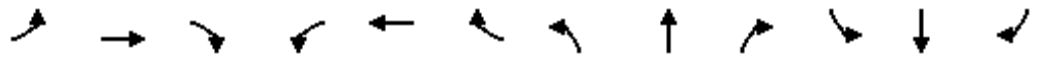
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 95 (73%), Referenced to phase 2:SBTL and 6:NBTL, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 24.8
 Intersection LOS: C
 Intersection Capacity Utilization 68.1%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive



Lanes, Volumes, Timings
10: Harden St./Harden Street Ext & Calhoun St.

Bull Street Commons Traffic Study
2015 Existing PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	127	35	168	20	16	10	151	964	42	53	828	74
Future Volume (vph)	127	35	168	20	16	10	151	964	42	53	828	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	50		0	0		325	300		200
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	100			25			25			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Frt		0.876			0.943			0.994				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1632	0	1770	1757	0	1770	5055	0	1770	3539	1583
Flt Permitted	0.738			0.274			0.258			0.224		
Satd. Flow (perm)	1375	1632	0	510	1757	0	481	5055	0	417	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		177			11			7				77
Link Speed (mph)		30			35			35				35
Link Distance (ft)		1071			821			1286				400
Travel Time (s)		24.3			16.0			25.1				7.8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	141	39	187	22	18	11	168	1071	47	59	920	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	141	226	0	22	29	0	168	1118	0	59	920	82
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	1.0	1.0		11.0	11.0		9.0	14.0		9.0	14.0	14.0
Minimum Split (s)	6.5	6.5		30.0	30.0		15.0	30.0		15.0	30.0	30.0
Total Split (s)	38.0	38.0		38.0	38.0		30.0	62.0		30.0	62.0	62.0
Total Split (%)	29.2%	29.2%		29.2%	29.2%		23.1%	47.7%		23.1%	47.7%	47.7%
Maximum Green (s)	32.5	32.5		32.5	32.5		24.0	56.0		24.0	56.0	56.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.5	1.5		1.5	1.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	0.0		0.0	0.0		-3.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	2.5	5.5		5.5	5.5		3.0	3.0		6.0	3.0	3.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	21.8	18.8		18.8	18.8		100.8	90.7		93.1	87.1	87.1
Actuated g/C Ratio	0.17	0.14		0.14	0.14		0.78	0.70		0.72	0.67	0.67
v/c Ratio	0.61	0.58		0.30	0.11		0.34	0.32		0.15	0.39	0.08
Control Delay	47.9	10.1		57.8	32.5		5.7	9.0		8.8	14.2	5.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	47.9	10.1		57.8	32.5		5.7	9.0		8.8	14.2	5.1
LOS	D	B		E	C		A	A		A	B	A
Approach Delay		24.6			43.4			8.6			13.2	
Approach LOS		C			D			A			B	

Lanes, Volumes, Timings
 10: Harden St./Harden Street Ext & Calhoun St.

Bull Street Commons Traffic Study
 2015 Existing PM

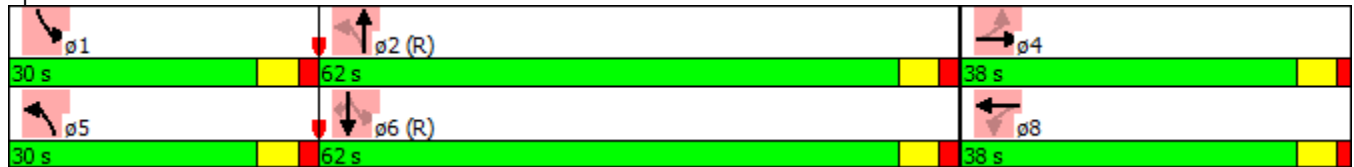


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	80	6		17	13		27	131		18	177	3
Queue Length 95th (ft)	175	39		43	40		60	189		29	241	29
Internal Link Dist (ft)		991			741			1206			320	
Turn Bay Length (ft)	225			50						300		200
Base Capacity (vph)	375	540		127	447		647	3527		569	2371	1086
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.38	0.42		0.17	0.06		0.26	0.32		0.10	0.39	0.08

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	130
Offset:	34 (26%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
Natural Cycle:	75
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.61
Intersection Signal Delay:	13.1
Intersection LOS:	B
Intersection Capacity Utilization	59.1%
ICU Level of Service	B
Analysis Period (min)	15

Splits and Phases: 10: Harden St./Harden Street Ext & Calhoun St.



Lanes, Volumes, Timings
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2015 Existing PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	280	9	5	234	4	15	5	18	15	21	41
Future Volume (vph)	21	280	9	5	234	4	15	5	18	15	21	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	275		0	0		0	300		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	100			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.998			0.937				0.900
Flt Protected	0.950			0.950				0.981		0.950		
Satd. Flow (prot)	1770	1848	0	1770	1859	0	0	1712	0	1770	1676	0
Flt Permitted	0.950			0.950				0.981		0.950		
Satd. Flow (perm)	1770	1848	0	1770	1859	0	0	1712	0	1770	1676	0
Link Speed (mph)		35			30			35				35
Link Distance (ft)		434			1071			385				2969
Travel Time (s)		8.5			24.3			7.5				57.8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	11%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	23	311	10	6	260	4	17	6	20	17	23	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	321	0	6	264	0	0	43	0	17	69	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	33.0%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2015 Existing PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	280	9	5	234	4	15	5	18	15	21	41
Future Volume (Veh/h)	21	280	9	5	234	4	15	5	18	15	21	41
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	23	311	10	6	260	4	17	6	20	17	23	46
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	TWLTL				TWLTL							
Median storage veh	2				2							
Upstream signal (ft)					1071							
pX, platoon unblocked												
vC, conflicting volume	264				321				692		262	
vC1, stage 1 conf vol							362		362		274	
vC2, stage 2 conf vol							330		276		380	
vCu, unblocked vol	264				321				692		262	
tC, single (s)	4.1				4.1				7.1		6.2	
tC, 2 stage (s)							6.1		5.5		6.1	
tF (s)	2.2				2.2				3.5		3.3	
p0 queue free %	98				100				97		96	
cM capacity (veh/h)	1300				1239				506		777	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total	23	321	6	264	43	17	69					
Volume Left	23	0	6	0	17	17	0					
Volume Right	0	10	0	4	20	0	46					
cSH	1300	1700	1239	1700	594	539	677					
Volume to Capacity	0.02	0.19	0.00	0.16	0.07	0.03	0.10					
Queue Length 95th (ft)	1	0	0	0	6	2	8					
Control Delay (s)	7.8	0.0	7.9	0.0	11.5	11.9	10.9					
Lane LOS	A		A		B	B	B					
Approach Delay (s)	0.5		0.2		11.5		11.1					
Approach LOS					B		B					
Intersection Summary												
Average Delay			2.3									
Intersection Capacity Utilization			33.0%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2015 Existing PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↕	↕		↕	↕	
Traffic Volume (vph)	1	357	13	25	332	9	17	2	60	35	11	26
Future Volume (vph)	1	357	13	25	332	9	17	2	60	35	11	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		225	50		0
Storage Lanes	0		0	0		0	1		1	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.997			0.854			0.894	
Flt Protected					0.997		0.950			0.950		
Satd. Flow (prot)	0	1850	0	0	1852	0	1703	1591	0	1770	1665	0
Flt Permitted					0.997		0.950			0.950		
Satd. Flow (perm)	0	1850	0	0	1852	0	1703	1591	0	1770	1665	0
Link Speed (mph)		35			35			35				35
Link Distance (ft)		1232			210			2969				473
Travel Time (s)		24.0			4.1			57.8				9.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90
Heavy Vehicles (%)	2%	2%	8%	2%	2%	2%	6%	2%	2%	2%	2%	2%
Adj. Flow (vph)	1	397	14	28	369	10	19	2	67	39	12	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	412	0	0	407	0	19	69	0	39	41	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	52.5%
Analysis Period (min)	15
	ICU Level of Service A













HCM Unsignalized Intersection Capacity Analysis
12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2015 Existing PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	
Traffic Volume (veh/h)	1	357	13	25	332	9	17	2	60	35	11	26
Future Volume (Veh/h)	1	357	13	25	332	9	17	2	60	35	11	26
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90
Hourly flow rate (vph)	1	397	14	28	369	10	19	2	67	39	12	29
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					1217							
pX, platoon unblocked	0.95						0.95	0.95		0.95	0.95	0.95
vC, conflicting volume	379			411			871	841	404	904	843	374
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	319			411			838	806	404	872	808	314
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			92	99	90	83	96	96
cM capacity (veh/h)	1178			1148			243	292	647	225	291	690
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	412	407	19	69	39	41						
Volume Left	1	28	19	0	39	0						
Volume Right	14	10	0	67	0	29						
cSH	1178	1148	243	625	225	492						
Volume to Capacity	0.00	0.02	0.08	0.11	0.17	0.08						
Queue Length 95th (ft)	0	2	6	9	15	7						
Control Delay (s)	0.0	0.8	21.1	11.5	24.3	13.0						
Lane LOS	A	A	C	B	C	B						
Approach Delay (s)	0.0	0.8	13.5		18.5							
Approach LOS			B		C							
Intersection Summary												
Average Delay			3.1									
Intersection Capacity Utilization			52.5%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
13: Harden Street Ext & Slighs Ave.

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	76	195	1019	63	118	901
Future Volume (vph)	76	195	1019	63	118	901
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		50	100	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				50	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3539	1495	1736	3539
Flt Permitted	0.950				0.194	
Satd. Flow (perm)	1770	1583	3539	1495	354	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		217		20		
Link Speed (mph)	30		35			35
Link Distance (ft)	359		2587			498
Travel Time (s)	8.2		50.4			9.7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.91
Heavy Vehicles (%)	2%	2%	2%	8%	4%	2%
Adj. Flow (vph)	84	217	1132	70	131	990
Shared Lane Traffic (%)						
Lane Group Flow (vph)	84	217	1132	70	131	990
Turn Type	Prot	Over	NA	Perm	pm+pt	NA
Protected Phases	4	5	6		5	2
Permitted Phases				6	2	
Detector Phase	4	5	6	6	5	2
Switch Phase						
Minimum Initial (s)	16.0	11.0	16.0	16.0	11.0	16.0
Minimum Split (s)	30.0	17.0	30.0	30.0	17.0	30.0
Total Split (s)	40.0	20.0	70.0	70.0	20.0	90.0
Total Split (%)	30.8%	15.4%	53.8%	53.8%	15.4%	69.2%
Maximum Green (s)	34.0	14.0	64.0	64.0	14.0	84.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0	-2.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0	4.0	2.0	2.0
Lead/Lag		Lead	Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)	20.0	15.6	88.4	86.4	106.0	106.0
Actuated g/C Ratio	0.15	0.12	0.68	0.66	0.82	0.82
v/c Ratio	0.31	0.57	0.47	0.07	0.29	0.34
Control Delay	52.4	12.8	12.0	5.2	5.4	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	52.4	12.8	12.0	5.2	5.4	2.1
LOS	D	B	B	A	A	A
Approach Delay	23.9		11.6			2.5

Lanes, Volumes, Timings
 13: Harden Street Ext & Slighs Ave.



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	C		B		A	
Queue Length 50th (ft)	64	0	294	23	12	35
Queue Length 95th (ft)	116	75	375	40	35	70
Internal Link Dist (ft)	279		2507		418	
Turn Bay Length (ft)				50	100	
Base Capacity (vph)	517	406	2406	1000	480	2885
Starvation Cap Reductn	0	0	0	0	0	834
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.53	0.47	0.07	0.27	0.48

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	130
Offset:	86 (66%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
Natural Cycle:	80
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.57
Intersection Signal Delay:	9.1
Intersection LOS:	A
Intersection Capacity Utilization	60.7%
ICU Level of Service	B
Analysis Period (min)	15

Splits and Phases: 13: Harden Street Ext & Slighs Ave.



Lanes, Volumes, Timings
14: Colonial Drive & Farrow Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Lane Configurations		↗↗	↖	↑↑	↑↓		
Traffic Volume (vph)	0	157	245	927	375	24	
Future Volume (vph)	0	157	245	927	375	24	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0	330	550			0	
Storage Lanes	0	1	1			0	
Taper Length (ft)	25		125				
Lane Util. Factor	1.00	0.88	1.00	0.95	0.95	0.95	
Frt		0.850			0.991		
Flt Protected			0.950				
Satd. Flow (prot)	0	2787	1770	3539	3507	0	
Flt Permitted			0.950				
Satd. Flow (perm)	0	2787	1770	3539	3507	0	
Right Turn on Red		Yes				No	
Satd. Flow (RTOR)		611					
Link Speed (mph)	35			35	35		
Link Distance (ft)	1114			708	2010		
Travel Time (s)	21.7			13.8	39.2		
Peak Hour Factor	0.90	0.90	0.96	0.90	0.92	0.90	
Adj. Flow (vph)	0	174	255	1030	408	27	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	174	255	1030	435	0	
Turn Type		Over	Prot	NA	NA		
Protected Phases		8	8	8 6	2	6	
Permitted Phases				8			
Detector Phase		8	8	8 6	2		
Switch Phase							
Minimum Initial (s)		16.0	16.0		16.0	11.0	
Minimum Split (s)		30.0	30.0		30.0	30.0	
Total Split (s)		33.0	33.0		32.0	32.0	
Total Split (%)		50.8%	50.8%		49.2%	49%	
Maximum Green (s)		27.0	27.0		26.0	26.5	
Yellow Time (s)		4.0	4.0		4.0	4.0	
All-Red Time (s)		2.0	2.0		2.0	1.5	
Lost Time Adjust (s)		-3.0	-3.0		-4.0		
Total Lost Time (s)		3.0	3.0		2.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0	3.0		3.0	3.0	
Recall Mode		None	None		C-Max	C-Max	
Act Effct Green (s)		23.2	23.2	65.0	36.8		
Actuated g/C Ratio		0.36	0.36	1.00	0.57		
v/c Ratio		0.13	0.40	0.29	0.22		
Control Delay		0.2	13.7	0.2	15.1		
Queue Delay		0.0	0.0	0.0	0.0		
Total Delay		0.2	13.7	0.2	15.1		
LOS		A	B	A	B		
Approach Delay				2.9	15.1		
Approach LOS				A	B		

Lanes, Volumes, Timings
 14: Colonial Drive & Farrow Road



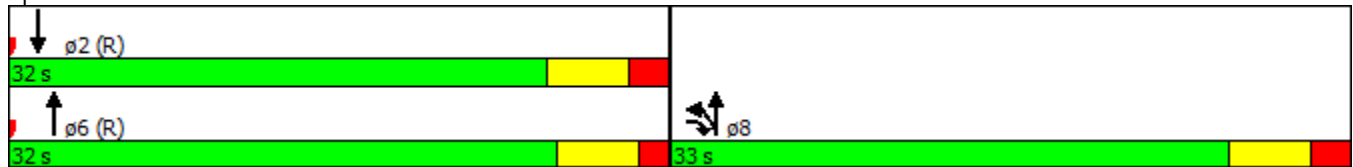
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Queue Length 50th (ft)		0	77	0	94		
Queue Length 95th (ft)		0	87	0	134		
Internal Link Dist (ft)	1034			628	1930		
Turn Bay Length (ft)		330	550				
Base Capacity (vph)		1615	816	3539	1983		
Starvation Cap Reductn		0	0	0	0		
Spillback Cap Reductn		0	0	0	0		
Storage Cap Reductn		0	0	0	0		
Reduced v/c Ratio		0.11	0.31	0.29	0.22		

Intersection Summary

Area Type: Other
 Cycle Length: 65
 Actuated Cycle Length: 65
 Offset: 42 (65%), Referenced to phase 2:SBT and 6:NBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.40
 Intersection Signal Delay: 5.4
 Intersection Capacity Utilization 33.6%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 14: Colonial Drive & Farrow Road



Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
2015 Existing PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	511	11	150	481	358	0	937	252	266	304	46
Future Volume (vph)	85	511	11	150	481	358	0	937	252	266	304	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		0	300		0	0		225	200		0
Storage Lanes	1		0	2		1	0		1	1		0
Taper Length (ft)	125			100			25			125		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.997				0.850			0.850		0.980	
Flt Protected	0.950			0.950						0.950		
Satd. Flow (prot)	1770	3529	0	3433	3539	1583	0	3539	1583	1770	3468	0
Flt Permitted	0.453			0.950						0.085		
Satd. Flow (perm)	844	3529	0	3433	3539	1583	0	3539	1583	158	3468	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				17			143		18	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1548			1446			2010			864	
Travel Time (s)		30.2			28.2			39.2			16.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	0.94	0.90	0.90
Adj. Flow (vph)	94	568	12	167	534	398	0	1041	263	283	338	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	94	580	0	167	534	398	0	1041	263	283	389	0
Turn Type	Perm	NA		Prot	NA	pm+ov		NA	Free	pm+pt	NA	
Protected Phases		4		3	8	1		2		1	6	
Permitted Phases	4					8			Free	6		
Detector Phase	4	4		3	8	1		2		1	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0	5.0		15.0		5.0	15.0	
Minimum Split (s)	30.0	30.0		21.0	41.0	17.0		41.0		17.0	30.0	
Total Split (s)	35.0	35.0		26.0	61.0	22.0		47.0		22.0	69.0	
Total Split (%)	26.9%	26.9%		20.0%	46.9%	16.9%		36.2%		16.9%	53.1%	
Maximum Green (s)	30.0	30.0		21.0	56.0	17.0		42.0		17.0	64.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5		3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5	1.5		1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0		-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead		Lead		Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Recall Mode	None	None		None	None	None		C-Min		None	C-Min	
Walk Time (s)					18.0			18.0				
Flash Dont Walk (s)					5.0			5.0				
Pedestrian Calls (#/hr)					0			0				
Act Effct Green (s)	28.0	28.0		16.0	48.0	74.1		47.9	130.0	74.0	74.0	
Actuated g/C Ratio	0.22	0.22		0.12	0.37	0.57		0.37	1.00	0.57	0.57	
v/c Ratio	0.52	0.76		0.40	0.41	0.44		0.80	0.17	0.78	0.20	
Control Delay	54.7	54.4		55.7	31.0	16.3		45.5	0.2	41.9	8.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	54.7	54.4		55.7	31.0	16.3		45.5	0.2	41.9	8.3	

Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
2015 Existing PM

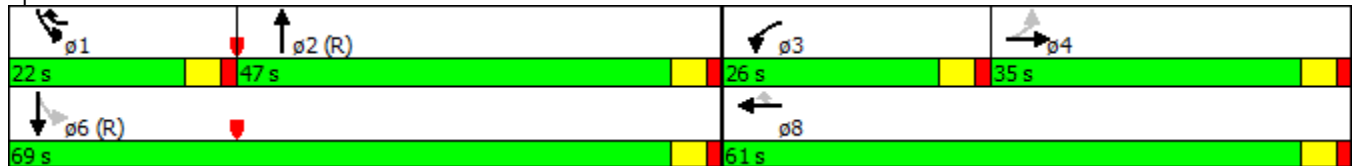


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	D		E	C	B		D	A	D	A	
Approach Delay		54.5			29.4			36.4			22.5	
Approach LOS		D			C			D			C	
Queue Length 50th (ft)	70	242		68	174	161		414	0	77	35	
Queue Length 95th (ft)	123	290		104	206	229		#543	0	#323	46	
Internal Link Dist (ft)		1468			1366			1930			784	
Turn Bay Length (ft)	175			300					225	200		
Base Capacity (vph)	205	861		580	1551	910		1302	1583	364	1981	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.46	0.67		0.29	0.34	0.44		0.80	0.17	0.78	0.20	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 35.1
 Intersection LOS: D
 Intersection Capacity Utilization 80.9%
 ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 15: Farrow Road & Beltline Blvd



Lanes, Volumes, Timings
16: Farrow Road & 277 NB RAMPS

Bull Street Commons Traffic Study
2015 Existing PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗						↕	↗	↖	↕	
Traffic Volume (vph)	144	0	14	0	0	0	0	805	595	60	580	0
Future Volume (vph)	144	0	14	0	0	0	0	805	595	60	580	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	0		0	0		0	250		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			25			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.850						0.937				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1770	1583	0	0	0	0	0	3316	0	1770	3539	0
Flt Permitted	0.950									0.138		
Satd. Flow (perm)	1770	1583	0	0	0	0	0	3316	0	257	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		182						187				
Link Speed (mph)		35			35			35				35
Link Distance (ft)		827			779			864				694
Travel Time (s)		16.1			15.2			16.8				13.5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.92	0.90
Adj. Flow (vph)	160	0	16	0	0	0	0	894	647	67	630	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	160	16	0	0	0	0	0	1541	0	67	630	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						6			2	
Permitted Phases	4									2		
Detector Phase	4	4						6		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0						10.0		10.0	10.0	
Minimum Split (s)	30.0	30.0						30.0		30.0	30.0	
Total Split (s)	66.0	66.0						64.0		64.0	64.0	
Total Split (%)	50.8%	50.8%						49.2%		49.2%	49.2%	
Maximum Green (s)	61.0	61.0						59.0		59.0	59.0	
Yellow Time (s)	3.5	3.5						3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5						1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0						-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0						4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Recall Mode	None	None						C-Max		C-Max	C-Max	
Act Effct Green (s)	18.4	18.4						103.6		103.6	103.6	
Actuated g/C Ratio	0.14	0.14						0.80		0.80	0.80	
v/c Ratio	0.64	0.04						0.57		0.33	0.22	
Control Delay	63.6	0.2						5.4		11.0	4.1	
Queue Delay	0.0	0.0						0.0		0.0	0.0	
Total Delay	63.6	0.2						5.4		11.0	4.1	
LOS	E	A						A		B	A	
Approach Delay		57.9						5.4			4.7	
Approach LOS		E						A			A	

Lanes, Volumes, Timings
 16: Farrow Road & 277 NB RAMPS

Bull Street Commons Traffic Study
 2015 Existing PM

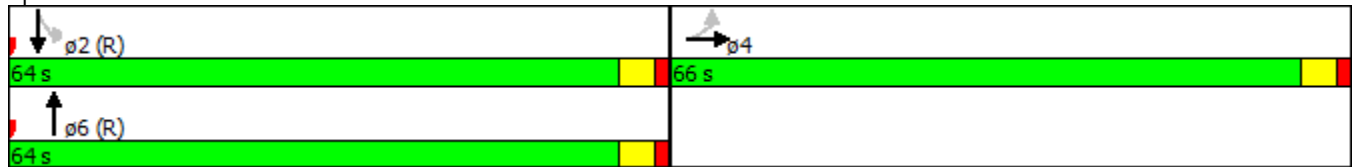


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	129	0						114		19	80	
Queue Length 95th (ft)	193	0						178		72	121	
Internal Link Dist (ft)		747			699			784			614	
Turn Bay Length (ft)	300									250		
Base Capacity (vph)	844	850						2680		204	2819	
Starvation Cap Reductn	0	0						0		0	0	
Spillback Cap Reductn	0	0						0		0	0	
Storage Cap Reductn	0	0						0		0	0	
Reduced v/c Ratio	0.19	0.02						0.57		0.33	0.22	

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	130
Offset:	0 (0%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.64
Intersection Signal Delay:	9.0
Intersection LOS:	A
Intersection Capacity Utilization	64.9%
ICU Level of Service	C
Analysis Period (min)	15

Splits and Phases: 16: Farrow Road & 277 NB RAMPS



Lanes, Volumes, Timings
17: Farrow Road & Lorick Avenue /277 SB Ramps

Bull Street Commons Traffic Study
2015 Existing PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	0	37	147	15	44	23	927	0	0	453	132
Future Volume (vph)	31	0	37	147	15	44	23	927	0	0	453	132
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	125		0	200		0	0		0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (ft)	25			150			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850		0.889							0.966
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1770	0	1583	1770	1656	0	1770	3539	0	0	3419	0
Flt Permitted	0.705			0.950			0.396					
Satd. Flow (perm)	1313	0	1583	1770	1656	0	738	3539	0	0	3419	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			41		49							39
Link Speed (mph)		35			35			35				35
Link Distance (ft)		467			1041			694				870
Travel Time (s)		9.1			20.3			13.5				16.9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	34	0	41	163	17	49	26	1030	0	0	503	147
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	0	41	163	66	0	26	1030	0	0	650	0
Turn Type	Perm		Perm	Perm	NA		Perm	NA			NA	
Protected Phases					4			2				6
Permitted Phases	8		8	4			2					
Detector Phase	8		8	4	4		2	2				6
Switch Phase												
Minimum Initial (s)	10.0		10.0	10.0	10.0		10.0	10.0				10.0
Minimum Split (s)	30.0		30.0	30.0	30.0		30.0	30.0				30.0
Total Split (s)	66.0		66.0	66.0	66.0		64.0	64.0				64.0
Total Split (%)	50.8%		50.8%	50.8%	50.8%		49.2%	49.2%				49.2%
Maximum Green (s)	61.0		61.0	61.0	61.0		59.0	59.0				59.0
Yellow Time (s)	3.5		3.5	3.5	3.5		3.5	3.5				3.5
All-Red Time (s)	1.5		1.5	1.5	1.5		1.5	1.5				1.5
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0		-1.0	-1.0				-1.0
Total Lost Time (s)	4.0		4.0	4.0	4.0		4.0	4.0				4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0				3.0
Recall Mode	None		None	None	None		C-Max	C-Max				C-Max
Act Effct Green (s)	18.6		18.6	18.6	18.6		103.4	103.4				103.4
Actuated g/C Ratio	0.14		0.14	0.14	0.14		0.80	0.80				0.80
v/c Ratio	0.18		0.16	0.64	0.24		0.04	0.37				0.24
Control Delay	49.0		14.3	63.6	19.6		5.1	5.6				3.7
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.0				0.0
Total Delay	49.0		14.3	63.6	19.6		5.1	5.6				3.7
LOS	D		B	E	B		A	A				A
Approach Delay					50.9			5.5				3.7
Approach LOS					D			A				A

Lanes, Volumes, Timings
 17: Farrow Road & Lorick Avenue /277 SB Ramps

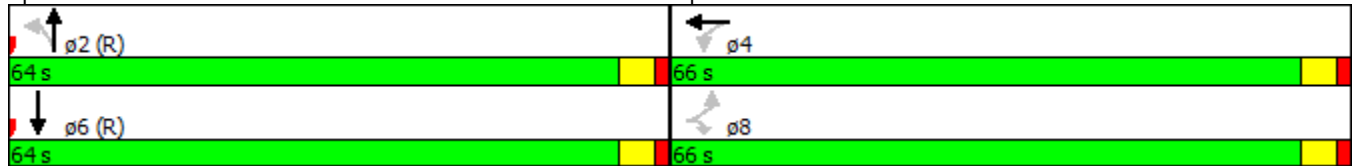


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	26		0	131	13		5	151			55	
Queue Length 95th (ft)	55		32	197	52		m12	185			95	
Internal Link Dist (ft)		387			961			614			790	
Turn Bay Length (ft)				125			200					
Base Capacity (vph)	626		776	844	815		586	2814			2727	
Starvation Cap Reductn	0		0	0	0		0	0			0	
Spillback Cap Reductn	0		0	0	0		0	0			0	
Storage Cap Reductn	0		0	0	0		0	0			0	
Reduced v/c Ratio	0.05		0.05	0.19	0.08		0.04	0.37			0.24	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 11.0
 Intersection LOS: B
 Intersection Capacity Utilization 47.1%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 17: Farrow Road & Lorick Avenue /277 SB Ramps



Lanes, Volumes, Timings
18: Assembly St./Assembly & Elmwood Avenue

Bull Street Commons Traffic Study
2015 Existing PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1501	253	314	1795	7	962	8	534	0	0	1
Future Volume (vph)	0	1501	253	314	1795	7	962	8	534	0	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		275	150		0	0		0	0		0
Storage Lanes	1		1	1		0	2		1	0		0
Taper Length (ft)	150			75			25			25		
Lane Util. Factor	1.00	0.86	0.86	0.97	0.91	0.91	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850		0.999				0.850		0.865	
Flt Protected				0.950			0.950					
Satd. Flow (prot)	1863	4806	1362	3433	5080	0	3433	1770	1504	0	1611	0
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	1863	4806	1362	3433	5080	0	3433	1770	1504	0	1611	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			273		1				112		126	
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		2522			509			585			432	
Travel Time (s)		57.3			11.6			13.3			8.4	
Peak Hour Factor	0.90	0.94	0.90	0.90	0.92	0.90	0.93	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1597	281	349	1951	8	1034	9	593	0	0	1
Shared Lane Traffic (%)			0%						0%			
Lane Group Flow (vph)	0	1597	281	349	1959	0	1034	9	593	0	1	0
Turn Type	Perm	NA	pm+ov	Prot	NA		Split	NA	pm+ov		NA	
Protected Phases		2	3	1	6		3	3	1		4	
Permitted Phases	2		2						3	4		
Detector Phase	2	2	3	1	6		3	3	1	4	4	
Switch Phase												
Minimum Initial (s)	16.0	16.0	11.0	11.0	16.0		11.0	11.0	11.0	4.5	4.5	
Minimum Split (s)	30.0	30.0	17.0	17.0	30.0		17.0	17.0	17.0	10.0	10.0	
Total Split (s)	46.0	46.0	49.0	25.0	71.0		49.0	49.0	25.0	10.0	10.0	
Total Split (%)	35.4%	35.4%	37.7%	19.2%	54.6%		37.7%	37.7%	19.2%	7.7%	7.7%	
Maximum Green (s)	40.0	40.0	43.0	19.0	65.0		43.0	43.0	19.0	4.5	4.5	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	1.5	1.5	
Lost Time Adjust (s)	0.0	-4.0	-4.0	-4.0	-4.0		-4.0	0.0	-4.0		-1.5	
Total Lost Time (s)	6.0	2.0	2.0	2.0	2.0		2.0	6.0	2.0		4.0	
Lead/Lag	Lead	Lead	Lead	Lag			Lead	Lead	Lag	Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max	None	None	C-Max		None	None	None	None	None	
Act Effct Green (s)		52.8	100.6	23.0	77.8		46.2	42.2	71.2		6.2	
Actuated g/C Ratio		0.41	0.77	0.18	0.60		0.36	0.32	0.55		0.05	
v/c Ratio		0.82	0.25	0.57	0.64		0.85	0.02	0.68		0.01	
Control Delay		39.1	1.0	43.9	10.1		46.3	29.5	21.2		0.0	
Queue Delay		0.0	0.0	0.0	0.5		0.0	0.0	0.0		0.0	
Total Delay		39.1	1.0	43.9	10.6		46.3	29.5	21.2		0.0	
LOS		D	A	D	B		D	C	C		A	
Approach Delay		33.4			15.6			37.1			0.0	
Approach LOS		C			B			D			A	

Lanes, Volumes, Timings
 18: Assembly St./Assembly & Elmwood Avenue

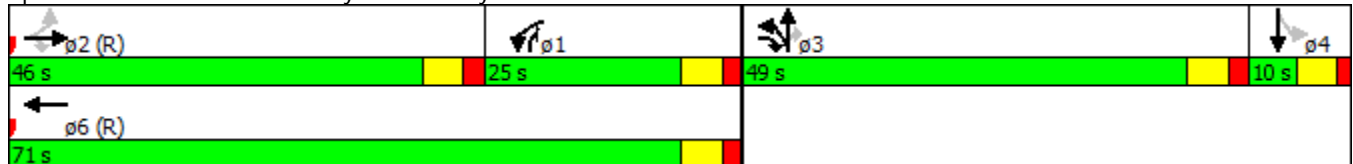


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		450	1	152	147		407	5	293		0	
Queue Length 95th (ft)		#634	19	m201	282		496	18	440		0	
Internal Link Dist (ft)		2442			429			505			352	
Turn Bay Length (ft)			275	150								
Base Capacity (vph)		1950	1115	607	3038		1241	585	874		196	
Starvation Cap Reductn		0	0	0	561		0	0	0		0	
Spillback Cap Reductn		0	0	0	0		0	0	0		0	
Storage Cap Reductn		0	0	0	0		0	0	0		0	
Reduced v/c Ratio		0.82	0.25	0.57	0.79		0.83	0.02	0.68		0.01	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 28 (22%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 27.4
 Intersection LOS: C
 Intersection Capacity Utilization 95.6%
 ICU Level of Service F
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Assembly St./Assembly & Elmwood Avenue



Lanes, Volumes, Timings
19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
2015 Existing PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑↑	↖	↖	↑↑↑		↖	↑↑	↖	↖	↑↓	↖
Traffic Volume (vph)	468	1438	68	12	1421	86	136	449	47	144	189	451
Future Volume (vph)	468	1438	68	12	1421	86	136	449	47	144	189	451
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		175	150		0	200		0	175		425
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	75			75			100			75		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850		0.991				0.850		0.939	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	1770	5040	0	1770	3539	1583	1770	3183	1441
Flt Permitted	0.950			0.165			0.291			0.192		
Satd. Flow (perm)	3433	5085	1583	307	5040	0	542	3539	1583	358	3183	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			76		9				126		94	83
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		509			563			693			3655	
Travel Time (s)		11.6			12.8			15.8			83.1	
Peak Hour Factor	0.91	0.97	0.90	0.90	0.95	0.90	0.90	0.90	0.90	0.90	0.95	0.90
Adj. Flow (vph)	514	1482	76	13	1496	96	151	499	52	160	199	501
Shared Lane Traffic (%)												27%
Lane Group Flow (vph)	514	1482	76	13	1592	0	151	499	52	160	334	366
Turn Type	Prot	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	pm+ov
Protected Phases	5	2	3		6		3	8		7	4	5
Permitted Phases			2	6			8		8	4		4
Detector Phase	5	2	3	6	6		3	8	8	7	4	5
Switch Phase												
Minimum Initial (s)	11.0	16.0	11.0	16.0	16.0		11.0	16.0	16.0	11.0	16.0	11.0
Minimum Split (s)	17.0	30.0	17.0	30.0	30.0		17.0	30.0	30.0	17.0	30.0	17.0
Total Split (s)	32.0	84.0	20.0	52.0	52.0		20.0	29.0	29.0	17.0	26.0	32.0
Total Split (%)	24.6%	64.6%	15.4%	40.0%	40.0%		15.4%	22.3%	22.3%	13.1%	20.0%	24.6%
Maximum Green (s)	26.0	78.0	14.0	46.0	46.0		14.0	23.0	23.0	11.0	20.0	26.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0	-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lead	Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	C-Max	C-Max		None	None	None	None	None	None
Act Effct Green (s)	28.0	83.4	102.2	53.4	53.4		42.0	25.6	25.6	38.8	23.8	53.8
Actuated g/C Ratio	0.22	0.64	0.79	0.41	0.41		0.32	0.20	0.20	0.30	0.18	0.41
v/c Ratio	0.70	0.45	0.06	0.10	0.77		0.45	0.71	0.13	0.59	0.51	0.57
Control Delay	66.4	8.8	0.1	18.2	26.6		36.5	55.0	0.6	41.8	36.8	25.5
Queue Delay	0.0	0.2	0.0	0.0	0.2		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.4	9.0	0.1	18.2	26.7		36.5	55.0	0.6	41.8	36.8	25.5
LOS	E	A	A	B	C		D	D	A	D	D	C
Approach Delay		22.9			26.7			47.0			32.9	
Approach LOS		C			C			D			C	

Lanes, Volumes, Timings
19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
2015 Existing PM

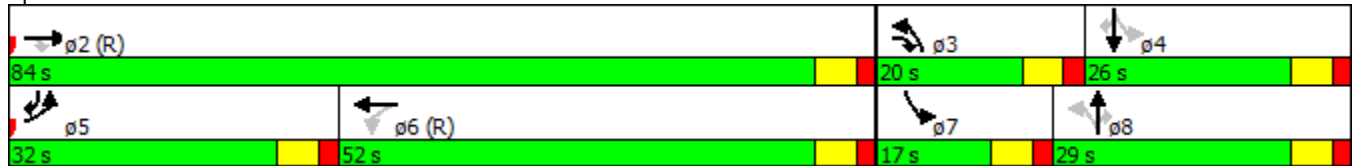


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	230	121	0	4	471		92	205	0	98	99	190
Queue Length 95th (ft)	m286	205	m0	m9	540		148	267	0	156	152	302
Internal Link Dist (ft)		429			483			613			3575	
Turn Bay Length (ft)	175		175	150			200			175		425
Base Capacity (vph)	792	3260	1274	126	2074		347	735	428	269	669	665
Starvation Cap Reductn	0	780	0	0	66		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	46		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.60	0.06	0.10	0.79		0.44	0.68	0.12	0.59	0.50	0.55

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 120 (92%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 28.9
 Intersection LOS: C
 Intersection Capacity Utilization 78.6%
 ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Main St. & Elmwood Avenue



Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2015 Existing PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕↕↕		↖	↕↕↕		↖	↕	↗		↕↕	
Traffic Volume (vph)	9	1305	80	29	1457	9	83	243	194	4	41	12
Future Volume (vph)	9	1305	80	29	1457	9	83	243	194	4	41	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	75		0	200		0	75		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			50			100			50		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.991			0.999				0.850		0.969	
Flt Protected	0.950			0.950			0.950				0.997	
Satd. Flow (prot)	1770	5040	0	1770	5080	0	1770	1863	1583	0	3419	0
Flt Permitted	0.129			0.135			0.714				0.937	
Satd. Flow (perm)	240	5040	0	251	5080	0	1330	1863	1583	0	3213	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			1				54		13	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		563			1012			3133			1095	
Travel Time (s)		12.8			23.0			71.2			24.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	10	1450	89	32	1567	10	92	270	216	4	46	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	1539	0	32	1577	0	92	270	216	0	63	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		6	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	86.0	86.0		86.0	86.0		44.0	44.0	44.0	44.0	44.0	
Total Split (%)	66.2%	66.2%		66.2%	66.2%		33.8%	33.8%	33.8%	33.8%	33.8%	
Maximum Green (s)	80.0	80.0		80.0	80.0		38.0	38.0	38.0	38.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0		-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0		2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None	None	None	None	
Act Effct Green (s)	97.3	97.3		97.3	97.3		28.7	28.7	28.7		28.7	
Actuated g/C Ratio	0.75	0.75		0.75	0.75		0.22	0.22	0.22		0.22	
v/c Ratio	0.06	0.41		0.17	0.41		0.31	0.66	0.55		0.09	
Control Delay	2.3	2.2		9.1	9.1		43.6	53.4	37.8		30.3	
Queue Delay	0.0	0.1		0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	2.3	2.3		9.1	9.1		43.6	53.4	37.8		30.3	
LOS	A	A		A	A		D	D	D		C	
Approach Delay		2.3			9.1			46.0			30.3	
Approach LOS		A			A			D			C	

Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2015 Existing PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	0	12		9	81		66	210	122		17	
Queue Length 95th (ft)	m3	220		m12	m230		108	279	188		34	
Internal Link Dist (ft)		483			932			3053			1015	
Turn Bay Length (ft)	200			75			200					
Base Capacity (vph)	179	3777		188	3804		429	601	547		1046	
Starvation Cap Reductn	0	704		0	0		0	0	0		0	
Spillback Cap Reductn	0	0		0	125		0	0	0		0	
Storage Cap Reductn	0	0		0	0		0	0	0		0	
Reduced v/c Ratio	0.06	0.50		0.17	0.43		0.21	0.45	0.39		0.06	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 18 (14%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 12.3
 Intersection LOS: B
 Intersection Capacity Utilization 63.7%
 ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 20: Sumter St. & Elmwood Avenue





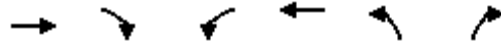
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	300	10	5	263	29	28
Future Volume (vph)	300	10	5	263	29	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	225		125	0
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.995					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1853	0	1770	1863	1770	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1853	0	1770	1863	1770	1583
Link Speed (mph)	35			35	35	
Link Distance (ft)	905			434	538	
Travel Time (s)	17.6			8.5	10.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	316	11	5	277	31	29
Shared Lane Traffic (%)						
Lane Group Flow (vph)	327	0	5	277	31	29
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	26.4%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 21: Barnwell St. & Calhoun St.

Bull Street Commons Traffic Study
 2015 Existing PM



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻		↻	↻	↻	↻
Traffic Volume (veh/h)	300	10	5	263	29	28
Future Volume (Veh/h)	300	10	5	263	29	28
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	316	11	5	277	31	29
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		TWLTL			
Median storage (veh)	2					
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			327		608	322
vC1, stage 1 conf vol					322	
vC2, stage 2 conf vol					287	
vCu, unblocked vol			327		608	322
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		95	96
cM capacity (veh/h)			1233		634	719

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	327	5	277	31	29
Volume Left	0	5	0	31	0
Volume Right	11	0	0	0	29
cSH	1700	1233	1700	634	719
Volume to Capacity	0.19	0.00	0.16	0.05	0.04
Queue Length 95th (ft)	0	0	0	4	3
Control Delay (s)	0.0	7.9	0.0	11.0	10.2
Lane LOS	A		B		
Approach Delay (s)	0.0	0.1	10.6		
Approach LOS	B				

Intersection Summary					
Average Delay	1.0				
Intersection Capacity Utilization	26.4%		ICU Level of Service		A
Analysis Period (min)	15				

Lanes, Volumes, Timings
 26: Colonial Drive & Mental Health Dwy



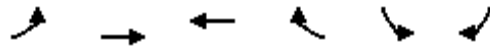
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	250	374	1	121	31
Future Volume (vph)	5	250	374	1	121	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.972	
Flt Protected	0.950				0.962	
Satd. Flow (prot)	1770	1863	1863	0	1742	0
Flt Permitted	0.950				0.962	
Satd. Flow (perm)	1770	1863	1863	0	1742	0
Link Speed (mph)		35	35		30	
Link Distance (ft)		736	1232		233	
Travel Time (s)		14.3	24.0		5.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	263	394	1	127	33
Shared Lane Traffic (%)						
Lane Group Flow (vph)	5	263	395	0	160	0
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	35.0%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 26: Colonial Drive & Mental Health Dwy

Bull Street Commons Traffic Study
 2015 Existing PM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↗		↙	↘
Traffic Volume (veh/h)	5	250	374	1	121	31
Future Volume (Veh/h)	5	250	374	1	121	31
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	263	394	1	127	33
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		736				
pX, platoon unblocked						
vC, conflicting volume	395				668	394
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	395				668	394
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				70	95
cM capacity (veh/h)	1164				422	655
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	5	263	395	160		
Volume Left	5	0	0	127		
Volume Right	0	0	1	33		
cSH	1164	1700	1700	455		
Volume to Capacity	0.00	0.15	0.23	0.35		
Queue Length 95th (ft)	0	0	0	39		
Control Delay (s)	8.1	0.0	0.0	17.1		
Lane LOS	A			C		
Approach Delay (s)	0.2		0.0	17.1		
Approach LOS				C		
Intersection Summary						
Average Delay			3.4			
Intersection Capacity Utilization			35.0%		ICU Level of Service	A
Analysis Period (min)			15			

2016 Background Conditions

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2016 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	4	3	153	18	36	23	556	542	409	2168	19
Future Volume (vph)	8	4	3	153	18	36	23	556	542	409	2168	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		200	675		0	175		0	200		250
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100			75			50			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt		0.936			0.900				0.850		0.999	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3313	0	3433	1666	0	1770	3539	1583	1770	5080	0
Flt Permitted	0.950			0.950			0.058			0.356		
Satd. Flow (perm)	1770	3313	0	3433	1666	0	108	3539	1583	663	5080	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			40				505		2	
Link Speed (mph)		30			40			40			45	
Link Distance (ft)		552			905			1206			1658	
Travel Time (s)		12.5			15.4			20.6			25.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.92	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	9	4	3	170	20	40	26	598	602	454	2357	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	9	7	0	170	60	0	26	598	602	454	2378	0
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	4	4		3	3			2	3	1	6	
Permitted Phases							2		2	6		
Detector Phase	4	4		3	3		2	2	3	1	6	
Switch Phase												
Minimum Initial (s)	14.0	14.0		11.0	11.0		16.0	16.0	11.0	11.0	16.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		30.0	30.0	20.0	17.0	30.0	
Total Split (s)	20.0	20.0		27.0	27.0		48.0	48.0	27.0	35.0	83.0	
Total Split (%)	15.4%	15.4%		20.8%	20.8%		36.9%	36.9%	20.8%	26.9%	63.8%	
Maximum Green (s)	14.0	14.0		21.0	21.0		42.0	42.0	21.0	29.0	77.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag	Lead	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	None	None	C-Max	
Act Effct Green (s)	18.0	18.0		17.6	17.6		76.3	76.3	95.8	100.4	100.4	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.59	0.59	0.74	0.77	0.77	
v/c Ratio	0.04	0.02		0.37	0.23		0.41	0.29	0.46	0.65	0.61	
Control Delay	49.1	39.0		40.2	15.8		35.5	4.4	4.9	11.1	9.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	49.1	39.0		40.2	15.8		35.5	4.4	4.9	11.1	9.1	
LOS	D	D		D	B		D	A	A	B	A	
Approach Delay		44.7			33.8			5.3			9.4	

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2016 Background AM

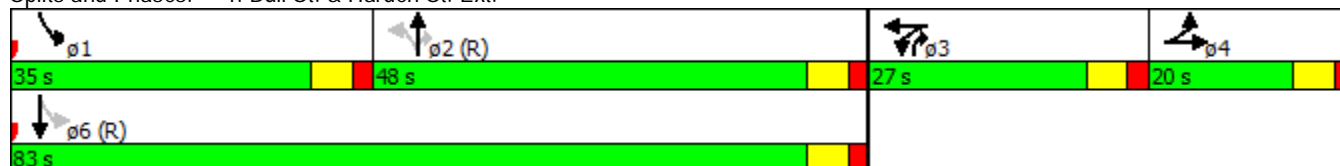


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			C			A			A	
Queue Length 50th (ft)	7	1		69	17		3	31	21	62	167	
Queue Length 95th (ft)	24	9		88	23		#59	138	520	235	505	
Internal Link Dist (ft)		472			825			1126			1578	
Turn Bay Length (ft)	100			675			175			200		
Base Capacity (vph)	245	461		660	352		63	2075	1361	793	3924	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.04	0.02		0.26	0.17		0.41	0.29	0.44	0.57	0.61	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 9.7
 Intersection LOS: A
 Intersection Capacity Utilization 77.9%
 ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Bull St. & Harden St. Ext.



Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

Bull Street Commons Traffic Study
2016 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	2	12	15	11	7	15	1153	77	65	2257	2
Future Volume (vph)	5	2	12	15	11	7	15	1153	77	65	2257	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	200		0	200		0	150		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			100			100			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Frt		0.870			0.940				0.850			
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1621	0	1770	1751	0	1770	5085	1583	1770	5085	0
Flt Permitted	0.744			0.258			0.043			0.197		
Satd. Flow (perm)	1386	1621	0	481	1751	0	80	5085	1583	367	5085	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		602			715			682			1206	
Travel Time (s)		13.7			16.3			11.6			20.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.94	0.90
Adj. Flow (vph)	6	2	13	17	12	8	17	1227	86	72	2401	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	15	0	17	20	0	17	1227	86	72	2403	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			3			2			6	
Permitted Phases	4			3			2		2	6		
Detector Phase	4	4		3	3		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	26.0	26.0		29.0	29.0		75.0	75.0	75.0	75.0	75.0	
Total Split (%)	20.0%	20.0%		22.3%	22.3%		57.7%	57.7%	57.7%	57.7%	57.7%	
Maximum Green (s)	20.0	20.0		23.0	23.0		69.0	69.0	69.0	69.0	69.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Act Effct Green (s)	20.0	20.0		21.9	21.9		104.9	104.9	104.9	104.9	104.9	
Actuated g/C Ratio	0.15	0.15		0.17	0.17		0.81	0.81	0.81	0.81	0.81	
v/c Ratio	0.03	0.06		0.21	0.07		0.27	0.30	0.07	0.24	0.59	
Control Delay	47.4	47.9		52.3	44.7		19.4	2.2	2.7	11.9	9.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	47.4	47.9		52.3	44.7		19.4	2.2	2.7	11.9	9.1	
LOS	D	D		D	D		B	A	A	B	A	
Approach Delay		47.7			48.2			2.5			9.2	
Approach LOS		D			D			A			A	

Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

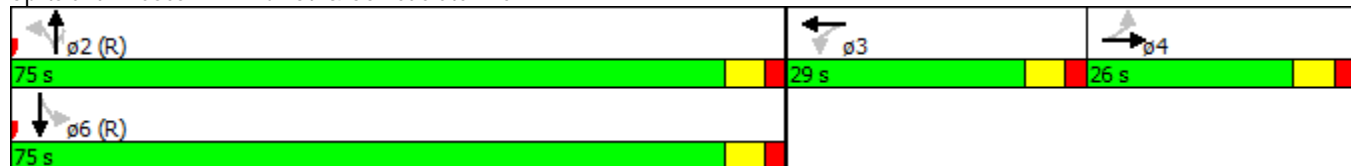


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	4	11		13	15		1	20	4	10	183	
Queue Length 95th (ft)	18	33		36	37		m7	61	18	m52	404	
Internal Link Dist (ft)		522			635			602			1126	
Turn Bay Length (ft)	150			200			200			150		
Base Capacity (vph)	255	299		99	363		64	4104	1277	296	4104	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.02	0.05		0.17	0.06		0.27	0.30	0.07	0.24	0.59	

Intersection Summary

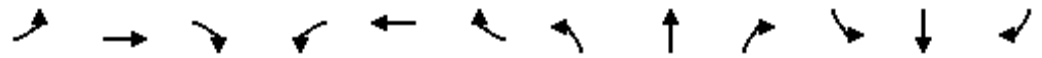
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 113 (87%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.59
 Intersection Signal Delay: 7.4
 Intersection LOS: A
 Intersection Capacity Utilization 74.0%
 ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bull St. & Confederate Ave.



Lanes, Volumes, Timings
3: Bull St. & Colonial Drive

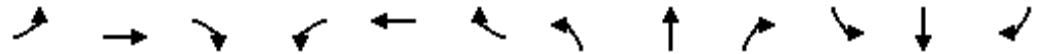
Bull Street Commons Traffic Study
2016 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗	↖	↔			↑↑↑		↘	↑↑↑	
Traffic Volume (vph)	0	0	5	189	1	9	0	1261	359	19	2171	10
Future Volume (vph)	0	0	5	189	1	9	0	1261	359	19	2171	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	150		0	0		0	200		0
Storage Lanes	0		1	1		0	0		0	1		0
Taper Length (ft)	25			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.865		0.986			0.967			0.999	
Flt Protected				0.950	0.957					0.950		
Satd. Flow (prot)	0	0	1611	1681	1670	0	0	4917	0	1770	5080	0
Flt Permitted				0.950	0.957					0.117		
Satd. Flow (perm)	0	0	1611	1681	1670	0	0	4917	0	218	5080	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)			25		4			141				
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		440			725			472			682	
Travel Time (s)		8.6			14.1			8.0			11.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.96	0.90	0.93	0.90
Adj. Flow (vph)	0	0	6	210	1	10	0	1327	374	21	2334	11
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	0	0	6	111	110	0	0	1701	0	21	2345	0
Turn Type			Perm	Perm	NA			NA		Perm	NA	
Protected Phases					8			2			6	
Permitted Phases			4	8						6		
Detector Phase			4	8	8			2		6	6	
Switch Phase												
Minimum Initial (s)			16.0	16.0	16.0			16.0		16.0	16.0	
Minimum Split (s)			30.0	30.0	30.0			30.0		30.0	30.0	
Total Split (s)			34.0	34.0	34.0			96.0		96.0	96.0	
Total Split (%)			26.2%	26.2%	26.2%			73.8%		73.8%	73.8%	
Maximum Green (s)			28.0	28.0	28.0			90.0		90.0	90.0	
Yellow Time (s)			4.0	4.0	4.0			4.0		4.0	4.0	
All-Red Time (s)			2.0	2.0	2.0			2.0		2.0	2.0	
Lost Time Adjust (s)			-4.0	-4.0	-4.0			-4.0		-4.0	-4.0	
Total Lost Time (s)			2.0	2.0	2.0			2.0		2.0	2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)			3.0	3.0	3.0			3.0		3.0	3.0	
Recall Mode			None	None	None			C-Max		C-Max	C-Max	
Act Effct Green (s)			20.7	20.7	20.7			105.3		105.3	105.3	
Actuated g/C Ratio			0.16	0.16	0.16			0.81		0.81	0.81	
v/c Ratio			0.02	0.42	0.41			0.42		0.12	0.57	
Control Delay			0.2	58.9	56.8			7.9		2.3	3.7	
Queue Delay			0.0	0.0	0.0			0.0		0.0	0.3	
Total Delay			0.2	58.9	56.8			7.9		2.3	4.0	
LOS			A	E	E			A		A	A	
Approach Delay					57.8			7.9			4.0	
Approach LOS					E			A			A	

Lanes, Volumes, Timings
3: Bull St. & Colonial Drive

Bull Street Commons Traffic Study
2016 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)			0	88	84			293		6	275	
Queue Length 95th (ft)			0	132	129			266		m0	1	
Internal Link Dist (ft)		360			645			392			602	
Turn Bay Length (ft)				150						200		
Base Capacity (vph)			415	413	414			4011		176	4116	
Starvation Cap Reductn			0	0	0			0		0	996	
Spillback Cap Reductn			0	0	0			0		0	0	
Storage Cap Reductn			0	0	0			0		0	0	
Reduced v/c Ratio			0.01	0.27	0.27			0.42		0.12	0.75	

Intersection Summary

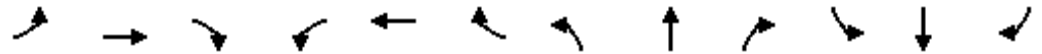
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.57
 Intersection Signal Delay: 8.3
 Intersection LOS: A
 Intersection Capacity Utilization 78.8%
 ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Bull St. & Colonial Drive



Lanes, Volumes, Timings
4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2016 Background AM



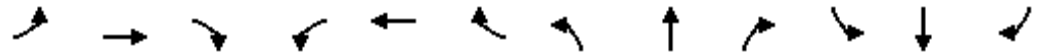
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↕	↕↕↕		↕	↕↕↕	
Traffic Volume (vph)	1	0	3	2	0	1	1	1589	1	0	2325	5
Future Volume (vph)	1	0	3	2	0	1	1	1589	1	0	2325	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			75			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt		0.899			0.955							
Flt Protected		0.988			0.968		0.950					
Satd. Flow (prot)	0	1655	0	0	1722	0	1770	5085	0	1863	5085	0
Flt Permitted		0.988			0.968		0.950					
Satd. Flow (perm)	0	1655	0	0	1722	0	1770	5085	0	1863	5085	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		341			529			443			472	
Travel Time (s)		6.6			10.3			7.6			8.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.97	0.90
Adj. Flow (vph)	1	0	3	2	0	1	1	1673	1	0	2397	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	4	0	0	3	0	1	1674	0	0	2403	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	55.0%
Analysis Period (min)	15
	ICU Level of Service B

HCM Unsignalized Intersection Capacity Analysis
4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2016 Background AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕			↕		↕	↑↑↑		↕	↑↑↑		
Traffic Volume (veh/h)	1	0	3	2	0	1	1	1589	1	0	2325	5	
Future Volume (Veh/h)	1	0	3	2	0	1	1	1589	1	0	2325	5	
Sign Control		Stop			Stop			Free			Free		
Grade		0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.97	0.90	
Hourly flow rate (vph)	1	0	3	2	0	1	1	1673	1	0	2397	6	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type													
Median storage veh													
Upstream signal (ft)													
pX, platoon unblocked	0.83	0.83	0.83	0.83	0.83		0.83						
vC, conflicting volume	2961	4076	802	2478	4078	558	2403			1674			
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	2654	3991	65	2074	3994	558	1985			1674			
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1			
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2			
p0 queue free %	89	100	100	92	100	100	100			100			
cM capacity (veh/h)	9	2	822	26	2	473	239			379			
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4			
Volume Total	4	3	1	669	669	336	0	959	959	485			
Volume Left	1	2	1	0	0	0	0	0	0	0			
Volume Right	3	1	0	0	0	1	0	0	0	6			
cSH	35	37	239	1700	1700	1700	1700	1700	1700	1700			
Volume to Capacity	0.11	0.08	0.00	0.39	0.39	0.20	0.00	0.56	0.56	0.29			
Queue Length 95th (ft)	9	6	0	0	0	0	0	0	0	0			
Control Delay (s)	118.9	109.2	20.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Lane LOS	F	F	C										
Approach Delay (s)	118.9	109.2	0.0										
Approach LOS	F	F											
Intersection Summary													
Average Delay			0.2										
Intersection Capacity Utilization			55.0%	ICU Level of Service					B				
Analysis Period (min)			15										

Lanes, Volumes, Timings
5: Bull St. & Jefferson Street



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	4	8	1	1559	2338	6
Future Volume (vph)	4	8	1	1559	2338	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	175			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		100			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Frt	0.907					
Flt Protected	0.985		0.950			
Satd. Flow (prot)	1664	0	1770	5085	5085	0
Flt Permitted	0.985		0.950			
Satd. Flow (perm)	1664	0	1770	5085	5085	0
Link Speed (mph)	35			40	40	
Link Distance (ft)	410			712	443	
Travel Time (s)	8.0			12.1	7.6	
Peak Hour Factor	0.90	0.90	0.90	0.94	0.97	0.90
Adj. Flow (vph)	4	9	1	1659	2410	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	13	0	1	1659	2417	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	55.3%
Analysis Period (min)	15
	ICU Level of Service B

HCM Unsignalized Intersection Capacity Analysis
 5: Bull St. & Jefferson Street

Bull Street Commons Traffic Study
 2016 Background AM



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	8	1	1559	2338	6
Future Volume (Veh/h)	4	8	1	1559	2338	6
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.94	0.97	0.90
Hourly flow rate (vph)	4	9	1	1659	2410	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	None	
Median storage (veh)				2		
Upstream signal (ft)				712	915	
pX, platoon unblocked	0.84	0.83	0.83			
vC, conflicting volume	2968	807	2417			
vC1, stage 1 conf vol	2414					
vC2, stage 2 conf vol	555					
vCu, unblocked vol	2562	62	1997			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	99	100			
cM capacity (veh/h)	74	824	236			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	13	1	553	553	553	964	964	489
Volume Left	4	1	0	0	0	0	0	0
Volume Right	9	0	0	0	0	0	0	7
cSH	200	236	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.07	0.00	0.33	0.33	0.33	0.57	0.57	0.29
Queue Length 95th (ft)	5	0	0	0	0	0	0	0
Control Delay (s)	24.3	20.3	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C	C						
Approach Delay (s)	24.3	0.0				0.0		
Approach LOS	C							

Intersection Summary		
Average Delay		0.1
Intersection Capacity Utilization	55.3%	ICU Level of Service
Analysis Period (min)	15	B

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
2016 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘		↙		↖	↗		↘	↙	↖
Traffic Volume (vph)	1031	57	828	2	6	4	334	539	68	32	1204	1111
Future Volume (vph)	1031	57	828	2	6	4	334	539	68	32	1204	1111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	775		0	125		0	175		0	100		0
Storage Lanes	1		2	1		0	1		0	1		1
Taper Length (ft)	50			50			125			50		
Lane Util. Factor	0.95	0.95	0.88	0.95	0.95	0.95	0.97	0.95	0.95	1.00	0.91	0.91
Frt			0.850		0.954			0.983				0.850
Flt Protected	0.950	0.957			0.992		0.950			0.950		
Satd. Flow (prot)	1681	1694	2787	0	3349	0	3433	3479	0	1770	3390	1441
Flt Permitted	0.950	0.957			0.992		0.950			0.395		
Satd. Flow (perm)	1681	1694	2787	0	3349	0	3433	3479	0	736	3390	1441
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			40	
Link Distance (ft)		1012			379			526			712	
Travel Time (s)		23.0			8.6			12.0			12.1	
Peak Hour Factor	0.97	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.90	0.94	0.97
Adj. Flow (vph)	1063	63	920	2	7	4	367	599	76	36	1281	1145
Shared Lane Traffic (%)	50%											0%
Lane Group Flow (vph)	531	595	920	0	13	0	367	675	0	36	1281	1145
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Perm	NA	pm+ov
Protected Phases	4	4	5	3	3		5	2			6	4
Permitted Phases			4							6		6
Detector Phase	4	4	5	3	3		5	2		6	6	4
Switch Phase												
Minimum Initial (s)	16.0	16.0	11.0	5.0	5.0		11.0	16.0		16.0	16.0	16.0
Minimum Split (s)	30.0	30.0	17.0	12.0	12.0		17.0	30.0		30.0	30.0	30.0
Total Split (s)	53.0	53.0	17.0	12.0	12.0		17.0	65.0		48.0	48.0	53.0
Total Split (%)	40.8%	40.8%	13.1%	9.2%	9.2%		13.1%	50.0%		36.9%	36.9%	40.8%
Maximum Green (s)	47.0	47.0	11.0	6.0	6.0		11.0	59.0		42.0	42.0	47.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0		-4.0		-4.0	-4.0		-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0		2.0		2.0	2.0		2.0	2.0	2.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max		C-Max	C-Max	None
Act Effct Green (s)	51.0	51.0	68.0		9.8		15.0	70.2		53.2	53.2	105.4
Actuated g/C Ratio	0.39	0.39	0.52		0.08		0.12	0.54		0.41	0.41	0.81
v/c Ratio	0.81	0.90	0.63		0.05		0.93	0.36		0.12	0.92	0.98
Control Delay	36.2	44.9	18.8		56.2		79.8	18.0		28.8	43.4	35.1
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	36.2	44.9	18.8		56.2		79.8	18.0		28.8	43.4	35.1
LOS	D	D	B		E		E	B		C	D	D
Approach Delay		30.9			56.3			39.8			39.3	
Approach LOS		C			E			D			D	

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

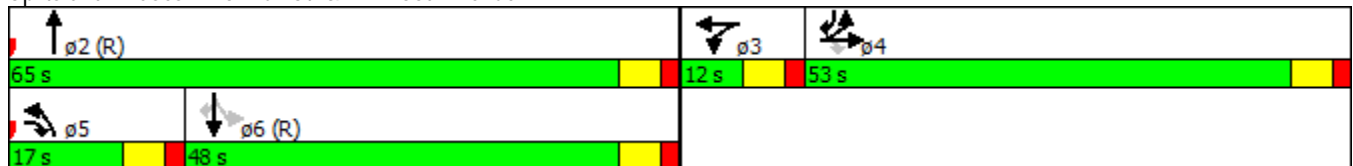


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	413	502	289		5		162	181		10	232	543
Queue Length 95th (ft)	593	#737	459		16		#257	266		m30	#804	#1500
Internal Link Dist (ft)		932			299			446			632	
Turn Bay Length (ft)	775						175			100		
Base Capacity (vph)	659	664	1457		257		396	1878		301	1387	1168
Starvation Cap Reductn	0	0	0		0		0	0		0	0	0
Spillback Cap Reductn	0	0	0		0		0	0		0	0	0
Storage Cap Reductn	0	0	0		0		0	0		0	0	0
Reduced v/c Ratio	0.81	0.90	0.63		0.05		0.93	0.36		0.12	0.92	0.98

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 126 (97%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.98
 Intersection Signal Delay: 36.4 Intersection LOS: D
 Intersection Capacity Utilization 101.4% ICU Level of Service G
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Bull St. & Elmwood Avenue



Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

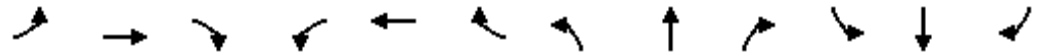
Bull Street Commons Traffic Study
2016 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	201	82	15	139	116	24	759	18	161	1802	93
Future Volume (vph)	82	201	82	15	139	116	24	759	18	161	1802	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	50			50			75			75		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.957			0.931			0.997				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3387	0	1770	3295	0	1770	3529	0	1770	3539	1583
Flt Permitted	0.400			0.357			0.076			0.304		
Satd. Flow (perm)	745	3387	0	665	3295	0	142	3529	0	566	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		34			129			5				103
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1044			459			1901				526
Travel Time (s)		23.7			10.4			43.2				12.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.94	0.90
Adj. Flow (vph)	91	223	91	17	151	129	27	843	20	179	1917	103
Shared Lane Traffic (%)												
Lane Group Flow (vph)	91	314	0	17	280	0	27	863	0	179	1917	103
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	16.0
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	30.0
Total Split (s)	31.0	31.0		31.0	31.0		99.0	99.0		99.0	99.0	99.0
Total Split (%)	23.8%	23.8%		23.8%	23.8%		76.2%	76.2%		76.2%	76.2%	76.2%
Maximum Green (s)	25.0	25.0		25.0	25.0		93.0	93.0		93.0	93.0	93.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	24.0	24.0		24.0	24.0		102.0	102.0		102.0	102.0	102.0
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.78	0.78		0.78	0.78	0.78
v/c Ratio	0.66	0.48		0.14	0.39		0.24	0.31		0.40	0.69	0.08
Control Delay	71.6	44.0		46.6	25.8		10.8	4.6		5.7	6.9	0.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.6	0.0
Total Delay	71.6	44.0		46.6	25.8		10.8	4.6		5.7	7.5	0.6
LOS	E	D		D	C		B	A		A	A	A
Approach Delay		50.2			27.0			4.8			7.0	
Approach LOS		D			C			A			A	

Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

Bull Street Commons Traffic Study
2016 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	72	112		12	56		5	89		53	328	4
Queue Length 95th (ft)	131	152		35	100		23	137		m41	296	m4
Internal Link Dist (ft)		964			379			1821			446	
Turn Bay Length (ft)	150			175			150			150		
Base Capacity (vph)	166	781		148	835		111	2768		443	2775	1263
Starvation Cap Reductn	0	0		0	0		0	0		0	435	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.55	0.40		0.11	0.34		0.24	0.31		0.40	0.82	0.08

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 106 (82%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 12.7
 Intersection LOS: B
 Intersection Capacity Utilization 103.1%
 ICU Level of Service G
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Bull St. & Calhoun St.



Lanes, Volumes, Timings
9: Harden Street Ext/Harden St. Ext. & Colonial Drive

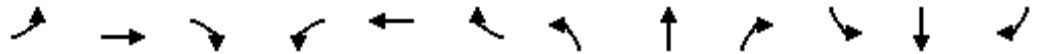
Bull Street Commons Traffic Study
2016 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	169	65	696	310	98	147	489	339	19	440	50
Future Volume (vph)	34	169	65	696	310	98	147	489	339	19	440	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		800	175		0	225		0	300		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	100			75			75			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.958			0.964				0.850		0.985	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3391	0	3433	3412	0	1770	3539	1583	1770	3486	0
Flt Permitted	0.491			0.950			0.381			0.395		
Satd. Flow (perm)	915	3391	0	3433	3412	0	710	3539	1583	736	3486	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		39			50				377			12
Link Speed (mph)		35			35			35				40
Link Distance (ft)		1013			300			483				2110
Travel Time (s)		19.7			5.8			9.4				36.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.90	0.90
Adj. Flow (vph)	38	188	72	773	344	109	163	520	377	21	489	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	260	0	773	453	0	163	520	377	21	545	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Free	Perm	NA	
Protected Phases		8		7	4			6				2
Permitted Phases	8						6		Free	2		
Detector Phase	8	8		7	4		6	6		2		2
Switch Phase												
Minimum Initial (s)	16.0	16.0		11.0	16.0		16.0	16.0		16.0		16.0
Minimum Split (s)	30.0	30.0		17.0	30.0		30.0	30.0		30.0		30.0
Total Split (s)	30.0	30.0		41.0	71.0		59.0	59.0		59.0		59.0
Total Split (%)	23.1%	23.1%		31.5%	54.6%		45.4%	45.4%		45.4%		45.4%
Maximum Green (s)	24.0	24.0		35.0	65.0		53.0	53.0		53.0		53.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0		-4.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0		3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max		C-Max
Act Effct Green (s)	20.4	20.4		36.9	59.3		66.7	66.7	130.0	66.7		66.7
Actuated g/C Ratio	0.16	0.16		0.28	0.46		0.51	0.51	1.00	0.51		0.51
v/c Ratio	0.27	0.46		0.79	0.29		0.45	0.29	0.24	0.06		0.30
Control Delay	37.1	29.3		38.6	18.1		21.5	16.7	0.3	25.8		26.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	37.1	29.3		38.6	18.1		21.5	16.7	0.3	25.8		26.9
LOS	D	C		D	B		C	B	A	C		C
Approach Delay		30.3			31.0			11.6				26.9
Approach LOS		C			C			B				C

Lanes, Volumes, Timings
 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Bull Street Commons Traffic Study
 2016 Background AM

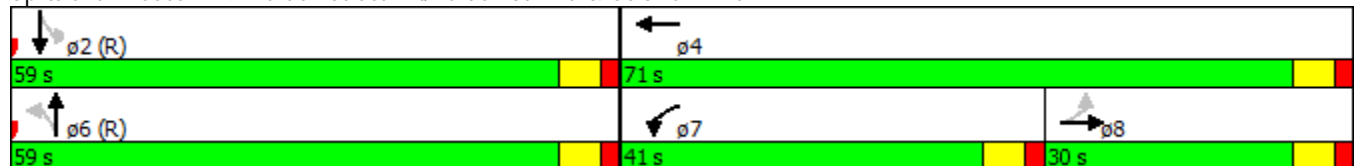


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	32	100		232	114		59	97	0	12	173	
Queue Length 95th (ft)	62	126		327	153		96	128	0	m29	308	
Internal Link Dist (ft)		933			220			403			2030	
Turn Bay Length (ft)	225			175			225			300		
Base Capacity (vph)	197	760		1029	1834		364	1816	1583	377	1795	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.19	0.34		0.75	0.25		0.45	0.29	0.24	0.06	0.30	

Intersection Summary

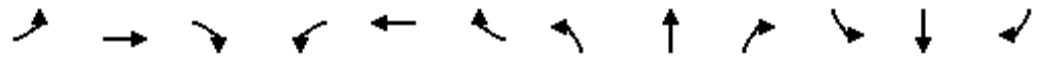
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 121 (93%), Referenced to phase 2:SBTL and 6:NBTL, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 23.7
 Intersection LOS: C
 Intersection Capacity Utilization 73.6%
 ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive



Lanes, Volumes, Timings
10: Harden St./Harden Street Ext & Calhoun St.

Bull Street Commons Traffic Study
2016 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	24	137	6	22	2	169	764	15	39	960	83
Future Volume (vph)	82	24	137	6	22	2	169	764	15	39	960	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	50		0	0		325	300		200
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	100			25			25			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Frt		0.873			0.988			0.997				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1626	0	1770	1840	0	1770	5070	0	1770	3539	1583
Flt Permitted	0.740			0.322			0.268			0.249		
Satd. Flow (perm)	1378	1626	0	600	1840	0	499	5070	0	464	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		152			2			3				82
Link Speed (mph)		30			35			35				35
Link Distance (ft)		820			1149			2515				497
Travel Time (s)		18.6			22.4			49.0				9.7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	91	27	152	7	24	2	188	849	17	43	1067	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	91	179	0	7	26	0	188	866	0	43	1067	92
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	1 2		1	2	2
Switch Phase												
Minimum Initial (s)	1.0	1.0		11.0	11.0		9.0	14.0		9.0	14.0	14.0
Minimum Split (s)	6.5	6.5		30.0	30.0		15.0	30.0		15.0	30.0	30.0
Total Split (s)	35.0	35.0		35.0	35.0		27.0	74.0		21.0	68.0	68.0
Total Split (%)	26.9%	26.9%		26.9%	26.9%		20.8%	56.9%		16.2%	52.3%	52.3%
Maximum Green (s)	29.5	29.5		29.5	29.5		21.0	68.0		15.0	62.0	62.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.5	1.5		1.5	1.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	0.0		0.0	0.0		-3.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	2.5	5.5		5.5	5.5		3.0	3.0		6.0	3.0	3.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	17.5	14.5		14.5	14.5		84.4	71.0		104.0	90.6	90.6
Actuated g/C Ratio	0.13	0.11		0.11	0.11		0.65	0.55		0.80	0.70	0.70
v/c Ratio	0.49	0.57		0.10	0.13		0.41	0.31		0.06	0.43	0.08
Control Delay	47.1	13.6		53.0	48.5		8.3	16.5		3.2	10.0	1.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	47.1	13.6		53.0	48.5		8.3	16.5		3.2	10.0	1.9
LOS	D	B		D	D		A	B		A	A	A
Approach Delay		24.9			49.4			15.0			9.1	
Approach LOS		C			D			B			A	

Lanes, Volumes, Timings
 10: Harden St./Harden Street Ext & Calhoun St.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	74	39		5	19		27	140		6	227	6
Queue Length 95th (ft)	131	106		20	46		51	169		13	315	27
Internal Link Dist (ft)		740			1069			2435			417	
Turn Bay Length (ft)	225			50						300		200
Base Capacity (vph)	344	486		136	419		599	2770		672	2465	1127
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.26	0.37		0.05	0.06		0.31	0.31		0.06	0.43	0.08

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 78 (60%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.57
 Intersection Signal Delay: 13.7
 Intersection LOS: B
 Intersection Capacity Utilization 58.4%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 10: Harden St./Harden Street Ext & Calhoun St.



Lanes, Volumes, Timings
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2016 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	236	35	9	239	9	14	20	11	6	12	36
Future Volume (vph)	33	236	35	9	239	9	14	20	11	6	12	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	275		0	0		0	300		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	100			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.981			0.995			0.968			0.887	
Flt Protected	0.950			0.950				0.984		0.950		
Satd. Flow (prot)	1770	1827	0	1770	1853	0	0	1774	0	1770	1652	0
Flt Permitted	0.950			0.950				0.984		0.950		
Satd. Flow (perm)	1770	1827	0	1770	1853	0	0	1774	0	1770	1652	0
Link Speed (mph)		35			30			35			35	
Link Distance (ft)		679			820			504			3014	
Travel Time (s)		13.2			18.6			9.8			58.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	37	262	39	10	266	10	16	22	12	7	13	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	37	301	0	10	276	0	0	50	0	7	53	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	37.0%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2016 Background AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	236	35	9	239	9	14	20	11	6	12	36
Future Volume (Veh/h)	33	236	35	9	239	9	14	20	11	6	12	36
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	37	262	39	10	266	10	16	22	12	7	13	40
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	TWLTL				TWLTL							
Median storage veh	2				2							
Upstream signal (ft)					820							
pX, platoon unblocked	0.98						0.98	0.98		0.98	0.98	0.98
vC, conflicting volume	276			301			688	652	282	650	666	271
vC1, stage 1 conf vol							356	356		291	291	
vC2, stage 2 conf vol							332	296		359	375	
vCu, unblocked vol	255			301			674	637	282	635	652	250
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			99			97	96	98	99	98	95
cM capacity (veh/h)	1288			1260			508	525	757	533	524	775
Direction, Lane #												
	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total	37	301	10	276	50	7	53					
Volume Left	37	0	10	0	16	7	0					
Volume Right	0	39	0	10	12	0	40					
cSH	1288	1700	1260	1700	560	533	694					
Volume to Capacity	0.03	0.18	0.01	0.16	0.09	0.01	0.08					
Queue Length 95th (ft)	2	0	1	0	7	1	6					
Control Delay (s)	7.9	0.0	7.9	0.0	12.1	11.8	10.6					
Lane LOS	A		A		B	B	B					
Approach Delay (s)	0.9		0.3		12.1	10.8						
Approach LOS					B	B						
Intersection Summary												
Average Delay			2.2									
Intersection Capacity Utilization			37.0%		ICU Level of Service		A					
Analysis Period (min)			15									

Lanes, Volumes, Timings
12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2016 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↗	↘		↗	↘	
Traffic Volume (vph)	11	259	29	69	347	53	6	9	17	6	4	2
Future Volume (vph)	11	259	29	69	347	53	6	9	17	6	4	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		225	50		0
Storage Lanes	0		0	0		0	1		1	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.987			0.984			0.902			0.950	
Flt Protected		0.998			0.993		0.950			0.950		
Satd. Flow (prot)	0	1835	0	0	1820	0	1770	1680	0	1770	1770	0
Flt Permitted		0.998			0.993		0.950			0.950		
Satd. Flow (perm)	0	1835	0	0	1820	0	1770	1680	0	1770	1770	0
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1327			161			3014			569	
Travel Time (s)		25.9			3.1			58.7			11.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	12	288	32	77	377	59	7	10	19	7	4	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	332	0	0	513	0	7	29	0	7	6	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	56.3%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
 2016 Background AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↗	↘		↗	↘	
Traffic Volume (veh/h)	11	259	29	69	347	53	6	9	17	6	4	2
Future Volume (Veh/h)	11	259	29	69	347	53	6	9	17	6	4	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	12	288	32	77	377	59	7	10	19	7	4	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					1174							
pX, platoon unblocked	0.90						0.90	0.90		0.90	0.90	0.90
vC, conflicting volume	436			320			892	918	304	912	904	406
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	321			320			827	855	304	849	840	289
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			94			97	96	97	97	98	100
cM capacity (veh/h)	1118			1240			244	247	736	226	252	677
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	332	513	7	29	7	6						
Volume Left	12	77	7	0	7	0						
Volume Right	32	59	0	19	0	2						
cSH	1118	1240	244	438	226	319						
Volume to Capacity	0.01	0.06	0.03	0.07	0.03	0.02						
Queue Length 95th (ft)	1	5	2	5	2	1						
Control Delay (s)	0.4	1.8	20.2	13.8	21.4	16.5						
Lane LOS	A	A	C	B	C	C						
Approach Delay (s)	0.4	1.8	15.0		19.1							
Approach LOS			C		C							
Intersection Summary												
Average Delay			2.1									
Intersection Capacity Utilization			56.3%		ICU Level of Service				B			
Analysis Period (min)			15									

Lanes, Volumes, Timings
13: Harden Street Ext & Slighs Ave.



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	118	197	873	65	119	1115
Future Volume (vph)	118	197	873	65	119	1115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		50	100	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				50	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1687	1482	3539	1583	1770	3539
Flt Permitted	0.950				0.238	
Satd. Flow (perm)	1687	1482	3539	1583	443	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		219		22		
Link Speed (mph)	30		35			35
Link Distance (ft)	398		2489			483
Travel Time (s)	9.0		48.5			9.4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.95
Heavy Vehicles (%)	7%	9%	2%	2%	2%	2%
Adj. Flow (vph)	131	219	970	72	132	1174
Shared Lane Traffic (%)						
Lane Group Flow (vph)	131	219	970	72	132	1174
Turn Type	Prot	Over	NA	Perm	pm+pt	NA
Protected Phases	4	5	6		5	2
Permitted Phases				6	2	
Detector Phase	4	5	6	6	5	2
Switch Phase						
Minimum Initial (s)	16.0	11.0	16.0	16.0	11.0	16.0
Minimum Split (s)	30.0	17.0	30.0	30.0	17.0	30.0
Total Split (s)	34.0	30.0	66.0	66.0	30.0	96.0
Total Split (%)	26.2%	23.1%	50.8%	50.8%	23.1%	73.8%
Maximum Green (s)	28.0	24.0	60.0	60.0	24.0	90.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0	-2.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0	4.0	2.0	2.0
Lead/Lag		Lead	Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)	21.4	15.9	86.7	84.7	104.6	104.6
Actuated g/C Ratio	0.16	0.12	0.67	0.65	0.80	0.80
v/c Ratio	0.47	0.59	0.41	0.07	0.25	0.41
Control Delay	54.9	13.2	4.0	0.7	3.0	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2
Total Delay	54.9	13.2	4.0	0.7	3.0	2.8
LOS	D	B	A	A	A	A
Approach Delay	28.8		3.8			2.8

Lanes, Volumes, Timings
 13: Harden Street Ext & Slighs Ave.



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	C		A		A	
Queue Length 50th (ft)	103	0	40	0	13	62
Queue Length 95th (ft)	162	74	316	9	m18	66
Internal Link Dist (ft)	318		2409		403	
Turn Bay Length (ft)			50		100	
Base Capacity (vph)	415	491	2358	1038	642	2846
Starvation Cap Reductn	0	0	0	0	0	704
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.45	0.41	0.07	0.21	0.55

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 129 (99%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.59
 Intersection Signal Delay: 6.6
 Intersection LOS: A
 Intersection Capacity Utilization 56.6%
 ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 13: Harden Street Ext & Slighs Ave.



Lanes, Volumes, Timings
14: Colonial Drive & Farrow Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Lane Configurations		↗↗	↖	↑↑	↑↓		
Traffic Volume (vph)	0	172	148	375	874	16	
Future Volume (vph)	0	172	148	375	874	16	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0	330	550			0	
Storage Lanes	0	1	1			0	
Taper Length (ft)	25		125				
Lane Util. Factor	1.00	0.88	1.00	0.95	0.95	0.95	
Frt		0.850			0.997		
Flt Protected			0.950				
Satd. Flow (prot)	0	2787	1770	3539	3529	0	
Flt Permitted			0.950				
Satd. Flow (perm)	0	2787	1770	3539	3529	0	
Right Turn on Red		Yes				No	
Satd. Flow (RTOR)		155					
Link Speed (mph)	35			35	35		
Link Distance (ft)	930			699	2077		
Travel Time (s)	18.1			13.6	40.5		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.91	0.90	
Adj. Flow (vph)	0	191	164	417	960	18	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	191	164	417	978	0	
Turn Type		Over	Prot	NA	NA		
Protected Phases		8	8	8 6	2		6
Permitted Phases							
Detector Phase		8	8	8 6	2		
Switch Phase							
Minimum Initial (s)		16.0	16.0		16.0		16.0
Minimum Split (s)		30.0	30.0		30.0		30.0
Total Split (s)		30.0	30.0		35.0		35.0
Total Split (%)		46.2%	46.2%		53.8%		54%
Maximum Green (s)		24.0	24.0		29.0		29.0
Yellow Time (s)		4.0	4.0		4.0		4.0
All-Red Time (s)		2.0	2.0		2.0		2.0
Lost Time Adjust (s)		-3.0	-3.0		-4.0		
Total Lost Time (s)		3.0	3.0		2.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0	3.0		3.0		3.0
Recall Mode		None	None		C-Max		C-Max
Act Effct Green (s)		19.6	19.6	65.0	40.4		
Actuated g/C Ratio		0.30	0.30	1.00	0.62		
v/c Ratio		0.20	0.31	0.12	0.45		
Control Delay		5.4	15.5	0.1	7.1		
Queue Delay		0.0	0.0	0.0	0.0		
Total Delay		5.4	15.5	0.1	7.1		
LOS		A	B	A	A		
Approach Delay				4.4	7.1		
Approach LOS				A	A		

Lanes, Volumes, Timings
 14: Colonial Drive & Farrow Road

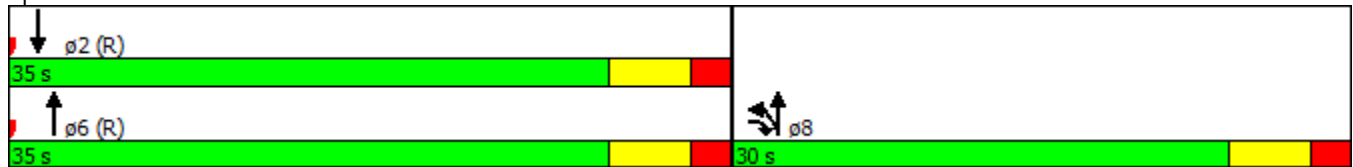


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Queue Length 50th (ft)		5	35	0	191		
Queue Length 95th (ft)		26	78	0	108		
Internal Link Dist (ft)	850			619	1997		
Turn Bay Length (ft)		330	550				
Base Capacity (vph)		1248	735	3539	2193		
Starvation Cap Reductn		0	0	0	0		
Spillback Cap Reductn		0	0	0	0		
Storage Cap Reductn		0	0	0	0		
Reduced v/c Ratio		0.15	0.22	0.12	0.45		

Intersection Summary

Area Type: Other
 Cycle Length: 65
 Actuated Cycle Length: 65
 Offset: 62 (95%), Referenced to phase 2:SBT and 6:NBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.45
 Intersection Signal Delay: 6.0
 Intersection LOS: A
 Intersection Capacity Utilization 44.7%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 14: Colonial Drive & Farrow Road



Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
2016 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	384	4	201	521	183	0	252	128	268	789	65
Future Volume (vph)	14	384	4	201	521	183	0	252	128	268	789	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		0	300		0	0		225	200		0
Storage Lanes	1		0	2		1	0		1	1		0
Taper Length (ft)	125			100			25			125		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.999				0.850			0.850		0.988	
Flt Protected	0.950			0.950						0.950		
Satd. Flow (prot)	1770	3536	0	3433	3539	1583	0	3539	1583	1770	3497	0
Flt Permitted	0.434			0.950						0.520		
Satd. Flow (perm)	808	3536	0	3433	3539	1583	0	3539	1583	969	3497	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				203			143		10	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1518			1183			2077			914	
Travel Time (s)		29.6			23.0			40.5			17.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.90
Adj. Flow (vph)	16	427	4	223	579	203	0	280	142	298	867	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	431	0	223	579	203	0	280	142	298	939	0
Turn Type	Perm	NA		Prot	NA	pm+ov		NA	Free	pm+pt	NA	
Protected Phases		4		3	8	1		2		1	6	
Permitted Phases	4					8			Free	6		
Detector Phase	4	4		3	8	1		2		1	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0	5.0		15.0		5.0	15.0	
Minimum Split (s)	30.0	30.0		21.0	41.0	17.0		41.0		17.0	30.0	
Total Split (s)	33.0	33.0		23.0	56.0	26.0		48.0		26.0	74.0	
Total Split (%)	25.4%	25.4%		17.7%	43.1%	20.0%		36.9%		20.0%	56.9%	
Maximum Green (s)	28.0	28.0		18.0	51.0	21.0		43.0		21.0	69.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5		3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5	1.5		1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0		-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead		Lead		Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Recall Mode	None	None		None	None	None		C-Min		None	C-Min	
Walk Time (s)					18.0			18.0				
Flash Dont Walk (s)					5.0			5.0				
Pedestrian Calls (#/hr)					0			0				
Act Effct Green (s)	22.0	22.0		16.5	42.5	63.9		58.1	130.0	79.5	79.5	
Actuated g/C Ratio	0.17	0.17		0.13	0.33	0.49		0.45	1.00	0.61	0.61	
v/c Ratio	0.12	0.72		0.51	0.50	0.23		0.18	0.09	0.43	0.44	
Control Delay	45.9	57.8		57.4	36.3	2.2		29.9	0.1	17.2	16.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	45.9	57.8		57.4	36.3	2.2		29.9	0.1	17.2	16.8	

Lanes, Volumes, Timings
 15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
 2016 Background AM



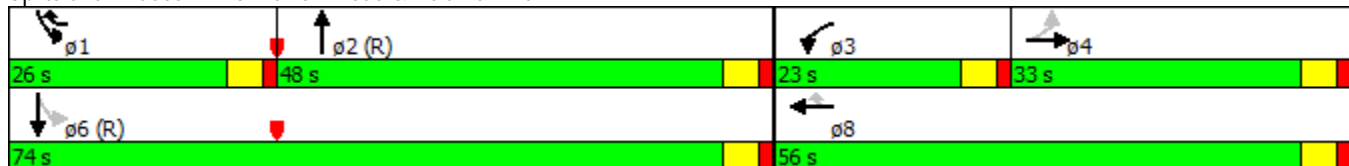
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	E		E	D	A		C	A	B	B	
Approach Delay		57.4			34.1			19.9			16.9	
Approach LOS		E			C			B			B	
Queue Length 50th (ft)	12	182		92	207	0		85	0	121	212	
Queue Length 95th (ft)	33	230		131	241	30		144	0	203	298	
Internal Link Dist (ft)		1438			1103			1997			834	
Turn Bay Length (ft)	175			300					225	200		
Base Capacity (vph)	180	789		501	1415	936		1584	1583	731	2141	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.09	0.55		0.45	0.41	0.22		0.18	0.09	0.41	0.44	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 28.7
 Intersection Capacity Utilization 67.6%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 15: Farrow Road & Beltline Blvd



Lanes, Volumes, Timings
16: Farrow Road & 277 NB RAMPS

Bull Street Commons Traffic Study
2016 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	0	8	0	0	0	0	301	160	41	1155	0
Future Volume (vph)	56	0	8	0	0	0	0	301	160	41	1155	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	0		0	0		0	250		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			25			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.850						0.948				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1770	1583	0	0	0	0	0	3355	0	1770	3539	0
Flt Permitted	0.950									0.463		
Satd. Flow (perm)	1770	1583	0	0	0	0	0	3355	0	862	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		109						178				
Link Speed (mph)		35			35			35				35
Link Distance (ft)		706			904			914				683
Travel Time (s)		13.8			17.6			17.8				13.3
Peak Hour Factor	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90
Adj. Flow (vph)	61	0	9	0	0	0	0	334	178	46	1229	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	61	9	0	0	0	0	0	512	0	46	1229	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						6			2	
Permitted Phases	4									2		
Detector Phase	4	4						6		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0						10.0		10.0	10.0	
Minimum Split (s)	30.0	30.0						30.0		30.0	30.0	
Total Split (s)	34.0	34.0						96.0		96.0	96.0	
Total Split (%)	26.2%	26.2%						73.8%		73.8%	73.8%	
Maximum Green (s)	29.0	29.0						91.0		91.0	91.0	
Yellow Time (s)	3.5	3.5						3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5						1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0						-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0						4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Recall Mode	None	None						C-Max		C-Max	C-Max	
Act Effct Green (s)	12.0	12.0						113.8		113.8	113.8	
Actuated g/C Ratio	0.09	0.09						0.88		0.88	0.88	
v/c Ratio	0.37	0.04						0.17		0.06	0.40	
Control Delay	61.8	0.2						2.1		2.4	2.9	
Queue Delay	0.0	0.0						0.0		0.0	0.1	
Total Delay	61.8	0.2						2.1		2.4	3.1	
LOS	E	A						A		A	A	
Approach Delay		53.9						2.1			3.0	
Approach LOS		D						A			A	

Lanes, Volumes, Timings
 16: Farrow Road & 277 NB RAMPS



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	50	0						100		6	113	
Queue Length 95th (ft)	94	0						5		m13	147	
Internal Link Dist (ft)		626			824			834			603	
Turn Bay Length (ft)	300									250		
Base Capacity (vph)	408	449						2958		754	3096	
Starvation Cap Reductn	0	0						0		0	691	
Spillback Cap Reductn	0	0						0		0	0	
Storage Cap Reductn	0	0						0		0	0	
Reduced v/c Ratio	0.15	0.02						0.17		0.06	0.51	

Intersection Summary

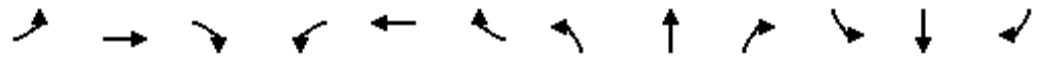
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.40
 Intersection Signal Delay: 4.7
 Intersection LOS: A
 Intersection Capacity Utilization 46.9%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 16: Farrow Road & 277 NB RAMPS



Lanes, Volumes, Timings
 17: Farrow Road & Lorick Avenue /277 SB Ramps

Bull Street Commons Traffic Study
 2016 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	0	38	505	13	33	12	346	0	0	662	199
Future Volume (vph)	12	0	38	505	13	33	12	346	0	0	662	199
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	125		0	200		0	0		0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (ft)	25			150			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850		0.891							0.964
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1770	0	1583	1770	1660	0	1770	3539	0	0	3412	0
Flt Permitted	0.724			0.950			0.232					
Satd. Flow (perm)	1349	0	1583	1770	1660	0	432	3539	0	0	3412	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			42		37							39
Link Speed (mph)		35			35			35				35
Link Distance (ft)		681			1031			683				835
Travel Time (s)		13.3			20.1			13.3				16.3
Peak Hour Factor	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.92	0.90	0.90	0.93	0.90
Adj. Flow (vph)	13	0	42	543	14	37	13	376	0	0	712	221
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	0	42	543	51	0	13	376	0	0	933	0
Turn Type	Perm		Perm	Perm	NA		Perm	NA			NA	
Protected Phases					4			2				6
Permitted Phases	8		8	4			2					
Detector Phase	8		8	4	4		2	2				6
Switch Phase												
Minimum Initial (s)	10.0		10.0	10.0	10.0		10.0	10.0				10.0
Minimum Split (s)	30.0		30.0	30.0	30.0		30.0	30.0				30.0
Total Split (s)	71.0		71.0	71.0	71.0		59.0	59.0				59.0
Total Split (%)	54.6%		54.6%	54.6%	54.6%		45.4%	45.4%				45.4%
Maximum Green (s)	66.0		66.0	66.0	66.0		54.0	54.0				54.0
Yellow Time (s)	3.5		3.5	3.5	3.5		3.5	3.5				3.5
All-Red Time (s)	1.5		1.5	1.5	1.5		1.5	1.5				1.5
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0		-1.0	-1.0				-1.0
Total Lost Time (s)	4.0		4.0	4.0	4.0		4.0	4.0				4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0				3.0
Recall Mode	None		None	None	None		C-Max	C-Max				C-Max
Act Effct Green (s)	49.4		49.4	49.4	49.4		72.6	72.6				72.6
Actuated g/C Ratio	0.38		0.38	0.38	0.38		0.56	0.56				0.56
v/c Ratio	0.03		0.07	0.81	0.08		0.05	0.19				0.49
Control Delay	21.2		5.9	45.2	9.1		9.4	7.7				19.0
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.0				0.0
Total Delay	21.2		5.9	45.2	9.1		9.4	7.7				19.0
LOS	C		A	D	A		A	A				B
Approach Delay					42.1			7.7				19.0
Approach LOS					D			A				B

Lanes, Volumes, Timings
 17: Farrow Road & Lorick Avenue /277 SB Ramps

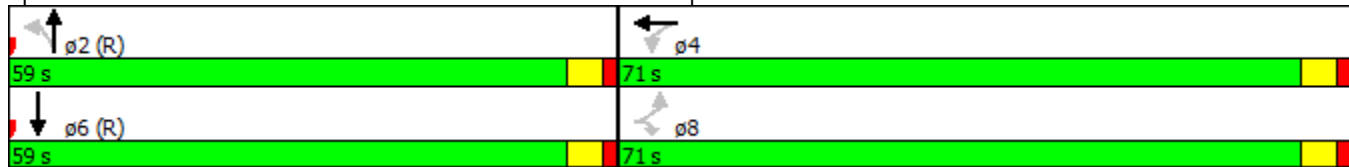


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	7		0	405	7		2	31			231	
Queue Length 95th (ft)	18		21	470	29		13	83			350	
Internal Link Dist (ft)		601			951			603			755	
Turn Bay Length (ft)				125			200					
Base Capacity (vph)	695		836	912	873		241	1975			1921	
Starvation Cap Reductn	0		0	0	0		0	0			0	
Spillback Cap Reductn	0		0	0	0		0	0			0	
Storage Cap Reductn	0		0	0	0		0	0			0	
Reduced v/c Ratio	0.02		0.05	0.60	0.06		0.05	0.19			0.49	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 23.5
 Intersection LOS: C
 Intersection Capacity Utilization 71.0%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 17: Farrow Road & Lorick Avenue /277 SB Ramps



Lanes, Volumes, Timings
18: Assembly St./Assembly & Elmwood Avenue

Bull Street Commons Traffic Study
2016 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2032	435	578	1365	4	248	1	213	0	0	0
Future Volume (vph)	0	2032	435	578	1365	4	248	1	213	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		275	150		0	0		0	0		0
Storage Lanes	1		1	1		0	2		1	0		0
Taper Length (ft)	150			75			25			25		
Lane Util. Factor	1.00	0.86	0.86	0.97	0.91	0.91	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850					0.851	0.850			
Flt Protected				0.950			0.950					
Satd. Flow (prot)	1863	4806	1362	3433	5085	0	3433	1506	1504	0	1863	0
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	1863	4806	1362	3433	5085	0	3433	1506	1504	0	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			171		1			111	76			
Link Speed (mph)		30			30			30				35
Link Distance (ft)		3707			509			546				403
Travel Time (s)		84.3			11.6			12.4				7.9
Peak Hour Factor	0.90	0.98	0.90	0.92	0.96	0.90	0.92	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	2073	483	628	1422	4	270	1	237	0	0	0
Shared Lane Traffic (%)			0%						47%			
Lane Group Flow (vph)	0	2073	483	628	1426	0	270	112	126	0	0	0
Turn Type	Perm	NA	pm+ov	Prot	NA		Split	NA	pm+ov			
Protected Phases		2	3	1	6		3	3	1	4	4	
Permitted Phases	2		2						3			
Detector Phase	2	2	3	1	6		3	3	1	4	4	
Switch Phase												
Minimum Initial (s)	16.0	16.0	6.0	11.0	16.0		6.0	6.0	11.0	4.0	4.0	
Minimum Split (s)	30.0	30.0	21.0	17.0	30.0		21.0	21.0	17.0	10.0	10.0	
Total Split (s)	68.0	68.0	21.0	31.0	99.0		21.0	21.0	31.0	10.0	10.0	
Total Split (%)	52.3%	52.3%	16.2%	23.8%	76.2%		16.2%	16.2%	23.8%	7.7%	7.7%	
Maximum Green (s)	62.0	62.0	15.0	25.0	93.0		15.0	15.0	25.0	4.0	4.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	-4.0	-4.0	-4.0	-4.0		-4.0	-2.0	-4.0		-2.0	
Total Lost Time (s)	6.0	2.0	2.0	2.0	2.0		2.0	4.0	2.0		4.0	
Lead/Lag	Lead	Lead	Lead	Lag			Lead	Lead	Lag	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes					Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max	None	None	C-Max		None	None	None	None	None	
Walk Time (s)			5.0				5.0	5.0				
Flash Dont Walk (s)			10.0				10.0	10.0				
Pedestrian Calls (#/hr)			0				0	0				
Act Effct Green (s)		76.5	97.0	29.0	107.5		18.5	16.5	49.5			
Actuated g/C Ratio		0.59	0.75	0.22	0.83		0.14	0.13	0.38			
v/c Ratio		0.73	0.46	0.82	0.34		0.55	0.39	0.20			
Control Delay		21.4	5.3	56.5	1.5		56.6	13.4	12.3			
Queue Delay		0.0	0.0	0.0	0.1		0.0	0.0	0.0			
Total Delay		21.4	5.3	56.5	1.6		56.6	13.4	12.3			

Lanes, Volumes, Timings
 18: Assembly St./Assembly & Elmwood Avenue

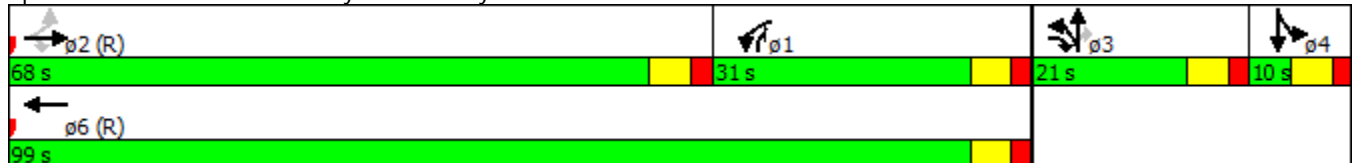


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C	A	E	A		E	B	B			
Approach Delay		18.4			18.4			36.1				
Approach LOS		B			B			D				
Queue Length 50th (ft)		471	93	289	50		110	1	28			
Queue Length 95th (ft)		533	155	m346	49		156	60	74			
Internal Link Dist (ft)		3627			429			466			323	
Turn Bay Length (ft)			275	150								
Base Capacity (vph)		2829	1059	765	4206		501	293	619			
Starvation Cap Reductn		0	0	0	1167		0	0	0			
Spillback Cap Reductn		0	0	0	0		0	0	0			
Storage Cap Reductn		0	0	0	0		0	0	0			
Reduced v/c Ratio		0.73	0.46	0.82	0.47		0.54	0.38	0.20			

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 14 (11%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 20.1
 Intersection LOS: C
 Intersection Capacity Utilization 76.1%
 ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Assembly St./Assembly & Elmwood Avenue



Lanes, Volumes, Timings
19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
2016 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑↑	↖	↖	↑↑↑		↖	↑↑	↖	↖	↑↓	↖
Traffic Volume (vph)	196	1970	62	69	1353	33	17	95	7	211	470	550
Future Volume (vph)	196	1970	62	69	1353	33	17	95	7	211	470	550
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		175	150		0	200		0	175		425
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	75			75			100			75		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850		0.996				0.850		0.989	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	1770	5065	0	1770	3539	1583	1770	3353	1441
Flt Permitted	0.950			0.062			0.185			0.609		
Satd. Flow (perm)	3433	5085	1583	115	5065	0	345	3539	1583	1134	3353	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			47		4				126		6	165
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		509			563			474			3675	
Travel Time (s)		11.6			12.8			10.8			83.5	
Peak Hour Factor	0.90	0.93	0.90	0.90	0.97	0.90	0.90	0.90	0.90	0.90	0.93	0.94
Adj. Flow (vph)	218	2118	69	77	1395	37	19	106	8	234	505	585
Shared Lane Traffic (%)												7%
Lane Group Flow (vph)	218	2118	69	77	1432	0	19	106	8	234	546	544
Turn Type	Prot	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	pm+ov
Protected Phases	5	2	3		6		3	8		7	4	5
Permitted Phases			2	6			8		8	4		4
Detector Phase	5	2	3	6	6		3	8	8	7	4	5
Switch Phase												
Minimum Initial (s)	11.0	16.0	11.0	16.0	16.0		11.0	16.0	16.0	11.0	16.0	11.0
Minimum Split (s)	17.0	30.0	17.0	30.0	30.0		17.0	30.0	30.0	17.0	30.0	17.0
Total Split (s)	17.0	83.0	17.0	66.0	66.0		17.0	30.0	30.0	17.0	30.0	17.0
Total Split (%)	13.1%	63.8%	13.1%	50.8%	50.8%		13.1%	23.1%	23.1%	13.1%	23.1%	13.1%
Maximum Green (s)	11.0	77.0	11.0	60.0	60.0		11.0	24.0	24.0	11.0	24.0	11.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0	-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lead	Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	C-Max	C-Max		None	None	None	None	None	None
Act Effct Green (s)	15.0	82.7	99.7	65.7	65.7		41.3	26.3	26.3	41.7	29.7	46.7
Actuated g/C Ratio	0.12	0.64	0.77	0.51	0.51		0.32	0.20	0.20	0.32	0.23	0.36
v/c Ratio	0.55	0.65	0.06	1.33	0.56		0.07	0.15	0.02	0.54	0.71	0.87
Control Delay	83.1	4.4	0.1	258.4	16.9		28.9	42.5	0.1	38.2	52.1	43.6
Queue Delay	0.0	0.1	0.0	0.0	0.1		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	83.1	4.5	0.1	258.4	17.0		28.9	42.5	0.1	38.2	52.1	43.6
LOS	F	A	A	F	B		C	D	A	D	D	D
Approach Delay		11.5			29.3			38.0			46.1	
Approach LOS		B			C			D			D	

Lanes, Volumes, Timings
 19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
 2016 Background AM

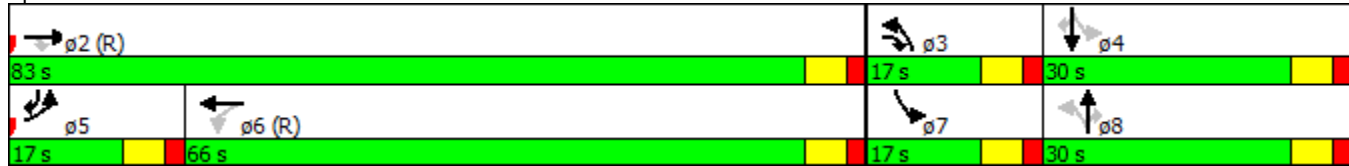


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	93	70	0	-77	331		11	38	0	148	236	354
Queue Length 95th (ft)	m129	89	m0	#188	343		29	65	0	222	305	#602
Internal Link Dist (ft)		429			483			394			3595	
Turn Bay Length (ft)	175		175	150			200			175		425
Base Capacity (vph)	396	3234	1224	58	2561		274	762	439	437	772	623
Starvation Cap Reductn	0	233	0	0	307		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	0.55	0.71	0.06	1.33	0.64		0.07	0.14	0.02	0.54	0.71	0.87

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 5 (4%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.33
 Intersection Signal Delay: 25.7 Intersection LOS: C
 Intersection Capacity Utilization 80.2% ICU Level of Service D
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Main St. & Elmwood Avenue



Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2016 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕↕↕		↖	↕↕↕		↖	↕	↗		↕↕	
Traffic Volume (vph)	11	1506	254	85	1368	6	34	11	20	6	113	17
Future Volume (vph)	11	1506	254	85	1368	6	34	11	20	6	113	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	75		0	200		0	75		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			50			100			50		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.977			0.999				0.850		0.981	
Flt Protected	0.950			0.950			0.950				0.998	
Satd. Flow (prot)	1770	4968	0	1770	5080	0	1770	1863	1583	0	3465	0
Flt Permitted	0.159			0.096			0.553				0.946	
Satd. Flow (perm)	296	4968	0	179	5080	0	1030	1863	1583	0	3284	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		79			2				25		11	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		563			1012			1692			1095	
Travel Time (s)		12.8			23.0			38.5			24.9	
Peak Hour Factor	0.90	0.95	0.90	0.90	0.95	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	12	1585	282	94	1440	7	38	12	22	7	126	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	1867	0	94	1447	0	38	12	22	0	152	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		6	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	100.0	100.0		100.0	100.0		30.0	30.0	30.0	30.0	30.0	
Total Split (%)	76.9%	76.9%		76.9%	76.9%		23.1%	23.1%	23.1%	23.1%	23.1%	
Maximum Green (s)	94.0	94.0		94.0	94.0		24.0	24.0	24.0	24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0		-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0		2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None	None	None	None	
Act Effct Green (s)	106.0	106.0		106.0	106.0		20.0	20.0	20.0		20.0	
Actuated g/C Ratio	0.82	0.82		0.82	0.82		0.15	0.15	0.15		0.15	
v/c Ratio	0.05	0.46		0.65	0.35		0.24	0.04	0.08		0.30	
Control Delay	1.0	0.7		18.9	2.7		52.9	47.5	15.9		46.9	
Queue Delay	0.0	0.1		0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	1.0	0.8		18.9	2.7		52.9	47.5	15.9		46.9	
LOS	A	A		B	A		D	D	B		D	
Approach Delay		0.8			3.7			40.7			46.9	
Approach LOS		A			A			D			D	

Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2016 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	0	13		33	64		29	9	0		55	
Queue Length 95th (ft)	m1	27		m47	m99		64	28	24		90	
Internal Link Dist (ft)		483			932			1612			1015	
Turn Bay Length (ft)	200			75			200					
Base Capacity (vph)	241	4065		145	4142		221	401	360		715	
Starvation Cap Reductn	0	738		0	0		0	0	0		0	
Spillback Cap Reductn	0	0		0	0		0	0	0		0	
Storage Cap Reductn	0	0		0	0		0	0	0		0	
Reduced v/c Ratio	0.05	0.56		0.65	0.35		0.17	0.03	0.06		0.21	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 13 (10%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 4.8
 Intersection LOS: A
 Intersection Capacity Utilization 86.3%
 ICU Level of Service E
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 20: Sumter St. & Elmwood Avenue





Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	301	24	23	245	3	11
Future Volume (vph)	301	24	23	245	3	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	225		125	0
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.990					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1844	0	1770	1863	1770	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1844	0	1770	1863	1770	1583
Link Speed (mph)	35			35	35	
Link Distance (ft)	1129			679	848	
Travel Time (s)	22.0			13.2	16.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	334	27	26	272	3	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	361	0	26	272	3	12
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	29.1%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 21: Barnwell St. & Calhoun St.



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻		↻	↻	↻	↻
Traffic Volume (veh/h)	301	24	23	245	3	11
Future Volume (Veh/h)	301	24	23	245	3	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	334	27	26	272	3	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		TWLTL			
Median storage veh	2					
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			361		672	348
vC1, stage 1 conf vol					348	
vC2, stage 2 conf vol					324	
vCu, unblocked vol			361		672	348
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	98
cM capacity (veh/h)			1198		600	696
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	361	26	272	3	12	
Volume Left	0	26	0	3	0	
Volume Right	27	0	0	0	12	
cSH	1700	1198	1700	600	696	
Volume to Capacity	0.21	0.02	0.16	0.00	0.02	
Queue Length 95th (ft)	0	2	0	0	1	
Control Delay (s)	0.0	8.1	0.0	11.0	10.3	
Lane LOS		A		B	B	
Approach Delay (s)	0.0	0.7		10.4		
Approach LOS				B		
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			29.1%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
 26: Colonial Drive & Mental Health Dwy

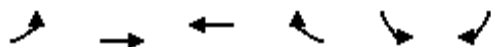


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	80	299	197	158	5	1
Future Volume (vph)	80	299	197	158	5	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.940		0.981	
Flt Protected	0.950				0.959	
Satd. Flow (prot)	1770	1863	1751	0	1752	0
Flt Permitted	0.950				0.959	
Satd. Flow (perm)	1770	1863	1751	0	1752	0
Link Speed (mph)		35	35		35	
Link Distance (ft)		725	1327		332	
Travel Time (s)		14.1	25.9		6.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	89	332	219	176	6	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	89	332	395	0	7	0
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	37.8%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 26: Colonial Drive & Mental Health Dwy



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	80	299	197	158	5	1
Future Volume (Veh/h)	80	299	197	158	5	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	89	332	219	176	6	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		725				
pX, platoon unblocked						
vC, conflicting volume	395				817	307
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	395				817	307
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				98	100
cM capacity (veh/h)	1164				320	733
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	89	332	395	7		
Volume Left	89	0	0	6		
Volume Right	0	0	176	1		
cSH	1164	1700	1700	348		
Volume to Capacity	0.08	0.20	0.23	0.02		
Queue Length 95th (ft)	6	0	0	2		
Control Delay (s)	8.4	0.0	0.0	15.6		
Lane LOS	A			C		
Approach Delay (s)	1.8		0.0	15.6		
Approach LOS				C		
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			37.8%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	14	18	473	3	243	6	2175	207	77	931	8
Future Volume (vph)	22	14	18	473	3	243	6	2175	207	77	931	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		200	675		0	175		0	200		250
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100			75			50			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt		0.917			0.852				0.850		0.999	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3245	0	3433	1587	0	1770	3539	1583	1770	5080	0
Flt Permitted	0.950			0.950			0.275			0.052		
Satd. Flow (perm)	1770	3245	0	3433	1587	0	512	3539	1583	97	5080	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			270				146		2	
Link Speed (mph)		30			40			40			45	
Link Distance (ft)		619			1038			1208			1992	
Travel Time (s)		14.1			17.7			20.6			30.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.90	0.94	0.90
Adj. Flow (vph)	24	16	20	526	3	270	7	2390	227	86	990	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	36	0	526	273	0	7	2390	227	86	999	0
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	4	4		3	3			2	3	1	6	
Permitted Phases							2		2	6		
Detector Phase	4	4		3	3		2	2	3	1	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0		11.0	11.0		16.0	16.0	11.0	11.0	16.0	
Minimum Split (s)	30.0	30.0		17.0	17.0		30.0	30.0	17.0	17.0	30.0	
Total Split (s)	30.0	30.0		18.0	18.0		65.0	65.0	18.0	17.0	82.0	
Total Split (%)	23.1%	23.1%		13.8%	13.8%		50.0%	50.0%	13.8%	13.1%	63.1%	
Maximum Green (s)	24.0	24.0		12.0	12.0		59.0	59.0	12.0	11.0	76.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag	Lead	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	None	None	C-Max	
Walk Time (s)				5.0	5.0				5.0			
Flash Dont Walk (s)				10.0	10.0				10.0			
Pedestrian Calls (#/hr)				0	0				0			
Act Effct Green (s)	20.0	20.0		16.0	16.0		75.4	75.4	93.4	92.4	92.4	
Actuated g/C Ratio	0.15	0.15		0.12	0.12		0.58	0.58	0.72	0.71	0.71	
v/c Ratio	0.09	0.07		1.25	0.63		0.02	1.16	0.19	0.33	0.28	
Control Delay	48.3	27.2		173.4	17.7		7.2	108.1	5.0	17.5	7.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	48.3	27.2		173.4	17.7		7.2	108.1	5.0	17.5	7.7	

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	C		F	B		A	F	A	B	A	
Approach Delay		35.6			120.2			98.9				8.5
Approach LOS		D			F			F				A
Queue Length 50th (ft)	18	6		~290	48		2	~1351	57	23	113	
Queue Length 95th (ft)	44	22		#407	130		m3	#1484	m70	70	135	
Internal Link Dist (ft)		539			958			1128				1912
Turn Bay Length (ft)	100			675			175			200		
Base Capacity (vph)	381	714		422	432		296	2052	1178	261	3611	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.05		1.25	0.63		0.02	1.16	0.19	0.33	0.28	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 119 (92%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.25
 Intersection Signal Delay: 80.3
 Intersection Capacity Utilization 90.8%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service E

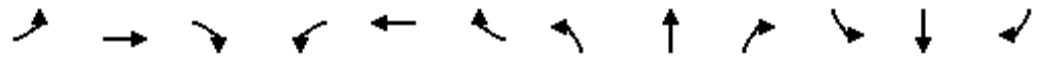
~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Bull St. & Harden St. Ext.



Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

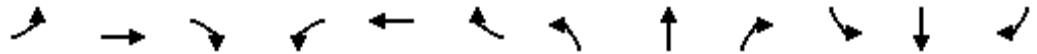
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	16	11	51	115	47	34	2262	8	6	1367	51
Future Volume (vph)	27	16	11	51	115	47	34	2262	8	6	1367	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	200		0	200		0	150		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			100			100			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Frt		0.940			0.957				0.850		0.995	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1751	0	1770	1783	0	1752	5085	1583	1770	5060	0
Flt Permitted	0.644			0.125			0.111			0.053		
Satd. Flow (perm)	1200	1751	0	233	1783	0	205	5085	1583	99	5060	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		602			376			654			1208	
Travel Time (s)		13.7			8.5			11.1			20.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.93	0.96
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%	2%
Adj. Flow (vph)	30	18	12	57	128	52	38	2381	9	7	1470	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	30	30	0	57	180	0	38	2381	9	7	1523	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			3			2			6	
Permitted Phases	4			3			2		2	6		
Detector Phase	4	4		3	3		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	30.0	30.0		34.0	34.0		66.0	66.0	66.0	66.0	66.0	
Total Split (%)	23.1%	23.1%		26.2%	26.2%		50.8%	50.8%	50.8%	50.8%	50.8%	
Maximum Green (s)	24.0	24.0		28.0	28.0		60.0	60.0	60.0	60.0	60.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Act Effct Green (s)	20.0	20.0		32.0	32.0		76.4	76.4	76.4	76.4	76.4	
Actuated g/C Ratio	0.15	0.15		0.25	0.25		0.59	0.59	0.59	0.59	0.59	
v/c Ratio	0.16	0.11		1.00	0.41		0.32	0.80	0.01	0.12	0.51	
Control Delay	50.4	48.7		170.0	44.5		17.7	20.3	10.2	13.5	10.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.2	0.0	0.0	0.0	
Total Delay	50.4	48.7		170.0	44.5		17.7	20.5	10.2	13.5	10.5	
LOS	D	D		F	D		B	C	B	B	B	
Approach Delay		49.6			74.7			20.4			10.5	

Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

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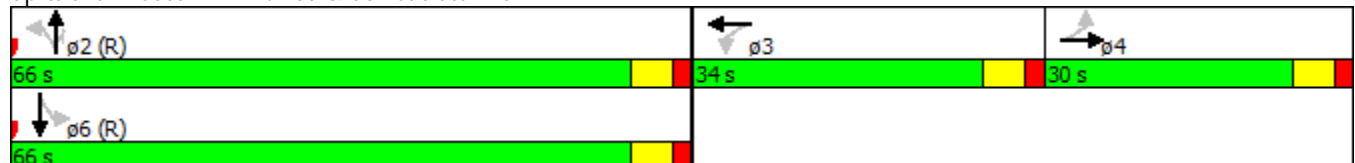
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	D			E			C			B		
Queue Length 50th (ft)	22	22		48	128		12	654	2	2	164	
Queue Length 95th (ft)	53	52		#142	200		m14	635	m2	m5	m162	
Internal Link Dist (ft)		522			296			574			1128	
Turn Bay Length (ft)	150			200			200			150		
Base Capacity (vph)	258	377		57	438		120	2988	930	57	2973	
Starvation Cap Reductn	0	0		0	0		0	124	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.12	0.08		1.00	0.41		0.32	0.83	0.01	0.12	0.51	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 88 (68%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.00
 Intersection Signal Delay: 20.3
 Intersection Capacity Utilization 72.8%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service C

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bull St. & Confederate Ave.



Lanes, Volumes, Timings
3: Bull St. & Colonial Drive

Bull Street Commons Traffic Study
2016 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗	↖	↔			↑↑↑		↘	↑↑↑	
Traffic Volume (vph)	0	0	4	356	6	52	0	2246	249	11	1373	23
Future Volume (vph)	0	0	4	356	6	52	0	2246	249	11	1373	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	150		0	0		0	200		0
Storage Lanes	0		1	1		0	0		0	1		0
Taper Length (ft)	25			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.865		0.958			0.984				0.997
Flt Protected				0.950	0.967					0.950		
Satd. Flow (prot)	0	0	1611	1681	1639	0	0	5004	0	1770	5070	0
Flt Permitted				0.950	0.967					0.041		
Satd. Flow (perm)	0	0	1611	1681	1639	0	0	5004	0	76	5070	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)			67		12			38				
Link Speed (mph)		35			35			40				40
Link Distance (ft)		440			693			362				654
Travel Time (s)		8.6			13.5			6.2				11.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.97	0.90	0.90	0.94	0.90
Adj. Flow (vph)	0	0	4	396	7	58	0	2315	277	12	1461	26
Shared Lane Traffic (%)				36%								
Lane Group Flow (vph)	0	0	4	253	208	0	0	2592	0	12	1487	0
Turn Type			Perm	Perm	NA			NA		Perm	NA	
Protected Phases					8			2				6
Permitted Phases			4	8						6		
Detector Phase			4	8	8			2		6		6
Switch Phase												
Minimum Initial (s)			16.0	16.0	16.0			16.0		16.0		16.0
Minimum Split (s)			30.0	30.0	30.0			30.0		30.0		30.0
Total Split (s)			37.0	37.0	37.0			93.0		93.0		93.0
Total Split (%)			28.5%	28.5%	28.5%			71.5%		71.5%		71.5%
Maximum Green (s)			31.0	31.0	31.0			87.0		87.0		87.0
Yellow Time (s)			4.0	4.0	4.0			4.0		4.0		4.0
All-Red Time (s)			2.0	2.0	2.0			2.0		2.0		2.0
Lost Time Adjust (s)			-4.0	-4.0	-4.0			-4.0		-4.0		-4.0
Total Lost Time (s)			2.0	2.0	2.0			2.0		2.0		2.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)			3.0	3.0	3.0			3.0		3.0		3.0
Recall Mode			None	None	None			C-Max		C-Max		C-Max
Act Effct Green (s)			28.3	28.3	28.3			97.7		97.7		97.7
Actuated g/C Ratio			0.22	0.22	0.22			0.75		0.75		0.75
v/c Ratio			0.01	0.69	0.57			0.69		0.21		0.39
Control Delay			0.0	57.4	49.0			7.0		10.3		1.5
Queue Delay			0.0	0.0	0.0			0.1		0.0		0.0
Total Delay			0.0	57.4	49.0			7.1		10.3		1.5
LOS			A	E	D			A		B		A
Approach Delay					53.6			7.1				1.6
Approach LOS					D			A				A

Lanes, Volumes, Timings
3: Bull St. & Colonial Drive

Bull Street Commons Traffic Study
2016 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)			0	209	156			242		1	23	
Queue Length 95th (ft)			0	297	234			m315		m1	m30	
Internal Link Dist (ft)		360			613			282			574	
Turn Bay Length (ft)				150						200		
Base Capacity (vph)			482	452	450			3768		56	3808	
Starvation Cap Reductn			0	0	0			0		0	124	
Spillback Cap Reductn			0	0	0			309		0	0	
Storage Cap Reductn			0	0	0			0		0	0	
Reduced v/c Ratio			0.01	0.56	0.46			0.75		0.21	0.40	

Intersection Summary

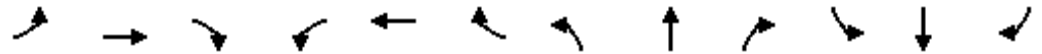
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 68 (52%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 10.0
 Intersection LOS: A
 Intersection Capacity Utilization 68.9%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Bull St. & Colonial Drive



Lanes, Volumes, Timings
4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2016 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↗	↑↑↑		↗	↑↑↑	
Traffic Volume (vph)	2	0	2	4	0	1	2	2487	0	1	1720	5
Future Volume (vph)	2	0	2	4	0	1	2	2487	0	1	1720	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			75			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt		0.932			0.973							
Flt Protected		0.976			0.962		0.950			0.950		
Satd. Flow (prot)	0	1694	0	0	1744	0	1770	5085	0	1770	5085	0
Flt Permitted		0.976			0.962		0.950			0.950		
Satd. Flow (perm)	0	1694	0	0	1744	0	1770	5085	0	1770	5085	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		519			596			521			362	
Travel Time (s)		10.1			11.6			8.9			6.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.94	0.90
Adj. Flow (vph)	2	0	2	4	0	1	2	2646	0	1	1830	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	4	0	0	5	0	2	2646	0	1	1836	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	58.1%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2016 Background PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕			↕		↕	↑↑↑		↕	↑↑↑		
Traffic Volume (veh/h)	2	0	2	4	0	1	2	2487	0	1	1720	5	
Future Volume (Veh/h)	2	0	2	4	0	1	2	2487	0	1	1720	5	
Sign Control		Stop			Stop			Free			Free		
Grade		0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.94	0.90	
Hourly flow rate (vph)	2	0	2	4	0	1	2	2646	0	1	1830	6	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type													
Median storage veh													
Upstream signal (ft)													
pX, platoon unblocked	0.77	0.77	0.90	0.77	0.77	0.72	0.90			0.72			
vC, conflicting volume	2722	4485	613	3264	4488	882	1836			2646			
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	1325	3602	177	2025	3606	0	1537			1939			
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1			
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2			
p0 queue free %	98	100	100	85	100	100	99			100			
cM capacity (veh/h)	87	4	751	26	4	785	385			216			
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4			
Volume Total	4	5	2	1058	1058	529	1	732	732	372			
Volume Left	2	4	2	0	0	0	1	0	0	0			
Volume Right	2	1	0	0	0	0	0	0	0	6			
cSH	156	32	385	1700	1700	1700	216	1700	1700	1700			
Volume to Capacity	0.03	0.16	0.01	0.62	0.62	0.31	0.00	0.43	0.43	0.22			
Queue Length 95th (ft)	2	12	0	0	0	0	0	0	0	0			
Control Delay (s)	28.6	136.6	14.4	0.0	0.0	0.0	21.7	0.0	0.0	0.0			
Lane LOS	D	F	B				C						
Approach Delay (s)	28.6	136.6	0.0				0.0						
Approach LOS	D	F											
Intersection Summary													
Average Delay			0.2										
Intersection Capacity Utilization			58.1%	ICU Level of Service					B				
Analysis Period (min)			15										

Lanes, Volumes, Timings
5: Bull St. & Jefferson Street



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	3	7	5	2481	1715	13
Future Volume (vph)	3	7	5	2481	1715	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	175			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		100			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Frt	0.902				0.999	
Flt Protected	0.987		0.950			
Satd. Flow (prot)	1658	0	1770	5085	5080	0
Flt Permitted	0.987		0.950			
Satd. Flow (perm)	1658	0	1770	5085	5080	0
Link Speed (mph)	35			40	40	
Link Distance (ft)	257			774	521	
Travel Time (s)	5.0			13.2	8.9	
Peak Hour Factor	0.90	0.90	0.90	0.95	0.96	0.90
Adj. Flow (vph)	3	8	6	2612	1786	14
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	0	6	2612	1800	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	57.9%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
5: Bull St. & Jefferson Street

Bull Street Commons Traffic Study
2016 Background PM



Movement	EBL	EBR	NBL	NBT	SBT	SBR			
Lane Configurations									
Traffic Volume (veh/h)	3	7	5	2481	1715	13			
Future Volume (Veh/h)	3	7	5	2481	1715	13			
Sign Control	Stop			Free	Free				
Grade	0%			0%	0%				
Peak Hour Factor	0.90	0.90	0.90	0.95	0.96	0.90			
Hourly flow rate (vph)	3	8	6	2612	1786	14			
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type				None	None				
Median storage (veh)									
Upstream signal (ft)				774	883				
pX, platoon unblocked	0.74	0.91	0.91						
vC, conflicting volume	2676	602	1800						
vC1, stage 1 conf vol									
vC2, stage 2 conf vol									
vCu, unblocked vol	1178	202	1522						
tC, single (s)	6.8	6.9	4.1						
tC, 2 stage (s)									
tF (s)	3.5	3.3	2.2						
p0 queue free %	98	99	98						
cM capacity (veh/h)	134	731	394						
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	
Volume Total	11	6	871	871	871	714	714	371	
Volume Left	3	6	0	0	0	0	0	0	
Volume Right	8	0	0	0	0	0	0	14	
cSH	329	394	1700	1700	1700	1700	1700	1700	
Volume to Capacity	0.03	0.02	0.51	0.51	0.51	0.42	0.42	0.22	
Queue Length 95th (ft)	3	1	0	0	0	0	0	0	
Control Delay (s)	16.3	14.3	0.0	0.0	0.0	0.0	0.0	0.0	
Lane LOS	C	B							
Approach Delay (s)	16.3	0.0					0.0		
Approach LOS	C								
Intersection Summary									
Average Delay			0.1						
Intersection Capacity Utilization			57.9%	ICU Level of Service	B				
Analysis Period (min)			15						

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
2016 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1305	12	533	32	41	37	432	1165	11	3	618	1087
Future Volume (vph)	1305	12	533	32	41	37	432	1165	11	3	618	1087
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	775		0	125		0	175		0	100		0
Storage Lanes	1		2	1		0	1		0	1		1
Taper Length (ft)	50			50			125			50		
Lane Util. Factor	0.95	0.95	0.88	0.95	0.95	0.95	0.97	0.95	0.95	1.00	0.91	0.91
Frt			0.850		0.950			0.999				0.850
Flt Protected	0.950	0.953			0.986		0.950			0.950		
Satd. Flow (prot)	1681	1686	2787	0	3315	0	3433	3536	0	1770	3390	1441
Flt Permitted	0.950	0.953			0.986		0.950			0.133		
Satd. Flow (perm)	1681	1686	2787	0	3315	0	3433	3536	0	248	3390	1441
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			40	
Link Distance (ft)		1012			326			526			774	
Travel Time (s)		23.0			7.4			12.0			13.2	
Peak Hour Factor	0.98	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1332	13	592	36	46	41	475	1294	12	3	687	1208
Shared Lane Traffic (%)	50%											0%
Lane Group Flow (vph)	666	679	592	0	123	0	475	1306	0	3	687	1208
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Perm	NA	pm+ov
Protected Phases	4	4	5	3	3		5	2			6	4
Permitted Phases			4							6		6
Detector Phase	4	4	5	3	3		5	2		6	6	4
Switch Phase												
Minimum Initial (s)	16.0	16.0	11.0	11.0	11.0		11.0	16.0		16.0	16.0	16.0
Minimum Split (s)	30.0	30.0	17.0	17.0	17.0		17.0	30.0		30.0	30.0	30.0
Total Split (s)	64.0	64.0	17.0	17.0	17.0		17.0	49.0		32.0	32.0	64.0
Total Split (%)	49.2%	49.2%	13.1%	13.1%	13.1%		13.1%	37.7%		24.6%	24.6%	49.2%
Maximum Green (s)	58.0	58.0	11.0	11.0	11.0		11.0	43.0		26.0	26.0	58.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0		-4.0		-4.0	-4.0		-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0		2.0		2.0	2.0		2.0	2.0	2.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max		C-Max	C-Max	None
Act Effct Green (s)	62.0	62.0	79.0		15.0		15.0	47.0		30.0	30.0	92.0
Actuated g/C Ratio	0.48	0.48	0.61		0.12		0.12	0.36		0.23	0.23	0.71
v/c Ratio	0.83	0.84	0.35		0.32		1.20	1.02		0.05	0.88	1.19
Control Delay	32.9	33.9	9.3		55.4		152.6	66.1		35.3	49.7	113.6
Queue Delay	0.0	0.0	0.0		0.0		0.0	29.8		0.0	0.0	0.0
Total Delay	32.9	33.9	9.3		55.4		152.6	96.0		35.3	49.7	113.6
LOS	C	C	A		E		F	F		D	D	F
Approach Delay		26.1			55.4			111.1			90.3	
Approach LOS		C			E			F			F	

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
2016 Background PM

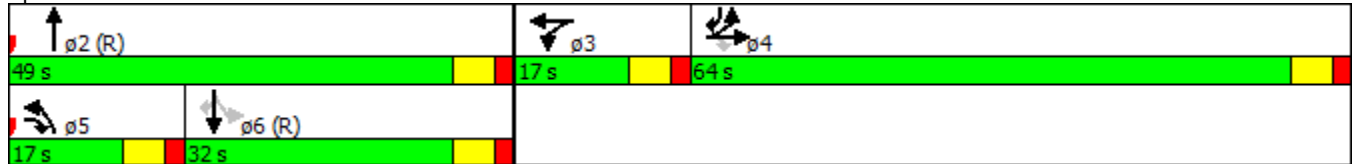


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	365	372	122		51		-252	-617		1	231	-1382
Queue Length 95th (ft)	581	#655	120		83		#359	#759		m4	#403	#1643
Internal Link Dist (ft)		932			246			446			694	
Turn Bay Length (ft)	775						175			100		
Base Capacity (vph)	801	804	1693		382		396	1278		57	782	1019
Starvation Cap Reductn	0	0	0		0		0	96		0	0	0
Spillback Cap Reductn	0	0	0		0		0	0		0	0	0
Storage Cap Reductn	0	0	0		0		0	0		0	0	0
Reduced v/c Ratio	0.83	0.84	0.35		0.32		1.20	1.10		0.05	0.88	1.19

Intersection Summary

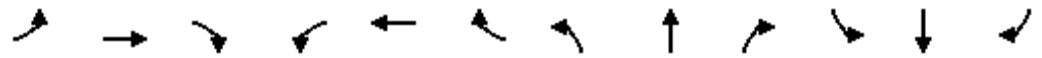
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 100 (77%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.20
 Intersection Signal Delay: 74.3
 Intersection LOS: E
 Intersection Capacity Utilization 99.0%
 ICU Level of Service F
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Bull St. & Elmwood Avenue



Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

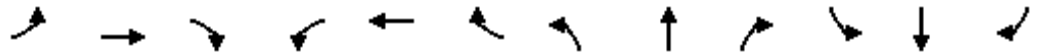
Bull Street Commons Traffic Study
2016 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	149	27	15	241	148	32	1467	11	81	1017	79
Future Volume (vph)	79	149	27	15	241	148	32	1467	11	81	1017	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	50			50			75			75		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.977			0.943			0.999				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3458	0	1770	3337	0	1770	3536	0	1770	3539	1583
Flt Permitted	0.266			0.531			0.224			0.118		
Satd. Flow (perm)	495	3458	0	989	3337	0	417	3536	0	220	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			59			1				88
Link Speed (mph)		30			30			30				30
Link Distance (ft)		937			677			1883				526
Travel Time (s)		21.3			15.4			42.8				12.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.92	0.90
Adj. Flow (vph)	88	166	30	17	268	164	36	1577	12	90	1105	88
Shared Lane Traffic (%)												
Lane Group Flow (vph)	88	196	0	17	432	0	36	1589	0	90	1105	88
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2				6
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	16.0
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	30.0
Total Split (s)	34.0	34.0		34.0	34.0		96.0	96.0		96.0	96.0	96.0
Total Split (%)	26.2%	26.2%		26.2%	26.2%		73.8%	73.8%		73.8%	73.8%	73.8%
Maximum Green (s)	28.0	28.0		28.0	28.0		90.0	90.0		90.0	90.0	90.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	27.4	27.4		27.4	27.4		98.6	98.6		98.6	98.6	98.6
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.76	0.76		0.76	0.76	0.76
v/c Ratio	0.85	0.26		0.08	0.58		0.11	0.59		0.54	0.41	0.07
Control Delay	103.2	39.4		45.8	47.4		6.1	8.6		20.8	4.4	1.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.4		0.0	0.2	0.0
Total Delay	103.2	39.4		45.8	47.5		6.1	8.9		20.8	4.6	1.7
LOS	F	D		D	D		A	A		C	A	A
Approach Delay		59.2			47.4			8.9			5.5	
Approach LOS		E			D			A			A	

Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

Bull Street Commons Traffic Study
2016 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	70	66		12	158		8	288		17	107	4
Queue Length 95th (ft)	#160	98		34	215		20	375		m43	165	m12
Internal Link Dist (ft)		857			597			1803			446	
Turn Bay Length (ft)	150			175			150			150		
Base Capacity (vph)	121	862		243	865		316	2681		167	2683	1221
Starvation Cap Reductn	0	0		0	0		0	0		0	724	0
Spillback Cap Reductn	0	0		0	6		0	508		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.73	0.23		0.07	0.50		0.11	0.73		0.54	0.56	0.07

Intersection Summary

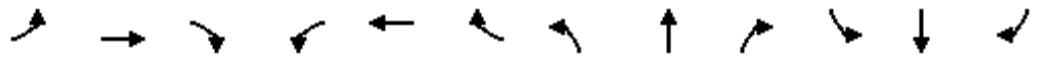
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 72 (55%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 16.4 Intersection LOS: B
 Intersection Capacity Utilization 94.2% ICU Level of Service F
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Bull St. & Calhoun St.



Lanes, Volumes, Timings
9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Bull Street Commons Traffic Study
2016 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	371	141	383	190	49	90	364	861	69	499	40
Future Volume (vph)	41	371	141	383	190	49	90	364	861	69	499	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		800	175		0	225		0	300		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	100			75			75			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.959			0.969				0.850		0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3394	0	3433	3429	0	1770	3539	1583	1770	3498	0
Flt Permitted	0.588			0.950			0.359			0.469		
Satd. Flow (perm)	1095	3394	0	3433	3429	0	669	3539	1583	874	3498	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		43			38				709			8
Link Speed (mph)		35			35			35				40
Link Distance (ft)		1007			305			498				1949
Travel Time (s)		19.6			5.9			9.7				33.2
Peak Hour Factor	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Adj. Flow (vph)	46	412	157	412	211	54	100	404	906	77	554	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	569	0	412	265	0	100	404	906	77	598	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Free	Perm	NA	
Protected Phases		8		7	4			6				2
Permitted Phases	8						6		Free	2		
Detector Phase	8	8		7	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	16.0	16.0		11.0	16.0		16.0	16.0		16.0	16.0	
Minimum Split (s)	30.0	30.0		17.0	30.0		30.0	30.0		30.0	30.0	
Total Split (s)	40.0	40.0		32.0	72.0		58.0	58.0		58.0	58.0	
Total Split (%)	30.8%	30.8%		24.6%	55.4%		44.6%	44.6%		44.6%	44.6%	
Maximum Green (s)	34.0	34.0		26.0	66.0		52.0	52.0		52.0	52.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	30.0	30.0		24.8	56.7		69.3	69.3	130.0	69.3	69.3	
Actuated g/C Ratio	0.23	0.23		0.19	0.44		0.53	0.53	1.00	0.53	0.53	
v/c Ratio	0.18	0.70		0.63	0.17		0.28	0.21	0.57	0.17	0.32	
Control Delay	36.0	43.4		62.3	14.5		14.7	12.3	6.8	25.7	25.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	36.0	43.4		62.3	14.5		14.7	12.3	6.8	25.7	25.2	
LOS	D	D		E	B		B	B	A	C	C	
Approach Delay		42.8			43.6			9.0			25.3	

Lanes, Volumes, Timings
 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Bull Street Commons Traffic Study
 2016 Background PM

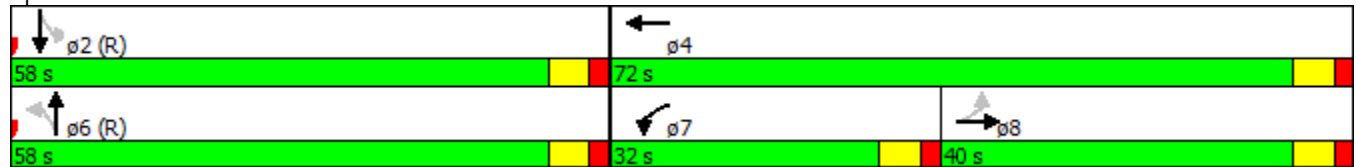


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	D			D			A			C		
Queue Length 50th (ft)	32	210		182	52		27	56	233	43	194	
Queue Length 95th (ft)	m53	253		234	66		48	74	518	96	273	
Internal Link Dist (ft)	927			225			418			1869		
Turn Bay Length (ft)	225			175			225			300		
Base Capacity (vph)	320	1022		792	1863		356	1886	1583	465	1867	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.14	0.56		0.52	0.14		0.28	0.21	0.57	0.17	0.32	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 95 (73%), Referenced to phase 2:SBTL and 6:NBTL, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 25.3
 Intersection LOS: C
 Intersection Capacity Utilization 68.4%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive



Lanes, Volumes, Timings
10: Harden St./Harden Street Ext & Calhoun St.

Bull Street Commons Traffic Study
2016 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	36	171	20	16	10	154	983	43	54	845	75
Future Volume (vph)	130	36	171	20	16	10	154	983	43	54	845	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	50		0	0		325	300		200
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	100			25			25			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Frt		0.876			0.943			0.994				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1632	0	1770	1757	0	1770	5055	0	1770	3539	1583
Flt Permitted	0.738			0.269			0.251			0.217		
Satd. Flow (perm)	1375	1632	0	501	1757	0	468	5055	0	404	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		175			11			8				83
Link Speed (mph)		30			35			35				35
Link Distance (ft)		1071			821			1286				405
Travel Time (s)		24.3			16.0			25.1				7.9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	144	40	190	22	18	11	171	1092	48	60	939	83
Shared Lane Traffic (%)												
Lane Group Flow (vph)	144	230	0	22	29	0	171	1140	0	60	939	83
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	1.0	1.0		11.0	11.0		9.0	14.0		9.0	14.0	14.0
Minimum Split (s)	6.5	6.5		30.0	30.0		15.0	30.0		15.0	30.0	30.0
Total Split (s)	38.0	38.0		38.0	38.0		24.0	73.0		19.0	68.0	68.0
Total Split (%)	29.2%	29.2%		29.2%	29.2%		18.5%	56.2%		14.6%	52.3%	52.3%
Maximum Green (s)	32.5	32.5		32.5	32.5		18.0	67.0		13.0	62.0	62.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.5	1.5		1.5	1.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	0.0		0.0	0.0		-3.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	2.5	5.5		5.5	5.5		3.0	3.0		6.0	3.0	3.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	22.1	19.1		19.1	19.1		100.7	90.4		92.8	86.8	86.8
Actuated g/C Ratio	0.17	0.15		0.15	0.15		0.77	0.70		0.71	0.67	0.67
v/c Ratio	0.62	0.59		0.30	0.11		0.35	0.32		0.16	0.40	0.08
Control Delay	49.7	12.1		57.8	32.3		5.9	9.2		6.7	9.8	2.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	49.7	12.1		57.8	32.3		5.9	9.2		6.7	9.8	2.5
LOS	D	B		E	C		A	A		A	A	A
Approach Delay		26.6			43.3			8.7			9.1	
Approach LOS		C			D			A			A	

Lanes, Volumes, Timings
 10: Harden St./Harden Street Ext & Calhoun St.

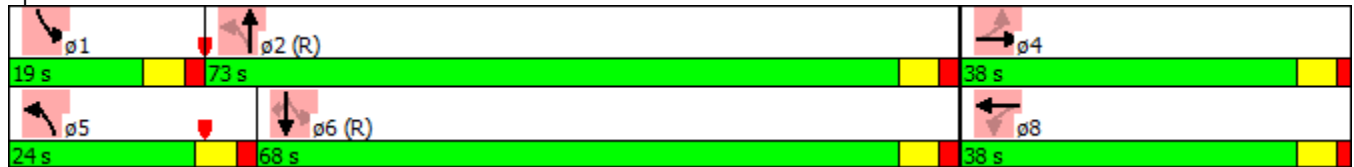


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	118	6		17	13		28	135		10	116	0
Queue Length 95th (ft)	182	37		43	40		62	195		27	250	17
Internal Link Dist (ft)		991			741			1206			325	
Turn Bay Length (ft)	225			50						300		200
Base Capacity (vph)	375	539		125	447		579	3519		437	2363	1084
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.38	0.43		0.18	0.06		0.30	0.32		0.14	0.40	0.08

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	130
Offset:	34 (26%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
Natural Cycle:	75
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.62
Intersection Signal Delay:	11.9
Intersection LOS:	B
Intersection Capacity Utilization	59.8%
ICU Level of Service	B
Analysis Period (min)	15

Splits and Phases: 10: Harden St./Harden Street Ext & Calhoun St.



Lanes, Volumes, Timings
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2016 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	286	9	5	239	4	15	5	18	15	21	42
Future Volume (vph)	21	286	9	5	239	4	15	5	18	15	21	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	275		0	0		0	300		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	100			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.998			0.937				0.899
Flt Protected	0.950			0.950				0.981		0.950		
Satd. Flow (prot)	1770	1848	0	1770	1859	0	0	1712	0	1770	1675	0
Flt Permitted	0.950			0.950				0.981		0.950		
Satd. Flow (perm)	1770	1848	0	1770	1859	0	0	1712	0	1770	1675	0
Link Speed (mph)		35			30			35				35
Link Distance (ft)		434			1071			385				2969
Travel Time (s)		8.5			24.3			7.5				57.8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	11%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	23	318	10	6	266	4	17	6	20	17	23	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	328	0	6	270	0	0	43	0	17	70	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	33.0% ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2016 Background PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (veh/h)	21	286	9	5	239	4	15	5	18	15	21	42		
Future Volume (Veh/h)	21	286	9	5	239	4	15	5	18	15	21	42		
Sign Control		Free			Free			Stop			Stop			
Grade		0%			0%			0%			0%			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly flow rate (vph)	23	318	10	6	266	4	17	6	20	17	23	47		
Pedestrians														
Lane Width (ft)														
Walking Speed (ft/s)														
Percent Blockage														
Right turn flare (veh)														
Median type	TWLTL				TWLTL									
Median storage veh	2				2									
Upstream signal (ft)					1071									
pX, platoon unblocked														
vC, conflicting volume	270				328				706	651	323	667	654	268
vC1, stage 1 conf vol									369	369		280	280	
vC2, stage 2 conf vol									336	282		387	374	
vCu, unblocked vol	270				328				706	651	323	667	654	268
tC, single (s)	4.1				4.1				7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)									6.1	5.5		6.1	5.5	
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98				100				97	99	97	97	96	94
cM capacity (veh/h)	1293				1232				500	532	718	533	534	771
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2							
Volume Total	23	328	6	270	43	17	70							
Volume Left	23	0	6	0	17	17	0							
Volume Right	0	10	0	4	20	0	47							
cSH	1293	1700	1232	1700	588	533	672							
Volume to Capacity	0.02	0.19	0.00	0.16	0.07	0.03	0.10							
Queue Length 95th (ft)	1	0	0	0	6	2	9							
Control Delay (s)	7.8	0.0	7.9	0.0	11.6	12.0	11.0							
Lane LOS	A		A		B		B	B						
Approach Delay (s)	0.5		0.2		11.6		11.2							
Approach LOS					B		B							
Intersection Summary														
Average Delay			2.2											
Intersection Capacity Utilization			33.0%		ICU Level of Service				A					
Analysis Period (min)			15											

Lanes, Volumes, Timings
12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2016 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (vph)	1	364	13	26	339	9	17	2	61	36	11	27
Future Volume (vph)	1	364	13	26	339	9	17	2	61	36	11	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		225	50		0
Storage Lanes	0		0	0		0	1		1	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.997			0.854			0.893	
Flt Protected					0.997		0.950			0.950		
Satd. Flow (prot)	0	1850	0	0	1852	0	1703	1591	0	1770	1663	0
Flt Permitted					0.997		0.950			0.950		
Satd. Flow (perm)	0	1850	0	0	1852	0	1703	1591	0	1770	1663	0
Link Speed (mph)		35			35			35				35
Link Distance (ft)		1274			210			2969				473
Travel Time (s)		24.8			4.1			57.8				9.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90
Heavy Vehicles (%)	2%	2%	8%	2%	2%	2%	6%	2%	2%	2%	2%	2%
Adj. Flow (vph)	1	404	14	29	377	10	19	2	68	40	12	30
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	419	0	0	416	0	19	70	0	40	42	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	53.7%
Analysis Period (min)	15
	ICU Level of Service A















HCM Unsignalized Intersection Capacity Analysis
 12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
 2016 Background PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↖	↗		↖	↗	
Traffic Volume (veh/h)	1	364	13	26	339	9	17	2	61	36	11	27
Future Volume (Veh/h)	1	364	13	26	339	9	17	2	61	36	11	27
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90
Hourly flow rate (vph)	1	404	14	29	377	10	19	2	68	40	12	30
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					1217							
pX, platoon unblocked	0.95						0.95	0.95		0.95	0.95	0.95
vC, conflicting volume	387			418			889	858	411	922	860	382
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	327			418			856	823	411	891	825	321
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			92	99	89	82	96	96
cM capacity (veh/h)	1170			1141			235	285	641	218	284	682
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	419	416	19	70	40	42						
Volume Left	1	29	19	0	40	0						
Volume Right	14	10	0	68	0	30						
cSH	1170	1141	235	619	218	487						
Volume to Capacity	0.00	0.03	0.08	0.11	0.18	0.09						
Queue Length 95th (ft)	0	2	7	10	16	7						
Control Delay (s)	0.0	0.8	21.6	11.6	25.2	13.1						
Lane LOS	A	A	C	B	D	B						
Approach Delay (s)	0.0	0.8	13.7		19.0							
Approach LOS			B		C							
Intersection Summary												
Average Delay			3.1									
Intersection Capacity Utilization			53.7%	ICU Level of Service	A							
Analysis Period (min)			15									

Lanes, Volumes, Timings
13: Harden Street Ext & Slighs Ave.

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (vph)	78	199	1039	64	120	919
Future Volume (vph)	78	199	1039	64	120	919
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		50	100	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				50	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3539	1495	1736	3539
Flt Permitted	0.950				0.188	
Satd. Flow (perm)	1770	1583	3539	1495	343	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		221		20		
Link Speed (mph)	30		35			35
Link Distance (ft)	359		2581			498
Travel Time (s)	8.2		50.3			9.7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.91
Heavy Vehicles (%)	2%	2%	2%	8%	4%	2%
Adj. Flow (vph)	87	221	1154	71	133	1010
Shared Lane Traffic (%)						
Lane Group Flow (vph)	87	221	1154	71	133	1010
Turn Type	Prot	Over	NA	Perm	pm+pt	NA
Protected Phases	4	5	6		5	2
Permitted Phases				6	2	
Detector Phase	4	5	6	6	5	2
Switch Phase						
Minimum Initial (s)	16.0	11.0	16.0	16.0	11.0	16.0
Minimum Split (s)	30.0	17.0	30.0	30.0	17.0	30.0
Total Split (s)	32.0	26.0	72.0	72.0	26.0	98.0
Total Split (%)	24.6%	20.0%	55.4%	55.4%	20.0%	75.4%
Maximum Green (s)	26.0	20.0	66.0	66.0	20.0	92.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0	-2.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0	4.0	2.0	2.0
Lead/Lag		Lead	Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)	20.0	15.8	88.2	86.2	106.0	106.0
Actuated g/C Ratio	0.15	0.12	0.68	0.66	0.82	0.82
v/c Ratio	0.32	0.57	0.48	0.07	0.30	0.35
Control Delay	52.6	12.7	11.7	4.2	5.3	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	52.6	12.7	11.7	4.2	5.3	1.9
LOS	D	B	B	A	A	A
Approach Delay	23.9		11.3			2.3

Lanes, Volumes, Timings
 13: Harden Street Ext & Slighs Ave.



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	C		B		A	
Queue Length 50th (ft)	66	0	287	23	10	48
Queue Length 95th (ft)	119	74	387	31	32	40
Internal Link Dist (ft)	279		2501		418	
Turn Bay Length (ft)			50		100	
Base Capacity (vph)	408	472	2400	998	536	2884
Starvation Cap Reductn	0	0	0	0	0	776
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.47	0.48	0.07	0.25	0.48

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	130
Offset:	86 (66%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
Natural Cycle:	80
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.57
Intersection Signal Delay:	8.9
Intersection LOS:	A
Intersection Capacity Utilization	61.2%
ICU Level of Service	B
Analysis Period (min)	15

Splits and Phases: 13: Harden Street Ext & Slighs Ave.



Lanes, Volumes, Timings
14: Colonial Drive & Farrow Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Lane Configurations		↗↗	↖	↑↑	↑↑		
Traffic Volume (vph)	0	160	250	946	383	24	
Future Volume (vph)	0	160	250	946	383	24	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0	330	550			0	
Storage Lanes	0	1	1			0	
Taper Length (ft)	25		125				
Lane Util. Factor	1.00	0.88	1.00	0.95	0.95	0.95	
Frt		0.850			0.991		
Flt Protected			0.950				
Satd. Flow (prot)	0	2787	1770	3539	3507	0	
Flt Permitted			0.950				
Satd. Flow (perm)	0	2787	1770	3539	3507	0	
Right Turn on Red		Yes				No	
Satd. Flow (RTOR)		620					
Link Speed (mph)	35			35	35		
Link Distance (ft)	1114			695	2010		
Travel Time (s)	21.7			13.5	39.2		
Peak Hour Factor	0.90	0.90	0.96	0.90	0.92	0.90	
Adj. Flow (vph)	0	178	260	1051	416	27	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	178	260	1051	443	0	
Turn Type		Over	Prot	NA	NA		
Protected Phases		8	8	8 6	2	6	
Permitted Phases				8			
Detector Phase		8	8	8 6	2		
Switch Phase							
Minimum Initial (s)		16.0	16.0		16.0	11.0	
Minimum Split (s)		30.0	30.0		30.0	30.0	
Total Split (s)		32.0	32.0		33.0	33.0	
Total Split (%)		49.2%	49.2%		50.8%	51%	
Maximum Green (s)		26.0	26.0		27.0	27.5	
Yellow Time (s)		4.0	4.0		4.0	4.0	
All-Red Time (s)		2.0	2.0		2.0	1.5	
Lost Time Adjust (s)		-3.0	-3.0		-4.0		
Total Lost Time (s)		3.0	3.0		2.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0	3.0		3.0	3.0	
Recall Mode		None	None		C-Max	C-Max	
Act Effct Green (s)		23.3	23.3	65.0	36.7		
Actuated g/C Ratio		0.36	0.36	1.00	0.56		
v/c Ratio		0.13	0.41	0.30	0.22		
Control Delay		0.2	13.2	0.2	10.7		
Queue Delay		0.0	0.0	0.0	0.0		
Total Delay		0.2	13.2	0.2	10.7		
LOS		A	B	A	B		
Approach Delay				2.8	10.7		
Approach LOS				A	B		

Lanes, Volumes, Timings
 14: Colonial Drive & Farrow Road

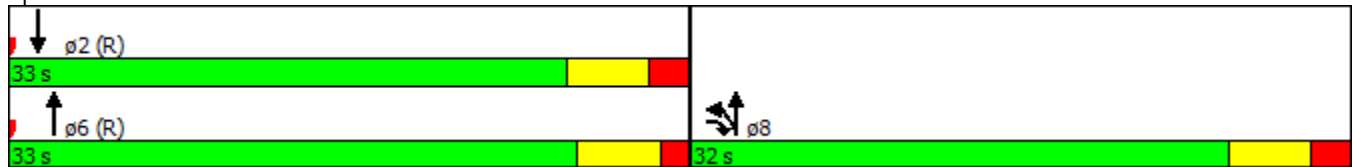


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Queue Length 50th (ft)		0	78	0	76		
Queue Length 95th (ft)		0	98	0	101		
Internal Link Dist (ft)	1034			615	1930		
Turn Bay Length (ft)		330	550				
Base Capacity (vph)		1586	789	3539	1981		
Starvation Cap Reductn		0	0	0	0		
Spillback Cap Reductn		0	0	0	0		
Storage Cap Reductn		0	0	0	0		
Reduced v/c Ratio		0.11	0.33	0.30	0.22		

Intersection Summary

Area Type:	Other
Cycle Length:	65
Actuated Cycle Length:	65
Offset:	42 (65%), Referenced to phase 2:SBT and 6:NBT, Start of 1st Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.41
Intersection Signal Delay:	4.3
Intersection LOS:	A
Intersection Capacity Utilization	33.9%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 14: Colonial Drive & Farrow Road



Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
2016 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	521	11	153	491	365	0	956	257	271	310	47
Future Volume (vph)	87	521	11	153	491	365	0	956	257	271	310	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		0	300		0	0		225	200		0
Storage Lanes	1		0	2		1	0		1	1		0
Taper Length (ft)	125			100			25			125		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.997				0.850			0.850		0.980	
Flt Protected	0.950			0.950						0.950		
Satd. Flow (prot)	1770	3529	0	3433	3539	1583	0	3539	1583	1770	3468	0
Flt Permitted	0.448			0.950						0.095		
Satd. Flow (perm)	835	3529	0	3433	3539	1583	0	3539	1583	177	3468	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				20			143		21	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1548			1446			2010			864	
Travel Time (s)		30.2			28.2			39.2			16.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	0.94	0.90	0.90
Adj. Flow (vph)	97	579	12	170	546	406	0	1062	268	288	344	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	97	591	0	170	546	406	0	1062	268	288	396	0
Turn Type	Perm	NA		Prot	NA	pm+ov		NA	Free	pm+pt	NA	
Protected Phases		4		3	8	1		2		1	6	
Permitted Phases	4					8			Free	6		
Detector Phase	4	4		3	8	1		2		1	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0	5.0		15.0		5.0	15.0	
Minimum Split (s)	30.0	30.0		21.0	41.0	17.0		41.0		17.0	30.0	
Total Split (s)	31.0	31.0		21.0	52.0	27.0		51.0		27.0	78.0	
Total Split (%)	23.8%	23.8%		16.2%	40.0%	20.8%		39.2%		20.8%	60.0%	
Maximum Green (s)	26.0	26.0		16.0	47.0	22.0		46.0		22.0	73.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5		3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5	1.5		1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0		-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead		Lead		Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Recall Mode	None	None		None	None	None		C-Min		None	C-Min	
Walk Time (s)					18.0			18.0				
Flash Dont Walk (s)					5.0			5.0				
Pedestrian Calls (#/hr)					0			0				
Act Effct Green (s)	26.4	26.4		16.0	46.4	71.1		50.9	130.0	75.6	75.6	
Actuated g/C Ratio	0.20	0.20		0.12	0.36	0.55		0.39	1.00	0.58	0.58	
v/c Ratio	0.57	0.83		0.40	0.43	0.46		0.77	0.17	0.81	0.20	
Control Delay	60.8	60.0		55.8	32.8	18.3		43.4	0.2	68.9	9.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	60.8	60.0		55.8	32.8	18.3		43.4	0.2	68.9	9.4	

Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
2016 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	E		E	C	B		D	A	E	A	
Approach Delay		60.1			31.0			34.7			34.5	
Approach LOS		E			C			C			C	
Queue Length 50th (ft)	73	247		69	178	175		430	0	209	57	
Queue Length 95th (ft)	136	317		106	231	254		520	0	#317	75	
Internal Link Dist (ft)		1468			1366			1930			784	
Turn Bay Length (ft)	175			300					225	200		
Base Capacity (vph)	177	751		448	1308	902		1387	1583	384	2027	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.55	0.79		0.38	0.42	0.45		0.77	0.17	0.75	0.20	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 38.2
 Intersection LOS: D
 Intersection Capacity Utilization 82.0%
 ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 15: Farrow Road & Beltline Blvd



Lanes, Volumes, Timings
16: Farrow Road & 277 NB RAMPS

Bull Street Commons Traffic Study
2016 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	147	0	14	0	0	0	0	821	607	61	592	0
Future Volume (vph)	147	0	14	0	0	0	0	821	607	61	592	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	0		0	0		0	250		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			25			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.850						0.937				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1770	1583	0	0	0	0	0	3316	0	1770	3539	0
Flt Permitted	0.950									0.133		
Satd. Flow (perm)	1770	1583	0	0	0	0	0	3316	0	248	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		345						363				
Link Speed (mph)		35			35			35				35
Link Distance (ft)		827			779			864				694
Travel Time (s)		16.1			15.2			16.8				13.5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.92	0.90
Adj. Flow (vph)	163	0	16	0	0	0	0	912	660	68	643	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	163	16	0	0	0	0	0	1572	0	68	643	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						6			2	
Permitted Phases	4									2		
Detector Phase	4	4						6		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0						10.0		10.0	10.0	
Minimum Split (s)	30.0	30.0						30.0		30.0	30.0	
Total Split (s)	32.0	32.0						98.0		98.0	98.0	
Total Split (%)	24.6%	24.6%						75.4%		75.4%	75.4%	
Maximum Green (s)	27.0	27.0						93.0		93.0	93.0	
Yellow Time (s)	3.5	3.5						3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5						1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0						-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0						4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Recall Mode	None	None						C-Max		C-Max	C-Max	
Act Effct Green (s)	18.2	18.2						103.8		103.8	103.8	
Actuated g/C Ratio	0.14	0.14						0.80		0.80	0.80	
v/c Ratio	0.66	0.03						0.58		0.34	0.23	
Control Delay	65.1	0.1						2.4		14.4	6.0	
Queue Delay	0.0	0.0						0.3		0.0	0.0	
Total Delay	65.1	0.1						2.7		14.4	6.0	
LOS	E	A						A		B	A	
Approach Delay		59.3						2.7			6.8	
Approach LOS		E						A			A	

Lanes, Volumes, Timings
 16: Farrow Road & 277 NB RAMPS

Bull Street Commons Traffic Study
 2016 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	132	0						30		27	80	
Queue Length 95th (ft)	199	0						52		74	108	
Internal Link Dist (ft)		747			699			784			614	
Turn Bay Length (ft)	300									250		
Base Capacity (vph)	381	611						2720		198	2824	
Starvation Cap Reductn	0	0						465		0	0	
Spillback Cap Reductn	0	0						0		0	0	
Storage Cap Reductn	0	0						0		0	0	
Reduced v/c Ratio	0.43	0.03						0.70		0.34	0.23	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 8.0
 Intersection Capacity Utilization 65.7%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service C

Splits and Phases: 16: Farrow Road & 277 NB RAMPS



Lanes, Volumes, Timings
17: Farrow Road & Lorick Avenue /277 SB Ramps

Bull Street Commons Traffic Study
2016 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	0	38	150	15	45	23	946	0	0	462	135
Future Volume (vph)	32	0	38	150	15	45	23	946	0	0	462	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	125		0	200		0	0		0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (ft)	25			150			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850		0.888							0.966
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1770	0	1583	1770	1654	0	1770	3539	0	0	3419	0
Flt Permitted	0.702			0.950			0.390					
Satd. Flow (perm)	1308	0	1583	1770	1654	0	726	3539	0	0	3419	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			42		50							57
Link Speed (mph)		35			35			35				35
Link Distance (ft)		467			1041			694				870
Travel Time (s)		9.1			20.3			13.5				16.9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	36	0	42	167	17	50	26	1051	0	0	513	150
Shared Lane Traffic (%)												
Lane Group Flow (vph)	36	0	42	167	67	0	26	1051	0	0	663	0
Turn Type	Perm		Perm	Perm	NA		Perm	NA			NA	
Protected Phases					4			2				6
Permitted Phases	8		8	4			2					
Detector Phase	8		8	4	4		2	2				6
Switch Phase												
Minimum Initial (s)	10.0		10.0	10.0	10.0		10.0	10.0				10.0
Minimum Split (s)	30.0		30.0	30.0	30.0		30.0	30.0				30.0
Total Split (s)	44.0		44.0	44.0	44.0		86.0	86.0				86.0
Total Split (%)	33.8%		33.8%	33.8%	33.8%		66.2%	66.2%				66.2%
Maximum Green (s)	39.0		39.0	39.0	39.0		81.0	81.0				81.0
Yellow Time (s)	3.5		3.5	3.5	3.5		3.5	3.5				3.5
All-Red Time (s)	1.5		1.5	1.5	1.5		1.5	1.5				1.5
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0		-1.0	-1.0				-1.0
Total Lost Time (s)	4.0		4.0	4.0	4.0		4.0	4.0				4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0				3.0
Recall Mode	None		None	None	None		C-Max	C-Max				C-Max
Act Effct Green (s)	18.7		18.7	18.7	18.7		103.3	103.3				103.3
Actuated g/C Ratio	0.14		0.14	0.14	0.14		0.79	0.79				0.79
v/c Ratio	0.19		0.16	0.66	0.24		0.05	0.37				0.24
Control Delay	49.3		14.2	64.5	19.6		2.7	3.2				3.6
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.0				0.0
Total Delay	49.3		14.2	64.5	19.6		2.7	3.2				3.6
LOS	D		B	E	B		A	A				A
Approach Delay					51.6			3.2				3.6
Approach LOS					D			A				A

Lanes, Volumes, Timings
 17: Farrow Road & Lorick Avenue /277 SB Ramps

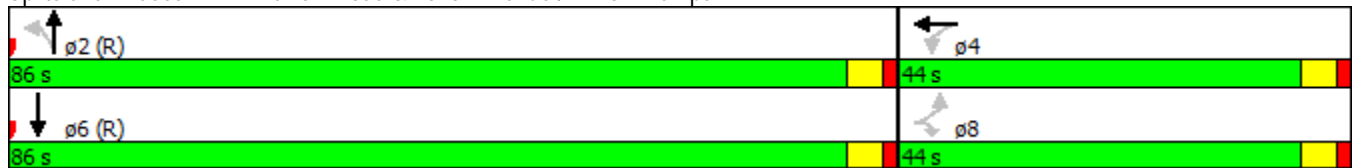


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	27		0	135	13		3	75			55	
Queue Length 95th (ft)	58		33	201	53		m6	120			94	
Internal Link Dist (ft)		387			961			614			790	
Turn Bay Length (ft)				125			200					
Base Capacity (vph)	402		516	544	543		577	2813			2729	
Starvation Cap Reductn	0		0	0	0		0	0			0	
Spillback Cap Reductn	0		0	0	0		0	0			0	
Storage Cap Reductn	0		0	0	0		0	0			0	
Reduced v/c Ratio	0.09		0.08	0.31	0.12		0.05	0.37			0.24	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 9.9
 Intersection LOS: A
 Intersection Capacity Utilization 47.8%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 17: Farrow Road & Lorick Avenue /277 SB Ramps



Lanes, Volumes, Timings
18: Assembly St./Assembly & Elmwood Avenue

Bull Street Commons Traffic Study
2016 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1531	258	320	1831	7	981	8	545	0	0	1
Future Volume (vph)	0	1531	258	320	1831	7	981	8	545	0	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		275	150		0	0		0	0		0
Storage Lanes	1		1	1		0	2		1	0		0
Taper Length (ft)	150			75			25			25		
Lane Util. Factor	1.00	0.86	0.86	0.97	0.91	0.91	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850		0.999				0.850		0.865	
Flt Protected				0.950			0.950					
Satd. Flow (prot)	1863	4806	1362	3433	5080	0	3433	1770	1504	0	1611	0
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	1863	4806	1362	3433	5080	0	3433	1770	1504	0	1611	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			273		1				102		126	
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		2522			509			585			432	
Travel Time (s)		57.3			11.6			13.3			8.4	
Peak Hour Factor	0.90	0.94	0.90	0.90	0.92	0.90	0.93	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1629	287	356	1990	8	1055	9	606	0	0	1
Shared Lane Traffic (%)			0%						0%			
Lane Group Flow (vph)	0	1629	287	356	1998	0	1055	9	606	0	1	0
Turn Type	Perm	NA	pm+ov	Prot	NA		Split	NA	pm+ov		NA	
Protected Phases		2	3	1	6		3	3	1		4	
Permitted Phases	2		2						3	4		
Detector Phase	2	2	3	1	6		3	3	1	4	4	
Switch Phase												
Minimum Initial (s)	16.0	16.0	11.0	11.0	16.0		11.0	11.0	11.0	4.5	4.5	
Minimum Split (s)	30.0	30.0	17.0	17.0	30.0		17.0	17.0	17.0	10.0	10.0	
Total Split (s)	51.0	51.0	46.0	23.0	74.0		46.0	46.0	23.0	10.0	10.0	
Total Split (%)	39.2%	39.2%	35.4%	17.7%	56.9%		35.4%	35.4%	17.7%	7.7%	7.7%	
Maximum Green (s)	45.0	45.0	40.0	17.0	68.0		40.0	40.0	17.0	4.5	4.5	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	1.5	1.5	
Lost Time Adjust (s)	0.0	-4.0	-4.0	-4.0	-4.0		-4.0	0.0	-4.0		-1.5	
Total Lost Time (s)	6.0	2.0	2.0	2.0	2.0		2.0	6.0	2.0		4.0	
Lead/Lag	Lead	Lead	Lead	Lag			Lead	Lead	Lag	Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max	None	None	C-Max		None	None	None	None	None	
Act Effct Green (s)		57.0	102.6	21.0	80.0		44.0	40.0	67.0		6.0	
Actuated g/C Ratio		0.44	0.79	0.16	0.62		0.34	0.31	0.52		0.05	
v/c Ratio		0.77	0.25	0.64	0.64		0.91	0.02	0.74		0.01	
Control Delay		34.6	1.0	51.0	10.8		53.4	31.6	26.5		0.0	
Queue Delay		0.0	0.0	0.0	0.6		0.0	0.0	0.0		0.0	
Total Delay		34.6	1.0	51.0	11.5		53.4	31.6	26.5		0.0	
LOS		C	A	D	B		D	C	C		A	
Approach Delay		29.6			17.4			43.5			0.0	
Approach LOS		C			B			D			A	

Lanes, Volumes, Timings
 18: Assembly St./Assembly & Elmwood Avenue

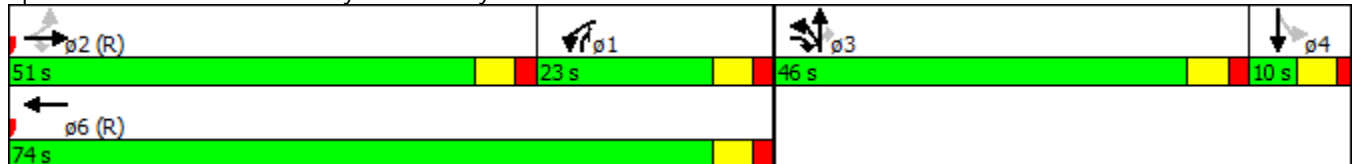


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		431	2	156	150		436	5	344		0	
Queue Length 95th (ft)		570	19	m206	355		#560	20	510		0	
Internal Link Dist (ft)		2442			429			505			352	
Turn Bay Length (ft)			275	150								
Base Capacity (vph)		2107	1132	554	3126		1161	544	824		194	
Starvation Cap Reductn		0	0	0	664		0	0	0		0	
Spillback Cap Reductn		0	0	0	0		0	0	0		0	
Storage Cap Reductn		0	0	0	0		0	0	0		0	
Reduced v/c Ratio		0.77	0.25	0.64	0.81		0.91	0.02	0.74		0.01	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 28 (22%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.91
 Intersection Signal Delay: 28.7
 Intersection LOS: C
 Intersection Capacity Utilization 96.9%
 ICU Level of Service F
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Assembly St./Assembly & Elmwood Avenue



Lanes, Volumes, Timings
19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
2016 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	477	1467	69	12	1449	88	139	458	48	147	193	460
Future Volume (vph)	477	1467	69	12	1449	88	139	458	48	147	193	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		175	150		0	200		0	175		425
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	75			75			100			75		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850		0.991				0.850		0.939	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	1770	5040	0	1770	3539	1583	1770	3183	1441
Flt Permitted	0.950			0.160			0.333			0.180		
Satd. Flow (perm)	3433	5085	1583	298	5040	0	620	3539	1583	335	3183	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			77		9				126		99	77
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		509			563			693			3655	
Travel Time (s)		11.6			12.8			15.8			83.1	
Peak Hour Factor	0.91	0.97	0.90	0.90	0.95	0.90	0.90	0.90	0.90	0.90	0.95	0.90
Adj. Flow (vph)	524	1512	77	13	1525	98	154	509	53	163	203	511
Shared Lane Traffic (%)												27%
Lane Group Flow (vph)	524	1512	77	13	1623	0	154	509	53	163	341	373
Turn Type	Prot	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	pm+ov
Protected Phases	5	2	3		6		3	8		7	4	5
Permitted Phases			2	6			8		8	4		4
Detector Phase	5	2	3	6	6		3	8	8	7	4	5
Switch Phase												
Minimum Initial (s)	11.0	16.0	11.0	16.0	16.0		11.0	16.0	16.0	11.0	16.0	11.0
Minimum Split (s)	17.0	30.0	17.0	30.0	30.0		17.0	30.0	30.0	17.0	30.0	17.0
Total Split (s)	30.0	83.0	17.0	53.0	53.0		17.0	30.0	30.0	17.0	30.0	30.0
Total Split (%)	23.1%	63.8%	13.1%	40.8%	40.8%		13.1%	23.1%	23.1%	13.1%	23.1%	23.1%
Maximum Green (s)	24.0	77.0	11.0	47.0	47.0		11.0	24.0	24.0	11.0	24.0	24.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0	-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lead	Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	C-Max	C-Max		None	None	None	None	None	None
Act Effct Green (s)	27.1	82.7	99.7	53.6	53.6		41.3	26.3	26.3	41.3	26.3	55.4
Actuated g/C Ratio	0.21	0.64	0.77	0.41	0.41		0.32	0.20	0.20	0.32	0.20	0.43
v/c Ratio	0.73	0.47	0.06	0.11	0.78		0.47	0.71	0.13	0.60	0.47	0.57
Control Delay	65.2	10.0	0.1	20.9	32.6		36.3	54.2	0.6	41.2	33.9	25.2
Queue Delay	0.0	0.2	0.0	0.0	0.2		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.2	10.2	0.1	20.9	32.8		36.3	54.2	0.6	41.2	33.9	25.2
LOS	E	B	A	C	C		D	D	A	D	C	C
Approach Delay		23.5			32.7			46.3			31.6	
Approach LOS		C			C			D			C	

Lanes, Volumes, Timings
19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
2016 Background PM

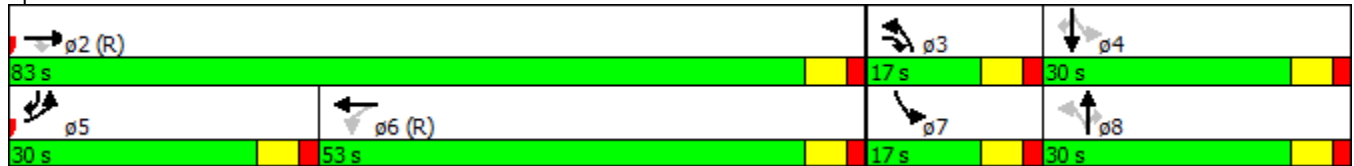


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	236	140	0	5	521		93	209	0	99	97	197
Queue Length 95th (ft)	289	241	m0	m9	578		149	271	0	157	147	305
Internal Link Dist (ft)		429			483			613			3575	
Turn Bay Length (ft)	175		175	150			200			175		425
Base Capacity (vph)	739	3234	1231	122	2082		329	762	439	272	763	667
Starvation Cap Reductn	0	775	0	0	66		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	60		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.61	0.06	0.11	0.81		0.47	0.67	0.12	0.60	0.45	0.56

Intersection Summary

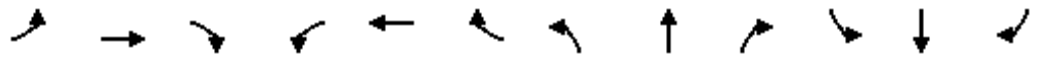
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 120 (92%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 30.7
 Intersection LOS: C
 Intersection Capacity Utilization 79.4%
 ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Main St. & Elmwood Avenue



Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2016 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕↕↗		↖	↕↕↗		↖	↕	↗		↕↗	
Traffic Volume (vph)	9	1331	82	30	1486	9	85	248	198	4	42	12
Future Volume (vph)	9	1331	82	30	1486	9	85	248	198	4	42	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	75		0	200		0	75		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			50			100			50		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.991			0.999				0.850		0.970	
Flt Protected	0.950			0.950			0.950				0.997	
Satd. Flow (prot)	1770	5040	0	1770	5080	0	1770	1863	1583	0	3423	0
Flt Permitted	0.123			0.129			0.713				0.937	
Satd. Flow (perm)	229	5040	0	240	5080	0	1328	1863	1583	0	3217	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			1				41		13	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		563			1012			3133			1095	
Travel Time (s)		12.8			23.0			71.2			24.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	10	1479	91	33	1598	10	94	276	220	4	47	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	1570	0	33	1608	0	94	276	220	0	64	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		6	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	81.0	81.0		81.0	81.0		49.0	49.0	49.0	49.0	49.0	
Total Split (%)	62.3%	62.3%		62.3%	62.3%		37.7%	37.7%	37.7%	37.7%	37.7%	
Maximum Green (s)	75.0	75.0		75.0	75.0		43.0	43.0	43.0	43.0	43.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0		-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0		2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None	None	None	None	
Act Effct Green (s)	96.8	96.8		96.8	96.8		29.2	29.2	29.2		29.2	
Actuated g/C Ratio	0.74	0.74		0.74	0.74		0.22	0.22	0.22		0.22	
v/c Ratio	0.06	0.42		0.19	0.43		0.32	0.66	0.57		0.09	
Control Delay	2.0	1.8		9.8	9.4		43.2	52.9	41.0		29.9	
Queue Delay	0.0	0.1		0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	2.0	1.9		9.8	9.5		43.2	52.9	41.0		29.9	
LOS	A	A		A	A		D	D	D		C	
Approach Delay		1.9			9.5			46.9			29.9	
Approach LOS		A			A			D			C	

Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2016 Background PM

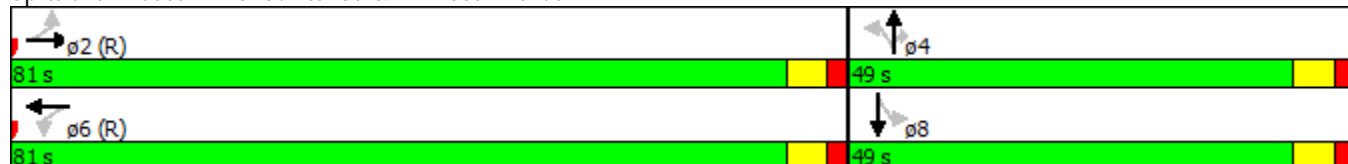


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	0	12		9	97		67	214	136		17	
Queue Length 95th (ft)	m2	212		m12	m243		108	283	200		34	
Internal Link Dist (ft)		483			932			3053			1015	
Turn Bay Length (ft)	200			75			200					
Base Capacity (vph)	170	3755		178	3782		480	673	598		1171	
Starvation Cap Reductn	0	573		0	0		0	0	0		0	
Spillback Cap Reductn	0	0		0	310		0	0	0		0	
Storage Cap Reductn	0	0		0	0		0	0	0		0	
Reduced v/c Ratio	0.06	0.49		0.19	0.46		0.20	0.41	0.37		0.05	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 18 (14%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 12.4
 Intersection LOS: B
 Intersection Capacity Utilization 64.2%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 20: Sumter St. & Elmwood Avenue





Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔	↔	↔	↔
Traffic Volume (vph)	306	10	5	268	30	29
Future Volume (vph)	306	10	5	268	30	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	225		125	0
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.996					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1855	0	1770	1863	1770	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1855	0	1770	1863	1770	1583
Link Speed (mph)	35			35	35	
Link Distance (ft)	905			434	600	
Travel Time (s)	17.6			8.5	11.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	322	11	5	282	32	31
Shared Lane Traffic (%)						
Lane Group Flow (vph)	333	0	5	282	32	31
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	26.7%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 21: Barnwell St. & Calhoun St.

Bull Street Commons Traffic Study
 2016 Background PM



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔	↔	↔	↔
Traffic Volume (veh/h)	306	10	5	268	30	29
Future Volume (Veh/h)	306	10	5	268	30	29
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	322	11	5	282	32	31
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		TWLTL			
Median storage (veh)	2					
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			333		620	328
vC1, stage 1 conf vol					328	
vC2, stage 2 conf vol					292	
vCu, unblocked vol			333		620	328
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		95	96
cM capacity (veh/h)			1226		629	714

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	333	5	282	32	31
Volume Left	0	5	0	32	0
Volume Right	11	0	0	0	31
cSH	1700	1226	1700	629	714
Volume to Capacity	0.20	0.00	0.17	0.05	0.04
Queue Length 95th (ft)	0	0	0	4	3
Control Delay (s)	0.0	7.9	0.0	11.0	10.3
Lane LOS	A		B		
Approach Delay (s)	0.0	0.1	10.7		
Approach LOS				B	

Intersection Summary					
Average Delay			1.0		
Intersection Capacity Utilization			26.7%	ICU Level of Service	A
Analysis Period (min)	15				

Lanes, Volumes, Timings
 26: Colonial Drive & Mental Health Dwy



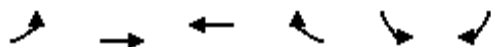
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	255	381	1	123	32
Future Volume (vph)	5	255	381	1	123	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.972	
Flt Protected	0.950				0.962	
Satd. Flow (prot)	1770	1863	1863	0	1742	0
Flt Permitted	0.950				0.962	
Satd. Flow (perm)	1770	1863	1863	0	1742	0
Link Speed (mph)		35	35		30	
Link Distance (ft)		693	1274		472	
Travel Time (s)		13.5	24.8		10.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	268	401	1	129	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	5	268	402	0	163	0
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	35.5%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 26: Colonial Drive & Mental Health Dwy

Bull Street Commons Traffic Study
 2016 Background PM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↗		↙	↘
Traffic Volume (veh/h)	5	255	381	1	123	32
Future Volume (Veh/h)	5	255	381	1	123	32
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	268	401	1	129	34
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		693				
pX, platoon unblocked						
vC, conflicting volume	402				680	402
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	402				680	402
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				69	95
cM capacity (veh/h)	1157				415	649
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	5	268	402	163		
Volume Left	5	0	0	129		
Volume Right	0	0	1	34		
cSH	1157	1700	1700	449		
Volume to Capacity	0.00	0.16	0.24	0.36		
Queue Length 95th (ft)	0	0	0	41		
Control Delay (s)	8.1	0.0	0.0	17.5		
Lane LOS	A			C		
Approach Delay (s)	0.1		0.0	17.5		
Approach LOS				C		
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			35.5%		ICU Level of Service	A
Analysis Period (min)			15			

2016 Build Conditions
Phase I
Initial Project Development

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2016 Phase 1 Build-Out AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗	↖	↗	↗	↖
Traffic Volume (vph)	8	4	3	153	18	36	23	561	542	409	2193	19
Future Volume (vph)	8	4	3	153	18	36	23	561	542	409	2193	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		200	675		0	175		0	200		250
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100			75			50			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt		0.936			0.900				0.850		0.999	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3313	0	3433	1666	0	1770	3539	1583	1770	5080	0
Flt Permitted	0.950			0.950			0.056			0.354		
Satd. Flow (perm)	1770	3313	0	3433	1666	0	104	3539	1583	659	5080	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			40				506		2	
Link Speed (mph)		30			40			40			45	
Link Distance (ft)		552			905			1206			1658	
Travel Time (s)		12.5			15.4			20.6			25.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.92	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	9	4	3	170	20	40	26	603	602	454	2384	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	9	7	0	170	60	0	26	603	602	454	2405	0
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	4	4		3	3			2	3	1	6	
Permitted Phases							2		2	6		
Detector Phase	4	4		3	3		2	2	3	1	6	
Switch Phase												
Minimum Initial (s)	14.0	14.0		11.0	11.0		16.0	16.0	11.0	11.0	16.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		30.0	30.0	20.0	17.0	30.0	
Total Split (s)	20.0	20.0		26.0	26.0		49.0	49.0	26.0	35.0	84.0	
Total Split (%)	15.4%	15.4%		20.0%	20.0%		37.7%	37.7%	20.0%	26.9%	64.6%	
Maximum Green (s)	14.0	14.0		20.0	20.0		43.0	43.0	20.0	29.0	78.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag	Lead	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	None	None	C-Max	
Act Effct Green (s)	18.0	18.0		17.6	17.6		76.4	76.4	96.0	100.4	100.4	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.59	0.59	0.74	0.77	0.77	
v/c Ratio	0.04	0.02		0.37	0.23		0.43	0.29	0.46	0.65	0.61	
Control Delay	49.1	39.0		40.5	15.9		36.9	4.0	4.4	11.2	9.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	49.1	39.0		40.5	15.9		36.9	4.0	4.4	11.2	9.2	
LOS	D	D		D	B		D	A	A	B	A	
Approach Delay		44.7			34.1			4.9			9.5	

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2016 Phase 1 Build-Out AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			C			A			A	
Queue Length 50th (ft)	7	1		71	19		2	28	20	62	171	
Queue Length 95th (ft)	24	9		90	30		#58	117	504	235	517	
Internal Link Dist (ft)		472			825			1126			1578	
Turn Bay Length (ft)	100			675			175			200		
Base Capacity (vph)	245	461		633	340		61	2080	1354	791	3924	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.02		0.27	0.18		0.43	0.29	0.44	0.57	0.61	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 9.6
 Intersection LOS: A
 Intersection Capacity Utilization 77.9%
 ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Bull St. & Harden St. Ext.



Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

Bull Street Commons Traffic Study
2016 Phase 1 Build-Out AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	2	12	15	11	7	15	1158	77	65	2282	2
Future Volume (vph)	5	2	12	15	11	7	15	1158	77	65	2282	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	200		0	200		0	150		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			100			100			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Frt		0.870			0.940				0.850			
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1621	0	1770	1751	0	1770	5085	1583	1770	5085	0
Flt Permitted	0.744			0.263			0.042			0.196		
Satd. Flow (perm)	1386	1621	0	490	1751	0	78	5085	1583	365	5085	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		602			715			682			1206	
Travel Time (s)		13.7			16.3			11.6			20.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.94	0.90
Adj. Flow (vph)	6	2	13	17	12	8	17	1232	86	72	2428	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	15	0	17	20	0	17	1232	86	72	2430	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			3			2				6
Permitted Phases	4			3			2		2	6		
Detector Phase	4	4		3	3		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	16.0
Minimum Split (s)	25.0	25.0		25.0	25.0		30.0	30.0	30.0	30.0	30.0	30.0
Total Split (s)	25.0	25.0		28.0	28.0		77.0	77.0	77.0	77.0	77.0	77.0
Total Split (%)	19.2%	19.2%		21.5%	21.5%		59.2%	59.2%	59.2%	59.2%	59.2%	59.2%
Maximum Green (s)	19.0	19.0		22.0	22.0		71.0	71.0	71.0	71.0	71.0	71.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	20.0	20.0		21.6	21.6		105.2	105.2	105.2	105.2	105.2	105.2
Actuated g/C Ratio	0.15	0.15		0.17	0.17		0.81	0.81	0.81	0.81	0.81	0.81
v/c Ratio	0.03	0.06		0.21	0.07		0.27	0.30	0.07	0.24	0.59	
Control Delay	47.4	47.9		52.7	45.2		21.0	2.0	2.4	11.6	8.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	47.4	47.9		52.7	45.2		21.0	2.0	2.4	11.6	8.9	
LOS	D	D		D	D		C	A	A	B	A	
Approach Delay		47.7			48.6			2.2			8.9	
Approach LOS		D			D			A			A	

Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

Bull Street Commons Traffic Study
2016 Phase 1 Build-Out AM

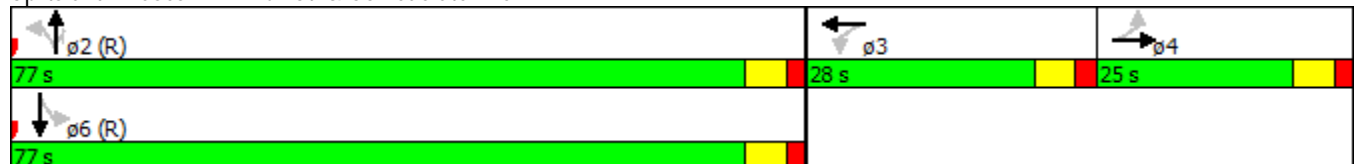


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	4	11		13	15		1	19	4	10	187	
Queue Length 95th (ft)	18	33		36	37		m9	53	16	m51	401	
Internal Link Dist (ft)		522			635			602			1126	
Turn Bay Length (ft)	150			200			200			150		
Base Capacity (vph)	245	286		98	350		63	4116	1281	295	4116	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.02	0.05		0.17	0.06		0.27	0.30	0.07	0.24	0.59	

Intersection Summary

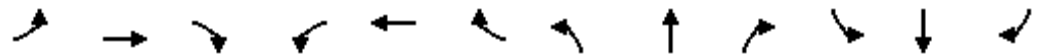
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 113 (87%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.59
 Intersection Signal Delay: 7.2
 Intersection LOS: A
 Intersection Capacity Utilization 74.0%
 ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bull St. & Confederate Ave.



Lanes, Volumes, Timings
3: Bull St. & Colonial Drive

Bull Street Commons Traffic Study
2016 Phase 1 Build-Out AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗	↖	↔			↑↑↑		↘	↑↑↑	
Traffic Volume (vph)	0	0	5	191	1	13	0	1262	361	38	2177	10
Future Volume (vph)	0	0	5	191	1	13	0	1262	361	38	2177	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	150		0	0		0	200		0
Storage Lanes	0		1	1		0	0		0	1		0
Taper Length (ft)	25			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.865		0.982			0.967				0.999
Flt Protected				0.950	0.958					0.950		
Satd. Flow (prot)	0	0	1611	1681	1665	0	0	4917	0	1770	5080	0
Flt Permitted				0.950	0.958					0.117		
Satd. Flow (perm)	0	0	1611	1681	1665	0	0	4917	0	218	5080	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)			25		5			150				
Link Speed (mph)		35			35			40				40
Link Distance (ft)		440			652			472				682
Travel Time (s)		8.6			12.7			8.0				11.6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.96	0.90	0.93	0.90
Adj. Flow (vph)	0	0	6	212	1	14	0	1328	376	42	2341	11
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	0	0	6	112	115	0	0	1704	0	42	2352	0
Turn Type			Perm	Perm	NA			NA		Perm	NA	
Protected Phases					8			2				6
Permitted Phases			4	8						6		
Detector Phase			4	8	8			2		6		6
Switch Phase												
Minimum Initial (s)			16.0	16.0	16.0			16.0		16.0		16.0
Minimum Split (s)			30.0	30.0	30.0			30.0		30.0		30.0
Total Split (s)			32.0	32.0	32.0			98.0		98.0		98.0
Total Split (%)			24.6%	24.6%	24.6%			75.4%		75.4%		75.4%
Maximum Green (s)			26.0	26.0	26.0			92.0		92.0		92.0
Yellow Time (s)			4.0	4.0	4.0			4.0		4.0		4.0
All-Red Time (s)			2.0	2.0	2.0			2.0		2.0		2.0
Lost Time Adjust (s)			-4.0	-4.0	-4.0			-4.0		-4.0		-4.0
Total Lost Time (s)			2.0	2.0	2.0			2.0		2.0		2.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)			3.0	3.0	3.0			3.0		3.0		3.0
Recall Mode			None	None	None			C-Max		C-Max		C-Max
Act Effct Green (s)			20.7	20.7	20.7			105.3		105.3		105.3
Actuated g/C Ratio			0.16	0.16	0.16			0.81		0.81		0.81
v/c Ratio			0.02	0.42	0.43			0.43		0.24		0.57
Control Delay			0.2	56.4	54.5			7.8		4.1		3.9
Queue Delay			0.0	0.0	0.0			0.0		0.0		0.4
Total Delay			0.2	56.4	54.5			7.8		4.1		4.2
LOS			A	E	D			A		A		A
Approach Delay					55.4			7.8				4.2
Approach LOS					E			A				A

Lanes, Volumes, Timings
3: Bull St. & Colonial Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)			0	84	83			276		13	284	
Queue Length 95th (ft)			0	129	127			m302		m0	1	
Internal Link Dist (ft)		360			572			392			602	
Turn Bay Length (ft)				150						200		
Base Capacity (vph)			391	387	388			4009		176	4113	
Starvation Cap Reductn			0	0	0			0		0	1005	
Spillback Cap Reductn			0	0	0			0		0	0	
Storage Cap Reductn			0	0	0			0		0	0	
Reduced v/c Ratio			0.02	0.29	0.30			0.43		0.24	0.76	

Intersection Summary

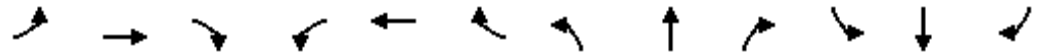
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.57
 Intersection Signal Delay: 8.3
 Intersection LOS: A
 Intersection Capacity Utilization 79.0%
 ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Bull St. & Colonial Drive



Lanes, Volumes, Timings
4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2016 Phase 1 Build-Out AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↗	↑↑↑		↗	↑↑↑	
Traffic Volume (vph)	1	0	5	3	0	2	2	1591	6	6	2327	5
Future Volume (vph)	1	0	5	3	0	2	2	1591	6	6	2327	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			75			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt		0.884			0.946			0.999				
Flt Protected		0.993			0.971		0.950			0.950		
Satd. Flow (prot)	0	1635	0	0	1711	0	1770	5080	0	1770	5085	0
Flt Permitted		0.993			0.971		0.950			0.950		
Satd. Flow (perm)	0	1635	0	0	1711	0	1770	5080	0	1770	5085	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		341			529			443			472	
Travel Time (s)		6.6			10.3			7.6			8.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.97	0.90
Adj. Flow (vph)	1	0	6	3	0	2	2	1675	7	7	2399	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	7	0	0	5	0	2	1682	0	7	2405	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	55.1%
Analysis Period (min)	15
	ICU Level of Service B

HCM Unsignalized Intersection Capacity Analysis
4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2016 Phase 1 Build-Out AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↑↑↑		↕	↑↑↑	
Traffic Volume (veh/h)	1	0	5	3	0	2	2	1591	6	6	2327	5
Future Volume (Veh/h)	1	0	5	3	0	2	2	1591	6	6	2327	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.97	0.90
Hourly flow rate (vph)	1	0	6	3	0	2	2	1675	7	7	2399	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
								None			None	
Median storage veh												
Upstream signal (ft)												
								1155			472	
pX, platoon unblocked	0.83	0.83	0.83	0.83	0.83		0.83					
vC, conflicting volume	2980	4102	803	2502	4102	562	2405			1682		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2676	4022	62	2102	4022	562	1985			1682		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	100	99	87	100	100	99			98		
cM capacity (veh/h)	9	2	825	24	2	470	239			377		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4		
Volume Total	7	5	2	670	670	342	7	960	960	486		
Volume Left	1	3	2	0	0	0	7	0	0	0		
Volume Right	6	2	0	0	0	7	0	0	0	6		
cSH	57	39	239	1700	1700	1700	377	1700	1700	1700		
Volume to Capacity	0.12	0.13	0.01	0.39	0.39	0.20	0.02	0.56	0.56	0.29		
Queue Length 95th (ft)	10	10	1	0	0	0	1	0	0	0		
Control Delay (s)	77.0	111.8	20.2	0.0	0.0	0.0	14.7	0.0	0.0	0.0		
Lane LOS	F	F	C				B					
Approach Delay (s)	77.0	111.8	0.0				0.0					
Approach LOS	F	F										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			55.1%			ICU Level of Service				B		
Analysis Period (min)			15									

Lanes, Volumes, Timings
5: Bull St. & Jefferson Street /Williams Street

Bull Street Commons Traffic Study
2016 Phase 1 Build-Out AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	10	0	0	1	1	1566	11	0	2343	6
Future Volume (vph)	4	0	10	0	0	1	1	1566	11	0	2343	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	175		0	150		0
Storage Lanes	1		1	0		1	1		0	1		0
Taper Length (ft)	25			25			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.850			0.865		0.999				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1770	0	1583	0	0	1611	1770	5080	0	1863	5085	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	1770	0	1583	0	0	1611	1770	5080	0	1863	5085	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		410			353			712			443	
Travel Time (s)		8.0			6.9			12.1			7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.97	0.90
Adj. Flow (vph)	4	0	11	0	0	1	1	1666	12	0	2415	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	0	11	0	0	1	1	1678	0	0	2422	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	55.4%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 5: Bull St. & Jefferson Street /Williams Street

Bull Street Commons Traffic Study
 2016 Phase 1 Build-Out AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	0	10	0	0	1	1	1566	11	0	2343	6
Future Volume (Veh/h)	4	0	10	0	0	1	1	1566	11	0	2343	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.97	0.90
Hourly flow rate (vph)	4	0	11	0	0	1	1	1666	12	0	2415	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked	0.83	0.83	0.83	0.83	0.83		0.83					
vC, conflicting volume	2977	4098	808	2490	4096	561	2422			1678		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2668	4017	61	2083	4014	561	2001			1678		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	55	100	99	100	100	100	100			100		
cM capacity (veh/h)	9	2	824	25	2	471	235			378		
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4	
Volume Total	4	11	1	1	666	666	345	0	966	966	490	
Volume Left	4	0	0	1	0	0	0	0	0	0	0	
Volume Right	0	11	1	0	0	0	12	0	0	0	7	
cSH	9	824	471	235	1700	1700	1700	1700	1700	1700	1700	
Volume to Capacity	0.45	0.01	0.00	0.00	0.39	0.39	0.20	0.00	0.57	0.57	0.29	
Queue Length 95th (ft)	24	1	0	0	0	0	0	0	0	0	0	
Control Delay (s)	596.6	9.4	12.7	20.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Lane LOS	F	A	B	C								
Approach Delay (s)	166.0		12.7	0.0				0.0				
Approach LOS	F		B									
Intersection Summary												
Average Delay			0.6									
Intersection Capacity Utilization			55.4%		ICU Level of Service				B			
Analysis Period (min)			15									

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
2016 Phase 1 Build-Out AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1049	78	828	6	11	4	334	539	87	36	1204	1114
Future Volume (vph)	1049	78	828	6	11	4	334	539	87	36	1204	1114
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	775		0	125		0	175		0	100		0
Storage Lanes	1		2	1		0	1		0	1		1
Taper Length (ft)	50			50			125			50		
Lane Util. Factor	0.95	0.95	0.88	0.95	0.95	0.95	0.97	0.95	0.95	1.00	0.91	0.91
Frt			0.850		0.974			0.979				0.850
Flt Protected	0.950	0.959			0.985		0.950			0.950		
Satd. Flow (prot)	1681	1697	2787	0	3395	0	3433	3465	0	1770	3390	1441
Flt Permitted	0.950	0.959			0.985		0.950			0.387		
Satd. Flow (perm)	1681	1697	2787	0	3395	0	3433	3465	0	721	3390	1441
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			40	
Link Distance (ft)		1012			379			526			712	
Travel Time (s)		23.0			8.6			12.0			12.1	
Peak Hour Factor	0.97	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.90	0.94	0.97
Adj. Flow (vph)	1081	87	920	7	12	4	367	599	97	40	1281	1148
Shared Lane Traffic (%)	50%											0%
Lane Group Flow (vph)	540	628	920	0	23	0	367	696	0	40	1281	1148
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Perm	NA	pm+ov
Protected Phases	4	4	5	3	3		5	2			6	4
Permitted Phases			4							6		6
Detector Phase	4	4	5	3	3		5	2		6	6	4
Switch Phase												
Minimum Initial (s)	16.0	16.0	11.0	5.0	5.0		11.0	16.0		16.0	16.0	16.0
Minimum Split (s)	30.0	30.0	17.0	12.0	12.0		17.0	30.0		30.0	30.0	30.0
Total Split (s)	53.0	53.0	17.0	12.0	12.0		17.0	65.0		48.0	48.0	53.0
Total Split (%)	40.8%	40.8%	13.1%	9.2%	9.2%		13.1%	50.0%		36.9%	36.9%	40.8%
Maximum Green (s)	47.0	47.0	11.0	6.0	6.0		11.0	59.0		42.0	42.0	47.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0		-4.0		-4.0	-4.0		-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0		2.0		2.0	2.0		2.0	2.0	2.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max		C-Max	C-Max	None
Act Effct Green (s)	51.0	51.0	68.0		9.9		15.0	67.8		50.8	50.8	102.6
Actuated g/C Ratio	0.39	0.39	0.52		0.08		0.12	0.52		0.39	0.39	0.79
v/c Ratio	0.82	0.94	0.63		0.09		0.93	0.39		0.14	0.97	1.01
Control Delay	37.3	52.5	19.6		56.7		80.0	19.8		30.2	51.8	43.5
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	37.3	52.5	19.6		56.7		80.0	19.8		30.2	51.8	43.5
LOS	D	D	B		E		F	B		C	D	D
Approach Delay		34.0			56.7			40.6			47.6	
Approach LOS		C			E			D			D	

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
2016 Phase 1 Build-Out AM

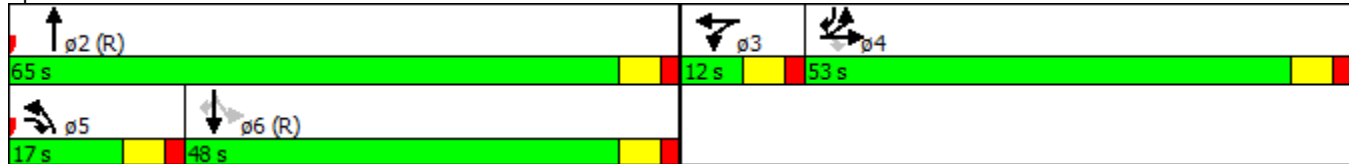


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	443	549	362		9		162	218		13	~640	~1169
Queue Length 95th (ft)	#632	#801	459		25		#257	275		m35	#813	#1504
Internal Link Dist (ft)		932			299			446			632	
Turn Bay Length (ft)	775						175			100		
Base Capacity (vph)	659	665	1457		261		396	1807		281	1324	1137
Starvation Cap Reductn	0	0	0		0		0	0		0	0	0
Spillback Cap Reductn	0	0	0		0		0	0		0	0	0
Storage Cap Reductn	0	0	0		0		0	0		0	0	0
Reduced v/c Ratio	0.82	0.94	0.63		0.09		0.93	0.39		0.14	0.97	1.01

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 126 (97%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.01
 Intersection Signal Delay: 41.3
 Intersection LOS: D
 Intersection Capacity Utilization 102.4%
 ICU Level of Service G
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Bull St. & Elmwood Avenue



Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

Bull Street Commons Traffic Study
2016 Phase 1 Build-Out AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	210	82	16	141	116	24	778	25	161	1806	93
Future Volume (vph)	82	210	82	16	141	116	24	778	25	161	1806	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	50			50			75			75		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.958			0.931			0.995				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3391	0	1770	3295	0	1770	3522	0	1770	3539	1583
Flt Permitted	0.398			0.346			0.075			0.294		
Satd. Flow (perm)	741	3391	0	645	3295	0	140	3522	0	548	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		34			129			7				103
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1044			459			1901				526
Travel Time (s)		23.7			10.4			43.2				12.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.94	0.90
Adj. Flow (vph)	91	233	91	18	153	129	27	864	28	179	1921	103
Shared Lane Traffic (%)												
Lane Group Flow (vph)	91	324	0	18	282	0	27	892	0	179	1921	103
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	16.0
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	30.0
Total Split (s)	31.0	31.0		31.0	31.0		99.0	99.0		99.0	99.0	99.0
Total Split (%)	23.8%	23.8%		23.8%	23.8%		76.2%	76.2%		76.2%	76.2%	76.2%
Maximum Green (s)	25.0	25.0		25.0	25.0		93.0	93.0		93.0	93.0	93.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	24.1	24.1		24.1	24.1		101.9	101.9		101.9	101.9	101.9
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.78	0.78		0.78	0.78	0.78
v/c Ratio	0.66	0.49		0.15	0.39		0.25	0.32		0.42	0.69	0.08
Control Delay	71.8	44.4		49.0	28.5		11.0	4.7		5.1	6.1	0.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.7	0.0
Total Delay	71.8	44.4		49.0	28.5		11.0	4.7		5.1	6.8	0.5
LOS	E	D		D	C		B	A		A	A	A
Approach Delay		50.4			29.7			4.8			6.3	
Approach LOS		D			C			A			A	

Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

Bull Street Commons Traffic Study
2016 Phase 1 Build-Out AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	72	116		13	63		5	94		26	277	2
Queue Length 95th (ft)	131	157		38	106		23	143		m41	m282	m3
Internal Link Dist (ft)		964			379			1821			446	
Turn Bay Length (ft)	150			175			150			150		
Base Capacity (vph)	165	782		143	835		109	2762		429	2774	1263
Starvation Cap Reductn	0	0		0	0		0	0		0	465	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.55	0.41		0.13	0.34		0.25	0.32		0.42	0.83	0.08

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 106 (82%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 12.6
 Intersection LOS: B
 Intersection Capacity Utilization 103.3%
 ICU Level of Service G
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Bull St. & Calhoun St.



Lanes, Volumes, Timings
9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Bull Street Commons Traffic Study
2016 Phase 1 Build-Out AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	180	65	696	359	98	147	489	339	19	440	50
Future Volume (vph)	34	180	65	696	359	98	147	489	339	19	440	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		800	175		0	225		0	300		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	100			75			75			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.960			0.968				0.850		0.985	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3398	0	3433	3426	0	1770	3539	1583	1770	3486	0
Flt Permitted	0.465			0.950			0.381			0.395		
Satd. Flow (perm)	866	3398	0	3433	3426	0	710	3539	1583	736	3486	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		36			41				377		12	
Link Speed (mph)		35			35			35			40	
Link Distance (ft)		1013			292			483			2110	
Travel Time (s)		19.7			5.7			9.4			36.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.90	0.90
Adj. Flow (vph)	38	200	72	773	399	109	163	520	377	21	489	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	272	0	773	508	0	163	520	377	21	545	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Free	Perm	NA	
Protected Phases		8		7	4			6			2	
Permitted Phases	8						6		Free	2		
Detector Phase	8	8		7	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	16.0	16.0		11.0	16.0		16.0	16.0		16.0	16.0	
Minimum Split (s)	30.0	30.0		17.0	30.0		30.0	30.0		30.0	30.0	
Total Split (s)	30.0	30.0		41.0	71.0		59.0	59.0		59.0	59.0	
Total Split (%)	23.1%	23.1%		31.5%	54.6%		45.4%	45.4%		45.4%	45.4%	
Maximum Green (s)	24.0	24.0		35.0	65.0		53.0	53.0		53.0	53.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	20.5	20.5		36.9	59.4		66.6	66.6	130.0	66.6	66.6	
Actuated g/C Ratio	0.16	0.16		0.28	0.46		0.51	0.51	1.00	0.51	0.51	
v/c Ratio	0.28	0.48		0.79	0.32		0.45	0.29	0.24	0.06	0.30	
Control Delay	36.6	30.0		39.2	19.4		21.4	16.2	0.3	25.7	27.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	36.6	30.0		39.2	19.4		21.4	16.2	0.3	25.7	27.2	
LOS	D	C		D	B		C	B	A	C	C	
Approach Delay		30.8			31.4			11.4			27.1	
Approach LOS		C			C			B			C	

Lanes, Volumes, Timings
 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Bull Street Commons Traffic Study
 2016 Phase 1 Build-Out AM

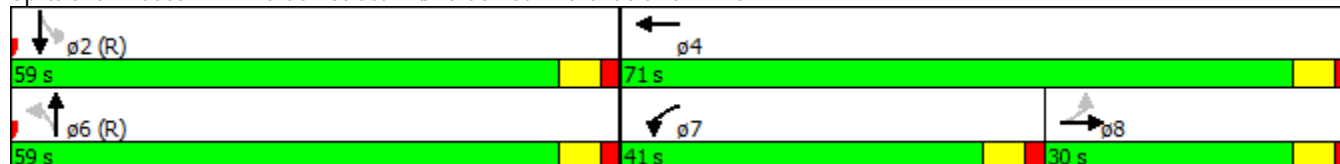


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	27	92		240	138		57	93	0	11	182	
Queue Length 95th (ft)	61	133		332	176		117	155	0	m29	307	
Internal Link Dist (ft)		933			212			403			2030	
Turn Bay Length (ft)	225			175			225			300		
Base Capacity (vph)	186	760		1029	1837		363	1812	1583	377	1791	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	111	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.20	0.36		0.75	0.28		0.45	0.29	0.24	0.06	0.32	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 121 (93%), Referenced to phase 2:SBTL and 6:NBTL, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 24.0
 Intersection LOS: C
 Intersection Capacity Utilization 73.6%
 ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive



Lanes, Volumes, Timings
10: Harden St./Harden Street Ext & Calhoun St.

Bull Street Commons Traffic Study
2016 Phase 1 Build-Out AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	25	141	6	26	2	187	764	15	39	960	83
Future Volume (vph)	82	25	141	6	26	2	187	764	15	39	960	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	50		0	0		325	300		200
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	100			25			25			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Frt		0.873			0.990			0.997				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1626	0	1770	1844	0	1770	5070	0	1770	3539	1583
Flt Permitted	0.737			0.299			0.268			0.249		
Satd. Flow (perm)	1373	1626	0	557	1844	0	499	5070	0	464	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		157			2			3				122
Link Speed (mph)		30			35			35				35
Link Distance (ft)		820			1149			2515				424
Travel Time (s)		18.6			22.4			49.0				8.3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	91	28	157	7	29	2	208	849	17	43	1067	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	91	185	0	7	31	0	208	866	0	43	1067	92
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	1 2		1	2	2
Switch Phase												
Minimum Initial (s)	1.0	1.0		11.0	11.0		9.0	14.0		9.0	14.0	14.0
Minimum Split (s)	6.5	6.5		30.0	30.0		15.0	30.0		15.0	30.0	30.0
Total Split (s)	35.0	35.0		35.0	35.0		32.0	74.0		21.0	63.0	63.0
Total Split (%)	26.9%	26.9%		26.9%	26.9%		24.6%	56.9%		16.2%	48.5%	48.5%
Maximum Green (s)	29.5	29.5		29.5	29.5		26.0	68.0		15.0	57.0	57.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.5	1.5		1.5	1.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	0.0		0.0	0.0		-3.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	2.5	5.5		5.5	5.5		3.0	3.0		6.0	3.0	3.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	17.5	14.5		14.5	14.5		86.0	71.0		104.0	89.0	89.0
Actuated g/C Ratio	0.13	0.11		0.11	0.11		0.66	0.55		0.80	0.68	0.68
v/c Ratio	0.49	0.58		0.11	0.15		0.44	0.31		0.06	0.44	0.08
Control Delay	47.0	13.7		53.7	49.5		8.1	16.5		1.3	10.0	1.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	47.0	13.7		53.7	49.5		8.1	16.5		1.3	10.0	1.6
LOS	D	B		D	D		A	B		A	A	A
Approach Delay		24.7			50.2			14.9			9.0	
Approach LOS		C			D			B			A	

Lanes, Volumes, Timings
 10: Harden St./Harden Street Ext & Calhoun St.

Bull Street Commons Traffic Study
 2016 Phase 1 Build-Out AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	74	42		5	23		28	140		2	268	8
Queue Length 95th (ft)	131	106		21	52		56	169		m5	403	22
Internal Link Dist (ft)		740			1069			2435			344	
Turn Bay Length (ft)	225			50						300		200
Base Capacity (vph)	343	490		126	419		667	2770		672	2421	1121
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.27	0.38		0.06	0.07		0.31	0.31		0.06	0.44	0.08

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 78 (60%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.58
 Intersection Signal Delay: 13.7
 Intersection LOS: B
 Intersection Capacity Utilization 59.4%
 ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Harden St./Harden Street Ext & Calhoun St.



Lanes, Volumes, Timings
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2016 Phase 1 Build-Out AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	237	35	9	243	27	14	21	11	10	12	37
Future Volume (vph)	38	237	35	9	243	27	14	21	11	10	12	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	275		0	0		0	300		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	100			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.981			0.985			0.968			0.886	
Flt Protected	0.950			0.950				0.985		0.950		
Satd. Flow (prot)	1770	1827	0	1770	1835	0	0	1776	0	1770	1650	0
Flt Permitted	0.950			0.950				0.985		0.950		
Satd. Flow (perm)	1770	1827	0	1770	1835	0	0	1776	0	1770	1650	0
Link Speed (mph)		35			30			35			35	
Link Distance (ft)		679			820			504			3014	
Travel Time (s)		13.2			18.6			9.8			58.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	42	263	39	10	270	30	16	23	12	11	13	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	302	0	10	300	0	0	51	0	11	54	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	37.1%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 11: Gregg Street/Gregg Street & Calhoun St.

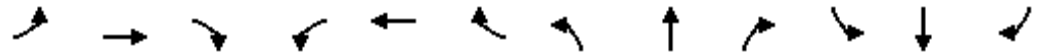
Bull Street Commons Traffic Study
 2016 Phase 1 Build-Out AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	237	35	9	243	27	14	21	11	10	12	37
Future Volume (Veh/h)	38	237	35	9	243	27	14	21	11	10	12	37
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	42	263	39	10	270	30	16	23	12	11	13	41
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	TWLTL				TWLTL							
Median storage veh	2				2							
Upstream signal (ft)					820							
pX, platoon unblocked	0.97						0.97	0.97		0.97	0.97	0.97
vC, conflicting volume	300			302			704	686	282	676	691	285
vC1, stage 1 conf vol							366	366		305	305	
vC2, stage 2 conf vol							338	320		370	386	
vCu, unblocked vol	267			302			682	664	282	653	669	251
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			99			97	95	98	98	97	95
cM capacity (veh/h)	1262			1259			499	510	756	521	513	766
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total	42	302	10	300	51	11	54					
Volume Left	42	0	10	0	16	11	0					
Volume Right	0	39	0	30	12	0	41					
cSH	1262	1700	1259	1700	548	521	685					
Volume to Capacity	0.03	0.18	0.01	0.18	0.09	0.02	0.08					
Queue Length 95th (ft)	3	0	1	0	8	2	6					
Control Delay (s)	8.0	0.0	7.9	0.0	12.2	12.1	10.7					
Lane LOS	A		A		B	B	B					
Approach Delay (s)	1.0		0.3		12.2	10.9						
Approach LOS					B	B						
Intersection Summary												
Average Delay			2.3									
Intersection Capacity Utilization			37.1%		ICU Level of Service		A					
Analysis Period (min)			15									

Lanes, Volumes, Timings
12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2016 Phase 1 Build-Out AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↗	↘		↗	↘	
Traffic Volume (vph)	11	264	38	97	368	53	8	9	23	6	4	2
Future Volume (vph)	11	264	38	97	368	53	8	9	23	6	4	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		225	50		0
Storage Lanes	0		0	0		0	1		1	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.984			0.986			0.892			0.950	
Flt Protected		0.998			0.991		0.950			0.950		
Satd. Flow (prot)	0	1829	0	0	1820	0	1770	1662	0	1770	1770	0
Flt Permitted		0.998			0.991		0.950			0.950		
Satd. Flow (perm)	0	1829	0	0	1820	0	1770	1662	0	1770	1770	0
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1125			161			3014			569	
Travel Time (s)		21.9			3.1			58.7			11.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	12	293	42	108	400	59	9	10	26	7	4	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	347	0	0	567	0	9	36	0	7	6	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	61.4%
ICU Level of Service	B
Analysis Period (min)	15












HCM Unsignalized Intersection Capacity Analysis
 12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
 2016 Phase 1 Build-Out AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (veh/h)	11	264	38	97	368	53	8	9	23	6	4	2
Future Volume (Veh/h)	11	264	38	97	368	53	8	9	23	6	4	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	12	293	42	108	400	59	9	10	26	7	4	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					1174							
pX, platoon unblocked	0.88						0.88	0.88		0.88	0.88	0.88
vC, conflicting volume	459			335			988	1013	314	1014	1004	430
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	318			335			918	947	314	949	938	285
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			91			96	95	96	96	98	100
cM capacity (veh/h)	1094			1224			202	207	726	182	210	664
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	347	567	9	36	7	6						
Volume Left	12	108	9	0	7	0						
Volume Right	42	59	0	26	0	2						
cSH	1094	1224	202	429	182	272						
Volume to Capacity	0.01	0.09	0.04	0.08	0.04	0.02						
Queue Length 95th (ft)	1	7	3	7	3	2						
Control Delay (s)	0.4	2.4	23.7	14.2	25.6	18.5						
Lane LOS	A	A	C	B	D	C						
Approach Delay (s)	0.4	2.4	16.1		22.3							
Approach LOS			C		C							
Intersection Summary												
Average Delay			2.6									
Intersection Capacity Utilization			61.4%		ICU Level of Service				B			
Analysis Period (min)			15									

Lanes, Volumes, Timings
13: Harden Street Ext & Slighs Ave.

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	118	197	873	65	119	1115
Future Volume (vph)	118	197	873	65	119	1115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		50	100	
Storage Lanes	1	0		1	1	
Taper Length (ft)	25				50	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	0.916			0.850		
Flt Protected	0.982				0.950	
Satd. Flow (prot)	1579	0	3539	1583	1770	3539
Flt Permitted	0.982				0.213	
Satd. Flow (perm)	1579	0	3539	1583	397	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	73			21		
Link Speed (mph)	30		35			35
Link Distance (ft)	398		2562			483
Travel Time (s)	9.0		49.9			9.4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.95
Heavy Vehicles (%)	7%	9%	2%	2%	2%	2%
Adj. Flow (vph)	131	219	970	72	132	1174
Shared Lane Traffic (%)						
Lane Group Flow (vph)	350	0	970	72	132	1174
Turn Type	Perm		NA	Perm	pm+pt	NA
Protected Phases			6		5	2
Permitted Phases	8			6	2	
Detector Phase	8		6	6	5	2
Switch Phase						
Minimum Initial (s)	6.0		16.0	16.0	11.0	16.0
Minimum Split (s)	30.0		30.0	30.0	17.0	30.0
Total Split (s)	49.0		62.0	62.0	19.0	81.0
Total Split (%)	37.7%		47.7%	47.7%	14.6%	62.3%
Maximum Green (s)	43.0		56.0	56.0	13.0	75.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0		-4.0	-2.0	-4.0	-4.0
Total Lost Time (s)	2.0		2.0	4.0	2.0	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		C-Max	C-Max	None	C-Max
Act Effct Green (s)	33.4		75.4	73.4	92.6	92.6
Actuated g/C Ratio	0.26		0.58	0.56	0.71	0.71
v/c Ratio	0.76		0.47	0.08	0.30	0.47
Control Delay	45.3		10.3	3.7	10.7	11.6
Queue Delay	0.0		0.0	0.0	0.0	0.3
Total Delay	45.3		10.3	3.7	10.7	11.8
LOS	D		B	A	B	B
Approach Delay	45.3		9.9			11.7

Lanes, Volumes, Timings
 13: Harden Street Ext & Slighs Ave.

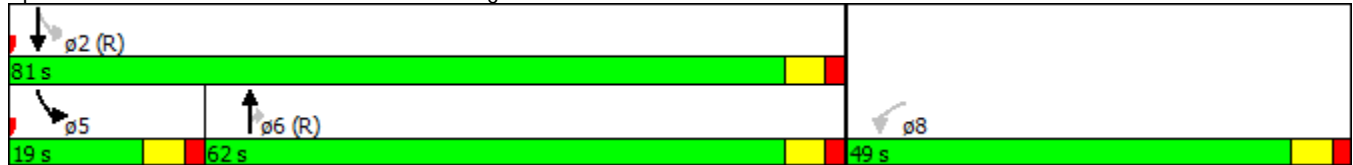


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	D		A		B	
Queue Length 50th (ft)	220		59	1	31	146
Queue Length 95th (ft)	301		381	13	m57	440
Internal Link Dist (ft)	318		2482			403
Turn Bay Length (ft)				50	100	
Base Capacity (vph)	617		2053	903	462	2521
Starvation Cap Reductn	0		0	0	0	637
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.57		0.47	0.08	0.29	0.62

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 129 (99%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 15.4
 Intersection LOS: B
 Intersection Capacity Utilization 61.9%
 ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 13: Harden Street Ext & Slighs Ave.



Lanes, Volumes, Timings
14: Colonial Drive & Farrow Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Lane Configurations							
Traffic Volume (vph)	0	174	149	385	921	16	
Future Volume (vph)	0	174	149	385	921	16	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0	330	550			0	
Storage Lanes	0	1	1			0	
Taper Length (ft)	25		125				
Lane Util. Factor	1.00	0.88	1.00	0.95	0.95	0.95	
Frt		0.850			0.997		
Flt Protected			0.950				
Satd. Flow (prot)	0	2787	1770	3539	3529	0	
Flt Permitted			0.950				
Satd. Flow (perm)	0	2787	1770	3539	3529	0	
Right Turn on Red		Yes				No	
Satd. Flow (RTOR)		135					
Link Speed (mph)	35			35	35		
Link Distance (ft)	930			708	2077		
Travel Time (s)	18.1			13.8	40.5		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.91	0.90	
Adj. Flow (vph)	0	193	166	428	1012	18	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	193	166	428	1030	0	
Turn Type		Over	Prot	NA	NA		
Protected Phases		8	8	8 6	2		6
Permitted Phases							
Detector Phase		8	8	8 6	2		
Switch Phase							
Minimum Initial (s)		16.0	16.0		16.0		16.0
Minimum Split (s)		30.0	30.0		30.0		30.0
Total Split (s)		30.0	30.0		35.0		35.0
Total Split (%)		46.2%	46.2%		53.8%		54%
Maximum Green (s)		24.0	24.0		29.0		29.0
Yellow Time (s)		4.0	4.0		4.0		4.0
All-Red Time (s)		2.0	2.0		2.0		2.0
Lost Time Adjust (s)		-3.0	-3.0		-4.0		
Total Lost Time (s)		3.0	3.0		2.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0	3.0		3.0		3.0
Recall Mode		None	None		C-Max		C-Max
Act Effct Green (s)		19.6	19.6	65.0	40.4		
Actuated g/C Ratio		0.30	0.30	1.00	0.62		
v/c Ratio		0.21	0.31	0.12	0.47		
Control Delay		6.6	17.5	0.1	7.1		
Queue Delay		0.0	0.0	0.0	0.0		
Total Delay		6.6	17.5	0.1	7.1		
LOS		A	B	A	A		
Approach Delay				4.9	7.1		
Approach LOS				A	A		

Lanes, Volumes, Timings
 14: Colonial Drive & Farrow Road

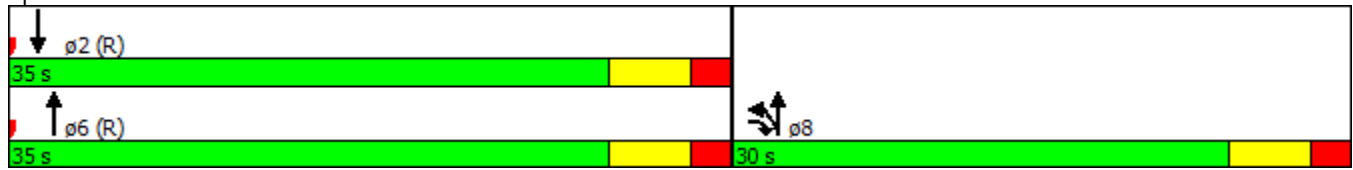


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Queue Length 50th (ft)		9	33	0	213		
Queue Length 95th (ft)		30	83	0	111		
Internal Link Dist (ft)	850			628	1997		
Turn Bay Length (ft)		330	550				
Base Capacity (vph)		1236	735	3539	2191		
Starvation Cap Reductn		0	0	0	0		
Spillback Cap Reductn		0	0	0	0		
Storage Cap Reductn		0	0	0	0		
Reduced v/c Ratio		0.16	0.23	0.12	0.47		

Intersection Summary

Area Type:	Other
Cycle Length:	65
Actuated Cycle Length:	65
Offset:	62 (95%), Referenced to phase 2:SBT and 6:NBT, Start of 1st Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.47
Intersection Signal Delay:	6.3
Intersection LOS:	A
Intersection Capacity Utilization	46.0%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 14: Colonial Drive & Farrow Road



Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
2016 Phase 1 Build-Out AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	384	4	206	521	183	0	261	129	268	831	65
Future Volume (vph)	14	384	4	206	521	183	0	261	129	268	831	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		0	300		0	0		225	200		0
Storage Lanes	1		0	2		1	0		1	1		0
Taper Length (ft)	125			100			25			125		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.999				0.850			0.850		0.989	
Flt Protected	0.950			0.950						0.950		
Satd. Flow (prot)	1770	3536	0	3433	3539	1583	0	3539	1583	1770	3500	0
Flt Permitted	0.434			0.950						0.512		
Satd. Flow (perm)	808	3536	0	3433	3539	1583	0	3539	1583	954	3500	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				203			143		10	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1518			1183			2077			914	
Travel Time (s)		29.6			23.0			40.5			17.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.90
Adj. Flow (vph)	16	427	4	229	579	203	0	290	143	298	913	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	431	0	229	579	203	0	290	143	298	985	0
Turn Type	Perm	NA		Prot	NA	pm+ov		NA	Free	pm+pt	NA	
Protected Phases		4		3	8	1		2		1	6	
Permitted Phases	4					8			Free	6		
Detector Phase	4	4		3	8	1		2		1	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0	5.0		15.0		5.0	15.0	
Minimum Split (s)	30.0	30.0		21.0	41.0	17.0		41.0		17.0	30.0	
Total Split (s)	33.0	33.0		23.0	56.0	26.0		48.0		26.0	74.0	
Total Split (%)	25.4%	25.4%		17.7%	43.1%	20.0%		36.9%		20.0%	56.9%	
Maximum Green (s)	28.0	28.0		18.0	51.0	21.0		43.0		21.0	69.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5		3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5	1.5		1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0		-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead		Lead		Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Recall Mode	None	None		None	None	None		C-Min		None	C-Min	
Walk Time (s)					18.0			18.0				
Flash Dont Walk (s)					5.0			5.0				
Pedestrian Calls (#/hr)					0			0				
Act Effct Green (s)	22.0	22.0		16.6	42.7	64.0		58.0	130.0	79.3	79.3	
Actuated g/C Ratio	0.17	0.17		0.13	0.33	0.49		0.45	1.00	0.61	0.61	
v/c Ratio	0.12	0.72		0.52	0.50	0.23		0.18	0.09	0.43	0.46	
Control Delay	45.9	57.8		57.4	36.2	2.2		31.3	0.1	17.3	17.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	45.9	57.8		57.4	36.2	2.2		31.3	0.1	17.3	17.2	

Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
2016 Phase 1 Build-Out AM



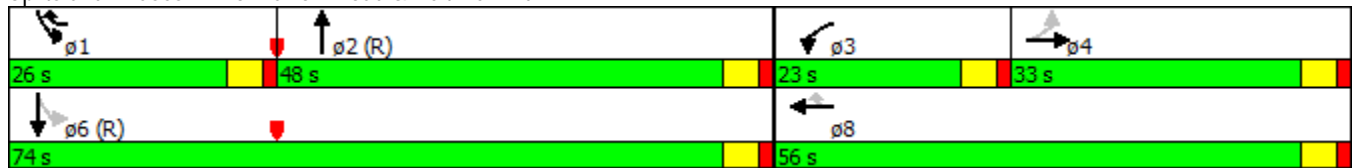
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	E		E	D	A		C	A	B	B	
Approach Delay		57.4			34.2			21.0			17.3	
Approach LOS		E			C			C			B	
Queue Length 50th (ft)	12	182		94	207	0		94	0	127	235	
Queue Length 95th (ft)	33	230		135	240	30		145	0	201	334	
Internal Link Dist (ft)		1438			1103			1997			834	
Turn Bay Length (ft)	175			300					225	200		
Base Capacity (vph)	180	789		501	1415	938		1582	1583	724	2139	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.09	0.55		0.46	0.41	0.22		0.18	0.09	0.41	0.46	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 28.8
 Intersection Capacity Utilization 67.6%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 15: Farrow Road & Beltline Blvd



Lanes, Volumes, Timings
16: Farrow Road & 277 NB RAMPS

Bull Street Commons Traffic Study
2016 Phase 1 Build-Out AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	0	8	0	0	0	0	302	168	41	1197	0
Future Volume (vph)	56	0	8	0	0	0	0	302	168	41	1197	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	0		0	0		0	250		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			25			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.850						0.946				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1770	1583	0	0	0	0	0	3348	0	1770	3539	0
Flt Permitted	0.950									0.458		
Satd. Flow (perm)	1770	1583	0	0	0	0	0	3348	0	853	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		101						187				
Link Speed (mph)		35			35			35				35
Link Distance (ft)		706			904			914				683
Travel Time (s)		13.8			17.6			17.8				13.3
Peak Hour Factor	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90
Adj. Flow (vph)	61	0	9	0	0	0	0	336	187	46	1273	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	61	9	0	0	0	0	0	523	0	46	1273	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						6			2	
Permitted Phases	4									2		
Detector Phase	4	4						6		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0						10.0		10.0	10.0	
Minimum Split (s)	30.0	30.0						30.0		30.0	30.0	
Total Split (s)	34.0	34.0						96.0		96.0	96.0	
Total Split (%)	26.2%	26.2%						73.8%		73.8%	73.8%	
Maximum Green (s)	29.0	29.0						91.0		91.0	91.0	
Yellow Time (s)	3.5	3.5						3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5						1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0						-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0						4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Recall Mode	None	None						C-Max		C-Max	C-Max	
Act Effct Green (s)	12.0	12.0						113.8		113.8	113.8	
Actuated g/C Ratio	0.09	0.09						0.88		0.88	0.88	
v/c Ratio	0.37	0.04						0.18		0.06	0.41	
Control Delay	61.8	0.2						2.2		2.3	2.8	
Queue Delay	0.0	0.0						0.0		0.0	0.1	
Total Delay	61.8	0.2						2.2		2.3	3.0	
LOS	E	A						A		A	A	
Approach Delay		53.9						2.2			2.9	
Approach LOS		D						A			A	

Lanes, Volumes, Timings
 16: Farrow Road & 277 NB RAMPS



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	50	0						112		6	108	
Queue Length 95th (ft)	94	0						5		m12	146	
Internal Link Dist (ft)		626			824			834			603	
Turn Bay Length (ft)	300									250		
Base Capacity (vph)	408	443						2953		746	3096	
Starvation Cap Reductn	0	0						0		0	693	
Spillback Cap Reductn	0	0						0		0	0	
Storage Cap Reductn	0	0						0		0	0	
Reduced v/c Ratio	0.15	0.02						0.18		0.06	0.53	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.41
 Intersection Signal Delay: 4.6
 Intersection LOS: A
 Intersection Capacity Utilization 48.1%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 16: Farrow Road & 277 NB RAMPS



Lanes, Volumes, Timings
 17: Farrow Road & Lorick Avenue /277 SB Ramps

Bull Street Commons Traffic Study
 2016 Phase 1 Build-Out AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	0	38	543	13	33	12	347	0	0	666	199
Future Volume (vph)	12	0	38	543	13	33	12	347	0	0	666	199
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	125		0	200		0	0		0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (ft)	25			150			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850		0.891							0.965
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1770	0	1583	1770	1660	0	1770	3539	0	0	3415	0
Flt Permitted	0.724			0.950			0.220					
Satd. Flow (perm)	1349	0	1583	1770	1660	0	410	3539	0	0	3415	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			42		37							38
Link Speed (mph)		35		35			35			35		35
Link Distance (ft)		681		1031			683			835		835
Travel Time (s)		13.3		20.1			13.3			16.3		16.3
Peak Hour Factor	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.92	0.90	0.90	0.93	0.90
Adj. Flow (vph)	13	0	42	584	14	37	13	377	0	0	716	221
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	0	42	584	51	0	13	377	0	0	937	0
Turn Type	Perm		Perm	Perm	NA		Perm	NA			NA	
Protected Phases				4			2				6	
Permitted Phases	8		8	4			2					
Detector Phase	8		8	4	4		2	2			6	
Switch Phase												
Minimum Initial (s)	10.0		10.0	10.0	10.0		10.0	10.0			10.0	
Minimum Split (s)	30.0		30.0	30.0	30.0		30.0	30.0			30.0	
Total Split (s)	74.0		74.0	74.0	74.0		56.0	56.0			56.0	
Total Split (%)	56.9%		56.9%	56.9%	56.9%		43.1%	43.1%			43.1%	
Maximum Green (s)	69.0		69.0	69.0	69.0		51.0	51.0			51.0	
Yellow Time (s)	3.5		3.5	3.5	3.5		3.5	3.5			3.5	
All-Red Time (s)	1.5		1.5	1.5	1.5		1.5	1.5			1.5	
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0		-1.0	-1.0			-1.0	
Total Lost Time (s)	4.0		4.0	4.0	4.0		4.0	4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0			3.0	
Recall Mode	None		None	None	None		C-Max	C-Max			C-Max	
Act Effct Green (s)	53.4		53.4	53.4	53.4		68.6	68.6			68.6	
Actuated g/C Ratio	0.41		0.41	0.41	0.41		0.53	0.53			0.53	
v/c Ratio	0.02		0.06	0.80	0.07		0.06	0.20			0.51	
Control Delay	18.8		5.2	42.0	8.1		12.0	9.5			21.8	
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay	18.8		5.2	42.0	8.1		12.0	9.5			21.8	
LOS	B		A	D	A		B	A			C	
Approach Delay				39.3			9.6				21.8	
Approach LOS				D			A				C	

Lanes, Volumes, Timings
 17: Farrow Road & Lorick Avenue /277 SB Ramps

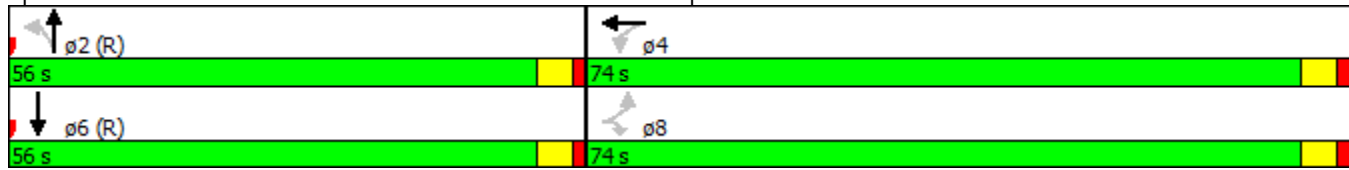


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	6		0	423	7		2	50			253	
Queue Length 95th (ft)	17		19	486	27		14	94			376	
Internal Link Dist (ft)		601			951			603			755	
Turn Bay Length (ft)				125			200					
Base Capacity (vph)	726		871	953	910		216	1868			1820	
Starvation Cap Reductn	0		0	0	0		0	0			0	
Spillback Cap Reductn	0		0	0	0		0	0			0	
Storage Cap Reductn	0		0	0	0		0	0			0	
Reduced v/c Ratio	0.02		0.05	0.61	0.06		0.06	0.20			0.51	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 24.6
 Intersection LOS: C
 Intersection Capacity Utilization 73.2%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 17: Farrow Road & Lorick Avenue /277 SB Ramps



Lanes, Volumes, Timings
18: Assembly St./Assembly & Elmwood Avenue

Bull Street Commons Traffic Study
2016 Phase 1 Build-Out AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2063	435	579	1372	4	248	1	217	0	0	0
Future Volume (vph)	0	2063	435	579	1372	4	248	1	217	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		275	150		0	0		0	0		0
Storage Lanes	1		1	1		0	2		1	0		0
Taper Length (ft)	150			75			25			25		
Lane Util. Factor	1.00	0.86	0.86	0.97	0.91	0.91	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850					0.851	0.850			
Flt Protected				0.950			0.950					
Satd. Flow (prot)	1863	4806	1362	3433	5085	0	3433	1506	1504	0	1863	0
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	1863	4806	1362	3433	5085	0	3433	1506	1504	0	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			171		1			113	76			
Link Speed (mph)		30			30			30				35
Link Distance (ft)		3707			509			546				403
Travel Time (s)		84.3			11.6			12.4				7.9
Peak Hour Factor	0.90	0.98	0.90	0.92	0.96	0.90	0.92	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	2105	483	629	1429	4	270	1	241	0	0	0
Shared Lane Traffic (%)			0%						47%			
Lane Group Flow (vph)	0	2105	483	629	1433	0	270	114	128	0	0	0
Turn Type	Perm	NA	pm+ov	Prot	NA		Split	NA	pm+ov			
Protected Phases		2	3	1	6		3	3	1	4	4	
Permitted Phases	2		2						3			
Detector Phase	2	2	3	1	6		3	3	1	4	4	
Switch Phase												
Minimum Initial (s)	16.0	16.0	6.0	11.0	16.0		6.0	6.0	11.0	4.0	4.0	
Minimum Split (s)	30.0	30.0	21.0	17.0	30.0		21.0	21.0	17.0	10.0	10.0	
Total Split (s)	68.0	68.0	21.0	31.0	99.0		21.0	21.0	31.0	10.0	10.0	
Total Split (%)	52.3%	52.3%	16.2%	23.8%	76.2%		16.2%	16.2%	23.8%	7.7%	7.7%	
Maximum Green (s)	62.0	62.0	15.0	25.0	93.0		15.0	15.0	25.0	4.0	4.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	-4.0	-4.0	-4.0	-4.0		-4.0	-2.0	-4.0		-2.0	
Total Lost Time (s)	6.0	2.0	2.0	2.0	2.0		2.0	4.0	2.0		4.0	
Lead/Lag	Lead	Lead	Lead	Lag			Lead	Lead	Lag	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes					Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max	None	None	C-Max		None	None	None	None	None	
Walk Time (s)			5.0				5.0	5.0				
Flash Dont Walk (s)			10.0				10.0	10.0				
Pedestrian Calls (#/hr)			0				0	0				
Act Effct Green (s)		76.5	97.0	29.0	107.5		18.5	16.5	49.5			
Actuated g/C Ratio		0.59	0.75	0.22	0.83		0.14	0.13	0.38			
v/c Ratio		0.74	0.46	0.82	0.34		0.55	0.39	0.21			
Control Delay		21.8	5.3	56.4	1.5		56.6	13.3	12.4			
Queue Delay		0.0	0.0	0.0	0.1		0.0	0.0	0.0			
Total Delay		21.8	5.3	56.4	1.6		56.6	13.3	12.4			

Lanes, Volumes, Timings
 18: Assembly St./Assembly & Elmwood Avenue

Bull Street Commons Traffic Study
 2016 Phase 1 Build-Out AM

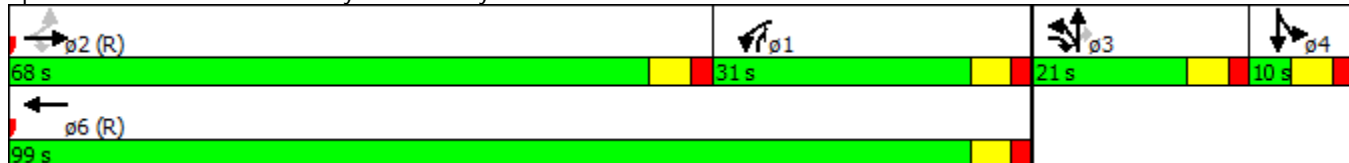


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C	A	E	A		E	B	B			
Approach Delay		18.7				18.3		35.9				
Approach LOS		B			B			D				
Queue Length 50th (ft)		483	93	290	50		110	1	29			
Queue Length 95th (ft)		548	155	m346	49		156	58	75			
Internal Link Dist (ft)		3627			429			466			323	
Turn Bay Length (ft)			275	150								
Base Capacity (vph)		2829	1059	765	4206		501	295	619			
Starvation Cap Reductn		0	0	0	1166		0	0	0			
Spillback Cap Reductn		0	0	0	0		0	0	0			
Storage Cap Reductn		0	0	0	0		0	0	0			
Reduced v/c Ratio		0.74	0.46	0.82	0.47		0.54	0.39	0.21			

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 14 (11%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 20.2
 Intersection LOS: C
 Intersection Capacity Utilization 76.7%
 ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Assembly St./Assembly & Elmwood Avenue



Lanes, Volumes, Timings
19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
2016 Phase 1 Build-Out AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	196	2005	62	69	1361	33	17	95	9	211	470	550
Future Volume (vph)	196	2005	62	69	1361	33	17	95	9	211	470	550
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		175	150		0	200		0	175		425
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	75			75			100			75		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850		0.996				0.850		0.989	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	1770	5065	0	1770	3539	1583	1770	3353	1441
Flt Permitted	0.950			0.062			0.185			0.609		
Satd. Flow (perm)	3433	5085	1583	115	5065	0	345	3539	1583	1134	3353	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			47		4				126		6	164
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		509			563			474			3675	
Travel Time (s)		11.6			12.8			10.8			83.5	
Peak Hour Factor	0.90	0.93	0.90	0.90	0.97	0.90	0.90	0.90	0.90	0.90	0.93	0.94
Adj. Flow (vph)	218	2156	69	77	1403	37	19	106	10	234	505	585
Shared Lane Traffic (%)												7%
Lane Group Flow (vph)	218	2156	69	77	1440	0	19	106	10	234	546	544
Turn Type	Prot	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	pm+ov
Protected Phases	5	2	3		6		3	8		7	4	5
Permitted Phases			2	6			8		8	4		4
Detector Phase	5	2	3	6	6		3	8	8	7	4	5
Switch Phase												
Minimum Initial (s)	11.0	16.0	11.0	16.0	16.0		11.0	16.0	16.0	11.0	16.0	11.0
Minimum Split (s)	17.0	30.0	17.0	30.0	30.0		17.0	30.0	30.0	17.0	30.0	17.0
Total Split (s)	17.0	83.0	17.0	66.0	66.0		17.0	30.0	30.0	17.0	30.0	17.0
Total Split (%)	13.1%	63.8%	13.1%	50.8%	50.8%		13.1%	23.1%	23.1%	13.1%	23.1%	13.1%
Maximum Green (s)	11.0	77.0	11.0	60.0	60.0		11.0	24.0	24.0	11.0	24.0	11.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0	-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lead	Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	C-Max	C-Max		None	None	None	None	None	None
Act Effct Green (s)	15.0	82.7	99.7	65.7	65.7		41.3	26.3	26.3	41.7	29.7	46.7
Actuated g/C Ratio	0.12	0.64	0.77	0.51	0.51		0.32	0.20	0.20	0.32	0.23	0.36
v/c Ratio	0.55	0.67	0.06	1.33	0.56		0.07	0.15	0.02	0.54	0.71	0.87
Control Delay	83.0	4.4	0.1	257.7	15.7		28.9	42.5	0.1	38.2	52.1	43.7
Queue Delay	0.0	0.1	0.0	0.0	0.1		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	83.0	4.5	0.1	257.7	15.9		28.9	42.5	0.1	38.2	52.1	43.7
LOS	F	A	A	F	B		C	D	A	D	D	D
Approach Delay		11.4			28.2			37.4			46.2	
Approach LOS		B			C			D			D	

Lanes, Volumes, Timings
 19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
 2016 Phase 1 Build-Out AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	93	72	0	-82	278		11	38	0	148	236	356
Queue Length 95th (ft)	m128	90	m0	#188	349		29	65	0	222	305	#603
Internal Link Dist (ft)		429			483			394			3595	
Turn Bay Length (ft)	175		175	150			200			175		425
Base Capacity (vph)	396	3234	1224	58	2561		274	762	439	437	772	623
Starvation Cap Reductn	0	229	0	0	303		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	0.55	0.72	0.06	1.33	0.64		0.07	0.14	0.02	0.54	0.71	0.87

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 5 (4%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.33
 Intersection Signal Delay: 25.2
 Intersection LOS: C
 Intersection Capacity Utilization 80.9%
 ICU Level of Service D
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Main St. & Elmwood Avenue



Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2016 Phase 1 Build-Out AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	1543	254	85	1376	6	34	11	22	6	113	17
Future Volume (vph)	11	1543	254	85	1376	6	34	11	22	6	113	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	75		0	200		0	75		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			50			100			50		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.978			0.999				0.850		0.981	
Flt Protected	0.950			0.950			0.950				0.998	
Satd. Flow (prot)	1770	4973	0	1770	5080	0	1770	1863	1583	0	3465	0
Flt Permitted	0.157			0.092			0.553				0.946	
Satd. Flow (perm)	292	4973	0	171	5080	0	1030	1863	1583	0	3284	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		76			1				25		11	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		563			1012			1692			1095	
Travel Time (s)		12.8			23.0			38.5			24.9	
Peak Hour Factor	0.90	0.95	0.90	0.90	0.95	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	12	1624	282	94	1448	7	38	12	24	7	126	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	1906	0	94	1455	0	38	12	24	0	152	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		6	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	100.0	100.0		100.0	100.0		30.0	30.0	30.0	30.0	30.0	
Total Split (%)	76.9%	76.9%		76.9%	76.9%		23.1%	23.1%	23.1%	23.1%	23.1%	
Maximum Green (s)	94.0	94.0		94.0	94.0		24.0	24.0	24.0	24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0		-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0		2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None	None	None	None	
Act Effct Green (s)	106.0	106.0		106.0	106.0		20.0	20.0	20.0		20.0	
Actuated g/C Ratio	0.82	0.82		0.82	0.82		0.15	0.15	0.15		0.15	
v/c Ratio	0.05	0.47		0.68	0.35		0.24	0.04	0.09		0.30	
Control Delay	1.0	0.7		20.6	2.9		52.9	47.5	17.2		46.9	
Queue Delay	0.0	0.1		0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	1.0	0.8		20.6	2.9		52.9	47.5	17.2		46.9	
LOS	A	A		C	A		D	D	B		D	
Approach Delay		0.8			3.9			40.4			46.9	
Approach LOS		A			A			D			D	

Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2016 Phase 1 Build-Out AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	0	14		44	95		29	9	0		55	
Queue Length 95th (ft)	m1	28		m48	m97		64	28	25		90	
Internal Link Dist (ft)		483			932			1612			1015	
Turn Bay Length (ft)	200			75			200					
Base Capacity (vph)	238	4068		139	4142		221	401	360		715	
Starvation Cap Reductn	0	733		0	0		0	0	0		0	
Spillback Cap Reductn	0	0		0	0		0	0	0		0	
Storage Cap Reductn	0	0		0	0		0	0	0		0	
Reduced v/c Ratio	0.05	0.57		0.68	0.35		0.17	0.03	0.07		0.21	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 13 (10%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 4.8
 Intersection LOS: A
 Intersection Capacity Utilization 87.1%
 ICU Level of Service E
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 20: Sumter St. & Elmwood Avenue



Lanes, Volumes, Timings
21: Barnwell St. & Calhoun St.

Bull Street Commons Traffic Study
2016 Phase 1 Build-Out AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	312	24	23	251	4	3	1	11	1	1	2
Future Volume (vph)	11	312	24	23	251	4	3	1	11	1	1	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	225		0	125		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.989			0.998			0.862				0.900
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1842	0	1770	1859	0	1770	1606	0	1770	1676	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1842	0	1770	1859	0	1770	1606	0	1770	1676	0
Link Speed (mph)		35			35			35				35
Link Distance (ft)		1129			679			719				673
Travel Time (s)		22.0			13.2			14.0				13.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	12	347	27	26	279	4	3	1	12	1	1	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	374	0	26	283	0	3	13	0	1	3	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	29.1%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
21: Barnwell St. & Calhoun St.

Bull Street Commons Traffic Study
2016 Phase 1 Build-Out AM

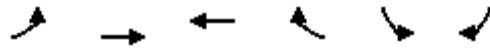


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	312	24	23	251	4	3	1	11	1	1	2
Future Volume (Veh/h)	11	312	24	23	251	4	3	1	11	1	1	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	12	347	27	26	279	4	3	1	12	1	1	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			TWLTL							
Median storage (veh)					2							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	283			374			718	720	360	716	731	281
vC1, stage 1 conf vol							384	384		333	333	
vC2, stage 2 conf vol							334	335		384	398	
vCu, unblocked vol	283			374			718	720	360	716	731	281
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			99	100	98	100	100	100
cM capacity (veh/h)	1279			1184			526	509	684	514	498	758

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	12	374	26	283	3	13	1	3
Volume Left	12	0	26	0	3	0	1	0
Volume Right	0	27	0	4	0	12	0	2
cSH	1279	1700	1184	1700	526	666	514	646
Volume to Capacity	0.01	0.22	0.02	0.17	0.01	0.02	0.00	0.00
Queue Length 95th (ft)	1	0	2	0	0	1	0	0
Control Delay (s)	7.8	0.0	8.1	0.0	11.9	10.5	12.0	10.6
Lane LOS	A		A		B	B	B	B
Approach Delay (s)	0.2		0.7		10.8		11.0	
Approach LOS					B		B	

Intersection Summary		
Average Delay		0.7
Intersection Capacity Utilization	29.1%	ICU Level of Service
Analysis Period (min)	15	A

Lanes, Volumes, Timings
 26: Colonial Drive & Mental Health Dwy



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	80	320	203	158	5	1
Future Volume (vph)	80	320	203	158	5	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.941		0.981	
Flt Protected	0.950				0.959	
Satd. Flow (prot)	1770	1863	1753	0	1752	0
Flt Permitted	0.950				0.959	
Satd. Flow (perm)	1770	1863	1753	0	1752	0
Link Speed (mph)		35	35		35	
Link Distance (ft)		652	275		401	
Travel Time (s)		12.7	5.4		7.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	89	356	226	176	6	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	89	356	402	0	7	0
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	38.1% ICU Level of Service A
Analysis Period (min)	15

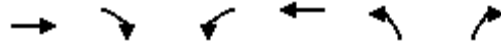
HCM Unsignalized Intersection Capacity Analysis
 26: Colonial Drive & Mental Health Dwy

Bull Street Commons Traffic Study
 2016 Phase 1 Build-Out AM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	80	320	203	158	5	1
Future Volume (Veh/h)	80	320	203	158	5	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	89	356	226	176	6	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		652				
pX, platoon unblocked						
vC, conflicting volume	402				848	314
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	402				848	314
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				98	100
cM capacity (veh/h)	1157				306	726
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	89	356	402	7		
Volume Left	89	0	0	6		
Volume Right	0	0	176	1		
cSH	1157	1700	1700	334		
Volume to Capacity	0.08	0.21	0.24	0.02		
Queue Length 95th (ft)	6	0	0	2		
Control Delay (s)	8.4	0.0	0.0	16.0		
Lane LOS	A			C		
Approach Delay (s)	1.7		0.0	16.0		
Approach LOS				C		
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			38.1%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
 27: Boyce Street & Colonial Drive



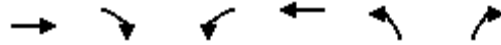
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↻	↻	↻
Traffic Volume (vph)	308	12	21	357	4	5
Future Volume (vph)	308	12	21	357	4	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		75	100		0	0
Storage Lanes		0	0		1	1
Taper Length (ft)			100		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.995					0.850
Flt Protected				0.997	0.950	
Satd. Flow (prot)	1853	0	0	1857	1770	1583
Flt Permitted				0.997	0.950	
Satd. Flow (perm)	1853	0	0	1857	1770	1583
Link Speed (mph)	35			35	35	
Link Distance (ft)	275			1125	814	
Travel Time (s)	5.4			21.9	15.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	342	13	23	397	4	6
Shared Lane Traffic (%)						
Lane Group Flow (vph)	355	0	0	420	4	6
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	46.0%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
27: Boyce Street & Colonial Drive

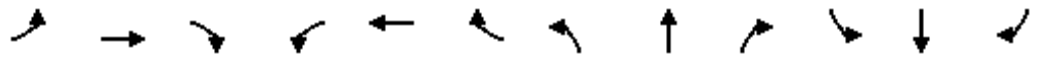
Bull Street Commons Traffic Study
2016 Phase 1 Build-Out AM



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→	↘	↙	←	↘	↗
Traffic Volume (veh/h)	308	12	21	357	4	5
Future Volume (Veh/h)	308	12	21	357	4	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	342	13	23	397	4	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (ft)	927					
pX, platoon unblocked						
vC, conflicting volume			355		792	348
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			355		792	348
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		99	99
cM capacity (veh/h)			1204		351	695
Direction, Lane #	EB 1	WB 1	NB 1	NB 2		
Volume Total	355	420	4	6		
Volume Left	0	23	4	0		
Volume Right	13	0	0	6		
cSH	1700	1204	351	695		
Volume to Capacity	0.21	0.02	0.01	0.01		
Queue Length 95th (ft)	0	1	1	1		
Control Delay (s)	0.0	0.6	15.4	10.2		
Lane LOS		A	C	B		
Approach Delay (s)	0.0	0.6	12.3			
Approach LOS			B			
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			46.0%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2016 Build Out Phase 1 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	14	18	473	3	243	6	2204	207	77	985	8
Future Volume (vph)	22	14	18	473	3	243	6	2204	207	77	985	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		200	675		0	175		0	200		250
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100			75			50			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt		0.917			0.852				0.850		0.999	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3245	0	3433	1587	0	1770	3539	1583	1770	5080	0
Flt Permitted	0.950			0.950			0.259			0.052		
Satd. Flow (perm)	1770	3245	0	3433	1587	0	482	3539	1583	97	5080	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			270				144			2
Link Speed (mph)		30			40			40				45
Link Distance (ft)		619			1038			1208				1992
Travel Time (s)		14.1			17.7			20.6				30.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.90	0.94	0.90
Adj. Flow (vph)	24	16	20	526	3	270	7	2422	227	86	1048	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	36	0	526	273	0	7	2422	227	86	1057	0
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	4	4		3	3			2	3	1	6	
Permitted Phases							2		2	6		
Detector Phase	4	4		3	3		2	2	3	1	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0		11.0	11.0		16.0	16.0	11.0	11.0	16.0	
Minimum Split (s)	30.0	30.0		17.0	17.0		30.0	30.0	17.0	17.0	30.0	
Total Split (s)	30.0	30.0		18.0	18.0		65.0	65.0	18.0	17.0	82.0	
Total Split (%)	23.1%	23.1%		13.8%	13.8%		50.0%	50.0%	13.8%	13.1%	63.1%	
Maximum Green (s)	24.0	24.0		12.0	12.0		59.0	59.0	12.0	11.0	76.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag	Lead	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	None	None	C-Max	
Walk Time (s)				5.0	5.0				5.0			
Flash Dont Walk (s)				10.0	10.0				10.0			
Pedestrian Calls (#/hr)				0	0				0			
Act Effct Green (s)	20.0	20.0		16.0	16.0		75.4	75.4	93.4	92.4	92.4	
Actuated g/C Ratio	0.15	0.15		0.12	0.12		0.58	0.58	0.72	0.71	0.71	
v/c Ratio	0.09	0.07		1.25	0.63		0.03	1.18	0.19	0.33	0.29	
Control Delay	48.3	27.2		173.0	17.4		7.2	114.5	4.9	17.5	7.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	48.3	27.2		173.0	17.4		7.2	114.5	4.9	17.5	7.8	

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2016 Build Out Phase 1 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	C		F	B		A	F	A	B	A	
Approach Delay		35.6			119.8			104.8				8.5
Approach LOS		D			F			F				A
Queue Length 50th (ft)	18	6		~290	55		2	~1382	56	23	121	
Queue Length 95th (ft)	44	22		#407	127		m3	#1514	m68	70	144	
Internal Link Dist (ft)		539			958			1128				1912
Turn Bay Length (ft)	100			675			175			200		
Base Capacity (vph)	381	714		422	432		279	2052	1178	261	3611	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.05		1.25	0.63		0.03	1.18	0.19	0.33	0.29	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 119 (92%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.25
 Intersection Signal Delay: 82.9
 Intersection Capacity Utilization 90.8%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service E

~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Bull St. & Harden St. Ext.



Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

Bull Street Commons Traffic Study
2016 Build Out Phase 1 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑↑	↗	↖	↑↑↑	↗
Traffic Volume (vph)	27	16	11	51	115	47	34	2291	8	6	1421	51
Future Volume (vph)	27	16	11	51	115	47	34	2291	8	6	1421	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	200		0	200		0	150		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			100			100			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Frt		0.940			0.957				0.850		0.995	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1751	0	1770	1783	0	1752	5085	1583	1770	5060	0
Flt Permitted	0.644			0.125			0.101			0.053		
Satd. Flow (perm)	1200	1751	0	233	1783	0	186	5085	1583	99	5060	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		602			376			654			1208	
Travel Time (s)		13.7			8.5			11.1			20.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.93	0.96
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%	2%
Adj. Flow (vph)	30	18	12	57	128	52	38	2412	9	7	1528	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	30	30	0	57	180	0	38	2412	9	7	1581	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			3			2				6
Permitted Phases	4			3			2		2	6		
Detector Phase	4	4		3	3		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	30.0	30.0		34.0	34.0		66.0	66.0	66.0	66.0	66.0	
Total Split (%)	23.1%	23.1%		26.2%	26.2%		50.8%	50.8%	50.8%	50.8%	50.8%	
Maximum Green (s)	24.0	24.0		28.0	28.0		60.0	60.0	60.0	60.0	60.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Act Effct Green (s)	20.0	20.0		32.0	32.0		76.4	76.4	76.4	76.4	76.4	
Actuated g/C Ratio	0.15	0.15		0.25	0.25		0.59	0.59	0.59	0.59	0.59	
v/c Ratio	0.16	0.11		1.00	0.41		0.35	0.81	0.01	0.12	0.53	
Control Delay	50.4	48.7		170.0	44.5		27.9	25.1	13.1	13.5	11.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	4.2	0.0	0.0	0.0	
Total Delay	50.4	48.7		170.0	44.5		27.9	29.3	13.1	13.5	11.0	
LOS	D	D		F	D		C	C	B	B	B	
Approach Delay		49.6			74.7			29.2			11.0	

Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

Bull Street Commons Traffic Study
2016 Build Out Phase 1 PM

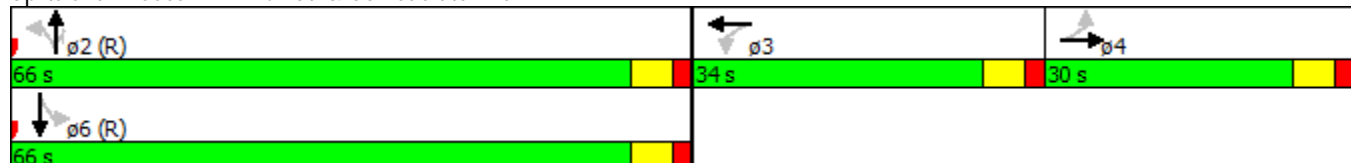


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	D				E		C		B			
Queue Length 50th (ft)	22	22		48	128		17	607	3	2	175	
Queue Length 95th (ft)	53	52		#142	200		53	678	12	m5	m174	
Internal Link Dist (ft)		522			296			574			1128	
Turn Bay Length (ft)	150			200			200			150		
Base Capacity (vph)	258	377		57	438		109	2988	930	57	2973	
Starvation Cap Reductn	0	0		0	0		0	498	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.12	0.08		1.00	0.41		0.35	0.97	0.01	0.12	0.53	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 88 (68%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.00
 Intersection Signal Delay: 25.3
 Intersection LOS: C
 Intersection Capacity Utilization 73.4%
 ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bull St. & Confederate Ave.



Lanes, Volumes, Timings
3: Bull St. & Colonial Drive

Bull Street Commons Traffic Study
2016 Build Out Phase 1 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗	↖	↔			↑↑↑		↘	↑↑↑	
Traffic Volume (vph)	0	0	4	368	6	75	0	2252	253	53	1385	23
Future Volume (vph)	0	0	4	368	6	75	0	2252	253	53	1385	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	150		0	0		0	200		0
Storage Lanes	0		1	1		0	0		0	1		0
Taper Length (ft)	25			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.865		0.947			0.984				0.997
Flt Protected				0.950	0.970					0.950		
Satd. Flow (prot)	0	0	1611	1681	1626	0	0	5004	0	1770	5070	0
Flt Permitted				0.950	0.970					0.036		
Satd. Flow (perm)	0	0	1611	1681	1626	0	0	5004	0	67	5070	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)			96		14			47				
Link Speed (mph)		35			35			40				40
Link Distance (ft)		440			694			362				654
Travel Time (s)		8.6			13.5			6.2				11.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.97	0.90	0.90	0.94	0.90
Adj. Flow (vph)	0	0	4	409	7	83	0	2322	281	59	1473	26
Shared Lane Traffic (%)				36%								
Lane Group Flow (vph)	0	0	4	262	237	0	0	2603	0	59	1499	0
Turn Type			Perm	Perm	NA			NA		Perm	NA	
Protected Phases					8			2				6
Permitted Phases			4	8						6		
Detector Phase			4	8	8			2		6		6
Switch Phase												
Minimum Initial (s)			16.0	16.0	16.0			16.0		16.0		16.0
Minimum Split (s)			30.0	30.0	30.0			30.0		30.0		30.0
Total Split (s)			30.0	30.0	30.0			134.0		134.0		134.0
Total Split (%)			18.3%	18.3%	18.3%			81.7%		81.7%		81.7%
Maximum Green (s)			24.0	24.0	24.0			128.0		128.0		128.0
Yellow Time (s)			4.0	4.0	4.0			4.0		4.0		4.0
All-Red Time (s)			2.0	2.0	2.0			2.0		2.0		2.0
Lost Time Adjust (s)			-4.0	-4.0	-4.0			-4.0		-4.0		-4.0
Total Lost Time (s)			2.0	2.0	2.0			2.0		2.0		2.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)			3.0	3.0	3.0			3.0		3.0		3.0
Recall Mode			None	None	None			C-Max		C-Max		C-Max
Act Effct Green (s)			28.0	28.0	28.0			132.0		132.0		132.0
Actuated g/C Ratio			0.17	0.17	0.17			0.80		0.80		0.80
v/c Ratio			0.01	0.91	0.82			0.64		1.11		0.37
Control Delay			0.0	100.8	83.9			7.2		181.9		4.7
Queue Delay			0.0	0.0	0.0			0.0		0.0		0.4
Total Delay			0.0	100.8	83.9			7.2		181.9		5.1
LOS			A	F	F			A		F		A
Approach Delay					92.8			7.2				11.8
Approach LOS					F			A				B

Lanes, Volumes, Timings
 3: Bull St. & Colonial Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)			0	294	247			351		~71	141	
Queue Length 95th (ft)			0	#478	#397			378		#118	156	
Internal Link Dist (ft)		360			614			282			574	
Turn Bay Length (ft)				150						200		
Base Capacity (vph)			354	287	289			4036		53	4080	
Starvation Cap Reductn			0	0	0			0		0	1812	
Spillback Cap Reductn			0	0	0			0		0	0	
Storage Cap Reductn			0	0	0			0		0	0	
Reduced v/c Ratio			0.01	0.91	0.82			0.64		1.11	0.66	

Intersection Summary

Area Type: Other
 Cycle Length: 164
 Actuated Cycle Length: 164
 Offset: 85 (52%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.11
 Intersection Signal Delay: 17.9
 Intersection LOS: B
 Intersection Capacity Utilization 69.1%
 ICU Level of Service C
 Analysis Period (min) 15
 ~ 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: 3: Bull St. & Colonial Drive



Lanes, Volumes, Timings
4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2016 Build Out Phase 1 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↗	↑↑↑		↗	↑↑↑	
Traffic Volume (vph)	2	0	6	10	0	7	6	2491	12	13	1732	5
Future Volume (vph)	2	0	6	10	0	7	6	2491	12	13	1732	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			75			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt		0.895			0.943			0.999				
Flt Protected		0.989			0.972		0.950			0.950		
Satd. Flow (prot)	0	1649	0	0	1707	0	1770	5080	0	1770	5085	0
Flt Permitted		0.989			0.972		0.950			0.950		
Satd. Flow (perm)	0	1649	0	0	1707	0	1770	5080	0	1770	5085	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		519			596			521			362	
Travel Time (s)		10.1			11.6			8.9			6.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.94	0.90
Adj. Flow (vph)	2	0	7	11	0	8	7	2650	13	14	1843	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	0	19	0	7	2663	0	14	1849	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	58.4%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2016 Build Out Phase 1 PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕			↕		↗	↑↑↑		↗	↑↑↑		
Traffic Volume (veh/h)	2	0	6	10	0	7	6	2491	12	13	1732	5	
Future Volume (Veh/h)	2	0	6	10	0	7	6	2491	12	13	1732	5	
Sign Control		Stop			Stop			Free			Free		
Grade		0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.94	0.90	
Hourly flow rate (vph)	2	0	7	11	0	8	7	2650	13	14	1843	6	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type													
Median storage veh													
Upstream signal (ft)													
pX, platoon unblocked	0.77	0.77	0.92	0.77	0.77	0.73	0.92			0.73			
vC, conflicting volume	2779	4551	617	3320	4548	890	1849			2663			
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	1577	3869	280	2276	3864	0	1619			1995			
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1			
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2			
p0 queue free %	96	100	99	29	100	99	98			93			
cM capacity (veh/h)	53	2	660	16	2	795	367			208			
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4			
Volume Total	9	19	7	1060	1060	543	14	737	737	375			
Volume Left	2	11	7	0	0	0	14	0	0	0			
Volume Right	7	8	0	0	0	13	0	0	0	6			
cSH	186	26	367	1700	1700	1700	208	1700	1700	1700			
Volume to Capacity	0.05	0.72	0.02	0.62	0.62	0.32	0.07	0.43	0.43	0.22			
Queue Length 95th (ft)	4	56	1	0	0	0	5	0	0	0			
Control Delay (s)	25.4	297.4	15.0	0.0	0.0	0.0	23.5	0.0	0.0	0.0			
Lane LOS	D	F	C				C						
Approach Delay (s)	25.4	297.4	0.0				0.2						
Approach LOS	D	F											
Intersection Summary													
Average Delay			1.4										
Intersection Capacity Utilization			58.4%	ICU Level of Service						B			
Analysis Period (min)			15										

Lanes, Volumes, Timings
5: Bull St. & Jefferson Street

Bull Street Commons Traffic Study
2016 Build Out Phase 1 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	11	0	0	2	5	2499	23	0	1737	13
Future Volume (vph)	3	0	11	0	0	2	5	2499	23	0	1737	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	175		0	125		0
Storage Lanes	1		1	0		1	1		0	1		0
Taper Length (ft)	25			25			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.850			0.865		0.999			0.999	
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1770	0	1583	0	0	1611	1770	5080	0	1863	5080	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	1770	0	1583	0	0	1611	1770	5080	0	1863	5080	0
Link Speed (mph)		35			30			40			40	
Link Distance (ft)		257			567			774			521	
Travel Time (s)		5.0			12.9			13.2			8.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.96	0.90
Adj. Flow (vph)	3	0	12	0	0	2	6	2631	26	0	1809	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	0	12	0	0	2	6	2657	0	0	1823	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	65.5%
Analysis Period (min)	15
	ICU Level of Service C

HCM Unsignalized Intersection Capacity Analysis

5: Bull St. & Jefferson Street

Bull Street Commons Traffic Study
2016 Build Out Phase 1 PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	0	11	0	0	2	5	2499	23	0	1737	13
Future Volume (Veh/h)	3	0	11	0	0	2	5	2499	23	0	1737	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.96	0.90
Hourly flow rate (vph)	3	0	12	0	0	2	6	2631	26	0	1809	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked	0.74	0.74	0.93	0.74	0.74	0.70	0.93			0.70		
vC, conflicting volume	2707	4485	610	3271	4479	890	1823			2657		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1391	3806	301	2157	3798	0	1611			1865		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	98	100	100	100	98			100		
cM capacity (veh/h)	74	3	644	19	3	758	372			223		
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4	
Volume Total	3	12	2	6	1052	1052	552	0	724	724	376	
Volume Left	3	0	0	6	0	0	0	0	0	0	0	
Volume Right	0	12	2	0	0	0	26	0	0	0	14	
cSH	74	644	758	372	1700	1700	1700	1700	1700	1700	1700	
Volume to Capacity	0.04	0.02	0.00	0.02	0.62	0.62	0.32	0.00	0.43	0.43	0.22	
Queue Length 95th (ft)	3	1	0	1	0	0	0	0	0	0	0	
Control Delay (s)	55.9	10.7	9.8	14.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Lane LOS	F	B	A	B								
Approach Delay (s)	19.7		9.8	0.0				0.0				
Approach LOS	C		A									
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization			65.5%		ICU Level of Service				C			
Analysis Period (min)			15									

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
2016 Build Out Phase 1 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1322	88	525	73	68	79	432	1147	71	21	608	1105
Future Volume (vph)	1322	88	525	73	68	79	432	1147	71	21	608	1105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	775		0	125		0	175		0	100		0
Storage Lanes	1		2	1		0	1		0	1		1
Taper Length (ft)	50			50			125			50		
Lane Util. Factor	0.95	0.95	0.88	0.95	0.95	0.95	0.97	0.95	0.95	1.00	0.91	0.91
Frt			0.850		0.946			0.991				0.850
Flt Protected	0.950	0.958			0.984		0.950			0.950		
Satd. Flow (prot)	1681	1695	2787	0	3295	0	3433	3507	0	1770	3390	1441
Flt Permitted	0.950	0.958			0.984		0.950			0.138		
Satd. Flow (perm)	1681	1695	2787	0	3295	0	3433	3507	0	257	3390	1441
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			40	
Link Distance (ft)		1012			335			526			774	
Travel Time (s)		23.0			7.6			12.0			13.2	
Peak Hour Factor	0.98	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1349	98	583	81	76	88	475	1274	79	23	676	1228
Shared Lane Traffic (%)	50%											0%
Lane Group Flow (vph)	674	773	583	0	245	0	475	1353	0	23	676	1228
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Perm	NA	pm+ov
Protected Phases	4	4	5	3	3		5	2			6	4
Permitted Phases			4							6		6
Detector Phase	4	4	5	3	3		5	2		6	6	4
Switch Phase												
Minimum Initial (s)	16.0	16.0	11.0	11.0	11.0		11.0	16.0		16.0	16.0	16.0
Minimum Split (s)	30.0	30.0	17.0	17.0	17.0		17.0	30.0		30.0	30.0	30.0
Total Split (s)	65.0	65.0	17.0	17.0	17.0		17.0	48.0		31.0	31.0	65.0
Total Split (%)	50.0%	50.0%	13.1%	13.1%	13.1%		13.1%	36.9%		23.8%	23.8%	50.0%
Maximum Green (s)	59.0	59.0	11.0	11.0	11.0		11.0	42.0		25.0	25.0	59.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0		-4.0		-4.0	-4.0		-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0		2.0		2.0	2.0		2.0	2.0	2.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max		C-Max	C-Max	None
Act Effct Green (s)	63.0	63.0	80.0		15.0		15.0	46.0		29.0	29.0	92.0
Actuated g/C Ratio	0.48	0.48	0.62		0.12		0.12	0.35		0.22	0.22	0.71
v/c Ratio	0.83	0.94	0.34		0.64		1.20	1.09		0.40	0.89	1.21
Control Delay	31.4	43.9	7.8		63.5		152.1	88.3		66.6	64.5	119.1
Queue Delay	0.0	0.0	0.0		0.0		0.0	4.0		0.0	0.0	0.0
Total Delay	31.4	43.9	7.8		63.5		152.1	92.3		66.6	64.5	119.1
LOS	C	D	A		E		F	F		E	E	F
Approach Delay		29.4			63.5			107.8			99.3	
Approach LOS		C			E			F			F	

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

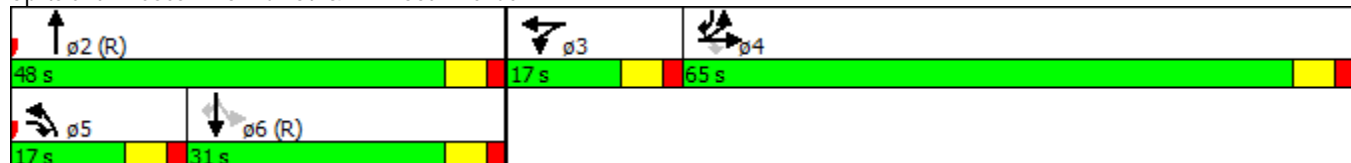


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	374	437	119		105		-245	-680		17	306	-1381
Queue Length 95th (ft)	572	#917	65		152		#359	#822		#53	#416	#1670
Internal Link Dist (ft)		932			255			446			694	
Turn Bay Length (ft)	775						175			100		
Base Capacity (vph)	814	821	1715		380		396	1240		57	756	1019
Starvation Cap Reductn	0	0	0		0		0	84		0	0	0
Spillback Cap Reductn	0	0	0		0		0	0		0	0	0
Storage Cap Reductn	0	0	0		0		0	0		0	0	0
Reduced v/c Ratio	0.83	0.94	0.34		0.64		1.20	1.17		0.40	0.89	1.21

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 100 (77%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.21
 Intersection Signal Delay: 76.9
 Intersection LOS: E
 Intersection Capacity Utilization 108.7%
 ICU Level of Service G
 Analysis Period (min) 15
 ~ 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: 6: Bull St. & Elmwood Avenue



Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

Bull Street Commons Traffic Study
2016 Build Out Phase 1 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	169	27	23	251	148	32	1509	26	81	1040	79
Future Volume (vph)	79	169	27	23	251	148	32	1509	26	81	1040	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	50			50			75			75		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.979			0.944			0.997				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3465	0	1770	3341	0	1770	3529	0	1770	3539	1583
Flt Permitted	0.259			0.505			0.217			0.107		
Satd. Flow (perm)	482	3465	0	941	3341	0	404	3529	0	199	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			56			4				88
Link Speed (mph)		30			30			30				30
Link Distance (ft)		937			677			1883				526
Travel Time (s)		21.3			15.4			42.8				12.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.92	0.90
Adj. Flow (vph)	88	188	30	26	279	164	36	1623	29	90	1130	88
Shared Lane Traffic (%)												
Lane Group Flow (vph)	88	218	0	26	443	0	36	1652	0	90	1130	88
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2				6
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	16.0
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	30.0
Total Split (s)	33.0	33.0		33.0	33.0		97.0	97.0		97.0	97.0	97.0
Total Split (%)	25.4%	25.4%		25.4%	25.4%		74.6%	74.6%		74.6%	74.6%	74.6%
Maximum Green (s)	27.0	27.0		27.0	27.0		91.0	91.0		91.0	91.0	91.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	27.7	27.7		27.7	27.7		98.3	98.3		98.3	98.3	98.3
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.76	0.76		0.76	0.76	0.76
v/c Ratio	0.86	0.29		0.13	0.59		0.12	0.62		0.60	0.42	0.07
Control Delay	107.3	40.5		47.8	48.9		6.1	9.0		27.2	5.2	1.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.5		0.0	0.2	0.0
Total Delay	107.3	40.5		47.8	48.9		6.1	9.4		27.2	5.4	1.6
LOS	F	D		D	D		A	A		C	A	A
Approach Delay		59.7			48.9			9.4			6.7	
Approach LOS		E			D			A			A	

Lanes, Volumes, Timings
 7: Bull St. & Calhoun St.

Bull Street Commons Traffic Study
 2016 Build Out Phase 1 PM

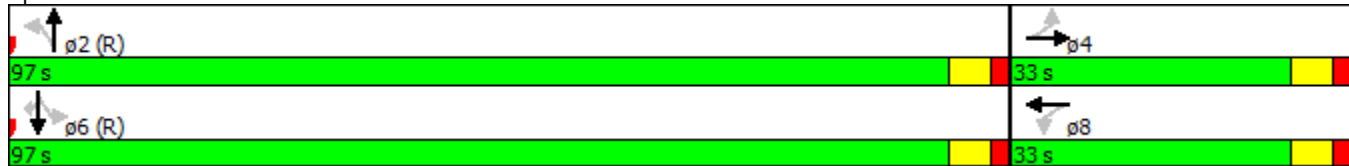


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	70	74		19	163		8	328		19	115	4
Queue Length 95th (ft)	#166	111		47	225		20	391		m51	m175	m12
Internal Link Dist (ft)		857			597			1803			446	
Turn Bay Length (ft)	150			175			150			150		
Base Capacity (vph)	114	836		224	839		305	2670		150	2677	1219
Starvation Cap Reductn	0	0		0	0		0	0		0	724	0
Spillback Cap Reductn	0	0		0	5		0	513		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.77	0.26		0.12	0.53		0.12	0.77		0.60	0.58	0.07

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 72 (55%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 17.4 Intersection LOS: B
 Intersection Capacity Utilization 95.9% ICU Level of Service F
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Bull St. & Calhoun St.



Lanes, Volumes, Timings
9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Bull Street Commons Traffic Study
2016 Build Out Phase 1 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕↗		↖↗	↕↗		↖	↕↗	↖	↖	↕↗	
Traffic Volume (vph)	41	429	141	383	298	49	90	364	861	69	499	40
Future Volume (vph)	41	429	141	383	298	49	90	364	861	69	499	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		800	175		0	225		0	300		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	100			75			75			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.963			0.979				0.850		0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3408	0	3433	3465	0	1770	3539	1583	1770	3498	0
Flt Permitted	0.524			0.950			0.354			0.465		
Satd. Flow (perm)	976	3408	0	3433	3465	0	659	3539	1583	866	3498	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			21				688			8
Link Speed (mph)		35			35			35				40
Link Distance (ft)		1007			300			498				1949
Travel Time (s)		19.6			5.8			9.7				33.2
Peak Hour Factor	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Adj. Flow (vph)	46	477	157	412	331	54	100	404	906	77	554	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	634	0	412	385	0	100	404	906	77	598	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Free	Perm	NA	
Protected Phases		8		7	4			6				2
Permitted Phases	8						6		Free	2		
Detector Phase	8	8		7	4		6	6		2		2
Switch Phase												
Minimum Initial (s)	16.0	16.0		11.0	16.0		16.0	16.0		16.0		16.0
Minimum Split (s)	30.0	30.0		17.0	30.0		30.0	30.0		30.0		30.0
Total Split (s)	41.0	41.0		29.0	70.0		60.0	60.0		60.0		60.0
Total Split (%)	31.5%	31.5%		22.3%	53.8%		46.2%	46.2%		46.2%		46.2%
Maximum Green (s)	35.0	35.0		23.0	64.0		54.0	54.0		54.0		54.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0		-4.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0		3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max		C-Max
Act Effct Green (s)	32.7	32.7		24.2	58.9		67.1	67.1	130.0	67.1		67.1
Actuated g/C Ratio	0.25	0.25		0.19	0.45		0.52	0.52	1.00	0.52		0.52
v/c Ratio	0.19	0.72		0.65	0.24		0.29	0.22	0.57	0.17		0.33
Control Delay	38.3	46.4		66.2	15.2		15.1	12.7	6.6	27.6		27.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	38.3	46.4		66.2	15.2		15.1	12.7	6.6	27.6		27.2
LOS	D	D		E	B		B	B	A	C		C
Approach Delay		45.9			41.6			8.9				27.2

Lanes, Volumes, Timings
 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Bull Street Commons Traffic Study
 2016 Build Out Phase 1 PM

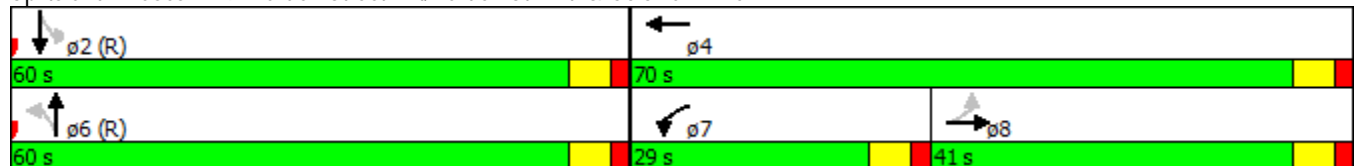


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			A			C	
Queue Length 50th (ft)	31	243		184	75		28	60	208	46	202	
Queue Length 95th (ft)	62	292		237	93		47	75	590	96	273	
Internal Link Dist (ft)		927			220			418			1869	
Turn Bay Length (ft)	225			175			225			300		
Base Capacity (vph)	292	1046		713	1822		340	1827	1583	447	1810	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.16	0.61		0.58	0.21		0.29	0.22	0.57	0.17	0.33	

Intersection Summary

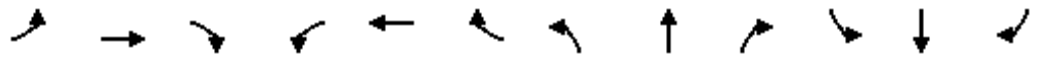
Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	130
Offset:	95 (73%), Referenced to phase 2:SBTL and 6:NBTL, Start of 1st Green
Natural Cycle:	80
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.72
Intersection Signal Delay:	26.7
Intersection LOS:	C
Intersection Capacity Utilization	69.0%
ICU Level of Service	C
Analysis Period (min)	15

Splits and Phases: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive



Lanes, Volumes, Timings
10: Harden St./Harden Street Ext & Calhoun St.

Bull Street Commons Traffic Study
2016 Build Out Phase 1 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	40	192	20	24	10	193	983	43	54	845	75
Future Volume (vph)	130	40	192	20	24	10	193	983	43	54	845	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	50		0	0		325	300		200
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	100			25			25			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Frt		0.876			0.957			0.994				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1632	0	1770	1783	0	1770	5055	0	1770	3539	1583
Flt Permitted	0.732			0.206			0.247			0.219		
Satd. Flow (perm)	1364	1632	0	384	1783	0	460	5055	0	408	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		181			11			8				122
Link Speed (mph)		30			35			35				35
Link Distance (ft)		1071			821			1286				421
Travel Time (s)		24.3			16.0			25.1				8.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	144	44	213	22	27	11	214	1092	48	60	939	83
Shared Lane Traffic (%)												
Lane Group Flow (vph)	144	257	0	22	38	0	214	1140	0	60	939	83
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	1.0	1.0		11.0	11.0		9.0	14.0		9.0	14.0	14.0
Minimum Split (s)	6.5	6.5		30.0	30.0		15.0	30.0		15.0	30.0	30.0
Total Split (s)	39.0	39.0		39.0	39.0		26.0	74.0		17.0	65.0	65.0
Total Split (%)	30.0%	30.0%		30.0%	30.0%		20.0%	56.9%		13.1%	50.0%	50.0%
Maximum Green (s)	33.5	33.5		33.5	33.5		20.0	68.0		11.0	59.0	59.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.5	1.5		1.5	1.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	0.0		0.0	0.0		-3.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	2.5	5.5		5.5	5.5		3.0	3.0		6.0	3.0	3.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	22.4	19.4		19.4	19.4		100.7	90.1		91.9	85.9	85.9
Actuated g/C Ratio	0.17	0.15		0.15	0.15		0.77	0.69		0.71	0.66	0.66
v/c Ratio	0.62	0.65		0.39	0.14		0.44	0.33		0.16	0.40	0.08
Control Delay	50.4	15.3		67.2	35.5		6.9	9.3		3.6	8.1	1.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	50.4	15.3		67.2	35.5		6.9	9.3		3.6	8.1	1.6
LOS	D	B		E	D		A	A		A	A	A
Approach Delay		27.9			47.2			8.9			7.4	
Approach LOS		C			D			A			A	

Lanes, Volumes, Timings
 10: Harden St./Harden Street Ext & Calhoun St.

Bull Street Commons Traffic Study
 2016 Build Out Phase 1 PM

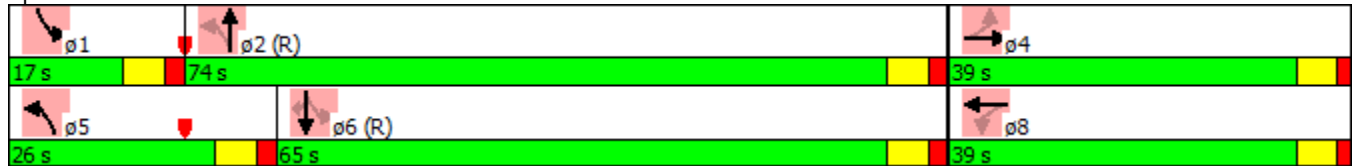


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	119	8		17	20		37	136		5	135	4
Queue Length 95th (ft)	181	56		45	50		78	196		m11	327	19
Internal Link Dist (ft)		991			741			1206			341	
Turn Bay Length (ft)	225			50						300		200
Base Capacity (vph)	382	554		98	467		593	3507		410	2338	1087
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.38	0.46		0.22	0.08		0.36	0.33		0.15	0.40	0.08

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 34 (26%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 11.8
 Intersection LOS: B
 Intersection Capacity Utilization 61.9%
 ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Harden St./Harden Street Ext & Calhoun St.



Lanes, Volumes, Timings
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2016 Build Out Phase 1 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	287	9	5	244	46	15	8	18	39	23	51
Future Volume (vph)	36	287	9	5	244	46	15	8	18	39	23	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	275		0	0		0	300		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	100			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.976			0.941				0.897
Flt Protected	0.950			0.950				0.982		0.950		
Satd. Flow (prot)	1770	1848	0	1770	1818	0	0	1721	0	1770	1671	0
Flt Permitted	0.950			0.950				0.982		0.950		
Satd. Flow (perm)	1770	1848	0	1770	1818	0	0	1721	0	1770	1671	0
Link Speed (mph)		35			30			35				35
Link Distance (ft)		434			1071			385				2969
Travel Time (s)		8.5			24.3			7.5				57.8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	11%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	40	319	10	6	271	51	17	9	20	43	26	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	329	0	6	322	0	0	46	0	43	83	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	38.0% ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2016 Build Out Phase 1 PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	287	9	5	244	46	15	8	18	39	23	51
Future Volume (Veh/h)	36	287	9	5	244	46	15	8	18	39	23	51
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	40	319	10	6	271	51	17	9	20	43	26	57
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh		2			2							
Upstream signal (ft)					1071							
pX, platoon unblocked												
vC, conflicting volume	322			329			757	738	324	732	718	296
vC1, stage 1 conf vol							404	404		308	308	
vC2, stage 2 conf vol							353	334		424	409	
vCu, unblocked vol	322			329			757	738	324	732	718	296
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			96	98	97	91	95	92
cM capacity (veh/h)	1238			1231			462	492	717	497	505	743
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total	40	329	6	322	46	43	83					
Volume Left	40	0	6	0	17	43	0					
Volume Right	0	10	0	51	20	0	57					
cSH	1238	1700	1231	1700	554	497	647					
Volume to Capacity	0.03	0.19	0.00	0.19	0.08	0.09	0.13					
Queue Length 95th (ft)	3	0	0	0	7	7	11					
Control Delay (s)	8.0	0.0	7.9	0.0	12.1	12.9	11.4					
Lane LOS	A		A		B	B	B					
Approach Delay (s)	0.9		0.1		12.1	11.9						
Approach LOS					B	B						
Intersection Summary												
Average Delay			2.8									
Intersection Capacity Utilization			38.0%		ICU Level of Service			A				
Analysis Period (min)			15									

Lanes, Volumes, Timings
12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2016 Build Out Phase 1 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	386	35	88	385	9	27	2	97	36	11	27
Future Volume (vph)	1	386	35	88	385	9	27	2	97	36	11	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		225	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.989			0.997			0.853				0.893
Flt Protected					0.991		0.950			0.950		
Satd. Flow (prot)	0	1833	0	0	1840	0	1703	1589	0	1770	1663	0
Flt Permitted					0.991		0.950			0.950		
Satd. Flow (perm)	0	1833	0	0	1840	0	1703	1589	0	1770	1663	0
Link Speed (mph)		35			35			35				35
Link Distance (ft)		949			210			2969				473
Travel Time (s)		18.5			4.1			57.8				9.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90
Heavy Vehicles (%)	2%	2%	8%	2%	2%	2%	6%	2%	2%	2%	2%	2%
Adj. Flow (vph)	1	429	39	98	428	10	30	2	108	40	12	30
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	469	0	0	536	0	30	110	0	40	42	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 66.8% ICU Level of Service C
 Analysis Period (min) 15












HCM Unsignalized Intersection Capacity Analysis
 12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
 2016 Build Out Phase 1 PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (veh/h)	1	386	35	88	385	9	27	2	97	36	11	27
Future Volume (Veh/h)	1	386	35	88	385	9	27	2	97	36	11	27
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90
Hourly flow rate (vph)	1	429	39	98	428	10	30	2	108	40	12	30
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			TWLTL							
Median storage veh					2							
Upstream signal (ft)					1217							
pX, platoon unblocked	0.90						0.90	0.90		0.90	0.90	0.90
vC, conflicting volume	438			468			1116	1084	448	1188	1099	433
vC1, stage 1 conf vol							450	450		629	629	
vC2, stage 2 conf vol							665	634		560	470	
vCu, unblocked vol	320			468			1073	1038	448	1154	1054	315
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.2	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			91			91	99	82	85	97	95
cM capacity (veh/h)	1116			1094			334	372	610	275	350	653
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	469	536	30	110	40	42						
Volume Left	1	98	30	0	40	0						
Volume Right	39	10	0	108	0	30						
cSH	1116	1094	334	603	275	523						
Volume to Capacity	0.00	0.09	0.09	0.18	0.15	0.08						
Queue Length 95th (ft)	0	7	7	17	13	7						
Control Delay (s)	0.0	2.4	16.8	12.3	20.3	12.5						
Lane LOS	A	A	C	B	C	B						
Approach Delay (s)	0.0	2.4	13.3		16.3							
Approach LOS			B		C							
Intersection Summary												
Average Delay			3.7									
Intersection Capacity Utilization			66.8%		ICU Level of Service		C					
Analysis Period (min)			15									

Lanes, Volumes, Timings
13: Harden Street Ext & Slighs Ave.

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	78	199	1039	64	120	919
Future Volume (vph)	78	199	1039	64	120	919
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		50	100	
Storage Lanes	1	0		1	1	
Taper Length (ft)	25				50	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	0.903			0.850		
Flt Protected	0.986				0.950	
Satd. Flow (prot)	1659	0	3539	1495	1736	3539
Flt Permitted	0.986				0.176	
Satd. Flow (perm)	1659	0	3539	1495	322	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	99			20		
Link Speed (mph)	30		35			35
Link Distance (ft)	359		2565			498
Travel Time (s)	8.2		50.0			9.7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.91
Heavy Vehicles (%)	2%	2%	2%	8%	4%	2%
Adj. Flow (vph)	87	221	1154	71	133	1010
Shared Lane Traffic (%)						
Lane Group Flow (vph)	308	0	1154	71	133	1010
Turn Type	Perm		NA	Perm	pm+pt	NA
Protected Phases			6		5	2
Permitted Phases	8			6	2	
Detector Phase	8		6	6	5	2
Switch Phase						
Minimum Initial (s)	11.0		16.0	16.0	11.0	16.0
Minimum Split (s)	30.0		30.0	30.0	17.0	30.0
Total Split (s)	39.0		72.0	72.0	19.0	91.0
Total Split (%)	30.0%		55.4%	55.4%	14.6%	70.0%
Maximum Green (s)	33.5		66.0	66.0	13.0	85.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	1.5		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0		-4.0	-2.0	-4.0	-4.0
Total Lost Time (s)	1.5		2.0	4.0	2.0	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		C-Max	C-Max	None	C-Max
Act Effct Green (s)	26.7		82.8	80.8	99.8	99.8
Actuated g/C Ratio	0.21		0.64	0.62	0.77	0.77
v/c Ratio	0.74		0.51	0.08	0.32	0.37
Control Delay	42.3		13.6	5.8	10.4	5.8
Queue Delay	0.0		0.0	0.0	0.0	0.2
Total Delay	42.3		13.6	5.8	10.4	6.0
LOS	D		B	A	B	A
Approach Delay	42.3		13.2			6.5

Lanes, Volumes, Timings
 13: Harden Street Ext & Slighs Ave.

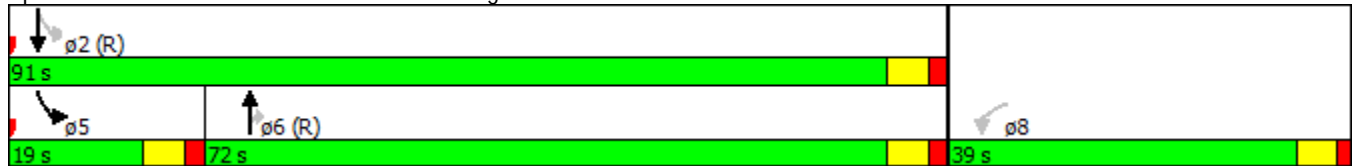


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	D		B			A
Queue Length 50th (ft)	168		308	22	28	105
Queue Length 95th (ft)	250		451	49	65	172
Internal Link Dist (ft)	279		2485			418
Turn Bay Length (ft)				50	100	
Base Capacity (vph)	549		2255	937	432	2717
Starvation Cap Reductn	0		0	0	0	714
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.56		0.51	0.08	0.31	0.50

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	130
Offset:	86 (66%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
Natural Cycle:	80
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.74
Intersection Signal Delay:	13.7
Intersection LOS:	B
Intersection Capacity Utilization	64.5%
ICU Level of Service	C
Analysis Period (min)	15

Splits and Phases: 13: Harden Street Ext & Slighs Ave.



Lanes, Volumes, Timings
14: Colonial Drive & Farrow Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Lane Configurations		↗↘	↖	↑↑	↑↓		
Traffic Volume (vph)	0	164	252	1002	487	24	
Future Volume (vph)	0	164	252	1002	487	24	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0	330	550			0	
Storage Lanes	0	1	1			0	
Taper Length (ft)	25		125				
Lane Util. Factor	1.00	0.88	1.00	0.95	0.95	0.95	
Frt		0.850			0.993		
Flt Protected			0.950				
Satd. Flow (prot)	0	2787	1770	3539	3514	0	
Flt Permitted			0.950				
Satd. Flow (perm)	0	2787	1770	3539	3514	0	
Right Turn on Red		Yes				No	
Satd. Flow (RTOR)		452					
Link Speed (mph)	35			35	35		
Link Distance (ft)	1114			699	2010		
Travel Time (s)	21.7			13.6	39.2		
Peak Hour Factor	0.90	0.90	0.96	0.90	0.92	0.90	
Adj. Flow (vph)	0	182	263	1113	529	27	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	182	263	1113	556	0	
Turn Type		Over	Prot	NA	NA		
Protected Phases		8	8	8 6	2	6	
Permitted Phases				8			
Detector Phase		8	8	8 6	2		
Switch Phase							
Minimum Initial (s)		16.0	16.0		16.0	11.0	
Minimum Split (s)		30.0	30.0		30.0	30.0	
Total Split (s)		32.0	32.0		33.0	33.0	
Total Split (%)		49.2%	49.2%		50.8%	51%	
Maximum Green (s)		26.0	26.0		27.0	27.5	
Yellow Time (s)		4.0	4.0		4.0	4.0	
All-Red Time (s)		2.0	2.0		2.0	1.5	
Lost Time Adjust (s)		-3.0	-3.0		-4.0		
Total Lost Time (s)		3.0	3.0		2.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0	3.0		3.0	3.0	
Recall Mode		None	None		C-Max	C-Max	
Act Effct Green (s)		23.5	23.5	65.0	36.5		
Actuated g/C Ratio		0.36	0.36	1.00	0.56		
v/c Ratio		0.14	0.41	0.31	0.28		
Control Delay		0.2	11.7	0.2	9.7		
Queue Delay		0.0	0.0	0.0	0.0		
Total Delay		0.2	11.7	0.2	9.7		
LOS		A	B	A	A		
Approach Delay				2.4	9.7		
Approach LOS				A	A		

Lanes, Volumes, Timings
 14: Colonial Drive & Farrow Road

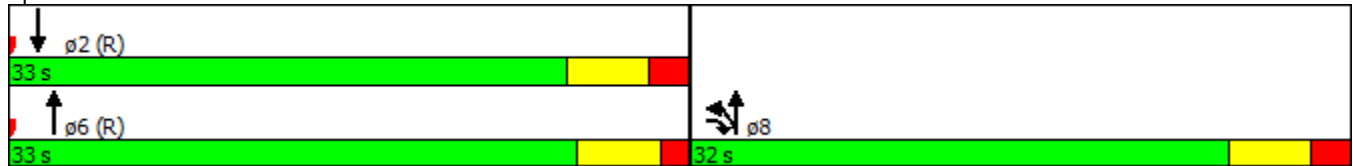


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Queue Length 50th (ft)		0	54	0	87		
Queue Length 95th (ft)		0	100	0	m114		
Internal Link Dist (ft)	1034			619	1930		
Turn Bay Length (ft)		330	550				
Base Capacity (vph)		1493	789	3536	1975		
Starvation Cap Reductn		0	0	0	0		
Spillback Cap Reductn		0	0	0	0		
Storage Cap Reductn		0	0	0	0		
Reduced v/c Ratio		0.12	0.33	0.31	0.28		

Intersection Summary

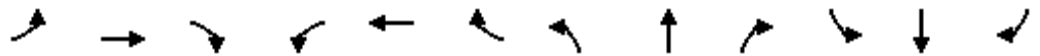
Area Type: Other
 Cycle Length: 65
 Actuated Cycle Length: 65
 Offset: 42 (65%), Referenced to phase 2:SBT and 6:NBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.41
 Intersection Signal Delay: 4.1
 Intersection LOS: A
 Intersection Capacity Utilization 34.9%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: Colonial Drive & Farrow Road



Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
2016 Build Out Phase 1 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	521	11	164	491	365	0	1005	264	271	403	47
Future Volume (vph)	87	521	11	164	491	365	0	1005	264	271	403	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		0	300		0	0		225	200		0
Storage Lanes	1		0	2		1	0		1	1		0
Taper Length (ft)	125			100			25			125		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.997				0.850			0.850		0.984	
Flt Protected	0.950			0.950						0.950		
Satd. Flow (prot)	1770	3529	0	3433	3539	1583	0	3539	1583	1770	3483	0
Flt Permitted	0.448			0.950						0.082		
Satd. Flow (perm)	835	3529	0	3433	3539	1583	0	3539	1583	153	3483	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				19			143			16
Link Speed (mph)		35			35			35				35
Link Distance (ft)		1548			1446			2010				864
Travel Time (s)		30.2			28.2			39.2				16.8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	0.94	0.90	0.90
Adj. Flow (vph)	97	579	12	182	546	406	0	1117	275	288	448	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	97	591	0	182	546	406	0	1117	275	288	500	0
Turn Type	Perm	NA		Prot	NA	pm+ov		NA	Free	pm+pt	NA	
Protected Phases		4		3	8	1		2		1	6	
Permitted Phases	4					8			Free	6		
Detector Phase	4	4		3	8	1		2		1	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0	5.0		15.0		5.0	15.0	
Minimum Split (s)	30.0	30.0		21.0	41.0	17.0		41.0		17.0	30.0	
Total Split (s)	30.0	30.0		21.0	51.0	26.0		53.0		26.0	79.0	
Total Split (%)	23.1%	23.1%		16.2%	39.2%	20.0%		40.8%		20.0%	60.8%	
Maximum Green (s)	25.0	25.0		16.0	46.0	21.0		48.0		21.0	74.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5		3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5	1.5		1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0		-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead		Lead		Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Recall Mode	None	None		None	None	None		C-Min		None	C-Min	
Walk Time (s)					18.0			18.0				
Flash Dont Walk (s)					5.0			5.0				
Pedestrian Calls (#/hr)					0			0				
Act Effct Green (s)	25.7	25.7		16.1	45.8	70.1		51.9	130.0	76.2	76.2	
Actuated g/C Ratio	0.20	0.20		0.12	0.35	0.54		0.40	1.00	0.59	0.59	
v/c Ratio	0.59	0.85		0.43	0.44	0.47		0.79	0.17	0.84	0.24	
Control Delay	62.7	62.3		56.1	33.3	19.2		41.2	0.2	78.0	8.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	62.7	62.3		56.1	33.3	19.2		41.2	0.2	78.0	8.6	

Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
2016 Build Out Phase 1 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	E		E	C	B		D	A	E	A	
Approach Delay		62.3			31.9			33.1			33.9	
Approach LOS		E			C			C			C	
Queue Length 50th (ft)	74	250		74	181	183		445	0	214	66	
Queue Length 95th (ft)	138	#325		112	233	265		556	0	#323	82	
Internal Link Dist (ft)		1468			1366			1930			784	
Turn Bay Length (ft)	175			300					225	200		
Base Capacity (vph)	170	720		448	1280	883		1413	1583	363	2048	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.57	0.82		0.41	0.43	0.46		0.79	0.17	0.79	0.24	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 37.9
 Intersection LOS: D
 Intersection Capacity Utilization 83.4%
 ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 15: Farrow Road & Beltline Blvd



Lanes, Volumes, Timings
16: Farrow Road & 277 NB RAMPS

Bull Street Commons Traffic Study
2016 Build Out Phase 1 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	147	0	14	0	0	0	0	825	652	61	685	0
Future Volume (vph)	147	0	14	0	0	0	0	825	652	61	685	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	0		0	0		0	250		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			25			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.850						0.935				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1770	1583	0	0	0	0	0	3309	0	1770	3539	0
Flt Permitted	0.950									0.123		
Satd. Flow (perm)	1770	1583	0	0	0	0	0	3309	0	229	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		286						387				
Link Speed (mph)		35			35			35				35
Link Distance (ft)		827			779			864				694
Travel Time (s)		16.1			15.2			16.8				13.5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.92	0.90
Adj. Flow (vph)	163	0	16	0	0	0	0	917	709	68	745	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	163	16	0	0	0	0	0	1626	0	68	745	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						6			2	
Permitted Phases	4									2		
Detector Phase	4	4						6		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0						10.0		10.0	10.0	
Minimum Split (s)	30.0	30.0						30.0		30.0	30.0	
Total Split (s)	32.0	32.0						98.0		98.0	98.0	
Total Split (%)	24.6%	24.6%						75.4%		75.4%	75.4%	
Maximum Green (s)	27.0	27.0						93.0		93.0	93.0	
Yellow Time (s)	3.5	3.5						3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5						1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0						-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0						4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Recall Mode	None	None						C-Max		C-Max	C-Max	
Act Effct Green (s)	18.2	18.2						103.8		103.8	103.8	
Actuated g/C Ratio	0.14	0.14						0.80		0.80	0.80	
v/c Ratio	0.66	0.03						0.60		0.37	0.26	
Control Delay	65.1	0.1						2.6		19.4	8.5	
Queue Delay	0.0	0.0						0.3		0.0	0.0	
Total Delay	65.1	0.1						2.9		19.4	8.5	
LOS	E	A						A		B	A	
Approach Delay		59.3						2.9			9.4	
Approach LOS		E						A			A	

Lanes, Volumes, Timings
 16: Farrow Road & 277 NB RAMPS

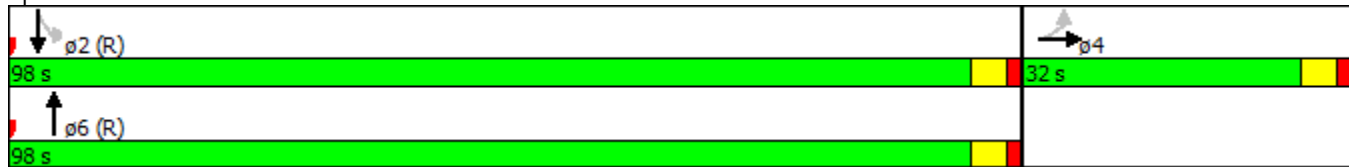


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	132	0						35		33	117	
Queue Length 95th (ft)	199	0						64		86	157	
Internal Link Dist (ft)		747			699			784			614	
Turn Bay Length (ft)	300									250		
Base Capacity (vph)	381	565						2719		182	2824	
Starvation Cap Reductn	0	0						438		0	0	
Spillback Cap Reductn	0	0						0		0	0	
Storage Cap Reductn	0	0						0		0	0	
Reduced v/c Ratio	0.43	0.03						0.71		0.37	0.26	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 8.7
 Intersection Capacity Utilization 65.7%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service C

Splits and Phases: 16: Farrow Road & 277 NB RAMPS



Lanes, Volumes, Timings
 17: Farrow Road & Lorick Avenue /277 SB Ramps

Bull Street Commons Traffic Study
 2016 Build Out Phase 1 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	0	38	235	15	45	23	950	0	0	470	135
Future Volume (vph)	32	0	38	235	15	45	23	950	0	0	470	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	125		0	200		0	0		0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (ft)	25			150			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850		0.888							0.967
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1770	0	1583	1770	1654	0	1770	3539	0	0	3422	0
Flt Permitted	0.713			0.950			0.379					
Satd. Flow (perm)	1328	0	1583	1770	1654	0	706	3539	0	0	3422	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			42		50							49
Link Speed (mph)		35			35			35				35
Link Distance (ft)		467			1041			694				870
Travel Time (s)		9.1			20.3			13.5				16.9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	36	0	42	261	17	50	26	1056	0	0	522	150
Shared Lane Traffic (%)												
Lane Group Flow (vph)	36	0	42	261	67	0	26	1056	0	0	672	0
Turn Type	Perm		Perm	Perm	NA		Perm	NA			NA	
Protected Phases					4			2				6
Permitted Phases	8		8	4			2					
Detector Phase	8		8	4	4		2	2				6
Switch Phase												
Minimum Initial (s)	10.0		10.0	10.0	10.0		10.0	10.0				10.0
Minimum Split (s)	30.0		30.0	30.0	30.0		30.0	30.0				30.0
Total Split (s)	50.0		50.0	50.0	50.0		80.0	80.0				80.0
Total Split (%)	38.5%		38.5%	38.5%	38.5%		61.5%	61.5%				61.5%
Maximum Green (s)	45.0		45.0	45.0	45.0		75.0	75.0				75.0
Yellow Time (s)	3.5		3.5	3.5	3.5		3.5	3.5				3.5
All-Red Time (s)	1.5		1.5	1.5	1.5		1.5	1.5				1.5
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0		-1.0	-1.0				-1.0
Total Lost Time (s)	4.0		4.0	4.0	4.0		4.0	4.0				4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0				3.0
Recall Mode	None		None	None	None		C-Max	C-Max				C-Max
Act Effct Green (s)	25.8		25.8	25.8	25.8		96.2	96.2				96.2
Actuated g/C Ratio	0.20		0.20	0.20	0.20		0.74	0.74				0.74
v/c Ratio	0.14		0.12	0.75	0.18		0.05	0.40				0.26
Control Delay	41.4		11.7	61.6	16.0		4.5	5.0				5.8
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.1				0.0
Total Delay	41.4		11.7	61.6	16.0		4.5	5.2				5.8
LOS	D		B	E	B		A	A				A
Approach Delay					52.3			5.2				5.8
Approach LOS					D			A				A

Lanes, Volumes, Timings
 17: Farrow Road & Lorick Avenue /277 SB Ramps



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	25		0	209	12		3	79			77	
Queue Length 95th (ft)	53		30	284	49		m9	199			128	
Internal Link Dist (ft)		387			961			614			790	
Turn Bay Length (ft)				125			200					
Base Capacity (vph)	469		587	626	617		522	2619			2545	
Starvation Cap Reductn	0		0	0	0		0	583			0	
Spillback Cap Reductn	0		0	0	0		0	0			0	
Storage Cap Reductn	0		0	0	0		0	0			0	
Reduced v/c Ratio	0.08		0.07	0.42	0.11		0.05	0.52			0.26	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 13.3
 Intersection LOS: B
 Intersection Capacity Utilization 52.6%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 17: Farrow Road & Lorick Avenue /277 SB Ramps



Lanes, Volumes, Timings
18: Assembly St./Assembly & Elmwood Avenue

Bull Street Commons Traffic Study
2016 Build Out Phase 1 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1600	258	324	1868	7	981	8	553	0	0	1
Future Volume (vph)	0	1600	258	324	1868	7	981	8	553	0	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		275	150		0	0		0	0		0
Storage Lanes	1		1	1		0	2		1	0		0
Taper Length (ft)	150			75			25			25		
Lane Util. Factor	1.00	0.86	0.86	0.97	0.91	0.91	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850		0.999				0.850		0.865	
Flt Protected				0.950			0.950					
Satd. Flow (prot)	1863	4806	1362	3433	5080	0	3433	1770	1504	0	1611	0
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	1863	4806	1362	3433	5080	0	3433	1770	1504	0	1611	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			276		1				99		126	
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		2522			509			585			432	
Travel Time (s)		57.3			11.6			13.3			8.4	
Peak Hour Factor	0.90	0.94	0.90	0.90	0.92	0.90	0.93	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1702	287	360	2030	8	1055	9	614	0	0	1
Shared Lane Traffic (%)			0%						0%			
Lane Group Flow (vph)	0	1702	287	360	2038	0	1055	9	614	0	1	0
Turn Type	Perm	NA	pm+ov	Prot	NA		Split	NA	pm+ov		NA	
Protected Phases		2	3	1	6		3	3	1		4	
Permitted Phases	2		2						3	4		
Detector Phase	2	2	3	1	6		3	3	1	4	4	
Switch Phase												
Minimum Initial (s)	16.0	16.0	11.0	11.0	16.0		11.0	11.0	11.0	4.5	4.5	
Minimum Split (s)	30.0	30.0	17.0	17.0	30.0		17.0	17.0	17.0	10.0	10.0	
Total Split (s)	52.0	52.0	46.0	22.0	74.0		46.0	46.0	22.0	10.0	10.0	
Total Split (%)	40.0%	40.0%	35.4%	16.9%	56.9%		35.4%	35.4%	16.9%	7.7%	7.7%	
Maximum Green (s)	46.0	46.0	40.0	16.0	68.0		40.0	40.0	16.0	4.5	4.5	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	1.5	1.5	
Lost Time Adjust (s)	0.0	-4.0	-4.0	-4.0	-4.0		-4.0	0.0	-4.0		-1.5	
Total Lost Time (s)	6.0	2.0	2.0	2.0	2.0		2.0	6.0	2.0		4.0	
Lead/Lag	Lead	Lead	Lead	Lag			Lead	Lead	Lag	Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max	None	None	C-Max		None	None	None	None	None	
Act Effct Green (s)		58.0	103.6	20.0	80.0		44.0	40.0	66.0		6.0	
Actuated g/C Ratio		0.45	0.80	0.15	0.62		0.34	0.31	0.51		0.05	
v/c Ratio		0.79	0.25	0.68	0.65		0.91	0.02	0.76		0.01	
Control Delay		34.8	0.9	52.4	10.7		53.4	31.6	28.3		0.0	
Queue Delay		0.0	0.0	0.0	0.7		0.0	0.0	0.0		0.0	
Total Delay		34.8	0.9	52.4	11.4		53.4	31.6	28.3		0.0	
LOS		C	A	D	B		D	C	C		A	
Approach Delay		29.9			17.6			44.1			0.0	
Approach LOS		C			B			D			A	

Lanes, Volumes, Timings
 18: Assembly St./Assembly & Elmwood Avenue

Bull Street Commons Traffic Study
 2016 Build Out Phase 1 PM

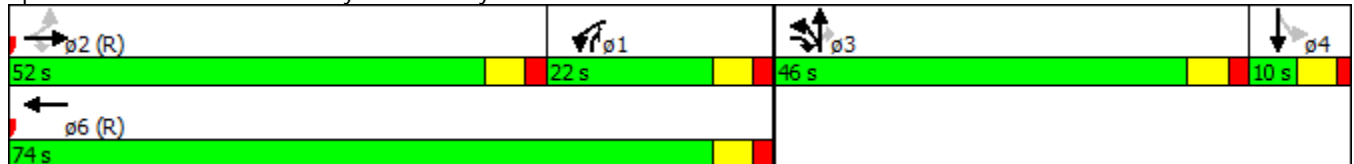


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		454	1	159	150		436	5	362		0	
Queue Length 95th (ft)		#603	18	m204	357		#560	20	536		0	
Internal Link Dist (ft)		2442			429			505			352	
Turn Bay Length (ft)			275	150								
Base Capacity (vph)		2144	1141	528	3126		1161	544	812		194	
Starvation Cap Reductn		0	0	0	661		0	0	0		0	
Spillback Cap Reductn		0	0	0	0		0	0	0		0	
Storage Cap Reductn		0	0	0	0		0	0	0		0	
Reduced v/c Ratio		0.79	0.25	0.68	0.83		0.91	0.02	0.76		0.01	

Intersection Summary

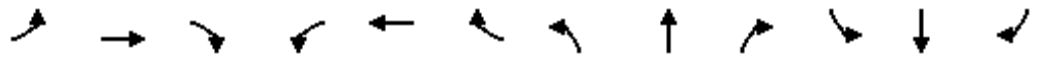
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 28 (22%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.91
 Intersection Signal Delay: 28.9
 Intersection LOS: C
 Intersection Capacity Utilization 97.6%
 ICU Level of Service F
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Assembly St./Assembly & Elmwood Avenue



Lanes, Volumes, Timings
19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
2016 Build Out Phase 1 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↑↑↑	↗	↖	↑↑↑		↖	↑↑	↗	↖	↑↑	↗
Traffic Volume (vph)	477	1544	69	14	1490	88	139	458	52	147	193	460
Future Volume (vph)	477	1544	69	14	1490	88	139	458	52	147	193	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		175	150		0	200		0	175		425
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	75			75			100			75		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850		0.991				0.850		0.939	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	1770	5040	0	1770	3539	1583	1770	3183	1441
Flt Permitted	0.950			0.147			0.333			0.180		
Satd. Flow (perm)	3433	5085	1583	274	5040	0	620	3539	1583	335	3183	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			77		9				126		99	76
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		509			563			693			3655	
Travel Time (s)		11.6			12.8			15.8			83.1	
Peak Hour Factor	0.91	0.97	0.90	0.90	0.95	0.90	0.90	0.90	0.90	0.90	0.95	0.90
Adj. Flow (vph)	524	1592	77	16	1568	98	154	509	58	163	203	511
Shared Lane Traffic (%)												27%
Lane Group Flow (vph)	524	1592	77	16	1666	0	154	509	58	163	341	373
Turn Type	Prot	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	pm+ov
Protected Phases	5	2	3		6		3	8		7	4	5
Permitted Phases			2	6			8		8	4		4
Detector Phase	5	2	3	6	6		3	8	8	7	4	5
Switch Phase												
Minimum Initial (s)	11.0	16.0	11.0	16.0	16.0		11.0	16.0	16.0	11.0	16.0	11.0
Minimum Split (s)	17.0	30.0	17.0	30.0	30.0		17.0	30.0	30.0	17.0	30.0	17.0
Total Split (s)	30.0	83.0	17.0	53.0	53.0		17.0	30.0	30.0	17.0	30.0	30.0
Total Split (%)	23.1%	63.8%	13.1%	40.8%	40.8%		13.1%	23.1%	23.1%	13.1%	23.1%	23.1%
Maximum Green (s)	24.0	77.0	11.0	47.0	47.0		11.0	24.0	24.0	11.0	24.0	24.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0	-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lead	Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	C-Max	C-Max		None	None	None	None	None	None
Act Effct Green (s)	27.1	82.7	99.7	53.6	53.6		41.3	26.3	26.3	41.3	26.3	55.4
Actuated g/C Ratio	0.21	0.64	0.77	0.41	0.41		0.32	0.20	0.20	0.32	0.20	0.43
v/c Ratio	0.73	0.49	0.06	0.14	0.80		0.47	0.71	0.14	0.60	0.47	0.57
Control Delay	64.7	10.3	0.1	22.8	32.7		36.3	54.2	0.7	41.2	33.9	25.3
Queue Delay	0.0	0.2	0.0	0.0	0.2		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.7	10.5	0.1	22.8	32.9		36.3	54.2	0.7	41.2	33.9	25.3
LOS	E	B	A	C	C		D	D	A	D	C	C
Approach Delay		23.1			32.8			46.0			31.6	
Approach LOS		C			C			D			C	

Lanes, Volumes, Timings
 19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
 2016 Build Out Phase 1 PM

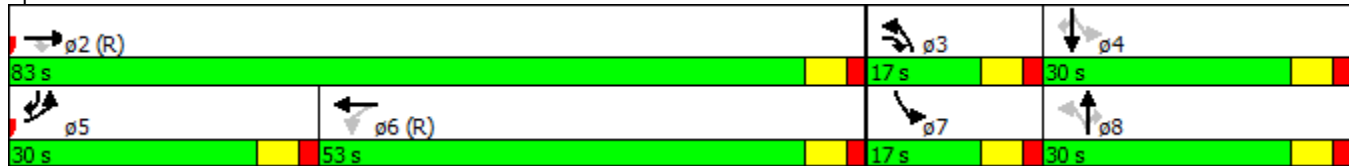


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	236	146	0	5	528		93	209	0	99	97	197
Queue Length 95th (ft)	290	256	m0	m12	583		149	271	0	157	147	306
Internal Link Dist (ft)		429			483			613			3575	
Turn Bay Length (ft)	175		175	150			200			175		425
Base Capacity (vph)	739	3234	1231	112	2082		329	762	439	272	763	667
Starvation Cap Reductn	0	760	0	0	56		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	65		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.64	0.06	0.14	0.83		0.47	0.67	0.13	0.60	0.45	0.56

Intersection Summary

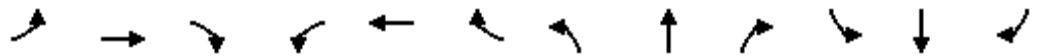
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 120 (92%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 30.5
 Intersection LOS: C
 Intersection Capacity Utilization 80.2%
 ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Main St. & Elmwood Avenue



Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2016 Build Out Phase 1 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕↕↕		↖	↕↕↕		↖	↕	↖		↕↕	
Traffic Volume (vph)	9	1412	82	32	1529	9	85	248	202	4	42	12
Future Volume (vph)	9	1412	82	32	1529	9	85	248	202	4	42	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	75		0	200		0	75		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			50			100			50		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.992			0.999				0.850		0.970	
Flt Protected	0.950			0.950			0.950				0.997	
Satd. Flow (prot)	1770	5045	0	1770	5080	0	1770	1863	1583	0	3423	0
Flt Permitted	0.117			0.116			0.713				0.937	
Satd. Flow (perm)	218	5045	0	216	5080	0	1328	1863	1583	0	3217	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			1				40		13	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		563			1012			3133			1095	
Travel Time (s)		12.8			23.0			71.2			24.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	10	1569	91	36	1644	10	94	276	224	4	47	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	1660	0	36	1654	0	94	276	224	0	64	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		6	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	85.0	85.0		85.0	85.0		45.0	45.0	45.0	45.0	45.0	
Total Split (%)	65.4%	65.4%		65.4%	65.4%		34.6%	34.6%	34.6%	34.6%	34.6%	
Maximum Green (s)	79.0	79.0		79.0	79.0		39.0	39.0	39.0	39.0	39.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0		-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0		2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None	None	None	None	
Act Effct Green (s)	96.9	96.9		96.9	96.9		29.1	29.1	29.1		29.1	
Actuated g/C Ratio	0.75	0.75		0.75	0.75		0.22	0.22	0.22		0.22	
v/c Ratio	0.06	0.44		0.23	0.44		0.32	0.66	0.58		0.09	
Control Delay	2.3	2.4		10.8	9.7		43.3	53.1	41.9		30.0	
Queue Delay	0.0	0.1		0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	2.3	2.5		10.8	9.8		43.3	53.1	41.9		30.0	
LOS	A	A		B	A		D	D	D		C	
Approach Delay		2.5			9.8			47.4			30.0	
Approach LOS		A			A			D			C	

Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2016 Build Out Phase 1 PM

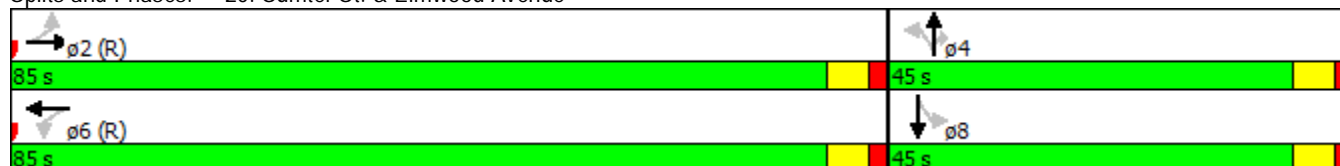


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	0	13		13	82		67	215	140			17
Queue Length 95th (ft)	m3	278		m13	m224		109	284	207			34
Internal Link Dist (ft)		483			932			3053				1015
Turn Bay Length (ft)	200			75			200					
Base Capacity (vph)	162	3763		160	3786		439	616	550			1072
Starvation Cap Reductn	0	593		0	0		0	0	0			0
Spillback Cap Reductn	0	0		0	394		0	0	0			0
Storage Cap Reductn	0	0		0	0		0	0	0			0
Reduced v/c Ratio	0.06	0.52		0.23	0.49		0.21	0.45	0.41			0.06

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 18 (14%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 12.6
 Intersection LOS: B
 Intersection Capacity Utilization 65.8%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 20: Sumter St. & Elmwood Avenue



Lanes, Volumes, Timings
21: Barnwell St. & Calhoun St.

Bull Street Commons Traffic Study
2016 Build Out Phase 1 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↻		↻	↑		↻	↻		↻	↻	
Traffic Volume (vph)	23	318	10	5	274	8	30	4	29	4	2	12
Future Volume (vph)	23	318	10	5	274	8	30	4	29	4	2	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	225		0	125		0	125		0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.996			0.867				0.870
Flt Protected		0.997		0.950			0.950			0.950		
Satd. Flow (prot)	0	1850	0	1770	1855	0	1770	1615	0	1770	1621	0
Flt Permitted		0.997		0.950			0.950			0.950		
Satd. Flow (perm)	0	1850	0	1770	1855	0	1770	1615	0	1770	1621	0
Link Speed (mph)		35			35			35				35
Link Distance (ft)		905			434			880				706
Travel Time (s)		17.6			8.5			17.1				13.8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	26	353	11	6	304	9	33	4	32	4	2	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	390	0	6	313	0	33	36	0	4	15	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	51.3%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 21: Barnwell St. & Calhoun St.

Bull Street Commons Traffic Study
 2016 Build Out Phase 1 PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↗		↖	↖		↖	↗		↖	↗	
Traffic Volume (veh/h)	23	318	10	5	274	8	30	4	29	4	2	12
Future Volume (Veh/h)	23	318	10	5	274	8	30	4	29	4	2	12
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	26	353	11	6	304	9	33	4	32	4	2	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None				TWLTL							
Median storage veh	2											
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	313			364			740	736	358	765	736	308
vC1, stage 1 conf vol							410	410		320	320	
vC2, stage 2 conf vol							330	325		444	416	
vCu, unblocked vol	313			364			740	736	358	765	736	308
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			94	99	95	99	100	98
cM capacity (veh/h)	1247			1195			508	500	686	483	503	732
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2					
Volume Total	390	6	313	33	36	4	15					
Volume Left	26	6	0	33	0	4	0					
Volume Right	11	0	9	0	32	0	13					
cSH	1247	1195	1700	508	659	483	690					
Volume to Capacity	0.02	0.01	0.18	0.06	0.05	0.01	0.02					
Queue Length 95th (ft)	2	0	0	5	4	1	2					
Control Delay (s)	0.7	8.0	0.0	12.6	10.8	12.5	10.3					
Lane LOS	A	A		B	B	B	B					
Approach Delay (s)	0.7	0.2		11.6		10.8						
Approach LOS				B		B						
Intersection Summary												
Average Delay			1.7									
Intersection Capacity Utilization			51.3%	ICU Level of Service				A				
Analysis Period (min)	15											

Lanes, Volumes, Timings
 26: Colonial Drive & Mental Health Dwy



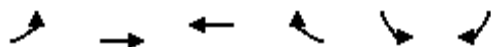
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	301	416	1	123	32
Future Volume (vph)	5	301	416	1	123	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.972	
Flt Protected	0.950				0.962	
Satd. Flow (prot)	1770	1863	1863	0	1742	0
Flt Permitted	0.950				0.962	
Satd. Flow (perm)	1770	1863	1863	0	1742	0
Link Speed (mph)		35	35		30	
Link Distance (ft)		694	326		457	
Travel Time (s)		13.5	6.4		10.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	334	462	1	137	36
Shared Lane Traffic (%)						
Lane Group Flow (vph)	6	334	463	0	173	0
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	37.4%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 26: Colonial Drive & Mental Health Dwy

Bull Street Commons Traffic Study
 2016 Build Out Phase 1 PM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	301	416	1	123	32
Future Volume (Veh/h)	5	301	416	1	123	32
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	334	462	1	137	36
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		694				
pX, platoon unblocked						
vC, conflicting volume	463				808	462
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	463				808	462
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				61	94
cM capacity (veh/h)	1098				348	599
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	6	334	463	173		
Volume Left	6	0	0	137		
Volume Right	0	0	1	36		
cSH	1098	1700	1700	381		
Volume to Capacity	0.01	0.20	0.27	0.45		
Queue Length 95th (ft)	0	0	0	57		
Control Delay (s)	8.3	0.0	0.0	22.0		
Lane LOS	A			C		
Approach Delay (s)	0.1		0.0	22.0		
Approach LOS				C		
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization			37.4%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
 27: Boyce Street & Colonial Drive



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	391	33	49	390	28	31
Future Volume (vph)	391	33	49	390	28	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		75	100		0	0
Storage Lanes		0	0		1	1
Taper Length (ft)			100		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.989					0.850
Flt Protected				0.994	0.950	
Satd. Flow (prot)	1842	0	0	1852	1770	1583
Flt Permitted				0.994	0.950	
Satd. Flow (perm)	1842	0	0	1852	1770	1583
Link Speed (mph)	35			35	30	
Link Distance (ft)	326			949	1007	
Travel Time (s)	6.4			18.5	22.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	434	37	54	433	31	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	471	0	0	487	31	34
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	59.1%
Analysis Period (min)	15
	ICU Level of Service B

HCM Unsignalized Intersection Capacity Analysis
27: Boyce Street & Colonial Drive

Bull Street Commons Traffic Study
2016 Build Out Phase 1 PM

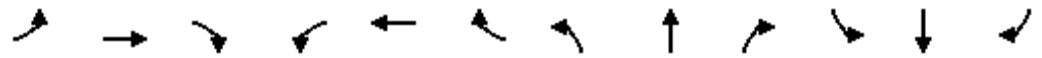


Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→	↘	↙	←	↖	↗
Traffic Volume (veh/h)	391	33	49	390	28	31
Future Volume (Veh/h)	391	33	49	390	28	31
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	434	37	54	433	31	34
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)	1020					
pX, platoon unblocked						
vC, conflicting volume			471		994	452
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			471		994	452
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		88	94
cM capacity (veh/h)			1091		258	607
Direction, Lane #	EB 1	WB 1	NB 1	NB 2		
Volume Total	471	487	31	34		
Volume Left	0	54	31	0		
Volume Right	37	0	0	34		
cSH	1700	1091	258	607		
Volume to Capacity	0.28	0.05	0.12	0.06		
Queue Length 95th (ft)	0	4	10	4		
Control Delay (s)	0.0	1.4	20.8	11.3		
Lane LOS		A	C	B		
Approach Delay (s)	0.0	1.4	15.8			
Approach LOS			C			
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization			59.1%	ICU Level of Service		B
Analysis Period (min)	15					

2018 Background Conditions

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2018 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖	↕		↖	↕	↖	↖	↕	↖
Traffic Volume (vph)	8	4	3	159	19	37	24	583	564	426	2280	20
Future Volume (vph)	8	4	3	159	19	37	24	583	564	426	2280	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		200	675		0	175		0	200		250
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100			75			50			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt		0.936			0.901				0.850		0.999	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3313	0	3433	1668	0	1770	3539	1583	1770	5080	0
Flt Permitted	0.950			0.950			0.056			0.338		
Satd. Flow (perm)	1770	3313	0	3433	1668	0	104	3539	1583	630	5080	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			41				491		2	
Link Speed (mph)		30			40			40			45	
Link Distance (ft)		552			905			1206			1658	
Travel Time (s)		12.5			15.4			20.6			25.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.92	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	9	4	3	177	21	41	27	627	627	473	2478	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	9	7	0	177	62	0	27	627	627	473	2500	0
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	4	4		3	3			2	3	1	6	
Permitted Phases							2		2	6		
Detector Phase	4	4		3	3		2	2	3	1	6	
Switch Phase												
Minimum Initial (s)	14.0	14.0		11.0	11.0		16.0	16.0	11.0	11.0	16.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		30.0	30.0	20.0	17.0	30.0	
Total Split (s)	20.0	20.0		25.0	25.0		49.0	49.0	25.0	36.0	85.0	
Total Split (%)	15.4%	15.4%		19.2%	19.2%		37.7%	37.7%	19.2%	27.7%	65.4%	
Maximum Green (s)	14.0	14.0		19.0	19.0		43.0	43.0	19.0	30.0	79.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag	Lead	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	None	None	C-Max	
Act Effct Green (s)	18.0	18.0		17.8	17.8		74.4	74.4	94.2	100.2	100.2	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.57	0.57	0.72	0.77	0.77	
v/c Ratio	0.04	0.02		0.38	0.24		0.46	0.31	0.49	0.68	0.64	
Control Delay	49.1	39.0		40.7	16.0		40.7	4.2	5.2	12.0	9.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	49.1	39.0		40.7	16.0		40.7	4.2	5.2	12.0	9.8	
LOS	D	D		D	B		D	A	A	B	A	
Approach Delay		44.7			34.3			5.4			10.1	

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	D			C			A			B		
Queue Length 50th (ft)	7	1		71	18		0	1	22	67	188	
Queue Length 95th (ft)	24	9		93	33		#58	125	566	250	560	
Internal Link Dist (ft)		472			825			1126			1578	
Turn Bay Length (ft)	100			675			175			200		
Base Capacity (vph)	245	461		607	328		59	2024	1325	783	3915	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.04	0.02		0.29	0.19		0.46	0.31	0.47	0.60	0.64	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 10.2
 Intersection LOS: B
 Intersection Capacity Utilization 80.2%
 ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Bull St. & Harden St. Ext.



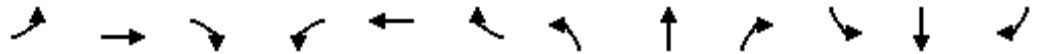
Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

Bull Street Commons Traffic Study
2018 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	2	13	16	12	7	16	1204	80	68	2373	2
Future Volume (vph)	5	2	13	16	12	7	16	1204	80	68	2373	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	200		0	200		0	150		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			100			100			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Frt		0.869			0.943				0.850			
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1619	0	1770	1757	0	1770	5085	1583	1770	5085	0
Flt Permitted	0.744			0.260			0.042			0.182		
Satd. Flow (perm)	1386	1619	0	484	1757	0	78	5085	1583	339	5085	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		602			715			682			1206	
Travel Time (s)		13.7			16.3			11.6			20.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.94	0.90
Adj. Flow (vph)	6	2	14	18	13	8	18	1281	89	76	2524	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	16	0	18	21	0	18	1281	89	76	2526	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			3			2			6	
Permitted Phases	4			3			2		2	6		
Detector Phase	4	4		3	3		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	25.0	25.0		28.0	28.0		77.0	77.0	77.0	77.0	77.0	
Total Split (%)	19.2%	19.2%		21.5%	21.5%		59.2%	59.2%	59.2%	59.2%	59.2%	
Maximum Green (s)	19.0	19.0		22.0	22.0		71.0	71.0	71.0	71.0	71.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Act Effct Green (s)	20.0	20.0		21.8	21.8		100.6	100.6	100.6	100.6	100.6	
Actuated g/C Ratio	0.15	0.15		0.17	0.17		0.77	0.77	0.77	0.77	0.77	
v/c Ratio	0.03	0.06		0.23	0.07		0.30	0.33	0.07	0.29	0.64	
Control Delay	47.4	47.9		53.2	45.0		24.8	2.5	2.9	15.1	12.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	47.4	47.9		53.2	45.0		24.8	2.5	2.9	15.1	12.2	
LOS	D	D		D	D		C	A	A	B	B	
Approach Delay		47.8			48.8			2.8			12.3	
Approach LOS		D			D			A			B	

Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

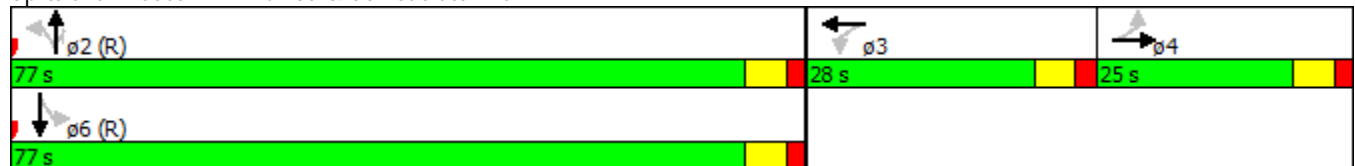


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	4	12		14	15		2	43	8	24	329	
Queue Length 95th (ft)	18	34		38	39		m10	58	17	m55	447	
Internal Link Dist (ft)		522			635			602			1126	
Turn Bay Length (ft)	150			200			200			150		
Base Capacity (vph)	245	286		96	351		60	3936	1225	262	3936	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.02	0.06		0.19	0.06		0.30	0.33	0.07	0.29	0.64	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 113 (87%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 9.6
 Intersection LOS: A
 Intersection Capacity Utilization 76.5%
 ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bull St. & Confederate Ave.



Lanes, Volumes, Timings
3: Bull St. & Colonial Drive

Bull Street Commons Traffic Study
2018 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗	↖	↔			↑↑↑		↘	↑↑↑	
Traffic Volume (vph)	0	0	5	198	1	14	0	1313	376	39	2264	11
Future Volume (vph)	0	0	5	198	1	14	0	1313	376	39	2264	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	150		0	0		0	200		0
Storage Lanes	0		1	1		0	0		0	1		0
Taper Length (ft)	25			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.865		0.980			0.967			0.999	
Flt Protected				0.950	0.959					0.950		
Satd. Flow (prot)	0	0	1611	1681	1663	0	0	4917	0	1770	5080	0
Flt Permitted				0.950	0.959					0.107		
Satd. Flow (perm)	0	0	1611	1681	1663	0	0	4917	0	199	5080	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)			25		5			160				
Link Speed (mph)		35			35			40				40
Link Distance (ft)		440			651			472				682
Travel Time (s)		8.6			12.7			8.0				11.6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.96	0.90	0.93	0.90
Adj. Flow (vph)	0	0	6	220	1	16	0	1382	392	43	2434	12
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	0	0	6	117	120	0	0	1774	0	43	2446	0
Turn Type			Perm	Perm	NA			NA		Perm	NA	
Protected Phases					8			2			6	
Permitted Phases			4	8						6		
Detector Phase			4	8	8			2		6	6	
Switch Phase												
Minimum Initial (s)			16.0	16.0	16.0			16.0		16.0	16.0	
Minimum Split (s)			30.0	30.0	30.0			30.0		30.0	30.0	
Total Split (s)			30.0	30.0	30.0			100.0		100.0	100.0	
Total Split (%)			23.1%	23.1%	23.1%			76.9%		76.9%	76.9%	
Maximum Green (s)			24.0	24.0	24.0			94.0		94.0	94.0	
Yellow Time (s)			4.0	4.0	4.0			4.0		4.0	4.0	
All-Red Time (s)			2.0	2.0	2.0			2.0		2.0	2.0	
Lost Time Adjust (s)			-4.0	-4.0	-4.0			-4.0		-4.0	-4.0	
Total Lost Time (s)			2.0	2.0	2.0			2.0		2.0	2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)			3.0	3.0	3.0			3.0		3.0	3.0	
Recall Mode			None	None	None			C-Max		C-Max	C-Max	
Act Effct Green (s)			20.9	20.9	20.9			105.1		105.1	105.1	
Actuated g/C Ratio			0.16	0.16	0.16			0.81		0.81	0.81	
v/c Ratio			0.02	0.43	0.44			0.44		0.27	0.60	
Control Delay			0.2	57.3	55.4			8.6		3.9	3.3	
Queue Delay			0.0	0.0	0.0			0.0		0.0	0.6	
Total Delay			0.2	57.3	55.4			8.6		3.9	3.9	
LOS			A	E	E			A		A	A	
Approach Delay					56.3			8.6			3.9	
Approach LOS					E			A			A	

Lanes, Volumes, Timings
3: Bull St. & Colonial Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)			0	89	87			298		1	198	
Queue Length 95th (ft)			0	133	132			m368		m0	1	
Internal Link Dist (ft)		360			571			392			602	
Turn Bay Length (ft)				150						200		
Base Capacity (vph)			366	362	362			4004		161	4106	
Starvation Cap Reductn			0	0	0			0		0	1138	
Spillback Cap Reductn			0	0	0			0		0	0	
Storage Cap Reductn			0	0	0			0		0	0	
Reduced v/c Ratio			0.02	0.32	0.33			0.44		0.27	0.82	

Intersection Summary

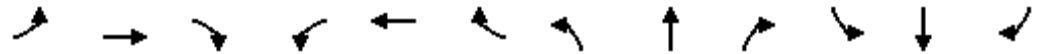
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.60
 Intersection Signal Delay: 8.5
 Intersection LOS: A
 Intersection Capacity Utilization 80.7%
 ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Bull St. & Colonial Drive



Lanes, Volumes, Timings
4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2018 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↑↑↑		↗	↑↑↑	
Traffic Volume (vph)	1	0	5	3	0	2	2	1655	6	6	2420	5
Future Volume (vph)	1	0	5	3	0	2	2	1655	6	6	2420	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			75			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt		0.884			0.946			0.999				
Flt Protected		0.993			0.971		0.950			0.950		
Satd. Flow (prot)	0	1635	0	0	1711	0	1770	5080	0	1770	5085	0
Flt Permitted		0.993			0.971		0.950			0.950		
Satd. Flow (perm)	0	1635	0	0	1711	0	1770	5080	0	1770	5085	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		341			529			443			472	
Travel Time (s)		6.6			10.3			7.6			8.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.97	0.90
Adj. Flow (vph)	1	0	6	3	0	2	2	1742	7	7	2495	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	7	0	0	5	0	2	1749	0	7	2501	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	56.9%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
4: Bull St. & Franklin Street /Freed Drive

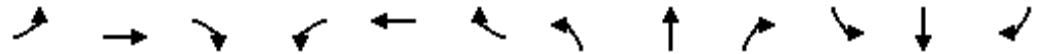
Bull Street Commons Traffic Study
2018 Background AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕			↕		↗	↕↕↕		↗	↕↕↕		
Traffic Volume (veh/h)	1	0	5	3	0	2	2	1655	6	6	2420	5	
Future Volume (Veh/h)	1	0	5	3	0	2	2	1655	6	6	2420	5	
Sign Control		Stop			Stop			Free			Free		
Grade		0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.97	0.90	
Hourly flow rate (vph)	1	0	6	3	0	2	2	1742	7	7	2495	6	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type													
Median storage veh													
Upstream signal (ft)													
pX, platoon unblocked	0.82	0.82	0.82	0.82	0.82		0.82						
vC, conflicting volume	3099	4265	835	2601	4264	584	2501			1749			
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	2786	4212	16	2177	4212	584	2054			1749			
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1			
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2			
p0 queue free %	86	100	99	85	100	100	99			98			
cM capacity (veh/h)	7	2	866	21	2	455	220			355			
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4			
Volume Total	7	5	2	697	697	355	7	998	998	505			
Volume Left	1	3	2	0	0	0	7	0	0	0			
Volume Right	6	2	0	0	0	7	0	0	0	6			
cSH	46	33	220	1700	1700	1700	355	1700	1700	1700			
Volume to Capacity	0.15	0.15	0.01	0.41	0.41	0.21	0.02	0.59	0.59	0.30			
Queue Length 95th (ft)	12	12	1	0	0	0	2	0	0	0			
Control Delay (s)	96.0	131.6	21.5	0.0	0.0	0.0	15.4	0.0	0.0	0.0			
Lane LOS	F	F	C				C						
Approach Delay (s)	96.0	131.6	0.0				0.0						
Approach LOS	F	F											
Intersection Summary													
Average Delay			0.3										
Intersection Capacity Utilization			56.9%	ICU Level of Service						B			
Analysis Period (min)			15										

Lanes, Volumes, Timings
5: Bull St. & Jefferson Street

Bull Street Commons Traffic Study
2018 Background AM

























Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	10	0	0	1	1	1629	11	0	2437	6
Future Volume (vph)	4	0	10	0	0	1	1	1629	11	0	2437	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	175		0	125		0
Storage Lanes	1		1	0		1	1		0	1		0
Taper Length (ft)	25			25			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.850			0.865		0.999				
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1770	0	1583	0	0	1611	1770	5080	0	1863	5085	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	1770	0	1583	0	0	1611	1770	5080	0	1863	5085	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		410			531			712			443	
Travel Time (s)		8.0			10.3			12.1			7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.97	0.90
Adj. Flow (vph)	4	0	11	0	0	1	1	1733	12	0	2512	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	0	11	0	0	1	1	1745	0	0	2519	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	57.2%
Analysis Period (min)	15
	ICU Level of Service B

HCM Unsignalized Intersection Capacity Analysis
5: Bull St. & Jefferson Street

Bull Street Commons Traffic Study
2018 Background AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								  			 	
Traffic Volume (veh/h)	4	0	10	0	0	1	1	1629	11	0	2437	6
Future Volume (Veh/h)	4	0	10	0	0	1	1	1629	11	0	2437	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.97	0.90
Hourly flow rate (vph)	4	0	11	0	0	1	1	1733	12	0	2512	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								712			915	
pX, platoon unblocked	0.81	0.81	0.81	0.81	0.81		0.81					
vC, conflicting volume	3096	4262	841	2589	4260	584	2519			1745		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2776	4208	8	2154	4205	584	2068			1745		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	44	100	99	100	100	100	100			100		
cM capacity (veh/h)	7	2	873	22	2	455	217			356		
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4	
Volume Total	4	11	1	1	693	693	359	0	1005	1005	509	
Volume Left	4	0	0	1	0	0	0	0	0	0	0	
Volume Right	0	11	1	0	0	0	12	0	0	0	7	
cSH	7	873	455	217	1700	1700	1700	1700	1700	1700	1700	
Volume to Capacity	0.56	0.01	0.00	0.00	0.41	0.41	0.21	0.00	0.59	0.59	0.30	
Queue Length 95th (ft)	26	1	0	0	0	0	0	0	0	0	0	
Control Delay (s)	774.9	9.2	12.9	21.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Lane LOS	F	A	B	C								
Approach Delay (s)	213.4		12.9	0.0				0.0				
Approach LOS	F		B									
Intersection Summary												
Average Delay			0.8									
Intersection Capacity Utilization			57.2%		ICU Level of Service				B			
Analysis Period (min)			15									

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
2018 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1091	80	862	6	11	4	347	560	90	37	1252	1159
Future Volume (vph)	1091	80	862	6	11	4	347	560	90	37	1252	1159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	775		0	125		0	175		0	100		0
Storage Lanes	1		2	1		0	1		0	1		1
Taper Length (ft)	50			50			125			50		
Lane Util. Factor	0.95	0.95	0.88	0.95	0.95	0.95	0.97	0.95	0.95	1.00	0.91	0.91
Frt			0.850		0.974			0.979				0.850
Flt Protected	0.950	0.959			0.985		0.950			0.950		
Satd. Flow (prot)	1681	1697	2787	0	3395	0	3433	3465	0	1770	3390	1441
Flt Permitted	0.950	0.959			0.985		0.950			0.377		
Satd. Flow (perm)	1681	1697	2787	0	3395	0	3433	3465	0	702	3390	1441
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			40	
Link Distance (ft)		1012			379			526			712	
Travel Time (s)		23.0			8.6			12.0			12.1	
Peak Hour Factor	0.97	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.90	0.94	0.97
Adj. Flow (vph)	1125	89	958	7	12	4	381	622	100	41	1332	1195
Shared Lane Traffic (%)	50%											0%
Lane Group Flow (vph)	562	652	958	0	23	0	381	722	0	41	1332	1195
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Perm	NA	pm+ov
Protected Phases	4	4	5	3	3		5	2			6	4
Permitted Phases			4							6		6
Detector Phase	4	4	5	3	3		5	2		6	6	4
Switch Phase												
Minimum Initial (s)	16.0	16.0	11.0	5.0	5.0		11.0	16.0		16.0	16.0	16.0
Minimum Split (s)	30.0	30.0	17.0	12.0	12.0		17.0	30.0		30.0	30.0	30.0
Total Split (s)	52.0	52.0	17.0	12.0	12.0		17.0	66.0		49.0	49.0	52.0
Total Split (%)	40.0%	40.0%	13.1%	9.2%	9.2%		13.1%	50.8%		37.7%	37.7%	40.0%
Maximum Green (s)	46.0	46.0	11.0	6.0	6.0		11.0	60.0		43.0	43.0	46.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0		-4.0		-4.0	-4.0		-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0		2.0		2.0	2.0		2.0	2.0	2.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max		C-Max	C-Max	None
Act Effct Green (s)	50.0	50.0	67.0		9.9		15.0	68.8		51.8	51.8	102.6
Actuated g/C Ratio	0.38	0.38	0.52		0.08		0.12	0.53		0.40	0.40	0.79
v/c Ratio	0.87	1.00	0.67		0.09		0.96	0.39		0.15	0.99	1.05
Control Delay	42.2	65.2	21.1		56.7		86.5	19.3		29.8	54.5	55.9
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.2		0.0	0.0	0.0
Total Delay	42.2	65.2	21.1		56.7		86.5	19.5		29.8	54.5	55.9
LOS	D	E	C		E		F	B		C	D	E
Approach Delay		39.8			56.7			42.6			54.8	
Approach LOS		D			E			D			D	

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
2018 Background AM

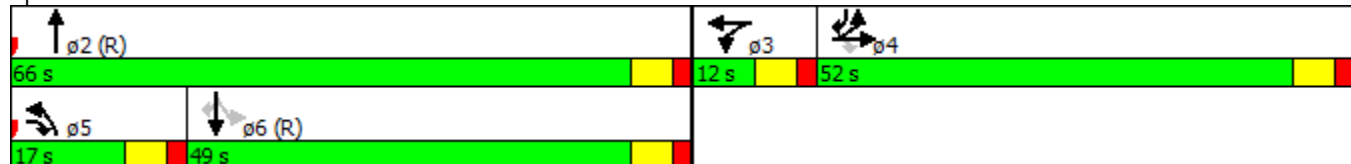


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	471	583	387		9		169	226		15	~675	~1304
Queue Length 95th (ft)	#687	#858	490		25		#271	283		m33	#825	#1597
Internal Link Dist (ft)		932			299			446			632	
Turn Bay Length (ft)	775						175			100		
Base Capacity (vph)	646	652	1436		261		396	1833		279	1350	1137
Starvation Cap Reductn	0	0	0		0		0	424		0	0	0
Spillback Cap Reductn	0	0	10		0		0	0		0	0	0
Storage Cap Reductn	0	0	0		0		0	0		0	0	0
Reduced v/c Ratio	0.87	1.00	0.67		0.09		0.96	0.51		0.15	0.99	1.05

Intersection Summary

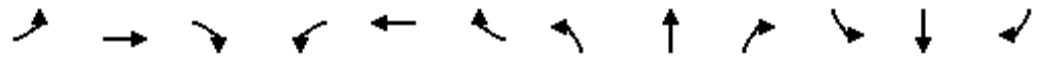
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 126 (97%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.05
 Intersection Signal Delay: 47.0 Intersection LOS: D
 Intersection Capacity Utilization 105.8% ICU Level of Service G
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Bull St. & Elmwood Avenue



Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

Bull Street Commons Traffic Study
2018 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	218	85	17	146	121	25	809	26	168	1879	97
Future Volume (vph)	85	218	85	17	146	121	25	809	26	168	1879	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	50			50			75			75		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.958			0.931			0.995				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3391	0	1770	3295	0	1770	3522	0	1770	3539	1583
Flt Permitted	0.388			0.336			0.065			0.282		
Satd. Flow (perm)	723	3391	0	626	3295	0	121	3522	0	525	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		29			134			7				108
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1044			459			1901				526
Travel Time (s)		23.7			10.4			43.2				12.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.94	0.90
Adj. Flow (vph)	94	242	94	19	159	134	28	899	29	187	1999	108
Shared Lane Traffic (%)												
Lane Group Flow (vph)	94	336	0	19	293	0	28	928	0	187	1999	108
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	16.0
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	30.0
Total Split (s)	31.0	31.0		31.0	31.0		99.0	99.0		99.0	99.0	99.0
Total Split (%)	23.8%	23.8%		23.8%	23.8%		76.2%	76.2%		76.2%	76.2%	76.2%
Maximum Green (s)	25.0	25.0		25.0	25.0		93.0	93.0		93.0	93.0	93.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	24.5	24.5		24.5	24.5		101.5	101.5		101.5	101.5	101.5
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.78	0.78		0.78	0.78	0.78
v/c Ratio	0.69	0.51		0.16	0.40		0.30	0.34		0.46	0.72	0.09
Control Delay	74.3	45.3		49.4	28.8		14.6	4.9		5.1	6.2	0.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.9	0.0
Total Delay	74.3	45.3		49.4	28.8		14.6	4.9		5.1	7.0	0.5
LOS	E	D		D	C		B	A		A	A	A
Approach Delay		51.6			30.1			5.2			6.6	
Approach LOS		D			C			A			A	

Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

Bull Street Commons Traffic Study
2018 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	75	123		13	66		6	103		27	275	2
Queue Length 95th (ft)	136	166		39	111		28	151		m39	m258	m2
Internal Link Dist (ft)		964			379			1821			446	
Turn Bay Length (ft)	150			175			150			150		
Base Capacity (vph)	161	778		139	839		94	2750		409	2762	1259
Starvation Cap Reductn	0	0		0	0		0	0		0	436	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.58	0.43		0.14	0.35		0.30	0.34		0.46	0.86	0.09

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 106 (82%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 12.9
 Intersection LOS: B
 Intersection Capacity Utilization 105.3%
 ICU Level of Service G
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Bull St. & Calhoun St.



Lanes, Volumes, Timings
9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Bull Street Commons Traffic Study
2018 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	187	68	724	372	102	153	508	352	20	457	52
Future Volume (vph)	35	187	68	724	372	102	153	508	352	20	457	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		800	175		0	225		0	300		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	100			75			75			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.960			0.968				0.850		0.985	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3398	0	3433	3426	0	1770	3539	1583	1770	3486	0
Flt Permitted	0.457			0.950			0.371			0.385		
Satd. Flow (perm)	851	3398	0	3433	3426	0	691	3539	1583	717	3486	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37			39				391		12	
Link Speed (mph)		35			35			35			40	
Link Distance (ft)		1013			300			483			2110	
Travel Time (s)		19.7			5.8			9.4			36.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.90	0.90
Adj. Flow (vph)	39	208	76	804	413	113	170	540	391	22	508	58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	39	284	0	804	526	0	170	540	391	22	566	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Free	Perm	NA	
Protected Phases		8		7	4			6			2	
Permitted Phases	8						6		Free	2		
Detector Phase	8	8		7	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	16.0	16.0		11.0	16.0		16.0	16.0		16.0	16.0	
Minimum Split (s)	30.0	30.0		17.0	30.0		30.0	30.0		30.0	30.0	
Total Split (s)	30.0	30.0		39.0	69.0		61.0	61.0		61.0	61.0	
Total Split (%)	23.1%	23.1%		30.0%	53.1%		46.9%	46.9%		46.9%	46.9%	
Maximum Green (s)	24.0	24.0		33.0	63.0		55.0	55.0		55.0	55.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	20.8	20.8		36.1	58.9		67.1	67.1	130.0	67.1	67.1	
Actuated g/C Ratio	0.16	0.16		0.28	0.45		0.52	0.52	1.00	0.52	0.52	
v/c Ratio	0.29	0.50		0.84	0.33		0.48	0.30	0.25	0.06	0.31	
Control Delay	35.4	29.3		41.2	20.9		22.0	16.2	0.3	24.9	26.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	35.4	29.3		41.2	20.9		22.0	16.2	0.3	24.9	27.0	
LOS	D	C		D	C		C	B	A	C	C	
Approach Delay		30.0			33.2			11.4			26.9	
Approach LOS		C			C			B			C	

Lanes, Volumes, Timings
 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

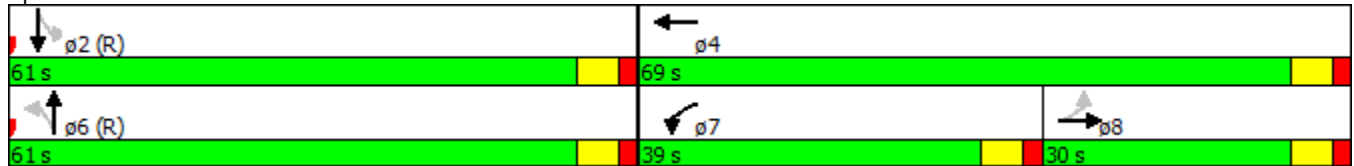


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	28	97		254	147		57	93	0	13	205	
Queue Length 95th (ft)	60	132		350	183		124	165	0	m27	308	
Internal Link Dist (ft)		933			220			403			2030	
Turn Bay Length (ft)	225			175			225			300		
Base Capacity (vph)	183	760		977	1784		357	1827	1583	370	1806	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	150	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.21	0.37		0.82	0.29		0.48	0.30	0.25	0.06	0.34	

Intersection Summary

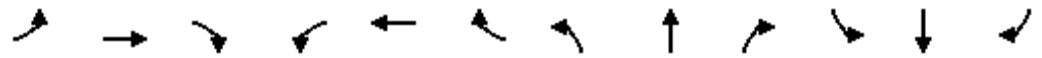
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 121 (93%), Referenced to phase 2:SBTL and 6:NBTL, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 24.6
 Intersection LOS: C
 Intersection Capacity Utilization 74.9%
 ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive



Lanes, Volumes, Timings
10: Harden St./Harden Street Ext & Calhoun St.

Bull Street Commons Traffic Study
2018 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	26	146	6	27	2	194	795	16	40	999	86
Future Volume (vph)	85	26	146	6	27	2	194	795	16	40	999	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	50		0	0		325	300		200
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	100			25			25			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Frt		0.873			0.991			0.997				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1626	0	1770	1846	0	1770	5070	0	1770	3539	1583
Flt Permitted	0.736			0.285			0.256			0.237		
Satd. Flow (perm)	1371	1626	0	531	1846	0	477	5070	0	441	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		162			2			4				122
Link Speed (mph)		30			35			35				35
Link Distance (ft)		820			1149			2515				354
Travel Time (s)		18.6			22.4			49.0				6.9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	94	29	162	7	30	2	216	883	18	44	1110	96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	94	191	0	7	32	0	216	901	0	44	1110	96
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	1 2		1	2	2
Switch Phase												
Minimum Initial (s)	1.0	1.0		11.0	11.0		9.0	14.0		9.0	14.0	14.0
Minimum Split (s)	6.5	6.5		30.0	30.0		15.0	30.0		15.0	30.0	30.0
Total Split (s)	35.0	35.0		35.0	35.0		31.0	74.0		21.0	64.0	64.0
Total Split (%)	26.9%	26.9%		26.9%	26.9%		23.8%	56.9%		16.2%	49.2%	49.2%
Maximum Green (s)	29.5	29.5		29.5	29.5		25.0	68.0		15.0	58.0	58.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.5	1.5		1.5	1.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	0.0		0.0	0.0		-3.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	2.5	5.5		5.5	5.5		3.0	3.0		6.0	3.0	3.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	17.8	14.8		14.8	14.8		86.8	71.0		103.5	87.9	87.9
Actuated g/C Ratio	0.14	0.11		0.11	0.11		0.67	0.55		0.80	0.68	0.68
v/c Ratio	0.50	0.58		0.12	0.15		0.45	0.33		0.07	0.46	0.09
Control Delay	47.2	13.3		53.7	49.2		8.3	16.6		1.3	10.9	1.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	47.2	13.3		53.7	49.2		8.3	16.6		1.3	10.9	1.6
LOS	D	B		D	D		A	B		A	B	A
Approach Delay		24.5			50.0			15.0			9.8	
Approach LOS		C			D			B			A	

Lanes, Volumes, Timings
 10: Harden St./Harden Street Ext & Calhoun St.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	77	46		5	23		29	146		2	320	9
Queue Length 95th (ft)	132	109		21	53		59	176		m5	438	m22
Internal Link Dist (ft)		740			1069			2435			274	
Turn Bay Length (ft)	225			50						300		200
Base Capacity (vph)	342	494		120	420		641	2770		654	2392	1109
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.27	0.39		0.06	0.08		0.34	0.33		0.07	0.46	0.09

Intersection Summary

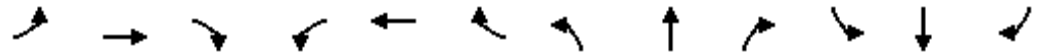
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 78 (60%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.58
 Intersection Signal Delay: 14.1
 Intersection LOS: B
 Intersection Capacity Utilization 61.0%
 ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Harden St./Harden Street Ext & Calhoun St.



Lanes, Volumes, Timings
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2018 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	246	36	10	252	28	15	22	12	10	13	38
Future Volume (vph)	39	246	36	10	252	28	15	22	12	10	13	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	275		0	0		0	300		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	100			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.981			0.985			0.967			0.887	
Flt Protected	0.950			0.950				0.985		0.950		
Satd. Flow (prot)	1770	1827	0	1770	1835	0	0	1774	0	1770	1652	0
Flt Permitted	0.950			0.950				0.985		0.950		
Satd. Flow (perm)	1770	1827	0	1770	1835	0	0	1774	0	1770	1652	0
Link Speed (mph)		35			30			35			35	
Link Distance (ft)		679			820			504			3014	
Travel Time (s)		13.2			18.6			9.8			58.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	43	273	40	11	280	31	17	24	13	11	14	42
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	313	0	11	311	0	0	54	0	11	56	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	37.9%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2018 Background AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	246	36	10	252	28	15	22	12	10	13	38
Future Volume (Veh/h)	39	246	36	10	252	28	15	22	12	10	13	38
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	43	273	40	11	280	31	17	24	13	11	14	42
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	TWLTL				TWLTL							
Median storage veh	2				2							
Upstream signal (ft)					820							
pX, platoon unblocked	0.97						0.97	0.97		0.97	0.97	0.97
vC, conflicting volume	311			313			730	712	293	702	716	296
vC1, stage 1 conf vol							379	379		318	318	
vC2, stage 2 conf vol							351	333		384	399	
vCu, unblocked vol	274			313			706	687	293	676	692	258
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			99			97	95	98	98	97	94
cM capacity (veh/h)	1250			1247			487	500	746	508	503	757
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total	43	313	11	311	54	11	56					
Volume Left	43	0	11	0	17	11	0					
Volume Right	0	40	0	31	13	0	42					
cSH	1250	1700	1247	1700	538	508	672					
Volume to Capacity	0.03	0.18	0.01	0.18	0.10	0.02	0.08					
Queue Length 95th (ft)	3	0	1	0	8	2	7					
Control Delay (s)	8.0	0.0	7.9	0.0	12.4	12.2	10.8					
Lane LOS	A		A		B	B	B					
Approach Delay (s)	1.0		0.3		12.4	11.1						
Approach LOS					B	B						
Intersection Summary												
Average Delay			2.3									
Intersection Capacity Utilization			37.9%		ICU Level of Service		A					
Analysis Period (min)			15									

Lanes, Volumes, Timings
12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2018 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↗	↘		↗	↘	
Traffic Volume (vph)	12	275	39	100	382	55	8	10	24	6	4	2
Future Volume (vph)	12	275	39	100	382	55	8	10	24	6	4	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		225	50		0
Storage Lanes	0		0	0		0	1		1	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.984			0.986			0.893			0.950	
Flt Protected		0.998			0.991		0.950			0.950		
Satd. Flow (prot)	0	1829	0	0	1820	0	1770	1663	0	1770	1770	0
Flt Permitted		0.998			0.991		0.950			0.950		
Satd. Flow (perm)	0	1829	0	0	1820	0	1770	1663	0	1770	1770	0
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1125			161			3014			569	
Travel Time (s)		21.9			3.1			58.7			11.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	13	306	43	111	415	61	9	11	27	7	4	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	362	0	0	587	0	9	38	0	7	6	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	63.1%
ICU Level of Service	B
Analysis Period (min)	15












HCM Unsignalized Intersection Capacity Analysis
 12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
 2018 Background AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (veh/h)	12	275	39	100	382	55	8	10	24	6	4	2
Future Volume (Veh/h)	12	275	39	100	382	55	8	10	24	6	4	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	13	306	43	111	415	61	9	11	27	7	4	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					1174							
pX, platoon unblocked	0.87						0.87	0.87		0.87	0.87	0.87
vC, conflicting volume	476			349			1025	1052	328	1054	1042	446
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	330			349			957	987	328	990	977	295
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			91			95	94	96	96	98	100
cM capacity (veh/h)	1076			1210			188	194	714	167	197	651
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	362	587	9	38	7	6						
Volume Left	13	111	9	0	7	0						
Volume Right	43	61	0	27	0	2						
cSH	1076	1210	188	402	167	257						
Volume to Capacity	0.01	0.09	0.05	0.09	0.04	0.02						
Queue Length 95th (ft)	1	8	4	8	3	2						
Control Delay (s)	0.4	2.4	25.1	14.9	27.4	19.4						
Lane LOS	A	A	D	B	D	C						
Approach Delay (s)	0.4	2.4	16.8		23.7							
Approach LOS			C		C							
Intersection Summary												
Average Delay			2.7									
Intersection Capacity Utilization			63.1%		ICU Level of Service		B					
Analysis Period (min)			15									

Lanes, Volumes, Timings
13: Harden Street Ext & Slighs Ave.

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	123	205	908	68	124	1160
Future Volume (vph)	123	205	908	68	124	1160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		50	100	
Storage Lanes	1	0		1	1	
Taper Length (ft)	25				50	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	0.916			0.850		
Flt Protected	0.982				0.950	
Satd. Flow (prot)	1579	0	3539	1583	1770	3539
Flt Permitted	0.982				0.196	
Satd. Flow (perm)	1579	0	3539	1583	365	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	72			21		
Link Speed (mph)	30		35			35
Link Distance (ft)	398		2631			483
Travel Time (s)	9.0		51.3			9.4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.95
Heavy Vehicles (%)	7%	9%	2%	2%	2%	2%
Adj. Flow (vph)	137	228	1009	76	138	1221
Shared Lane Traffic (%)						
Lane Group Flow (vph)	365	0	1009	76	138	1221
Turn Type	Perm		NA	Perm	pm+pt	NA
Protected Phases			6		5	2
Permitted Phases	4			6	2	
Detector Phase	4		6	6	5	2
Switch Phase						
Minimum Initial (s)	16.0		16.0	16.0	11.0	16.0
Minimum Split (s)	30.0		30.0	30.0	17.0	30.0
Total Split (s)	49.0		62.0	62.0	19.0	81.0
Total Split (%)	37.7%		47.7%	47.7%	14.6%	62.3%
Maximum Green (s)	43.0		56.0	56.0	13.0	75.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0		-4.0	-2.0	-4.0	-4.0
Total Lost Time (s)	2.0		2.0	4.0	2.0	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		C-Max	C-Max	None	C-Max
Act Effct Green (s)	34.7		74.0	72.0	91.3	91.3
Actuated g/C Ratio	0.27		0.57	0.55	0.70	0.70
v/c Ratio	0.77		0.50	0.09	0.33	0.49
Control Delay	45.4		11.4	4.1	13.5	14.7
Queue Delay	0.0		0.0	0.0	0.0	0.3
Total Delay	45.4		11.4	4.1	13.5	15.1
LOS	D		B	A	B	B
Approach Delay	45.4		10.9			14.9

Lanes, Volumes, Timings
 13: Harden Street Ext & Slighs Ave.



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	D		B			B
Queue Length 50th (ft)	232		286	2	39	309
Queue Length 95th (ft)	313		410	26	m69	479
Internal Link Dist (ft)	318		2551			403
Turn Bay Length (ft)				50	100	
Base Capacity (vph)	616		2015	886	440	2485
Starvation Cap Reductn	0		0	0	0	631
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.59		0.50	0.09	0.31	0.66

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 129 (99%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 17.3
 Intersection LOS: B
 Intersection Capacity Utilization 63.7%
 ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 13: Harden Street Ext & Slighs Ave.



Lanes, Volumes, Timings
14: Colonial Drive & Farrow Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Lane Configurations		↗↗	↖	↑↑	↑↑		
Traffic Volume (vph)	0	181	155	401	956	17	
Future Volume (vph)	0	181	155	401	956	17	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0	330	550			0	
Storage Lanes	0	1	1			0	
Taper Length (ft)	25		125				
Lane Util. Factor	1.00	0.88	1.00	0.95	0.95	0.95	
Frt		0.850			0.997		
Flt Protected			0.950				
Satd. Flow (prot)	0	2787	1770	3539	3529	0	
Flt Permitted			0.950				
Satd. Flow (perm)	0	2787	1770	3539	3529	0	
Right Turn on Red		Yes				No	
Satd. Flow (RTOR)		121					
Link Speed (mph)	35			35	35		
Link Distance (ft)	930			699	2077		
Travel Time (s)	18.1			13.6	40.5		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.91	0.90	
Adj. Flow (vph)	0	201	172	446	1051	19	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	201	172	446	1070	0	
Turn Type		Over	Prot	NA	NA		
Protected Phases		8	8	8 6	2		6
Permitted Phases							
Detector Phase		8	8	8 6	2		
Switch Phase							
Minimum Initial (s)		16.0	16.0		16.0		16.0
Minimum Split (s)		30.0	30.0		30.0		30.0
Total Split (s)		30.0	30.0		35.0		35.0
Total Split (%)		46.2%	46.2%		53.8%		54%
Maximum Green (s)		24.0	24.0		29.0		29.0
Yellow Time (s)		4.0	4.0		4.0		4.0
All-Red Time (s)		2.0	2.0		2.0		2.0
Lost Time Adjust (s)		-3.0	-3.0		-4.0		
Total Lost Time (s)		3.0	3.0		2.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0	3.0		3.0		3.0
Recall Mode		None	None		C-Max		C-Max
Act Effct Green (s)		19.7	19.7	65.0	40.3		
Actuated g/C Ratio		0.30	0.30	1.00	0.62		
v/c Ratio		0.22	0.32	0.13	0.49		
Control Delay		7.8	18.7	0.1	6.6		
Queue Delay		0.0	0.0	0.0	0.0		
Total Delay		7.8	18.7	0.1	6.6		
LOS		A	B	A	A		
Approach Delay				5.3	6.6		
Approach LOS				A	A		

Lanes, Volumes, Timings
 14: Colonial Drive & Farrow Road

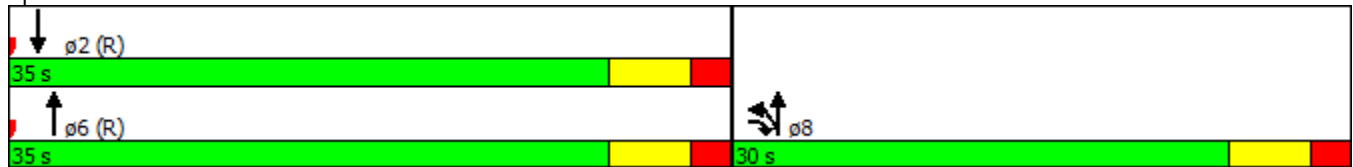


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Queue Length 50th (ft)		13	38	0	233		
Queue Length 95th (ft)		34	90	0	117		
Internal Link Dist (ft)	850			619	1997		
Turn Bay Length (ft)		330	550				
Base Capacity (vph)		1228	735	3539	2188		
Starvation Cap Reductn		0	0	0	0		
Spillback Cap Reductn		0	0	0	0		
Storage Cap Reductn		0	0	0	0		
Reduced v/c Ratio		0.16	0.23	0.13	0.49		

Intersection Summary

Area Type:	Other
Cycle Length:	65
Actuated Cycle Length:	65
Offset:	62 (95%), Referenced to phase 2:SBT and 6:NBT, Start of 1st Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.49
Intersection Signal Delay:	6.3
Intersection LOS:	A
Intersection Capacity Utilization	47.0%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 14: Colonial Drive & Farrow Road



Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
2018 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	399	4	214	542	190	0	271	134	279	863	68
Future Volume (vph)	15	399	4	214	542	190	0	271	134	279	863	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		0	300		0	0		225	200		0
Storage Lanes	1		0	2		1	0		1	1		0
Taper Length (ft)	125			100			25			125		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.999				0.850			0.850		0.989	
Flt Protected	0.950			0.950						0.950		
Satd. Flow (prot)	1770	3536	0	3433	3539	1583	0	3539	1583	1770	3500	0
Flt Permitted	0.424			0.950						0.501		
Satd. Flow (perm)	790	3536	0	3433	3539	1583	0	3539	1583	933	3500	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				211			149		10	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1518			1183			2077			914	
Travel Time (s)		29.6			23.0			40.5			17.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.90
Adj. Flow (vph)	17	443	4	238	602	211	0	301	149	310	948	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	447	0	238	602	211	0	301	149	310	1024	0
Turn Type	Perm	NA		Prot	NA	pm+ov		NA	Free	pm+pt	NA	
Protected Phases		4		3	8	1		2		1	6	
Permitted Phases	4					8			Free	6		
Detector Phase	4	4		3	8	1		2		1	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0	5.0		15.0		5.0	15.0	
Minimum Split (s)	30.0	30.0		21.0	41.0	17.0		41.0		17.0	30.0	
Total Split (s)	33.0	33.0		23.0	56.0	28.0		46.0		28.0	74.0	
Total Split (%)	25.4%	25.4%		17.7%	43.1%	21.5%		35.4%		21.5%	56.9%	
Maximum Green (s)	28.0	28.0		18.0	51.0	23.0		41.0		23.0	69.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5		3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5	1.5		1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0		-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead		Lead		Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Recall Mode	None	None		None	None	None		C-Min		None	C-Min	
Walk Time (s)					18.0			18.0				
Flash Dont Walk (s)					5.0			5.0				
Pedestrian Calls (#/hr)					0			0				
Act Effct Green (s)	22.7	22.7		16.8	43.5	65.6		56.4	130.0	78.5	78.5	
Actuated g/C Ratio	0.17	0.17		0.13	0.33	0.50		0.43	1.00	0.60	0.60	
v/c Ratio	0.12	0.72		0.54	0.51	0.23		0.20	0.09	0.46	0.48	
Control Delay	45.3	57.2		57.6	35.7	2.0		33.4	0.1	18.3	18.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	45.3	57.2		57.6	35.7	2.0		33.4	0.1	18.3	18.3	

Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd



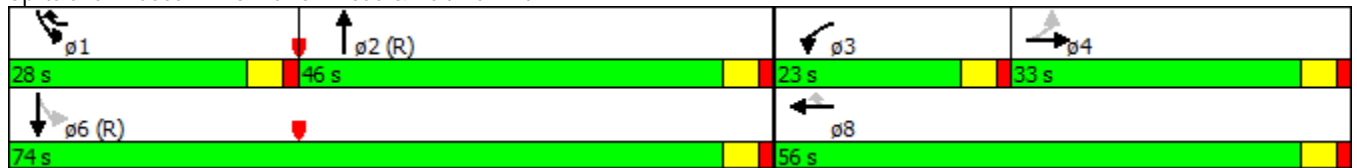
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	E		E	D	A		C	A	B	B	
Approach Delay		56.8			33.9			22.4			18.3	
Approach LOS		E			C			C			B	
Queue Length 50th (ft)	12	189		98	215	0		97	0	138	256	
Queue Length 95th (ft)	34	235		139	244	29		156	0	219	372	
Internal Link Dist (ft)		1438			1103			1997			834	
Turn Bay Length (ft)	175			300					225	200		
Base Capacity (vph)	176	789		502	1415	971		1545	1583	720	2116	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.10	0.57		0.47	0.43	0.22		0.19	0.09	0.43	0.48	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 29.3
 Intersection Capacity Utilization 68.8%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 15: Farrow Road & Beltline Blvd



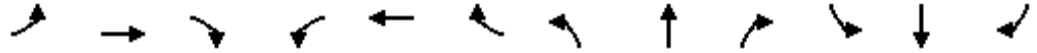
Lanes, Volumes, Timings
16: Farrow Road & 277 NB RAMPS

Bull Street Commons Traffic Study
2018 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	0	8	0	0	0	0	314	175	42	1243	0
Future Volume (vph)	58	0	8	0	0	0	0	314	175	42	1243	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	0		0	0		0	250		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			25			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.850						0.946				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1770	1583	0	0	0	0	0	3348	0	1770	3539	0
Flt Permitted	0.950									0.449		
Satd. Flow (perm)	1770	1583	0	0	0	0	0	3348	0	836	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		91						194				
Link Speed (mph)		35			35			35				35
Link Distance (ft)		706			904			914				683
Travel Time (s)		13.8			17.6			17.8				13.3
Peak Hour Factor	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90
Adj. Flow (vph)	63	0	9	0	0	0	0	349	194	47	1322	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	63	9	0	0	0	0	0	543	0	47	1322	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						6			2	
Permitted Phases	4									2		
Detector Phase	4	4						6		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0						10.0		10.0	10.0	
Minimum Split (s)	30.0	30.0						30.0		30.0	30.0	
Total Split (s)	34.0	34.0						96.0		96.0	96.0	
Total Split (%)	26.2%	26.2%						73.8%		73.8%	73.8%	
Maximum Green (s)	29.0	29.0						91.0		91.0	91.0	
Yellow Time (s)	3.5	3.5						3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5						1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0						-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0						4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Recall Mode	None	None						C-Max		C-Max	C-Max	
Act Effct Green (s)	12.1	12.1						113.7		113.7	113.7	
Actuated g/C Ratio	0.09	0.09						0.87		0.87	0.87	
v/c Ratio	0.38	0.04						0.18		0.06	0.43	
Control Delay	62.1	0.4						1.9		2.3	2.9	
Queue Delay	0.0	0.0						0.0		0.0	0.1	
Total Delay	62.1	0.4						1.9		2.3	3.0	
LOS	E	A						A		A	A	
Approach Delay		54.4						1.9			3.0	
Approach LOS		D						A			A	

Lanes, Volumes, Timings
 16: Farrow Road & 277 NB RAMPS



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	51	0						116		6	115	
Queue Length 95th (ft)	97	0						5		m11	153	
Internal Link Dist (ft)		626			824			834			603	
Turn Bay Length (ft)	300									250		
Base Capacity (vph)	408	435						2952		731	3095	
Starvation Cap Reductn	0	0						0		0	692	
Spillback Cap Reductn	0	0						0		0	0	
Storage Cap Reductn	0	0						0		0	0	
Reduced v/c Ratio	0.15	0.02						0.18		0.06	0.55	

Intersection Summary

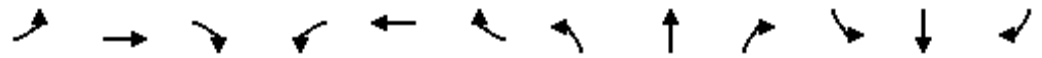
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.43
 Intersection Signal Delay: 4.5
 Intersection LOS: A
 Intersection Capacity Utilization 49.4%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 16: Farrow Road & 277 NB RAMPS



Lanes, Volumes, Timings
17: Farrow Road & Lorick Avenue /277 SB Ramps

Bull Street Commons Traffic Study
2018 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	0	39	563	14	34	13	361	0	0	693	207
Future Volume (vph)	13	0	39	563	14	34	13	361	0	0	693	207
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	125		0	200		0	0		0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (ft)	25			150			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850		0.894							0.965
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1770	0	1583	1770	1665	0	1770	3539	0	0	3415	0
Flt Permitted	0.722			0.950			0.201					
Satd. Flow (perm)	1345	0	1583	1770	1665	0	374	3539	0	0	3415	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			43		38							38
Link Speed (mph)		35		35			35			35		35
Link Distance (ft)		681		1031			683			835		835
Travel Time (s)		13.3		20.1			13.3			16.3		16.3
Peak Hour Factor	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.92	0.90	0.90	0.93	0.90
Adj. Flow (vph)	14	0	43	605	16	38	14	392	0	0	745	230
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	0	43	605	54	0	14	392	0	0	975	0
Turn Type	Perm		Perm	Perm	NA		Perm	NA			NA	
Protected Phases				4			2				6	
Permitted Phases	8		8	4			2					
Detector Phase	8		8	4	4		2	2			6	
Switch Phase												
Minimum Initial (s)	10.0		10.0	10.0	10.0		10.0	10.0			10.0	
Minimum Split (s)	30.0		30.0	30.0	30.0		30.0	30.0			30.0	
Total Split (s)	74.0		74.0	74.0	74.0		56.0	56.0			56.0	
Total Split (%)	56.9%		56.9%	56.9%	56.9%		43.1%	43.1%			43.1%	
Maximum Green (s)	69.0		69.0	69.0	69.0		51.0	51.0			51.0	
Yellow Time (s)	3.5		3.5	3.5	3.5		3.5	3.5			3.5	
All-Red Time (s)	1.5		1.5	1.5	1.5		1.5	1.5			1.5	
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0		-1.0	-1.0			-1.0	
Total Lost Time (s)	4.0		4.0	4.0	4.0		4.0	4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0			3.0	
Recall Mode	None		None	None	None		C-Max	C-Max			C-Max	
Act Effct Green (s)	55.0		55.0	55.0	55.0		67.0	67.0			67.0	
Actuated g/C Ratio	0.42		0.42	0.42	0.42		0.52	0.52			0.52	
v/c Ratio	0.02		0.06	0.81	0.07		0.07	0.21			0.55	
Control Delay	18.1		4.9	41.2	7.8		12.6	10.0			23.4	
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay	18.1		4.9	41.2	7.8		12.6	10.0			23.4	
LOS	B		A	D	A		B	A			C	
Approach Delay				38.5			10.1				23.4	
Approach LOS				D			B				C	

Lanes, Volumes, Timings
 17: Farrow Road & Lorick Avenue /277 SB Ramps

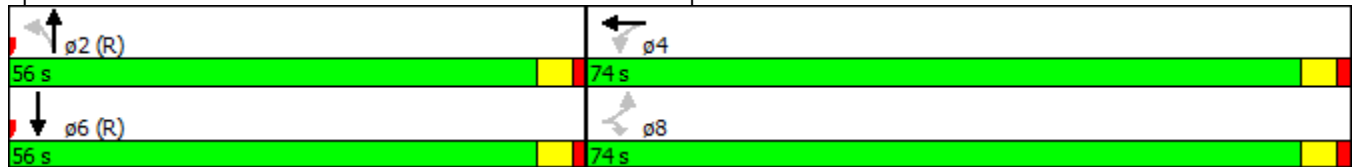


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	7		0	436	8		3	63			275	
Queue Length 95th (ft)	17		19	498	28		15	102			406	
Internal Link Dist (ft)		601			951			603			755	
Turn Bay Length (ft)				125			200					
Base Capacity (vph)	724		872	953	914		192	1824			1779	
Starvation Cap Reductn	0		0	0	0		0	0			0	
Spillback Cap Reductn	0		0	0	0		0	0			0	
Storage Cap Reductn	0		0	0	0		0	0			0	
Reduced v/c Ratio	0.02		0.05	0.63	0.06		0.07	0.21			0.55	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 25.1
 Intersection Capacity Utilization 75.3%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service D

Splits and Phases: 17: Farrow Road & Lorick Avenue /277 SB Ramps



Lanes, Volumes, Timings
18: Assembly St./Assembly & Elmwood Avenue

Bull Street Commons Traffic Study
2018 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2145	452	603	1427	4	258	1	226	0	0	0
Future Volume (vph)	0	2145	452	603	1427	4	258	1	226	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		275	150		0	0		0	0		0
Storage Lanes	1		1	1		0	2		1	0		0
Taper Length (ft)	150			75			25			25		
Lane Util. Factor	1.00	0.86	0.86	0.97	0.91	0.91	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850					0.851	0.850			
Flt Protected				0.950			0.950					
Satd. Flow (prot)	1863	4806	1362	3433	5085	0	3433	1506	1504	0	1863	0
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	1863	4806	1362	3433	5085	0	3433	1506	1504	0	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			168		1			118	76			
Link Speed (mph)		30			30			30				35
Link Distance (ft)		3707			509			546				403
Travel Time (s)		84.3			11.6			12.4				7.9
Peak Hour Factor	0.90	0.98	0.90	0.92	0.96	0.90	0.92	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	2189	502	655	1486	4	280	1	251	0	0	0
Shared Lane Traffic (%)			0%						47%			
Lane Group Flow (vph)	0	2189	502	655	1490	0	280	119	133	0	0	0
Turn Type	Perm	NA	pm+ov	Prot	NA		Split	NA	pm+ov			
Protected Phases		2	3	1	6		3	3	1	4	4	
Permitted Phases	2		2						3			
Detector Phase	2	2	3	1	6		3	3	1	4	4	
Switch Phase												
Minimum Initial (s)	16.0	16.0	6.0	11.0	16.0		6.0	6.0	11.0	4.0	4.0	
Minimum Split (s)	30.0	30.0	21.0	17.0	30.0		21.0	21.0	17.0	10.0	10.0	
Total Split (s)	68.0	68.0	21.0	31.0	99.0		21.0	21.0	31.0	10.0	10.0	
Total Split (%)	52.3%	52.3%	16.2%	23.8%	76.2%		16.2%	16.2%	23.8%	7.7%	7.7%	
Maximum Green (s)	62.0	62.0	15.0	25.0	93.0		15.0	15.0	25.0	4.0	4.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	-4.0	-4.0	-4.0	-4.0		-4.0	-2.0	-4.0		-2.0	
Total Lost Time (s)	6.0	2.0	2.0	2.0	2.0		2.0	4.0	2.0		4.0	
Lead/Lag	Lead	Lead	Lead	Lag			Lead	Lead	Lag	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes					Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max	None	None	C-Max		None	None	None	None	None	
Walk Time (s)			5.0				5.0	5.0				
Flash Dont Walk (s)			10.0				10.0	10.0				
Pedestrian Calls (#/hr)			0				0	0				
Act Effct Green (s)		76.5	97.0	29.0	107.5		18.5	16.5	49.5			
Actuated g/C Ratio		0.59	0.75	0.22	0.83		0.14	0.13	0.38			
v/c Ratio		0.77	0.47	0.86	0.35		0.57	0.40	0.21			
Control Delay		22.8	5.6	58.3	1.5		57.0	13.3	13.0			
Queue Delay		0.0	0.0	0.0	0.1		0.0	0.0	0.0			
Total Delay		22.8	5.6	58.3	1.6		57.0	13.3	13.0			

Lanes, Volumes, Timings
 18: Assembly St./Assembly & Elmwood Avenue

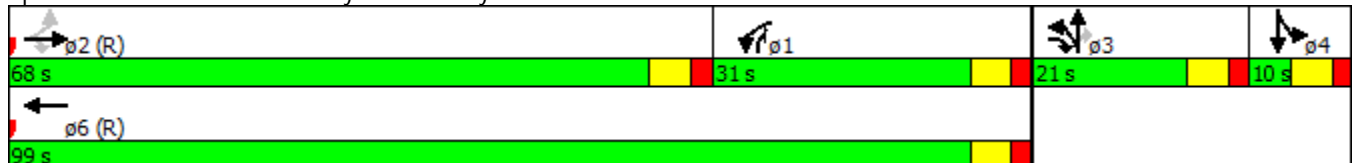


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C	A	E	A		E	B	B			
Approach Delay		19.6				18.9		36.2				
Approach LOS		B			B			D				
Queue Length 50th (ft)		520	103	302	50		114	1	31			
Queue Length 95th (ft)		587	169	m#360	m51		162	61	80			
Internal Link Dist (ft)		3627			429			466			323	
Turn Bay Length (ft)			275	150								
Base Capacity (vph)		2827	1058	765	4204		501	299	620			
Starvation Cap Reductn		0	0	0	1166		0	0	0			
Spillback Cap Reductn		0	0	0	0		0	0	0			
Storage Cap Reductn		0	0	0	0		0	0	0			
Reduced v/c Ratio		0.77	0.47	0.86	0.49		0.56	0.40	0.21			

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 14 (11%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 21.0 Intersection LOS: C
 Intersection Capacity Utilization 79.4% ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Assembly St./Assembly & Elmwood Avenue



Lanes, Volumes, Timings
19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
2018 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	204	2084	65	72	1415	34	18	99	9	220	489	572
Future Volume (vph)	204	2084	65	72	1415	34	18	99	9	220	489	572
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		175	150		0	200		0	175		425
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	75			75			100			75		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850		0.996				0.850		0.989	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	1770	5065	0	1770	3539	1583	1770	3353	1441
Flt Permitted	0.950			0.062			0.166			0.604		
Satd. Flow (perm)	3433	5085	1583	115	5065	0	309	3539	1583	1125	3353	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			41		4				126		6	159
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		509			563			474			3675	
Travel Time (s)		11.6			12.8			10.8			83.5	
Peak Hour Factor	0.90	0.93	0.90	0.90	0.97	0.90	0.90	0.90	0.90	0.90	0.93	0.94
Adj. Flow (vph)	227	2241	72	80	1459	38	20	110	10	244	526	609
Shared Lane Traffic (%)												7%
Lane Group Flow (vph)	227	2241	72	80	1497	0	20	110	10	244	569	566
Turn Type	Prot	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	pm+ov
Protected Phases	5	2	3		6		3	8		7	4	5
Permitted Phases			2	6			8		8	4		4
Detector Phase	5	2	3	6	6		3	8	8	7	4	5
Switch Phase												
Minimum Initial (s)	11.0	16.0	11.0	16.0	16.0		11.0	16.0	16.0	11.0	16.0	11.0
Minimum Split (s)	17.0	30.0	17.0	30.0	30.0		17.0	30.0	30.0	17.0	30.0	17.0
Total Split (s)	17.0	83.0	17.0	66.0	66.0		17.0	30.0	30.0	17.0	30.0	17.0
Total Split (%)	13.1%	63.8%	13.1%	50.8%	50.8%		13.1%	23.1%	23.1%	13.1%	23.1%	13.1%
Maximum Green (s)	11.0	77.0	11.0	60.0	60.0		11.0	24.0	24.0	11.0	24.0	11.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0	-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lead	Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	C-Max	C-Max		None	None	None	None	None	None
Act Effct Green (s)	15.0	82.6	99.6	65.6	65.6		41.4	26.4	26.4	41.8	29.8	46.8
Actuated g/C Ratio	0.12	0.64	0.77	0.50	0.50		0.32	0.20	0.20	0.32	0.23	0.36
v/c Ratio	0.57	0.69	0.06	1.40	0.59		0.08	0.15	0.02	0.56	0.74	0.91
Control Delay	82.8	4.5	0.1	279.0	16.6		28.9	42.5	0.1	38.9	53.1	49.5
Queue Delay	0.0	0.1	0.0	0.0	0.2		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.8	4.7	0.1	279.0	16.8		28.9	42.5	0.1	38.9	53.1	49.5
LOS	F	A	A	F	B		C	D	A	D	D	D
Approach Delay		11.5			30.1			37.5			49.1	
Approach LOS		B			C			D			D	

Lanes, Volumes, Timings
 19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
 2018 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	97	75	0	-87	302		11	40	0	155	248	392
Queue Length 95th (ft)	m129	94	m0	#193	383		30	66	0	232	319	#657
Internal Link Dist (ft)		429			483			394			3595	
Turn Bay Length (ft)	175		175	150			200			175		425
Base Capacity (vph)	396	3231	1222	57	2557		266	762	439	436	772	620
Starvation Cap Reductn	0	227	0	0	278		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	0.57	0.75	0.06	1.40	0.66		0.08	0.14	0.02	0.56	0.74	0.91

Intersection Summary

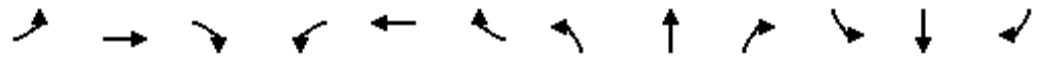
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 5 (4%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.40
 Intersection Signal Delay: 26.6 Intersection LOS: C
 Intersection Capacity Utilization 83.2% ICU Level of Service E
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Main St. & Elmwood Avenue



Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2018 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕↕↗		↖	↕↕↗		↖	↕	↗		↕↗	
Traffic Volume (vph)	12	1603	264	88	1431	6	35	12	23	6	118	18
Future Volume (vph)	12	1603	264	88	1431	6	35	12	23	6	118	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	75		0	200		0	75		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			50			100			50		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.978			0.999				0.850		0.981	
Flt Protected	0.950			0.950			0.950				0.998	
Satd. Flow (prot)	1770	4973	0	1770	5080	0	1770	1863	1583	0	3465	0
Flt Permitted	0.147			0.084			0.543				0.946	
Satd. Flow (perm)	274	4973	0	156	5080	0	1011	1863	1583	0	3284	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		76			1				26		11	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		563			1012			1692			1095	
Travel Time (s)		12.8			23.0			38.5			24.9	
Peak Hour Factor	0.90	0.95	0.90	0.90	0.95	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	13	1687	293	98	1506	7	39	13	26	7	131	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	1980	0	98	1513	0	39	13	26	0	158	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		6	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	100.0	100.0		100.0	100.0		30.0	30.0	30.0	30.0	30.0	
Total Split (%)	76.9%	76.9%		76.9%	76.9%		23.1%	23.1%	23.1%	23.1%	23.1%	
Maximum Green (s)	94.0	94.0		94.0	94.0		24.0	24.0	24.0	24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0		-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0		2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None	None	None	None	
Act Effct Green (s)	106.0	106.0		106.0	106.0		20.0	20.0	20.0		20.0	
Actuated g/C Ratio	0.82	0.82		0.82	0.82		0.15	0.15	0.15		0.15	
v/c Ratio	0.06	0.49		0.77	0.37		0.25	0.05	0.10		0.31	
Control Delay	1.1	0.8		20.5	2.9		53.3	47.5	17.2		47.2	
Queue Delay	0.0	0.1		0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	1.1	0.9		20.5	2.9		53.3	47.5	17.2		47.2	
LOS	A	A		C	A		D	D	B		D	
Approach Delay		0.9			4.0			40.3			47.2	
Approach LOS		A			A			D			D	

Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2018 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	0	16		57	101		29	10	0		58	
Queue Length 95th (ft)	m1	30		m56	m97		66	30	27		93	
Internal Link Dist (ft)		483			932			1612			1015	
Turn Bay Length (ft)	200			75			200					
Base Capacity (vph)	223	4068		127	4142		217	401	361		715	
Starvation Cap Reductn	0	735		0	0		0	0	0		0	
Spillback Cap Reductn	0	0		0	0		0	0	0		0	
Storage Cap Reductn	0	0		0	0		0	0	0		0	
Reduced v/c Ratio	0.06	0.59		0.77	0.37		0.18	0.03	0.07		0.22	

Intersection Summary

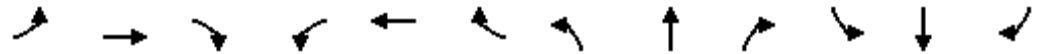
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 13 (10%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 4.9
 Intersection LOS: A
 Intersection Capacity Utilization 89.3%
 ICU Level of Service E
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 20: Sumter St. & Elmwood Avenue



Lanes, Volumes, Timings
21: Barnwell St. & Calhoun St.

Bull Street Commons Traffic Study
2018 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	324	25	24	261	4	3	1	12	1	1	2
Future Volume (vph)	11	324	25	24	261	4	3	1	12	1	1	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	225		0	125		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.989			0.998			0.861				0.900
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1842	0	1770	1859	0	1770	1604	0	1770	1676	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1842	0	1770	1859	0	1770	1604	0	1770	1676	0
Link Speed (mph)		35			35			35				35
Link Distance (ft)		1129			679			852				1007
Travel Time (s)		22.0			13.2			16.6				19.6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	12	360	28	27	290	4	3	1	13	1	1	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	388	0	27	294	0	3	14	0	1	3	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	29.9%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
21: Barnwell St. & Calhoun St.

Bull Street Commons Traffic Study
2018 Background AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	324	25	24	261	4	3	1	12	1	1	2
Future Volume (Veh/h)	11	324	25	24	261	4	3	1	12	1	1	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	12	360	28	27	290	4	3	1	13	1	1	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			TWLTL							
Median storage veh					2							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	294			388			744	746	374	744	758	292
vC1, stage 1 conf vol							398	398		346	346	
vC2, stage 2 conf vol							346	348		398	412	
vCu, unblocked vol	294			388			744	746	374	744	758	292
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			99	100	98	100	100	100
cM capacity (veh/h)	1268			1170			515	500	672	502	488	747
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	12	388	27	294	3	14	1	3				
Volume Left	12	0	27	0	3	0	1	0				
Volume Right	0	28	0	4	0	13	0	2				
cSH	1268	1700	1170	1700	515	656	502	635				
Volume to Capacity	0.01	0.23	0.02	0.17	0.01	0.02	0.00	0.00				
Queue Length 95th (ft)	1	0	2	0	0	2	0	0				
Control Delay (s)	7.9	0.0	8.1	0.0	12.0	10.6	12.2	10.7				
Lane LOS	A		A		B	B	B	B				
Approach Delay (s)	0.2		0.7		10.9		11.1					
Approach LOS					B		B					
Intersection Summary												
Average Delay			0.7									
Intersection Capacity Utilization			29.9%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
 26: Colonial Drive & Mental Healthy Dwy.



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	83	332	211	164	5	1
Future Volume (vph)	83	332	211	164	5	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.941		0.981	
Flt Protected	0.950				0.959	
Satd. Flow (prot)	1770	1863	1753	0	1752	0
Flt Permitted	0.950				0.959	
Satd. Flow (perm)	1770	1863	1753	0	1752	0
Link Speed (mph)		35	35		35	
Link Distance (ft)		651	276		364	
Travel Time (s)		12.7	5.4		7.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	92	369	234	182	6	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	92	369	416	0	7	0
Sign Control		Free	Free		Stop	

Intersection Summary

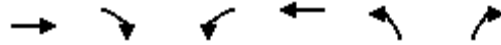
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	39.1%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 26: Colonial Drive & Mental Healthy Dwy.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	83	332	211	164	5	1
Future Volume (Veh/h)	83	332	211	164	5	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	92	369	234	182	6	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		651				
pX, platoon unblocked						
vC, conflicting volume	416				878	325
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	416				878	325
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				98	100
cM capacity (veh/h)	1143				293	716
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	92	369	416	7		
Volume Left	92	0	0	6		
Volume Right	0	0	182	1		
cSH	1143	1700	1700	320		
Volume to Capacity	0.08	0.22	0.24	0.02		
Queue Length 95th (ft)	7	0	0	2		
Control Delay (s)	8.4	0.0	0.0	16.5		
Lane LOS	A			C		
Approach Delay (s)	1.7		0.0	16.5		
Approach LOS				C		
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			39.1%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
 27: Boyce Street & Colonial Drive



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	320	12	21	371	4	5
Future Volume (vph)	320	12	21	371	4	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		75	100		150	0
Storage Lanes		0	0		1	1
Taper Length (ft)			100		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.995					0.850
Flt Protected				0.997	0.950	
Satd. Flow (prot)	1853	0	0	1857	1770	1583
Flt Permitted				0.997	0.950	
Satd. Flow (perm)	1853	0	0	1857	1770	1583
Link Speed (mph)	35			35	35	
Link Distance (ft)	276			1125	814	
Travel Time (s)	5.4			21.9	15.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	356	13	23	412	4	6
Shared Lane Traffic (%)						
Lane Group Flow (vph)	369	0	0	435	4	6
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	46.7%
Analysis Period (min)	15
	ICU Level of Service A

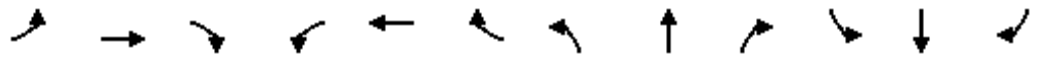
HCM Unsignalized Intersection Capacity Analysis
27: Boyce Street & Colonial Drive



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→	↘	↙	←	↖	↗
Traffic Volume (veh/h)	320	12	21	371	4	5
Future Volume (Veh/h)	320	12	21	371	4	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	356	13	23	412	4	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	927					
pX, platoon unblocked						
vC, conflicting volume			369		820	362
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			369		820	362
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		99	99
cM capacity (veh/h)			1190		338	682
Direction, Lane #	EB 1	WB 1	NB 1	NB 2		
Volume Total	369	435	4	6		
Volume Left	0	23	4	0		
Volume Right	13	0	0	6		
cSH	1700	1190	338	682		
Volume to Capacity	0.22	0.02	0.01	0.01		
Queue Length 95th (ft)	0	1	1	1		
Control Delay (s)	0.0	0.6	15.8	10.3		
Lane LOS	A		C	B		
Approach Delay (s)	0.0	0.6	12.5			
Approach LOS	B					
Intersection Summary						
Average Delay	0.5					
Intersection Capacity Utilization	46.7%		ICU Level of Service			A
Analysis Period (min)	15					

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2018 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	15	19	492	3	253	6	2291	215	80	1023	8
Future Volume (vph)	23	15	19	492	3	253	6	2291	215	80	1023	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		200	675		0	175		0	200		250
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100			75			50			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt		0.917			0.852				0.850		0.999	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3245	0	3433	1587	0	1770	3539	1583	1770	5080	0
Flt Permitted	0.950			0.950			0.248			0.055		
Satd. Flow (perm)	1770	3245	0	3433	1587	0	462	3539	1583	102	5080	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			281				172			2
Link Speed (mph)		30			40			40				45
Link Distance (ft)		619			1038			1208				1992
Travel Time (s)		14.1			17.7			20.6				30.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.90	0.94	0.90
Adj. Flow (vph)	26	17	21	547	3	281	7	2518	236	89	1088	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	26	38	0	547	284	0	7	2518	236	89	1097	0
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	4	4		3	3			2	3	1	6	
Permitted Phases							2		2	6		
Detector Phase	4	4		3	3		2	2	3	1	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0		11.0	11.0		16.0	16.0	11.0	11.0	16.0	
Minimum Split (s)	22.0	22.0		21.0	21.0		22.0	22.0	21.0	17.0	22.0	
Total Split (s)	22.0	22.0		21.0	21.0		70.0	70.0	21.0	17.0	87.0	
Total Split (%)	16.9%	16.9%		16.2%	16.2%		53.8%	53.8%	16.2%	13.1%	66.9%	
Maximum Green (s)	16.0	16.0		15.0	15.0		64.0	64.0	15.0	11.0	81.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag	Lead	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	None	None	C-Max	
Walk Time (s)				5.0	5.0				5.0			
Flash Dont Walk (s)				10.0	10.0				10.0			
Pedestrian Calls (#/hr)				0	0				0			
Act Effct Green (s)	20.0	20.0		19.0	19.0		72.4	72.4	93.4	89.4	89.4	
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.56	0.56	0.72	0.69	0.69	
v/c Ratio	0.10	0.07		1.09	0.60		0.03	1.28	0.20	0.34	0.31	
Control Delay	48.4	27.0		122.1	19.1		17.0	163.9	9.0	18.0	9.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	48.4	27.0		122.1	19.1		17.0	163.9	9.0	18.0	9.1	

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2018 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	C		F	B		B	F	A	B	A	
Approach Delay		35.7			86.9			150.3				9.8
Approach LOS		D			F			F				A
Queue Length 50th (ft)	19	6		~269	60		4	~1509	84	25	138	
Queue Length 95th (ft)	47	23		#389	131		m0	#1637	m104	73	163	
Internal Link Dist (ft)		539			958			1128				1912
Turn Bay Length (ft)	100			675			175			200		
Base Capacity (vph)	272	517		501	471		257	1971	1185	262	3494	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.07		1.09	0.60		0.03	1.28	0.20	0.34	0.31	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.28
 Intersection Signal Delay: 103.5
 Intersection LOS: F
 Intersection Capacity Utilization 93.9%
 ICU Level of Service F
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Bull St. & Harden St. Ext.



Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

Bull Street Commons Traffic Study
2018 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	17	12	53	120	49	35	2383	8	6	1476	53
Future Volume (vph)	28	17	12	53	120	49	35	2383	8	6	1476	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	200		0	200		0	150		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			100			100			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Frt		0.939			0.957				0.850			0.995
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1749	0	1770	1783	0	1752	5085	1583	1770	5060	0
Flt Permitted	0.640			0.133			0.095			0.052		
Satd. Flow (perm)	1192	1749	0	248	1783	0	175	5085	1583	97	5060	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		602			376			654			1208	
Travel Time (s)		13.7			8.5			11.1			20.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.93	0.96
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%	2%
Adj. Flow (vph)	31	19	13	59	133	54	39	2508	9	7	1587	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	32	0	59	187	0	39	2508	9	7	1642	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			3			2				6
Permitted Phases	4			3			2		2	6		
Detector Phase	4	4		3	3		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	16.0
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0	30.0	30.0	30.0	30.0
Total Split (s)	30.0	30.0		32.0	32.0		68.0	68.0	68.0	68.0	68.0	68.0
Total Split (%)	23.1%	23.1%		24.6%	24.6%		52.3%	52.3%	52.3%	52.3%	52.3%	52.3%
Maximum Green (s)	24.0	24.0		26.0	26.0		62.0	62.0	62.0	62.0	62.0	62.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	20.0	20.0		30.0	30.0		78.4	78.4	78.4	78.4	78.4	78.4
Actuated g/C Ratio	0.15	0.15		0.23	0.23		0.60	0.60	0.60	0.60	0.60	0.60
v/c Ratio	0.17	0.12		1.04	0.45		0.37	0.82	0.01	0.12	0.54	
Control Delay	50.6	48.8		179.5	47.2		21.8	20.4	10.9	23.8	20.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.3	0.0	0.0	0.0	
Total Delay	50.6	48.8		179.5	47.2		21.8	20.7	10.9	23.8	20.0	
LOS	D	D		F	D		C	C	B	C	B	
Approach Delay		49.7			78.9			20.7			20.0	

Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

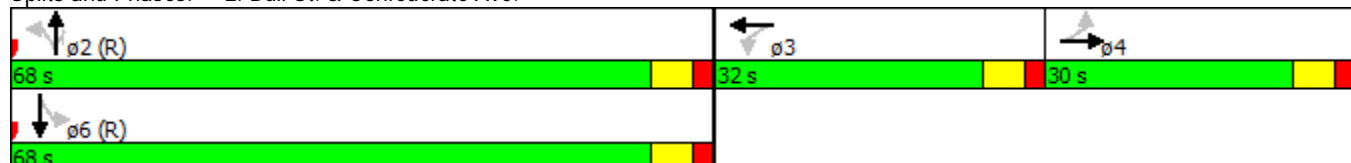


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	D			E			C			B		
Queue Length 50th (ft)	23	24		-53	136		11	653	2	3	291	
Queue Length 95th (ft)	55	55		#148	212		m20	677	m3	m7	m312	
Internal Link Dist (ft)		522			296			574			1128	
Turn Bay Length (ft)	150			200			200			150		
Base Capacity (vph)	256	376		57	411		105	3066	954	58	3051	
Starvation Cap Reductn	0	0		0	0		0	133	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.12	0.09		1.04	0.45		0.37	0.86	0.01	0.12	0.54	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 88 (68%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.04
 Intersection Signal Delay: 24.0 Intersection LOS: C
 Intersection Capacity Utilization 76.0% ICU Level of Service D
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bull St. & Confederate Ave.



Lanes, Volumes, Timings
3: Bull St. & Colonial Drive

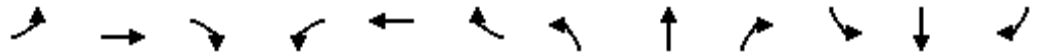
Bull Street Commons Traffic Study
2018 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗	↖	↔			↑↑↑		↘	↑↑↑	
Traffic Volume (vph)	0	0	4	382	6	77	0	2343	263	54	1440	24
Future Volume (vph)	0	0	4	382	6	77	0	2343	263	54	1440	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	150		0	0		0	200		0
Storage Lanes	0		1	1		0	0		0	1		0
Taper Length (ft)	25			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.865		0.948			0.984				0.997
Flt Protected				0.950	0.970					0.950		
Satd. Flow (prot)	0	0	1611	1681	1627	0	0	5004	0	1770	5070	0
Flt Permitted				0.950	0.970					0.040		
Satd. Flow (perm)	0	0	1611	1681	1627	0	0	5004	0	75	5070	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)			71		13			46				
Link Speed (mph)		35			35			40				40
Link Distance (ft)		440			644			362				654
Travel Time (s)		8.6			12.5			6.2				11.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.97	0.90	0.90	0.94	0.90
Adj. Flow (vph)	0	0	4	424	7	86	0	2415	292	60	1532	27
Shared Lane Traffic (%)				36%								
Lane Group Flow (vph)	0	0	4	271	246	0	0	2707	0	60	1559	0
Turn Type			Perm	Perm	NA			NA		Perm	NA	
Protected Phases					8			2				6
Permitted Phases			4	8						6		
Detector Phase			4	8	8			2		6		6
Switch Phase												
Minimum Initial (s)			16.0	16.0	16.0			16.0		16.0		16.0
Minimum Split (s)			30.0	30.0	30.0			30.0		30.0		30.0
Total Split (s)			31.0	31.0	31.0			99.0		99.0		99.0
Total Split (%)			23.8%	23.8%	23.8%			76.2%		76.2%		76.2%
Maximum Green (s)			25.0	25.0	25.0			93.0		93.0		93.0
Yellow Time (s)			4.0	4.0	4.0			4.0		4.0		4.0
All-Red Time (s)			2.0	2.0	2.0			2.0		2.0		2.0
Lost Time Adjust (s)			-4.0	-4.0	-4.0			-4.0		-4.0		-4.0
Total Lost Time (s)			2.0	2.0	2.0			2.0		2.0		2.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)			3.0	3.0	3.0			3.0		3.0		3.0
Recall Mode			None	None	None			C-Max		C-Max		C-Max
Act Effct Green (s)			27.1	27.1	27.1			98.9		98.9		98.9
Actuated g/C Ratio			0.21	0.21	0.21			0.76		0.76		0.76
v/c Ratio			0.01	0.77	0.70			0.71		1.07		0.40
Control Delay			0.0	68.2	60.6			5.4		160.6		1.0
Queue Delay			0.0	0.0	0.0			0.2		0.0		0.0
Total Delay			0.0	68.2	60.6			5.6		160.6		1.0
LOS			A	E	E			A		F		A
Approach Delay					64.6			5.6				6.9
Approach LOS					E			A				A

Lanes, Volumes, Timings
3: Bull St. & Colonial Drive

Bull Street Commons Traffic Study
2018 Background PM

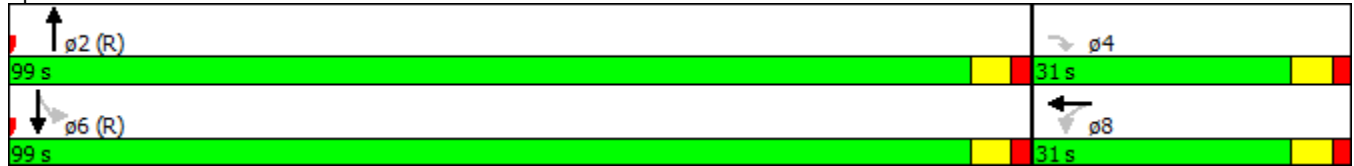


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)			0	234	201			257		~44	18	
Queue Length 95th (ft)			0	341	301			m218		m#142	m20	
Internal Link Dist (ft)		360			564			282			574	
Turn Bay Length (ft)				150						200		
Base Capacity (vph)			414	374	373			3818		56	3857	
Starvation Cap Reductn			0	0	0			0		0	175	
Spillback Cap Reductn			0	0	0			325		0	0	
Storage Cap Reductn			0	0	0			0		0	0	
Reduced v/c Ratio			0.01	0.72	0.66			0.77		1.07	0.42	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 68 (52%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.07
 Intersection Signal Delay: 12.3
 Intersection LOS: B
 Intersection Capacity Utilization 71.1%
 ICU Level of Service C
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Bull St. & Colonial Drive



Lanes, Volumes, Timings
4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2018 Background PM



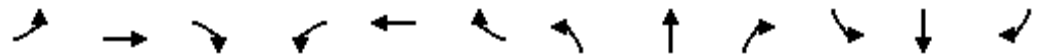
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↕↕↕		↗	↕↕↕	
Traffic Volume (vph)	2	0	6	10	0	7	6	2591	12	13	1801	5
Future Volume (vph)	2	0	6	10	0	7	6	2591	12	13	1801	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			75			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt		0.895			0.943			0.999				
Flt Protected		0.989			0.972		0.950			0.950		
Satd. Flow (prot)	0	1649	0	0	1707	0	1770	5080	0	1770	5085	0
Flt Permitted		0.989			0.972		0.950			0.950		
Satd. Flow (perm)	0	1649	0	0	1707	0	1770	5080	0	1770	5085	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		519			596			521			362	
Travel Time (s)		10.1			11.6			8.9			6.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.94	0.90
Adj. Flow (vph)	2	0	7	11	0	8	7	2756	13	14	1916	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	0	19	0	7	2769	0	14	1922	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	60.3%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
4: Bull St. & Franklin Street /Freed Drive

























Bull Street Commons Traffic Study
2018 Background PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕			↕		↕	↑↑↑		↕	↑↑↑		
Traffic Volume (veh/h)	2	0	6	10	0	7	6	2591	12	13	1801	5	
Future Volume (Veh/h)	2	0	6	10	0	7	6	2591	12	13	1801	5	
Sign Control		Stop			Stop			Free			Free		
Grade		0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.94	0.90	
Hourly flow rate (vph)	2	0	7	11	0	8	7	2756	13	14	1916	6	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type													
								None			None		
Median storage veh													
Upstream signal (ft)													
								1295			362		
pX, platoon unblocked	0.78	0.78	0.90	0.78	0.78	0.72	0.90			0.72			
vC, conflicting volume	2888	4730	642	3450	4726	925	1922			2769			
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	1516	3891	194	2241	3887	0	1623			2107			
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1			
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2			
p0 queue free %	97	100	99	33	100	99	98			92			
cM capacity (veh/h)	58	2	730	16	2	785	356			186			
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4			
Volume Total	9	19	7	1102	1102	564	14	766	766	389			
Volume Left	2	11	7	0	0	0	14	0	0	0			
Volume Right	7	8	0	0	0	13	0	0	0	6			
cSH	205	28	356	1700	1700	1700	186	1700	1700	1700			
Volume to Capacity	0.04	0.68	0.02	0.65	0.65	0.33	0.08	0.45	0.45	0.23			
Queue Length 95th (ft)	3	54	2	0	0	0	6	0	0	0			
Control Delay (s)	23.3	271.9	15.3	0.0	0.0	0.0	26.0	0.0	0.0	0.0			
Lane LOS	C	F	C					D					
Approach Delay (s)	23.3	271.9	0.0					0.2					
Approach LOS	C	F											
Intersection Summary													
Average Delay			1.2										
Intersection Capacity Utilization			60.3%	ICU Level of Service					B				
Analysis Period (min)			15										

Lanes, Volumes, Timings
5: Bull St. & Jefferson Street

Bull Street Commons Traffic Study
2018 Background PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								  			  	
Traffic Volume (vph)	3	0	11	0	0	2	5	2599	23	0	1806	14
Future Volume (vph)	3	0	11	0	0	2	5	2599	23	0	1806	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	0		0	175		0	125		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.850			0.865		0.999			0.999	
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1770	0	1583	0	0	1611	1770	5080	0	1863	5080	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	1770	0	1583	0	0	1611	1770	5080	0	1863	5080	0
Link Speed (mph)		35			30			40			40	
Link Distance (ft)		257			602			774			521	
Travel Time (s)		5.0			13.7			13.2			8.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.96	0.90
Adj. Flow (vph)	3	0	12	0	0	2	6	2736	26	0	1881	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	0	12	0	0	2	6	2762	0	0	1897	0
Sign Control		Stop			Stop			Free			Free	























Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	67.4%
Analysis Period (min)	15
	ICU Level of Service C

HCM Unsignalized Intersection Capacity Analysis

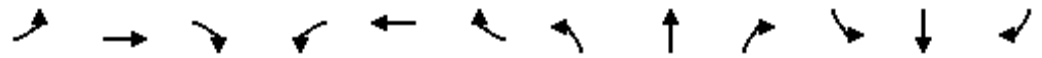
5: Bull St. & Jefferson Street

Bull Street Commons Traffic Study
2018 Background PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								 			 	
Traffic Volume (veh/h)	3	0	11	0	0	2	5	2599	23	0	1806	14
Future Volume (Veh/h)	3	0	11	0	0	2	5	2599	23	0	1806	14
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.96	0.90
Hourly flow rate (vph)	3	0	12	0	0	2	6	2736	26	0	1881	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
								None			None	
Median storage veh												
Upstream signal (ft)												
								774			883	
pX, platoon unblocked	0.74	0.74	0.90	0.74	0.74	0.69	0.90			0.69		
vC, conflicting volume	2815	4663	635	3400	4658	925	1897			2762		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1342	3839	221	2132	3832	0	1618			1988		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	98	100	100	100	98			100		
cM capacity (veh/h)	81	3	707	20	3	750	360			198		
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4	
Volume Total	3	12	2	6	1094	1094	573	0	752	752	392	
Volume Left	3	0	0	6	0	0	0	0	0	0	0	
Volume Right	0	12	2	0	0	0	26	0	0	0	16	
cSH	81	707	750	360	1700	1700	1700	1700	1700	1700	1700	
Volume to Capacity	0.04	0.02	0.00	0.02	0.64	0.64	0.34	0.00	0.44	0.44	0.23	
Queue Length 95th (ft)	3	1	0	1	0	0	0	0	0	0	0	
Control Delay (s)	51.4	10.2	9.8	15.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Lane LOS	F	B	A	C								
Approach Delay (s)	18.4		9.8	0.0				0.0				
Approach LOS	C		A									
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization			67.4%		ICU Level of Service					C		
Analysis Period (min)			15									

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
2018 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1374	89	547	74	69	80	450	1194	72	21	633	1149
Future Volume (vph)	1374	89	547	74	69	80	450	1194	72	21	633	1149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	775		0	125		0	175		0	100		0
Storage Lanes	1		2	1		0	1		0	1		1
Taper Length (ft)	50			50			125			50		
Lane Util. Factor	0.95	0.95	0.88	0.95	0.95	0.95	0.97	0.95	0.95	1.00	0.91	0.91
Frt			0.850		0.946			0.991				0.850
Flt Protected	0.950	0.958			0.984		0.950			0.950		
Satd. Flow (prot)	1681	1695	2787	0	3295	0	3433	3507	0	1770	3390	1441
Flt Permitted	0.950	0.958			0.984		0.950			0.133		
Satd. Flow (perm)	1681	1695	2787	0	3295	0	3433	3507	0	248	3390	1441
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30				40
Link Distance (ft)		1012			335			526				774
Travel Time (s)		23.0			7.6			12.0				13.2
Peak Hour Factor	0.98	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1402	99	608	82	77	89	495	1327	80	23	703	1277
Shared Lane Traffic (%)	50%											0%
Lane Group Flow (vph)	701	800	608	0	248	0	495	1407	0	23	703	1277
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Perm	NA	pm+ov
Protected Phases	4	4	5	3	3		5	2			6	4
Permitted Phases			4							6		6
Detector Phase	4	4	5	3	3		5	2		6	6	4
Switch Phase												
Minimum Initial (s)	16.0	16.0	11.0	11.0	11.0		11.0	16.0		16.0	16.0	16.0
Minimum Split (s)	30.0	30.0	17.0	17.0	17.0		17.0	30.0		30.0	30.0	30.0
Total Split (s)	64.0	64.0	17.0	17.0	17.0		17.0	49.0		32.0	32.0	64.0
Total Split (%)	49.2%	49.2%	13.1%	13.1%	13.1%		13.1%	37.7%		24.6%	24.6%	49.2%
Maximum Green (s)	58.0	58.0	11.0	11.0	11.0		11.0	43.0		26.0	26.0	58.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0		-4.0		-4.0	-4.0		-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0		2.0		2.0	2.0		2.0	2.0	2.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max		C-Max	C-Max	None
Act Effct Green (s)	62.0	62.0	79.0		15.0		15.0	47.0		30.0	30.0	92.0
Actuated g/C Ratio	0.48	0.48	0.61		0.12		0.12	0.36		0.23	0.23	0.71
v/c Ratio	0.88	0.99	0.36		0.65		1.25	1.11		0.40	0.90	1.25
Control Delay	35.7	54.4	8.0		63.8		171.0	94.4		60.3	60.4	142.0
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.3		0.0	0.0	0.0
Total Delay	35.7	54.4	8.0		63.8		171.0	94.7		60.3	60.4	142.0
LOS	D	D	A		E		F	F		E	E	F
Approach Delay		34.8			63.8			114.5			112.4	
Approach LOS		C			E			F			F	

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
2018 Background PM

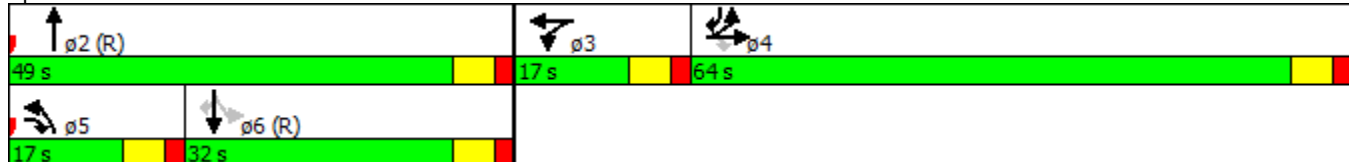


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	404	561	113		106		-264	-717		12	274	-1481
Queue Length 95th (ft)	#793	#981	69		154		m#377	#860		m37	#421	#1782
Internal Link Dist (ft)		932			255			446			694	
Turn Bay Length (ft)	775						175			100		
Base Capacity (vph)	801	808	1693		380		396	1267		57	782	1019
Starvation Cap Reductn	0	0	0		0		0	91		0	0	0
Spillback Cap Reductn	0	0	0		0		0	0		0	0	0
Storage Cap Reductn	0	0	0		0		0	0		0	0	0
Reduced v/c Ratio	0.88	0.99	0.36		0.65		1.25	1.20		0.40	0.90	1.25

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 100 (77%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.25
 Intersection Signal Delay: 85.0 Intersection LOS: F
 Intersection Capacity Utilization 111.5% ICU Level of Service H
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Bull St. & Elmwood Avenue



Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

Bull Street Commons Traffic Study
2018 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	175	28	24	260	154	33	1568	27	84	1081	82
Future Volume (vph)	82	175	28	24	260	154	33	1568	27	84	1081	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	50			50			75			75		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.979			0.944			0.997				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3465	0	1770	3341	0	1770	3529	0	1770	3539	1583
Flt Permitted	0.247			0.499			0.204			0.096		
Satd. Flow (perm)	460	3465	0	930	3341	0	380	3529	0	179	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			49			4				91
Link Speed (mph)		30			30			30				30
Link Distance (ft)		937			677			1883				526
Travel Time (s)		21.3			15.4			42.8				12.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.92	0.90
Adj. Flow (vph)	91	194	31	27	289	171	37	1686	30	93	1175	91
Shared Lane Traffic (%)												
Lane Group Flow (vph)	91	225	0	27	460	0	37	1716	0	93	1175	91
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	16.0
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	30.0
Total Split (s)	33.0	33.0		33.0	33.0		97.0	97.0		97.0	97.0	97.0
Total Split (%)	25.4%	25.4%		25.4%	25.4%		74.6%	74.6%		74.6%	74.6%	74.6%
Maximum Green (s)	27.0	27.0		27.0	27.0		91.0	91.0		91.0	91.0	91.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	28.1	28.1		28.1	28.1		97.9	97.9		97.9	97.9	97.9
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.75	0.75		0.75	0.75	0.75
v/c Ratio	0.92	0.30		0.13	0.60		0.13	0.65		0.69	0.44	0.07
Control Delay	120.2	40.4		48.0	50.5		6.4	9.6		37.9	5.4	1.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.7		0.0	0.2	0.0
Total Delay	120.2	40.4		48.0	50.5		6.4	10.2		37.9	5.7	1.6
LOS	F	D		D	D		A	B		D	A	A
Approach Delay		63.4			50.4			10.2			7.6	
Approach LOS		E			D			B			A	

Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

Bull Street Commons Traffic Study
2018 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	73	76		19	174		8	353		23	127	4
Queue Length 95th (ft)	#179	114		49	237		21	419		m68	m188	m11
Internal Link Dist (ft)		857			597			1803			446	
Turn Bay Length (ft)	150			175			150			150		
Base Capacity (vph)	109	836		221	834		285	2657		134	2664	1214
Starvation Cap Reductn	0	0		0	0		0	0		0	695	0
Spillback Cap Reductn	0	0		0	5		0	523		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.83	0.27		0.12	0.55		0.13	0.80		0.69	0.60	0.07

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 72 (55%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 18.6 Intersection LOS: B
 Intersection Capacity Utilization 97.5% ICU Level of Service F
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Bull St. & Calhoun St.



Lanes, Volumes, Timings
9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Bull Street Commons Traffic Study
2018 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	444	146	398	305	51	93	379	896	72	519	41
Future Volume (vph)	42	444	146	398	305	51	93	379	896	72	519	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		800	175		0	225		0	300		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	100			75			75			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.963			0.978				0.850		0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3408	0	3433	3461	0	1770	3539	1583	1770	3498	0
Flt Permitted	0.518			0.950			0.340			0.453		
Satd. Flow (perm)	965	3408	0	3433	3461	0	633	3539	1583	844	3498	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			22				688			8
Link Speed (mph)		35			35			35				40
Link Distance (ft)		1007			328			498				1949
Travel Time (s)		19.6			6.4			9.7				33.2
Peak Hour Factor	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Adj. Flow (vph)	47	493	162	428	339	57	103	421	943	80	577	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	47	655	0	428	396	0	103	421	943	80	623	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Free	Perm	NA	
Protected Phases		8		7	4			6				2
Permitted Phases	8						6		Free	2		
Detector Phase	8	8		7	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	16.0	16.0		11.0	16.0		16.0	16.0		16.0	16.0	
Minimum Split (s)	30.0	30.0		17.0	30.0		30.0	30.0		30.0	30.0	
Total Split (s)	40.0	40.0		29.0	69.0		61.0	61.0		61.0	61.0	
Total Split (%)	30.8%	30.8%		22.3%	53.1%		46.9%	46.9%		46.9%	46.9%	
Maximum Green (s)	34.0	34.0		23.0	63.0		55.0	55.0		55.0	55.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	33.0	33.0		24.5	59.6		66.4	66.4	130.0	66.4	66.4	
Actuated g/C Ratio	0.25	0.25		0.19	0.46		0.51	0.51	1.00	0.51	0.51	
v/c Ratio	0.19	0.73		0.66	0.25		0.32	0.23	0.60	0.19	0.35	
Control Delay	34.5	42.9		67.9	15.0		16.1	13.2	7.4	24.8	24.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	34.5	42.9		67.9	15.0		16.1	13.2	7.4	24.8	24.7	
LOS	C	D		E	B		B	B	A	C	C	
Approach Delay		42.3			42.5			9.7			24.7	

Lanes, Volumes, Timings
 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Bull Street Commons Traffic Study
 2018 Background PM

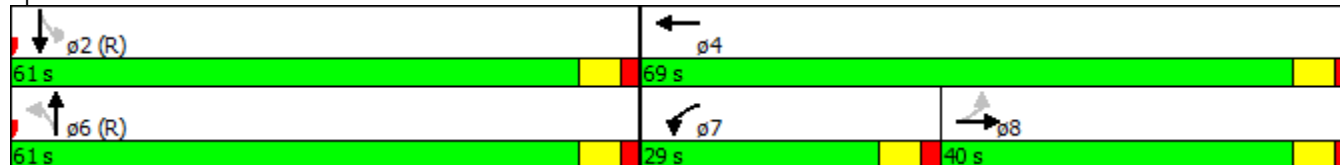


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	D			D			A			C		
Queue Length 50th (ft)	30	245		191	76		28	60	272	47	210	
Queue Length 95th (ft)	m50	m291		245	102		51	83	662	96	281	
Internal Link Dist (ft)	927			248			418			1869		
Turn Bay Length (ft)	225			175			225			300		
Base Capacity (vph)	282	1020		713	1794		323	1808	1583	431	1790	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.17	0.64		0.60	0.22		0.32	0.23	0.60	0.19	0.35	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 95 (73%), Referenced to phase 2:SBTL and 6:NBTL, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 26.1
 Intersection LOS: C
 Intersection Capacity Utilization 70.6%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive



Lanes, Volumes, Timings
10: Harden St./Harden Street Ext & Calhoun St.

Bull Street Commons Traffic Study
2018 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	41	199	21	25	11	199	1023	45	56	879	79
Future Volume (vph)	135	41	199	21	25	11	199	1023	45	56	879	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	50		0	0		325	300		200
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	100			25			25			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Frt		0.876			0.955			0.994				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1632	0	1770	1779	0	1770	5055	0	1770	3539	1583
Flt Permitted	0.731			0.201			0.233			0.207		
Satd. Flow (perm)	1362	1632	0	374	1779	0	434	5055	0	386	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		177			12			8				122
Link Speed (mph)		30			35			35				35
Link Distance (ft)		1071			821			1286				478
Travel Time (s)		24.3			16.0			25.1				9.3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	150	46	221	23	28	12	221	1137	50	62	977	88
Shared Lane Traffic (%)												
Lane Group Flow (vph)	150	267	0	23	40	0	221	1187	0	62	977	88
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	1.0	1.0		11.0	11.0		9.0	14.0		9.0	14.0	14.0
Minimum Split (s)	6.5	6.5		30.0	30.0		15.0	30.0		15.0	30.0	30.0
Total Split (s)	38.0	38.0		38.0	38.0		26.0	75.0		17.0	66.0	66.0
Total Split (%)	29.2%	29.2%		29.2%	29.2%		20.0%	57.7%		13.1%	50.8%	50.8%
Maximum Green (s)	32.5	32.5		32.5	32.5		20.0	69.0		11.0	60.0	60.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.5	1.5		1.5	1.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	0.0		0.0	0.0		-3.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	2.5	5.5		5.5	5.5		3.0	3.0		6.0	3.0	3.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	22.9	19.9		19.9	19.9		100.3	89.6		91.1	85.1	85.1
Actuated g/C Ratio	0.18	0.15		0.15	0.15		0.77	0.69		0.70	0.65	0.65
v/c Ratio	0.62	0.67		0.40	0.14		0.47	0.34		0.17	0.42	0.08
Control Delay	51.0	17.4		68.0	34.7		7.6	9.7		3.6	10.0	2.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	51.0	17.4		68.0	34.7		7.6	9.7		3.6	10.0	2.1
LOS	D	B		E	C		A	A		A	A	A
Approach Delay		29.5			46.9			9.4			9.0	
Approach LOS		C			D			A			A	

Lanes, Volumes, Timings
10: Harden St./Harden Street Ext & Calhoun St.

Bull Street Commons Traffic Study
2018 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	122	78		18	21		39	145		3	162	7
Queue Length 95th (ft)	m184	64		47	51		82	209		m13	415	25
Internal Link Dist (ft)		991			741			1206			398	
Turn Bay Length (ft)	225			50						300		200
Base Capacity (vph)	371	540		93	453		575	3485		393	2315	1078
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.40	0.49		0.25	0.09		0.38	0.34		0.16	0.42	0.08

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 34 (26%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 12.8 Intersection LOS: B
 Intersection Capacity Utilization 64.0% ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Harden St./Harden Street Ext & Calhoun St.



Lanes, Volumes, Timings
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2018 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	298	10	5	253	46	16	8	19	40	24	53
Future Volume (vph)	37	298	10	5	253	46	16	8	19	40	24	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	275		0	0		0	300		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	100			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.977			0.941				0.897
Flt Protected	0.950			0.950				0.982		0.950		
Satd. Flow (prot)	1770	1848	0	1770	1820	0	0	1721	0	1770	1671	0
Flt Permitted	0.950			0.950				0.982		0.950		
Satd. Flow (perm)	1770	1848	0	1770	1820	0	0	1721	0	1770	1671	0
Link Speed (mph)		35			30			35				35
Link Distance (ft)		434			1071			385				2969
Travel Time (s)		8.5			24.3			7.5				57.8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	11%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	41	331	11	6	281	51	18	9	21	44	27	59
Shared Lane Traffic (%)												
Lane Group Flow (vph)	41	342	0	6	332	0	0	48	0	44	86	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	38.8% ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2018 Background PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	298	10	5	253	46	16	8	19	40	24	53
Future Volume (Veh/h)	37	298	10	5	253	46	16	8	19	40	24	53
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	41	331	11	6	281	51	18	9	21	44	27	59
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh		2			2							
Upstream signal (ft)					1071							
pX, platoon unblocked												
vC, conflicting volume	332			342			784	762	336	757	742	306
vC1, stage 1 conf vol							418	418		318	318	
vC2, stage 2 conf vol							366	344		438	424	
vCu, unblocked vol	332			342			784	762	336	757	742	306
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			96	98	97	91	95	92
cM capacity (veh/h)	1227			1217			450	483	706	486	496	733
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total	41	342	6	332	48	44	86					
Volume Left	41	0	6	0	18	44	0					
Volume Right	0	11	0	51	21	0	59					
cSH	1227	1700	1217	1700	543	486	637					
Volume to Capacity	0.03	0.20	0.00	0.20	0.09	0.09	0.13					
Queue Length 95th (ft)	3	0	0	0	7	7	12					
Control Delay (s)	8.0	0.0	8.0	0.0	12.3	13.2	11.5					
Lane LOS	A		A		B	B	B					
Approach Delay (s)	0.9		0.1		12.3	12.1						
Approach LOS					B	B						
Intersection Summary												
Average Delay			2.8									
Intersection Capacity Utilization			38.8%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2018 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↕	↕		↕	↕	
Traffic Volume (vph)	1	401	36	89	398	10	28	2	100	37	12	28
Future Volume (vph)	1	401	36	89	398	10	28	2	100	37	12	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		225	50		0
Storage Lanes	0		0	0		0	1		1	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.989			0.997			0.853			0.894	
Flt Protected					0.991		0.950			0.950		
Satd. Flow (prot)	0	1833	0	0	1840	0	1703	1589	0	1770	1665	0
Flt Permitted					0.991		0.950			0.950		
Satd. Flow (perm)	0	1833	0	0	1840	0	1703	1589	0	1770	1665	0
Link Speed (mph)		35			35			35				35
Link Distance (ft)		949			210			2969				473
Travel Time (s)		18.5			4.1			57.8				9.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90
Heavy Vehicles (%)	2%	2%	8%	2%	2%	2%	6%	2%	2%	2%	2%	2%
Adj. Flow (vph)	1	446	40	99	442	11	31	2	111	41	13	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	487	0	0	552	0	31	113	0	41	44	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	68.5%
Analysis Period (min)	15
	ICU Level of Service C

HCM Unsignalized Intersection Capacity Analysis

12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2018 Background PM














Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	
Traffic Volume (veh/h)	1	401	36	89	398	10	28	2	100	37	12	28
Future Volume (Veh/h)	1	401	36	89	398	10	28	2	100	37	12	28
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90
Hourly flow rate (vph)	1	446	40	99	442	11	31	2	111	41	13	31
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					1217							
pX, platoon unblocked	0.90						0.90	0.90		0.90	0.90	0.90
vC, conflicting volume	453			486			1151	1119	466	1226	1134	448
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	334			486			1111	1076	466	1194	1092	328
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			91			77	99	81	63	93	95
cM capacity (veh/h)	1100			1077			137	179	597	110	175	641

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	487	552	31	113	41	44
Volume Left	1	99	31	0	41	0
Volume Right	40	11	0	111	0	31
cSH	1100	1077	137	573	110	358
Volume to Capacity	0.00	0.09	0.23	0.20	0.37	0.12
Queue Length 95th (ft)	0	8	21	18	38	10
Control Delay (s)	0.0	2.4	38.8	12.8	56.0	16.4
Lane LOS	A	A	E	B	F	C
Approach Delay (s)	0.0	2.4	18.4		35.5	
Approach LOS			C		E	

Intersection Summary

Average Delay		5.5				
Intersection Capacity Utilization		68.5%		ICU Level of Service		C
Analysis Period (min)		15				

Lanes, Volumes, Timings
13: Harden Street Ext & Slighs Ave.

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	81	207	1081	67	125	956
Future Volume (vph)	81	207	1081	67	125	956
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		50	100	
Storage Lanes	1	0		1	1	
Taper Length (ft)	25				50	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	0.903			0.850		
Flt Protected	0.986				0.950	
Satd. Flow (prot)	1659	0	3539	1495	1736	3539
Flt Permitted	0.986				0.159	
Satd. Flow (perm)	1659	0	3539	1495	290	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	100			20		
Link Speed (mph)	30		35			35
Link Distance (ft)	359		2508			498
Travel Time (s)	8.2		48.9			9.7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.91
Heavy Vehicles (%)	2%	2%	2%	8%	4%	2%
Adj. Flow (vph)	90	230	1201	74	139	1051
Shared Lane Traffic (%)						
Lane Group Flow (vph)	320	0	1201	74	139	1051
Turn Type	Perm		NA	Perm	pm+pt	NA
Protected Phases			6		5	2
Permitted Phases	4			6	2	
Detector Phase	4		6	6	5	2
Switch Phase						
Minimum Initial (s)	16.0		16.0	16.0	11.0	16.0
Minimum Split (s)	30.0		30.0	30.0	17.0	30.0
Total Split (s)	40.0		71.0	71.0	19.0	90.0
Total Split (%)	30.8%		54.6%	54.6%	14.6%	69.2%
Maximum Green (s)	34.0		65.0	65.0	13.0	84.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0		-4.0	-2.0	-4.0	-4.0
Total Lost Time (s)	2.0		2.0	4.0	2.0	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		C-Max	C-Max	None	C-Max
Act Effct Green (s)	28.1		80.9	78.9	97.9	97.9
Actuated g/C Ratio	0.22		0.62	0.61	0.75	0.75
v/c Ratio	0.73		0.55	0.08	0.36	0.39
Control Delay	41.8		14.9	6.0	13.2	7.9
Queue Delay	0.0		0.0	0.0	0.0	0.2
Total Delay	41.8		14.9	6.0	13.2	8.1
LOS	D		B	A	B	A
Approach Delay	41.8		14.4			8.7

Lanes, Volumes, Timings
 13: Harden Street Ext & Slighs Ave.



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	D		B		A	
Queue Length 50th (ft)	177		340	21	36	139
Queue Length 95th (ft)	261		488	47	m73	201
Internal Link Dist (ft)	279		2428			418
Turn Bay Length (ft)				50	100	
Base Capacity (vph)	555		2201	914	407	2666
Starvation Cap Reductn	0		0	0	0	670
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.58		0.55	0.08	0.34	0.53

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 86 (66%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 15.1
 Intersection LOS: B
 Intersection Capacity Utilization 66.3%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 13: Harden Street Ext & Slighs Ave.



Lanes, Volumes, Timings
14: Colonial Drive & Farrow Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Lane Configurations		↗↗	↖	↑↑	↑↓		
Traffic Volume (vph)	0	171	262	1040	502	25	
Future Volume (vph)	0	171	262	1040	502	25	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0	330	550			0	
Storage Lanes	0	1	1			0	
Taper Length (ft)	25		125				
Lane Util. Factor	1.00	0.88	1.00	0.95	0.95	0.95	
Frt		0.850			0.993		
Flt Protected			0.950				
Satd. Flow (prot)	0	2787	1770	3539	3514	0	
Flt Permitted			0.950				
Satd. Flow (perm)	0	2787	1770	3539	3514	0	
Right Turn on Red		Yes				No	
Satd. Flow (RTOR)		432					
Link Speed (mph)	35			35	35		
Link Distance (ft)	1114			672	2010		
Travel Time (s)	21.7			13.1	39.2		
Peak Hour Factor	0.90	0.90	0.96	0.90	0.92	0.90	
Adj. Flow (vph)	0	190	273	1156	546	28	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	190	273	1156	574	0	
Turn Type		Over	Prot	NA	NA		
Protected Phases		8	8	8 6	2	6	
Permitted Phases				8			
Detector Phase		8	8	8 6	2		
Switch Phase							
Minimum Initial (s)		16.0	16.0		16.0	11.0	
Minimum Split (s)		30.0	30.0		30.0	30.0	
Total Split (s)		32.0	32.0		33.0	33.0	
Total Split (%)		49.2%	49.2%		50.8%	51%	
Maximum Green (s)		26.0	26.0		27.0	27.5	
Yellow Time (s)		4.0	4.0		4.0	4.0	
All-Red Time (s)		2.0	2.0		2.0	1.5	
Lost Time Adjust (s)		-3.0	-3.0		-4.0		
Total Lost Time (s)		3.0	3.0		2.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0	3.0		3.0	3.0	
Recall Mode		None	None		C-Max	C-Max	
Act Effct Green (s)		24.2	24.2	65.0	35.8		
Actuated g/C Ratio		0.37	0.37	1.00	0.55		
v/c Ratio		0.15	0.42	0.33	0.30		
Control Delay		0.2	11.2	0.2	11.4		
Queue Delay		0.0	0.0	0.0	0.0		
Total Delay		0.2	11.2	0.2	11.4		
LOS		A	B	A	B		
Approach Delay				2.3	11.4		
Approach LOS				A	B		

Lanes, Volumes, Timings
 14: Colonial Drive & Farrow Road

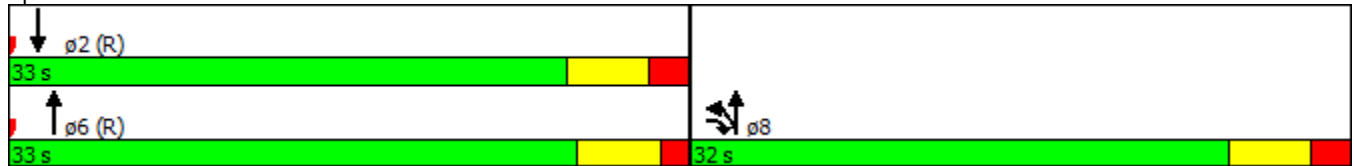


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Queue Length 50th (ft)		0	53	0	91		
Queue Length 95th (ft)		0	93	0	m130		
Internal Link Dist (ft)	1034			592	1930		
Turn Bay Length (ft)		330	550				
Base Capacity (vph)		1482	789	3524	1937		
Starvation Cap Reductn		0	0	0	0		
Spillback Cap Reductn		0	0	0	0		
Storage Cap Reductn		0	0	0	0		
Reduced v/c Ratio		0.13	0.35	0.33	0.30		

Intersection Summary

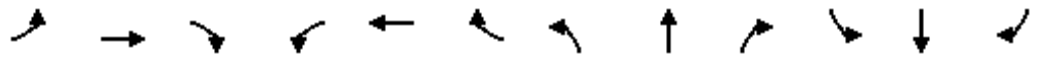
Area Type: Other
 Cycle Length: 65
 Actuated Cycle Length: 65
 Offset: 42 (65%), Referenced to phase 2:SBT and 6:NBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.42
 Intersection Signal Delay: 4.5
 Intersection LOS: A
 Intersection Capacity Utilization 35.9%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: Colonial Drive & Farrow Road



Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
2018 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	542	12	170	510	380	0	1043	274	282	416	49
Future Volume (vph)	90	542	12	170	510	380	0	1043	274	282	416	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		0	300		0	0		225	200		0
Storage Lanes	1		0	2		1	0		1	1		0
Taper Length (ft)	125			100			25			125		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.997				0.850			0.850		0.984	
Flt Protected	0.950			0.950						0.950		
Satd. Flow (prot)	1770	3529	0	3433	3539	1583	0	3539	1583	1770	3483	0
Flt Permitted	0.439			0.950						0.073		
Satd. Flow (perm)	818	3529	0	3433	3539	1583	0	3539	1583	136	3483	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				17			143		16	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1548			1446			2010			864	
Travel Time (s)		30.2			28.2			39.2			16.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	0.94	0.90	0.90
Adj. Flow (vph)	100	602	13	189	567	422	0	1159	285	300	462	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	100	615	0	189	567	422	0	1159	285	300	516	0
Turn Type	Perm	NA		Prot	NA	pm+ov		NA	Free	pm+pt	NA	
Protected Phases		4		3	8	1		2		1	6	
Permitted Phases	4					8			Free	6		
Detector Phase	4	4		3	8	1		2		1	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0	5.0		15.0		5.0	15.0	
Minimum Split (s)	30.0	30.0		21.0	41.0	17.0		41.0		17.0	30.0	
Total Split (s)	30.0	30.0		21.0	51.0	26.0		53.0		26.0	79.0	
Total Split (%)	23.1%	23.1%		16.2%	39.2%	20.0%		40.8%		20.0%	60.8%	
Maximum Green (s)	25.0	25.0		16.0	46.0	21.0		48.0		21.0	74.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5		3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5	1.5		1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0		-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead		Lead		Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Recall Mode	None	None		None	None	None		C-Min		None	C-Min	
Walk Time (s)					18.0			18.0				
Flash Dont Walk (s)					5.0			5.0				
Pedestrian Calls (#/hr)					0			0				
Act Effct Green (s)	26.0	26.0		16.2	46.2	70.9		51.1	130.0	75.8	75.8	
Actuated g/C Ratio	0.20	0.20		0.12	0.36	0.55		0.39	1.00	0.58	0.58	
v/c Ratio	0.61	0.87		0.44	0.45	0.48		0.83	0.18	0.88	0.25	
Control Delay	64.5	64.1		56.3	33.4	19.3		43.5	0.2	82.3	8.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	64.5	64.1		56.3	33.4	19.3		43.5	0.2	82.3	8.7	

Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
2018 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	E		E	C	B		D	A	F	A	
Approach Delay		64.2			32.0			35.0			35.8	
Approach LOS		E			C			C			D	
Queue Length 50th (ft)	77	263		77	190	195		467	0	230	69	
Queue Length 95th (ft)	#150	#361		115	243	280		583	0	#360	85	
Internal Link Dist (ft)		1468			1366			1930			784	
Turn Bay Length (ft)	175			300					225	200		
Base Capacity (vph)	167	722		448	1279	886		1390	1583	355	2037	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.60	0.85		0.42	0.44	0.48		0.83	0.18	0.85	0.25	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.88
 Intersection Signal Delay: 39.3
 Intersection LOS: D
 Intersection Capacity Utilization 85.7%
 ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 15: Farrow Road & Beltline Blvd



Lanes, Volumes, Timings
16: Farrow Road & 277 NB RAMPS

Bull Street Commons Traffic Study
2018 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	153	0	15	0	0	0	0	858	676	64	709	0
Future Volume (vph)	153	0	15	0	0	0	0	858	676	64	709	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	0		0	0		0	250		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			25			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.850						0.935				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1770	1583	0	0	0	0	0	3309	0	1770	3539	0
Flt Permitted	0.950									0.113		
Satd. Flow (perm)	1770	1583	0	0	0	0	0	3309	0	210	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		281						410				
Link Speed (mph)		35			35			35				35
Link Distance (ft)		827			779			864				694
Travel Time (s)		16.1			15.2			16.8				13.5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.92	0.90
Adj. Flow (vph)	170	0	17	0	0	0	0	953	735	71	771	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	170	17	0	0	0	0	0	1688	0	71	771	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						6			2	
Permitted Phases	4									2		
Detector Phase	4	4						6		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0						10.0		10.0	10.0	
Minimum Split (s)	30.0	30.0						30.0		30.0	30.0	
Total Split (s)	30.0	30.0						100.0		100.0	100.0	
Total Split (%)	23.1%	23.1%						76.9%		76.9%	76.9%	
Maximum Green (s)	25.0	25.0						95.0		95.0	95.0	
Yellow Time (s)	3.5	3.5						3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5						1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0						-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0						4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Recall Mode	None	None						C-Max		C-Max	C-Max	
Act Effct Green (s)	18.7	18.7						103.3		103.3	103.3	
Actuated g/C Ratio	0.14	0.14						0.79		0.79	0.79	
v/c Ratio	0.67	0.04						0.62		0.43	0.27	
Control Delay	65.1	0.1						2.7		22.4	8.0	
Queue Delay	0.0	0.0						0.4		0.0	0.0	
Total Delay	65.1	0.1						3.1		22.4	8.0	
LOS	E	A						A		C	A	
Approach Delay		59.2						3.1			9.2	
Approach LOS		E						A			A	

Lanes, Volumes, Timings
 16: Farrow Road & 277 NB RAMPS



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	138	0						33		35	145	
Queue Length 95th (ft)	205	0						61		96	168	
Internal Link Dist (ft)		747			699			784			614	
Turn Bay Length (ft)	300									250		
Base Capacity (vph)	354	541						2713		166	2812	
Starvation Cap Reductn	0	0						438		0	0	
Spillback Cap Reductn	0	0						0		0	0	
Storage Cap Reductn	0	0						0		0	0	
Reduced v/c Ratio	0.48	0.03						0.74		0.43	0.27	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 8.9
 Intersection LOS: A
 Intersection Capacity Utilization 68.3%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 16: Farrow Road & 277 NB RAMPS



Lanes, Volumes, Timings
17: Farrow Road & Lorick Avenue /277 SB Ramps

Bull Street Commons Traffic Study
2018 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	0	39	241	16	47	24	988	0	0	489	140
Future Volume (vph)	33	0	39	241	16	47	24	988	0	0	489	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	125		0	200		0	0		0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (ft)	25			150			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850		0.889							0.967
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1770	0	1583	1770	1656	0	1770	3539	0	0	3422	0
Flt Permitted	0.706			0.950			0.366					
Satd. Flow (perm)	1315	0	1583	1770	1656	0	682	3539	0	0	3422	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			43		52							49
Link Speed (mph)		35			35			35				35
Link Distance (ft)		467			1041			694				870
Travel Time (s)		9.1			20.3			13.5				16.9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	37	0	43	268	18	52	27	1098	0	0	543	156
Shared Lane Traffic (%)												
Lane Group Flow (vph)	37	0	43	268	70	0	27	1098	0	0	699	0
Turn Type	Perm		Perm	Perm	NA		Perm	NA			NA	
Protected Phases					4			2				6
Permitted Phases	8		8	4			2					
Detector Phase	8		8	4	4		2	2				6
Switch Phase												
Minimum Initial (s)	10.0		10.0	10.0	10.0		10.0	10.0				10.0
Minimum Split (s)	30.0		30.0	30.0	30.0		30.0	30.0				30.0
Total Split (s)	50.0		50.0	50.0	50.0		80.0	80.0				80.0
Total Split (%)	38.5%		38.5%	38.5%	38.5%		61.5%	61.5%				61.5%
Maximum Green (s)	45.0		45.0	45.0	45.0		75.0	75.0				75.0
Yellow Time (s)	3.5		3.5	3.5	3.5		3.5	3.5				3.5
All-Red Time (s)	1.5		1.5	1.5	1.5		1.5	1.5				1.5
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0		-1.0	-1.0				-1.0
Total Lost Time (s)	4.0		4.0	4.0	4.0		4.0	4.0				4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0				3.0
Recall Mode	None		None	None	None		C-Max	C-Max				C-Max
Act Effct Green (s)	26.3		26.3	26.3	26.3		95.7	95.7				95.7
Actuated g/C Ratio	0.20		0.20	0.20	0.20		0.74	0.74				0.74
v/c Ratio	0.14		0.12	0.75	0.19		0.05	0.42				0.28
Control Delay	41.1		11.3	61.4	15.7		5.0	5.5				6.1
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.2				0.0
Total Delay	41.1		11.3	61.4	15.7		5.0	5.6				6.1
LOS	D		B	E	B		A	A				A
Approach Delay					51.9			5.6				6.1
Approach LOS					D			A				A

Lanes, Volumes, Timings
 17: Farrow Road & Lorick Avenue /277 SB Ramps

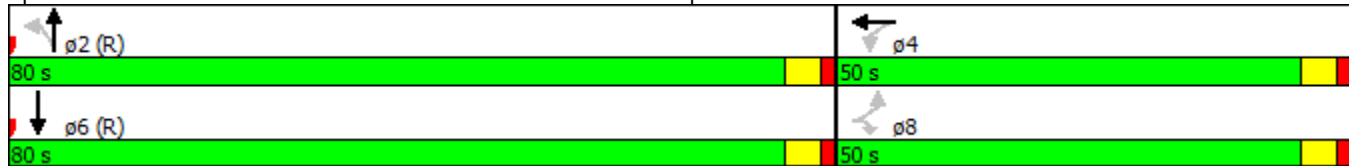


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	26		0	214	12		4	87			83	
Queue Length 95th (ft)	54		30	290	50		m10	220			137	
Internal Link Dist (ft)		387			961			614			790	
Turn Bay Length (ft)				125			200					
Base Capacity (vph)	465		587	626	619		502	2605			2532	
Starvation Cap Reductn	0		0	0	0		0	575			0	
Spillback Cap Reductn	0		0	0	0		0	0			0	
Storage Cap Reductn	0		0	0	0		0	0			0	
Reduced v/c Ratio	0.08		0.07	0.43	0.11		0.05	0.54			0.28	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 13.4
 Intersection LOS: B
 Intersection Capacity Utilization 54.0%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 17: Farrow Road & Lorick Avenue /277 SB Ramps



Lanes, Volumes, Timings
18: Assembly St./Assembly & Elmwood Avenue

Bull Street Commons Traffic Study
2018 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1662	268	337	1942	7	1021	8	575	0	0	1
Future Volume (vph)	0	1662	268	337	1942	7	1021	8	575	0	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		275	150		0	0		0	0		0
Storage Lanes	1		1	1		0	2		1	0		0
Taper Length (ft)	150			75			25			25		
Lane Util. Factor	1.00	0.86	0.86	0.97	0.91	0.91	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850		0.999				0.850		0.865	
Flt Protected				0.950			0.950					
Satd. Flow (prot)	1863	4806	1362	3433	5080	0	3433	1770	1504	0	1611	0
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	1863	4806	1362	3433	5080	0	3433	1770	1504	0	1611	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			272		1				96		126	
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		2522			509			585			432	
Travel Time (s)		57.3			11.6			13.3			8.4	
Peak Hour Factor	0.90	0.94	0.90	0.90	0.92	0.90	0.93	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1768	298	374	2111	8	1098	9	639	0	0	1
Shared Lane Traffic (%)			0%						0%			
Lane Group Flow (vph)	0	1768	298	374	2119	0	1098	9	639	0	1	0
Turn Type	Perm	NA	pm+ov	Prot	NA		Split	NA	pm+ov		NA	
Protected Phases		2	3	1	6		3	3	1		4	
Permitted Phases	2		2						3	4		
Detector Phase	2	2	3	1	6		3	3	1	4	4	
Switch Phase												
Minimum Initial (s)	16.0	16.0	11.0	11.0	16.0		11.0	11.0	11.0	4.5	4.5	
Minimum Split (s)	30.0	30.0	17.0	17.0	30.0		17.0	17.0	17.0	10.0	10.0	
Total Split (s)	54.0	54.0	44.0	22.0	76.0		44.0	44.0	22.0	10.0	10.0	
Total Split (%)	41.5%	41.5%	33.8%	16.9%	58.5%		33.8%	33.8%	16.9%	7.7%	7.7%	
Maximum Green (s)	48.0	48.0	38.0	16.0	70.0		38.0	38.0	16.0	4.5	4.5	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	1.5	1.5	
Lost Time Adjust (s)	0.0	-4.0	-4.0	-4.0	-4.0		-4.0	0.0	-4.0		-1.5	
Total Lost Time (s)	6.0	2.0	2.0	2.0	2.0		2.0	6.0	2.0		4.0	
Lead/Lag	Lead	Lead	Lead	Lag			Lead	Lead	Lag	Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max	None	None	C-Max		None	None	None	None	None	
Act Effct Green (s)		60.0	103.6	20.0	82.0		42.0	38.0	64.0		6.0	
Actuated g/C Ratio		0.46	0.80	0.15	0.63		0.32	0.29	0.49		0.05	
v/c Ratio		0.80	0.26	0.71	0.66		0.99	0.02	0.81		0.01	
Control Delay		33.7	1.0	54.2	10.5		68.6	33.0	33.1		0.0	
Queue Delay		0.0	0.0	0.0	0.9		0.0	0.0	0.0		0.0	
Total Delay		33.7	1.0	54.2	11.4		68.6	33.0	33.1		0.0	
LOS		C	A	D	B		E	C	C		A	
Approach Delay		29.0			17.8			55.4			0.0	
Approach LOS		C			B			E			A	

Lanes, Volumes, Timings
 18: Assembly St./Assembly & Elmwood Avenue

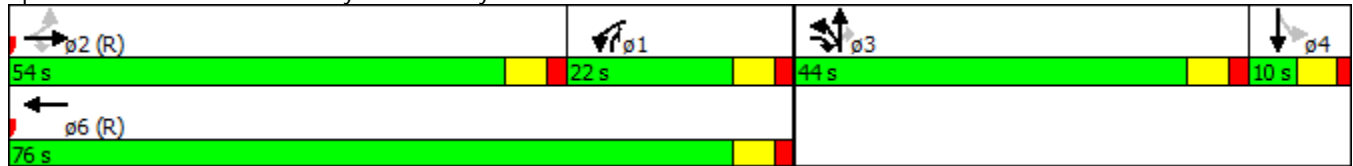


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		467	3	168	154		473	5	407		0	
Queue Length 95th (ft)		618	20	m209	414		#624	20	601		0	
Internal Link Dist (ft)		2442			429			505			352	
Turn Bay Length (ft)			275	150								
Base Capacity (vph)		2218	1140	528	3204		1109	517	789		194	
Starvation Cap Reductn		0	0	0	717		0	0	0		0	
Spillback Cap Reductn		0	0	0	0		0	0	0		0	
Storage Cap Reductn		0	0	0	0		0	0	0		0	
Reduced v/c Ratio		0.80	0.26	0.71	0.85		0.99	0.02	0.81		0.01	

Intersection Summary

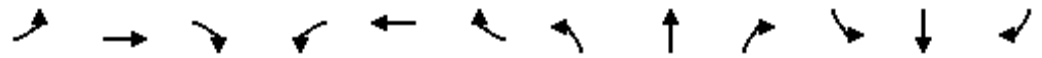
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 28 (22%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.99
 Intersection Signal Delay: 31.9
 Intersection LOS: C
 Intersection Capacity Utilization 100.1%
 ICU Level of Service G
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Assembly St./Assembly & Elmwood Avenue



Lanes, Volumes, Timings
19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
2018 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	497	1603	72	15	1549	91	144	476	54	153	201	479
Future Volume (vph)	497	1603	72	15	1549	91	144	476	54	153	201	479
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		175	150		0	200		0	175		425
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	75			75			100			75		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850		0.991				0.850		0.939	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	1770	5040	0	1770	3539	1583	1770	3183	1441
Flt Permitted	0.950			0.138			0.319			0.166		
Satd. Flow (perm)	3433	5085	1583	257	5040	0	594	3539	1583	309	3183	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			80		9				126		98	76
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		509			563			693			3655	
Travel Time (s)		11.6			12.8			15.8			83.1	
Peak Hour Factor	0.91	0.97	0.90	0.90	0.95	0.90	0.90	0.90	0.90	0.90	0.95	0.90
Adj. Flow (vph)	546	1653	80	17	1631	101	160	529	60	170	212	532
Shared Lane Traffic (%)												27%
Lane Group Flow (vph)	546	1653	80	17	1732	0	160	529	60	170	356	388
Turn Type	Prot	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	pm+ov
Protected Phases	5	2	3		6		3	8		7	4	5
Permitted Phases			2	6			8		8	4		4
Detector Phase	5	2	3	6	6		3	8	8	7	4	5
Switch Phase												
Minimum Initial (s)	11.0	16.0	11.0	16.0	16.0		11.0	16.0	16.0	11.0	16.0	11.0
Minimum Split (s)	17.0	30.0	17.0	30.0	30.0		17.0	30.0	30.0	17.0	30.0	17.0
Total Split (s)	29.0	83.0	17.0	54.0	54.0		17.0	30.0	30.0	17.0	30.0	29.0
Total Split (%)	22.3%	63.8%	13.1%	41.5%	41.5%		13.1%	23.1%	23.1%	13.1%	23.1%	22.3%
Maximum Green (s)	23.0	77.0	11.0	48.0	48.0		11.0	24.0	24.0	11.0	24.0	23.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0	-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lead	Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	C-Max	C-Max		None	None	None	None	None	None
Act Effct Green (s)	26.5	82.4	99.4	53.8	53.8		41.6	26.6	26.6	41.6	26.6	55.2
Actuated g/C Ratio	0.20	0.63	0.76	0.41	0.41		0.32	0.20	0.20	0.32	0.20	0.42
v/c Ratio	0.78	0.51	0.07	0.16	0.83		0.49	0.73	0.14	0.64	0.49	0.59
Control Delay	65.5	10.7	0.3	22.8	32.1		36.8	54.8	0.7	42.9	34.8	26.6
Queue Delay	0.0	0.3	0.0	0.0	0.4		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.5	11.0	0.3	22.8	32.5		36.8	54.8	0.7	42.9	34.8	26.6
LOS	E	B	A	C	C		D	D	A	D	C	C
Approach Delay		23.6			32.4			46.6			32.8	
Approach LOS		C			C			D			C	

Lanes, Volumes, Timings
19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
2018 Background PM

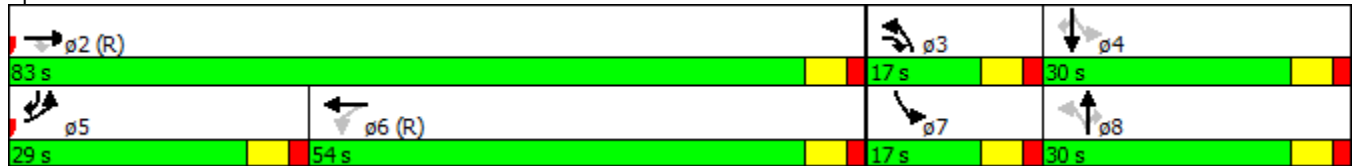


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	246	152	0	6	550		97	218	0	103	103	213
Queue Length 95th (ft)	303	273	m0	m12	563		154	282	0	164	156	329
Internal Link Dist (ft)		429			483			613			3575	
Turn Bay Length (ft)	175		175	150			200			175		425
Base Capacity (vph)	713	3222	1229	106	2092		325	762	439	267	762	659
Starvation Cap Reductn	0	756	0	0	42		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	76		0	0	0	0	0	1
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.67	0.07	0.16	0.86		0.49	0.69	0.14	0.64	0.47	0.59

Intersection Summary

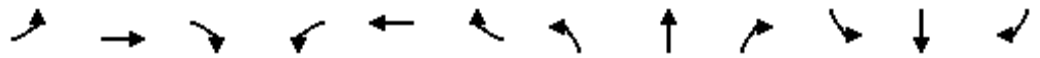
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 120 (92%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 30.8
 Intersection LOS: C
 Intersection Capacity Utilization 82.0%
 ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Main St. & Elmwood Avenue



Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2018 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕↕↕		↖	↕↕↕		↖	↕	↖		↕↕	
Traffic Volume (vph)	10	1466	85	33	1589	10	88	258	210	4	44	13
Future Volume (vph)	10	1466	85	33	1589	10	88	258	210	4	44	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	75		0	200		0	75		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			50			100			50		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.992			0.999				0.850		0.969	
Flt Protected	0.950			0.950			0.950				0.997	
Satd. Flow (prot)	1770	5045	0	1770	5080	0	1770	1863	1583	0	3419	0
Flt Permitted	0.106			0.106			0.711				0.938	
Satd. Flow (perm)	197	5045	0	197	5080	0	1324	1863	1583	0	3217	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			1				36		14	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		563			1012			3133			1095	
Travel Time (s)		12.8			23.0			71.2			24.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	1629	94	37	1709	11	98	287	233	4	49	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	1723	0	37	1720	0	98	287	233	0	67	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		6	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	86.0	86.0		86.0	86.0		44.0	44.0	44.0	44.0	44.0	
Total Split (%)	66.2%	66.2%		66.2%	66.2%		33.8%	33.8%	33.8%	33.8%	33.8%	
Maximum Green (s)	80.0	80.0		80.0	80.0		38.0	38.0	38.0	38.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0		-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0		2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None	None	None	None	
Act Effct Green (s)	96.0	96.0		96.0	96.0		30.0	30.0	30.0		30.0	
Actuated g/C Ratio	0.74	0.74		0.74	0.74		0.23	0.23	0.23		0.23	
v/c Ratio	0.08	0.46		0.26	0.46		0.32	0.67	0.59		0.09	
Control Delay	3.1	3.1		12.3	10.7		42.8	52.6	42.8		29.1	
Queue Delay	0.0	0.1		0.0	0.1		0.0	0.0	0.0		0.0	
Total Delay	3.1	3.2		12.3	10.8		42.8	52.6	42.8		29.1	
LOS	A	A		B	B		D	D	D		C	
Approach Delay		3.2			10.8			47.4			29.1	
Approach LOS		A			B			D			C	

Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2018 Background PM

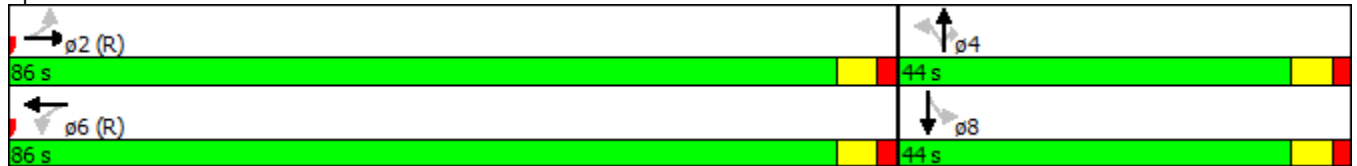


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	0	15		14	81		69	221	149		18	
Queue Length 95th (ft)	m0	299		m13	m221		113	293	217		35	
Internal Link Dist (ft)		483			932			3053			1015	
Turn Bay Length (ft)	200			75			200					
Base Capacity (vph)	145	3729		145	3751		427	601	535		1048	
Starvation Cap Reductn	0	627		0	0		0	0	0		0	
Spillback Cap Reductn	0	0		0	467		0	0	0		0	
Storage Cap Reductn	0	0		0	0		0	0	0		0	
Reduced v/c Ratio	0.08	0.56		0.26	0.52		0.23	0.48	0.44		0.06	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 18 (14%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 13.3
 Intersection LOS: B
 Intersection Capacity Utilization 66.9%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 20: Sumter St. & Elmwood Avenue



Lanes, Volumes, Timings
21: Barnwell St. & Calhoun St.

Bull Street Commons Traffic Study
2018 Background PM



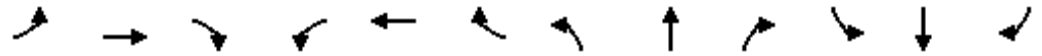
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	330	11	5	285	8	31	4	30	4	2	12
Future Volume (vph)	23	330	11	5	285	8	31	4	30	4	2	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	225		0	125		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.996			0.866			0.870	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1853	0	1770	1855	0	1770	1613	0	1770	1621	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1853	0	1770	1855	0	1770	1613	0	1770	1621	0
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		905			434			693			623	
Travel Time (s)		17.6			8.5			13.5			12.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	26	367	12	6	317	9	34	4	33	4	2	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	26	379	0	6	326	0	34	37	0	4	15	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	34.2%
Analysis Period (min)	15
	ICU Level of Service A

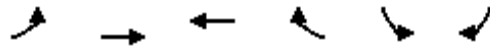
HCM Unsignalized Intersection Capacity Analysis
 21: Barnwell St. & Calhoun St.

Bull Street Commons Traffic Study
 2018 Background PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	330	11	5	285	8	31	4	30	4	2	12
Future Volume (Veh/h)	23	330	11	5	285	8	31	4	30	4	2	12
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	26	367	12	6	317	9	34	4	33	4	2	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			TWLTL							
Median storage (veh)					2							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	326			379			768	763	373	788	764	322
vC1, stage 1 conf vol							425	425		334	334	
vC2, stage 2 conf vol							343	338		454	431	
vCu, unblocked vol	326			379			768	763	373	788	764	322
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			93	99	95	99	100	98
cM capacity (veh/h)	1234			1179			497	491	673	474	493	719
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	26	379	6	326	34	37	4	15				
Volume Left	26	0	6	0	34	0	4	0				
Volume Right	0	12	0	9	0	33	0	13				
cSH	1234	1700	1179	1700	497	647	474	678				
Volume to Capacity	0.02	0.22	0.01	0.19	0.07	0.06	0.01	0.02				
Queue Length 95th (ft)	2	0	0	0	5	5	1	2				
Control Delay (s)	8.0	0.0	8.1	0.0	12.8	10.9	12.7	10.4				
Lane LOS	A		A		B	B	B	B				
Approach Delay (s)	0.5		0.1		11.8		10.9					
Approach LOS					B		B					
Intersection Summary												
Average Delay			1.6									
Intersection Capacity Utilization			34.2%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
 26: Colonial Drive & Mental Healthy Dwy.

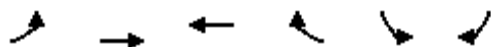


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	311	432	1	128	33
Future Volume (vph)	5	311	432	1	128	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.972	
Flt Protected	0.950				0.962	
Satd. Flow (prot)	1770	1863	1863	0	1742	0
Flt Permitted	0.950				0.962	
Satd. Flow (perm)	1770	1863	1863	0	1742	0
Link Speed (mph)		35	35		30	
Link Distance (ft)		644	375		472	
Travel Time (s)		12.5	7.3		10.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	346	480	1	142	37
Shared Lane Traffic (%)						
Lane Group Flow (vph)	6	346	481	0	179	0
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	38.6%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 26: Colonial Drive & Mental Healthy Dwy.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	311	432	1	128	33
Future Volume (Veh/h)	5	311	432	1	128	33
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	346	480	1	142	37
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		644				
pX, platoon unblocked						
vC, conflicting volume	481				838	480
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	481				838	480
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				58	94
cM capacity (veh/h)	1082				334	585

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	6	346	481	179
Volume Left	6	0	0	142
Volume Right	0	0	1	37
cSH	1082	1700	1700	367
Volume to Capacity	0.01	0.20	0.28	0.49
Queue Length 95th (ft)	0	0	0	64
Control Delay (s)	8.3	0.0	0.0	23.8
Lane LOS	A			C
Approach Delay (s)	0.1		0.0	23.8
Approach LOS				C

Intersection Summary			
Average Delay		4.3	
Intersection Capacity Utilization		38.6%	ICU Level of Service A
Analysis Period (min)		15	

Lanes, Volumes, Timings
27: Boyce Street & Colonial Drive

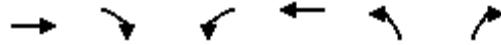


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	↔
Traffic Volume (vph)	407	33	49	405	28	31
Future Volume (vph)	407	33	49	405	28	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		75	100		150	0
Storage Lanes		0	0		1	1
Taper Length (ft)			100		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.990					0.850
Flt Protected				0.995	0.950	
Satd. Flow (prot)	1844	0	0	1853	1770	1583
Flt Permitted				0.995	0.950	
Satd. Flow (perm)	1844	0	0	1853	1770	1583
Link Speed (mph)	35			35	30	
Link Distance (ft)	375			949	1007	
Travel Time (s)	7.3			18.5	22.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	452	37	54	450	31	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	489	0	0	504	31	34
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	60.8%
Analysis Period (min)	15
	ICU Level of Service B

HCM Unsignalized Intersection Capacity Analysis
27: Boyce Street & Colonial Drive



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	407	33	49	405	28	31
Future Volume (Veh/h)	407	33	49	405	28	31
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	452	37	54	450	31	34
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	1019					
pX, platoon unblocked						
vC, conflicting volume			489		1028	470
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			489		1028	470
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		87	94
cM capacity (veh/h)			1074		246	593
Direction, Lane #	EB 1	WB 1	NB 1	NB 2		
Volume Total	489	504	31	34		
Volume Left	0	54	31	0		
Volume Right	37	0	0	34		
cSH	1700	1074	246	593		
Volume to Capacity	0.29	0.05	0.13	0.06		
Queue Length 95th (ft)	0	4	11	5		
Control Delay (s)	0.0	1.4	21.7	11.4		
Lane LOS		A	C	B		
Approach Delay (s)	0.0	1.4	16.3			
Approach LOS			C			
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization			60.8%	ICU Level of Service		B
Analysis Period (min)			15			

**2018 Build Conditions
Phase II
The Commons at BullStreet**

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2017 Build Out Phase 2 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗	↗	↖	↗	↗
Traffic Volume (vph)	8	4	3	159	19	37	24	625	564	426	2335	20
Future Volume (vph)	8	4	3	159	19	37	24	625	564	426	2335	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		200	675		0	175		0	200		250
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100			75			50			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt		0.936			0.901				0.850		0.999	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3313	0	3433	1668	0	1770	3539	1583	1770	5080	0
Flt Permitted	0.950			0.950			0.058			0.313		
Satd. Flow (perm)	1770	3313	0	3433	1668	0	108	3539	1583	583	5080	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			41				482		2	
Link Speed (mph)		30			40			40			45	
Link Distance (ft)		552			905			1206			1658	
Travel Time (s)		12.5			15.4			20.6			25.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.92	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	9	4	3	177	21	41	27	672	627	473	2538	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	9	7	0	177	62	0	27	672	627	473	2560	0
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	4	4		3	3			2	3	1	6	
Permitted Phases							2		2	6		
Detector Phase	4	4		3	3		2	2	3	1	6	
Switch Phase												
Minimum Initial (s)	14.0	14.0		11.0	11.0		16.0	16.0	11.0	11.0	16.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		30.0	30.0	20.0	17.0	30.0	
Total Split (s)	20.0	20.0		25.0	25.0		48.0	48.0	25.0	37.0	85.0	
Total Split (%)	15.4%	15.4%		19.2%	19.2%		36.9%	36.9%	19.2%	28.5%	65.4%	
Maximum Green (s)	14.0	14.0		19.0	19.0		42.0	42.0	19.0	31.0	79.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag	Lead	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	None	None	C-Max	
Act Effct Green (s)	18.0	18.0		17.8	17.8		72.5	72.5	92.3	100.2	100.2	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.56	0.56	0.71	0.77	0.77	
v/c Ratio	0.04	0.02		0.38	0.24		0.45	0.34	0.50	0.69	0.65	
Control Delay	49.1	39.0		39.8	15.2		42.0	7.5	6.9	12.9	10.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	49.1	39.0		39.8	15.2		42.0	7.5	6.9	12.9	10.1	
LOS	D	D		D	B		D	A	A	B	B	
Approach Delay		44.7			33.4			8.0			10.5	

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2017 Build Out Phase 2 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	D			C			A			B		
Queue Length 50th (ft)	7	1		71	18		0	1	72	67	197	
Queue Length 95th (ft)	24	9		94	33		#80	193	197	256	586	
Internal Link Dist (ft)	472			825			1126			1578		
Turn Bay Length (ft)	100			675			175			200		
Base Capacity (vph)	245	461		607	328		60	1972	1307	768	3915	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.04	0.02		0.29	0.19		0.45	0.34	0.48	0.62	0.65	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 11.1
 Intersection LOS: B
 Intersection Capacity Utilization 80.6%
 ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Bull St. & Harden St. Ext.



Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

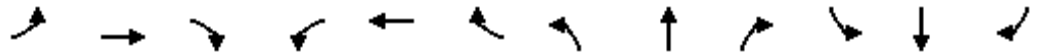
Bull Street Commons Traffic Study
2017 Build Out Phase 2 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑↑	↗	↖	↑↑↑	↗
Traffic Volume (vph)	5	2	13	16	12	7	16	1246	80	68	2428	2
Future Volume (vph)	5	2	13	16	12	7	16	1246	80	68	2428	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	200		0	200		0	150		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			100			100			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Frt		0.869			0.943				0.850			
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1619	0	1770	1757	0	1770	5085	1583	1770	5085	0
Flt Permitted	0.744			0.272			0.042			0.173		
Satd. Flow (perm)	1386	1619	0	507	1757	0	78	5085	1583	322	5085	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		602			715			682			1206	
Travel Time (s)		13.7			16.3			11.6			20.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.94	0.90
Adj. Flow (vph)	6	2	14	18	13	8	18	1326	89	76	2583	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	16	0	18	21	0	18	1326	89	76	2585	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			3			2				6
Permitted Phases	4			3			2		2	6		
Detector Phase	4	4		3	3		2	2	2	6		6
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	16.0
Minimum Split (s)	25.0	25.0		25.0	25.0		30.0	30.0	30.0	30.0	30.0	30.0
Total Split (s)	26.0	26.0		26.0	26.0		78.0	78.0	78.0	78.0	78.0	78.0
Total Split (%)	20.0%	20.0%		20.0%	20.0%		60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Maximum Green (s)	20.0	20.0		20.0	20.0		72.0	72.0	72.0	72.0	72.0	72.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	20.0	20.0		21.1	21.1		101.3	101.3	101.3	101.3	101.3	101.3
Actuated g/C Ratio	0.15	0.15		0.16	0.16		0.78	0.78	0.78	0.78	0.78	0.78
v/c Ratio	0.03	0.06		0.22	0.07		0.30	0.33	0.07	0.30	0.65	
Control Delay	47.4	47.9		53.8	46.1		28.8	6.5	7.5	15.2	12.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	47.4	47.9		53.8	46.1		28.8	6.5	7.5	15.2	12.1	
LOS	D	D		D	D		C	A	A	B	B	
Approach Delay		47.8			49.7			6.8				12.2
Approach LOS		D			D			A				B

Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

Bull Street Commons Traffic Study
2017 Build Out Phase 2 AM

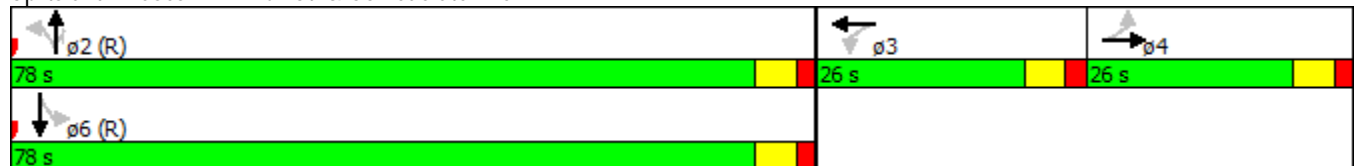


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	4	12		13	15		3	67	12	25	338	
Queue Length 95th (ft)	18	34		39	39		m14	159	44	m54	454	
Internal Link Dist (ft)		522			635			602			1126	
Turn Bay Length (ft)	150			200			200			150		
Base Capacity (vph)	255	298		93	324		61	3961	1233	251	3961	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	27	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.02	0.05		0.19	0.06		0.30	0.33	0.07	0.30	0.66	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 113 (87%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 10.9
 Intersection LOS: B
 Intersection Capacity Utilization 76.5%
 ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bull St. & Confederate Ave.



Lanes, Volumes, Timings
3: Bull St. & Colonial Drive

Bull Street Commons Traffic Study
2017 Build Out Phase 2 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗	↖	↔			↑↑↑		↘	↑↑↑	
Traffic Volume (vph)	0	0	5	209	1	35	0	1334	390	60	2298	11
Future Volume (vph)	0	0	5	209	1	35	0	1334	390	60	2298	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	150		0	0		0	200		0
Storage Lanes	0		1	1		0	0		0	1		0
Taper Length (ft)	25			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.865		0.961			0.966				0.999
Flt Protected				0.950	0.965					0.950		
Satd. Flow (prot)	0	0	1611	1681	1641	0	0	4912	0	1770	5080	0
Flt Permitted				0.950	0.965					0.102		
Satd. Flow (perm)	0	0	1611	1681	1641	0	0	4912	0	190	5080	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)			25		13			163				
Link Speed (mph)		35			35			40				40
Link Distance (ft)		440			277			171				682
Travel Time (s)		8.6			5.4			2.9				11.6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.96	0.90	0.93	0.90
Adj. Flow (vph)	0	0	6	232	1	39	0	1404	406	67	2471	12
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	0	0	6	123	149	0	0	1810	0	67	2483	0
Turn Type			Perm	Perm	NA			NA		Perm	NA	
Protected Phases					8			2				6
Permitted Phases			4	8						6		
Detector Phase			4	8	8			2		6		6
Switch Phase												
Minimum Initial (s)			16.0	16.0	16.0			16.0		16.0		16.0
Minimum Split (s)			30.0	30.0	30.0			30.0		30.0		30.0
Total Split (s)			30.0	30.0	30.0			100.0		100.0		100.0
Total Split (%)			23.1%	23.1%	23.1%			76.9%		76.9%		76.9%
Maximum Green (s)			24.0	24.0	24.0			94.0		94.0		94.0
Yellow Time (s)			4.0	4.0	4.0			4.0		4.0		4.0
All-Red Time (s)			2.0	2.0	2.0			2.0		2.0		2.0
Lost Time Adjust (s)			-4.0	-4.0	-4.0			-4.0		-4.0		-4.0
Total Lost Time (s)			2.0	2.0	2.0			2.0		2.0		2.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)			3.0	3.0	3.0			3.0		3.0		3.0
Recall Mode			None	None	None			C-Max		C-Max		C-Max
Act Effct Green (s)			21.9	21.9	21.9			104.1		104.1		104.1
Actuated g/C Ratio			0.17	0.17	0.17			0.80		0.80		0.80
v/c Ratio			0.02	0.44	0.52			0.46		0.44		0.61
Control Delay			0.2	57.9	56.0			4.3		11.9		3.9
Queue Delay			0.0	0.0	0.0			0.0		0.0		0.7
Total Delay			0.2	57.9	56.0			4.3		11.9		4.7
LOS			A	E	E			A		B		A
Approach Delay					56.8			4.3				4.8
Approach LOS					E			A				A

Lanes, Volumes, Timings
3: Bull St. & Colonial Drive

Bull Street Commons Traffic Study
2017 Build Out Phase 2 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)			0	96	107			95		0	1	
Queue Length 95th (ft)			0	133	148			97		m41	229	
Internal Link Dist (ft)		360			197			91			602	
Turn Bay Length (ft)				150						200		
Base Capacity (vph)			366	362	363			3966		151	4068	
Starvation Cap Reductn			0	0	0			98		0	1107	
Spillback Cap Reductn			0	0	0			0		0	0	
Storage Cap Reductn			0	0	0			0		0	0	
Reduced v/c Ratio			0.02	0.34	0.41			0.47		0.44	0.84	

Intersection Summary

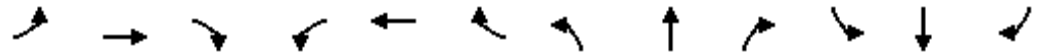
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.61
 Intersection Signal Delay: 7.7
 Intersection LOS: A
 Intersection Capacity Utilization 81.3%
 ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Bull St. & Colonial Drive



Lanes, Volumes, Timings
4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2017 Build Out Phase 2 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗		↑↑↑			↑↑↑	
Traffic Volume (vph)	0	0	5	0	0	8	0	1685	23	0	2471	5
Future Volume (vph)	0	0	5	0	0	8	0	1685	23	0	2471	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	50		0
Storage Lanes	0		1	0		1	0		0	0		0
Taper Length (ft)	25			25			75			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.865			0.865		0.998				
Flt Protected												
Satd. Flow (prot)	0	0	1611	0	0	1611	0	5075	0	0	5085	0
Flt Permitted												
Satd. Flow (perm)	0	0	1611	0	0	1611	0	5075	0	0	5085	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		341			529			298			224	
Travel Time (s)		6.6			10.3			5.1			3.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.97	0.90
Adj. Flow (vph)	0	0	6	0	0	9	0	1774	26	0	2547	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	6	0	0	9	0	1800	0	0	2553	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	57.9%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2017 Build Out Phase 2 AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗		↑↑↑			↑↑↑	
Traffic Volume (veh/h)	0	0	5	0	0	8	0	1685	23	0	2471	5
Future Volume (Veh/h)	0	0	5	0	0	8	0	1685	23	0	2471	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.97	0.90
Hourly flow rate (vph)	0	0	6	0	0	9	0	1774	26	0	2547	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume												
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol												
tC, single (s)												
tC, 2 stage (s)												
tF (s)												
p0 queue free %												
cM capacity (veh/h)												
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	6	9	710	710	381	1019	1019	515				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	6	9	0	0	26	0	0	6				
cSH	872	919	1700	1700	1700	1700	1700	1700				
Volume to Capacity	0.01	0.01	0.42	0.42	0.22	0.60	0.60	0.30				
Queue Length 95th (ft)	1	1	0	0	0	0	0	0				
Control Delay (s)	9.2	9.0	0.0	0.0	0.0	0.0	0.0	0.0				
Lane LOS	A	A										
Approach Delay (s)	9.2	9.0	0.0			0.0						
Approach LOS	A	A										
Intersection Summary												
Average Delay												
Intersection Capacity Utilization												
Analysis Period (min)												
			0.0									
			57.9%	ICU Level of Service						B		
			15									

Lanes, Volumes, Timings
5: Bull St. & Jefferson Street



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↘	↑↑↑	↑↑↑	
Traffic Volume (vph)	0	17	1	1706	2488	9
Future Volume (vph)	0	17	1	1706	2488	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	175			0
Storage Lanes	0	1	1			0
Taper Length (ft)	25		100			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Frt		0.865			0.999	
Flt Protected			0.950			
Satd. Flow (prot)	0	1611	1770	5085	5080	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	1611	1770	5085	5080	0
Link Speed (mph)	35			40	40	
Link Distance (ft)	410			712	223	
Travel Time (s)	8.0			12.1	3.8	
Peak Hour Factor	0.90	0.90	0.90	0.94	0.97	0.90
Adj. Flow (vph)	0	19	1	1815	2565	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	19	1	1815	2575	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	58.3%
Analysis Period (min)	15
	ICU Level of Service B

HCM Unsignalized Intersection Capacity Analysis
5: Bull St. & Jefferson Street



Movement	EBL	EBR	NBL	NBT	SBT	SBR			
Lane Configurations		↗	↘	↑↑↑	↑↑↑				
Traffic Volume (veh/h)	0	17	1	1706	2488	9			
Future Volume (Veh/h)	0	17	1	1706	2488	9			
Sign Control	Stop			Free		Free			
Grade	0%			0%		0%			
Peak Hour Factor	0.90	0.90	0.90	0.94	0.97	0.90			
Hourly flow rate (vph)	0	19	1	1815	2565	10			
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type				None	None				
Median storage veh									
Upstream signal (ft)				712	223				
pX, platoon unblocked	0.84	0.84	0.84						
vC, conflicting volume	3177	860	2575						
vC1, stage 1 conf vol									
vC2, stage 2 conf vol									
vCu, unblocked vol	2916	143	2196						
tC, single (s)	6.8	6.9	4.1						
tC, 2 stage (s)									
tF (s)	3.5	3.3	2.2						
p0 queue free %	100	97	99						
cM capacity (veh/h)	10	734	198						
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	
Volume Total	19	1	605	605	605	1026	1026	523	
Volume Left	0	1	0	0	0	0	0	0	
Volume Right	19	0	0	0	0	0	0	10	
cSH	734	198	1700	1700	1700	1700	1700	1700	
Volume to Capacity	0.03	0.01	0.36	0.36	0.36	0.60	0.60	0.31	
Queue Length 95th (ft)	2	0	0	0	0	0	0	0	
Control Delay (s)	10.0	23.3	0.0	0.0	0.0	0.0	0.0	0.0	
Lane LOS	B	C							
Approach Delay (s)	10.0	0.0					0.0		
Approach LOS	B								
Intersection Summary									
Average Delay			0.0						
Intersection Capacity Utilization			58.3%	ICU Level of Service				B	
Analysis Period (min)			15						

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

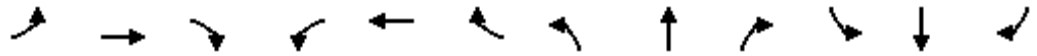
Bull Street Commons Traffic Study
2017 Build Out Phase 2 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1125	121	862	11	43	9	347	587	97	44	1273	1185
Future Volume (vph)	1125	121	862	11	43	9	347	587	97	44	1273	1185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	775		0	125		0	175		0	100		0
Storage Lanes	1		2	1		0	1		0	1		1
Taper Length (ft)	50			50			125			50		
Lane Util. Factor	0.95	0.95	0.88	0.95	0.95	0.95	0.97	0.95	0.95	1.00	0.91	0.91
Frt			0.850		0.979			0.979				0.850
Flt Protected	0.950	0.961			0.992		0.950			0.950		
Satd. Flow (prot)	1681	1701	2787	0	3437	0	3433	3465	0	1770	3390	1441
Flt Permitted	0.950	0.961			0.992		0.950			0.363		
Satd. Flow (perm)	1681	1701	2787	0	3437	0	3433	3465	0	676	3390	1441
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			40	
Link Distance (ft)		1012			379			526			712	
Travel Time (s)		23.0			8.6			12.0			12.1	
Peak Hour Factor	0.97	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.90	0.94	0.97
Adj. Flow (vph)	1160	134	958	12	48	10	381	652	108	49	1354	1222
Shared Lane Traffic (%)	50%											0%
Lane Group Flow (vph)	580	714	958	0	70	0	381	760	0	49	1354	1222
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Perm	NA	pm+ov
Protected Phases	4	4	5	3	3		5	2			6	4
Permitted Phases			4							6		6
Detector Phase	4	4	5	3	3		5	2		6	6	4
Switch Phase												
Minimum Initial (s)	16.0	16.0	11.0	5.0	5.0		11.0	16.0		16.0	16.0	16.0
Minimum Split (s)	30.0	30.0	17.0	12.0	12.0		17.0	30.0		30.0	30.0	30.0
Total Split (s)	53.0	53.0	17.0	12.0	12.0		17.0	65.0		48.0	48.0	53.0
Total Split (%)	40.8%	40.8%	13.1%	9.2%	9.2%		13.1%	50.0%		36.9%	36.9%	40.8%
Maximum Green (s)	47.0	47.0	11.0	6.0	6.0		11.0	59.0		42.0	42.0	47.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0		-4.0		-4.0	-4.0		-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0		2.0		2.0	2.0		2.0	2.0	2.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max		C-Max	C-Max	None
Act Effct Green (s)	51.0	51.0	68.0		10.0		15.0	65.4		48.4	48.4	99.8
Actuated g/C Ratio	0.39	0.39	0.52		0.08		0.12	0.50		0.37	0.37	0.77
v/c Ratio	0.88	1.07	0.66		0.27		0.96	0.44		0.20	1.07	1.10
Control Delay	42.9	84.5	21.0		59.3		86.4	21.5		32.1	81.3	75.7
Queue Delay	0.0	0.0	0.1		0.0		0.0	0.3		0.0	0.0	0.0
Total Delay	42.9	84.5	21.1		59.3		86.4	21.7		32.1	81.3	75.7
LOS	D	F	C		E		F	C		C	F	E
Approach Delay		46.8			59.3			43.3			77.8	
Approach LOS		D			E			D			E	

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
2017 Build Out Phase 2 AM

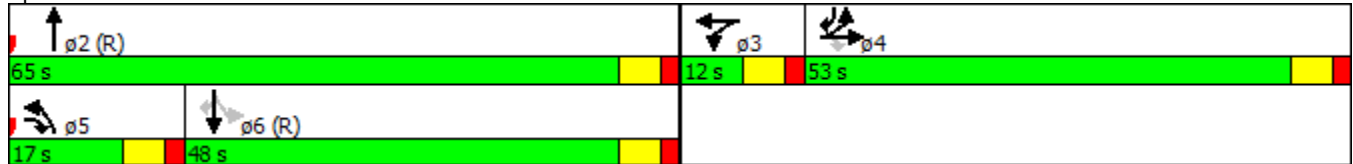


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	491	~711	386		30		169	243		19	~713	~1346
Queue Length 95th (ft)	#710	#969	484		55		#271	302		m43	#863	#1650
Internal Link Dist (ft)		932			299			446			632	
Turn Bay Length (ft)	775						175			100		
Base Capacity (vph)	659	667	1457		264		396	1743		251	1262	1106
Starvation Cap Reductn	0	0	0		0		0	389		0	0	0
Spillback Cap Reductn	0	0	27		0		0	0		0	0	0
Storage Cap Reductn	0	0	0		0		0	0		0	0	0
Reduced v/c Ratio	0.88	1.07	0.67		0.27		0.96	0.56		0.20	1.07	1.10

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 126 (97%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.10
 Intersection Signal Delay: 59.7
 Intersection LOS: E
 Intersection Capacity Utilization 108.7%
 ICU Level of Service G
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Bull St. & Elmwood Avenue



Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

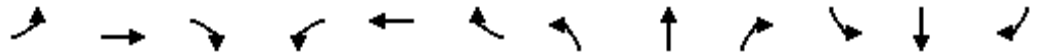
Bull Street Commons Traffic Study
2017 Build Out Phase 2 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	235	85	30	159	121	25	843	43	168	1905	97
Future Volume (vph)	85	235	85	30	159	121	25	843	43	168	1905	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	50			50			75			75		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.960			0.935			0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3398	0	1770	3309	0	1770	3514	0	1770	3539	1583
Flt Permitted	0.374			0.318			0.061			0.263		
Satd. Flow (perm)	697	3398	0	592	3309	0	114	3514	0	490	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		28			134			11				108
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1044			459			1901				526
Travel Time (s)		23.7			10.4			43.2				12.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.94	0.90
Adj. Flow (vph)	94	261	94	33	173	134	28	937	48	187	2027	108
Shared Lane Traffic (%)												
Lane Group Flow (vph)	94	355	0	33	307	0	28	985	0	187	2027	108
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	16.0
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	30.0
Total Split (s)	31.0	31.0		31.0	31.0		99.0	99.0		99.0	99.0	99.0
Total Split (%)	23.8%	23.8%		23.8%	23.8%		76.2%	76.2%		76.2%	76.2%	76.2%
Maximum Green (s)	25.0	25.0		25.0	25.0		93.0	93.0		93.0	93.0	93.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	24.8	24.8		24.8	24.8		101.2	101.2		101.2	101.2	101.2
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.78	0.78		0.78	0.78	0.78
v/c Ratio	0.71	0.53		0.29	0.42		0.32	0.36		0.49	0.74	0.09
Control Delay	76.9	46.0		54.5	29.8		16.3	5.1		5.2	6.1	0.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	1.1	0.0
Total Delay	76.9	46.0		54.5	29.8		16.3	5.1		5.2	7.2	0.5
LOS	E	D		D	C		B	A		A	A	A
Approach Delay		52.4			32.2			5.4			6.7	
Approach LOS		D			C			A			A	

Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

Bull Street Commons Traffic Study
2017 Build Out Phase 2 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	75	131		25	71		6	114		33	325	2
Queue Length 95th (ft)	#144	175		59	117		31	163		m40	m251	m2
Internal Link Dist (ft)		964			379			1821			446	
Turn Bay Length (ft)	150			175			150			150		
Base Capacity (vph)	155	779		132	842		88	2739		381	2756	1256
Starvation Cap Reductn	0	0		0	0		0	0		0	451	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.61	0.46		0.25	0.36		0.32	0.36		0.49	0.88	0.09

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 106 (82%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 13.5

Intersection LOS: B

Intersection Capacity Utilization 106.0%

ICU Level of Service G

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

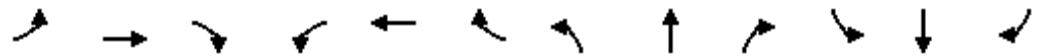
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Bull St. & Calhoun St.



Lanes, Volumes, Timings
9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Bull Street Commons Traffic Study
2017 Build Out Phase 2 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	255	68	724	460	102	153	508	352	20	457	52
Future Volume (vph)	35	255	68	724	460	102	153	508	352	20	457	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		800	175		0	225		0	300		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	100			75			75			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.968			0.973				0.850		0.985	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3426	0	3433	3444	0	1770	3539	1583	1770	3486	0
Flt Permitted	0.415			0.950			0.367			0.381		
Satd. Flow (perm)	773	3426	0	3433	3444	0	684	3539	1583	710	3486	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			30				391			12
Link Speed (mph)		35			35			35				40
Link Distance (ft)		778			314			483				2110
Travel Time (s)		15.2			6.1			9.4				36.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.90	0.90
Adj. Flow (vph)	39	283	76	804	511	113	170	540	391	22	508	58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	39	359	0	804	624	0	170	540	391	22	566	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Free	Perm	NA	
Protected Phases		8		7	4			6				2
Permitted Phases	8						6		Free	2		
Detector Phase	8	8		7	4		6	6		2		2
Switch Phase												
Minimum Initial (s)	16.0	16.0		11.0	16.0		16.0	16.0		16.0		16.0
Minimum Split (s)	30.0	30.0		17.0	30.0		30.0	30.0		30.0		30.0
Total Split (s)	30.0	30.0		39.0	69.0		61.0	61.0		61.0		61.0
Total Split (%)	23.1%	23.1%		30.0%	53.1%		46.9%	46.9%		46.9%		46.9%
Maximum Green (s)	24.0	24.0		33.0	63.0		55.0	55.0		55.0		55.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0		-4.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0		3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max		C-Max
Act Effct Green (s)	22.6	22.6		36.1	60.7		65.3	65.3	130.0	65.3		65.3
Actuated g/C Ratio	0.17	0.17		0.28	0.47		0.50	0.50	1.00	0.50		0.50
v/c Ratio	0.29	0.58		0.84	0.38		0.50	0.30	0.25	0.06		0.32
Control Delay	36.9	34.4		42.1	22.4		23.3	17.0	0.3	27.6		27.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	36.9	34.4		42.1	22.4		23.3	17.0	0.3	27.6		27.9
LOS	D	C		D	C		C	B	A	C		C
Approach Delay		34.7			33.5			12.1				27.8
Approach LOS		C			C			B				C

Lanes, Volumes, Timings
 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Bull Street Commons Traffic Study
 2017 Build Out Phase 2 AM

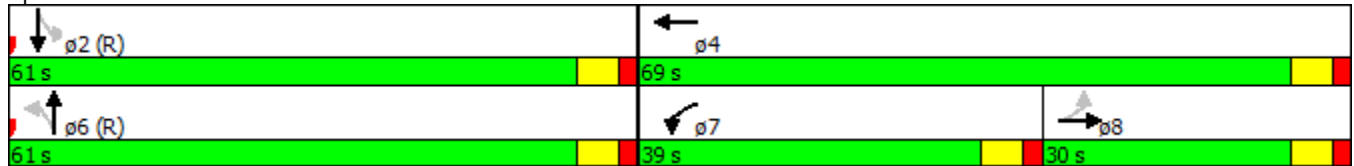


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	23	112		265	190		57	93	0	13	207	
Queue Length 95th (ft)	51	149		362	217		124	166	0	m28	319	
Internal Link Dist (ft)		698			234			403			2030	
Turn Bay Length (ft)	225			175			225			300		
Base Capacity (vph)	166	756		977	1789		343	1778	1583	356	1758	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	119	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.23	0.47		0.82	0.35		0.50	0.30	0.25	0.06	0.35	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 121 (93%), Referenced to phase 2:SBTL and 6:NBTL, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 26.0
 Intersection LOS: C
 Intersection Capacity Utilization 74.9%
 ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive



Lanes, Volumes, Timings
10: Harden St./Harden Street Ext & Calhoun St.

Bull Street Commons Traffic Study
2017 Build Out Phase 2 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	29	178	6	30	2	236	795	16	40	999	86
Future Volume (vph)	85	29	178	6	30	2	236	795	16	40	999	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	50		0	0		325	300		200
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	100			25			25			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Frt		0.871			0.991			0.997				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1622	0	1770	1846	0	1770	5070	0	1770	3539	1583
Flt Permitted	0.734			0.270			0.227			0.235		
Satd. Flow (perm)	1367	1622	0	503	1846	0	423	5070	0	438	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		198			2			3				122
Link Speed (mph)		30			35			35				35
Link Distance (ft)		820			1149			2515				454
Travel Time (s)		18.6			22.4			49.0				8.8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	94	32	198	7	33	2	262	883	18	44	1110	96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	94	230	0	7	35	0	262	901	0	44	1110	96
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	1 2		1	2	2
Switch Phase												
Minimum Initial (s)	1.0	1.0		11.0	11.0		9.0	14.0		9.0	14.0	14.0
Minimum Split (s)	6.5	6.5		30.0	30.0		15.0	30.0		15.0	30.0	30.0
Total Split (s)	38.0	38.0		38.0	38.0		43.0	73.0		19.0	49.0	49.0
Total Split (%)	29.2%	29.2%		29.2%	29.2%		33.1%	56.2%		14.6%	37.7%	37.7%
Maximum Green (s)	32.5	32.5		32.5	32.5		37.0	67.0		13.0	43.0	43.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.5	1.5		1.5	1.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	0.0		0.0	0.0		-3.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	2.5	5.5		5.5	5.5		3.0	3.0		6.0	3.0	3.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	17.8	14.8		14.8	14.8		91.7	70.0		102.1	81.9	81.9
Actuated g/C Ratio	0.14	0.11		0.11	0.11		0.71	0.54		0.79	0.63	0.63
v/c Ratio	0.50	0.64		0.12	0.17		0.50	0.33		0.07	0.50	0.09
Control Delay	48.8	13.8		54.2	49.7		8.1	17.2		1.7	14.7	3.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	48.8	13.8		54.2	49.7		8.1	17.2		1.7	14.7	3.0
LOS	D	B		D	D		A	B		A	B	A
Approach Delay		24.0			50.4			15.1			13.3	
Approach LOS		C			D			B			B	

Lanes, Volumes, Timings
 10: Harden St./Harden Street Ext & Calhoun St.

Bull Street Commons Traffic Study
 2017 Build Out Phase 2 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	77	55		5	26		36	150		2	324	15
Queue Length 95th (ft)	131	120		21	56		73	180		m5	440	m35
Internal Link Dist (ft)		740			1069			2435			374	
Turn Bay Length (ft)	225			50						300		200
Base Capacity (vph)	373	554		125	463		761	2731		658	2230	1042
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.25	0.42		0.06	0.08		0.34	0.33		0.07	0.50	0.09

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 78 (60%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 15.9
 Intersection LOS: B
 Intersection Capacity Utilization 64.4%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Harden St./Harden Street Ext & Calhoun St.



Lanes, Volumes, Timings
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2017 Build Out Phase 2 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	270	36	10	283	42	15	25	12	21	15	43
Future Volume (vph)	46	270	36	10	283	42	15	25	12	21	15	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	275		0	0		0	300		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	100			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982			0.980			0.970				0.889
Flt Protected	0.950			0.950				0.986		0.950		
Satd. Flow (prot)	1770	1829	0	1770	1825	0	0	1782	0	1770	1656	0
Flt Permitted	0.950			0.950				0.986		0.950		
Satd. Flow (perm)	1770	1829	0	1770	1825	0	0	1782	0	1770	1656	0
Link Speed (mph)		35			30			35				35
Link Distance (ft)		517			820			504				3014
Travel Time (s)		10.1			18.6			9.8				58.7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	51	300	40	11	314	47	17	28	13	23	17	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	51	340	0	11	361	0	0	58	0	23	65	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	40.3%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2017 Build Out Phase 2 AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	270	36	10	283	42	15	25	12	21	15	43
Future Volume (Veh/h)	46	270	36	10	283	42	15	25	12	21	15	43
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	51	300	40	11	314	47	17	28	13	23	17	48
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh		2			2							
Upstream signal (ft)					820							
pX, platoon unblocked	0.94						0.94	0.94		0.94	0.94	0.94
vC, conflicting volume	361			340			814	805	320	788	802	338
vC1, stage 1 conf vol							422	422		360	360	
vC2, stage 2 conf vol							392	383		429	442	
vCu, unblocked vol	294			340			774	764	320	747	761	269
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			99			96	94	98	95	96	93
cM capacity (veh/h)	1197			1219			446	463	721	468	472	727
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total	51	340	11	361	58	23	65					
Volume Left	51	0	11	0	17	23	0					
Volume Right	0	40	0	47	13	0	48					
cSH	1197	1700	1219	1700	497	468	637					
Volume to Capacity	0.04	0.20	0.01	0.21	0.12	0.05	0.10					
Queue Length 95th (ft)	3	0	1	0	10	4	8					
Control Delay (s)	8.1	0.0	8.0	0.0	13.2	13.1	11.3					
Lane LOS	A		A		B	B	B					
Approach Delay (s)	1.1		0.2		13.2	11.8						
Approach LOS					B	B						
Intersection Summary												
Average Delay			2.5									
Intersection Capacity Utilization			40.3%		ICU Level of Service			A				
Analysis Period (min)			15									

Lanes, Volumes, Timings
12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2017 Build Out Phase 2 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↗	↘		↗	↘	
Traffic Volume (vph)	12	338	39	107	463	55	8	10	29	6	4	2
Future Volume (vph)	12	338	39	107	463	55	8	10	29	6	4	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		225	50		0
Storage Lanes	0		0	0		0	1		1	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.987			0.988			0.888			0.950	
Flt Protected		0.998			0.991		0.950			0.950		
Satd. Flow (prot)	0	1835	0	0	1824	0	1770	1654	0	1770	1770	0
Flt Permitted		0.998			0.991		0.950			0.950		
Satd. Flow (perm)	0	1835	0	0	1824	0	1770	1654	0	1770	1770	0
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		980			161			3014			569	
Travel Time (s)		19.1			3.1			58.7			11.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	13	376	43	119	503	61	9	11	32	7	4	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	432	0	0	683	0	9	43	0	7	6	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	71.1%
Analysis Period (min)	15
	ICU Level of Service C












HCM Unsignalized Intersection Capacity Analysis
 12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
 2017 Build Out Phase 2 AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (veh/h)	12	338	39	107	463	55	8	10	29	6	4	2
Future Volume (Veh/h)	12	338	39	107	463	55	8	10	29	6	4	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	13	376	43	119	503	61	9	11	32	7	4	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					1174							
pX, platoon unblocked	0.84						0.84	0.84		0.84	0.84	0.84
vC, conflicting volume	564			419			1199	1226	398	1232	1216	534
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	383			419			1141	1172	398	1181	1162	346
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			90			93	92	95	94	97	100
cM capacity (veh/h)	985			1140			132	142	652	114	144	584
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	432	683	9	43	7	6						
Volume Left	13	119	9	0	7	0						
Volume Right	43	61	0	32	0	2						
cSH	985	1140	132	340	114	193						
Volume to Capacity	0.01	0.10	0.07	0.13	0.06	0.03						
Queue Length 95th (ft)	1	9	5	11	5	2						
Control Delay (s)	0.4	2.6	34.2	17.1	38.6	24.3						
Lane LOS	A	A	D	C	E	C						
Approach Delay (s)	0.4	2.6	20.1		32.0							
Approach LOS			C		D							
Intersection Summary												
Average Delay			2.9									
Intersection Capacity Utilization			71.1%	ICU Level of Service	C							
Analysis Period (min)			15									

Lanes, Volumes, Timings
13: Harden Street Ext & Slighs Ave.

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	123	205	908	68	124	1160
Future Volume (vph)	123	205	908	68	124	1160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		50	100	
Storage Lanes	1	0		1	1	
Taper Length (ft)	25				50	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	0.916			0.850		
Flt Protected	0.982				0.950	
Satd. Flow (prot)	1579	0	3539	1583	1770	3539
Flt Permitted	0.982				0.196	
Satd. Flow (perm)	1579	0	3539	1583	365	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	72			21		
Link Speed (mph)	30		35			35
Link Distance (ft)	398		2533			483
Travel Time (s)	9.0		49.3			9.4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.95
Heavy Vehicles (%)	7%	9%	2%	2%	2%	2%
Adj. Flow (vph)	137	228	1009	76	138	1221
Shared Lane Traffic (%)						
Lane Group Flow (vph)	365	0	1009	76	138	1221
Turn Type	Perm		NA	Perm	pm+pt	NA
Protected Phases			6		5	2
Permitted Phases	4			6	2	
Detector Phase	4		6	6	5	2
Switch Phase						
Minimum Initial (s)	16.0		16.0	16.0	11.0	16.0
Minimum Split (s)	30.0		30.0	30.0	17.0	30.0
Total Split (s)	49.0		62.0	62.0	19.0	81.0
Total Split (%)	37.7%		47.7%	47.7%	14.6%	62.3%
Maximum Green (s)	43.0		56.0	56.0	13.0	75.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0		-4.0	-2.0	-4.0	-4.0
Total Lost Time (s)	2.0		2.0	4.0	2.0	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		C-Max	C-Max	None	C-Max
Act Effct Green (s)	34.7		74.0	72.0	91.3	91.3
Actuated g/C Ratio	0.27		0.57	0.55	0.70	0.70
v/c Ratio	0.77		0.50	0.09	0.33	0.49
Control Delay	45.4		11.6	4.0	13.3	14.0
Queue Delay	0.0		0.0	0.0	0.0	0.3
Total Delay	45.4		11.6	4.0	13.3	14.4
LOS	D		B	A	B	B
Approach Delay	45.4		11.1			14.3

Lanes, Volumes, Timings
 13: Harden Street Ext & Slighs Ave.



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	D		B		B	
Queue Length 50th (ft)	232		291	2	39	222
Queue Length 95th (ft)	313		416	26	m66	481
Internal Link Dist (ft)	318		2453			403
Turn Bay Length (ft)				50	100	
Base Capacity (vph)	616		2015	886	440	2485
Starvation Cap Reductn	0		0	0	0	615
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.59		0.50	0.09	0.31	0.65

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 129 (99%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 17.1
 Intersection LOS: B
 Intersection Capacity Utilization 63.7%
 ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 13: Harden Street Ext & Slighs Ave.



Lanes, Volumes, Timings
14: Colonial Drive & Farrow Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Lane Configurations		↗↗	↖	↑↑	↑↑		
Traffic Volume (vph)	0	184	157	467	1041	17	
Future Volume (vph)	0	184	157	467	1041	17	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0	330	550			0	
Storage Lanes	0	1	1			0	
Taper Length (ft)	25		125				
Lane Util. Factor	1.00	0.88	1.00	0.95	0.95	0.95	
Frt		0.850			0.998		
Flt Protected			0.950				
Satd. Flow (prot)	0	2787	1770	3539	3532	0	
Flt Permitted			0.950				
Satd. Flow (perm)	0	2787	1770	3539	3532	0	
Right Turn on Red		Yes				No	
Satd. Flow (RTOR)		94					
Link Speed (mph)	35			35	35		
Link Distance (ft)	930			685	2077		
Travel Time (s)	18.1			13.3	40.5		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.91	0.90	
Adj. Flow (vph)	0	204	174	519	1144	19	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	204	174	519	1163	0	
Turn Type		Over	Prot	NA	NA		
Protected Phases		8	8	8 6	2		6
Permitted Phases							
Detector Phase		8	8	8 6	2		
Switch Phase							
Minimum Initial (s)		16.0	16.0		16.0		16.0
Minimum Split (s)		30.0	30.0		30.0		30.0
Total Split (s)		30.0	30.0		35.0		35.0
Total Split (%)		46.2%	46.2%		53.8%		54%
Maximum Green (s)		24.0	24.0		29.0		29.0
Yellow Time (s)		4.0	4.0		4.0		4.0
All-Red Time (s)		2.0	2.0		2.0		2.0
Lost Time Adjust (s)		-3.0	-3.0		-4.0		
Total Lost Time (s)		3.0	3.0		2.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0	3.0		3.0		3.0
Recall Mode		None	None		C-Max		C-Max
Act Effct Green (s)		19.9	19.9	65.0	40.1		
Actuated g/C Ratio		0.31	0.31	1.00	0.62		
v/c Ratio		0.22	0.32	0.15	0.53		
Control Delay		9.6	19.9	0.1	6.1		
Queue Delay		0.0	0.0	0.0	0.0		
Total Delay		9.6	19.9	0.1	6.1		
LOS		A	B	A	A		
Approach Delay				5.1	6.1		
Approach LOS				A	A		

Lanes, Volumes, Timings
 14: Colonial Drive & Farrow Road

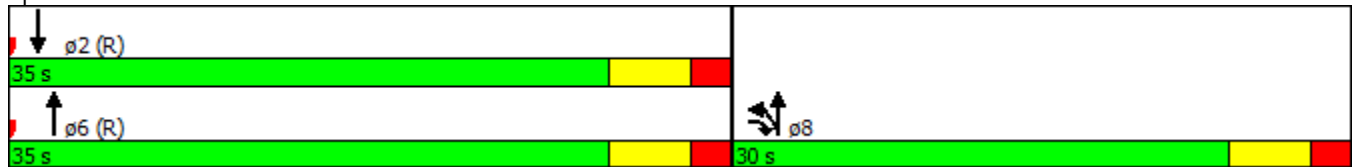


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Queue Length 50th (ft)		18	50	0	286		
Queue Length 95th (ft)		38	78	0	117		
Internal Link Dist (ft)	850			605	1997		
Turn Bay Length (ft)		330	550				
Base Capacity (vph)		1212	735	3539	2180		
Starvation Cap Reductn		0	0	0	0		
Spillback Cap Reductn		0	0	0	0		
Storage Cap Reductn		0	0	0	0		
Reduced v/c Ratio		0.17	0.24	0.15	0.53		

Intersection Summary

Area Type:	Other
Cycle Length:	65
Actuated Cycle Length:	65
Offset:	62 (95%), Referenced to phase 2:SBT and 6:NBT, Start of 1st Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.53
Intersection Signal Delay:	6.1
Intersection LOS:	A
Intersection Capacity Utilization	49.3%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 14: Colonial Drive & Farrow Road



Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
2017 Build Out Phase 2 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	399	4	228	542	190	0	326	145	279	934	68
Future Volume (vph)	15	399	4	228	542	190	0	326	145	279	934	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		0	300		0	0		225	200		0
Storage Lanes	1		0	2		1	0		1	1		0
Taper Length (ft)	125			100			25			125		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.999				0.850			0.850		0.990	
Flt Protected	0.950			0.950						0.950		
Satd. Flow (prot)	1770	3536	0	3433	3539	1583	0	3539	1583	1770	3504	0
Flt Permitted	0.424			0.950						0.458		
Satd. Flow (perm)	790	3536	0	3433	3539	1583	0	3539	1583	853	3504	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				211			161		9	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1518			1183			2077			914	
Travel Time (s)		29.6			23.0			40.5			17.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.90
Adj. Flow (vph)	17	443	4	253	602	211	0	362	161	310	1026	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	447	0	253	602	211	0	362	161	310	1102	0
Turn Type	Perm	NA		Prot	NA	pm+ov		NA	Free	pm+pt	NA	
Protected Phases		4		3	8	1		2		1	6	
Permitted Phases	4					8			Free	6		
Detector Phase	4	4		3	8	1		2		1	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0	5.0		15.0		5.0	15.0	
Minimum Split (s)	30.0	30.0		21.0	41.0	17.0		41.0		17.0	30.0	
Total Split (s)	32.0	32.0		23.0	55.0	27.0		48.0		27.0	75.0	
Total Split (%)	24.6%	24.6%		17.7%	42.3%	20.8%		36.9%		20.8%	57.7%	
Maximum Green (s)	27.0	27.0		18.0	50.0	22.0		43.0		22.0	70.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5		3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5	1.5		1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0		-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead		Lead		Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Recall Mode	None	None		None	None	None		C-Min		None	C-Min	
Walk Time (s)					18.0			18.0				
Flash Dont Walk (s)					5.0			5.0				
Pedestrian Calls (#/hr)					0			0				
Act Effct Green (s)	22.7	22.7		17.1	43.8	65.9		56.1	130.0	78.2	78.2	
Actuated g/C Ratio	0.17	0.17		0.13	0.34	0.51		0.43	1.00	0.60	0.60	
v/c Ratio	0.12	0.72		0.56	0.51	0.23		0.24	0.10	0.48	0.52	
Control Delay	45.4	57.3		58.0	35.5	2.0		38.5	0.1	19.2	19.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	45.4	57.3		58.0	35.5	2.0		38.5	0.1	19.2	19.8	

Lanes, Volumes, Timings
 15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
 2017 Build Out Phase 2 AM



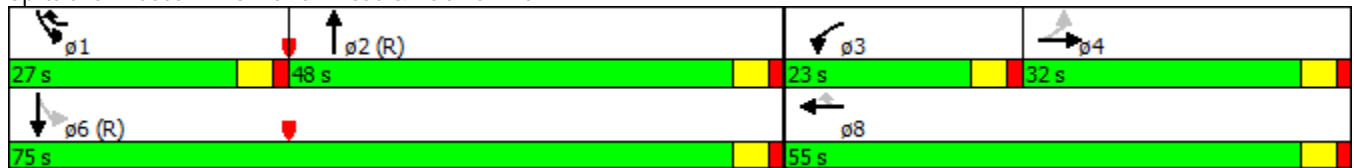
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	E		E	D	A		D	A	B	B	
Approach Delay		56.9			34.2			26.7			19.7	
Approach LOS		E			C			C			B	
Queue Length 50th (ft)	12	189		105	215	0		128	0	139	275	
Queue Length 95th (ft)	34	235		146	242	28		198	0	242	452	
Internal Link Dist (ft)		1438			1103			1997			834	
Turn Bay Length (ft)	175			300					225	200		
Base Capacity (vph)	170	764		505	1395	965		1552	1583	680	2118	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.10	0.59		0.50	0.43	0.22		0.23	0.10	0.46	0.52	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 30.2
 Intersection Capacity Utilization 68.8%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 15: Farrow Road & Beltline Blvd



Lanes, Volumes, Timings
16: Farrow Road & 277 NB RAMPS

Bull Street Commons Traffic Study
2017 Build Out Phase 2 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	0	8	0	0	0	0	319	225	42	1314	0
Future Volume (vph)	58	0	8	0	0	0	0	319	225	42	1314	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	0		0	0		0	250		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			25			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.850						0.938				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1770	1583	0	0	0	0	0	3320	0	1770	3539	0
Flt Permitted	0.950									0.423		
Satd. Flow (perm)	1770	1583	0	0	0	0	0	3320	0	788	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		83						250				
Link Speed (mph)		35			35			35				35
Link Distance (ft)		706			904			914				683
Travel Time (s)		13.8			17.6			17.8				13.3
Peak Hour Factor	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90
Adj. Flow (vph)	63	0	9	0	0	0	0	354	250	47	1398	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	63	9	0	0	0	0	0	604	0	47	1398	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						6			2	
Permitted Phases	4									2		
Detector Phase	4	4						6		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0						10.0		10.0	10.0	
Minimum Split (s)	30.0	30.0						30.0		30.0	30.0	
Total Split (s)	32.0	32.0						98.0		98.0	98.0	
Total Split (%)	24.6%	24.6%						75.4%		75.4%	75.4%	
Maximum Green (s)	27.0	27.0						93.0		93.0	93.0	
Yellow Time (s)	3.5	3.5						3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5						1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0						-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0						4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Recall Mode	None	None						C-Max		C-Max	C-Max	
Act Effct Green (s)	12.1	12.1						113.7		113.7	113.7	
Actuated g/C Ratio	0.09	0.09						0.87		0.87	0.87	
v/c Ratio	0.38	0.04						0.21		0.07	0.45	
Control Delay	62.1	0.4						2.5		2.1	2.4	
Queue Delay	0.0	0.0						0.0		0.0	0.2	
Total Delay	62.1	0.4						2.5		2.1	2.6	
LOS	E	A						A		A	A	
Approach Delay		54.4						2.5			2.6	
Approach LOS		D						A			A	

Lanes, Volumes, Timings
 16: Farrow Road & 277 NB RAMPS

Bull Street Commons Traffic Study
 2017 Build Out Phase 2 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	51	0						146		5	91	
Queue Length 95th (ft)	97	0						2		m10	134	
Internal Link Dist (ft)		626			824			834			603	
Turn Bay Length (ft)	300									250		
Base Capacity (vph)	381	406						2935		689	3095	
Starvation Cap Reductn	0	0						0		0	732	
Spillback Cap Reductn	0	0						0		0	0	
Storage Cap Reductn	0	0						0		0	0	
Reduced v/c Ratio	0.17	0.02						0.21		0.07	0.59	

Intersection Summary

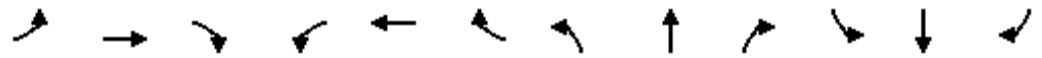
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.45
 Intersection Signal Delay: 4.3
 Intersection LOS: A
 Intersection Capacity Utilization 51.3%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 16: Farrow Road & 277 NB RAMPS



Lanes, Volumes, Timings
 17: Farrow Road & Lorick Avenue /277 SB Ramps

Bull Street Commons Traffic Study
 2017 Build Out Phase 2 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	0	39	627	14	34	13	366	0	0	700	207
Future Volume (vph)	13	0	39	627	14	34	13	366	0	0	700	207
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	125		0	200		0	0		0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (ft)	25			150			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850		0.894							0.965
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1770	0	1583	1770	1665	0	1770	3539	0	0	3415	0
Flt Permitted	0.722			0.950			0.173					
Satd. Flow (perm)	1345	0	1583	1770	1665	0	322	3539	0	0	3415	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			43		38							34
Link Speed (mph)		35		35			35				35	
Link Distance (ft)		681		1031			683				835	
Travel Time (s)		13.3		20.1			13.3				16.3	
Peak Hour Factor	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.92	0.90	0.90	0.93	0.90
Adj. Flow (vph)	14	0	43	674	16	38	14	398	0	0	753	230
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	0	43	674	54	0	14	398	0	0	983	0
Turn Type	Perm		Perm	Perm	NA		Perm	NA			NA	
Protected Phases				4			2				6	
Permitted Phases	8		8	4			2					
Detector Phase	8		8	4	4		2	2			6	
Switch Phase												
Minimum Initial (s)	10.0		10.0	10.0	10.0		10.0	10.0			10.0	
Minimum Split (s)	30.0		30.0	30.0	30.0		30.0	30.0			30.0	
Total Split (s)	80.0		80.0	80.0	80.0		50.0	50.0			50.0	
Total Split (%)	61.5%		61.5%	61.5%	61.5%		38.5%	38.5%			38.5%	
Maximum Green (s)	75.0		75.0	75.0	75.0		45.0	45.0			45.0	
Yellow Time (s)	3.5		3.5	3.5	3.5		3.5	3.5			3.5	
All-Red Time (s)	1.5		1.5	1.5	1.5		1.5	1.5			1.5	
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0		-1.0	-1.0			-1.0	
Total Lost Time (s)	4.0		4.0	4.0	4.0		4.0	4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0			3.0	
Recall Mode	None		None	None	None		C-Max	C-Max			C-Max	
Act Effct Green (s)	62.3		62.3	62.3	62.3		59.7	59.7			59.7	
Actuated g/C Ratio	0.48		0.48	0.48	0.48		0.46	0.46			0.46	
v/c Ratio	0.02		0.06	0.80	0.07		0.10	0.24			0.62	
Control Delay	14.2		3.8	35.3	6.1		14.8	11.3			29.5	
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay	14.2		3.8	35.3	6.1		14.8	11.3			29.5	
LOS	B		A	D	A		B	B			C	
Approach Delay				33.1			11.5				29.5	
Approach LOS				C			B				C	

Lanes, Volumes, Timings
 17: Farrow Road & Lorick Avenue /277 SB Ramps

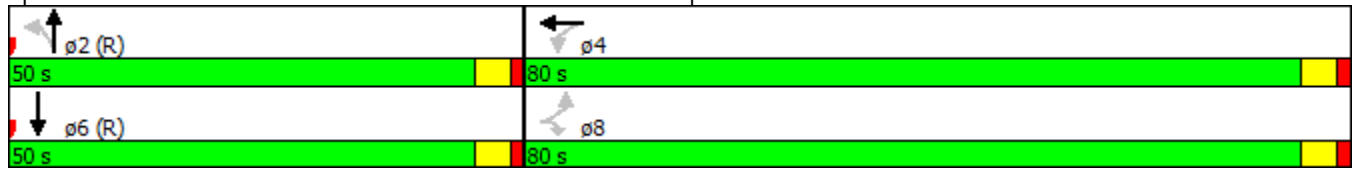


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	6		0	460	7		3	65			316	
Queue Length 95th (ft)	14		17	509	24		16	107			458	
Internal Link Dist (ft)		601			951			603			755	
Turn Bay Length (ft)				125			200					
Base Capacity (vph)	786		943	1034	989		147	1625			1587	
Starvation Cap Reductn	0		0	0	0		0	0			0	
Spillback Cap Reductn	0		0	0	0		0	0			0	
Storage Cap Reductn	0		0	0	0		0	0			0	
Reduced v/c Ratio	0.02		0.05	0.65	0.05		0.10	0.24			0.62	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 26.7
 Intersection Capacity Utilization 79.0%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service D

Splits and Phases: 17: Farrow Road & Lorick Avenue /277 SB Ramps



Lanes, Volumes, Timings
18: Assembly St./Assembly & Elmwood Avenue

Bull Street Commons Traffic Study
2017 Build Out Phase 2 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2196	452	608	1467	4	258	1	233	0	0	0
Future Volume (vph)	0	2196	452	608	1467	4	258	1	233	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		275	150		0	0		0	0		0
Storage Lanes	1		1	1		0	2		1	0		0
Taper Length (ft)	150			75			25			25		
Lane Util. Factor	1.00	0.86	0.86	0.97	0.91	0.91	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850					0.851	0.850			
Flt Protected				0.950			0.950					
Satd. Flow (prot)	1863	4806	1362	3433	5085	0	3433	1506	1504	0	1863	0
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	1863	4806	1362	3433	5085	0	3433	1506	1504	0	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			170		1			122	76			
Link Speed (mph)		30			30			30				35
Link Distance (ft)		3707			509			546				403
Travel Time (s)		84.3			11.6			12.4				7.9
Peak Hour Factor	0.90	0.98	0.90	0.92	0.96	0.90	0.92	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	2241	502	661	1528	4	280	1	259	0	0	0
Shared Lane Traffic (%)			0%						47%			
Lane Group Flow (vph)	0	2241	502	661	1532	0	280	123	137	0	0	0
Turn Type	Perm	NA	pm+ov	Prot	NA		Split	NA	pm+ov			
Protected Phases		2	3	1	6		3	3	1	4	4	
Permitted Phases	2		2						3			
Detector Phase	2	2	3	1	6		3	3	1	4	4	
Switch Phase												
Minimum Initial (s)	16.0	16.0	6.0	11.0	16.0		6.0	6.0	11.0	4.0	4.0	
Minimum Split (s)	30.0	30.0	21.0	17.0	30.0		21.0	21.0	17.0	10.0	10.0	
Total Split (s)	69.0	69.0	21.0	30.0	99.0		21.0	21.0	30.0	10.0	10.0	
Total Split (%)	53.1%	53.1%	16.2%	23.1%	76.2%		16.2%	16.2%	23.1%	7.7%	7.7%	
Maximum Green (s)	63.0	63.0	15.0	24.0	93.0		15.0	15.0	24.0	4.0	4.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	-4.0	-4.0	-4.0	-4.0		-4.0	-2.0	-4.0		-2.0	
Total Lost Time (s)	6.0	2.0	2.0	2.0	2.0		2.0	4.0	2.0		4.0	
Lead/Lag	Lead	Lead	Lead	Lag			Lead	Lead	Lag	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes					Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max	None	None	C-Max		None	None	None	None	None	
Walk Time (s)			5.0				5.0	5.0				
Flash Dont Walk (s)			10.0				10.0	10.0				
Pedestrian Calls (#/hr)			0				0	0				
Act Effct Green (s)		77.5	98.0	28.0	107.5		18.5	16.5	48.5			
Actuated g/C Ratio		0.60	0.75	0.22	0.83		0.14	0.13	0.37			
v/c Ratio		0.78	0.47	0.89	0.36		0.57	0.41	0.22			
Control Delay		22.5	5.3	62.0	1.5		57.0	13.3	13.7			
Queue Delay		0.0	0.0	0.0	0.1		0.0	0.0	0.0			
Total Delay		22.5	5.3	62.0	1.6		57.0	13.3	13.7			

Lanes, Volumes, Timings
 18: Assembly St./Assembly & Elmwood Avenue

Bull Street Commons Traffic Study
 2017 Build Out Phase 2 AM

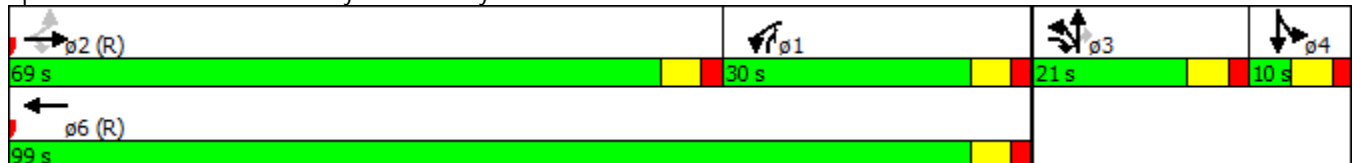


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C	A	E	A		E	B	B			
Approach Delay		19.3			19.8			36.1				
Approach LOS		B			B			D				
Queue Length 50th (ft)		531	97	305	50		114	1	34			
Queue Length 95th (ft)		599	161	m#378	m52		162	62	84			
Internal Link Dist (ft)		3627			429			466			323	
Turn Bay Length (ft)			275	150								
Base Capacity (vph)		2864	1068	739	4204		501	302	609			
Starvation Cap Reductn		0	0	0	1160		0	0	0			
Spillback Cap Reductn		0	0	0	0		0	0	0			
Storage Cap Reductn		0	0	0	0		0	0	0			
Reduced v/c Ratio		0.78	0.47	0.89	0.50		0.56	0.41	0.22			

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 14 (11%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.89
 Intersection Signal Delay: 21.2
 Intersection LOS: C
 Intersection Capacity Utilization 80.5%
 ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Assembly St./Assembly & Elmwood Avenue



Lanes, Volumes, Timings
19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
2017 Build Out Phase 2 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	204	2142	65	75	1460	39	18	99	12	227	489	572
Future Volume (vph)	204	2142	65	75	1460	39	18	99	12	227	489	572
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		175	150		0	200		0	175		425
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	75			75			100			75		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850		0.996				0.850		0.989	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	1770	5065	0	1770	3539	1583	1770	3353	1441
Flt Permitted	0.950			0.062			0.166			0.604		
Satd. Flow (perm)	3433	5085	1583	115	5065	0	309	3539	1583	1125	3353	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			41		4				126		6	157
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		509			563			474			3675	
Travel Time (s)		11.6			12.8			10.8			83.5	
Peak Hour Factor	0.90	0.93	0.90	0.90	0.97	0.90	0.90	0.90	0.90	0.90	0.93	0.94
Adj. Flow (vph)	227	2303	72	83	1505	43	20	110	13	252	526	609
Shared Lane Traffic (%)												7%
Lane Group Flow (vph)	227	2303	72	83	1548	0	20	110	13	252	569	566
Turn Type	Prot	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	pm+ov
Protected Phases	5	2	3		6		3	8		7	4	5
Permitted Phases			2	6			8		8	4		4
Detector Phase	5	2	3	6	6		3	8	8	7	4	5
Switch Phase												
Minimum Initial (s)	11.0	16.0	11.0	16.0	16.0		11.0	16.0	16.0	11.0	16.0	11.0
Minimum Split (s)	17.0	30.0	17.0	30.0	30.0		17.0	30.0	30.0	17.0	30.0	17.0
Total Split (s)	17.0	83.0	17.0	66.0	66.0		17.0	30.0	30.0	17.0	30.0	17.0
Total Split (%)	13.1%	63.8%	13.1%	50.8%	50.8%		13.1%	23.1%	23.1%	13.1%	23.1%	13.1%
Maximum Green (s)	11.0	77.0	11.0	60.0	60.0		11.0	24.0	24.0	11.0	24.0	11.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0	-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lead	Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	C-Max	C-Max		None	None	None	None	None	None
Act Effct Green (s)	15.0	82.6	99.6	65.6	65.6		41.4	26.4	26.4	41.8	29.8	46.8
Actuated g/C Ratio	0.12	0.64	0.77	0.50	0.50		0.32	0.20	0.20	0.32	0.23	0.36
v/c Ratio	0.57	0.71	0.06	1.46	0.61		0.08	0.15	0.03	0.58	0.74	0.91
Control Delay	82.3	4.9	0.1	298.6	17.5		28.9	42.5	0.2	39.5	53.1	49.9
Queue Delay	0.0	0.2	0.0	0.0	0.2		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.3	5.1	0.1	298.6	17.7		28.9	42.5	0.2	39.5	53.1	49.9
LOS	F	A	A	F	B		C	D	A	D	D	D
Approach Delay		11.7			32.0			36.7			49.3	
Approach LOS		B			C			D			D	

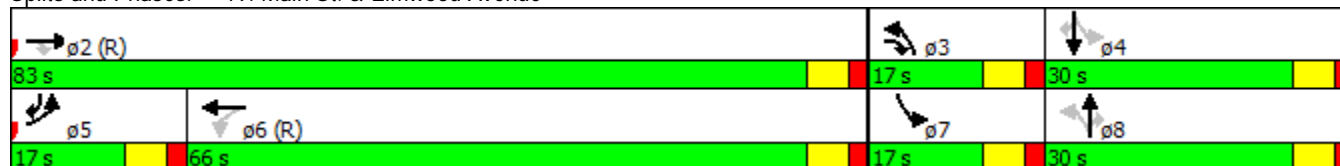


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	97	83	0	-92	344		11	40	0	161	248	394
Queue Length 95th (ft)	m128	103	m0	#202	407		30	66	0	239	319	#659
Internal Link Dist (ft)		429			483			394			3595	
Turn Bay Length (ft)	175		175	150			200			175		425
Base Capacity (vph)	396	3231	1222	57	2557		266	762	439	436	772	619
Starvation Cap Reductn	0	219	0	0	255		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	0.57	0.76	0.06	1.46	0.67		0.08	0.14	0.03	0.58	0.74	0.91

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 5 (4%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.46
 Intersection Signal Delay: 27.1 Intersection LOS: C
 Intersection Capacity Utilization 84.3% ICU Level of Service E
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Main St. & Elmwood Avenue



Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2017 Build Out Phase 2 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	1671	264	90	1484	9	35	12	27	9	118	18
Future Volume (vph)	12	1671	264	90	1484	9	35	12	27	9	118	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	75		0	200		0	75		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			50			100			50		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.979			0.999				0.850		0.981	
Flt Protected	0.950			0.950			0.950				0.997	
Satd. Flow (prot)	1770	4979	0	1770	5080	0	1770	1863	1583	0	3462	0
Flt Permitted	0.137			0.077			0.538				0.942	
Satd. Flow (perm)	255	4979	0	143	5080	0	1002	1863	1583	0	3271	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		72			2				30		11	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		563			1012			1692			1095	
Travel Time (s)		12.8			23.0			38.5			24.9	
Peak Hour Factor	0.90	0.95	0.90	0.90	0.95	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	13	1759	293	100	1562	10	39	13	30	10	131	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	2052	0	100	1572	0	39	13	30	0	161	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		6	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	100.0	100.0		100.0	100.0		30.0	30.0	30.0	30.0	30.0	
Total Split (%)	76.9%	76.9%		76.9%	76.9%		23.1%	23.1%	23.1%	23.1%	23.1%	
Maximum Green (s)	94.0	94.0		94.0	94.0		24.0	24.0	24.0	24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0		-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0		2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None	None	None	None	
Act Effct Green (s)	106.0	106.0		106.0	106.0		20.0	20.0	20.0		20.0	
Actuated g/C Ratio	0.82	0.82		0.82	0.82		0.15	0.15	0.15		0.15	
v/c Ratio	0.06	0.50		0.86	0.38		0.25	0.05	0.11		0.31	
Control Delay	1.2	0.8		26.4	3.1		53.4	47.5	16.6		47.4	
Queue Delay	0.0	0.1		0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	1.2	0.9		26.4	3.1		53.4	47.5	16.6		47.4	
LOS	A	A		C	A		D	D	B		D	
Approach Delay		1.0			4.5			39.0			47.4	
Approach LOS		A			A			D			D	

Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2017 Build Out Phase 2 AM

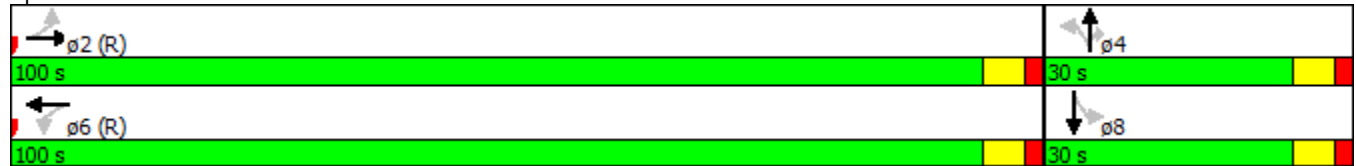


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	0	19		65	103		29	10	0		60	
Queue Length 95th (ft)	m1	32		m59	m94		66	30	29		95	
Internal Link Dist (ft)		483			932			1612			1015	
Turn Bay Length (ft)	200			75			200					
Base Capacity (vph)	207	4073		116	4142		215	401	364		713	
Starvation Cap Reductn	0	726		0	0		0	0	0		0	
Spillback Cap Reductn	0	0		0	0		0	0	0		0	
Storage Cap Reductn	0	0		0	0		0	0	0		0	
Reduced v/c Ratio	0.06	0.61		0.86	0.38		0.18	0.03	0.08		0.23	

Intersection Summary

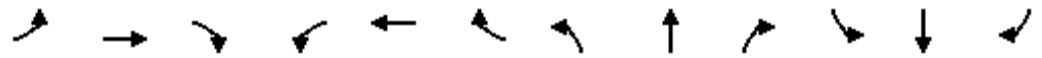
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 13 (10%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 5.1
 Intersection LOS: A
 Intersection Capacity Utilization 90.6%
 ICU Level of Service E
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 20: Sumter St. & Elmwood Avenue



Lanes, Volumes, Timings
 21: Barnwell St./Barnwell St & Calhoun St.

Bull Street Commons Traffic Study
 2017 Build Out Phase 2 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	331	25	24	266	35	3	4	12	25	4	23
Future Volume (vph)	38	331	25	24	266	35	3	4	12	25	4	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	225		0	125		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.989			0.983			0.885				0.870
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1842	0	1770	1831	0	1770	1649	0	1770	1621	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1842	0	1770	1831	0	1770	1649	0	1770	1621	0
Link Speed (mph)		35			35			35				35
Link Distance (ft)		487			517			761				974
Travel Time (s)		9.5			10.1			14.8				19.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	42	368	28	27	296	39	3	4	13	28	4	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	396	0	27	335	0	3	17	0	28	30	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	40.3%
Analysis Period (min)	15
	ICU Level of Service A













HCM Unsignalized Intersection Capacity Analysis
 21: Barnwell St./Barnwell St & Calhoun St.

Bull Street Commons Traffic Study
 2017 Build Out Phase 2 AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	331	25	24	266	35	3	4	12	25	4	23
Future Volume (Veh/h)	38	331	25	24	266	35	3	4	12	25	4	23
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	42	368	28	27	296	39	3	4	13	28	4	26
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage (veh)		2			2							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	335			396			844	855	382	836	850	316
vC1, stage 1 conf vol							466	466		370	370	
vC2, stage 2 conf vol							378	389		467	480	
vCu, unblocked vol	335			396			844	855	382	836	850	316
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			98			99	99	98	94	99	96
cM capacity (veh/h)	1224			1163			448	447	665	451	447	725
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	42	396	27	335	3	17	28	30				
Volume Left	42	0	27	0	3	0	28	0				
Volume Right	0	28	0	39	0	13	0	26				
cSH	1224	1700	1163	1700	448	597	451	669				
Volume to Capacity	0.03	0.23	0.02	0.20	0.01	0.03	0.06	0.04				
Queue Length 95th (ft)	3	0	2	0	1	2	5	4				
Control Delay (s)	8.0	0.0	8.2	0.0	13.1	11.2	13.5	10.6				
Lane LOS	A		A		B	B	B	B				
Approach Delay (s)	0.8		0.6		11.5		12.0					
Approach LOS					B		B					
Intersection Summary												
Average Delay			1.7									
Intersection Capacity Utilization			40.3%		ICU Level of Service			A				
Analysis Period (min)			15									

Lanes, Volumes, Timings
23: Bull St. & Access #3

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	40	11	1729	41	37	2479
Future Volume (vph)	40	11	1729	41	37	2479
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		75	150	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	5085	1583	1770	5085
Flt Permitted	0.950				0.089	
Satd. Flow (perm)	1770	1583	5085	1583	166	5085
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		12		20		
Link Speed (mph)	35		40			40
Link Distance (ft)	526		223			298
Travel Time (s)	10.2		3.8			5.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	44	12	1921	46	41	2754
Shared Lane Traffic (%)						
Lane Group Flow (vph)	44	12	1921	46	41	2754
Turn Type	Prot	Perm	NA	Perm	D.P+P	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	2	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	6.0	6.0	11.0	11.0	6.0	11.0
Minimum Split (s)	12.0	12.0	17.0	17.0	17.0	17.0
Total Split (s)	24.0	24.0	87.0	87.0	19.0	106.0
Total Split (%)	18.5%	18.5%	66.9%	66.9%	14.6%	81.5%
Maximum Green (s)	18.0	18.0	81.0	81.0	13.0	100.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)	10.7	10.7	104.7	104.7	110.5	114.5
Actuated g/C Ratio	0.08	0.08	0.81	0.81	0.85	0.88
v/c Ratio	0.30	0.09	0.47	0.04	0.17	0.62
Control Delay	60.7	25.8	12.2	5.7	1.9	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	60.7	25.8	12.2	5.7	1.9	1.4
LOS	E	C	B	A	A	A
Approach Delay	53.2		12.0			1.4
Approach LOS	D		B			A



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Length 50th (ft)	36	0	421	10	1	65
Queue Length 95th (ft)	73	20	m463	m18	m3	65
Internal Link Dist (ft)	446		143			218
Turn Bay Length (ft)				75	150	
Base Capacity (vph)	272	253	4097	1279	330	4477
Starvation Cap Reductn	0	0	0	0	0	65
Spillback Cap Reductn	5	0	0	0	0	361
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.05	0.47	0.04	0.12	0.67

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBSB and 6:SBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.62
 Intersection Signal Delay: 6.3
 Intersection LOS: A
 Intersection Capacity Utilization 59.6%
 ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 23: Bull St. & Access #3





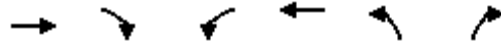
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↻		↻
Traffic Volume (vph)	436	14	0	244	0	11
Future Volume (vph)	436	14	0	244	0	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.996			0.865		
Flt Protected						
Satd. Flow (prot)	1855	0	0	1863	0	1611
Flt Permitted						
Satd. Flow (perm)	1855	0	0	1863	0	1611
Link Speed (mph)	35			35		
Link Distance (ft)	277			266 171		
Travel Time (s)	5.4			5.2 3.3		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	484	16	0	271	0	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	500	0	0	271	0	12
Sign Control	Free			Free Stop		

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	33.8% ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
25: Access #5 & Colonial Drive

Bull Street Commons Traffic Study
2017 Build Out Phase 2 AM



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↷			↶		↷
Traffic Volume (veh/h)	436	14	0	244	0	11
Future Volume (Veh/h)	436	14	0	244	0	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	484	16	0	271	0	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	277					
pX, platoon unblocked						
vC, conflicting volume			500		763	492
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			500		763	492
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	98
cM capacity (veh/h)			1064		372	577
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	500	271	12			
Volume Left	0	0	0			
Volume Right	16	0	12			
cSH	1700	1700	577			
Volume to Capacity	0.29	0.16	0.02			
Queue Length 95th (ft)	0	0	2			
Control Delay (s)	0.0	0.0	11.4			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	11.4			
Approach LOS			B			
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			33.8%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
 26: Access #5/Mental Health Dwy & Colonial Drive

Bull Street Commons Traffic Study
 2017 Build Out Phase 2 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	357	7	19	227	164	16	0	11	5	0	1
Future Volume (vph)	83	357	7	19	227	164	16	0	11	5	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		75	100		0	0		0	0		0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.997			0.937			0.850				0.981
Flt Protected	0.950			0.950			0.950					0.959
Satd. Flow (prot)	1770	1857	0	1770	1745	0	1770	1583	0	0	1752	0
Flt Permitted	0.950			0.950			0.950					0.959
Satd. Flow (perm)	1770	1857	0	1770	1745	0	1770	1583	0	0	1752	0
Link Speed (mph)		35			35			35				35
Link Distance (ft)		266			531			305				407
Travel Time (s)		5.2			10.3			5.9				7.9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	92	397	8	21	252	182	18	0	12	6	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	92	405	0	21	434	0	18	12	0	0	7	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	41.0%
Analysis Period (min)	15
	ICU Level of Service A

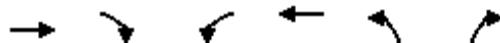
HCM Unsignalized Intersection Capacity Analysis
 26: Access #5/Mental Health Dwy & Colonial Drive

Bull Street Commons Traffic Study
 2017 Build Out Phase 2 AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	83	357	7	19	227	164	16	0	11	5	0	1
Future Volume (Veh/h)	83	357	7	19	227	164	16	0	11	5	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	92	397	8	21	252	182	18	0	12	6	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		543										
pX, platoon unblocked												
vC, conflicting volume	434			405			880	1061	401	978	974	343
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	434			405			880	1061	401	978	974	343
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			98			93	100	98	97	100	100
cM capacity (veh/h)	1126			1154			247	202	649	208	227	700
Direction, Lane #												
	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total	92	405	21	434	18	12	7					
Volume Left	92	0	21	0	18	0	6					
Volume Right	0	8	0	182	0	12	1					
cSH	1126	1700	1154	1700	247	649	232					
Volume to Capacity	0.08	0.24	0.02	0.26	0.07	0.02	0.03					
Queue Length 95th (ft)	7	0	1	0	6	1	2					
Control Delay (s)	8.5	0.0	8.2	0.0	20.7	10.7	21.0					
Lane LOS	A		A		C	B	C					
Approach Delay (s)	1.6		0.4		16.7		21.0					
Approach LOS					C		C					
Intersection Summary												
Average Delay			1.6									
Intersection Capacity Utilization			41.0%		ICU Level of Service		A					
Analysis Period (min)			15									

Lanes, Volumes, Timings
27: Boyce Street & Colonial Drive



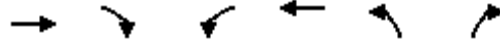
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	342	26	82	391	19	46
Future Volume (vph)	342	26	82	391	19	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		75	100		0	0
Storage Lanes		0	0		1	1
Taper Length (ft)			100		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.990					0.850
Flt Protected				0.991	0.950	
Satd. Flow (prot)	1844	0	0	1846	1770	1583
Flt Permitted				0.991	0.950	
Satd. Flow (perm)	1844	0	0	1846	1770	1583
Link Speed (mph)	35			35	35	
Link Distance (ft)	531			980	814	
Travel Time (s)	10.3			19.1	15.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	380	29	91	434	21	51
Shared Lane Traffic (%)						
Lane Group Flow (vph)	409	0	0	525	21	51
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	58.0%
Analysis Period (min)	15
	ICU Level of Service B

HCM Unsignalized Intersection Capacity Analysis
27: Boyce Street & Colonial Drive

Bull Street Commons Traffic Study
2017 Build Out Phase 2 AM



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↵	↶
Traffic Volume (veh/h)	342	26	82	391	19	46
Future Volume (Veh/h)	342	26	82	391	19	46
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	380	29	91	434	21	51
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (ft)	1074					
pX, platoon unblocked						
vC, conflicting volume			409		1010	394
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			409		1010	394
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			92		91	92
cM capacity (veh/h)			1150		245	655
Direction, Lane #	EB 1	WB 1	NB 1	NB 2		
Volume Total	409	525	21	51		
Volume Left	0	91	21	0		
Volume Right	29	0	0	51		
cSH	1700	1150	245	655		
Volume to Capacity	0.24	0.08	0.09	0.08		
Queue Length 95th (ft)	0	6	7	6		
Control Delay (s)	0.0	2.2	21.1	11.0		
Lane LOS		A	C	B		
Approach Delay (s)	0.0	2.2	13.9			
Approach LOS			B			
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			58.0%	ICU Level of Service		B
Analysis Period (min)			15			

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2018 Build-Out Phase 2 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖↗	↕		↖	↕↕	↗	↖	↕↕↗	
Traffic Volume (vph)	23	15	19	492	3	253	6	2340	215	80	1091	8
Future Volume (vph)	23	15	19	492	3	253	6	2340	215	80	1091	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		200	675		0	175		0	200		250
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100			75			50			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt		0.917			0.852				0.850		0.999	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3245	0	3433	1587	0	1770	3539	1583	1770	5080	0
Flt Permitted	0.950			0.950			0.230			0.053		
Satd. Flow (perm)	1770	3245	0	3433	1587	0	428	3539	1583	99	5080	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			281				141			2
Link Speed (mph)		30			40			40				45
Link Distance (ft)		619			1038			1208				1992
Travel Time (s)		14.1			17.7			20.6				30.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.90	0.94	0.90
Adj. Flow (vph)	26	17	21	547	3	281	7	2571	236	89	1161	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	26	38	0	547	284	0	7	2571	236	89	1170	0
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	4	4		3	3			2	3	1	6	
Permitted Phases							2		2	6		
Detector Phase	4	4		3	3		2	2	3	1	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0		11.0	11.0		16.0	16.0	11.0	11.0	16.0	
Minimum Split (s)	30.0	30.0		17.0	17.0		30.0	30.0	17.0	17.0	30.0	
Total Split (s)	30.0	30.0		19.0	19.0		64.0	64.0	19.0	17.0	81.0	
Total Split (%)	23.1%	23.1%		14.6%	14.6%		49.2%	49.2%	14.6%	13.1%	62.3%	
Maximum Green (s)	24.0	24.0		13.0	13.0		58.0	58.0	13.0	11.0	75.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag	Lead	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	None	None	C-Max	
Walk Time (s)				5.0	5.0				5.0			
Flash Dont Walk (s)				10.0	10.0				10.0			
Pedestrian Calls (#/hr)				0	0				0			
Act Effct Green (s)	20.0	20.0		17.0	17.0		74.4	74.4	93.4	91.4	91.4	
Actuated g/C Ratio	0.15	0.15		0.13	0.13		0.57	0.57	0.72	0.70	0.70	
v/c Ratio	0.10	0.07		1.22	0.63		0.03	1.27	0.20	0.34	0.33	
Control Delay	48.4	27.0		161.9	17.2		12.5	142.7	0.2	18.1	8.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	48.4	27.0		161.9	17.2		12.5	142.7	0.2	18.1	8.5	

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2018 Build-Out Phase 2 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	C		F	B		B	F	A	B	A	
Approach Delay		35.7			112.5			130.4				9.1
Approach LOS		D			F			F				A
Queue Length 50th (ft)	19	6		~297	63		1	~1470	0	24	142	
Queue Length 95th (ft)	47	23		#412	132		m3	#1605	m0	73	167	
Internal Link Dist (ft)		539			958			1128				1912
Turn Bay Length (ft)	100			675			175			200		
Base Capacity (vph)	381	715		448	451		244	2025	1177	262	3572	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.05		1.22	0.63		0.03	1.27	0.20	0.34	0.33	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 119 (92%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.27
 Intersection Signal Delay: 95.4
 Intersection LOS: F
 Intersection Capacity Utilization 93.9%
 ICU Level of Service F
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Bull St. & Harden St. Ext.



Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

Bull Street Commons Traffic Study
2018 Build-Out Phase 2 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	17	12	53	120	49	35	2432	8	6	1544	53
Future Volume (vph)	28	17	12	53	120	49	35	2432	8	6	1544	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	200		0	200		0	150		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			100			100			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Frt		0.939			0.957				0.850			0.995
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1749	0	1770	1783	0	1752	5085	1583	1770	5060	0
Flt Permitted	0.640			0.138			0.086			0.051		
Satd. Flow (perm)	1192	1749	0	257	1783	0	159	5085	1583	95	5060	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		602			376			654			1208	
Travel Time (s)		13.7			8.5			11.1			20.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.93	0.96
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%	2%
Adj. Flow (vph)	31	19	13	59	133	54	39	2560	9	7	1660	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	32	0	59	187	0	39	2560	9	7	1715	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			3			2				6
Permitted Phases	4			3			2		2	6		
Detector Phase	4	4		3	3		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	16.0
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0	30.0	30.0	30.0	30.0
Total Split (s)	30.0	30.0		31.0	31.0		69.0	69.0	69.0	69.0	69.0	69.0
Total Split (%)	23.1%	23.1%		23.8%	23.8%		53.1%	53.1%	53.1%	53.1%	53.1%	53.1%
Maximum Green (s)	24.0	24.0		25.0	25.0		63.0	63.0	63.0	63.0	63.0	63.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	20.0	20.0		29.0	29.0		79.4	79.4	79.4	79.4	79.4	79.4
Actuated g/C Ratio	0.15	0.15		0.22	0.22		0.61	0.61	0.61	0.61	0.61	0.61
v/c Ratio	0.17	0.12		1.04	0.47		0.41	0.82	0.01	0.12	0.56	
Control Delay	50.6	48.8		179.8	48.4		33.1	29.4	12.8	19.0	18.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	35.6	0.0	0.0	0.0	
Total Delay	50.6	48.8		179.8	48.4		33.1	65.0	12.8	19.0	18.7	
LOS	D	D		F	D		C	E	B	B	B	
Approach Delay		49.7			79.9			64.3				18.7

Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

Bull Street Commons Traffic Study
2018 Build-Out Phase 2 PM



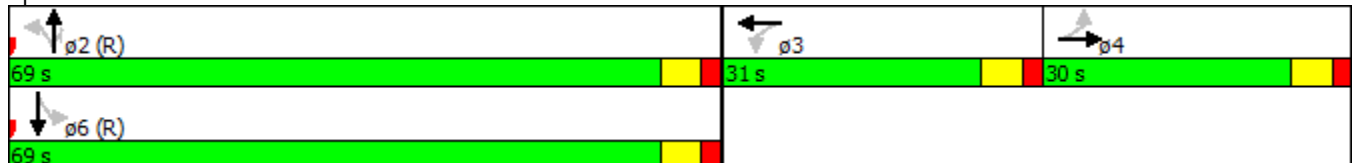
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	D		E					E		B		
Queue Length 50th (ft)	23	24		-53	138		22	813	4	3	425	
Queue Length 95th (ft)	55	55		#148	215		m37	870	m6	m6	m428	
Internal Link Dist (ft)		522			296			574			1128	
Turn Bay Length (ft)	150			200			200			150		
Base Capacity (vph)	256	376		57	397		96	3105	967	57	3090	
Starvation Cap Reductn	0	0		0	0		0	722	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.12	0.09		1.04	0.47		0.41	1.07	0.01	0.12	0.56	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.04
 Intersection Signal Delay: 48.0
 Intersection Capacity Utilization 76.9%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service D

~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bull St. & Confederate Ave.



Lanes, Volumes, Timings
3: Bull St. & Colonial Drive

Bull Street Commons Traffic Study
2018 Build-Out Phase 2 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	4	394	6	102	0	2367	280	79	1483	24
Future Volume (vph)	0	0	4	394	6	102	0	2367	280	79	1483	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	150		0	0		0	200		0
Storage Lanes	0		1	1		0	0		0	1		0
Taper Length (ft)	25			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.865		0.939			0.983				0.997
Flt Protected				0.950	0.972					0.950		
Satd. Flow (prot)	0	0	1611	1681	1615	0	0	4999	0	1770	5070	0
Flt Permitted				0.950	0.972					0.040		
Satd. Flow (perm)	0	0	1611	1681	1615	0	0	4999	0	75	5070	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)			67		13			50				
Link Speed (mph)		35			35			40				40
Link Distance (ft)		440			278			204				654
Travel Time (s)		8.6			5.4			3.5				11.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.97	0.90	0.90	0.94	0.90
Adj. Flow (vph)	0	0	4	438	7	113	0	2440	311	88	1578	27
Shared Lane Traffic (%)				36%								
Lane Group Flow (vph)	0	0	4	280	278	0	0	2751	0	88	1605	0
Turn Type			Perm	Perm	NA			NA		Perm	NA	
Protected Phases					8			2				6
Permitted Phases			4	8						6		
Detector Phase			4	8	8			2		6		6
Switch Phase												
Minimum Initial (s)			16.0	16.0	16.0			16.0		16.0		16.0
Minimum Split (s)			30.0	30.0	30.0			30.0		30.0		30.0
Total Split (s)			30.0	30.0	30.0			100.0		100.0		100.0
Total Split (%)			23.1%	23.1%	23.1%			76.9%		76.9%		76.9%
Maximum Green (s)			24.0	24.0	24.0			94.0		94.0		94.0
Yellow Time (s)			4.0	4.0	4.0			4.0		4.0		4.0
All-Red Time (s)			2.0	2.0	2.0			2.0		2.0		2.0
Lost Time Adjust (s)			-4.0	-4.0	-4.0			-4.0		-4.0		-4.0
Total Lost Time (s)			2.0	2.0	2.0			2.0		2.0		2.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)			3.0	3.0	3.0			3.0		3.0		3.0
Recall Mode			None	None	None			C-Max		C-Max		C-Max
Act Effct Green (s)			26.9	26.9	26.9			99.1		99.1		99.1
Actuated g/C Ratio			0.21	0.21	0.21			0.76		0.76		0.76
v/c Ratio			0.01	0.81	0.81			0.72		1.54		0.42
Control Delay			0.0	72.3	70.2			17.2		340.0		5.6
Queue Delay			0.0	0.0	0.0			3.9		0.0		0.1
Total Delay			0.0	72.3	70.2			21.1		340.0		5.7
LOS			A	E	E			C		F		A
Approach Delay					71.3			21.1				23.1
Approach LOS					E			C				C

Lanes, Volumes, Timings
3: Bull St. & Colonial Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)			0	247	235			583		-102	109	
Queue Length 95th (ft)			0	#378	#366			735		m#204	m197	
Internal Link Dist (ft)		360			198			124				574
Turn Bay Length (ft)				150						200		
Base Capacity (vph)			399	362	358			3823		57	3865	
Starvation Cap Reductn			0	0	0			975		0	837	
Spillback Cap Reductn			0	0	0			576		0	0	
Storage Cap Reductn			0	0	0			0		0	0	
Reduced v/c Ratio			0.01	0.77	0.78			0.97		1.54	0.53	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 68 (52%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.54
 Intersection Signal Delay: 27.3
 Intersection LOS: C
 Intersection Capacity Utilization 86.5%
 ICU Level of Service E
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Bull St. & Colonial Drive



Lanes, Volumes, Timings
4: Bull St. & Franklin Street /Freed Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗		↑↑↑			↑↑↑	
Traffic Volume (vph)	0	0	6	0	0	15	0	2626	33	0	1868	5
Future Volume (vph)	0	0	6	0	0	15	0	2626	33	0	1868	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	50		0
Storage Lanes	0		1	0		1	0		0	0		0
Taper Length (ft)	25			25			75			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.865			0.865		0.998				
Flt Protected												
Satd. Flow (prot)	0	0	1611	0	0	1611	0	5075	0	0	5085	0
Flt Permitted												
Satd. Flow (perm)	0	0	1611	0	0	1611	0	5075	0	0	5085	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		519			596			242			224	
Travel Time (s)		10.1			11.6			4.1			3.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.94	0.90
Adj. Flow (vph)	0	0	7	0	0	17	0	2794	37	0	1987	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	7	0	0	17	0	2831	0	0	1993	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	61.5%
Analysis Period (min)	15
	ICU Level of Service B

HCM Unsignalized Intersection Capacity Analysis

4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2018 Build-Out Phase 2 PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗		↑↑↑			↑↑↑	
Traffic Volume (veh/h)	0	0	6	0	0	15	0	2626	33	0	1868	5
Future Volume (Veh/h)	0	0	6	0	0	15	0	2626	33	0	1868	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.94	0.90
Hourly flow rate (vph)	0	0	7	0	0	17	0	2794	37	0	1987	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								242			428	
pX, platoon unblocked	0.71	0.71	0.89	0.71	0.71	0.66	0.89			0.66		
vC, conflicting volume	2938	4821	665	3482	4806	950	1993			2831		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1292	3926	200	2052	3905	0	1689			1973		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	100	100	98	100			100		
cM capacity (veh/h)	84	2	720	23	2	716	334			191		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	7	17	1118	1118	596	795	795	403				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	7	17	0	0	37	0	0	6				
cSH	720	716	1700	1700	1700	1700	1700	1700				
Volume to Capacity	0.01	0.02	0.66	0.66	0.35	0.47	0.47	0.24				
Queue Length 95th (ft)	1	2	0	0	0	0	0	0				
Control Delay (s)	10.0	10.1	0.0	0.0	0.0	0.0	0.0	0.0				
Lane LOS	B	B										
Approach Delay (s)	10.0	10.1	0.0			0.0						
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization			61.5%		ICU Level of Service					B		
Analysis Period (min)			15									

Lanes, Volumes, Timings
5: Bull St. & Jefferson Street



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	18	5	2704	1865	17
Future Volume (vph)	0	18	5	2704	1865	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	175			0
Storage Lanes	0	1	1			0
Taper Length (ft)	25		100			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Frt		0.865			0.999	
Flt Protected			0.950			
Satd. Flow (prot)	0	1611	1770	5085	5080	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	1611	1770	5085	5080	0
Link Speed (mph)	35			40	40	
Link Distance (ft)	257			774	213	
Travel Time (s)	5.0			13.2	3.6	
Peak Hour Factor	0.90	0.90	0.90	0.95	0.96	0.90
Adj. Flow (vph)	0	20	6	2846	1943	19
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	20	6	2846	1962	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	55.6% ICU Level of Service B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

5: Bull St. & Jefferson Street

Bull Street Commons Traffic Study
2018 Build-Out Phase 2 PM



Movement	EBL	EBR	NBL	NBT	SBT	SBR				
Lane Configurations										
Traffic Volume (veh/h)	0	18	5	2704	1865	17				
Future Volume (Veh/h)	0	18	5	2704	1865	17				
Sign Control	Stop			Free	Free					
Grade	0%			0%	0%					
Peak Hour Factor	0.90	0.90	0.90	0.95	0.96	0.90				
Hourly flow rate (vph)	0	20	6	2846	1943	19				
Pedestrians										
Lane Width (ft)										
Walking Speed (ft/s)										
Percent Blockage										
Right turn flare (veh)										
Median type				None	TWLTL					
Median storage (veh)					2					
Upstream signal (ft)				774	213					
pX, platoon unblocked	0.72	0.90	0.90							
vC, conflicting volume	2913	657	1962							
vC1, stage 1 conf vol	1952									
vC2, stage 2 conf vol	961									
vCu, unblocked vol	1422	253	1695							
tC, single (s)	6.8	6.9	4.1							
tC, 2 stage (s)	5.8									
tF (s)	3.5	3.3	2.2							
p0 queue free %	100	97	98							
cM capacity (veh/h)	120	675	337							
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3		
Volume Total	20	6	949	949	949	777	777	408		
Volume Left	0	6	0	0	0	0	0	0		
Volume Right	20	0	0	0	0	0	0	19		
cSH	675	337	1700	1700	1700	1700	1700	1700		
Volume to Capacity	0.03	0.02	0.56	0.56	0.56	0.46	0.46	0.24		
Queue Length 95th (ft)	2	1	0	0	0	0	0	0		
Control Delay (s)	10.5	15.9	0.0	0.0	0.0	0.0	0.0	0.0		
Lane LOS	B	C								
Approach Delay (s)	10.5	0.0					0.0			
Approach LOS	B									
Intersection Summary										
Average Delay			0.1							
Intersection Capacity Utilization			55.6%	ICU Level of Service	B					
Analysis Period (min)			15							

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
2018 Build-Out Phase 2 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1376	190	537	96	106	137	450	1217	91	35	651	1180
Future Volume (vph)	1376	190	537	96	106	137	450	1217	91	35	651	1180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	775		0	125		0	175		0	100		0
Storage Lanes	1		2	1		0	1		0	1		1
Taper Length (ft)	50			50			125			50		
Lane Util. Factor	0.95	0.95	0.88	0.95	0.95	0.95	0.97	0.95	0.95	1.00	0.91	0.91
Frt			0.850		0.940			0.990				0.850
Flt Protected	0.950	0.963			0.986		0.950			0.950		
Satd. Flow (prot)	1681	1704	2787	0	3280	0	3433	3504	0	1770	3390	1441
Flt Permitted	0.950	0.963			0.986		0.950			0.125		
Satd. Flow (perm)	1681	1704	2787	0	3280	0	3433	3504	0	233	3390	1441
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30				40
Link Distance (ft)		1012			338			526				774
Travel Time (s)		23.0			7.7			12.0				13.2
Peak Hour Factor	0.98	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1404	211	597	107	118	152	495	1352	101	39	723	1311
Shared Lane Traffic (%)	50%											0%
Lane Group Flow (vph)	702	913	597	0	377	0	495	1453	0	39	723	1311
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Perm	NA	pm+ov
Protected Phases	4	4	5	3	3		5	2			6	4
Permitted Phases			4							6		6
Detector Phase	4	4	5	3	3		5	2		6	6	4
Switch Phase												
Minimum Initial (s)	16.0	16.0	11.0	11.0	11.0		11.0	16.0		16.0	16.0	16.0
Minimum Split (s)	30.0	30.0	17.0	17.0	17.0		17.0	30.0		30.0	30.0	30.0
Total Split (s)	62.0	62.0	17.0	17.0	17.0		17.0	51.0		34.0	34.0	62.0
Total Split (%)	47.7%	47.7%	13.1%	13.1%	13.1%		13.1%	39.2%		26.2%	26.2%	47.7%
Maximum Green (s)	56.0	56.0	11.0	11.0	11.0		11.0	45.0		28.0	28.0	56.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0		-4.0		-4.0	-4.0		-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0		2.0		2.0	2.0		2.0	2.0	2.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead		Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max		C-Max	C-Max	None
Act Effct Green (s)	60.0	60.0	77.0		15.0		15.0	49.0		32.0	32.0	92.0
Actuated g/C Ratio	0.46	0.46	0.59		0.12		0.12	0.38		0.25	0.25	0.71
v/c Ratio	0.91	1.16	0.36		1.00		1.25	1.10		0.68	0.87	1.29
Control Delay	45.9	117.2	13.7		102.8		170.2	92.0		102.2	62.9	159.8
Queue Delay	0.0	0.0	0.0		2.7		0.0	0.3		0.0	0.0	0.0
Total Delay	45.9	117.2	13.7		105.6		170.2	92.4		102.2	62.9	159.8
LOS	D	F	B		F		F	F		F	E	F
Approach Delay		66.6			105.6			112.2			124.9	
Approach LOS		E			F			F			F	

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
2018 Build-Out Phase 2 PM

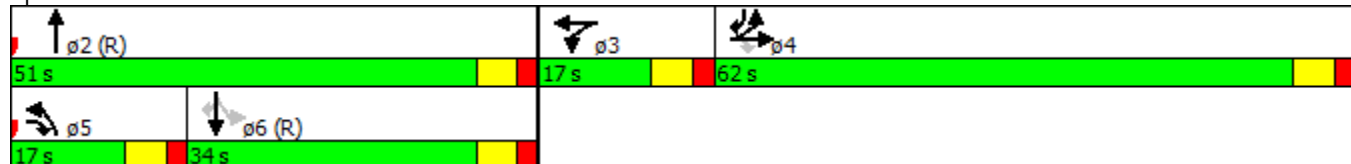


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	636	-983	138		169		-270	-735		25	259	-1586
Queue Length 95th (ft)	#850	#1257	213		#277		m#379	m#874		#94	#416	#1883
Internal Link Dist (ft)		932			258			446			694	
Turn Bay Length (ft)	775						175			100		
Base Capacity (vph)	775	786	1650		378		396	1320		57	834	1019
Starvation Cap Reductn	0	0	0		0		0	107		0	0	0
Spillback Cap Reductn	0	0	26		4		0	0		0	0	0
Storage Cap Reductn	0	0	0		0		0	0		0	0	0
Reduced v/c Ratio	0.91	1.16	0.37		1.01		1.25	1.20		0.68	0.87	1.29

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.29
 Intersection Signal Delay: 100.6
 Intersection LOS: F
 Intersection Capacity Utilization 116.4%
 ICU Level of Service H
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Bull St. & Elmwood Avenue



Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

Bull Street Commons Traffic Study
2018 Build-Out Phase 2 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	196	28	39	275	154	33	1610	48	84	1111	82
Future Volume (vph)	82	196	28	39	275	154	33	1610	48	84	1111	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	50			50			75			75		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.981			0.946			0.996				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3472	0	1770	3348	0	1770	3525	0	1770	3539	1583
Flt Permitted	0.231			0.469			0.196			0.086		
Satd. Flow (perm)	430	3472	0	874	3348	0	365	3525	0	160	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			50			7				91
Link Speed (mph)		30			30			30				30
Link Distance (ft)		937			677			1883				526
Travel Time (s)		21.3			15.4			42.8				12.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.92	0.90
Adj. Flow (vph)	91	218	31	43	306	171	37	1731	53	93	1208	91
Shared Lane Traffic (%)												
Lane Group Flow (vph)	91	249	0	43	477	0	37	1784	0	93	1208	91
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2				6
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	16.0
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	30.0
Total Split (s)	30.0	30.0		30.0	30.0		100.0	100.0		100.0	100.0	100.0
Total Split (%)	23.1%	23.1%		23.1%	23.1%		76.9%	76.9%		76.9%	76.9%	76.9%
Maximum Green (s)	24.0	24.0		24.0	24.0		94.0	94.0		94.0	94.0	94.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	28.0	28.0		28.0	28.0		98.0	98.0		98.0	98.0	98.0
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.75	0.75		0.75	0.75	0.75
v/c Ratio	0.99	0.33		0.23	0.63		0.13	0.67		0.78	0.45	0.07
Control Delay	142.5	42.5		51.9	50.7		5.7	9.5		60.4	12.4	4.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	2.8		0.0	0.4	0.0
Total Delay	142.5	42.5		51.9	50.7		5.7	12.3		60.4	12.8	4.0
LOS	F	D		D	D		A	B		E	B	A
Approach Delay		69.3			50.8			12.2			15.4	
Approach LOS		E			D			B			B	

Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

Bull Street Commons Traffic Study
2018 Build-Out Phase 2 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	77	89		32	190		7	342		67	294	12
Queue Length 95th (ft)	#194	130		72	248		19	406		m#114	m373	m20
Internal Link Dist (ft)		857			597			1803			446	
Turn Bay Length (ft)	150			175			150			150		
Base Capacity (vph)	92	756		188	760		275	2659		120	2667	1215
Starvation Cap Reductn	0	0		0	0		0	0		0	838	0
Spillback Cap Reductn	0	0		0	7		0	734		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.99	0.33		0.23	0.63		0.13	0.93		0.78	0.66	0.07

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 72 (55%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.99
 Intersection Signal Delay: 23.0 Intersection LOS: C
 Intersection Capacity Utilization 99.4% ICU Level of Service F
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Bull St. & Calhoun St.



Lanes, Volumes, Timings
9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Bull Street Commons Traffic Study
2018 Build-Out Phase 2 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	523	146	398	415	51	93	379	896	72	519	41
Future Volume (vph)	42	523	146	398	415	51	93	379	896	72	519	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		800	175		0	225		0	300		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	100			75			75			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.967			0.983				0.850		0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3422	0	3433	3479	0	1770	3539	1583	1770	3498	0
Flt Permitted	0.461			0.950			0.331			0.447		
Satd. Flow (perm)	859	3422	0	3433	3479	0	617	3539	1583	833	3498	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		29			16				655			8
Link Speed (mph)		35			35			35				40
Link Distance (ft)		736			322			498				1949
Travel Time (s)		14.3			6.3			9.7				33.2
Peak Hour Factor	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Adj. Flow (vph)	47	581	162	428	461	57	103	421	943	80	577	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	47	743	0	428	518	0	103	421	943	80	623	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Free	Perm	NA	
Protected Phases		8		7	4			6				2
Permitted Phases	8						6		Free	2		
Detector Phase	8	8		7	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	16.0	16.0		11.0	16.0		16.0	16.0		16.0	16.0	
Minimum Split (s)	30.0	30.0		17.0	30.0		30.0	30.0		30.0	30.0	
Total Split (s)	43.0	43.0		28.0	71.0		59.0	59.0		59.0	59.0	
Total Split (%)	33.1%	33.1%		21.5%	54.6%		45.4%	45.4%		45.4%	45.4%	
Maximum Green (s)	37.0	37.0		22.0	65.0		53.0	53.0		53.0	53.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	36.6	36.6		24.1	62.8		63.2	63.2	130.0	63.2	63.2	
Actuated g/C Ratio	0.28	0.28		0.19	0.48		0.49	0.49	1.00	0.49	0.49	
v/c Ratio	0.19	0.75		0.67	0.31		0.34	0.24	0.60	0.20	0.37	
Control Delay	33.6	42.9		68.2	14.0		18.3	14.9	7.5	21.2	21.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	33.6	42.9		68.2	14.0		18.3	14.9	7.5	21.2	21.0	
LOS	C	D		E	B		B	B	A	C	C	
Approach Delay		42.4			38.5			10.3			21.0	

Lanes, Volumes, Timings
 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

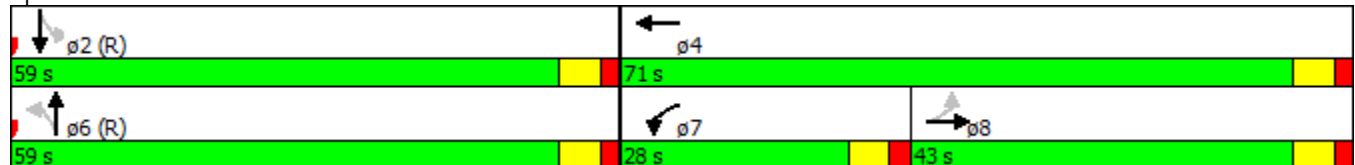


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			B			C	
Queue Length 50th (ft)	31	277		192	96		29	62		274	38	174
Queue Length 95th (ft)	m51	m327		247	131		56	92		663	79	235
Internal Link Dist (ft)		656			242			418			1869	
Turn Bay Length (ft)	225			175			225			300		
Base Capacity (vph)	270	1099		686	1854		300	1721		1583	405	1705
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.17	0.68		0.62	0.28		0.34	0.24		0.60	0.20	0.37

Intersection Summary

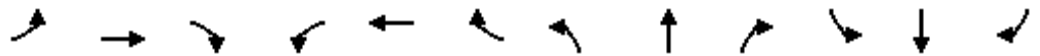
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 95 (73%), Referenced to phase 2:SBTL and 6:NBTL, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 25.6
 Intersection LOS: C
 Intersection Capacity Utilization 72.8%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive



Lanes, Volumes, Timings
10: Harden St./Harden Street Ext & Calhoun St.

Bull Street Commons Traffic Study
2018 Build-Out Phase 2 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	44	235	21	29	11	250	1023	45	56	879	79
Future Volume (vph)	135	44	235	21	29	11	250	1023	45	56	879	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	50		0	0		325	300		200
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	100			25			25			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Frt		0.874			0.959			0.994				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1628	0	1770	1786	0	1770	5055	0	1770	3539	1583
Flt Permitted	0.728			0.198			0.227			0.213		
Satd. Flow (perm)	1356	1628	0	369	1786	0	423	5055	0	397	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		195			12			8				122
Link Speed (mph)		30			35			35				35
Link Distance (ft)		1071			821			1286				340
Travel Time (s)		24.3			16.0			25.1				6.6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	150	49	261	23	32	12	278	1137	50	62	977	88
Shared Lane Traffic (%)												
Lane Group Flow (vph)	150	310	0	23	44	0	278	1187	0	62	977	88
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	1.0	1.0		11.0	11.0		9.0	14.0		9.0	14.0	14.0
Minimum Split (s)	6.5	6.5		30.0	30.0		15.0	30.0		15.0	30.0	30.0
Total Split (s)	37.0	37.0		37.0	37.0		32.0	76.0		17.0	61.0	61.0
Total Split (%)	28.5%	28.5%		28.5%	28.5%		24.6%	58.5%		13.1%	46.9%	46.9%
Maximum Green (s)	31.5	31.5		31.5	31.5		26.0	70.0		11.0	55.0	55.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.5	1.5		1.5	1.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	0.0		0.0	0.0		-3.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	2.5	5.5		5.5	5.5		3.0	3.0		6.0	3.0	3.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	23.2	20.2		20.2	20.2		100.6	89.3		88.1	82.1	82.1
Actuated g/C Ratio	0.18	0.16		0.16	0.16		0.77	0.69		0.68	0.63	0.63
v/c Ratio	0.62	0.74		0.40	0.15		0.56	0.34		0.17	0.44	0.08
Control Delay	51.0	21.5		68.0	35.6		9.0	9.8		4.4	11.3	2.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	51.0	21.5		68.0	35.6		9.0	9.8		4.4	11.3	2.9
LOS	D	C		E	D		A	A		A	B	A
Approach Delay		31.2			46.7			9.7			10.2	
Approach LOS		C			D			A			B	

Lanes, Volumes, Timings
 10: Harden St./Harden Street Ext & Calhoun St.

Bull Street Commons Traffic Study
 2018 Build-Out Phase 2 PM

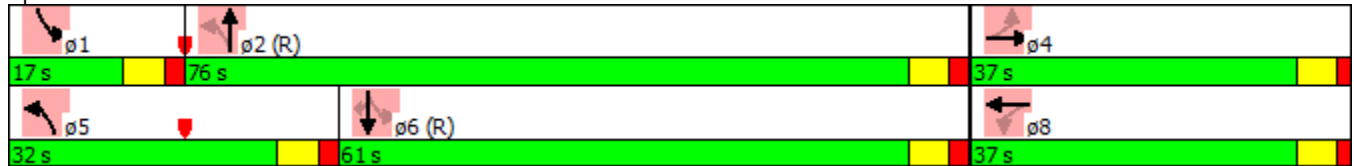


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	123	25		18	24		51	145		0	142	5
Queue Length 95th (ft)	m181	m200		46	55		106	213		m0	401	21
Internal Link Dist (ft)		991			741			1206			260	
Turn Bay Length (ft)	225			50						300		200
Base Capacity (vph)	359	542		89	441		630	3476		391	2235	1044
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.42	0.57		0.26	0.10		0.44	0.34		0.16	0.44	0.08

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 34 (26%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 13.8
 Intersection LOS: B
 Intersection Capacity Utilization 66.8%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Harden St./Harden Street Ext & Calhoun St.



Lanes, Volumes, Timings
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2018 Build-Out Phase 2 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	324	10	5	289	65	16	13	19	53	28	61
Future Volume (vph)	46	324	10	5	289	65	16	13	19	53	28	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	275		0	0		0	300		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	100			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.973			0.947				0.897
Flt Protected	0.950			0.950				0.983		0.950		
Satd. Flow (prot)	1770	1850	0	1770	1812	0	0	1734	0	1770	1671	0
Flt Permitted	0.950			0.950				0.983		0.950		
Satd. Flow (perm)	1770	1850	0	1770	1812	0	0	1734	0	1770	1671	0
Link Speed (mph)		35			30			35				35
Link Distance (ft)		462			1071			385				2969
Travel Time (s)		9.0			24.3			7.5				57.8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	11%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	51	360	11	6	321	72	18	14	21	59	31	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	51	371	0	6	393	0	0	53	0	59	99	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	41.9%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2018 Build-Out Phase 2 PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	324	10	5	289	65	16	13	19	53	28	61
Future Volume (Veh/h)	46	324	10	5	289	65	16	13	19	53	28	61
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	51	360	11	6	321	72	18	14	21	59	31	68
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh		2			2							
Upstream signal (ft)					1071							
pX, platoon unblocked	0.98						0.98	0.98		0.98	0.98	0.98
vC, conflicting volume	393			371			884	872	366	859	842	357
vC1, stage 1 conf vol							468	468		369	369	
vC2, stage 2 conf vol							416	405		490	473	
vCu, unblocked vol	369			371			871	859	366	845	828	333
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			99			96	97	97	87	93	90
cM capacity (veh/h)	1164			1188			401	441	680	441	460	694
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total	51	371	6	393	53	59	99					
Volume Left	51	0	6	0	18	59	0					
Volume Right	0	11	0	72	21	0	68					
cSH	1164	1700	1188	1700	493	441	599					
Volume to Capacity	0.04	0.22	0.01	0.23	0.11	0.13	0.17					
Queue Length 95th (ft)	3	0	0	0	9	11	15					
Control Delay (s)	8.2	0.0	8.0	0.0	13.2	14.4	12.2					
Lane LOS	A		A		B	B	B					
Approach Delay (s)	1.0		0.1		13.2	13.0						
Approach LOS					B	B						
Intersection Summary												
Average Delay			3.1									
Intersection Capacity Utilization			41.9%		ICU Level of Service			A				
Analysis Period (min)			15									

Lanes, Volumes, Timings
12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2018 Build-Out Phase 2 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (vph)	1	470	40	101	496	10	32	2	110	37	12	28
Future Volume (vph)	1	470	40	101	496	10	32	2	110	37	12	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		225	50		0
Storage Lanes	0		0	0		0	1		1	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.990			0.998			0.852				0.894
Flt Protected					0.992		0.950			0.950		
Satd. Flow (prot)	0	1836	0	0	1844	0	1703	1587	0	1770	1665	0
Flt Permitted					0.992		0.950			0.950		
Satd. Flow (perm)	0	1836	0	0	1844	0	1703	1587	0	1770	1665	0
Link Speed (mph)		35			35			35				35
Link Distance (ft)		949			210			2969				473
Travel Time (s)		18.5			4.1			57.8				9.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90
Heavy Vehicles (%)	2%	2%	8%	2%	2%	2%	6%	2%	2%	2%	2%	2%
Adj. Flow (vph)	1	522	44	112	551	11	36	2	122	41	13	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	567	0	0	674	0	36	124	0	41	44	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	78.2%
Analysis Period (min)	15
	ICU Level of Service D












HCM Unsignalized Intersection Capacity Analysis
 12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
 2018 Build-Out Phase 2 PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↗	↘		↗	↘	
Traffic Volume (veh/h)	1	470	40	101	496	10	32	2	110	37	12	28
Future Volume (Veh/h)	1	470	40	101	496	10	32	2	110	37	12	28
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90
Hourly flow rate (vph)	1	522	44	112	551	11	36	2	122	41	13	31
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					1217							
pX, platoon unblocked	0.86						0.86	0.86		0.86	0.86	0.86
vC, conflicting volume	562			566			1364	1332	544	1450	1348	556
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	406			566			1341	1304	544	1441	1323	400
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			89			58	98	77	38	89	94
cM capacity (veh/h)	988			1006			86	122	539	66	119	558
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	567	674	36	124	41	44						
Volume Left	1	112	36	0	41	0						
Volume Right	44	11	0	122	0	31						
cSH	988	1006	86	511	66	267						
Volume to Capacity	0.00	0.11	0.42	0.24	0.62	0.17						
Queue Length 95th (ft)	0	9	42	24	66	15						
Control Delay (s)	0.0	2.8	74.0	14.3	124.1	21.1						
Lane LOS	A	A	F	B	F	C						
Approach Delay (s)	0.0	2.8	27.7		70.8							
Approach LOS			D		F							
Intersection Summary												
Average Delay			8.3									
Intersection Capacity Utilization			78.2%		ICU Level of Service				D			
Analysis Period (min)			15									

Lanes, Volumes, Timings
13: Harden Street Ext & Slighs Ave.

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	81	207	1081	67	125	956
Future Volume (vph)	81	207	1081	67	125	956
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		50	100	
Storage Lanes	1	0		1	1	
Taper Length (ft)	25				50	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	0.903			0.850		
Flt Protected	0.986				0.950	
Satd. Flow (prot)	1659	0	3539	1495	1736	3539
Flt Permitted	0.986				0.159	
Satd. Flow (perm)	1659	0	3539	1495	290	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	100			20		
Link Speed (mph)	30		35			35
Link Distance (ft)	359		2647			498
Travel Time (s)	8.2		51.6			9.7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.91
Heavy Vehicles (%)	2%	2%	2%	8%	4%	2%
Adj. Flow (vph)	90	230	1201	74	139	1051
Shared Lane Traffic (%)						
Lane Group Flow (vph)	320	0	1201	74	139	1051
Turn Type	Perm		NA	Perm	pm+pt	NA
Protected Phases			6		5	2
Permitted Phases	4			6	2	
Detector Phase	4		6	6	5	2
Switch Phase						
Minimum Initial (s)	16.0		16.0	16.0	11.0	16.0
Minimum Split (s)	30.0		30.0	30.0	17.0	30.0
Total Split (s)	40.0		71.0	71.0	19.0	90.0
Total Split (%)	30.8%		54.6%	54.6%	14.6%	69.2%
Maximum Green (s)	34.0		65.0	65.0	13.0	84.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0		-4.0	-2.0	-4.0	-4.0
Total Lost Time (s)	2.0		2.0	4.0	2.0	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		C-Max	C-Max	None	C-Max
Act Effct Green (s)	28.1		80.9	78.9	97.9	97.9
Actuated g/C Ratio	0.22		0.62	0.61	0.75	0.75
v/c Ratio	0.73		0.55	0.08	0.36	0.39
Control Delay	41.8		14.7	5.6	12.4	6.4
Queue Delay	0.0		0.0	0.0	0.0	0.1
Total Delay	41.8		14.7	5.6	12.4	6.5
LOS	D		B	A	B	A
Approach Delay	41.8		14.2			7.2

Lanes, Volumes, Timings
 13: Harden Street Ext & Slighs Ave.

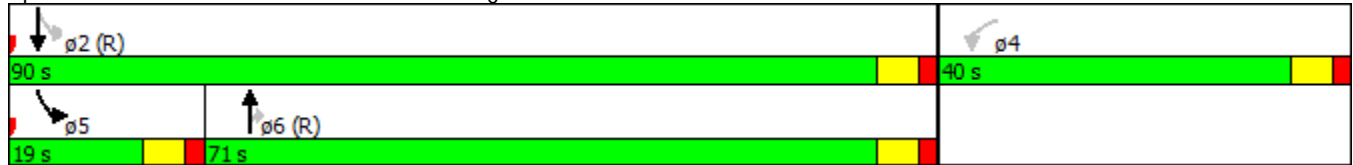


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	D		B		A	
Queue Length 50th (ft)	177		341	19	33	110
Queue Length 95th (ft)	261		487	40	m69	181
Internal Link Dist (ft)	279		2567			418
Turn Bay Length (ft)				50	100	
Base Capacity (vph)	555		2201	914	407	2666
Starvation Cap Reductn	0		0	0	0	617
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.58		0.55	0.08	0.34	0.51

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 86 (66%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 14.4
 Intersection LOS: B
 Intersection Capacity Utilization 66.3%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 13: Harden Street Ext & Slighs Ave.



Lanes, Volumes, Timings
14: Colonial Drive & Farrow Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Lane Configurations		↗↗	↖	↑↑	↑↑		
Traffic Volume (vph)	0	175	265	1116	608	25	
Future Volume (vph)	0	175	265	1116	608	25	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0	330	550			0	
Storage Lanes	0	1	1			0	
Taper Length (ft)	25		125				
Lane Util. Factor	1.00	0.88	1.00	0.95	0.95	0.95	
Frt		0.850			0.994		
Flt Protected			0.950				
Satd. Flow (prot)	0	2787	1770	3539	3518	0	
Flt Permitted			0.950				
Satd. Flow (perm)	0	2787	1770	3539	3518	0	
Right Turn on Red		Yes				No	
Satd. Flow (RTOR)		311					
Link Speed (mph)	35			35	35		
Link Distance (ft)	1114			676	2010		
Travel Time (s)	21.7			13.2	39.2		
Peak Hour Factor	0.90	0.90	0.96	0.90	0.92	0.90	
Adj. Flow (vph)	0	194	276	1240	661	28	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	194	276	1240	689	0	
Turn Type		Over	Prot	NA	NA		
Protected Phases		8	8	8 6	2	6	
Permitted Phases				8			
Detector Phase		8	8	8 6	2		
Switch Phase							
Minimum Initial (s)		16.0	16.0		16.0	11.0	
Minimum Split (s)		30.0	30.0		30.0	30.0	
Total Split (s)		32.0	32.0		33.0	33.0	
Total Split (%)		49.2%	49.2%		50.8%	51%	
Maximum Green (s)		26.0	26.0		27.0	27.5	
Yellow Time (s)		4.0	4.0		4.0	4.0	
All-Red Time (s)		2.0	2.0		2.0	1.5	
Lost Time Adjust (s)		-3.0	-3.0		-4.0		
Total Lost Time (s)		3.0	3.0		2.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0	3.0		3.0	3.0	
Recall Mode		None	None		C-Max	C-Max	
Act Effct Green (s)		24.5	24.5	65.0	35.5		
Actuated g/C Ratio		0.38	0.38	1.00	0.55		
v/c Ratio		0.16	0.41	0.35	0.36		
Control Delay		0.4	11.0	0.2	11.9		
Queue Delay		0.0	0.0	0.0	0.0		
Total Delay		0.4	11.0	0.2	11.9		
LOS		A	B	A	B		
Approach Delay				2.2	11.9		
Approach LOS				A	B		

Lanes, Volumes, Timings
 14: Colonial Drive & Farrow Road

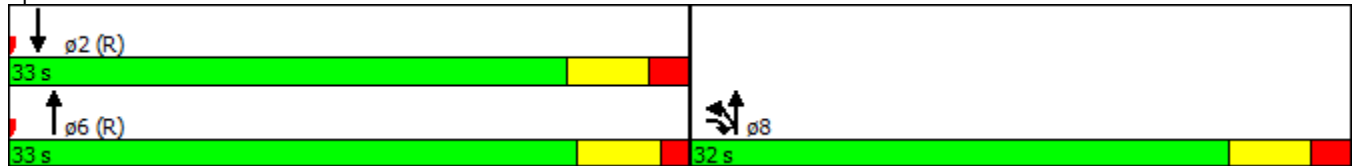


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Queue Length 50th (ft)		0	56	0	104		
Queue Length 95th (ft)		2	104	0	m155		
Internal Link Dist (ft)	1034			596	1930		
Turn Bay Length (ft)		330	550				
Base Capacity (vph)		1415	789	3539	1922		
Starvation Cap Reductn		0	0	0	0		
Spillback Cap Reductn		0	0	0	0		
Storage Cap Reductn		0	0	0	0		
Reduced v/c Ratio		0.14	0.35	0.35	0.36		

Intersection Summary

Area Type: Other
 Cycle Length: 65
 Actuated Cycle Length: 65
 Offset: 42 (65%), Referenced to phase 2:SBT and 6:NBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.41
 Intersection Signal Delay: 4.8
 Intersection LOS: A
 Intersection Capacity Utilization 39.0%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: Colonial Drive & Farrow Road



Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
2018 Build-Out Phase 2 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	542	12	187	510	380	0	1107	286	282	505	49
Future Volume (vph)	90	542	12	187	510	380	0	1107	286	282	505	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		0	300		0	0		225	200		0
Storage Lanes	1		0	2		1	0		1	1		0
Taper Length (ft)	125			100			25			125		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.997				0.850			0.850		0.987	
Flt Protected	0.950			0.950						0.950		
Satd. Flow (prot)	1770	3529	0	3433	3539	1583	0	3539	1583	1770	3493	0
Flt Permitted	0.439			0.950						0.072		
Satd. Flow (perm)	818	3529	0	3433	3539	1583	0	3539	1583	134	3493	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				17			143		13	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1548			1446			2010			864	
Travel Time (s)		30.2			28.2			39.2			16.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	0.94	0.90	0.90
Adj. Flow (vph)	100	602	13	208	567	422	0	1230	298	300	561	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	100	615	0	208	567	422	0	1230	298	300	615	0
Turn Type	Perm	NA		Prot	NA	pm+ov		NA	Free	pm+pt	NA	
Protected Phases		4		3	8	1		2		1	6	
Permitted Phases	4					8			Free	6		
Detector Phase	4	4		3	8	1		2		1	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0	5.0		15.0		5.0	15.0	
Minimum Split (s)	30.0	30.0		21.0	41.0	17.0		41.0		17.0	30.0	
Total Split (s)	30.0	30.0		21.0	51.0	25.0		54.0		25.0	79.0	
Total Split (%)	23.1%	23.1%		16.2%	39.2%	19.2%		41.5%		19.2%	60.8%	
Maximum Green (s)	25.0	25.0		16.0	46.0	20.0		49.0		20.0	74.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5		3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5	1.5		1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0		-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead		Lead		Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Recall Mode	None	None		None	None	None		C-Min		None	C-Min	
Walk Time (s)					18.0			18.0				
Flash Dont Walk (s)					5.0			5.0				
Pedestrian Calls (#/hr)					0			0				
Act Effct Green (s)	26.0	26.0		16.2	46.2	70.4		51.6	130.0	75.8	75.8	
Actuated g/C Ratio	0.20	0.20		0.12	0.36	0.54		0.40	1.00	0.58	0.58	
v/c Ratio	0.61	0.87		0.49	0.45	0.49		0.88	0.19	0.90	0.30	
Control Delay	64.6	64.2		57.2	33.4	19.7		45.3	0.3	81.9	8.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	64.6	64.2		57.2	33.4	19.7		45.3	0.3	81.9	8.6	

Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
2018 Build-Out Phase 2 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	E		E	C	B		D	A	F	A	
Approach Delay		64.2			32.7			36.5			32.6	
Approach LOS		E			C			D			C	
Queue Length 50th (ft)	77	263		85	190	199		505	0	231	82	
Queue Length 95th (ft)	#151	#363		125	243	286		#647	0	#375	105	
Internal Link Dist (ft)		1468			1366			1930			784	
Turn Bay Length (ft)	175			300					225	200		
Base Capacity (vph)	166	721		448	1279	875		1404	1583	342	2041	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.60	0.85		0.46	0.44	0.48		0.88	0.19	0.88	0.30	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 39.2
 Intersection LOS: D
 Intersection Capacity Utilization 87.4%
 ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 15: Farrow Road & Beltline Blvd



Lanes, Volumes, Timings
 16: Farrow Road & 277 NB RAMPS

Bull Street Commons Traffic Study
 2018 Build-Out Phase 2 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	153	0	15	0	0	0	0	864	734	64	798	0
Future Volume (vph)	153	0	15	0	0	0	0	864	734	64	798	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	0		0	0		0	250		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			25			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.850						0.932				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1770	1583	0	0	0	0	0	3299	0	1770	3539	0
Flt Permitted	0.950									0.102		
Satd. Flow (perm)	1770	1583	0	0	0	0	0	3299	0	190	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		236						440				
Link Speed (mph)		35			35			35				35
Link Distance (ft)		827			779			864				694
Travel Time (s)		16.1			15.2			16.8				13.5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.92	0.90
Adj. Flow (vph)	170	0	17	0	0	0	0	960	798	71	867	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	170	17	0	0	0	0	0	1758	0	71	867	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						6			2	
Permitted Phases	4									2		
Detector Phase	4	4						6		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0						10.0		10.0	10.0	
Minimum Split (s)	30.0	30.0						30.0		30.0	30.0	
Total Split (s)	30.0	30.0						100.0		100.0	100.0	
Total Split (%)	23.1%	23.1%						76.9%		76.9%	76.9%	
Maximum Green (s)	25.0	25.0						95.0		95.0	95.0	
Yellow Time (s)	3.5	3.5						3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5						1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0						-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0						4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Recall Mode	None	None						C-Max		C-Max	C-Max	
Act Effct Green (s)	18.7	18.7						103.3		103.3	103.3	
Actuated g/C Ratio	0.14	0.14						0.79		0.79	0.79	
v/c Ratio	0.67	0.04						0.65		0.47	0.31	
Control Delay	65.1	0.2						3.1		23.7	7.0	
Queue Delay	0.0	0.0						0.4		0.0	0.0	
Total Delay	65.1	0.2						3.6		23.7	7.0	
LOS	E	A						A		C	A	
Approach Delay		59.2						3.6			8.2	
Approach LOS		E						A			A	

Lanes, Volumes, Timings
 16: Farrow Road & 277 NB RAMPS

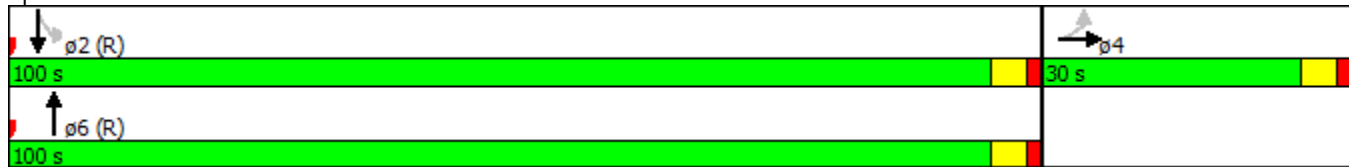


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	138	0						37		32	141	
Queue Length 95th (ft)	205	0						63		94	158	
Internal Link Dist (ft)		747			699			784			614	
Turn Bay Length (ft)	300									250		
Base Capacity (vph)	354	505						2711		150	2812	
Starvation Cap Reductn	0	0						430		0	0	
Spillback Cap Reductn	0	0						0		0	0	
Storage Cap Reductn	0	0						0		0	0	
Reduced v/c Ratio	0.48	0.03						0.77		0.47	0.31	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 8.7
 Intersection Capacity Utilization 68.3%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service C

Splits and Phases: 16: Farrow Road & 277 NB RAMPS



Lanes, Volumes, Timings
 17: Farrow Road & Lorick Avenue /277 SB Ramps

Bull Street Commons Traffic Study
 2018 Build-Out Phase 2 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	0	39	322	16	47	24	994	0	0	497	140
Future Volume (vph)	33	0	39	322	16	47	24	994	0	0	497	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	125		0	200		0	0		0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (ft)	25			150			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850		0.889							0.967
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1770	0	1583	1770	1656	0	1770	3539	0	0	3422	0
Flt Permitted	0.711			0.950			0.353					
Satd. Flow (perm)	1324	0	1583	1770	1656	0	658	3539	0	0	3422	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			43		52							42
Link Speed (mph)		35			35			35				35
Link Distance (ft)		467			1041			694				870
Travel Time (s)		9.1			20.3			13.5				16.9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	37	0	43	358	18	52	27	1104	0	0	552	156
Shared Lane Traffic (%)												
Lane Group Flow (vph)	37	0	43	358	70	0	27	1104	0	0	708	0
Turn Type	Perm		Perm	Perm	NA		Perm	NA			NA	
Protected Phases					4			2				6
Permitted Phases	8		8	4			2					
Detector Phase	8		8	4	4		2	2				6
Switch Phase												
Minimum Initial (s)	10.0		10.0	10.0	10.0		10.0	10.0				10.0
Minimum Split (s)	30.0		30.0	30.0	30.0		30.0	30.0				30.0
Total Split (s)	58.0		58.0	58.0	58.0		72.0	72.0				72.0
Total Split (%)	44.6%		44.6%	44.6%	44.6%		55.4%	55.4%				55.4%
Maximum Green (s)	53.0		53.0	53.0	53.0		67.0	67.0				67.0
Yellow Time (s)	3.5		3.5	3.5	3.5		3.5	3.5				3.5
All-Red Time (s)	1.5		1.5	1.5	1.5		1.5	1.5				1.5
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0		-1.0	-1.0				-1.0
Total Lost Time (s)	4.0		4.0	4.0	4.0		4.0	4.0				4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0				3.0
Recall Mode	None		None	None	None		C-Max	C-Max				C-Max
Act Effct Green (s)	33.5		33.5	33.5	33.5		88.5	88.5				88.5
Actuated g/C Ratio	0.26		0.26	0.26	0.26		0.68	0.68				0.68
v/c Ratio	0.11		0.10	0.79	0.15		0.06	0.46				0.30
Control Delay	34.5		9.3	56.8	12.9		9.9	10.7				8.9
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.2				0.0
Total Delay	34.5		9.3	56.8	12.9		9.9	10.9				8.9
LOS	C		A	E	B		A	B				A
Approach Delay					49.7			10.9				8.9
Approach LOS					D			B				A

Lanes, Volumes, Timings
 17: Farrow Road & Lorick Avenue /277 SB Ramps

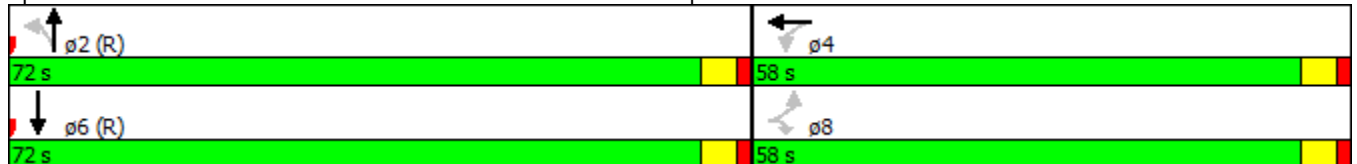


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	24		0	282	11		6	178			108	
Queue Length 95th (ft)	48		27	359	45		m14	301			174	
Internal Link Dist (ft)		387			961			614			790	
Turn Bay Length (ft)				125			200					
Base Capacity (vph)	549		682	735	718		447	2409			2343	
Starvation Cap Reductn	0		0	0	0		0	494			0	
Spillback Cap Reductn	0		0	0	0		0	0			0	
Storage Cap Reductn	0		0	0	0		0	0			0	
Reduced v/c Ratio	0.07		0.06	0.49	0.10		0.06	0.58			0.30	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 17.7
 Intersection LOS: B
 Intersection Capacity Utilization 54.4%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 17: Farrow Road & Lorick Avenue /277 SB Ramps



Lanes, Volumes, Timings
18: Assembly St./Assembly & Elmwood Avenue

Bull Street Commons Traffic Study
2018 Build-Out Phase 2 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1726	268	343	1988	7	1021	8	583	0	0	1
Future Volume (vph)	0	1726	268	343	1988	7	1021	8	583	0	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		275	150		0	0		0	0		0
Storage Lanes	1		1	1		0	2		1	0		0
Taper Length (ft)	150			75			25			25		
Lane Util. Factor	1.00	0.86	0.86	0.97	0.91	0.91	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850		0.999				0.850		0.865	
Flt Protected				0.950			0.950					
Satd. Flow (prot)	1863	4806	1362	3433	5080	0	3433	1770	1504	0	1611	0
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	1863	4806	1362	3433	5080	0	3433	1770	1504	0	1611	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			270		1				95		126	
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		2522			509			585			432	
Travel Time (s)		57.3			11.6			13.3			8.4	
Peak Hour Factor	0.90	0.94	0.90	0.90	0.92	0.90	0.93	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1836	298	381	2161	8	1098	9	648	0	0	1
Shared Lane Traffic (%)			0%						0%			
Lane Group Flow (vph)	0	1836	298	381	2169	0	1098	9	648	0	1	0
Turn Type	Perm	NA	pm+ov	Prot	NA		Split	NA	pm+ov		NA	
Protected Phases		2	3	1	6		3	3	1		4	
Permitted Phases	2		2						3	4		
Detector Phase	2	2	3	1	6		3	3	1	4	4	
Switch Phase												
Minimum Initial (s)	16.0	16.0	11.0	11.0	16.0		11.0	11.0	11.0	4.5	4.5	
Minimum Split (s)	30.0	30.0	17.0	17.0	30.0		17.0	17.0	17.0	10.0	10.0	
Total Split (s)	54.0	54.0	44.0	22.0	76.0		44.0	44.0	22.0	10.0	10.0	
Total Split (%)	41.5%	41.5%	33.8%	16.9%	58.5%		33.8%	33.8%	16.9%	7.7%	7.7%	
Maximum Green (s)	48.0	48.0	38.0	16.0	70.0		38.0	38.0	16.0	4.5	4.5	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	1.5	1.5	
Lost Time Adjust (s)	0.0	-4.0	-4.0	-4.0	-4.0		-4.0	0.0	-4.0		-1.5	
Total Lost Time (s)	6.0	2.0	2.0	2.0	2.0		2.0	6.0	2.0		4.0	
Lead/Lag	Lead	Lead	Lead	Lag			Lead	Lead	Lag	Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max	None	None	C-Max		None	None	None	None	None	
Act Effct Green (s)		60.0	103.6	20.0	82.0		42.0	38.0	64.0		6.0	
Actuated g/C Ratio		0.46	0.80	0.15	0.63		0.32	0.29	0.49		0.05	
v/c Ratio		0.83	0.26	0.72	0.68		0.99	0.02	0.82		0.01	
Control Delay		34.9	1.0	54.1	10.6		68.6	33.0	34.1		0.0	
Queue Delay		0.0	0.0	0.0	1.1		0.0	0.0	0.0		0.0	
Total Delay		34.9	1.0	54.1	11.7		68.6	33.0	34.1		0.0	
LOS		C	A	D	B		E	C	C		A	
Approach Delay		30.2			18.1			55.6			0.0	
Approach LOS		C			B			E			A	

Lanes, Volumes, Timings
 18: Assembly St./Assembly & Elmwood Avenue

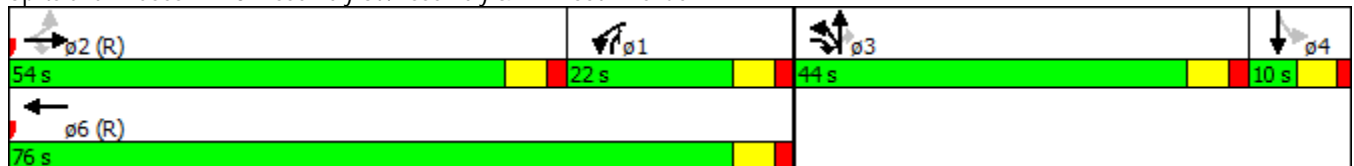


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		496	4	171	156		473	5	418		0	
Queue Length 95th (ft)		#695	20	m210	469		#624	20	617		0	
Internal Link Dist (ft)		2442			429			505			352	
Turn Bay Length (ft)			275	150								
Base Capacity (vph)		2218	1140	528	3204		1109	517	788		194	
Starvation Cap Reductn		0	0	0	717		0	0	0		0	
Spillback Cap Reductn		0	0	0	0		0	0	0		0	
Storage Cap Reductn		0	0	0	0		0	0	0		0	
Reduced v/c Ratio		0.83	0.26	0.72	0.87		0.99	0.02	0.82		0.01	

Intersection Summary

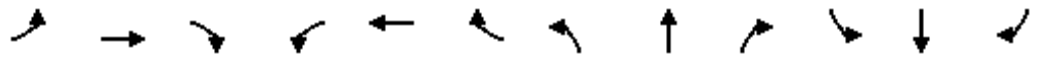
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 28 (22%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.99
 Intersection Signal Delay: 32.3 Intersection LOS: C
 Intersection Capacity Utilization 101.0% ICU Level of Service G
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Assembly St./Assembly & Elmwood Avenue



Lanes, Volumes, Timings
19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
2018 Build-Out Phase 2 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↑↑↑	↗	↖	↑↑↑		↖	↑↑	↗	↖	↑↑	↗
Traffic Volume (vph)	497	1675	72	18	1601	97	144	476	59	161	201	479
Future Volume (vph)	497	1675	72	18	1601	97	144	476	59	161	201	479
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		175	150		0	200		0	175		425
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	75			75			100			75		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850		0.991				0.850		0.939	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	1770	5040	0	1770	3539	1583	1770	3183	1441
Flt Permitted	0.950			0.127			0.319			0.166		
Satd. Flow (perm)	3433	5085	1583	237	5040	0	594	3539	1583	309	3183	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			80		9				126		98	76
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		509			563			693			3655	
Travel Time (s)		11.6			12.8			15.8			83.1	
Peak Hour Factor	0.91	0.97	0.90	0.90	0.95	0.90	0.90	0.90	0.90	0.90	0.95	0.90
Adj. Flow (vph)	546	1727	80	20	1685	108	160	529	66	179	212	532
Shared Lane Traffic (%)												27%
Lane Group Flow (vph)	546	1727	80	20	1793	0	160	529	66	179	356	388
Turn Type	Prot	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	pm+ov
Protected Phases	5	2	3		6		3	8		7	4	5
Permitted Phases			2	6			8		8	4		4
Detector Phase	5	2	3	6	6		3	8	8	7	4	5
Switch Phase												
Minimum Initial (s)	11.0	16.0	11.0	16.0	16.0		11.0	16.0	16.0	11.0	16.0	11.0
Minimum Split (s)	17.0	30.0	17.0	30.0	30.0		17.0	30.0	30.0	17.0	30.0	17.0
Total Split (s)	28.0	83.0	17.0	55.0	55.0		17.0	30.0	30.0	17.0	30.0	28.0
Total Split (%)	21.5%	63.8%	13.1%	42.3%	42.3%		13.1%	23.1%	23.1%	13.1%	23.1%	21.5%
Maximum Green (s)	22.0	77.0	11.0	49.0	49.0		11.0	24.0	24.0	11.0	24.0	22.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0	-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lead	Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	C-Max	C-Max		None	None	None	None	None	None
Act Effct Green (s)	25.8	82.4	99.4	54.6	54.6		41.6	26.6	26.6	41.6	26.6	54.4
Actuated g/C Ratio	0.20	0.63	0.76	0.42	0.42		0.32	0.20	0.20	0.32	0.20	0.42
v/c Ratio	0.80	0.54	0.07	0.20	0.84		0.49	0.73	0.16	0.67	0.49	0.60
Control Delay	66.0	11.1	0.3	20.2	24.4		36.8	54.8	0.8	44.7	34.8	27.3
Queue Delay	0.0	0.3	0.0	0.0	0.5		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.0	11.4	0.3	20.2	24.9		36.8	54.8	0.8	44.7	34.8	27.3
LOS	E	B	A	C	C		D	D	A	D	C	C
Approach Delay		23.7			24.9			46.2			33.6	
Approach LOS		C			C			D			C	

Lanes, Volumes, Timings
19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
2018 Build-Out Phase 2 PM

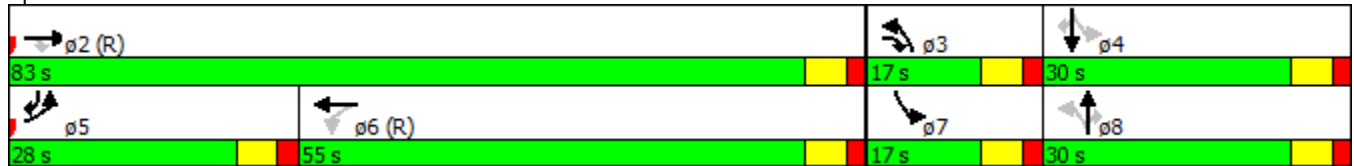


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	246	161	0	6	515		97	218	0	109	103	216
Queue Length 95th (ft)	m298	286	m0	m12	201		154	282	0	172	156	335
Internal Link Dist (ft)		429			483			613			3575	
Turn Bay Length (ft)	175		175	150			200			175		425
Base Capacity (vph)	686	3222	1229	99	2122		325	762	439	267	762	649
Starvation Cap Reductn	0	743	0	0	36		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	88		0	0	0	0	1	1
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.70	0.07	0.20	0.88		0.49	0.69	0.15	0.67	0.47	0.60

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 120 (92%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 28.5
 Intersection LOS: C
 Intersection Capacity Utilization 83.1%
 ICU Level of Service E
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Main St. & Elmwood Avenue



Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	1551	85	37	1650	13	88	258	214	8	44	13
Future Volume (vph)	10	1551	85	37	1650	13	88	258	214	8	44	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	75		0	200		0	75		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			50			100			50		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.992			0.999				0.850		0.971	
Flt Protected	0.950			0.950			0.950				0.994	
Satd. Flow (prot)	1770	5045	0	1770	5080	0	1770	1863	1583	0	3416	0
Flt Permitted	0.098			0.094			0.704				0.888	
Satd. Flow (perm)	183	5045	0	175	5080	0	1311	1863	1583	0	3052	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			2				35		14	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		563			1012			3133			1095	
Travel Time (s)		12.8			23.0			71.2			24.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	1723	94	41	1774	14	98	287	238	9	49	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	1817	0	41	1788	0	98	287	238	0	72	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		6	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	90.0	90.0		90.0	90.0		40.0	40.0	40.0	40.0	40.0	
Total Split (%)	69.2%	69.2%		69.2%	69.2%		30.8%	30.8%	30.8%	30.8%	30.8%	
Maximum Green (s)	84.0	84.0		84.0	84.0		34.0	34.0	34.0	34.0	34.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0		-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0		2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None	None	None	None	
Act Effct Green (s)	96.2	96.2		96.2	96.2		29.8	29.8	29.8		29.8	
Actuated g/C Ratio	0.74	0.74		0.74	0.74		0.23	0.23	0.23		0.23	
v/c Ratio	0.08	0.49		0.32	0.48		0.33	0.67	0.61		0.10	
Control Delay	4.2	4.3		10.9	7.8		43.1	53.1	44.1		29.9	
Queue Delay	0.0	0.1		0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	4.2	4.5		10.9	7.8		43.1	53.1	44.1		29.9	
LOS	A	A		B	A		D	D	D		C	
Approach Delay		4.5			7.9			48.1			29.9	
Approach LOS		A			A			D			C	

Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	1	187		10	186		69	221	154		20	
Queue Length 95th (ft)	m5	323		m10	m183		114	296	226		38	
Internal Link Dist (ft)		483			932			3053			1015	
Turn Bay Length (ft)	200			75			200					
Base Capacity (vph)	135	3737		129	3760		383	544	487		902	
Starvation Cap Reductn	0	744		0	0		0	0	0		0	
Spillback Cap Reductn	0	0		0	178		0	0	0		0	
Storage Cap Reductn	0	0		0	0		0	0	0		0	
Reduced v/c Ratio	0.08	0.61		0.32	0.50		0.26	0.53	0.49		0.08	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 18 (14%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 12.6
 Intersection LOS: B
 Intersection Capacity Utilization 68.5%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 20: Sumter St. & Elmwood Avenue



Lanes, Volumes, Timings
21: Barnwell St. & Calhoun St.

Bull Street Commons Traffic Study
2018 Build-Out Phase 2 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	337	11	5	290	47	31	9	30	32	5	37
Future Volume (vph)	58	337	11	5	290	47	31	9	30	32	5	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	225		0	125		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.979			0.885				0.869
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1853	0	1770	1824	0	1770	1649	0	1770	1619	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1853	0	1770	1824	0	1770	1649	0	1770	1619	0
Link Speed (mph)		35			35			35				35
Link Distance (ft)		592			462			1358				932
Travel Time (s)		11.5			9.0			26.5				18.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	64	374	12	6	322	52	34	10	33	36	6	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	64	386	0	6	374	0	34	43	0	36	47	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	40.2%
Analysis Period (min)	15
	ICU Level of Service A













HCM Unsignalized Intersection Capacity Analysis
21: Barnwell St. & Calhoun St.

Bull Street Commons Traffic Study
2018 Build-Out Phase 2 PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR				
Lane Configurations																
Traffic Volume (veh/h)	58	337	11	5	290	47	31	9	30	32	5	37				
Future Volume (Veh/h)	58	337	11	5	290	47	31	9	30	32	5	37				
Sign Control		Free			Free			Stop			Stop					
Grade		0%			0%			0%			0%					
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90				
Hourly flow rate (vph)	64	374	12	6	322	52	34	10	33	36	6	41				
Pedestrians																
Lane Width (ft)																
Walking Speed (ft/s)																
Percent Blockage																
Right turn flare (veh)																
Median type	TWLTL				TWLTL											
Median storage veh	2				2											
Upstream signal (ft)																
pX, platoon unblocked																
vC, conflicting volume	374		386		886		894		380		900		874		348	
vC1, stage 1 conf vol					508		508				360		360			
vC2, stage 2 conf vol					378		386				540		514			
vCu, unblocked vol	374		386		886		894		380		900		874		348	
tC, single (s)	4.1		4.1		7.1		6.5		6.2		7.1		6.5		6.2	
tC, 2 stage (s)					6.1		5.5				6.1		5.5			
tF (s)	2.2		2.2		3.5		4.0		3.3		3.5		4.0		3.3	
p0 queue free %	95		99		92		98		95		91		99		94	
cM capacity (veh/h)	1184		1172		418		428		667		412		443		695	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2								
Volume Total	64	386	6	374	34	43	36	47								
Volume Left	64	0	6	0	34	0	36	0								
Volume Right	0	12	0	52	0	33	0	41								
cSH	1184	1700	1172	1700	418	590	412	648								
Volume to Capacity	0.05	0.23	0.01	0.22	0.08	0.07	0.09	0.07								
Queue Length 95th (ft)	4	0	0	0	7	6	7	6								
Control Delay (s)	8.2	0.0	8.1	0.0	14.4	11.6	14.6	11.0								
Lane LOS	A		A		B	B	B	B								
Approach Delay (s)	1.2		0.1		12.8		12.5									
Approach LOS					B		B									
Intersection Summary																
Average Delay			2.6													
Intersection Capacity Utilization			40.2%		ICU Level of Service				A							
Analysis Period (min)			15													

Lanes, Volumes, Timings
23: Bull St. & Access #3

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	55	23	2649	72	60	1832
Future Volume (vph)	55	23	2649	72	60	1832
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		75	0	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	5085	1583	1770	5085
Flt Permitted	0.950				0.040	
Satd. Flow (perm)	1770	1583	5085	1583	75	5085
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		26		21		
Link Speed (mph)	35		40			40
Link Distance (ft)	871		213			242
Travel Time (s)	17.0		3.6			4.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	61	26	2943	80	67	2036
Shared Lane Traffic (%)						
Lane Group Flow (vph)	61	26	2943	80	67	2036
Turn Type	Prot	Perm	NA	Perm	D.P+P	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	2	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	6.0	6.0	11.0	11.0	6.0	11.0
Minimum Split (s)	30.0	30.0	30.0	30.0	17.0	30.0
Total Split (s)	30.0	30.0	83.0	83.0	17.0	100.0
Total Split (%)	23.1%	23.1%	63.8%	63.8%	13.1%	76.9%
Maximum Green (s)	24.0	24.0	77.0	77.0	11.0	94.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)	11.8	11.8	102.6	102.6	109.4	113.4
Actuated g/C Ratio	0.09	0.09	0.79	0.79	0.84	0.87
v/c Ratio	0.38	0.16	0.73	0.06	0.37	0.46
Control Delay	61.5	20.0	11.7	4.3	33.5	0.6
Queue Delay	0.5	0.0	0.3	0.0	0.0	0.1
Total Delay	62.0	20.0	12.0	4.3	33.5	0.7
LOS	E	B	B	A	C	A
Approach Delay	49.4		11.8			1.8
Approach LOS	D		B			A



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Length 50th (ft)	49	0	516	13	13	13
Queue Length 95th (ft)	93	29	m634	m15	m61	22
Internal Link Dist (ft)	791		133			162
Turn Bay Length (ft)				75		
Base Capacity (vph)	354	337	4012	1253	234	4434
Starvation Cap Reductn	0	0	421	0	0	934
Spillback Cap Reductn	118	0	243	0	0	352
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.08	0.82	0.06	0.29	0.58

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBSB and 6:SBT, Start of 1st Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 8.4
 Intersection LOS: A
 Intersection Capacity Utilization 62.8%
 ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 23: Bull St. & Access #3



Lanes, Volumes, Timings
25: Access #5 & Colonial Drive



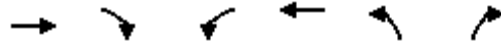
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑		↑
Traffic Volume (vph)	337	21	0	502	0	16
Future Volume (vph)	337	21	0	502	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		75	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.992					0.865
Flt Protected						
Satd. Flow (prot)	1848	0	0	1863	0	1611
Flt Permitted						
Satd. Flow (perm)	1848	0	0	1863	0	1611
Link Speed (mph)	35			35	35	
Link Distance (ft)	278			296	299	
Travel Time (s)	5.4			5.8	5.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	374	23	0	558	0	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	397	0	0	558	0	18
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	29.8%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
25: Access #5 & Colonial Drive

Bull Street Commons Traffic Study
2018 Build-Out Phase 2 PM



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↻		↻
Traffic Volume (veh/h)	337	21	0	502	0	16
Future Volume (Veh/h)	337	21	0	502	0	16
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	374	23	0	558	0	18
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		TWLTL			
Median storage (veh)	2					
Upstream signal (ft)	278					
pX, platoon unblocked						
vC, conflicting volume			397		944	386
vC1, stage 1 conf vol					386	
vC2, stage 2 conf vol					558	
vCu, unblocked vol			397		944	386
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	97
cM capacity (veh/h)			1162		497	662
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	397	558	18			
Volume Left	0	0	0			
Volume Right	23	0	18			
cSH	1700	1700	662			
Volume to Capacity	0.23	0.33	0.03			
Queue Length 95th (ft)	0	0	2			
Control Delay (s)	0.0	0.0	10.6			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	10.6			
Approach LOS			B			
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			29.8%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
 26: Access #6/Mental Health Dwy. & Colonial Drive

Bull Street Commons Traffic Study
 2018 Build-Out Phase 2 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	336	12	25	450	1	19	0	16	128	0	33
Future Volume (vph)	5	336	12	25	450	1	19	0	16	128	0	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		0	0		0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995						0.850				0.972
Flt Protected	0.950			0.950			0.950					0.962
Satd. Flow (prot)	1770	1853	0	1770	1863	0	1770	1583	0	0	1742	0
Flt Permitted	0.950			0.950			0.950					0.962
Satd. Flow (perm)	1770	1853	0	1770	1863	0	1770	1583	0	0	1742	0
Link Speed (mph)		35			35			30				30
Link Distance (ft)		296			446			350				357
Travel Time (s)		5.8			8.7			8.0				8.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	373	13	28	500	1	21	0	18	142	0	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	386	0	28	501	0	21	18	0	0	179	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	46.2%
Analysis Period (min)	15
	ICU Level of Service A

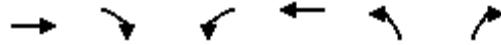
HCM Unsignalized Intersection Capacity Analysis
 26: Access #6/Mental Health Dwy. & Colonial Drive

Bull Street Commons Traffic Study
 2018 Build-Out Phase 2 PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	336	12	25	450	1	19	0	16	128	0	33
Future Volume (Veh/h)	5	336	12	25	450	1	19	0	16	128	0	33
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	373	13	28	500	1	21	0	18	142	0	37
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	TWLTL				None							
Median storage veh	2											
Upstream signal (ft)	574											
pX, platoon unblocked												
vC, conflicting volume	501			386			984	948	380	960	954	500
vC1, stage 1 conf vol							392	392		556	556	
vC2, stage 2 conf vol							593	557		403	398	
vCu, unblocked vol	501			386			984	948	380	960	954	500
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			95	100	97	66	100	94
cM capacity (veh/h)	1063			1172			394	431	667	420	427	570
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total	6	386	28	501	21	18	179					
Volume Left	6	0	28	0	21	0	142					
Volume Right	0	13	0	1	0	18	37					
cSH	1063	1700	1172	1700	394	667	445					
Volume to Capacity	0.01	0.23	0.02	0.29	0.05	0.03	0.40					
Queue Length 95th (ft)	0	0	2	0	4	2	48					
Control Delay (s)	8.4	0.0	8.1	0.0	14.6	10.5	18.4					
Lane LOS	A		A		B	B	C					
Approach Delay (s)	0.1		0.4		12.8		18.4					
Approach LOS					B		C					
Intersection Summary												
Average Delay			3.6									
Intersection Capacity Utilization			46.2%		ICU Level of Service			A				
Analysis Period (min)			15									

Lanes, Volumes, Timings
27: Boyce Street & Colonial Drive



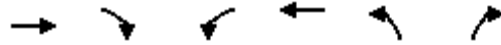
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	427	54	143	413	63	84
Future Volume (vph)	427	54	143	413	63	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		75	100		0	0
Storage Lanes		0	0		1	1
Taper Length (ft)			100		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.985					0.850
Flt Protected				0.987	0.950	
Satd. Flow (prot)	1835	0	0	1839	1770	1583
Flt Permitted				0.987	0.950	
Satd. Flow (perm)	1835	0	0	1839	1770	1583
Link Speed (mph)	35			35	35	
Link Distance (ft)	446			949	1007	
Travel Time (s)	8.7			18.5	19.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	474	60	159	459	70	93
Shared Lane Traffic (%)						
Lane Group Flow (vph)	534	0	0	618	70	93
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	68.9% ICU Level of Service C
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 27: Boyce Street & Colonial Drive

Bull Street Commons Traffic Study
 2018 Build-Out Phase 2 PM



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	←	←
Traffic Volume (veh/h)	427	54	143	413	63	84
Future Volume (Veh/h)	427	54	143	413	63	84
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	474	60	159	459	70	93
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	1020					
pX, platoon unblocked						
vC, conflicting volume			534		1281	504
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			534		1281	504
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			85		55	84
cM capacity (veh/h)			1034		155	568
Direction, Lane #	EB 1	WB 1	NB 1	NB 2		
Volume Total	534	618	70	93		
Volume Left	0	159	70	0		
Volume Right	60	0	0	93		
cSH	1700	1034	155	568		
Volume to Capacity	0.31	0.15	0.45	0.16		
Queue Length 95th (ft)	0	14	52	15		
Control Delay (s)	0.0	3.8	46.2	12.6		
Lane LOS		A	E	B		
Approach Delay (s)	0.0	3.8	27.0			
Approach LOS			D			
Intersection Summary						
Average Delay			5.1			
Intersection Capacity Utilization			68.9%	ICU Level of Service	C	
Analysis Period (min)	15					

2018 Build Conditions - IMPROVED
Phase II
The Commons at BullStreet

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
2017 Build Out Phase 2 AM Improved



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1125	121	862	11	43	9	347	587	97	44	1273	1185
Future Volume (vph)	1125	121	862	11	43	9	347	587	97	44	1273	1185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	775		250	125		0	175		0	100		0
Storage Lanes	1		1	1		0	1		0	1		1
Taper Length (ft)	50			50			125			50		
Lane Util. Factor	0.91	0.91	0.88	0.95	0.95	0.95	0.97	0.95	0.95	1.00	0.91	0.91
Frt			0.850		0.979			0.979				0.850
Flt Protected	0.950	0.961			0.992		0.950			0.950		
Satd. Flow (prot)	1610	3258	2787	0	3437	0	3433	3465	0	1770	3390	1441
Flt Permitted	0.950	0.961			0.992		0.950			0.363		
Satd. Flow (perm)	1610	3258	2787	0	3437	0	3433	3465	0	676	3390	1441
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30				40
Link Distance (ft)		1012			379			526				712
Travel Time (s)		23.0			8.6			12.0				12.1
Peak Hour Factor	0.97	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.90	0.94	0.97
Adj. Flow (vph)	1160	134	958	12	48	10	381	652	108	49	1354	1222
Shared Lane Traffic (%)	50%											0%
Lane Group Flow (vph)	580	714	958	0	70	0	381	760	0	49	1354	1222
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Perm	NA	Free
Protected Phases	4	4	5	3	3		5	2			6	
Permitted Phases			4							6		Free
Detector Phase	4	4	5	3	3		5	2		6	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0	11.0	5.0	5.0		11.0	16.0		16.0	16.0	
Minimum Split (s)	30.0	30.0	17.0	12.0	12.0		17.0	30.0		30.0	30.0	
Total Split (s)	47.0	47.0	17.0	12.0	12.0		17.0	71.0		54.0	54.0	
Total Split (%)	36.2%	36.2%	13.1%	9.2%	9.2%		13.1%	54.6%		41.5%	41.5%	
Maximum Green (s)	41.0	41.0	11.0	6.0	6.0		11.0	65.0		48.0	48.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0	-4.0		-4.0		-4.0	-4.0		-4.0	-4.0	
Total Lost Time (s)	2.0	2.0	2.0		2.0		2.0	2.0		2.0	2.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead		Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		C-Max	C-Max	
Act Effct Green (s)	45.0	45.0	62.0		10.0		15.0	71.4		54.4	54.4	130.0
Actuated g/C Ratio	0.35	0.35	0.48		0.08		0.12	0.55		0.42	0.42	1.00
v/c Ratio	1.04	1.00dl	0.72		0.27		0.96	0.40		0.17	0.95	0.85
Control Delay	81.5	28.7	27.3		59.3		86.4	18.1		25.7	44.8	15.8
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.2		0.0	0.0	0.0
Total Delay	81.5	28.7	27.3		59.3		86.4	18.3		25.7	44.8	15.8
LOS	F	C	C		E		F	B		C	D	B
Approach Delay		41.7			59.3			41.0			30.9	
Approach LOS		D			E			D			C	

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
2017 Build Out Phase 2 AM Improved

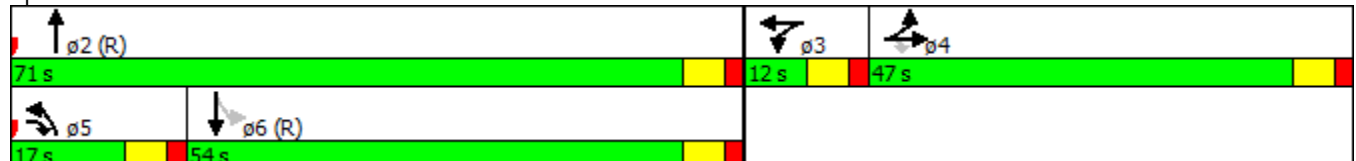


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	~589	285	416		30		169	225		15	492	507
Queue Length 95th (ft)	#842	338	522		55		#271	281		m36	#785	441
Internal Link Dist (ft)		932			299			446			632	
Turn Bay Length (ft)	775		250				175			100		
Base Capacity (vph)	557	1127	1329		264		396	1903		282	1418	1441
Starvation Cap Reductn	0	0	0		0		0	473		0	0	0
Spillback Cap Reductn	0	0	11		0		0	0		0	0	0
Storage Cap Reductn	0	0	0		0		0	0		0	0	0
Reduced v/c Ratio	1.04	0.63	0.73		0.27		0.96	0.53		0.17	0.95	0.85

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 126 (97%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.04
 Intersection Signal Delay: 37.1
 Intersection LOS: D
 Intersection Capacity Utilization 105.5%
 ICU Level of Service G
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 6: Bull St. & Elmwood Avenue



Lanes, Volumes, Timings
12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2017 Build Out Phase 2 AM Improved



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	338	39	107	463	55	8	10	29	6	4	2
Future Volume (vph)	12	338	39	107	463	55	8	10	29	6	4	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		225	50		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.985			0.984			0.888				0.950
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1835	0	1770	1833	0	1770	1654	0	1770	1770	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1835	0	1770	1833	0	1770	1654	0	1770	1770	0
Link Speed (mph)		35			35			35				35
Link Distance (ft)		980			161			3014				569
Travel Time (s)		19.1			3.1			58.7				11.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	13	376	43	119	503	61	9	11	32	7	4	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	419	0	119	564	0	9	43	0	7	6	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 47.7% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study

2017 Build Out Phase 2 AM Improved



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	338	39	107	463	55	8	10	29	6	4	2
Future Volume (Veh/h)	12	338	39	107	463	55	8	10	29	6	4	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	13	376	43	119	503	61	9	11	32	7	4	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					1174							
pX, platoon unblocked	0.87						0.87	0.87		0.87	0.87	0.87
vC, conflicting volume	564			419			1168	1226	398	1211	1216	534
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	420			419			1117	1183	398	1166	1173	385
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			90			94	92	95	94	97	100
cM capacity (veh/h)	987			1140			142	145	652	121	147	575
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	13	419	119	564	9	43	7	6				
Volume Left	13	0	119	0	9	0	7	0				
Volume Right	0	43	0	61	0	32	0	2				
cSH	987	1700	1140	1700	142	344	121	196				
Volume to Capacity	0.01	0.25	0.10	0.33	0.06	0.12	0.06	0.03				
Queue Length 95th (ft)	1	0	9	0	5	11	5	2				
Control Delay (s)	8.7	0.0	8.5	0.0	32.0	16.9	36.6	24.0				
Lane LOS	A		A		D	C	E	C				
Approach Delay (s)	0.3		1.5		19.6		30.8					
Approach LOS					C		D					
Intersection Summary												
Average Delay			2.2									
Intersection Capacity Utilization			47.7%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
2018 Build-Out Phase 2 PM - Improved



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1376	190	537	96	106	137	450	1217	91	35	651	1180
Future Volume (vph)	1376	190	537	96	106	137	450	1217	91	35	651	1180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	775		250	125		0	175		0	100		0
Storage Lanes	1		1	1		0	1		0	1		1
Taper Length (ft)	50			50			125			50		
Lane Util. Factor	0.91	0.91	0.88	0.95	0.95	0.95	0.97	0.91	0.91	1.00	0.95	1.00
Frt			0.850		0.940			0.990				0.850
Flt Protected	0.950	0.963			0.986		0.950			0.950		
Satd. Flow (prot)	1610	3265	2787	0	3280	0	3433	5034	0	1770	3539	1583
Flt Permitted	0.950	0.963			0.986		0.950			0.133		
Satd. Flow (perm)	1610	3265	2787	0	3280	0	3433	5034	0	248	3539	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30				40
Link Distance (ft)		1012			338			526				774
Travel Time (s)		23.0			7.7			12.0				13.2
Peak Hour Factor	0.98	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1404	211	597	107	118	152	495	1352	101	39	723	1311
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	702	913	597	0	377	0	495	1453	0	39	723	1311
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Perm	NA	Free
Protected Phases	4	4	5	3	3		5	2			6	
Permitted Phases			4							6		Free
Detector Phase	4	4	5	3	3		5	2		6	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0	11.0	11.0	11.0		11.0	16.0		16.0	16.0	
Minimum Split (s)	30.0	30.0	17.0	17.0	17.0		17.0	30.0		30.0	30.0	
Total Split (s)	59.0	59.0	21.0	18.0	18.0		21.0	53.0		32.0	32.0	
Total Split (%)	45.4%	45.4%	16.2%	13.8%	13.8%		16.2%	40.8%		24.6%	24.6%	
Maximum Green (s)	53.0	53.0	15.0	12.0	12.0		15.0	47.0		26.0	26.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0	-4.0		-4.0		-4.0	-4.0		-4.0	-4.0	
Total Lost Time (s)	2.0	2.0	2.0		2.0		2.0	2.0		2.0	2.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead		Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		C-Max	C-Max	
Act Effct Green (s)	57.0	57.0	78.0		16.0		19.0	51.0		30.0	30.0	130.0
Actuated g/C Ratio	0.44	0.44	0.60		0.12		0.15	0.39		0.23	0.23	1.00
v/c Ratio	1.00	0.95dl	0.36		0.94		0.99	0.74		0.68	0.89	0.83
Control Delay	66.0	27.3	14.5		87.6		82.4	35.0		99.9	62.2	5.1
Queue Delay	0.0	0.0	0.0		0.0		0.0	1.1		0.0	0.0	0.0
Total Delay	66.0	27.3	14.5		87.6		82.4	36.1		99.9	62.2	5.1
LOS	E	C	B		F		F	D		F	E	A
Approach Delay		36.1			87.6			47.8			26.8	
Approach LOS		D			F			D			C	

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
2018 Build-Out Phase 2 PM - Improved

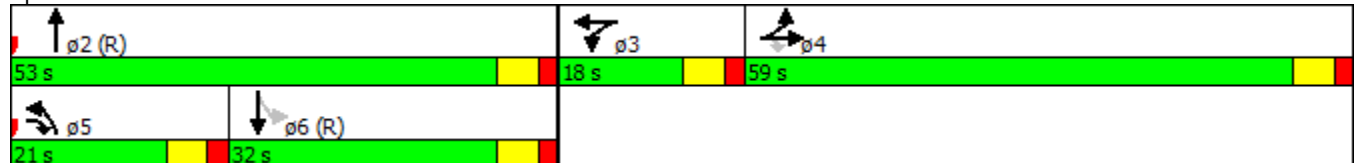


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	687	340	148		168		219	396		30	312	0
Queue Length 95th (ft)	#957	450	221		#266		m#330	m452		#97	#416	0
Internal Link Dist (ft)		932			258			446			694	
Turn Bay Length (ft)	775		250				175			100		
Base Capacity (vph)	705	1431	1672		403		501	1974		57	816	1583
Starvation Cap Reductn	0	0	0		0		0	280		0	0	0
Spillback Cap Reductn	0	0	34		0		0	0		0	0	0
Storage Cap Reductn	0	0	0		0		0	0		0	0	0
Reduced v/c Ratio	1.00	0.64	0.36		0.94		0.99	0.86		0.68	0.89	0.83

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.00
 Intersection Signal Delay: 39.6 Intersection LOS: D
 Intersection Capacity Utilization 100.4% ICU Level of Service G
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 6: Bull St. & Elmwood Avenue



Lanes, Volumes, Timings
12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2018 Build-Out Phase 2 PM - Improved



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	470	40	101	496	10	32	2	110	37	12	28
Future Volume (vph)	1	470	40	101	496	10	32	2	110	37	12	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		225	50		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.988			0.997			0.852				0.894
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1832	0	1770	1857	0	1703	1587	0	1770	1665	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1832	0	1770	1857	0	1703	1587	0	1770	1665	0
Link Speed (mph)		35			35			35				35
Link Distance (ft)		949			210			2969				473
Travel Time (s)		18.5			4.1			57.8				9.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90
Heavy Vehicles (%)	2%	2%	8%	2%	2%	2%	6%	2%	2%	2%	2%	2%
Adj. Flow (vph)	1	522	44	112	551	11	36	2	122	41	13	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	566	0	112	562	0	36	124	0	41	44	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	51.5%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
 2018 Build-Out Phase 2 PM - Improved



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	470	40	101	496	10	32	2	110	37	12	28
Future Volume (Veh/h)	1	470	40	101	496	10	32	2	110	37	12	28
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90
Hourly flow rate (vph)	1	522	44	112	551	11	36	2	122	41	13	31
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					1217							
pX, platoon unblocked	0.88						0.88	0.88		0.88	0.88	0.88
vC, conflicting volume	562			566			1358	1332	544	1428	1348	556
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	435			566			1339	1309	544	1418	1328	429
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			89			59	98	77	42	89	94
cM capacity (veh/h)	991			1006			89	124	539	70	121	552
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	1	566	112	562	36	124	41	44				
Volume Left	1	0	112	0	36	0	41	0				
Volume Right	0	44	0	11	0	122	0	31				
cSH	991	1700	1006	1700	89	511	70	269				
Volume to Capacity	0.00	0.33	0.11	0.33	0.41	0.24	0.58	0.16				
Queue Length 95th (ft)	0	0	9	0	41	24	62	14				
Control Delay (s)	8.6	0.0	9.0	0.0	70.7	14.3	111.1	21.0				
Lane LOS	A		A		F	B	F	C				
Approach Delay (s)	0.0		1.5		27.0		64.4					
Approach LOS					D		F					
Intersection Summary												
Average Delay			7.3									
Intersection Capacity Utilization			51.5%		ICU Level of Service				A			
Analysis Period (min)			15									

2020 Background Conditions

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2020 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗	↗	↖	↗	↖
Traffic Volume (vph)	9	4	3	166	20	39	25	649	586	443	2426	21
Future Volume (vph)	9	4	3	166	20	39	25	649	586	443	2426	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		200	675		0	175		0	200		250
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100			75			50			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt		0.936			0.901				0.850		0.999	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3313	0	3433	1668	0	1770	3539	1583	1770	5080	0
Flt Permitted	0.950			0.950			0.062			0.290		
Satd. Flow (perm)	1770	3313	0	3433	1668	0	115	3539	1583	540	5080	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			43				460		2	
Link Speed (mph)		30			40			40			45	
Link Distance (ft)		552			905			1206			1658	
Travel Time (s)		12.5			15.4			20.6			25.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.92	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	10	4	3	184	22	43	28	698	651	492	2637	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	7	0	184	65	0	28	698	651	492	2660	0
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	4	4		3	3			2	3	1	6	
Permitted Phases							2		2	6		
Detector Phase	4	4		3	3		2	2	3	1	6	
Switch Phase												
Minimum Initial (s)	14.0	14.0		11.0	11.0		16.0	16.0	11.0	11.0	16.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		30.0	30.0	20.0	17.0	30.0	
Total Split (s)	20.0	20.0		26.0	26.0		45.0	45.0	26.0	39.0	84.0	
Total Split (%)	15.4%	15.4%		20.0%	20.0%		34.6%	34.6%	20.0%	30.0%	64.6%	
Maximum Green (s)	14.0	14.0		20.0	20.0		39.0	39.0	20.0	33.0	78.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag	Lead	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	None	None	C-Max	
Act Effct Green (s)	18.0	18.0		18.2	18.2		68.6	68.6	88.8	99.8	99.8	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.53	0.53	0.68	0.77	0.77	
v/c Ratio	0.04	0.02		0.38	0.24		0.47	0.37	0.53	0.71	0.68	
Control Delay	49.1	39.0		39.2	14.7		43.8	8.6	8.4	14.7	10.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	49.1	39.0		39.2	14.7		43.8	8.6	8.4	14.7	10.8	
LOS	D	D		D	B		D	A	A	B	B	
Approach Delay		44.9			32.8			9.2			11.4	

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	D			C			A			B		
Queue Length 50th (ft)	7	1		0	18		5	60	99	77	230	
Queue Length 95th (ft)	25	9		98	40		#82	205	313	303	639	
Internal Link Dist (ft)	472			825			1126			1578		
Turn Bay Length (ft)	100			675			175			200		
Base Capacity (vph)	245	461		633	343		60	1867	1277	764	3900	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.04	0.02		0.29	0.19		0.47	0.37	0.51	0.64	0.68	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 12.0
 Intersection LOS: B
 Intersection Capacity Utilization 82.5%
 ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Bull St. & Harden St. Ext.



Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

Bull Street Commons Traffic Study
2020 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	2	13	17	12	8	17	1295	83	71	2523	2
Future Volume (vph)	6	2	13	17	12	8	17	1295	83	71	2523	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	200		0	200		0	150		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			100			100			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Frt		0.869			0.939				0.850			
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1619	0	1770	1749	0	1770	5085	1583	1770	5085	0
Flt Permitted	0.743			0.276			0.042			0.163		
Satd. Flow (perm)	1384	1619	0	514	1749	0	78	5085	1583	304	5085	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		602			715			682			1206	
Travel Time (s)		13.7			16.3			11.6			20.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.94	0.90
Adj. Flow (vph)	7	2	14	19	13	9	19	1378	92	79	2684	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	16	0	19	22	0	19	1378	92	79	2686	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			3			2			6	
Permitted Phases	4			3			2		2	6		
Detector Phase	4	4		3	3		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	25.0	25.0		25.0	25.0		80.0	80.0	80.0	80.0	80.0	
Total Split (%)	19.2%	19.2%		19.2%	19.2%		61.5%	61.5%	61.5%	61.5%	61.5%	
Maximum Green (s)	19.0	19.0		19.0	19.0		74.0	74.0	74.0	74.0	74.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Act Effct Green (s)	20.0	20.0		20.9	20.9		101.5	101.5	101.5	101.5	101.5	
Actuated g/C Ratio	0.15	0.15		0.16	0.16		0.78	0.78	0.78	0.78	0.78	
v/c Ratio	0.03	0.06		0.23	0.08		0.31	0.35	0.07	0.33	0.68	
Control Delay	47.5	47.9		54.7	46.6		30.1	7.3	8.2	15.6	12.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	47.5	47.9		54.7	46.6		30.1	7.3	8.2	15.6	12.1	
LOS	D	D		D	D		C	A	A	B	B	
Approach Delay		47.8			50.4			7.7			12.2	
Approach LOS		D			D			A			B	

Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	5	12		14	16		3	86	15	26	614	
Queue Length 95th (ft)	20	34		40	41		m15	183	50	m52	457	
Internal Link Dist (ft)		522			635			602			1126	
Turn Bay Length (ft)	150			200			200			150		
Base Capacity (vph)	244	286		90	309		61	3969	1235	237	3969	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	89	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.03	0.06		0.21	0.07		0.31	0.35	0.07	0.33	0.69	

Intersection Summary

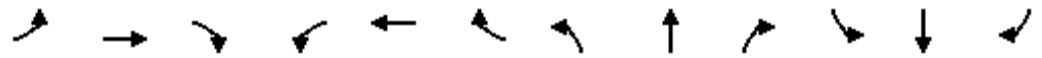
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 113 (87%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 11.2 Intersection LOS: B
 Intersection Capacity Utilization 79.0% ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bull St. & Confederate Ave.



Lanes, Volumes, Timings
3: Bull St. & Colonial Drive

Bull Street Commons Traffic Study
2020 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗	↖	↔			↑↑↑		↘	↑↑↑	
Traffic Volume (vph)	0	0	6	217	1	35	0	1387	405	61	2389	11
Future Volume (vph)	0	0	6	217	1	35	0	1387	405	61	2389	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	150		0	0		0	200		0
Storage Lanes	0		1	1		0	0		0	1		0
Taper Length (ft)	25			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.865		0.962			0.966				0.999
Flt Protected				0.950	0.964					0.950		
Satd. Flow (prot)	0	0	1611	1681	1641	0	0	4912	0	1770	5080	0
Flt Permitted				0.950	0.964					0.093		
Satd. Flow (perm)	0	0	1611	1681	1641	0	0	4912	0	173	5080	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)			25		12			163				
Link Speed (mph)		35			35			40				40
Link Distance (ft)		440			298			171				682
Travel Time (s)		8.6			5.8			2.9				11.6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.96	0.90	0.93	0.90
Adj. Flow (vph)	0	0	7	241	1	39	0	1460	422	68	2569	12
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	0	0	7	128	153	0	0	1882	0	68	2581	0
Turn Type			Perm	Perm	NA			NA		Perm	NA	
Protected Phases					8			2				6
Permitted Phases			4	8						6		
Detector Phase			4	8	8			2		6		6
Switch Phase												
Minimum Initial (s)			16.0	16.0	16.0			16.0		16.0		16.0
Minimum Split (s)			30.0	30.0	30.0			30.0		30.0		30.0
Total Split (s)			30.0	30.0	30.0			100.0		100.0		100.0
Total Split (%)			23.1%	23.1%	23.1%			76.9%		76.9%		76.9%
Maximum Green (s)			24.0	24.0	24.0			94.0		94.0		94.0
Yellow Time (s)			4.0	4.0	4.0			4.0		4.0		4.0
All-Red Time (s)			2.0	2.0	2.0			2.0		2.0		2.0
Lost Time Adjust (s)			-4.0	-4.0	-4.0			-4.0		-4.0		-4.0
Total Lost Time (s)			2.0	2.0	2.0			2.0		2.0		2.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)			3.0	3.0	3.0			3.0		3.0		3.0
Recall Mode			None	None	None			C-Max		C-Max		C-Max
Act Effct Green (s)			22.1	22.1	22.1			103.9		103.9		103.9
Actuated g/C Ratio			0.17	0.17	0.17			0.80		0.80		0.80
v/c Ratio			0.02	0.45	0.53			0.48		0.49		0.64
Control Delay			0.2	54.8	53.3			4.2		15.2		3.6
Queue Delay			0.0	0.0	0.0			0.0		0.0		0.8
Total Delay			0.2	54.8	53.3			4.2		15.2		4.4
LOS			A	D	D			A		B		A
Approach Delay					54.0			4.2				4.7
Approach LOS					D			A				A

Lanes, Volumes, Timings
3: Bull St. & Colonial Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)			0	97	107			91		0	1	
Queue Length 95th (ft)			1	135	149			87		m44	176	
Internal Link Dist (ft)		360			218			91			602	
Turn Bay Length (ft)				150						200		
Base Capacity (vph)			366	362	362			3957		138	4058	
Starvation Cap Reductn			0	0	0			125		0	1031	
Spillback Cap Reductn			0	0	0			0		0	0	
Storage Cap Reductn			0	0	0			0		0	0	
Reduced v/c Ratio			0.02	0.35	0.42			0.49		0.49	0.85	

Intersection Summary

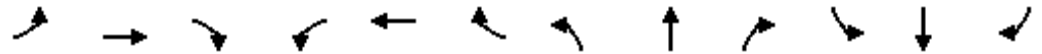
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 7.4
 Intersection Capacity Utilization 83.1%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service E
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Bull St. & Colonial Drive



Lanes, Volumes, Timings
4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2020 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗		↑↑↑			↑↑↑	
Traffic Volume (vph)	0	0	5	0	0	8	0	1752	23	0	2569	6
Future Volume (vph)	0	0	5	0	0	8	0	1752	23	0	2569	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	50		0
Storage Lanes	0		1	0		1	0		0	0		0
Taper Length (ft)	25			25			75			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.865			0.865		0.998				
Flt Protected												
Satd. Flow (prot)	0	0	1611	0	0	1611	0	5075	0	0	5085	0
Flt Permitted												
Satd. Flow (perm)	0	0	1611	0	0	1611	0	5075	0	0	5085	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		341			529			220			301	
Travel Time (s)		6.6			10.3			3.8			5.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.97	0.90
Adj. Flow (vph)	0	0	6	0	0	9	0	1844	26	0	2648	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	6	0	0	9	0	1870	0	0	2655	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	59.8%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2020 Background AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗		↑↑↑			↑↑↑	
Traffic Volume (veh/h)	0	0	5	0	0	8	0	1752	23	0	2569	6
Future Volume (Veh/h)	0	0	5	0	0	8	0	1752	23	0	2569	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.97	0.90
Hourly flow rate (vph)	0	0	6	0	0	9	0	1844	26	0	2648	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)								220			472	
pX, platoon unblocked	0.86	0.86	0.78	0.86	0.86	0.85	0.78			0.85		
vC, conflicting volume	3275	4522	886	2746	4512	628	2655			1870		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1926	3379	0	1308	3368	0	2149			1422		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	100	100	99	100			100		
cM capacity (veh/h)	34	6	851	100	7	926	194			406		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	6	9	738	738	395	1059	1059	537				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	6	9	0	0	26	0	0	7				
cSH	851	926	1700	1700	1700	1700	1700	1700				
Volume to Capacity	0.01	0.01	0.43	0.43	0.23	0.62	0.62	0.32				
Queue Length 95th (ft)	1	1	0	0	0	0	0	0				
Control Delay (s)	9.3	8.9	0.0	0.0	0.0	0.0	0.0	0.0				
Lane LOS	A	A										
Approach Delay (s)	9.3	8.9	0.0			0.0						
Approach LOS	A	A										
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization			59.8%		ICU Level of Service					B		
Analysis Period (min)			15									

Lanes, Volumes, Timings
5: Bull St. & Jefferson Street



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	18	1	1771	2587	10
Future Volume (vph)	0	18	1	1771	2587	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	175			0
Storage Lanes	0	1	1			0
Taper Length (ft)	25		100			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Frt		0.865			0.999	
Flt Protected			0.950			
Satd. Flow (prot)	0	1611	1770	5085	5080	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	1611	1770	5085	5080	0
Link Speed (mph)	35			40	40	
Link Distance (ft)	410			712	223	
Travel Time (s)	8.0			12.1	3.8	
Peak Hour Factor	0.90	0.90	0.90	0.94	0.97	0.90
Adj. Flow (vph)	0	20	1	1884	2667	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	20	1	1884	2678	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	60.2%
Analysis Period (min)	15
	ICU Level of Service B

HCM Unsignalized Intersection Capacity Analysis
 5: Bull St. & Jefferson Street



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↖	↑↑↑	↑↑↑	↘
Traffic Volume (veh/h)	0	18	1	1771	2587	10
Future Volume (Veh/h)	0	18	1	1771	2587	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.94	0.97	0.90
Hourly flow rate (vph)	0	20	1	1884	2667	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				712	223	
pX, platoon unblocked	0.85	0.82	0.82			
vC, conflicting volume	3302	894	2678			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2579	96	2274			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	99			
cM capacity (veh/h)	18	771	181			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	20	1	628	628	628	1067	1067	544
Volume Left	0	1	0	0	0	0	0	0
Volume Right	20	0	0	0	0	0	0	11
cSH	771	181	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.03	0.01	0.37	0.37	0.37	0.63	0.63	0.32
Queue Length 95th (ft)	2	0	0	0	0	0	0	0
Control Delay (s)	9.8	25.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	D						
Approach Delay (s)	9.8	0.0				0.0		
Approach LOS	A							

Intersection Summary		
Average Delay		0.0
Intersection Capacity Utilization	60.2%	ICU Level of Service
Analysis Period (min)	15	B

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1168	124	897	11	44	9	361	610	100	45	1324	1231
Future Volume (vph)	1168	124	897	11	44	9	361	610	100	45	1324	1231
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	775		250	125		0	175		0	100		0
Storage Lanes	1		1	1		0	1		0	1		1
Taper Length (ft)	50			50			125			50		
Lane Util. Factor	0.91	0.91	0.88	0.95	0.95	0.95	0.97	0.91	0.91	1.00	0.95	1.00
Frt			0.850		0.979			0.979				0.850
Flt Protected	0.950	0.961			0.992		0.950			0.950		
Satd. Flow (prot)	1610	3258	2787	0	3437	0	3433	4979	0	1770	3539	1583
Flt Permitted	0.950	0.961			0.992		0.950			0.341		
Satd. Flow (perm)	1610	3258	2787	0	3437	0	3433	4979	0	635	3539	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			40	
Link Distance (ft)		1012			379			526			712	
Travel Time (s)		23.0			8.6			12.0			12.1	
Peak Hour Factor	0.97	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.90	0.94	0.97
Adj. Flow (vph)	1204	138	997	12	49	10	397	678	111	50	1409	1269
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	602	740	997	0	71	0	397	789	0	50	1409	1269
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Perm	NA	Free
Protected Phases	4	4	5	3	3		5	2			6	
Permitted Phases			4							6		Free
Detector Phase	4	4	5	3	3		5	2		6	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0	11.0	5.0	5.0		11.0	16.0		16.0	16.0	
Minimum Split (s)	30.0	30.0	17.0	12.0	12.0		17.0	30.0		30.0	30.0	
Total Split (s)	48.0	48.0	17.0	12.0	12.0		17.0	70.0		53.0	53.0	
Total Split (%)	36.9%	36.9%	13.1%	9.2%	9.2%		13.1%	53.8%		40.8%	40.8%	
Maximum Green (s)	42.0	42.0	11.0	6.0	6.0		11.0	64.0		47.0	47.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0	-4.0		-4.0		-4.0	-4.0		-4.0	-4.0	
Total Lost Time (s)	2.0	2.0	2.0		2.0		2.0	2.0		2.0	2.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead		Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		C-Max	C-Max	
Act Effct Green (s)	46.0	46.0	63.0		10.0		15.0	70.4		53.4	53.4	130.0
Actuated g/C Ratio	0.35	0.35	0.48		0.08		0.12	0.54		0.41	0.41	1.00
v/c Ratio	1.06	1.01dl	0.74		0.27		1.00	0.29		0.19	0.97	0.80
Control Delay	85.2	28.0	27.2		59.4		95.8	16.6		27.8	48.2	11.4
Queue Delay	0.0	0.0	0.4		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	85.2	28.0	27.6		59.4		95.8	16.6		27.8	48.2	11.4
LOS	F	C	C		E		F	B		C	D	B
Approach Delay		42.5			59.4			43.1			30.7	
Approach LOS		D			E			D			C	

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

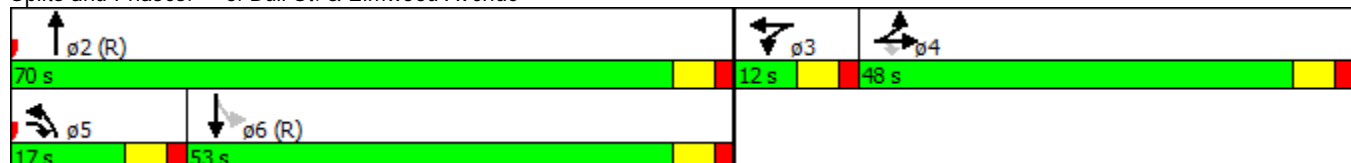


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	~619	288	436		30		~177	155		17	~561	417
Queue Length 95th (ft)	#878	341	546		56		#282	169		m37	#790	309
Internal Link Dist (ft)		932			299			446			632	
Turn Bay Length (ft)	775		250				175			100		
Base Capacity (vph)	569	1152	1350		264		396	2696		261	1453	1583
Starvation Cap Reductn	0	0	0		0		0	0		0	0	0
Spillback Cap Reductn	0	0	73		0		0	0		0	0	0
Storage Cap Reductn	0	0	0		0		0	0		0	0	0
Reduced v/c Ratio	1.06	0.64	0.78		0.27		1.00	0.29		0.19	0.97	0.80

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 126 (97%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.06
 Intersection Signal Delay: 37.7 Intersection LOS: D
 Intersection Capacity Utilization 95.9% ICU Level of Service F
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 6: Bull St. & Elmwood Avenue



Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

Bull Street Commons Traffic Study
2020 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	244	88	31	165	126	26	874	44	174	1981	100
Future Volume (vph)	88	244	88	31	165	126	26	874	44	174	1981	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	50			50			75			75		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.960			0.934			0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3398	0	1770	3306	0	1770	3514	0	1770	3539	1583
Flt Permitted	0.371			0.315			0.050			0.251		
Satd. Flow (perm)	691	3398	0	587	3306	0	93	3514	0	468	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			140			10				104
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1044			459			1901				526
Travel Time (s)		23.7			10.4			43.2				12.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.94	0.90
Adj. Flow (vph)	98	271	98	34	179	140	29	971	49	193	2107	111
Shared Lane Traffic (%)												
Lane Group Flow (vph)	98	369	0	34	319	0	29	1020	0	193	2107	111
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2				6
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	16.0
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	30.0
Total Split (s)	36.0	36.0		36.0	36.0		94.0	94.0		94.0	94.0	94.0
Total Split (%)	27.7%	27.7%		27.7%	27.7%		72.3%	72.3%		72.3%	72.3%	72.3%
Maximum Green (s)	30.0	30.0		30.0	30.0		88.0	88.0		88.0	88.0	88.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	25.9	25.9		25.9	25.9		100.1	100.1		100.1	100.1	100.1
Actuated g/C Ratio	0.20	0.20		0.20	0.20		0.77	0.77		0.77	0.77	0.77
v/c Ratio	0.72	0.53		0.29	0.41		0.41	0.38		0.54	0.77	0.09
Control Delay	75.3	46.3		49.8	26.2		27.8	5.7		7.8	7.4	0.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	1.2	0.0
Total Delay	75.3	46.3		49.8	26.2		27.8	5.7		7.8	8.6	0.6
LOS	E	D		D	C		C	A		A	A	A
Approach Delay		52.4			28.5			6.3			8.1	
Approach LOS		D			C			A			A	

Lanes, Volumes, Timings
7: Bull St. & Calhoun St.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	78	141		24	68		7	120		35	333	1
Queue Length 95th (ft)	137	176		57	113		#61	202		m62	m430	m2
Internal Link Dist (ft)		964			379			1821			446	
Turn Bay Length (ft)	150			175			150			150		
Base Capacity (vph)	180	902		153	968		71	2708		360	2725	1242
Starvation Cap Reductn	0	0		0	0		0	0		0	369	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.54	0.41		0.22	0.33		0.41	0.38		0.54	0.89	0.09

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 106 (82%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 14.2
 Intersection LOS: B
 Intersection Capacity Utilization 108.1%
 ICU Level of Service G
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Bull St. & Calhoun St.



Lanes, Volumes, Timings
9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Bull Street Commons Traffic Study
2020 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	262	71	753	473	106	159	529	367	21	476	54
Future Volume (vph)	36	262	71	753	473	106	159	529	367	21	476	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		800	175		0	225		0	300		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	100			75			75			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.968			0.973				0.850		0.985	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3426	0	3433	3444	0	1770	3539	1583	1770	3486	0
Flt Permitted	0.407			0.950			0.350			0.364		
Satd. Flow (perm)	758	3426	0	3433	3444	0	652	3539	1583	678	3486	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			31				408			12
Link Speed (mph)		35			35			35				40
Link Distance (ft)		424			345			483				2110
Travel Time (s)		8.3			6.7			9.4				36.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.90	0.90
Adj. Flow (vph)	40	291	79	837	526	118	177	563	408	23	529	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	370	0	837	644	0	177	563	408	23	589	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Free	Perm	NA	
Protected Phases		8		7	4			6				2
Permitted Phases	8						6		Free	2		
Detector Phase	8	8		7	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	16.0	16.0		11.0	16.0		16.0	16.0		16.0	16.0	
Minimum Split (s)	30.0	30.0		17.0	30.0		30.0	30.0		30.0	30.0	
Total Split (s)	30.0	30.0		40.0	70.0		60.0	60.0		60.0	60.0	
Total Split (%)	23.1%	23.1%		30.8%	53.8%		46.2%	46.2%		46.2%	46.2%	
Maximum Green (s)	24.0	24.0		34.0	64.0		54.0	54.0		54.0	54.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	22.9	22.9		37.3	62.2		63.8	63.8	130.0	63.8	63.8	
Actuated g/C Ratio	0.18	0.18		0.29	0.48		0.49	0.49	1.00	0.49	0.49	
v/c Ratio	0.30	0.59		0.85	0.39		0.55	0.32	0.26	0.07	0.34	
Control Delay	39.8	36.7		42.7	21.0		27.0	18.7	0.3	27.5	28.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	39.8	36.7		42.7	21.0		27.0	18.7	0.3	27.5	28.4	
LOS	D	D		D	C		C	B	A	C	C	
Approach Delay		37.0			33.3			13.5			28.3	
Approach LOS		D			C			B			C	

Lanes, Volumes, Timings
 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

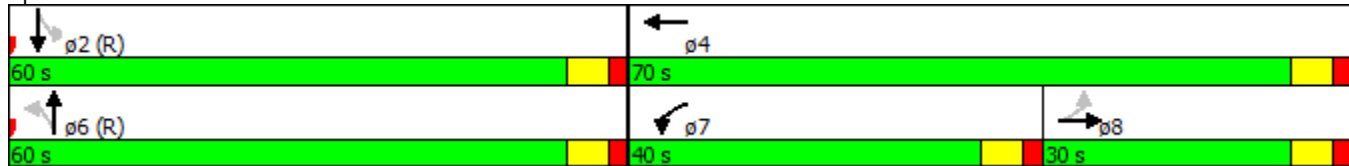


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	23	116		274	193		61	100	0	13	220	
Queue Length 95th (ft)	m52	157		380	197		139	189	0	m28	321	
Internal Link Dist (ft)		344			265			403			2030	
Turn Bay Length (ft)	225			175			225			300		
Base Capacity (vph)	163	756		1003	1816		319	1737	1583	332	1717	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	133	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.25	0.49		0.83	0.35		0.55	0.32	0.26	0.07	0.37	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 121 (93%), Referenced to phase 2:SBTL and 6:NBTL, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 26.6
 Intersection LOS: C
 Intersection Capacity Utilization 76.4%
 ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive



Lanes, Volumes, Timings
10: Harden St./Harden Street Ext & Calhoun St.

Bull Street Commons Traffic Study
2020 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	30	184	7	31	2	243	827	17	42	1039	89
Future Volume (vph)	88	30	184	7	31	2	243	827	17	42	1039	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	50		0	0		325	300		200
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	100			25			25			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Frt		0.871			0.992			0.997				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1622	0	1770	1848	0	1770	5070	0	1770	3539	1583
Flt Permitted	0.734			0.263			0.203			0.227		
Satd. Flow (perm)	1367	1622	0	490	1848	0	378	5070	0	423	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		204			2			4				122
Link Speed (mph)		30			35			35				35
Link Distance (ft)		820			1149			2515				371
Travel Time (s)		18.6			22.4			49.0				7.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	98	33	204	8	34	2	270	919	19	47	1154	99
Shared Lane Traffic (%)												
Lane Group Flow (vph)	98	237	0	8	36	0	270	938	0	47	1154	99
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	1 2		1	2	2
Switch Phase												
Minimum Initial (s)	1.0	1.0		11.0	11.0		9.0	14.0		9.0	14.0	14.0
Minimum Split (s)	6.5	6.5		30.0	30.0		15.0	30.0		15.0	30.0	30.0
Total Split (s)	38.0	38.0		38.0	38.0		43.0	75.0		17.0	49.0	49.0
Total Split (%)	29.2%	29.2%		29.2%	29.2%		33.1%	57.7%		13.1%	37.7%	37.7%
Maximum Green (s)	32.5	32.5		32.5	32.5		37.0	69.0		11.0	43.0	43.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.5	1.5		1.5	1.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	0.0		0.0	0.0		-3.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	2.5	5.5		5.5	5.5		3.0	3.0		6.0	3.0	3.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	18.2	15.2		15.2	15.2		93.8	72.0		100.7	81.2	81.2
Actuated g/C Ratio	0.14	0.12		0.12	0.12		0.72	0.55		0.77	0.62	0.62
v/c Ratio	0.51	0.64		0.14	0.17		0.53	0.33		0.08	0.52	0.10
Control Delay	49.5	15.5		54.7	49.3		8.6	16.2		2.0	16.1	3.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	49.5	15.5		54.7	49.3		8.6	16.2		2.0	16.1	3.5
LOS	D	B		D	D		A	B		A	B	A
Approach Delay		25.4			50.3			14.5			14.7	
Approach LOS		C			D			B			B	

Lanes, Volumes, Timings
 10: Harden St./Harden Street Ext & Calhoun St.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	78	63		6	26		38	151		2	343	17
Queue Length 95th (ft)	137	121		22	57		77	181		m7	456	m40
Internal Link Dist (ft)		740			1069			2435			291	
Turn Bay Length (ft)	225			50						300		200
Base Capacity (vph)	373	558		122	463		737	2809		620	2210	1034
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.26	0.42		0.07	0.08		0.37	0.33		0.08	0.52	0.10

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 78 (60%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 16.4
 Intersection LOS: B
 Intersection Capacity Utilization 66.4%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Harden St./Harden Street Ext & Calhoun St.



Lanes, Volumes, Timings
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2020 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	280	38	10	293	42	15	26	12	22	15	45
Future Volume (vph)	47	280	38	10	293	42	15	26	12	22	15	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	275		0	0		0	300		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	100			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982			0.981			0.970			0.888	
Flt Protected	0.950			0.950				0.986		0.950		
Satd. Flow (prot)	1770	1829	0	1770	1827	0	0	1782	0	1770	1654	0
Flt Permitted	0.950			0.950				0.986		0.950		
Satd. Flow (perm)	1770	1829	0	1770	1827	0	0	1782	0	1770	1654	0
Link Speed (mph)		35			30			35			35	
Link Distance (ft)		489			820			504			3014	
Travel Time (s)		9.5			18.6			9.8			58.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	52	311	42	11	326	47	17	29	13	24	17	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	52	353	0	11	373	0	0	59	0	24	67	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	40.9%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2020 Background AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	47	280	38	10	293	42	15	26	12	22	15	45
Future Volume (Veh/h)	47	280	38	10	293	42	15	26	12	22	15	45
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	52	311	42	11	326	47	17	29	13	24	17	50
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	TWLTL				TWLTL							
Median storage veh	2				2							
Upstream signal (ft)					820							
pX, platoon unblocked	0.94						0.94	0.94		0.94	0.94	0.94
vC, conflicting volume	373			353			842	831	332	814	828	350
vC1, stage 1 conf vol							436	436		372	372	
vC2, stage 2 conf vol							406	395		442	457	
vCu, unblocked vol	306			353			803	791	332	773	789	281
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			99			96	94	98	95	96	93
cM capacity (veh/h)	1184			1206			433	454	710	457	463	715
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total	52	353	11	373	59	24	67					
Volume Left	52	0	11	0	17	24	0					
Volume Right	0	42	0	47	13	0	50					
cSH	1184	1700	1206	1700	486	457	628					
Volume to Capacity	0.04	0.21	0.01	0.22	0.12	0.05	0.11					
Queue Length 95th (ft)	3	0	1	0	10	4	9					
Control Delay (s)	8.2	0.0	8.0	0.0	13.4	13.3	11.4					
Lane LOS	A		A		B	B	B					
Approach Delay (s)	1.1		0.2		13.4	11.9						
Approach LOS					B	B						
Intersection Summary												
Average Delay			2.5									
Intersection Capacity Utilization			40.9%		ICU Level of Service		A					
Analysis Period (min)			15									

Lanes, Volumes, Timings
12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2020 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	348	40	110	477	57	9	10	30	7	4	2
Future Volume (vph)	12	348	40	110	477	57	9	10	30	7	4	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		225	50		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.985			0.984			0.887			0.950	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1835	0	1770	1833	0	1770	1652	0	1770	1770	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1835	0	1770	1833	0	1770	1652	0	1770	1770	0
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		980			161			3014			569	
Travel Time (s)		19.1			3.1			58.7			11.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	13	387	44	122	518	63	10	11	33	8	4	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	431	0	122	581	0	10	44	0	8	6	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	49.1%
Analysis Period (min)	15
	ICU Level of Service A












HCM Unsignalized Intersection Capacity Analysis
 12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
 2020 Background AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	348	40	110	477	57	9	10	30	7	4	2
Future Volume (Veh/h)	12	348	40	110	477	57	9	10	30	7	4	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	13	387	44	122	518	63	10	11	33	8	4	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					1175							
pX, platoon unblocked	0.86						0.86	0.86		0.86	0.86	0.86
vC, conflicting volume	581			431			1201	1260	409	1245	1250	550
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	437			431			1154	1222	409	1205	1211	400
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			89			92	92	95	93	97	100
cM capacity (veh/h)	971			1129			133	136	642	112	139	562
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	13	431	122	581	10	44	8	6				
Volume Left	13	0	122	0	10	0	8	0				
Volume Right	0	44	0	63	0	33	0	2				
cSH	971	1700	1129	1700	133	333	112	185				
Volume to Capacity	0.01	0.25	0.11	0.34	0.08	0.13	0.07	0.03				
Queue Length 95th (ft)	1	0	9	0	6	11	6	3				
Control Delay (s)	8.8	0.0	8.6	0.0	34.2	17.4	39.5	25.1				
Lane LOS	A		A		D	C	E	D				
Approach Delay (s)	0.3		1.5		20.5		33.3					
Approach LOS					C		D					
Intersection Summary												
Average Delay			2.3									
Intersection Capacity Utilization			49.1%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
13: Harden Street Ext & Slighs Ave.

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	128	213	945	71	129	1207
Future Volume (vph)	128	213	945	71	129	1207
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		50	100	
Storage Lanes	1	0		1	1	
Taper Length (ft)	25				50	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	0.916			0.850		
Flt Protected	0.982				0.950	
Satd. Flow (prot)	1579	0	3539	1583	1770	3539
Flt Permitted	0.982				0.180	
Satd. Flow (perm)	1579	0	3539	1583	335	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	73			21		
Link Speed (mph)	30		35			35
Link Distance (ft)	398		2615			483
Travel Time (s)	9.0		50.9			9.4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.95
Heavy Vehicles (%)	7%	9%	2%	2%	2%	2%
Adj. Flow (vph)	142	237	1050	79	143	1271
Shared Lane Traffic (%)						
Lane Group Flow (vph)	379	0	1050	79	143	1271
Turn Type	Perm		NA	Perm	pm+pt	NA
Protected Phases			6		5	2
Permitted Phases	4			6	2	
Detector Phase	4		6	6	5	2
Switch Phase						
Minimum Initial (s)	16.0		16.0	16.0	11.0	16.0
Minimum Split (s)	30.0		30.0	30.0	17.0	30.0
Total Split (s)	50.0		61.0	61.0	19.0	80.0
Total Split (%)	38.5%		46.9%	46.9%	14.6%	61.5%
Maximum Green (s)	44.0		55.0	55.0	13.0	74.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0		-4.0	-2.0	-4.0	-4.0
Total Lost Time (s)	2.0		2.0	4.0	2.0	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		C-Max	C-Max	None	C-Max
Act Effct Green (s)	35.9		72.8	70.8	90.1	90.1
Actuated g/C Ratio	0.28		0.56	0.54	0.69	0.69
v/c Ratio	0.78		0.53	0.09	0.36	0.52
Control Delay	45.2		12.5	5.0	14.9	15.1
Queue Delay	0.0		0.0	0.0	0.0	0.4
Total Delay	45.2		12.5	5.0	14.9	15.4
LOS	D		B	A	B	B
Approach Delay	45.2		11.9			15.4

Lanes, Volumes, Timings
 13: Harden Street Ext & Slighs Ave.



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	D		B			B
Queue Length 50th (ft)	242		305	2	43	282
Queue Length 95th (ft)	324		438	33	m72	503
Internal Link Dist (ft)	318		2535			403
Turn Bay Length (ft)				50	100	
Base Capacity (vph)	629		1981	871	419	2453
Starvation Cap Reductn	0		0	0	0	566
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.60		0.53	0.09	0.34	0.67

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 129 (99%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 17.9
 Intersection Capacity Utilization 65.5%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 13: Harden Street Ext & Slighs Ave.



Lanes, Volumes, Timings
14: Colonial Drive & Farrow Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Lane Configurations		↗↗	↖	↑↑	↑↓		
Traffic Volume (vph)	0	192	163	482	1078	18	
Future Volume (vph)	0	192	163	482	1078	18	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0	330	550			0	
Storage Lanes	0	1	1			0	
Taper Length (ft)	25		125				
Lane Util. Factor	1.00	0.88	1.00	0.95	0.95	0.95	
Frt		0.850			0.998		
Flt Protected			0.950				
Satd. Flow (prot)	0	2787	1770	3539	3532	0	
Flt Permitted			0.950				
Satd. Flow (perm)	0	2787	1770	3539	3532	0	
Right Turn on Red		Yes				No	
Satd. Flow (RTOR)		84					
Link Speed (mph)	35			35	35		
Link Distance (ft)	930			654	2077		
Travel Time (s)	18.1			12.7	40.5		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.91	0.90	
Adj. Flow (vph)	0	213	181	536	1185	20	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	213	181	536	1205	0	
Turn Type		Over	Prot	NA	NA		
Protected Phases		8	8	8 6	2		6
Permitted Phases							
Detector Phase		8	8	8 6	2		
Switch Phase							
Minimum Initial (s)		16.0	16.0		16.0		16.0
Minimum Split (s)		30.0	30.0		30.0		30.0
Total Split (s)		30.0	30.0		35.0		35.0
Total Split (%)		46.2%	46.2%		53.8%		54%
Maximum Green (s)		24.0	24.0		29.0		29.0
Yellow Time (s)		4.0	4.0		4.0		4.0
All-Red Time (s)		2.0	2.0		2.0		2.0
Lost Time Adjust (s)		-3.0	-3.0		-4.0		
Total Lost Time (s)		3.0	3.0		2.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0	3.0		3.0		3.0
Recall Mode		None	None		C-Max		C-Max
Act Effct Green (s)		20.0	20.0	65.0	40.0		
Actuated g/C Ratio		0.31	0.31	1.00	0.62		
v/c Ratio		0.23	0.33	0.15	0.55		
Control Delay		10.5	20.0	0.1	6.7		
Queue Delay		0.0	0.0	0.0	0.0		
Total Delay		10.5	20.0	0.1	6.7		
LOS		B	B	A	A		
Approach Delay				5.1	6.7		
Approach LOS				A	A		

Lanes, Volumes, Timings
 14: Colonial Drive & Farrow Road

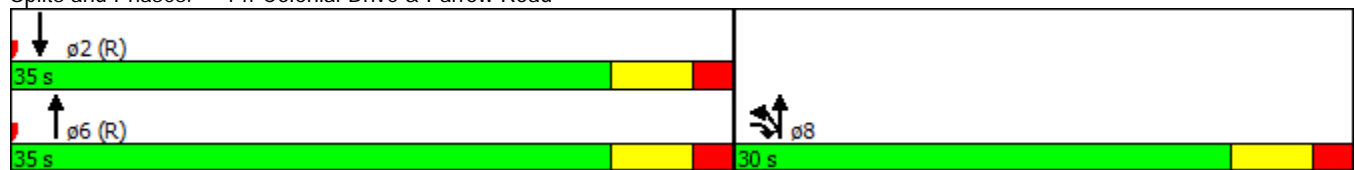


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Queue Length 50th (ft)		21	52	0	295		
Queue Length 95th (ft)		41	83	0	177		
Internal Link Dist (ft)	850			574	1997		
Turn Bay Length (ft)		330	550				
Base Capacity (vph)		1206	735	3539	2174		
Starvation Cap Reductn		0	0	0	0		
Spillback Cap Reductn		0	0	0	0		
Storage Cap Reductn		0	0	0	0		
Reduced v/c Ratio		0.18	0.25	0.15	0.55		

Intersection Summary

Area Type:	Other
Cycle Length:	65
Actuated Cycle Length:	65
Offset:	62 (95%), Referenced to phase 2:SBT and 6:NBT, Start of 1st Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.55
Intersection Signal Delay:	6.5
Intersection LOS:	A
Intersection Capacity Utilization	50.4%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 14: Colonial Drive & Farrow Road



Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
2020 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	415	4	237	564	198	0	337	150	290	968	71
Future Volume (vph)	15	415	4	237	564	198	0	337	150	290	968	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		0	300		0	0		225	200		0
Storage Lanes	1		0	2		1	0		1	1		0
Taper Length (ft)	125			100			25			125		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.999				0.850			0.850		0.990	
Flt Protected	0.950			0.950						0.950		
Satd. Flow (prot)	1770	3536	0	3433	3539	1583	0	3539	1583	1770	3504	0
Flt Permitted	0.414			0.950						0.445		
Satd. Flow (perm)	771	3536	0	3433	3539	1583	0	3539	1583	829	3504	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				220			167		9	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1518			1183			2077			914	
Travel Time (s)		29.6			23.0			40.5			17.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.90
Adj. Flow (vph)	17	461	4	263	627	220	0	374	167	322	1064	79
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	465	0	263	627	220	0	374	167	322	1143	0
Turn Type	Perm	NA		Prot	NA	pm+ov		NA	Free	pm+pt	NA	
Protected Phases		4		3	8	1		2		1	6	
Permitted Phases	4					8			Free	6		
Detector Phase	4	4		3	8	1		2		1	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0	5.0		15.0		5.0	15.0	
Minimum Split (s)	30.0	30.0		21.0	41.0	17.0		41.0		17.0	30.0	
Total Split (s)	32.0	32.0		23.0	55.0	28.0		47.0		28.0	75.0	
Total Split (%)	24.6%	24.6%		17.7%	42.3%	21.5%		36.2%		21.5%	57.7%	
Maximum Green (s)	27.0	27.0		18.0	50.0	23.0		42.0		23.0	70.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5		3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5	1.5		1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0		-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead		Lead		Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Recall Mode	None	None		None	None	None		C-Min		None	C-Min	
Walk Time (s)					18.0			18.0				
Flash Dont Walk (s)					5.0			5.0				
Pedestrian Calls (#/hr)					0			0				
Act Effct Green (s)	23.4	23.4		17.3	44.6	67.8		54.2	130.0	77.4	77.4	
Actuated g/C Ratio	0.18	0.18		0.13	0.34	0.52		0.42	1.00	0.60	0.60	
v/c Ratio	0.12	0.73		0.58	0.52	0.24		0.25	0.11	0.51	0.55	
Control Delay	44.9	57.1		58.2	35.1	1.8		38.9	0.1	20.4	21.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	44.9	57.1		58.2	35.1	1.8		38.9	0.1	20.4	21.2	

Lanes, Volumes, Timings
 15: Farrow Road & Beltline Blvd

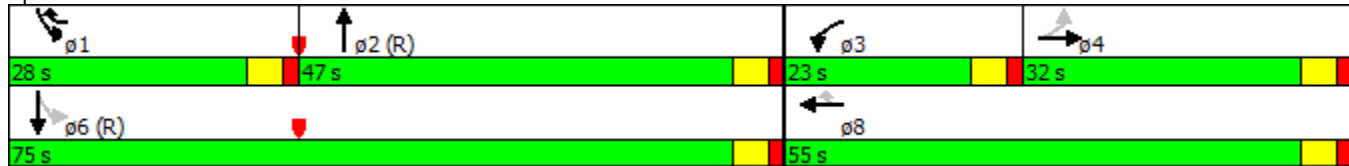


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	E		E	D	A		D	A	C	C	
Approach Delay		56.7			34.0			27.0			21.0	
Approach LOS		E			C			C			C	
Queue Length 50th (ft)	12	196		109	224	0		136	0	145	293	
Queue Length 95th (ft)	34	243		151	250	27		191	0	259	455	
Internal Link Dist (ft)		1438			1103			1997			834	
Turn Bay Length (ft)	175			300					225	200		
Base Capacity (vph)	167	768		507	1400	989		1510	1583	672	2101	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.10	0.61		0.52	0.45	0.22		0.25	0.11	0.48	0.54	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 30.7
 Intersection Capacity Utilization 70.0%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 15: Farrow Road & Beltline Blvd



Lanes, Volumes, Timings
16: Farrow Road & 277 NB RAMPS

Bull Street Commons Traffic Study
2020 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	0	9	0	0	0	0	332	231	44	1363	0
Future Volume (vph)	61	0	9	0	0	0	0	332	231	44	1363	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	0		0	0		0	250		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			25			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.850						0.938				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1770	1583	0	0	0	0	0	3320	0	1770	3539	0
Flt Permitted	0.950									0.414		
Satd. Flow (perm)	1770	1583	0	0	0	0	0	3320	0	771	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		75						257				
Link Speed (mph)		35			35			35				35
Link Distance (ft)		706			904			914				683
Travel Time (s)		13.8			17.6			17.8				13.3
Peak Hour Factor	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90
Adj. Flow (vph)	66	0	10	0	0	0	0	369	257	49	1450	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	66	10	0	0	0	0	0	626	0	49	1450	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						6			2	
Permitted Phases	4									2		
Detector Phase	4	4						6		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0						10.0		10.0	10.0	
Minimum Split (s)	30.0	30.0						30.0		30.0	30.0	
Total Split (s)	32.0	32.0						98.0		98.0	98.0	
Total Split (%)	24.6%	24.6%						75.4%		75.4%	75.4%	
Maximum Green (s)	27.0	27.0						93.0		93.0	93.0	
Yellow Time (s)	3.5	3.5						3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5						1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0						-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0						4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Recall Mode	None	None						C-Max		C-Max	C-Max	
Act Effct Green (s)	12.2	12.2						113.6		113.6	113.6	
Actuated g/C Ratio	0.09	0.09						0.87		0.87	0.87	
v/c Ratio	0.40	0.05						0.21		0.07	0.47	
Control Delay	62.3	0.4						2.1		2.1	2.6	
Queue Delay	0.0	0.0						0.0		0.0	0.2	
Total Delay	62.3	0.4						2.1		2.1	2.8	
LOS	E	A						A		A	A	
Approach Delay		54.2						2.1			2.8	
Approach LOS		D						A			A	

Lanes, Volumes, Timings
 16: Farrow Road & 277 NB RAMPS



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	54	0						153		6	104	
Queue Length 95th (ft)	99	0						2		m9	151	
Internal Link Dist (ft)		626			824			834			603	
Turn Bay Length (ft)	300									250		
Base Capacity (vph)	381	399						2932		673	3091	
Starvation Cap Reductn	0	0						0		0	724	
Spillback Cap Reductn	0	0						0		0	0	
Storage Cap Reductn	0	0						0		0	0	
Reduced v/c Ratio	0.17	0.03						0.21		0.07	0.61	

Intersection Summary

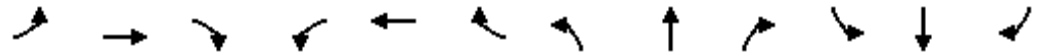
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.47
 Intersection Signal Delay: 4.4
 Intersection LOS: A
 Intersection Capacity Utilization 52.7%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 16: Farrow Road & 277 NB RAMPS



Lanes, Volumes, Timings
17: Farrow Road & Lorick Avenue /277 SB Ramps

Bull Street Commons Traffic Study
2020 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	0	41	649	14	35	13	380	0	0	728	215
Future Volume (vph)	13	0	41	649	14	35	13	380	0	0	728	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	125		0	200		0	0		0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (ft)	25			150			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850		0.894							0.965
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1770	0	1583	1770	1665	0	1770	3539	0	0	3415	0
Flt Permitted	0.721			0.950			0.154					
Satd. Flow (perm)	1343	0	1583	1770	1665	0	287	3539	0	0	3415	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			46		39							35
Link Speed (mph)		35			35			35				35
Link Distance (ft)		681			1031			683				835
Travel Time (s)		13.3			20.1			13.3				16.3
Peak Hour Factor	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.92	0.90	0.90	0.93	0.90
Adj. Flow (vph)	14	0	46	698	16	39	14	413	0	0	783	239
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	0	46	698	55	0	14	413	0	0	1022	0
Turn Type	Perm		Perm	Perm	NA		Perm	NA			NA	
Protected Phases					4			2				6
Permitted Phases	8		8	4			2					
Detector Phase	8		8	4	4		2	2				6
Switch Phase												
Minimum Initial (s)	10.0		10.0	10.0	10.0		10.0	10.0				10.0
Minimum Split (s)	30.0		30.0	30.0	30.0		30.0	30.0				30.0
Total Split (s)	79.0		79.0	79.0	79.0		51.0	51.0				51.0
Total Split (%)	60.8%		60.8%	60.8%	60.8%		39.2%	39.2%				39.2%
Maximum Green (s)	74.0		74.0	74.0	74.0		46.0	46.0				46.0
Yellow Time (s)	3.5		3.5	3.5	3.5		3.5	3.5				3.5
All-Red Time (s)	1.5		1.5	1.5	1.5		1.5	1.5				1.5
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0		-1.0	-1.0				-1.0
Total Lost Time (s)	4.0		4.0	4.0	4.0		4.0	4.0				4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0				3.0
Recall Mode	None		None	None	None		C-Max	C-Max				C-Max
Act Effct Green (s)	63.5		63.5	63.5	63.5		58.5	58.5				58.5
Actuated g/C Ratio	0.49		0.49	0.49	0.49		0.45	0.45				0.45
v/c Ratio	0.02		0.06	0.81	0.07		0.11	0.26				0.66
Control Delay	13.8		3.7	35.4	5.9		16.8	12.5				31.1
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.0				0.0
Total Delay	13.8		3.7	35.4	5.9		16.8	12.5				31.1
LOS	B		A	D	A		B	B				C
Approach Delay					33.2			12.7				31.1
Approach LOS					C			B				C

Lanes, Volumes, Timings
 17: Farrow Road & Lorick Avenue /277 SB Ramps

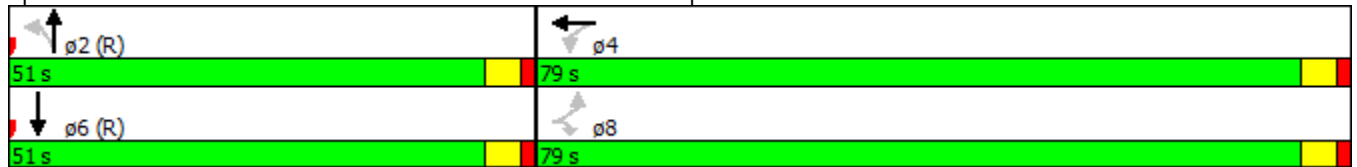


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	6		0	475	7		0	68			342	
Queue Length 95th (ft)	14		17	540	24		17	119			483	
Internal Link Dist (ft)		601			951			603			755	
Turn Bay Length (ft)				125			200					
Base Capacity (vph)	774		932	1021	977		129	1592			1556	
Starvation Cap Reductn	0		0	0	0		0	0			0	
Spillback Cap Reductn	0		0	0	0		0	0			0	
Storage Cap Reductn	0		0	0	0		0	0			0	
Reduced v/c Ratio	0.02		0.05	0.68	0.06		0.11	0.26			0.66	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 27.7
 Intersection LOS: C
 Intersection Capacity Utilization 81.3%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 17: Farrow Road & Lorick Avenue /277 SB Ramps



Lanes, Volumes, Timings
18: Assembly St./Assembly & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2281	470	632	1524	4	268	1	242	0	0	0
Future Volume (vph)	0	2281	470	632	1524	4	268	1	242	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		275	150		0	0		0	0		0
Storage Lanes	1		1	1		0	2		1	0		0
Taper Length (ft)	150			75			25			25		
Lane Util. Factor	1.00	0.86	0.86	0.97	0.91	0.91	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850					0.851	0.850			
Flt Protected				0.950			0.950					
Satd. Flow (prot)	1863	4806	1362	3433	5085	0	3433	1506	1504	0	1863	0
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	1863	4806	1362	3433	5085	0	3433	1506	1504	0	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			172		1			126	76			
Link Speed (mph)		30			30			30				35
Link Distance (ft)		3707			509			546				403
Travel Time (s)		84.3			11.6			12.4				7.9
Peak Hour Factor	0.90	0.98	0.90	0.92	0.96	0.90	0.92	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	2328	522	687	1588	4	291	1	269	0	0	0
Shared Lane Traffic (%)			0%						47%			
Lane Group Flow (vph)	0	2328	522	687	1592	0	291	127	143	0	0	0
Turn Type	Perm	NA	pm+ov	Prot	NA		Split	NA	pm+ov			
Protected Phases		2	3	1	6		3	3	1	4	4	
Permitted Phases	2		2						3			
Detector Phase	2	2	3	1	6		3	3	1	4	4	
Switch Phase												
Minimum Initial (s)	16.0	16.0	6.0	11.0	16.0		6.0	6.0	11.0	4.0	4.0	
Minimum Split (s)	30.0	30.0	21.0	17.0	30.0		21.0	21.0	17.0	10.0	10.0	
Total Split (s)	70.0	70.0	21.0	29.0	99.0		21.0	21.0	29.0	10.0	10.0	
Total Split (%)	53.8%	53.8%	16.2%	22.3%	76.2%		16.2%	16.2%	22.3%	7.7%	7.7%	
Maximum Green (s)	64.0	64.0	15.0	23.0	93.0		15.0	15.0	23.0	4.0	4.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	-4.0	-4.0	-4.0	-4.0		-4.0	-2.0	-4.0		-2.0	
Total Lost Time (s)	6.0	2.0	2.0	2.0	2.0		2.0	4.0	2.0		4.0	
Lead/Lag	Lead	Lead	Lead	Lag			Lead	Lead	Lag	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes					Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max	None	None	C-Max		None	None	None	None	None	
Walk Time (s)			5.0				5.0	5.0				
Flash Dont Walk (s)			10.0				10.0	10.0				
Pedestrian Calls (#/hr)			0				0	0				
Act Effct Green (s)		78.4	99.0	27.0	107.4		18.6	16.6	47.6			
Actuated g/C Ratio		0.60	0.76	0.21	0.83		0.14	0.13	0.37			
v/c Ratio		0.80	0.48	0.96	0.38		0.59	0.42	0.24			
Control Delay		22.7	5.3	72.1	1.5		57.6	13.2	14.6			
Queue Delay		0.0	0.0	0.0	0.1		0.0	0.0	0.0			
Total Delay		22.7	5.3	72.1	1.7		57.6	13.2	14.6			

Lanes, Volumes, Timings
 18: Assembly St./Assembly & Elmwood Avenue

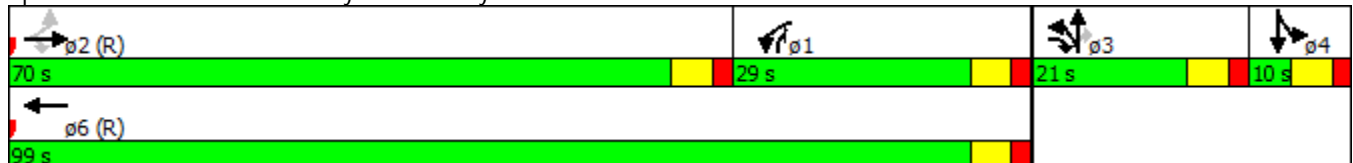


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C	A	E	A		E	B	B			
Approach Delay		19.5			22.9			36.6				
Approach LOS		B			C			D				
Queue Length 50th (ft)		559	101	318	51		119	1	38			
Queue Length 95th (ft)		630	167	m#409	m53		168	63	91			
Internal Link Dist (ft)		3627			429			466			323	
Turn Bay Length (ft)			275	150								
Base Capacity (vph)		2899	1078	713	4201		501	306	598			
Starvation Cap Reductn		0	0	0	1161		0	0	0			
Spillback Cap Reductn		0	0	0	0		0	0	0			
Storage Cap Reductn		0	0	0	0		0	0	0			
Reduced v/c Ratio		0.80	0.48	0.96	0.52		0.58	0.42	0.24			

Intersection Summary

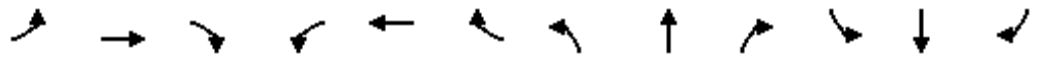
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 14 (11%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 22.6
 Intersection LOS: C
 Intersection Capacity Utilization 83.2%
 ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Assembly St./Assembly & Elmwood Avenue



Lanes, Volumes, Timings
19: Main St. & Elmwood Avenue

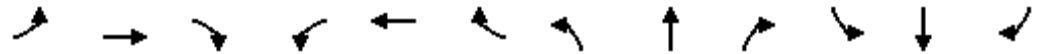
Bull Street Commons Traffic Study
2020 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↑↑↑	↗	↖	↑↑↑		↖	↑↑	↗	↖	↑↗	↗
Traffic Volume (vph)	212	2225	67	78	1517	40	19	103	13	236	509	595
Future Volume (vph)	212	2225	67	78	1517	40	19	103	13	236	509	595
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		175	150		0	200		0	175		425
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	75			75			100			75		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850		0.996				0.850		0.989	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	1770	5065	0	1770	3539	1583	1770	3353	1441
Flt Permitted	0.950			0.062			0.148			0.599		
Satd. Flow (perm)	3433	5085	1583	115	5065	0	276	3539	1583	1116	3353	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			35		4				126		6	153
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		509			563			474			3675	
Travel Time (s)		11.6			12.8			10.8			83.5	
Peak Hour Factor	0.90	0.93	0.90	0.90	0.97	0.90	0.90	0.90	0.90	0.90	0.93	0.94
Adj. Flow (vph)	236	2392	74	87	1564	44	21	114	14	262	547	633
Shared Lane Traffic (%)												7%
Lane Group Flow (vph)	236	2392	74	87	1608	0	21	114	14	262	591	589
Turn Type	Prot	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	pm+ov
Protected Phases	5	2	3		6		3	8		7	4	5
Permitted Phases			2	6			8		8	4		4
Detector Phase	5	2	3	6	6		3	8	8	7	4	5
Switch Phase												
Minimum Initial (s)	11.0	16.0	11.0	16.0	16.0		11.0	16.0	16.0	11.0	16.0	11.0
Minimum Split (s)	17.0	30.0	17.0	30.0	30.0		17.0	30.0	30.0	17.0	30.0	17.0
Total Split (s)	17.0	83.0	17.0	66.0	66.0		17.0	30.0	30.0	17.0	30.0	17.0
Total Split (%)	13.1%	63.8%	13.1%	50.8%	50.8%		13.1%	23.1%	23.1%	13.1%	23.1%	13.1%
Maximum Green (s)	11.0	77.0	11.0	60.0	60.0		11.0	24.0	24.0	11.0	24.0	11.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0	-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lead	Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	C-Max	C-Max		None	None	None	None	None	None
Act Effct Green (s)	15.0	82.6	99.6	65.6	65.6		41.4	26.4	26.4	41.8	29.8	46.8
Actuated g/C Ratio	0.12	0.64	0.77	0.50	0.50		0.32	0.20	0.20	0.32	0.23	0.36
v/c Ratio	0.60	0.74	0.06	1.53	0.63		0.08	0.16	0.03	0.60	0.77	0.96
Control Delay	82.1	5.4	0.1	326.5	20.7		29.0	42.5	0.2	40.5	54.4	57.8
Queue Delay	0.0	0.2	0.0	0.0	0.2		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.1	5.6	0.1	326.5	20.8		29.0	42.5	0.2	40.5	54.4	57.8
LOS	F	A	A	F	C		C	D	A	D	D	E
Approach Delay		12.1			36.5			36.7			53.3	
Approach LOS		B			D			D			D	

Lanes, Volumes, Timings
 19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
 2020 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	102	93	0	~102	345		12	41	0	169	259	432
Queue Length 95th (ft)	m131	113	m0	#215	468		31	68	0	250	333	#712
Internal Link Dist (ft)		429			483			394			3595	
Turn Bay Length (ft)	175		175	150			200			175		425
Base Capacity (vph)	396	3231	1220	57	2557		260	762	439	434	772	616
Starvation Cap Reductn	0	215	0	0	230		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	0.60	0.79	0.06	1.53	0.69		0.08	0.15	0.03	0.60	0.77	0.96

Intersection Summary

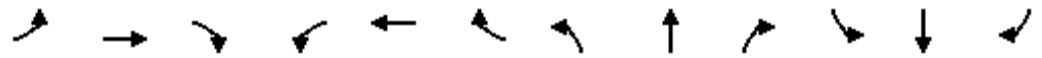
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 5 (4%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.53
 Intersection Signal Delay: 29.5
 Intersection LOS: C
 Intersection Capacity Utilization 86.7%
 ICU Level of Service E
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Main St. & Elmwood Avenue



Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	1735	275	94	1542	10	36	12	28	10	123	19
Future Volume (vph)	12	1735	275	94	1542	10	36	12	28	10	123	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	75		0	200		0	75		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			50			100			50		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.978			0.999				0.850		0.981	
Flt Protected	0.950			0.950			0.950				0.997	
Satd. Flow (prot)	1770	4973	0	1770	5080	0	1770	1863	1583	0	3462	0
Flt Permitted	0.127			0.069			0.525				0.941	
Satd. Flow (perm)	237	4973	0	129	5080	0	978	1863	1583	0	3267	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		72			2				31		11	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		563			1012			1692			1095	
Travel Time (s)		12.8			23.0			38.5			24.9	
Peak Hour Factor	0.90	0.95	0.90	0.90	0.95	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	13	1826	306	104	1623	11	40	13	31	11	137	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	2132	0	104	1634	0	40	13	31	0	169	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		6	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	100.0	100.0		100.0	100.0		30.0	30.0	30.0	30.0	30.0	
Total Split (%)	76.9%	76.9%		76.9%	76.9%		23.1%	23.1%	23.1%	23.1%	23.1%	
Maximum Green (s)	94.0	94.0		94.0	94.0		24.0	24.0	24.0	24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0		-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0		2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None	None	None	None	
Act Effct Green (s)	106.0	106.0		106.0	106.0		20.0	20.0	20.0		20.0	
Actuated g/C Ratio	0.82	0.82		0.82	0.82		0.15	0.15	0.15		0.15	
v/c Ratio	0.07	0.52		0.99	0.39		0.27	0.05	0.12		0.33	
Control Delay	1.2	0.9		81.6	2.6		53.9	47.5	16.4		47.8	
Queue Delay	0.0	0.1		0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	1.2	1.0		81.6	2.6		53.9	47.5	16.4		47.8	
LOS	A	A		F	A		D	D	B		D	
Approach Delay		1.0			7.4			39.1			47.8	
Approach LOS		A			A			D			D	

Lanes, Volumes, Timings
 20: Sumter St. & Elmwood Avenue

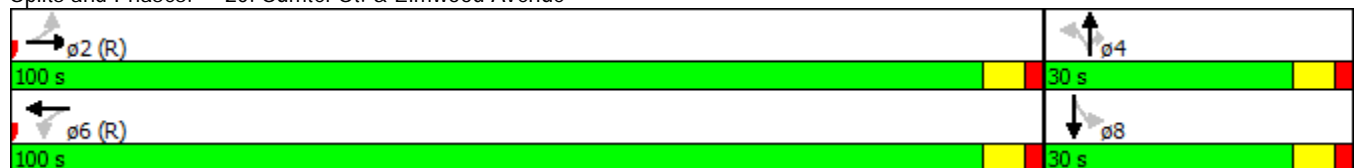


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	0	21		64	91		30	10	0		63	
Queue Length 95th (ft)	m1	32		m#131	m85		68	30	30		100	
Internal Link Dist (ft)		483			932			1612			1015	
Turn Bay Length (ft)	200			75			200					
Base Capacity (vph)	193	4068		105	4142		210	401	365		712	
Starvation Cap Reductn	0	720		0	0		0	0	0		0	
Spillback Cap Reductn	0	0		0	52		0	0	0		0	
Storage Cap Reductn	0	0		0	0		0	0	0		0	
Reduced v/c Ratio	0.07	0.64		0.99	0.40		0.19	0.03	0.08		0.24	

Intersection Summary

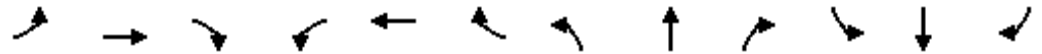
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 13 (10%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.99
 Intersection Signal Delay: 6.4
 Intersection LOS: A
 Intersection Capacity Utilization 92.9%
 ICU Level of Service F
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 20: Sumter St. & Elmwood Avenue



Lanes, Volumes, Timings
21: Barnwell Street & Calhoun St.

Bull Street Commons Traffic Study
2020 Background AM



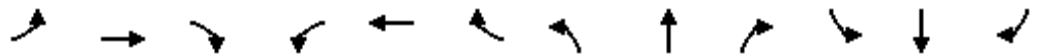
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	344	26	25	276	35	3	4	12	25	4	23
Future Volume (vph)	38	344	26	25	276	35	3	4	12	25	4	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	225		0	125		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	75			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.989			0.983			0.885				0.870
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1842	0	1770	1831	0	1770	1649	0	1770	1621	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1842	0	1770	1831	0	1770	1649	0	1770	1621	0
Link Speed (mph)		35			30			35				35
Link Distance (ft)		852			489			921				531
Travel Time (s)		16.6			11.1			17.9				10.3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	42	382	29	28	307	39	3	4	13	28	4	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	411	0	28	346	0	3	17	0	28	30	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	41.1%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
21: Barnwell Street & Calhoun St.

Bull Street Commons Traffic Study
2020 Background AM


















Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	344	26	25	276	35	3	4	12	25	4	23
Future Volume (Veh/h)	38	344	26	25	276	35	3	4	12	25	4	23
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	42	382	29	28	307	39	3	4	13	28	4	26
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh		2			2							
Upstream signal (ft)					1309							
pX, platoon unblocked												
vC, conflicting volume	346			411			872	882	396	864	878	326
vC1, stage 1 conf vol							480	480		382	382	
vC2, stage 2 conf vol							391	402		481	495	
vCu, unblocked vol	346			411			872	882	396	864	878	326
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			98			99	99	98	94	99	96
cM capacity (veh/h)	1213			1148			437	438	653	440	437	715

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	42	411	28	346	3	17	28	30
Volume Left	42	0	28	0	3	0	28	0
Volume Right	0	29	0	39	0	13	0	26
cSH	1213	1700	1148	1700	437	585	440	659
Volume to Capacity	0.03	0.24	0.02	0.20	0.01	0.03	0.06	0.05
Queue Length 95th (ft)	3	0	2	0	1	2	5	4
Control Delay (s)	8.1	0.0	8.2	0.0	13.3	11.3	13.7	10.7
Lane LOS	A		A		B	B	B	B
Approach Delay (s)	0.7		0.6		11.6		12.2	
Approach LOS					B		B	

Intersection Summary		
Average Delay		1.7
Intersection Capacity Utilization	41.1%	ICU Level of Service
Analysis Period (min)	15	A

Lanes, Volumes, Timings
23: Bull St. & Access #3

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			  			  
Traffic Volume (vph)	40	11	1797	41	37	2578
Future Volume (vph)	40	11	1797	41	37	2578
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		75	0	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	0.91
Frt		0.850	0.997			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	5070	0	1770	5085
Flt Permitted	0.950				0.076	
Satd. Flow (perm)	1770	1583	5070	0	142	5085
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		12	6			
Link Speed (mph)	35		40			40
Link Distance (ft)	526		223			220
Travel Time (s)	10.2		3.8			3.8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	44	12	1997	46	41	2864
Shared Lane Traffic (%)						
Lane Group Flow (vph)	44	12	2043	0	41	2864
Turn Type	Prot	Perm	NA		D.P+P	NA
Protected Phases	8		2		1	6
Permitted Phases		8			2	
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	6.0	6.0	11.0		6.0	11.0
Minimum Split (s)	12.0	12.0	17.0		12.0	17.0
Total Split (s)	23.0	23.0	94.0		13.0	107.0
Total Split (%)	17.7%	17.7%	72.3%		10.0%	82.3%
Maximum Green (s)	17.0	17.0	88.0		7.0	101.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0		4.0	4.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	C-Max		None	C-Max
Act Effct Green (s)	10.7	10.7	104.7		110.5	114.5
Actuated g/C Ratio	0.08	0.08	0.81		0.85	0.88
v/c Ratio	0.30	0.09	0.50		0.18	0.64
Control Delay	60.7	25.8	15.1		2.2	1.4
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	60.7	25.8	15.1		2.2	1.4
LOS	E	C	B		A	A
Approach Delay	53.2		15.1			1.4
Approach LOS	D		B			A

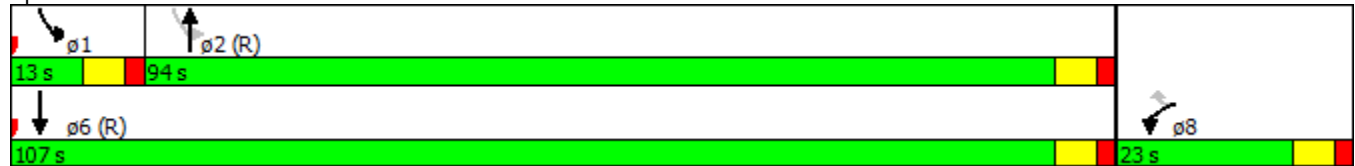


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Length 50th (ft)	36	0	479		1	69
Queue Length 95th (ft)	73	20	m524		m3	69
Internal Link Dist (ft)	446		143			140
Turn Bay Length (ft)						
Base Capacity (vph)	258	241	4086		234	4477
Starvation Cap Reductn	0	0	0		0	59
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.17	0.05	0.50		0.18	0.65

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBSB and 6:SBT, Start of 1st Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 7.6
 Intersection LOS: A
 Intersection Capacity Utilization 61.5%
 ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 23: Bull St. & Access #3



Lanes, Volumes, Timings
25: Access #5 & Colonial Drive



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↑		↻
Traffic Volume (vph)	452	14	0	252	0	11
Future Volume (vph)	452	14	0	252	0	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		75	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.996					0.865
Flt Protected						
Satd. Flow (prot)	1855	0	0	1863	0	1611
Flt Permitted						
Satd. Flow (perm)	1855	0	0	1863	0	1611
Link Speed (mph)	35			35	35	
Link Distance (ft)	298			342	305	
Travel Time (s)	5.8			6.7	5.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	502	16	0	280	0	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	518	0	0	280	0	12
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	34.6%
Analysis Period (min)	15
	ICU Level of Service A

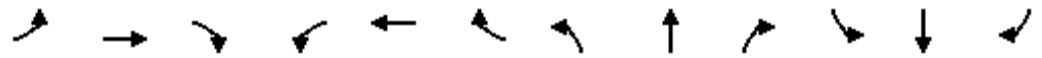
HCM Unsignalized Intersection Capacity Analysis
25: Access #5 & Colonial Drive



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	452	14	0	252	0	11
Future Volume (Veh/h)	452	14	0	252	0	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	502	16	0	280	0	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)	298					
pX, platoon unblocked						
vC, conflicting volume			518		790	510
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			518		790	510
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	98
cM capacity (veh/h)			1048		359	563
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	518	280	12			
Volume Left	0	0	0			
Volume Right	16	0	12			
cSH	1700	1700	563			
Volume to Capacity	0.30	0.16	0.02			
Queue Length 95th (ft)	0	0	2			
Control Delay (s)	0.0	0.0	11.5			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	11.5			
Approach LOS			B			
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			34.6%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
26: Access #6/Mental Health Dwy. & Colonial Drive

Bull Street Commons Traffic Study
2020 Background AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	369	7	19	235	171	16	0	11	6	0	1
Future Volume (vph)	86	369	7	19	235	171	16	0	11	6	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		0	0		0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.997			0.937			0.850				0.983
Flt Protected	0.950			0.950			0.950					0.958
Satd. Flow (prot)	1770	1857	0	1770	1745	0	1770	1583	0	0	1754	0
Flt Permitted	0.950			0.950			0.950					0.958
Satd. Flow (perm)	1770	1857	0	1770	1745	0	1770	1583	0	0	1754	0
Link Speed (mph)		35			35			35				35
Link Distance (ft)		342			433			354				258
Travel Time (s)		6.7			8.4			6.9				5.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	96	410	8	21	261	190	18	0	12	7	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	96	418	0	21	451	0	18	12	0	0	8	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	42.9%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 26: Access #6/Mental Health Dwy. & Colonial Drive

Bull Street Commons Traffic Study
 2020 Background AM

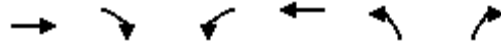


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	86	369	7	19	235	171	16	0	11	6	0	1
Future Volume (Veh/h)	86	369	7	19	235	171	16	0	11	6	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	96	410	8	21	261	190	18	0	12	7	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		640										
pX, platoon unblocked												
vC, conflicting volume	451			418			910	1099	414	1012	1008	356
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	451			418			910	1099	414	1012	1008	356
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			98			92	100	98	96	100	100
cM capacity (veh/h)	1109			1141			235	191	638	197	216	688

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	96	418	21	451	18	12	8
Volume Left	96	0	21	0	18	0	7
Volume Right	0	8	0	190	0	12	1
cSH	1109	1700	1141	1700	235	638	216
Volume to Capacity	0.09	0.25	0.02	0.27	0.08	0.02	0.04
Queue Length 95th (ft)	7	0	1	0	6	1	3
Control Delay (s)	8.6	0.0	8.2	0.0	21.6	10.7	22.3
Lane LOS	A		A		C	B	C
Approach Delay (s)	1.6		0.4		17.3		22.3
Approach LOS					C		C

Intersection Summary		
Average Delay		1.7
Intersection Capacity Utilization	42.9%	ICU Level of Service
Analysis Period (min)	15	A

Lanes, Volumes, Timings
27: Boyce St. & Colonial Drive

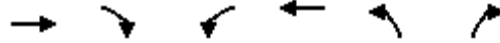


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	354	26	82	406	19	46
Future Volume (vph)	354	26	82	406	19	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		75	100		150	0
Storage Lanes		0	1		1	1
Taper Length (ft)			100		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.991					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1846	0	1770	1863	1770	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1846	0	1770	1863	1770	1583
Link Speed (mph)	35			35	35	
Link Distance (ft)	433			980	814	
Travel Time (s)	8.4			19.1	15.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	393	29	91	451	21	51
Shared Lane Traffic (%)						
Lane Group Flow (vph)	422	0	91	451	21	51
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	38.1%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
27: Boyce St. & Colonial Drive



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→		↵	↑	↵	↗
Traffic Volume (veh/h)	354	26	82	406	19	46
Future Volume (Veh/h)	354	26	82	406	19	46
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	393	29	91	451	21	51
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)	1073					
pX, platoon unblocked						
vC, conflicting volume			422		1040	408
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			422		1040	408
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			92		91	92
cM capacity (veh/h)			1137		235	644
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	422	91	451	21	51	
Volume Left	0	91	0	21	0	
Volume Right	29	0	0	0	51	
cSH	1700	1137	1700	235	644	
Volume to Capacity	0.25	0.08	0.27	0.09	0.08	
Queue Length 95th (ft)	0	7	0	7	6	
Control Delay (s)	0.0	8.4	0.0	21.9	11.1	
Lane LOS	A		C		B	
Approach Delay (s)	0.0	1.4	14.2			
Approach LOS					B	
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization			38.1%	ICU Level of Service		A
Analysis Period (min)	15					

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2020 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	15	20	512	3	263	7	2432	224	83	1130	9
Future Volume (vph)	24	15	20	512	3	263	7	2432	224	83	1130	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		200	675		0	175		0	200		250
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100			75			50			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt		0.915			0.852				0.850		0.999	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3238	0	3433	1587	0	1770	3539	1583	1770	5080	0
Flt Permitted	0.950			0.950			0.220			0.053		
Satd. Flow (perm)	1770	3238	0	3433	1587	0	410	3539	1583	99	5080	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			292				141			2
Link Speed (mph)		30			40			40				45
Link Distance (ft)		619			1038			1208				1992
Travel Time (s)		14.1			17.7			20.6				30.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.90	0.94	0.90
Adj. Flow (vph)	27	17	22	569	3	292	8	2673	246	92	1202	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	39	0	569	295	0	8	2673	246	92	1212	0
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	4	4		3	3			2	3	1	6	
Permitted Phases							2		2	6		
Detector Phase	4	4		3	3		2	2	3	1	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0		11.0	11.0		16.0	16.0	11.0	11.0	16.0	
Minimum Split (s)	30.0	30.0		17.0	17.0		30.0	30.0	17.0	17.0	30.0	
Total Split (s)	30.0	30.0		19.0	19.0		64.0	64.0	19.0	17.0	81.0	
Total Split (%)	23.1%	23.1%		14.6%	14.6%		49.2%	49.2%	14.6%	13.1%	62.3%	
Maximum Green (s)	24.0	24.0		13.0	13.0		58.0	58.0	13.0	11.0	75.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag	Lead	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	None	None	C-Max	
Walk Time (s)				5.0	5.0				5.0			
Flash Dont Walk (s)				10.0	10.0				10.0			
Pedestrian Calls (#/hr)				0	0				0			
Act Effct Green (s)	20.0	20.0		17.0	17.0		74.4	74.4	93.4	91.4	91.4	
Actuated g/C Ratio	0.15	0.15		0.13	0.13		0.57	0.57	0.72	0.70	0.70	
v/c Ratio	0.10	0.08		1.27	0.64		0.03	1.32	0.21	0.35	0.34	
Control Delay	48.5	26.5		180.3	17.0		13.4	165.5	0.3	18.7	8.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	48.5	26.5		180.3	17.0		13.4	165.5	0.3	18.7	8.6	

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2020 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	C		F	B		B	F	A	B	A	
Approach Delay		35.5			124.6			151.2				9.3
Approach LOS		D			F			F				A
Queue Length 50th (ft)	20	6		~316	67		1	~1566	0	25	149	
Queue Length 95th (ft)	49	24		#435	136		m3	#1700	m0	77	175	
Internal Link Dist (ft)		539			958			1128			1912	
Turn Bay Length (ft)	100			675			175			200		
Base Capacity (vph)	381	714		448	461		234	2025	1177	262	3572	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.05		1.27	0.64		0.03	1.32	0.21	0.35	0.34	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 119 (92%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.32
 Intersection Signal Delay: 109.4
 Intersection LOS: F
 Intersection Capacity Utilization 96.9%
 ICU Level of Service F
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Bull St. & Harden St. Ext.



Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

Bull Street Commons Traffic Study
2020 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	18	12	55	125	51	36	2527	9	7	1601	55
Future Volume (vph)	29	18	12	55	125	51	36	2527	9	7	1601	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	200		0	200		0	150		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			100			100			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Frt		0.941			0.956				0.850		0.995	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1753	0	1770	1781	0	1752	5085	1583	1770	5060	0
Flt Permitted	0.634			0.143			0.080			0.051		
Satd. Flow (perm)	1181	1753	0	266	1781	0	148	5085	1583	95	5060	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		602			376			654			1208	
Travel Time (s)		13.7			8.5			11.1			20.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.93	0.96
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%	2%
Adj. Flow (vph)	32	20	13	61	139	57	40	2660	10	8	1722	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	33	0	61	196	0	40	2660	10	8	1779	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			3			2			6	
Permitted Phases	4			3			2		2	6		
Detector Phase	4	4		3	3		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	30.0	30.0		30.0	30.0		70.0	70.0	70.0	70.0	70.0	
Total Split (%)	23.1%	23.1%		23.1%	23.1%		53.8%	53.8%	53.8%	53.8%	53.8%	
Maximum Green (s)	24.0	24.0		24.0	24.0		64.0	64.0	64.0	64.0	64.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Act Effct Green (s)	20.0	20.0		28.0	28.0		80.4	80.4	80.4	80.4	80.4	
Actuated g/C Ratio	0.15	0.15		0.22	0.22		0.62	0.62	0.62	0.62	0.62	
v/c Ratio	0.18	0.12		1.07	0.51		0.44	0.85	0.01	0.14	0.57	
Control Delay	50.8	48.9		189.4	50.4		38.1	33.7	12.2	19.6	18.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	46.4	0.0	0.0	0.0	
Total Delay	50.8	48.9		189.4	50.4		38.1	80.1	12.2	19.6	18.7	
LOS	D	D		F	D		D	F	B	B	B	
Approach Delay		49.8			83.4			79.2			18.7	

Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

Bull Street Commons Traffic Study
2020 Background PM



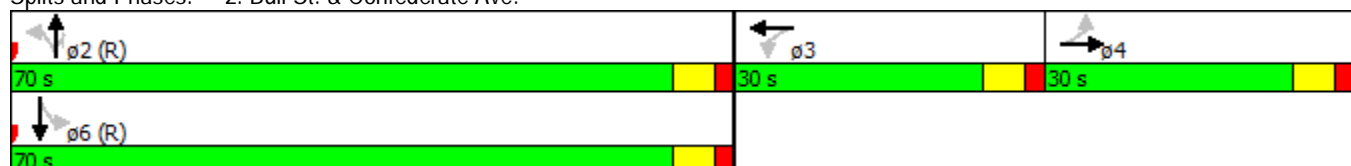
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	D		F					E		B		
Queue Length 50th (ft)	24	24		-57	147		31	849	4	3	442	
Queue Length 95th (ft)	56	57		#153	226		m43	905	m5	m7	m439	
Internal Link Dist (ft)		522			296			574				1128
Turn Bay Length (ft)	150			200			200			150		
Base Capacity (vph)	254	377		57	383		91	3144	979	58	3129	
Starvation Cap Reductn	0	0		0	0		0	757	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.13	0.09		1.07	0.51		0.44	1.11	0.01	0.14	0.57	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.07
 Intersection Signal Delay: 56.6
 Intersection LOS: E
 Intersection Capacity Utilization 79.6%
 ICU Level of Service D
 Analysis Period (min) 15

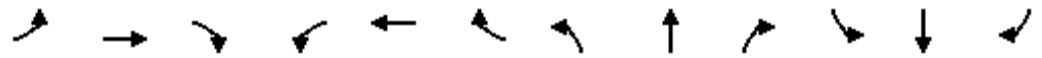
- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bull St. & Confederate Ave.



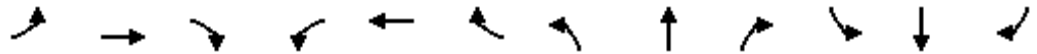
Lanes, Volumes, Timings
3: Bull St. & Colonial Drive

Bull Street Commons Traffic Study
2020 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗	↖	↔			↑↑↑		↘	↑↑↑	
Traffic Volume (vph)	0	0	4	409	7	104	0	2461	290	79	1541	25
Future Volume (vph)	0	0	4	409	7	104	0	2461	290	79	1541	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	150		0	0		0	200		0
Storage Lanes	0		1	1		0	0		0	1		0
Taper Length (ft)	25			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.865		0.939			0.983				0.997
Flt Protected				0.950	0.972					0.950		
Satd. Flow (prot)	0	0	1611	1681	1615	0	0	4999	0	1770	5070	0
Flt Permitted				0.950	0.972					0.040		
Satd. Flow (perm)	0	0	1611	1681	1615	0	0	4999	0	75	5070	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)			60		11			50				
Link Speed (mph)		35			35			40				40
Link Distance (ft)		440			314			204				654
Travel Time (s)		8.6			6.1			3.5				11.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.97	0.90	0.90	0.94	0.90
Adj. Flow (vph)	0	0	4	454	8	116	0	2537	322	88	1639	28
Shared Lane Traffic (%)				36%								
Lane Group Flow (vph)	0	0	4	291	287	0	0	2859	0	88	1667	0
Turn Type			Perm	Perm	NA			NA		Perm	NA	
Protected Phases					8			2				6
Permitted Phases			4	8						6		
Detector Phase			4	8	8			2		6		6
Switch Phase												
Minimum Initial (s)			16.0	16.0	16.0			16.0		16.0		16.0
Minimum Split (s)			30.0	30.0	30.0			30.0		30.0		30.0
Total Split (s)			30.0	30.0	30.0			100.0		100.0		100.0
Total Split (%)			23.1%	23.1%	23.1%			76.9%		76.9%		76.9%
Maximum Green (s)			24.0	24.0	24.0			94.0		94.0		94.0
Yellow Time (s)			4.0	4.0	4.0			4.0		4.0		4.0
All-Red Time (s)			2.0	2.0	2.0			2.0		2.0		2.0
Lost Time Adjust (s)			-4.0	-4.0	-4.0			-4.0		-4.0		-4.0
Total Lost Time (s)			2.0	2.0	2.0			2.0		2.0		2.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)			3.0	3.0	3.0			3.0		3.0		3.0
Recall Mode			None	None	None			C-Max		C-Max		C-Max
Act Effct Green (s)			27.1	27.1	27.1			98.9		98.9		98.9
Actuated g/C Ratio			0.21	0.21	0.21			0.76		0.76		0.76
v/c Ratio			0.01	0.83	0.83			0.75		1.54		0.43
Control Delay			0.0	73.8	72.3			21.3		339.0		6.2
Queue Delay			0.0	0.0	0.2			46.9		0.0		0.1
Total Delay			0.0	73.8	72.5			68.2		339.0		6.3
LOS			A	E	E			E		F		A
Approach Delay					73.1			68.2				23.0
Approach LOS					E			E				C

Lanes, Volumes, Timings
3: Bull St. & Colonial Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)			0	257	245			849		-102	129	
Queue Length 95th (ft)			0	#398	#390			898		m#204	m219	
Internal Link Dist (ft)		360			234			124				574
Turn Bay Length (ft)				150						200		
Base Capacity (vph)			394	362	356			3813		57	3855	
Starvation Cap Reductn			0	0	0			1373		0	835	
Spillback Cap Reductn			0	0	2			1064		0	0	
Storage Cap Reductn			0	0	0			0		0	0	
Reduced v/c Ratio			0.01	0.80	0.81			1.17		1.54	0.55	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 68 (52%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.54
 Intersection Signal Delay: 53.4
 Intersection LOS: D
 Intersection Capacity Utilization 87.0%
 ICU Level of Service E
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Bull St. & Colonial Drive



Lanes, Volumes, Timings
4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2020 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗		↑↑↑			↑↑↑	
Traffic Volume (vph)	0	0	6	0	0	15	0	2731	33	0	1940	6
Future Volume (vph)	0	0	6	0	0	15	0	2731	33	0	1940	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	50		0
Storage Lanes	0		1	0		1	0		0	0		0
Taper Length (ft)	25			25			75			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.865			0.865		0.998			0.999	
Flt Protected												
Satd. Flow (prot)	0	0	1611	0	0	1611	0	5075	0	0	5080	0
Flt Permitted												
Satd. Flow (perm)	0	0	1611	0	0	1611	0	5075	0	0	5080	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		519			596			242			224	
Travel Time (s)		10.1			11.6			4.1			3.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.94	0.90
Adj. Flow (vph)	0	0	7	0	0	17	0	2905	37	0	2064	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	7	0	0	17	0	2942	0	0	2071	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	63.5%
Analysis Period (min)	15
	ICU Level of Service B

HCM Unsignalized Intersection Capacity Analysis

4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2020 Background PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗		↑↑↑			↑↑↑	
Traffic Volume (veh/h)	0	0	6	0	0	15	0	2731	33	0	1940	6
Future Volume (Veh/h)	0	0	6	0	0	15	0	2731	33	0	1940	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.94	0.90
Hourly flow rate (vph)	0	0	7	0	0	17	0	2905	37	0	2064	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked	0.64	0.64	0.88	0.64	0.64	0.58	0.88			0.58		
vC, conflicting volume	3053	5010	692	3618	4994	987	2071			2942		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1030	4075	192	1911	4052	0	1753			1835		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	100	100	97	100			100		
cM capacity (veh/h)	117	2	722	26	2	634	313			192		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	7	17	1162	1162	618	826	826	420				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	7	17	0	0	37	0	0	7				
cSH	722	634	1700	1700	1700	1700	1700	1700				
Volume to Capacity	0.01	0.03	0.68	0.68	0.36	0.49	0.49	0.25				
Queue Length 95th (ft)	1	2	0	0	0	0	0	0				
Control Delay (s)	10.0	10.8	0.0	0.0	0.0	0.0	0.0	0.0				
Lane LOS	B	B										
Approach Delay (s)	10.0	10.8	0.0			0.0						
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization			63.5%		ICU Level of Service				B			
Analysis Period (min)			15									

Lanes, Volumes, Timings
5: Bull St. & Jefferson Street



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	19	6	2808	1937	17
Future Volume (vph)	0	19	6	2808	1937	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	175			0
Storage Lanes	0	1	1			0
Taper Length (ft)	25		100			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Frt		0.865			0.999	
Flt Protected			0.950			
Satd. Flow (prot)	0	1611	1770	5085	5080	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	1611	1770	5085	5080	0
Link Speed (mph)	35			40	40	
Link Distance (ft)	257			774	213	
Travel Time (s)	5.0			13.2	3.6	
Peak Hour Factor	0.90	0.90	0.90	0.95	0.96	0.90
Adj. Flow (vph)	0	21	7	2956	2018	19
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	21	7	2956	2037	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	57.6%
Analysis Period (min)	15
	ICU Level of Service B

HCM Unsignalized Intersection Capacity Analysis
5: Bull St. & Jefferson Street

Bull Street Commons Traffic Study
2020 Background PM



Movement	EBL	EBR	NBL	NBT	SBT	SBR			
Lane Configurations									
Traffic Volume (veh/h)	0	19	6	2808	1937	17			
Future Volume (Veh/h)	0	19	6	2808	1937	17			
Sign Control	Stop			Free	Free				
Grade	0%			0%	0%				
Peak Hour Factor	0.90	0.90	0.90	0.95	0.96	0.90			
Hourly flow rate (vph)	0	21	7	2956	2018	19			
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type				None	None				
Median storage veh									
Upstream signal (ft)				774	213				
pX, platoon unblocked	0.79	0.91	0.91						
vC, conflicting volume	3027	682	2037						
vC1, stage 1 conf vol									
vC2, stage 2 conf vol									
vCu, unblocked vol	1876	304	1793						
tC, single (s)	6.8	6.9	4.1						
tC, 2 stage (s)									
tF (s)	3.5	3.3	2.2						
p0 queue free %	100	97	98						
cM capacity (veh/h)	49	629	310						
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	
Volume Total	21	7	985	985	985	807	807	423	
Volume Left	0	7	0	0	0	0	0	0	
Volume Right	21	0	0	0	0	0	0	19	
cSH	629	310	1700	1700	1700	1700	1700	1700	
Volume to Capacity	0.03	0.02	0.58	0.58	0.58	0.47	0.47	0.25	
Queue Length 95th (ft)	3	2	0	0	0	0	0	0	
Control Delay (s)	10.9	16.9	0.0	0.0	0.0	0.0	0.0	0.0	
Lane LOS	B	C							
Approach Delay (s)	10.9	0.0					0.0		
Approach LOS	B								
Intersection Summary									
Average Delay			0.1						
Intersection Capacity Utilization			57.6%	ICU Level of Service	B				
Analysis Period (min)			15						

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1431	190	559	97	108	139	468	1266	91	35	677	1226
Future Volume (vph)	1431	190	559	97	108	139	468	1266	91	35	677	1226
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	775		230	125		0	175		0	100		0
Storage Lanes	1		1	1		0	1		0	1		1
Taper Length (ft)	50			50			125			50		
Lane Util. Factor	0.91	0.91	0.88	0.95	0.95	0.95	0.97	0.91	0.91	1.00	0.95	1.00
Frt			0.850		0.940			0.990				0.850
Flt Protected	0.950	0.963			0.986		0.950			0.950		
Satd. Flow (prot)	1610	3265	2787	0	3280	0	3433	5034	0	1770	3539	1583
Flt Permitted	0.950	0.963			0.986		0.950			0.138		
Satd. Flow (perm)	1610	3265	2787	0	3280	0	3433	5034	0	257	3539	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30				40
Link Distance (ft)		1012			313			526				774
Travel Time (s)		23.0			7.1			12.0				13.2
Peak Hour Factor	0.98	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1460	211	621	108	120	154	514	1407	101	39	752	1362
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	730	941	621	0	382	0	514	1508	0	39	752	1362
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Perm	NA	Free
Protected Phases	4	4	5	3	3		5	2			6	
Permitted Phases			4							6		Free
Detector Phase	4	4	5	3	3		5	2		6	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0	11.0	11.0	11.0		11.0	16.0		16.0	16.0	
Minimum Split (s)	30.0	30.0	17.0	17.0	17.0		17.0	30.0		30.0	30.0	
Total Split (s)	61.0	61.0	21.0	17.0	17.0		21.0	52.0		31.0	31.0	
Total Split (%)	46.9%	46.9%	16.2%	13.1%	13.1%		16.2%	40.0%		23.8%	23.8%	
Maximum Green (s)	55.0	55.0	15.0	11.0	11.0		15.0	46.0		25.0	25.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0	-4.0		-4.0		-4.0	-4.0		-4.0	-4.0	
Total Lost Time (s)	2.0	2.0	2.0		2.0		2.0	2.0		2.0	2.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead		Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		C-Max	C-Max	
Act Effct Green (s)	59.0	59.0	80.0		15.0		19.0	50.0		29.0	29.0	130.0
Actuated g/C Ratio	0.45	0.45	0.62		0.12		0.15	0.38		0.22	0.22	1.00
v/c Ratio	1.00	0.96dl	0.36		1.01		1.03	0.78		0.68	0.95	0.86
Control Delay	65.1	25.5	13.5		105.6		89.5	36.1		102.4	74.6	19.8
Queue Delay	0.0	0.0	0.0		0.0		0.0	1.8		0.0	0.0	0.0
Total Delay	65.1	25.5	13.6		105.6		89.5	37.9		102.4	74.6	19.8
LOS	E	C	B		F		F	D		F	E	B
Approach Delay		34.9			105.6			51.0			40.5	
Approach LOS		C			F			D			D	

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Background PM

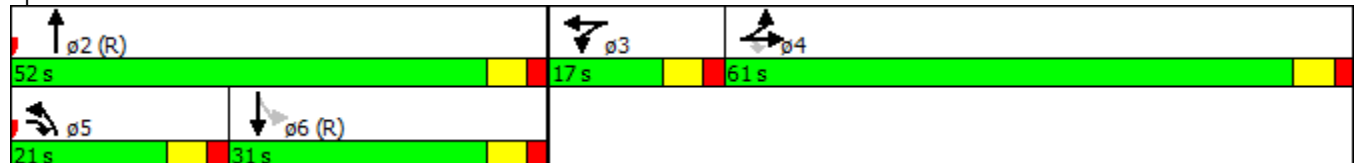


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	716	345	151		-174		-239	421		25	289	791
Queue Length 95th (ft)	#993	452	229		#282		m#348	m478		m#94	#449	988
Internal Link Dist (ft)		932			233			446			694	
Turn Bay Length (ft)	775		230				175			100		
Base Capacity (vph)	730	1481	1715		378		501	1936		57	789	1583
Starvation Cap Reductn	0	0	0		0		0	261		0	0	0
Spillback Cap Reductn	0	0	102		0		0	0		0	0	0
Storage Cap Reductn	0	0	0		0		0	0		0	0	0
Reduced v/c Ratio	1.00	0.64	0.38		1.01		1.03	0.90		0.68	0.95	0.86

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.03
 Intersection Signal Delay: 45.3
 Intersection LOS: D
 Intersection Capacity Utilization 103.1%
 ICU Level of Service G
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 6: Bull St. & Elmwood Avenue



Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

Bull Street Commons Traffic Study
2020 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	202	29	40	286	160	34	1672	48	87	1154	85
Future Volume (vph)	85	202	29	40	286	160	34	1672	48	87	1154	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	50			50			75			75		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.981			0.946			0.996				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3472	0	1770	3348	0	1770	3525	0	1770	3539	1583
Flt Permitted	0.225			0.467			0.183			0.075		
Satd. Flow (perm)	419	3472	0	870	3348	0	341	3525	0	140	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			43			6				94
Link Speed (mph)		30			30			30				30
Link Distance (ft)		937			677			1883				526
Travel Time (s)		21.3			15.4			42.8				12.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.92	0.90
Adj. Flow (vph)	94	224	32	44	318	178	38	1798	53	97	1254	94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	94	256	0	44	496	0	38	1851	0	97	1254	94
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2				6
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	16.0
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	30.0
Total Split (s)	31.0	31.0		31.0	31.0		99.0	99.0		99.0	99.0	99.0
Total Split (%)	23.8%	23.8%		23.8%	23.8%		76.2%	76.2%		76.2%	76.2%	76.2%
Maximum Green (s)	25.0	25.0		25.0	25.0		93.0	93.0		93.0	93.0	93.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	29.0	29.0		29.0	29.0		97.0	97.0		97.0	97.0	97.0
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.75	0.75		0.75	0.75	0.75
v/c Ratio	1.01	0.33		0.23	0.64		0.15	0.70		0.93	0.47	0.08
Control Delay	147.0	41.8		50.2	50.7		6.3	10.6		95.8	17.1	5.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.1		0.0	0.5	0.0
Total Delay	147.0	41.8		50.2	50.7		6.3	10.7		95.8	17.6	5.4
LOS	F	D		D	D		A	B		F	B	A
Approach Delay		70.1			50.7			10.6			22.1	
Approach LOS		E			D			B			C	

Lanes, Volumes, Timings
 7: Bull St. & Calhoun St.

Bull Street Commons Traffic Study
 2020 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	~81	91		33	195		8	383		79	427	17
Queue Length 95th (ft)	#198	133		72	261		20	455		m#129	m447	m25
Internal Link Dist (ft)		857			597			1803			446	
Turn Bay Length (ft)	150			175			150			150		
Base Capacity (vph)	93	783		194	780		254	2631		104	2640	1205
Starvation Cap Reductn	0	0		0	0		0	0		0	862	0
Spillback Cap Reductn	0	0		0	0		0	111		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.01	0.33		0.23	0.64		0.15	0.73		0.93	0.71	0.08

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 72 (55%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.01
 Intersection Signal Delay: 24.6 Intersection LOS: C
 Intersection Capacity Utilization 101.1% ICU Level of Service G
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Bull St. & Calhoun St.



Lanes, Volumes, Timings
9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Bull Street Commons Traffic Study
2020 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	539	152	414	423	53	97	394	932	75	540	43
Future Volume (vph)	44	539	152	414	423	53	97	394	932	75	540	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		800	175		0	225		0	300		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	100			75			75			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.967			0.983				0.850		0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3422	0	3433	3479	0	1770	3539	1583	1770	3498	0
Flt Permitted	0.456			0.950			0.317			0.435		
Satd. Flow (perm)	849	3422	0	3433	3479	0	590	3539	1583	810	3498	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		29			16				656			8
Link Speed (mph)		35			35			35				40
Link Distance (ft)		431			345			498				1949
Travel Time (s)		8.4			6.7			9.7				33.2
Peak Hour Factor	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Adj. Flow (vph)	49	599	169	445	470	59	108	438	981	83	600	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	768	0	445	529	0	108	438	981	83	648	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Free	Perm	NA	
Protected Phases		8		7	4			6				2
Permitted Phases	8						6		Free	2		
Detector Phase	8	8		7	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	16.0	16.0		11.0	16.0		16.0	16.0		16.0	16.0	
Minimum Split (s)	30.0	30.0		17.0	30.0		30.0	30.0		30.0	30.0	
Total Split (s)	42.0	42.0		28.0	70.0		60.0	60.0		60.0	60.0	
Total Split (%)	32.3%	32.3%		21.5%	53.8%		46.2%	46.2%		46.2%	46.2%	
Maximum Green (s)	36.0	36.0		22.0	64.0		54.0	54.0		54.0	54.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	36.8	36.8		24.5	63.3		62.7	62.7	130.0	62.7	62.7	
Actuated g/C Ratio	0.28	0.28		0.19	0.49		0.48	0.48	1.00	0.48	0.48	
v/c Ratio	0.20	0.78		0.69	0.31		0.38	0.26	0.62	0.21	0.38	
Control Delay	33.8	44.1		69.6	14.2		19.6	15.4	8.3	21.6	21.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	33.8	44.1		69.6	14.2		19.6	15.4	8.3	21.6	21.6	
LOS	C	D		E	B		B	B	A	C	C	
Approach Delay		43.5			39.5			11.1			21.6	

Lanes, Volumes, Timings
 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Bull Street Commons Traffic Study
 2020 Background PM

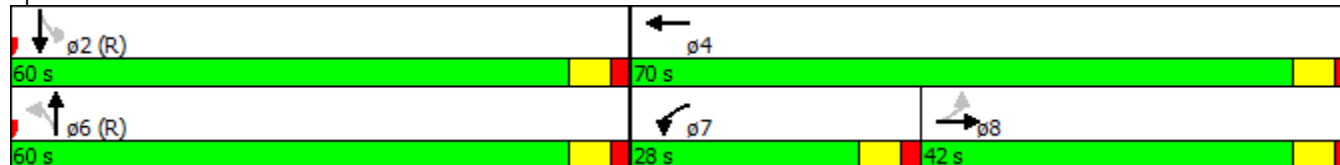


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			B			C	
Queue Length 50th (ft)	32	315		199	97		31	65	351	41	188	
Queue Length 95th (ft)	m54	m361		256	140		m63	103	717	82	242	
Internal Link Dist (ft)		351			265			418			1869	
Turn Bay Length (ft)	225			175			225			300		
Base Capacity (vph)	261	1073		686	1827		284	1707	1583	390	1692	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.19	0.72		0.65	0.29		0.38	0.26	0.62	0.21	0.38	

Intersection Summary

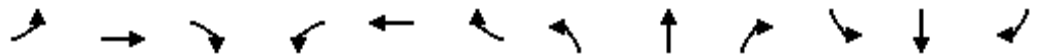
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 95 (73%), Referenced to phase 2:SBTL and 6:NBTL, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 26.4
 Intersection LOS: C
 Intersection Capacity Utilization 74.5%
 ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive



Lanes, Volumes, Timings
10: Harden St./Harden Street Ext & Calhoun St.

Bull Street Commons Traffic Study
2020 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	140	46	242	22	30	11	257	1064	46	59	914	82
Future Volume (vph)	140	46	242	22	30	11	257	1064	46	59	914	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	50		0	0		325	300		200
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	100			25			25			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Frt		0.874			0.960			0.994				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1628	0	1770	1788	0	1770	5055	0	1770	3539	1583
Flt Permitted	0.728			0.191			0.209			0.206		
Satd. Flow (perm)	1356	1628	0	356	1788	0	389	5055	0	384	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		193			12			8				122
Link Speed (mph)		30			35			35				35
Link Distance (ft)		1071			821			1286				484
Travel Time (s)		24.3			16.0			25.1				9.4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	156	51	269	24	33	12	286	1182	51	66	1016	91
Shared Lane Traffic (%)												
Lane Group Flow (vph)	156	320	0	24	45	0	286	1233	0	66	1016	91
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	1.0	1.0		11.0	11.0		9.0	14.0		9.0	14.0	14.0
Minimum Split (s)	6.5	6.5		30.0	30.0		15.0	30.0		15.0	30.0	30.0
Total Split (s)	37.0	37.0		37.0	37.0		34.0	78.0		15.0	59.0	59.0
Total Split (%)	28.5%	28.5%		28.5%	28.5%		26.2%	60.0%		11.5%	45.4%	45.4%
Maximum Green (s)	31.5	31.5		31.5	31.5		28.0	72.0		9.0	53.0	53.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.5	1.5		1.5	1.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	0.0		0.0	0.0		-3.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	2.5	5.5		5.5	5.5		3.0	3.0		6.0	3.0	3.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	23.9	20.9		20.9	20.9		100.2	88.6		85.5	79.5	79.5
Actuated g/C Ratio	0.18	0.16		0.16	0.16		0.77	0.68		0.66	0.61	0.61
v/c Ratio	0.63	0.76		0.42	0.15		0.58	0.36		0.19	0.47	0.09
Control Delay	51.4	23.7		69.1	35.2		10.0	10.3		5.4	14.0	3.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	51.4	23.7		69.1	35.2		10.0	10.3		5.4	14.0	3.8
LOS	D	C		E	D		A	B		A	B	A
Approach Delay		32.8			47.0			10.2			12.8	
Approach LOS		C			D			B			B	

Lanes, Volumes, Timings
 10: Harden St./Harden Street Ext & Calhoun St.

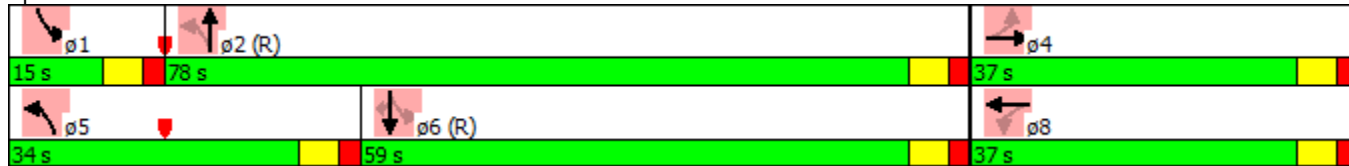


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	128	32		18	24		56	158		3	265	5
Queue Length 95th (ft)	m182	m201		46	56		111	227		m26	434	m40
Internal Link Dist (ft)		991			741			1206			404	
Turn Bay Length (ft)	225			50						300		200
Base Capacity (vph)	359	540		86	442		630	3448		348	2163	1015
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.43	0.59		0.28	0.10		0.45	0.36		0.19	0.47	0.09

Intersection Summary

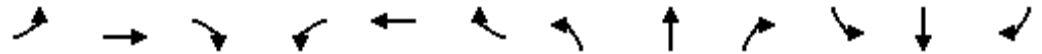
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 34 (26%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 15.2
 Intersection LOS: B
 Intersection Capacity Utilization 69.0%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Harden St./Harden Street Ext & Calhoun St.



Lanes, Volumes, Timings
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2020 Background PM



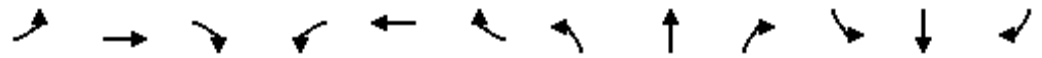
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	336	10	6	299	65	17	14	20	54	29	62
Future Volume (vph)	47	336	10	6	299	65	17	14	20	54	29	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	275		0	0		0	300		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	100			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.973			0.948				0.898
Flt Protected	0.950			0.950				0.984		0.950		
Satd. Flow (prot)	1770	1851	0	1770	1812	0	0	1738	0	1770	1673	0
Flt Permitted	0.950			0.950				0.984		0.950		
Satd. Flow (perm)	1770	1851	0	1770	1812	0	0	1738	0	1770	1673	0
Link Speed (mph)		35			30			35				35
Link Distance (ft)		522			1071			385				2969
Travel Time (s)		10.2			24.3			7.5				57.8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	11%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	52	373	11	7	332	72	19	16	22	60	32	69
Shared Lane Traffic (%)												
Lane Group Flow (vph)	52	384	0	7	404	0	0	57	0	60	101	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	42.6%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2020 Background PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	47	336	10	6	299	65	17	14	20	54	29	62
Future Volume (Veh/h)	47	336	10	6	299	65	17	14	20	54	29	62
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	52	373	11	7	332	72	19	16	22	60	32	69
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh		2			2							
Upstream signal (ft)					1071							
pX, platoon unblocked	0.97						0.97	0.97		0.97	0.97	0.97
vC, conflicting volume	404			384			914	900	378	889	870	368
vC1, stage 1 conf vol							482	482		382	382	
vC2, stage 2 conf vol							431	418		507	488	
vCu, unblocked vol	375			384			898	885	378	873	853	338
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			99			95	96	97	86	93	90
cM capacity (veh/h)	1153			1174			390	432	668	428	450	686
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total	52	384	7	404	57	60	101					
Volume Left	52	0	7	0	19	60	0					
Volume Right	0	11	0	72	22	0	69					
cSH	1153	1700	1174	1700	480	428	588					
Volume to Capacity	0.05	0.23	0.01	0.24	0.12	0.14	0.17					
Queue Length 95th (ft)	4	0	0	0	10	12	15					
Control Delay (s)	8.3	0.0	8.1	0.0	13.5	14.8	12.4					
Lane LOS	A		A		B	B	B					
Approach Delay (s)	1.0		0.1		13.5	13.3						
Approach LOS					B	B						
Intersection Summary												
Average Delay			3.2									
Intersection Capacity Utilization			42.6%		ICU Level of Service		A					
Analysis Period (min)			15									

Lanes, Volumes, Timings
12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2020 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	485	40	102	511	10	33	2	112	39	12	29
Future Volume (vph)	1	485	40	102	511	10	33	2	112	39	12	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		225	50		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.989			0.997			0.852				0.893
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1834	0	1770	1857	0	1703	1587	0	1770	1663	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1834	0	1770	1857	0	1703	1587	0	1770	1663	0
Link Speed (mph)		35			35			35				35
Link Distance (ft)		949			210			2969				473
Travel Time (s)		18.5			4.1			57.8				9.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90
Heavy Vehicles (%)	2%	2%	8%	2%	2%	2%	6%	2%	2%	2%	2%	2%
Adj. Flow (vph)	1	539	44	113	568	11	37	2	124	43	13	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	583	0	113	579	0	37	126	0	43	45	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	52.4%
Analysis Period (min)	15
	ICU Level of Service A












HCM Unsignalized Intersection Capacity Analysis
 12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
 2020 Background PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	1	485	40	102	511	10	33	2	112	39	12	29	
Future Volume (Veh/h)	1	485	40	102	511	10	33	2	112	39	12	29	
Sign Control		Free			Free			Stop			Stop		
Grade		0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	
Hourly flow rate (vph)	1	539	44	113	568	11	37	2	124	43	13	32	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None					None							
Median storage (veh)													
Upstream signal (ft)												1217	
pX, platoon unblocked	0.88						0.88	0.88					0.88
vC, conflicting volume	579						583	1396	1368	561	1466	1384	574
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	451						583	1381	1350	561	1461	1368	445
tC, single (s)	4.1						4.1	7.2	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)													
tF (s)	2.2						2.2	3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100						89	55	98	76	33	89	94
cM capacity (veh/h)	974						991	82	117	527	65	114	538
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2					
Volume Total	1	583	113	579	37	126	43	45					
Volume Left	1	0	113	0	37	0	43	0					
Volume Right	0	44	0	11	0	124	0	32					
cSH	974	1700	991	1700	82	499	65	259					
Volume to Capacity	0.00	0.34	0.11	0.34	0.45	0.25	0.67	0.17					
Queue Length 95th (ft)	0	0	10	0	46	25	72	15					
Control Delay (s)	8.7	0.0	9.1	0.0	80.9	14.6	134.9	21.8					
Lane LOS	A		A		F	B	F	C					
Approach Delay (s)	0.0	1.5		29.7			77.0						
Approach LOS					D		F						
Intersection Summary													
Average Delay			8.3										
Intersection Capacity Utilization			52.4%		ICU Level of Service				A				
Analysis Period (min)			15										

Lanes, Volumes, Timings
13: Harden Street Ext & Slighs Ave.

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	84	215	1125	70	130	995
Future Volume (vph)	84	215	1125	70	130	995
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		50	100	
Storage Lanes	1	0		1	1	
Taper Length (ft)	25				50	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	0.903			0.850		
Flt Protected	0.986				0.950	
Satd. Flow (prot)	1659	0	3539	1495	1736	3539
Flt Permitted	0.986				0.145	
Satd. Flow (perm)	1659	0	3539	1495	265	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	99			21		
Link Speed (mph)	30		35			35
Link Distance (ft)	359		2501			498
Travel Time (s)	8.2		48.7			9.7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.91
Heavy Vehicles (%)	2%	2%	2%	8%	4%	2%
Adj. Flow (vph)	93	239	1250	78	144	1093
Shared Lane Traffic (%)						
Lane Group Flow (vph)	332	0	1250	78	144	1093
Turn Type	Perm		NA	Perm	pm+pt	NA
Protected Phases			6		5	2
Permitted Phases	4			6	2	
Detector Phase	4		6	6	5	2
Switch Phase						
Minimum Initial (s)	16.0		16.0	16.0	11.0	16.0
Minimum Split (s)	30.0		30.0	30.0	17.0	30.0
Total Split (s)	39.0		72.0	72.0	19.0	91.0
Total Split (%)	30.0%		55.4%	55.4%	14.6%	70.0%
Maximum Green (s)	33.0		66.0	66.0	13.0	85.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0		-4.0	-2.0	-4.0	-4.0
Total Lost Time (s)	2.0		2.0	4.0	2.0	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		C-Max	C-Max	None	C-Max
Act Effct Green (s)	28.6		80.2	78.2	97.4	97.4
Actuated g/C Ratio	0.22		0.62	0.60	0.75	0.75
v/c Ratio	0.75		0.57	0.09	0.39	0.41
Control Delay	43.2		15.5	5.4	14.1	6.8
Queue Delay	0.0		0.0	0.0	0.0	0.1
Total Delay	43.2		15.5	5.4	14.1	7.0
LOS	D		B	A	B	A
Approach Delay	43.2		14.9			7.8

Lanes, Volumes, Timings
 13: Harden Street Ext & Slighs Ave.



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	D		B		A	
Queue Length 50th (ft)	188		369	16	37	121
Queue Length 95th (ft)	276		517	37	m71	190
Internal Link Dist (ft)	279		2421			418
Turn Bay Length (ft)				50	100	
Base Capacity (vph)	543		2182	907	390	2651
Starvation Cap Reductn	0		0	0	0	568
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.61		0.57	0.09	0.37	0.52

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 86 (66%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 15.1
 Intersection LOS: B
 Intersection Capacity Utilization 68.2%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 13: Harden Street Ext & Slighs Ave.



Lanes, Volumes, Timings
14: Colonial Drive & Farrow Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Lane Configurations		↗↗	↖	↑↑	↑↓		
Traffic Volume (vph)	0	181	275	1155	624	26	
Future Volume (vph)	0	181	275	1155	624	26	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0	330	550			0	
Storage Lanes	0	1	1			0	
Taper Length (ft)	25		125				
Lane Util. Factor	1.00	0.88	1.00	0.95	0.95	0.95	
Frt		0.850			0.994		
Flt Protected			0.950				
Satd. Flow (prot)	0	2787	1770	3539	3518	0	
Flt Permitted			0.950				
Satd. Flow (perm)	0	2787	1770	3539	3518	0	
Right Turn on Red		Yes				No	
Satd. Flow (RTOR)		297					
Link Speed (mph)	35			35	35		
Link Distance (ft)	1114			654	2010		
Travel Time (s)	21.7			12.7	39.2		
Peak Hour Factor	0.90	0.90	0.96	0.90	0.92	0.90	
Adj. Flow (vph)	0	201	286	1283	678	29	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	201	286	1283	707	0	
Turn Type		Over	Prot	NA	NA		
Protected Phases		8	8	8 6	2	6	
Permitted Phases				8			
Detector Phase		8	8	8 6	2		
Switch Phase							
Minimum Initial (s)		16.0	16.0		16.0	11.0	
Minimum Split (s)		30.0	30.0		30.0	30.0	
Total Split (s)		32.0	32.0		33.0	33.0	
Total Split (%)		49.2%	49.2%		50.8%	51%	
Maximum Green (s)		26.0	26.0		27.0	27.5	
Yellow Time (s)		4.0	4.0		4.0	4.0	
All-Red Time (s)		2.0	2.0		2.0	1.5	
Lost Time Adjust (s)		-3.0	-3.0		-4.0		
Total Lost Time (s)		3.0	3.0		2.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0	3.0		3.0	3.0	
Recall Mode		None	None		C-Max	C-Max	
Act Effct Green (s)		24.8	24.8	65.0	35.2		
Actuated g/C Ratio		0.38	0.38	1.00	0.54		
v/c Ratio		0.16	0.42	0.36	0.37		
Control Delay		0.7	10.7	0.2	12.2		
Queue Delay		0.0	0.0	0.0	0.0		
Total Delay		0.7	10.7	0.2	12.2		
LOS		A	B	A	B		
Approach Delay				2.1	12.2		
Approach LOS				A	B		

Lanes, Volumes, Timings
 14: Colonial Drive & Farrow Road

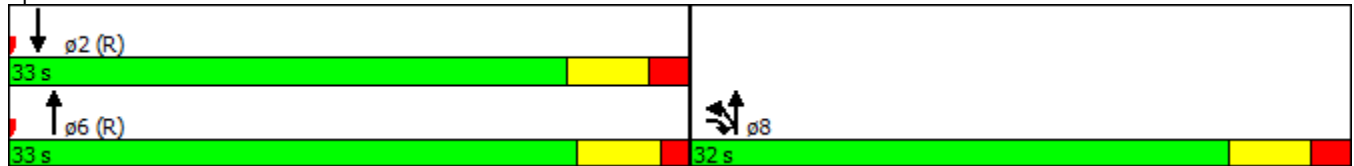


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Queue Length 50th (ft)		0	59	0	108		
Queue Length 95th (ft)		5	97	0	m165		
Internal Link Dist (ft)	1034			574	1930		
Turn Bay Length (ft)		330	550				
Base Capacity (vph)		1407	789	3539	1906		
Starvation Cap Reductn		0	0	0	0		
Spillback Cap Reductn		0	0	0	0		
Storage Cap Reductn		0	0	0	0		
Reduced v/c Ratio		0.14	0.36	0.36	0.37		

Intersection Summary

Area Type: Other
 Cycle Length: 65
 Actuated Cycle Length: 65
 Offset: 42 (65%), Referenced to phase 2:SBT and 6:NBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.42
 Intersection Signal Delay: 4.9
 Intersection LOS: A
 Intersection Capacity Utilization 40.0%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: Colonial Drive & Farrow Road



Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
2020 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	564	12	194	531	395	0	1148	297	294	518	51
Future Volume (vph)	94	564	12	194	531	395	0	1148	297	294	518	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		0	300		0	0		225	200		0
Storage Lanes	1		0	2		1	0		1	1		0
Taper Length (ft)	125			100			25			125		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.997				0.850			0.850		0.986	
Flt Protected	0.950			0.950						0.950		
Satd. Flow (prot)	1770	3529	0	3433	3539	1583	0	3539	1583	1770	3490	0
Flt Permitted	0.429			0.950						0.072		
Satd. Flow (perm)	799	3529	0	3433	3539	1583	0	3539	1583	134	3490	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				17			143		14	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1548			1446			2010			864	
Travel Time (s)		30.2			28.2			39.2			16.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	0.94	0.90	0.90
Adj. Flow (vph)	104	627	13	216	590	439	0	1276	309	313	576	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	104	640	0	216	590	439	0	1276	309	313	633	0
Turn Type	Perm	NA		Prot	NA	pm+ov		NA	Free	pm+pt	NA	
Protected Phases		4		3	8	1		2		1	6	
Permitted Phases	4					8			Free	6		
Detector Phase	4	4		3	8	1		2		1	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0	5.0		15.0		5.0	15.0	
Minimum Split (s)	30.0	30.0		21.0	41.0	17.0		41.0		17.0	30.0	
Total Split (s)	30.0	30.0		21.0	51.0	24.0		55.0		24.0	79.0	
Total Split (%)	23.1%	23.1%		16.2%	39.2%	18.5%		42.3%		18.5%	60.8%	
Maximum Green (s)	25.0	25.0		16.0	46.0	19.0		50.0		19.0	74.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5		3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5	1.5		1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0		-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead		Lead		Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Recall Mode	None	None		None	None	None		C-Min		None	C-Min	
Walk Time (s)					18.0			18.0				
Flash Dont Walk (s)					5.0			5.0				
Pedestrian Calls (#/hr)					0			0				
Act Effct Green (s)	26.3	26.3		16.2	46.5	70.6		51.4	130.0	75.5	75.5	
Actuated g/C Ratio	0.20	0.20		0.12	0.36	0.54		0.40	1.00	0.58	0.58	
v/c Ratio	0.65	0.90		0.51	0.47	0.51		0.91	0.20	0.95	0.31	
Control Delay	67.2	66.5		57.7	33.5	20.3		48.4	0.3	89.2	9.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	67.2	66.5		57.7	33.5	20.3		48.4	0.3	89.2	9.0	

Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	E		E	C	C		D	A	F	A	
Approach Delay		66.6			33.1			39.0			35.6	
Approach LOS		E			C			D			D	
Queue Length 50th (ft)	81	276		89	199	214		532	0	243	98	
Queue Length 95th (ft)	#163	#387		129	254	306		#678	0	#409	118	
Internal Link Dist (ft)		1468			1366			1930			784	
Turn Bay Length (ft)	175			300					225	200		
Base Capacity (vph)	163	722		448	1279	867		1400	1583	330	2031	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.64	0.89		0.48	0.46	0.51		0.91	0.20	0.95	0.31	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.95
 Intersection Signal Delay: 41.2
 Intersection LOS: D
 Intersection Capacity Utilization 89.8%
 ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 15: Farrow Road & Beltline Blvd



Lanes, Volumes, Timings
16: Farrow Road & 277 NB RAMPS

Bull Street Commons Traffic Study
2020 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	159	0	15	0	0	0	0	899	760	66	822	0
Future Volume (vph)	159	0	15	0	0	0	0	899	760	66	822	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	0		0	0		0	250		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			25			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.850						0.932				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1770	1583	0	0	0	0	0	3299	0	1770	3539	0
Flt Permitted	0.950									0.092		
Satd. Flow (perm)	1770	1583	0	0	0	0	0	3299	0	171	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		225						439				
Link Speed (mph)		35			35			35				35
Link Distance (ft)		827			779			864				694
Travel Time (s)		16.1			15.2			16.8				13.5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.92	0.90
Adj. Flow (vph)	177	0	17	0	0	0	0	999	826	73	893	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	177	17	0	0	0	0	0	1825	0	73	893	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						6			2	
Permitted Phases	4									2		
Detector Phase	4	4						6		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0						10.0		10.0	10.0	
Minimum Split (s)	30.0	30.0						30.0		30.0	30.0	
Total Split (s)	30.0	30.0						100.0		100.0	100.0	
Total Split (%)	23.1%	23.1%						76.9%		76.9%	76.9%	
Maximum Green (s)	25.0	25.0						95.0		95.0	95.0	
Yellow Time (s)	3.5	3.5						3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5						1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0						-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0						4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Recall Mode	None	None						C-Max		C-Max	C-Max	
Act Effct Green (s)	19.2	19.2						102.8		102.8	102.8	
Actuated g/C Ratio	0.15	0.15						0.79		0.79	0.79	
v/c Ratio	0.68	0.04						0.68		0.54	0.32	
Control Delay	65.0	0.2						3.6		30.2	6.8	
Queue Delay	0.0	0.0						0.5		0.0	0.0	
Total Delay	65.0	0.2						4.1		30.2	6.8	
LOS	E	A						A		C	A	
Approach Delay		59.3						4.1			8.5	
Approach LOS		E						A			A	

Lanes, Volumes, Timings
 16: Farrow Road & 277 NB RAMPS



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	143	0						41		22	166	
Queue Length 95th (ft)	211	0						80		#118	164	
Internal Link Dist (ft)		747			699			784			614	
Turn Bay Length (ft)	300									250		
Base Capacity (vph)	354	496						2700		135	2798	
Starvation Cap Reductn	0	0						409		0	0	
Spillback Cap Reductn	0	0						0		0	0	
Storage Cap Reductn	0	0						0		0	0	
Reduced v/c Ratio	0.50	0.03						0.80		0.54	0.32	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 9.1
 Intersection LOS: A
 Intersection Capacity Utilization 70.3%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 16: Farrow Road & 277 NB RAMPS



Lanes, Volumes, Timings
 17: Farrow Road & Lorick Avenue /277 SB Ramps

Bull Street Commons Traffic Study
 2020 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	0	41	328	17	49	25	1033	0	0	516	146
Future Volume (vph)	34	0	41	328	17	49	25	1033	0	0	516	146
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	125		0	200		0	0		0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (ft)	25			150			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850		0.889							0.967
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1770	0	1583	1770	1656	0	1770	3539	0	0	3422	0
Flt Permitted	0.708			0.950			0.340					
Satd. Flow (perm)	1319	0	1583	1770	1656	0	633	3539	0	0	3422	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			46		53							41
Link Speed (mph)		35			35			35				35
Link Distance (ft)		467			1041			694				870
Travel Time (s)		9.1			20.3			13.5				16.9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	38	0	46	364	19	54	28	1148	0	0	573	162
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	0	46	364	73	0	28	1148	0	0	735	0
Turn Type	Perm		Perm	Perm	NA		Perm	NA			NA	
Protected Phases					4			2				6
Permitted Phases	8		8	4			2					
Detector Phase	8		8	4	4		2	2				6
Switch Phase												
Minimum Initial (s)	10.0		10.0	10.0	10.0		10.0	10.0				10.0
Minimum Split (s)	30.0		30.0	30.0	30.0		30.0	30.0				30.0
Total Split (s)	60.0		60.0	60.0	60.0		70.0	70.0				70.0
Total Split (%)	46.2%		46.2%	46.2%	46.2%		53.8%	53.8%				53.8%
Maximum Green (s)	55.0		55.0	55.0	55.0		65.0	65.0				65.0
Yellow Time (s)	3.5		3.5	3.5	3.5		3.5	3.5				3.5
All-Red Time (s)	1.5		1.5	1.5	1.5		1.5	1.5				1.5
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0		-1.0	-1.0				-1.0
Total Lost Time (s)	4.0		4.0	4.0	4.0		4.0	4.0				4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0				3.0
Recall Mode	None		None	None	None		C-Max	C-Max				C-Max
Act Effct Green (s)	34.2		34.2	34.2	34.2		87.8	87.8				87.8
Actuated g/C Ratio	0.26		0.26	0.26	0.26		0.68	0.68				0.68
v/c Ratio	0.11		0.10	0.78	0.15		0.07	0.48				0.32
Control Delay	33.9		9.0	55.8	13.0		11.0	11.9				9.4
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.2				0.0
Total Delay	33.9		9.0	55.8	13.0		11.0	12.1				9.4
LOS	C		A	E	B		B	B				A
Approach Delay					48.6			12.1				9.4
Approach LOS					D			B				A

Lanes, Volumes, Timings
 17: Farrow Road & Lorick Avenue /277 SB Ramps

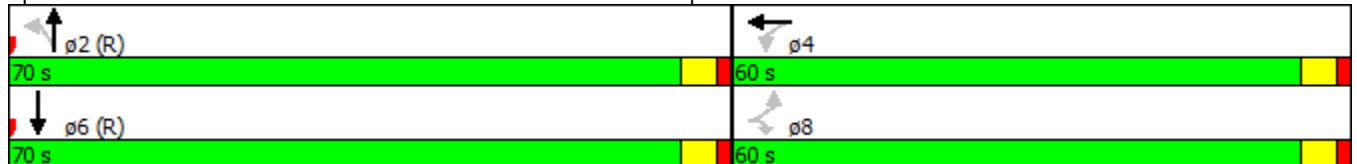


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	24		0	286	13		7	214			115	
Queue Length 95th (ft)	48		28	359	46		m14	327			188	
Internal Link Dist (ft)		387			961			614			790	
Turn Bay Length (ft)				125			200					
Base Capacity (vph)	568		708	762	743		427	2389			2323	
Starvation Cap Reductn	0		0	0	0		0	481			0	
Spillback Cap Reductn	0		0	0	0		0	0			0	
Storage Cap Reductn	0		0	0	0		0	0			0	
Reduced v/c Ratio	0.07		0.06	0.48	0.10		0.07	0.60			0.32	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 18.1
 Intersection LOS: B
 Intersection Capacity Utilization 55.4%
 ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 17: Farrow Road & Lorick Avenue /277 SB Ramps



Lanes, Volumes, Timings
18: Assembly St./Assembly & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1790	279	357	2065	8	1062	9	606	0	0	1
Future Volume (vph)	0	1790	279	357	2065	8	1062	9	606	0	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		275	150		0	0		0	0		0
Storage Lanes	1		1	1		0	2		1	0		0
Taper Length (ft)	150			75			25			25		
Lane Util. Factor	1.00	0.86	0.86	0.97	0.91	0.91	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850		0.999				0.850		0.865	
Flt Protected				0.950			0.950					
Satd. Flow (prot)	1863	4806	1362	3433	5080	0	3433	1770	1504	0	1611	0
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	1863	4806	1362	3433	5080	0	3433	1770	1504	0	1611	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			282		1				92		126	
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		2522			509			585			432	
Travel Time (s)		57.3			11.6			13.3			8.4	
Peak Hour Factor	0.90	0.94	0.90	0.90	0.92	0.90	0.93	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1904	310	397	2245	9	1142	10	673	0	0	1
Shared Lane Traffic (%)			0%						0%			
Lane Group Flow (vph)	0	1904	310	397	2254	0	1142	10	673	0	1	0
Turn Type	Perm	NA	pm+ov	Prot	NA		Split	NA	pm+ov		NA	
Protected Phases		2	3	1	6		3	3	1		4	
Permitted Phases	2		2						3	4		
Detector Phase	2	2	3	1	6		3	3	1	4	4	
Switch Phase												
Minimum Initial (s)	16.0	16.0	11.0	11.0	16.0		11.0	11.0	11.0	4.5	4.5	
Minimum Split (s)	30.0	30.0	17.0	17.0	30.0		17.0	17.0	17.0	10.0	10.0	
Total Split (s)	56.0	56.0	44.0	20.0	76.0		44.0	44.0	20.0	10.0	10.0	
Total Split (%)	43.1%	43.1%	33.8%	15.4%	58.5%		33.8%	33.8%	15.4%	7.7%	7.7%	
Maximum Green (s)	50.0	50.0	38.0	14.0	70.0		38.0	38.0	14.0	4.5	4.5	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	1.5	1.5	
Lost Time Adjust (s)	0.0	-4.0	-4.0	-4.0	-4.0		-4.0	0.0	-4.0		-1.5	
Total Lost Time (s)	6.0	2.0	2.0	2.0	2.0		2.0	6.0	2.0		4.0	
Lead/Lag	Lead	Lead	Lead	Lag			Lead	Lead	Lag	Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max	None	None	C-Max		None	None	None	None	None	
Act Effct Green (s)		62.0	105.6	18.0	82.0		42.0	38.0	62.0		6.0	
Actuated g/C Ratio		0.48	0.81	0.14	0.63		0.32	0.29	0.48		0.05	
v/c Ratio		0.83	0.27	0.84	0.70		1.03	0.02	0.88		0.01	
Control Delay		33.9	1.0	61.8	11.2		78.0	33.0	40.9		0.0	
Queue Delay		0.0	0.0	0.0	1.5		0.0	0.0	0.0		0.0	
Total Delay		33.9	1.0	61.8	12.7		78.0	33.0	40.9		0.0	
LOS		C	A	E	B		E	C	D		A	
Approach Delay		29.3			20.1			64.1			0.0	
Approach LOS		C			C			E			A	

Lanes, Volumes, Timings
 18: Assembly St./Assembly & Elmwood Avenue

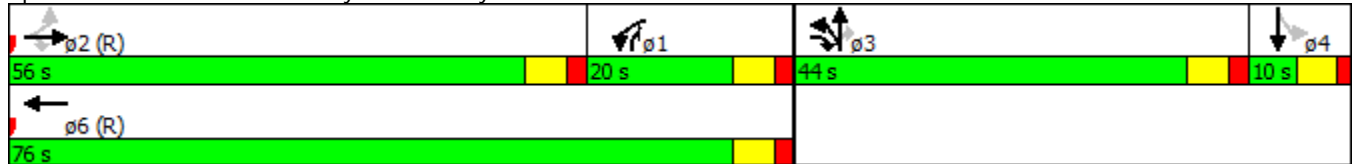


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		509	3	181	164		-529	6	469		0	
Queue Length 95th (ft)		#716	19	m#217	578		#665	21	#738		0	
Internal Link Dist (ft)		2442			429			505			352	
Turn Bay Length (ft)			275	150								
Base Capacity (vph)		2292	1159	475	3204		1109	517	765		194	
Starvation Cap Reductn		0	0	0	709		0	0	0		0	
Spillback Cap Reductn		0	0	0	0		0	0	0		0	
Storage Cap Reductn		0	0	0	0		0	0	0		0	
Reduced v/c Ratio		0.83	0.27	0.84	0.90		1.03	0.02	0.88		0.01	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 28 (22%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.03
 Intersection Signal Delay: 35.1
 Intersection LOS: D
 Intersection Capacity Utilization 103.7%
 ICU Level of Service G
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Assembly St./Assembly & Elmwood Avenue



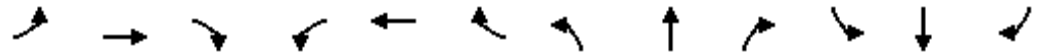
Lanes, Volumes, Timings
19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↑↑↑	↗	↖	↑↑↑		↖	↑↑	↗	↖	↑↓	↗
Traffic Volume (vph)	517	1737	75	18	1662	101	150	496	61	167	209	498
Future Volume (vph)	517	1737	75	18	1662	101	150	496	61	167	209	498
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		175	150		0	200		0	175		425
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	75			75			100			75		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850		0.991				0.850		0.939	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	1770	5040	0	1770	3539	1583	1770	3183	1441
Flt Permitted	0.950			0.119			0.308			0.151		
Satd. Flow (perm)	3433	5085	1583	222	5040	0	574	3539	1583	281	3183	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			83		9				126		97	76
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		509			563			693			3655	
Travel Time (s)		11.6			12.8			15.8			83.1	
Peak Hour Factor	0.91	0.97	0.90	0.90	0.95	0.90	0.90	0.90	0.90	0.90	0.95	0.90
Adj. Flow (vph)	568	1791	83	20	1749	112	167	551	68	186	220	553
Shared Lane Traffic (%)												27%
Lane Group Flow (vph)	568	1791	83	20	1861	0	167	551	68	186	369	404
Turn Type	Prot	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	pm+ov
Protected Phases	5	2	3		6		3	8		7	4	5
Permitted Phases			2	6			8		8	4		4
Detector Phase	5	2	3	6	6		3	8	8	7	4	5
Switch Phase												
Minimum Initial (s)	11.0	16.0	11.0	16.0	16.0		11.0	16.0	16.0	11.0	16.0	11.0
Minimum Split (s)	17.0	30.0	17.0	30.0	30.0		17.0	30.0	30.0	17.0	30.0	17.0
Total Split (s)	27.0	83.0	17.0	56.0	56.0		17.0	30.0	30.0	17.0	30.0	27.0
Total Split (%)	20.8%	63.8%	13.1%	43.1%	43.1%		13.1%	23.1%	23.1%	13.1%	23.1%	20.8%
Maximum Green (s)	21.0	77.0	11.0	50.0	50.0		11.0	24.0	24.0	11.0	24.0	21.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0	-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lead	Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	C-Max	C-Max		None	None	None	None	None	None
Act Effct Green (s)	25.0	82.1	99.1	55.1	55.1		41.9	26.9	26.9	41.9	26.9	53.9
Actuated g/C Ratio	0.19	0.63	0.76	0.42	0.42		0.32	0.21	0.21	0.32	0.21	0.41
v/c Ratio	0.86	0.56	0.07	0.21	0.87		0.52	0.75	0.16	0.71	0.50	0.63
Control Delay	68.1	11.7	0.5	22.9	27.6		37.4	55.6	0.8	47.5	35.5	28.9
Queue Delay	0.0	0.4	0.0	0.0	1.1		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.1	12.0	0.5	22.9	28.6		37.4	55.6	0.8	47.5	35.5	28.9
LOS	E	B	A	C	C		D	E	A	D	D	C
Approach Delay		24.7			28.6			47.0			35.1	
Approach LOS		C			C			D			D	

Lanes, Volumes, Timings
19: Main St. & Elmwood Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	253	175	0	7	527		101	228	0	114	109	235
Queue Length 95th (ft)	m#315	309	m0	m13	237		160	294	0	#193	163	360
Internal Link Dist (ft)		429			483			613			3575	
Turn Bay Length (ft)	175		175	150			200			175		425
Base Capacity (vph)	660	3211	1226	94	2141		322	762	439	262	761	641
Starvation Cap Reductn	0	744	0	0	24		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	108		0	0	0	0	1	1
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.73	0.07	0.21	0.92		0.52	0.72	0.15	0.71	0.49	0.63

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 120 (92%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green

Natural Cycle: 105

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 30.4

Intersection LOS: C

Intersection Capacity Utilization 85.4%

ICU Level of Service E

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

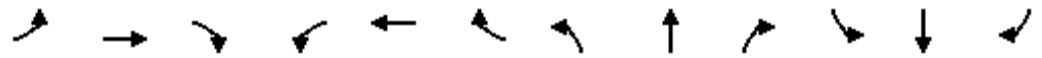
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Main St. & Elmwood Avenue



Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	1607	88	38	1713	13	92	268	222	8	45	13
Future Volume (vph)	10	1607	88	38	1713	13	92	268	222	8	45	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	75		0	200		0	75		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			50			100			50		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.992			0.999				0.850		0.971	
Flt Protected	0.950			0.950			0.950				0.994	
Satd. Flow (prot)	1770	5045	0	1770	5080	0	1770	1863	1583	0	3416	0
Flt Permitted	0.089			0.086			0.703				0.877	
Satd. Flow (perm)	166	5045	0	160	5080	0	1310	1863	1583	0	3014	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			2				33		14	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		563			1012			3133			1095	
Travel Time (s)		12.8			23.0			71.2			24.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	1786	98	42	1842	14	102	298	247	9	50	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	1884	0	42	1856	0	102	298	247	0	73	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		6	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	92.0	92.0		92.0	92.0		38.0	38.0	38.0	38.0	38.0	
Total Split (%)	70.8%	70.8%		70.8%	70.8%		29.2%	29.2%	29.2%	29.2%	29.2%	
Maximum Green (s)	86.0	86.0		86.0	86.0		32.0	32.0	32.0	32.0	32.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0		-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0		2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None	None	None	None	
Act Effct Green (s)	96.1	96.1		96.1	96.1		29.9	29.9	29.9		29.9	
Actuated g/C Ratio	0.74	0.74		0.74	0.74		0.23	0.23	0.23		0.23	
v/c Ratio	0.09	0.50		0.36	0.49		0.34	0.70	0.63		0.10	
Control Delay	4.7	5.0		11.9	6.2		43.7	54.3	45.8		30.3	
Queue Delay	0.0	0.2		0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	4.7	5.2		11.9	6.3		43.7	54.3	45.8		30.3	
LOS	A	A		B	A		D	D	D		C	
Approach Delay		5.2			6.4			49.4			30.3	
Approach LOS		A			A			D			C	

Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	1	207		8	151		72	230	162		20	
Queue Length 95th (ft)	m4	346		m9	m300		119	313	242		39	
Internal Link Dist (ft)		483			932			3053			1015	
Turn Bay Length (ft)	200			75			200					
Base Capacity (vph)	122	3733		118	3755		362	515	462		844	
Starvation Cap Reductn	0	808		0	0		0	0	0		0	
Spillback Cap Reductn	0	0		0	227		0	0	0		0	
Storage Cap Reductn	0	0		0	0		0	0	0		0	
Reduced v/c Ratio	0.09	0.64		0.36	0.53		0.28	0.58	0.53		0.09	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 18 (14%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 12.4
 Intersection LOS: B
 Intersection Capacity Utilization 70.1%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 20: Sumter St. & Elmwood Avenue



Lanes, Volumes, Timings
21: Barnwell Street & Calhoun St.

Bull Street Commons Traffic Study
2020 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	350	11	6	301	47	32	9	31	32	5	37
Future Volume (vph)	58	350	11	6	301	47	32	9	31	32	5	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	225		0	125		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	75			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.980			0.884			0.869	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1855	0	1770	1825	0	1770	1647	0	1770	1619	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1855	0	1770	1825	0	1770	1647	0	1770	1619	0
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		532			522			728			463	
Travel Time (s)		10.4			10.2			14.2			9.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	64	389	12	7	334	52	36	10	34	36	6	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	64	401	0	7	386	0	36	44	0	36	47	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	40.9%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
21: Barnwell Street & Calhoun St.

Bull Street Commons Traffic Study
2020 Background PM


















Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	58	350	11	6	301	47	32	9	31	32	5	37
Future Volume (Veh/h)	58	350	11	6	301	47	32	9	31	32	5	37
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	64	389	12	7	334	52	36	10	34	36	6	41
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh		2			2							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	386			401			915	923	395	930	903	360
vC1, stage 1 conf vol							523	523		374	374	
vC2, stage 2 conf vol							392	400		556	529	
vCu, unblocked vol	386			401			915	923	395	930	903	360
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			99			91	98	95	91	99	94
cM capacity (veh/h)	1172			1158			408	419	654	401	433	684

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	64	401	7	386	36	44	36	47
Volume Left	64	0	7	0	36	0	36	0
Volume Right	0	12	0	52	0	34	0	41
cSH	1172	1700	1158	1700	408	580	401	637
Volume to Capacity	0.05	0.24	0.01	0.23	0.09	0.08	0.09	0.07
Queue Length 95th (ft)	4	0	0	0	7	6	7	6
Control Delay (s)	8.2	0.0	8.1	0.0	14.7	11.7	14.9	11.1
Lane LOS	A		A		B	B	B	B
Approach Delay (s)	1.1		0.1		13.0		12.7	
Approach LOS					B		B	

Intersection Summary		
Average Delay		2.6
Intersection Capacity Utilization	40.9%	ICU Level of Service
Analysis Period (min)		15
		A

Lanes, Volumes, Timings
23: Bull St. & Williams St

Bull Street Commons Traffic Study
2020 Background PM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			  			  
Traffic Volume (vph)	55	23	2754	72	60	1905
Future Volume (vph)	55	23	2754	72	60	1905
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150	0		75	150	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	0.91
Frt		0.850	0.996			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	5065	0	1770	5085
Flt Permitted	0.950				0.040	
Satd. Flow (perm)	1770	1583	5065	0	75	5085
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		26	8			
Link Speed (mph)	35		40			40
Link Distance (ft)	871		213			242
Travel Time (s)	17.0		3.6			4.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	61	26	3060	80	67	2117
Shared Lane Traffic (%)						
Lane Group Flow (vph)	61	26	3140	0	67	2117
Turn Type	Prot	Perm	NA		D.P+P	NA
Protected Phases	8		2		1	6
Permitted Phases		8			2	
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	6.0	6.0	11.0		11.0	11.0
Minimum Split (s)	12.0	12.0	17.0		17.0	17.0
Total Split (s)	14.0	14.0	99.0		17.0	116.0
Total Split (%)	10.8%	10.8%	76.2%		13.1%	89.2%
Maximum Green (s)	8.0	8.0	93.0		11.0	110.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0		4.0	4.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	C-Max		None	C-Max
Act Effct Green (s)	9.6	9.6	102.0		111.6	115.6
Actuated g/C Ratio	0.07	0.07	0.78		0.86	0.89
v/c Ratio	0.47	0.19	0.79		0.29	0.47
Control Delay	69.7	22.5	12.8		34.2	0.5
Queue Delay	0.0	0.0	5.2		0.0	0.1
Total Delay	69.7	22.5	18.0		34.2	0.6
LOS	E	C	B		C	A
Approach Delay	55.6		18.0			1.6
Approach LOS	E		B			A

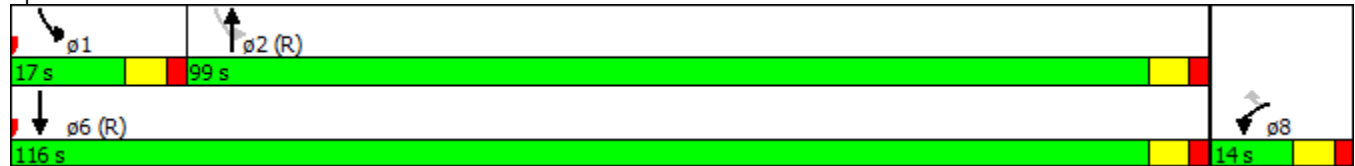


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Length 50th (ft)	50	0	688		14	9
Queue Length 95th (ft)	98	30	m749		m55	10
Internal Link Dist (ft)	791		133			162
Turn Bay Length (ft)	150				150	
Base Capacity (vph)	136	145	3975		233	4521
Starvation Cap Reductn	0	0	132		0	872
Spillback Cap Reductn	0	0	783		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.45	0.18	0.98		0.29	0.58

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBSB and 6:SBT, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 12.0
 Intersection LOS: B
 Intersection Capacity Utilization 66.5%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 23: Bull St. & Williams St





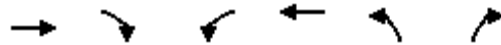
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↶			↷		↷
Traffic Volume (vph)	349	21	0	519	0	16
Future Volume (vph)	349	21	0	519	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		75	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.992					0.865
Flt Protected						
Satd. Flow (prot)	1848	0	0	1863	0	1611
Flt Permitted						
Satd. Flow (perm)	1848	0	0	1863	0	1611
Link Speed (mph)	35			35	35	
Link Distance (ft)	314			371	299	
Travel Time (s)	6.1			7.2	5.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	388	23	0	577	0	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	411	0	0	577	0	18
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	30.6%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
25: Access #5 & Colonial Drive

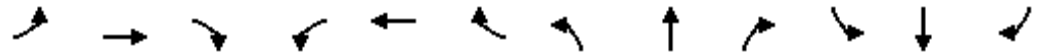
Bull Street Commons Traffic Study
2020 Background PM



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔		↔
Traffic Volume (veh/h)	349	21	0	519	0	16
Future Volume (Veh/h)	349	21	0	519	0	16
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	388	23	0	577	0	18
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	314					
pX, platoon unblocked						
vC, conflicting volume			411		976	400
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			411		976	400
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	97
cM capacity (veh/h)			1148		278	650
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	411	577	18			
Volume Left	0	0	0			
Volume Right	23	0	18			
cSH	1700	1700	650			
Volume to Capacity	0.24	0.34	0.03			
Queue Length 95th (ft)	0	0	2			
Control Delay (s)	0.0	0.0	10.7			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	10.7			
Approach LOS			B			
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			30.6%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
 26: Access #6/Mental Health Dwy. & Colonial Drive

Bull Street Commons Traffic Study
 2020 Background PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	347	12	25	466	1	19	0	16	134	0	34
Future Volume (vph)	6	347	12	25	466	1	19	0	16	134	0	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	75		0	0		0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995						0.850				0.973
Flt Protected	0.950			0.950			0.950					0.962
Satd. Flow (prot)	1770	1853	0	1770	1863	0	1770	1583	0	0	1744	0
Flt Permitted	0.950			0.950			0.950					0.962
Satd. Flow (perm)	1770	1853	0	1770	1863	0	1770	1583	0	0	1744	0
Link Speed (mph)		35			35			30				30
Link Distance (ft)		371			337			373				213
Travel Time (s)		7.2			6.6			8.5				4.8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	7	386	13	28	518	1	21	0	18	149	0	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	399	0	28	519	0	21	18	0	0	187	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	47.4%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 26: Access #6/Mental Health Dwy. & Colonial Drive

Bull Street Commons Traffic Study
 2020 Background PM

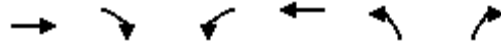


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	347	12	25	466	1	19	0	16	134	0	34
Future Volume (Veh/h)	6	347	12	25	466	1	19	0	16	134	0	34
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	7	386	13	28	518	1	21	0	18	149	0	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		685										
pX, platoon unblocked												
vC, conflicting volume	519			399			1018	982	392	992	988	518
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	519			399			1018	982	392	992	988	518
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			89	100	97	30	100	93
cM capacity (veh/h)	1047			1160			196	242	656	213	240	557

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	7	399	28	519	21	18	187
Volume Left	7	0	28	0	21	0	149
Volume Right	0	13	0	1	0	18	38
cSH	1047	1700	1160	1700	196	656	244
Volume to Capacity	0.01	0.23	0.02	0.31	0.11	0.03	0.77
Queue Length 95th (ft)	1	0	2	0	9	2	139
Control Delay (s)	8.5	0.0	8.2	0.0	25.5	10.6	55.9
Lane LOS	A		A		D	B	F
Approach Delay (s)	0.1		0.4		18.7		55.9
Approach LOS					C		F

Intersection Summary		
Average Delay		9.7
Intersection Capacity Utilization	47.4%	ICU Level of Service
Analysis Period (min)		15
		A

Lanes, Volumes, Timings
27: Boyce Street & Colonial Drive

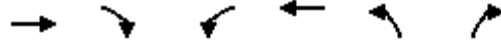


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Traffic Volume (vph)	443	54	143	429	63	84
Future Volume (vph)	443	54	143	429	63	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		75	100		150	0
Storage Lanes		1	1		1	1
Taper Length (ft)			100		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1863	1583	1770	1863	1770	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1863	1583	1770	1863	1770	1583
Link Speed (mph)	35			35	35	
Link Distance (ft)	337			949	1007	
Travel Time (s)	6.6			18.5	19.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	492	60	159	477	70	93
Shared Lane Traffic (%)						
Lane Group Flow (vph)	492	60	159	477	70	93
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	44.7% ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
27: Boyce Street & Colonial Drive

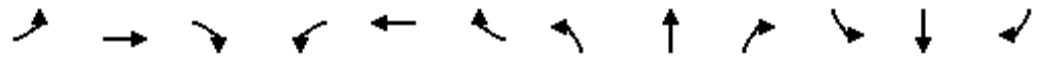


Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↖	↗
Traffic Volume (veh/h)	443	54	143	429	63	84
Future Volume (Veh/h)	443	54	143	429	63	84
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	492	60	159	477	70	93
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)	1022					
pX, platoon unblocked						
vC, conflicting volume			552		1287	492
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			552		1287	492
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			84		54	84
cM capacity (veh/h)			1018		153	577
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	492	60	159	477	70	93
Volume Left	0	0	159	0	70	0
Volume Right	0	60	0	0	0	93
cSH	1700	1700	1018	1700	153	577
Volume to Capacity	0.29	0.04	0.16	0.28	0.46	0.16
Queue Length 95th (ft)	0	0	14	0	53	14
Control Delay (s)	0.0	0.0	9.2	0.0	47.0	12.4
Lane LOS			A			B
Approach Delay (s)	0.0		2.3		27.3	
Approach LOS					D	
Intersection Summary						
Average Delay			4.4			
Intersection Capacity Utilization			44.7%	ICU Level of Service		A
Analysis Period (min)	15					

2020 Build Conditions
Phase III
Potential Project Buildout

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗	↗	↖	↗	↗
Traffic Volume (vph)	9	4	3	166	20	39	25	713	586	443	2549	21
Future Volume (vph)	9	4	3	166	20	39	25	713	586	443	2549	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		200	675		0	175		0	200		250
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100			75			50			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt		0.936			0.901				0.850		0.999	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3313	0	3433	1668	0	1770	3539	1583	1770	5080	0
Flt Permitted	0.950			0.950			0.062			0.257		
Satd. Flow (perm)	1770	3313	0	3433	1668	0	115	3539	1583	479	5080	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			43				456		2	
Link Speed (mph)		30			40			40			45	
Link Distance (ft)		552			905			1206			1658	
Travel Time (s)		12.5			15.4			20.6			25.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.92	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	10	4	3	184	22	43	28	767	651	492	2771	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	7	0	184	65	0	28	767	651	492	2794	0
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	4	4		3	3			2	3	1	6	
Permitted Phases							2		2	6		
Detector Phase	4	4		3	3		2	2	3	1	6	
Switch Phase												
Minimum Initial (s)	14.0	14.0		11.0	11.0		16.0	16.0	11.0	11.0	16.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		30.0	30.0	20.0	17.0	30.0	
Total Split (s)	20.0	20.0		25.0	25.0		47.0	47.0	25.0	38.0	85.0	
Total Split (%)	15.4%	15.4%		19.2%	19.2%		36.2%	36.2%	19.2%	29.2%	65.4%	
Maximum Green (s)	14.0	14.0		19.0	19.0		41.0	41.0	19.0	32.0	79.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag	Lead	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	None	None	C-Max	
Act Effct Green (s)	18.0	18.0		18.2	18.2		67.8	67.8	88.0	99.8	99.8	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.52	0.52	0.68	0.77	0.77	
v/c Ratio	0.04	0.02		0.38	0.24		0.47	0.42	0.53	0.74	0.72	
Control Delay	49.1	39.0		40.8	19.8		49.7	13.6	12.7	17.8	11.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	49.1	39.0		40.8	19.8		49.7	13.6	12.7	17.8	11.6	
LOS	D	D		D	B		D	B	B	B	B	
Approach Delay		44.9			35.3			13.9			12.5	

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			B			B	
Queue Length 50th (ft)	7	1		72	18		10	147	211	86	256	
Queue Length 95th (ft)	25	9		109	55		#83	312	425	335	709	
Internal Link Dist (ft)		472			825			1126			1578	
Turn Bay Length (ft)	100			675			175			200		
Base Capacity (vph)	245	461		607	330		59	1844	1260	725	3900	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.04	0.02		0.30	0.20		0.47	0.42	0.52	0.68	0.72	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 14.2
 Intersection LOS: B
 Intersection Capacity Utilization 84.7%
 ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Bull St. & Harden St. Ext.



Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑↑	↗	↖	↑↑↑	
Traffic Volume (vph)	6	2	13	17	12	8	17	1359	83	71	2646	2
Future Volume (vph)	6	2	13	17	12	8	17	1359	83	71	2646	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	200		0	200		0	150		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			100			100			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Frt		0.869			0.939				0.850			
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1619	0	1770	1749	0	1770	5085	1583	1770	5085	0
Flt Permitted	0.743			0.276			0.042			0.150		
Satd. Flow (perm)	1384	1619	0	514	1749	0	78	5085	1583	279	5085	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		602			715			682			1206	
Travel Time (s)		13.7			16.3			11.6			20.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.94	0.90
Adj. Flow (vph)	7	2	14	19	13	9	19	1446	92	79	2815	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	16	0	19	22	0	19	1446	92	79	2817	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			3			2				6
Permitted Phases	4			3			2		2	6		
Detector Phase	4	4		3	3		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	25.0	25.0		25.0	25.0		80.0	80.0	80.0	80.0	80.0	
Total Split (%)	19.2%	19.2%		19.2%	19.2%		61.5%	61.5%	61.5%	61.5%	61.5%	
Maximum Green (s)	19.0	19.0		19.0	19.0		74.0	74.0	74.0	74.0	74.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Act Effct Green (s)	20.0	20.0		20.9	20.9		101.5	101.5	101.5	101.5	101.5	
Actuated g/C Ratio	0.15	0.15		0.16	0.16		0.78	0.78	0.78	0.78	0.78	
v/c Ratio	0.03	0.06		0.23	0.08		0.31	0.36	0.07	0.36	0.71	
Control Delay	47.5	47.9		54.7	46.6		38.4	13.2	13.3	17.5	13.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.1	
Total Delay	47.5	47.9		54.7	46.6		38.4	13.2	13.3	17.5	13.5	
LOS	D	D		D	D		D	B	B	B	B	
Approach Delay		47.8			50.4			13.5			13.6	
Approach LOS		D			D			B			B	

Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	5	12		14	16		6	184	30	26	681	
Queue Length 95th (ft)	20	34		40	41		m26	329	83	m53	510	
Internal Link Dist (ft)		522			635			602			1126	
Turn Bay Length (ft)	150			200			200			150		
Base Capacity (vph)	244	286		90	309		61	3969	1235	217	3969	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	138	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.03	0.06		0.21	0.07		0.31	0.36	0.07	0.36	0.74	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 113 (87%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 14.1
 Intersection LOS: B
 Intersection Capacity Utilization 79.0%
 ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bull St. & Confederate Ave.



Lanes, Volumes, Timings
3: Bull St. & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗	↖	↔			↑↑↑		↘	↑↑↑	
Traffic Volume (vph)	0	0	6	217	1	58	0	1428	405	106	2467	11
Future Volume (vph)	0	0	6	217	1	58	0	1428	405	106	2467	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	150		0	0		0	200		0
Storage Lanes	0		1	1		0	0		0	1		0
Taper Length (ft)	25			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.865		0.946			0.967			0.999	
Flt Protected				0.950	0.969					0.950		
Satd. Flow (prot)	0	0	1611	1681	1622	0	0	4917	0	1770	5080	0
Flt Permitted				0.950	0.969					0.087		
Satd. Flow (perm)	0	0	1611	1681	1622	0	0	4917	0	162	5080	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)			25		20			158				
Link Speed (mph)		35			35			40				40
Link Distance (ft)		440			312			171				682
Travel Time (s)		8.6			6.1			2.9				11.6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.96	0.90	0.93	0.90
Adj. Flow (vph)	0	0	7	241	1	64	0	1503	422	118	2653	12
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	0	0	7	128	178	0	0	1925	0	118	2665	0
Turn Type			Perm	Perm	NA			NA		Perm	NA	
Protected Phases					8			2			6	
Permitted Phases			4	8						6		
Detector Phase			4	8	8			2		6	6	
Switch Phase												
Minimum Initial (s)			16.0	16.0	16.0			16.0		16.0	16.0	
Minimum Split (s)			30.0	30.0	30.0			30.0		30.0	30.0	
Total Split (s)			30.0	30.0	30.0			100.0		100.0	100.0	
Total Split (%)			23.1%	23.1%	23.1%			76.9%		76.9%	76.9%	
Maximum Green (s)			24.0	24.0	24.0			94.0		94.0	94.0	
Yellow Time (s)			4.0	4.0	4.0			4.0		4.0	4.0	
All-Red Time (s)			2.0	2.0	2.0			2.0		2.0	2.0	
Lost Time Adjust (s)			-4.0	-4.0	-4.0			-4.0		-4.0	-4.0	
Total Lost Time (s)			2.0	2.0	2.0			2.0		2.0	2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)			3.0	3.0	3.0			3.0		3.0	3.0	
Recall Mode			None	None	None			C-Max		C-Max	C-Max	
Act Effct Green (s)			23.0	23.0	23.0			103.0		103.0	103.0	
Actuated g/C Ratio			0.18	0.18	0.18			0.79		0.79	0.79	
v/c Ratio			0.02	0.43	0.59			0.49		0.92	0.66	
Control Delay			0.2	44.2	43.1			2.1		68.8	4.4	
Queue Delay			0.0	0.0	0.0			0.0		0.0	1.2	
Total Delay			0.2	44.2	43.1			2.1		68.8	5.7	
LOS			A	D	D			A		E	A	
Approach Delay					43.5			2.1			8.3	
Approach LOS					D			A			A	

Lanes, Volumes, Timings
3: Bull St. & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)			0	80	96			13		46	1	
Queue Length 95th (ft)			1	m123	m149			16		m#108	252	
Internal Link Dist (ft)		360			232			91			602	
Turn Bay Length (ft)				150						200		
Base Capacity (vph)			366	362	365			3927		128	4024	
Starvation Cap Reductn			0	0	0			228		0	1043	
Spillback Cap Reductn			0	0	0			0		0	0	
Storage Cap Reductn			0	0	0			0		0	0	
Reduced v/c Ratio			0.02	0.35	0.49			0.52		0.92	0.89	

Intersection Summary

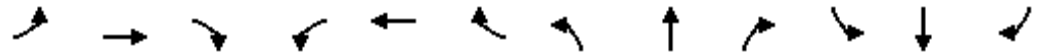
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 8.1
 Intersection LOS: A
 Intersection Capacity Utilization 84.6%
 ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Bull St. & Colonial Drive



Lanes, Volumes, Timings
4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗		↑↑↑			↑↑↑	
Traffic Volume (vph)	0	0	5	0	0	26	0	1775	68	0	2647	6
Future Volume (vph)	0	0	5	0	0	26	0	1775	68	0	2647	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	50		0
Storage Lanes	0		1	0		1	0		0	0		0
Taper Length (ft)	25			25			75			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.865			0.865		0.994				
Flt Protected												
Satd. Flow (prot)	0	0	1611	0	0	1611	0	5055	0	0	5085	0
Flt Permitted												
Satd. Flow (perm)	0	0	1611	0	0	1611	0	5055	0	0	5085	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		341			529			302			219	
Travel Time (s)		6.6			10.3			5.1			3.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.97	0.90
Adj. Flow (vph)	0	0	6	0	0	29	0	1868	76	0	2729	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	6	0	0	29	0	1944	0	0	2736	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	61.3%
Analysis Period (min)	15
	ICU Level of Service B

HCM Unsignalized Intersection Capacity Analysis

4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗		↑↑↑			↑↑↑	
Traffic Volume (veh/h)	0	0	5	0	0	26	0	1775	68	0	2647	6
Future Volume (Veh/h)	0	0	5	0	0	26	0	1775	68	0	2647	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.97	0.90
Hourly flow rate (vph)	0	0	6	0	0	29	0	1868	76	0	2729	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL				None
Median storage veh								2				
Upstream signal (ft)								302				390
pX, platoon unblocked	0.88	0.88	0.76	0.88	0.88	0.77	0.76			0.77		
vC, conflicting volume	3384	4676	913	2822	4642	661	2736			1944		
vC1, stage 1 conf vol	2732	2732		1906	1906							
vC2, stage 2 conf vol	652	1944		916	2736							
vCu, unblocked vol	1460	2934	0	818	2894	0	2185			1182		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	100	100	97	100			100		
cM capacity (veh/h)	35	59	826	164	59	835	182			452		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	6	29	747	747	450	1092	1092	553				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	6	29	0	0	76	0	0	7				
cSH	826	835	1700	1700	1700	1700	1700	1700				
Volume to Capacity	0.01	0.03	0.44	0.44	0.26	0.64	0.64	0.33				
Queue Length 95th (ft)	1	3	0	0	0	0	0	0				
Control Delay (s)	9.4	9.5	0.0	0.0	0.0	0.0	0.0	0.0				
Lane LOS	A	A										
Approach Delay (s)	9.4	9.5	0.0			0.0						
Approach LOS	A	A										
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization			61.3%		ICU Level of Service					B		
Analysis Period (min)			15									

Lanes, Volumes, Timings
5: Bull St. & Jefferson Street



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↘	↑↑↑	↑↑↑	
Traffic Volume (vph)	0	29	7	1900	2662	10
Future Volume (vph)	0	29	7	1900	2662	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	175			0
Storage Lanes	0	1	1			0
Taper Length (ft)	25		100			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Frt		0.865			0.999	
Flt Protected			0.950			
Satd. Flow (prot)	0	1611	1770	5085	5080	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	1611	1770	5085	5080	0
Link Speed (mph)	35			40	40	
Link Distance (ft)	410			712	223	
Travel Time (s)	8.0			12.1	3.8	
Peak Hour Factor	0.90	0.90	0.90	0.94	0.97	0.90
Adj. Flow (vph)	0	32	8	2021	2744	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	32	8	2021	2755	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	61.7%
Analysis Period (min)	15
	ICU Level of Service B

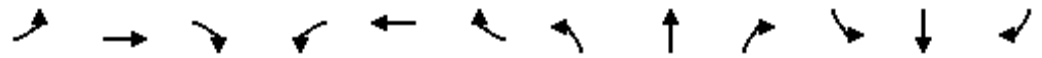
HCM Unsignalized Intersection Capacity Analysis
5: Bull St. & Jefferson Street



Movement	EBL	EBR	NBL	NBT	SBT	SBR			
Lane Configurations		↗	↘	↑↑↑	↑↑↑				
Traffic Volume (veh/h)	0	29	7	1900	2662	10			
Future Volume (Veh/h)	0	29	7	1900	2662	10			
Sign Control	Stop			Free	Free				
Grade	0%			0%	0%				
Peak Hour Factor	0.90	0.90	0.90	0.94	0.97	0.90			
Hourly flow rate (vph)	0	32	8	2021	2744	11			
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type				None	None				
Median storage (veh)									
Upstream signal (ft)				712	223				
pX, platoon unblocked	0.79	0.75	0.75						
vC, conflicting volume	3439	920	2755						
vC1, stage 1 conf vol									
vC2, stage 2 conf vol									
vCu, unblocked vol	2504	0	2184						
tC, single (s)	6.8	6.9	4.1						
tC, 2 stage (s)									
tF (s)	3.5	3.3	2.2						
p0 queue free %	100	96	96						
cM capacity (veh/h)	18	817	180						
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	
Volume Total	32	8	674	674	674	1098	1098	560	
Volume Left	0	8	0	0	0	0	0	0	
Volume Right	32	0	0	0	0	0	0	11	
cSH	817	180	1700	1700	1700	1700	1700	1700	
Volume to Capacity	0.04	0.04	0.40	0.40	0.40	0.65	0.65	0.33	
Queue Length 95th (ft)	3	3	0	0	0	0	0	0	
Control Delay (s)	9.6	25.9	0.0	0.0	0.0	0.0	0.0	0.0	
Lane LOS	A	D							
Approach Delay (s)	9.6	0.1					0.0		
Approach LOS	A								
Intersection Summary									
Average Delay			0.1						
Intersection Capacity Utilization			61.7%	ICU Level of Service			B		
Analysis Period (min)			15						

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

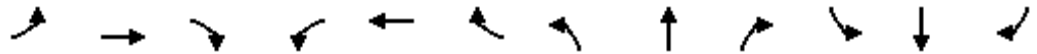
Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1246	336	919	23	155	21	373	655	122	67	1347	1272
Future Volume (vph)	1246	336	919	23	155	21	373	655	122	67	1347	1272
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	775		0	125		0	175		0	100		0
Storage Lanes	1		2	1		0	1		0	1		1
Taper Length (ft)	50			50			125			50		
Lane Util. Factor	0.91	0.91	0.88	0.95	0.95	0.95	0.97	0.91	0.91	1.00	0.95	1.00
Frt			0.850		0.984			0.976				0.850
Flt Protected	0.950	0.969			0.994		0.950			0.950		
Satd. Flow (prot)	1610	3285	2787	0	3462	0	3433	4963	0	1770	3539	1583
Flt Permitted	0.950	0.969			0.994		0.950			0.316		
Satd. Flow (perm)	1610	3285	2787	0	3462	0	3433	4963	0	589	3539	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30				40
Link Distance (ft)		1012			379			526				712
Travel Time (s)		23.0			8.6			12.0				12.1
Peak Hour Factor	0.97	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.90	0.94	0.97
Adj. Flow (vph)	1285	373	1021	26	172	23	410	728	136	74	1433	1311
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	642	1016	1021	0	221	0	410	864	0	74	1433	1311
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Perm	NA	Free
Protected Phases	4	4	5	3	3		5	2			6	
Permitted Phases			4							6		Free
Detector Phase	4	4	5	3	3		5	2		6	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0	11.0	5.0	5.0		11.0	16.0		16.0	16.0	
Minimum Split (s)	30.0	30.0	17.0	12.0	12.0		17.0	30.0		30.0	30.0	
Total Split (s)	49.0	49.0	17.0	12.0	12.0		17.0	69.0		52.0	52.0	
Total Split (%)	37.7%	37.7%	13.1%	9.2%	9.2%		13.1%	53.1%		40.0%	40.0%	
Maximum Green (s)	43.0	43.0	11.0	6.0	6.0		11.0	63.0		46.0	46.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0	-4.0		-4.0		-4.0	-4.0		-4.0	-4.0	
Total Lost Time (s)	2.0	2.0	2.0		2.0		2.0	2.0		2.0	2.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead		Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		C-Max	C-Max	
Act Effct Green (s)	47.0	47.0	64.0		10.0		15.0	67.0		50.0	50.0	130.0
Actuated g/C Ratio	0.36	0.36	0.49		0.08		0.12	0.52		0.38	0.38	1.00
v/c Ratio	1.10	1.06dl	0.74		0.83		1.04	0.34		0.33	1.05	0.83
Control Delay	98.1	35.8	26.9		84.3		101.7	17.9		31.1	71.1	12.1
Queue Delay	0.0	0.0	0.1		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	98.1	35.8	27.0		84.3		101.7	17.9		31.1	71.1	12.1
LOS	F	D	C		F		F	B		C	E	B
Approach Delay		47.4			84.3			44.9			42.6	
Approach LOS		D			F			D			D	

Lanes, Volumes, Timings
 6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM

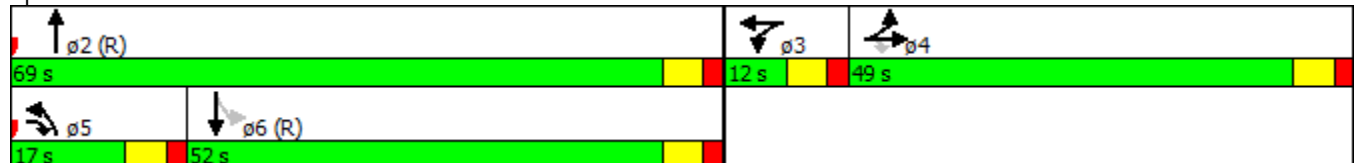


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	~686	441	448		98		~192	175		32	~683	375
Queue Length 95th (ft)	#946	524	559		#167		#297	204		m58	#828	319
Internal Link Dist (ft)		932			299			446			632	
Turn Bay Length (ft)	775						175			100		
Base Capacity (vph)	582	1187	1372		266		396	2557		226	1361	1583
Starvation Cap Reductn	0	0	0		0		0	0		0	0	0
Spillback Cap Reductn	0	0	20		0		0	0		0	0	0
Storage Cap Reductn	0	0	0		0		0	0		0	0	0
Reduced v/c Ratio	1.10	0.86	0.76		0.83		1.04	0.34		0.33	1.05	0.83

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 126 (97%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.10
 Intersection Signal Delay: 46.2 Intersection LOS: D
 Intersection Capacity Utilization 101.3% ICU Level of Service G
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 6: Bull St. & Elmwood Avenue



Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

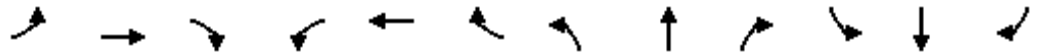
Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	300	88	54	194	138	26	941	89	196	2016	100
Future Volume (vph)	88	300	88	54	194	138	26	941	89	196	2016	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	50			50			75			75		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.966			0.937			0.987				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3419	0	1770	3316	0	1770	3493	0	1770	3539	1583
Flt Permitted	0.319			0.248			0.046			0.216		
Satd. Flow (perm)	594	3419	0	462	3316	0	86	3493	0	402	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			129			22				111
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1044			459			1901				526
Travel Time (s)		23.7			10.4			43.2				12.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.94	0.90
Adj. Flow (vph)	98	333	98	60	211	153	29	1046	99	218	2145	111
Shared Lane Traffic (%)												
Lane Group Flow (vph)	98	431	0	60	364	0	29	1145	0	218	2145	111
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2				6
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	16.0
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	30.0
Total Split (s)	30.0	30.0		30.0	30.0		100.0	100.0		100.0	100.0	100.0
Total Split (%)	23.1%	23.1%		23.1%	23.1%		76.9%	76.9%		76.9%	76.9%	76.9%
Maximum Green (s)	24.0	24.0		24.0	24.0		94.0	94.0		94.0	94.0	94.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	25.8	25.8		25.8	25.8		100.2	100.2		100.2	100.2	100.2
Actuated g/C Ratio	0.20	0.20		0.20	0.20		0.77	0.77		0.77	0.77	0.77
v/c Ratio	0.84	0.62		0.66	0.48		0.44	0.42		0.71	0.79	0.09
Control Delay	97.7	48.8		85.2	35.2		30.8	5.7		11.6	5.6	0.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	1.3	0.0
Total Delay	97.7	48.8		85.2	35.2		30.8	5.7		11.6	6.9	0.3
LOS	F	D		F	D		C	A		B	A	A
Approach Delay		57.8			42.3			6.4			7.0	
Approach LOS		E			D			A			A	

Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	78	163		47	94		8	158		59	375	1
Queue Length 95th (ft)	#179	220		#116	146		#62	191		m51	m233	m0
Internal Link Dist (ft)		964			379			1821			446	
Turn Bay Length (ft)	150			175			150			150		
Base Capacity (vph)	127	754		99	815		66	2696		309	2726	1245
Starvation Cap Reductn	0	0		0	0		0	0		0	356	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.77	0.57		0.61	0.45		0.44	0.42		0.71	0.91	0.09

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 106 (82%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 15.9
 Intersection LOS: B
 Intersection Capacity Utilization 109.1%
 ICU Level of Service H
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Bull St. & Calhoun St.



Lanes, Volumes, Timings
9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	327	71	932	584	106	159	529	454	21	476	54
Future Volume (vph)	36	327	71	932	584	106	159	529	454	21	476	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		800	175		0	225		0	300		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	100			75			75			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.973			0.977				0.850		0.985	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3444	0	3433	3458	0	1770	3539	1583	1770	3486	0
Flt Permitted	0.361			0.950			0.326			0.341		
Satd. Flow (perm)	672	3444	0	3433	3458	0	607	3539	1583	635	3486	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			27				504		11	
Link Speed (mph)		35			35			35			40	
Link Distance (ft)		424			340			483			2110	
Travel Time (s)		8.3			6.6			9.4			36.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.90	0.90
Adj. Flow (vph)	40	363	79	1036	649	118	177	563	504	23	529	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	442	0	1036	767	0	177	563	504	23	589	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Free	Perm	NA	
Protected Phases		8		7	4			6			2	
Permitted Phases	8						6		Free	2		
Detector Phase	8	8		7	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	16.0	16.0		11.0	16.0		16.0	16.0		16.0	16.0	
Minimum Split (s)	30.0	30.0		17.0	30.0		30.0	30.0		30.0	30.0	
Total Split (s)	30.0	30.0		46.0	76.0		54.0	54.0		54.0	54.0	
Total Split (%)	23.1%	23.1%		35.4%	58.5%		41.5%	41.5%		41.5%	41.5%	
Maximum Green (s)	24.0	24.0		40.0	70.0		48.0	48.0		48.0	48.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	24.7	24.7		43.5	70.2		55.8	55.8	130.0	55.8	55.8	
Actuated g/C Ratio	0.19	0.19		0.33	0.54		0.43	0.43	1.00	0.43	0.43	
v/c Ratio	0.31	0.66		0.90	0.41		0.68	0.37	0.32	0.08	0.39	
Control Delay	49.4	46.3		46.6	16.5		54.4	38.1	0.4	30.0	31.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.1	
Total Delay	49.4	46.3		46.6	16.5		54.4	38.1	0.4	30.0	31.2	
LOS	D	D		D	B		D	D	A	C	C	
Approach Delay		46.5			33.8			25.1			31.2	
Approach LOS		D			C			C			C	

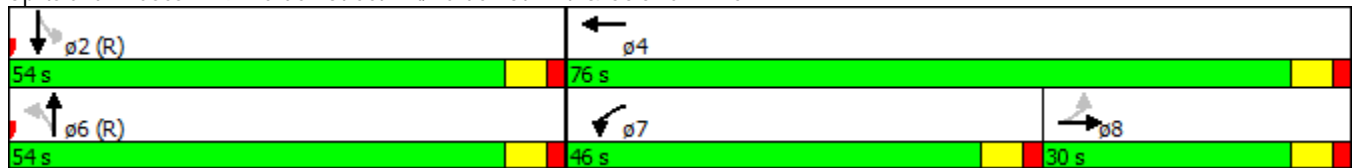


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	25	151		390	245		107	177	0	13	226	
Queue Length 95th (ft)	m51	m200		#497	216		#240	233	0	m28	323	
Internal Link Dist (ft)		344			260			403			2030	
Turn Bay Length (ft)	225			175			225			300		
Base Capacity (vph)	144	755		1161	1980		260	1517	1583	272	1501	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	137	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.28	0.59		0.89	0.39		0.68	0.37	0.32	0.08	0.43	

Intersection Summary

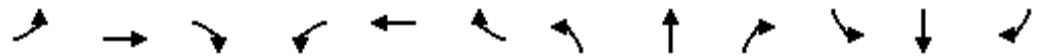
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 121 (93%), Referenced to phase 2:SBTL and 6:NBTL, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 32.3
 Intersection LOS: C
 Intersection Capacity Utilization 81.5%
 ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive



Lanes, Volumes, Timings
10: Harden St./Harden Street Ext & Calhoun St.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	36	207	7	42	2	288	961	17	42	1109	89
Future Volume (vph)	88	36	207	7	42	2	288	961	17	42	1109	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	50		0	0		325	300		200
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	100			25			25			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Frt		0.872			0.994			0.997				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1624	0	1770	1852	0	1770	5070	0	1770	3539	1583
Flt Permitted	0.725			0.261			0.161			0.186		
Satd. Flow (perm)	1350	1624	0	486	1852	0	300	5070	0	346	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		210			2			3				122
Link Speed (mph)		30			35			35				35
Link Distance (ft)		820			1149			2515				456
Travel Time (s)		18.6			22.4			49.0				8.9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	98	40	230	8	47	2	320	1068	19	47	1232	99
Shared Lane Traffic (%)												
Lane Group Flow (vph)	98	270	0	8	49	0	320	1087	0	47	1232	99
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	1 2		1	2	2
Switch Phase												
Minimum Initial (s)	1.0	1.0		11.0	11.0		9.0	14.0		9.0	14.0	14.0
Minimum Split (s)	6.5	6.5		30.0	30.0		15.0	30.0		15.0	30.0	30.0
Total Split (s)	37.0	37.0		37.0	37.0		47.0	75.0		18.0	46.0	46.0
Total Split (%)	28.5%	28.5%		28.5%	28.5%		36.2%	57.7%		13.8%	35.4%	35.4%
Maximum Green (s)	31.5	31.5		31.5	31.5		41.0	69.0		12.0	40.0	40.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.5	1.5		1.5	1.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	0.0		0.0	0.0		-3.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	2.5	5.5		5.5	5.5		3.0	3.0		6.0	3.0	3.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	18.3	15.3		15.3	15.3		96.4	72.0		98.9	77.6	77.6
Actuated g/C Ratio	0.14	0.12		0.12	0.12		0.74	0.55		0.76	0.60	0.60
v/c Ratio	0.52	0.72		0.14	0.22		0.62	0.39		0.08	0.58	0.10
Control Delay	50.3	17.7		54.6	50.6		18.4	16.9		2.6	17.7	3.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	50.3	17.7		54.6	50.6		18.4	16.9		2.6	17.7	3.2
LOS	D	B		D	D		B	B		A	B	A
Approach Delay		26.3			51.1			17.3			16.1	
Approach LOS		C			D			B			B	

Lanes, Volumes, Timings
 10: Harden St./Harden Street Ext & Calhoun St.

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM

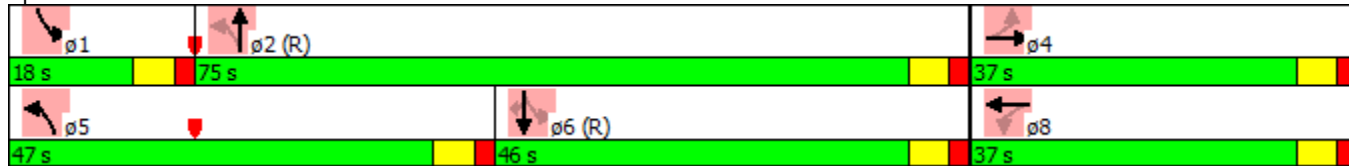


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	81	67		6	37		84	182		3	331	13
Queue Length 95th (ft)	m132	153		22	73		170	215		m12	509	34
Internal Link Dist (ft)		740			1069			2435			376	
Turn Bay Length (ft)	225			50						300		200
Base Capacity (vph)	358	552		117	450		742	2809		572	2112	993
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.27	0.49		0.07	0.11		0.43	0.39		0.08	0.58	0.10

Intersection Summary

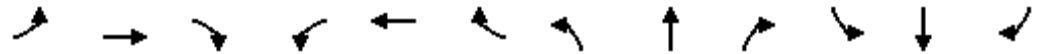
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 78 (60%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 18.4
 Intersection LOS: B
 Intersection Capacity Utilization 72.5%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Harden St./Harden Street Ext & Calhoun St.



Lanes, Volumes, Timings
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	103	297	38	10	304	87	15	38	12	34	20	74
Future Volume (vph)	103	297	38	10	304	87	15	38	12	34	20	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	275		0	0		0	300		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	100			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.983			0.967			0.976			0.882	
Flt Protected	0.950			0.950				0.988		0.950		
Satd. Flow (prot)	1770	1831	0	1770	1801	0	0	1796	0	1770	1643	0
Flt Permitted	0.950			0.950				0.988		0.950		
Satd. Flow (perm)	1770	1831	0	1770	1801	0	0	1796	0	1770	1643	0
Link Speed (mph)		35			30			35			35	
Link Distance (ft)		449			820			504			3014	
Travel Time (s)		8.7			18.6			9.8			58.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	114	330	42	11	338	97	17	42	13	38	22	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	114	372	0	11	435	0	0	72	0	38	104	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	47.2%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	103	297	38	10	304	87	15	38	12	34	20	74
Future Volume (Veh/h)	103	297	38	10	304	87	15	38	12	34	20	74
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	114	330	42	11	338	97	17	42	13	38	22	82
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	TWLTL				TWLTL							
Median storage veh	2				2							
Upstream signal (ft)					820							
pX, platoon unblocked	0.92						0.92	0.92		0.92	0.92	0.92
vC, conflicting volume	435			372			1032	1036	351	1000	1008	386
vC1, stage 1 conf vol							579	579		408	408	
vC2, stage 2 conf vol							453	457		592	600	
vCu, unblocked vol	343			372			991	996	351	957	966	290
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			99			95	88	98	89	94	88
cM capacity (veh/h)	1119			1186			324	359	692	349	382	689
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total	114	372	11	435	72	38	104					
Volume Left	114	0	11	0	17	38	0					
Volume Right	0	42	0	97	13	0	82					
cSH	1119	1700	1186	1700	382	349	589					
Volume to Capacity	0.10	0.22	0.01	0.26	0.19	0.11	0.18					
Queue Length 95th (ft)	8	0	1	0	17	9	16					
Control Delay (s)	8.6	0.0	8.1	0.0	16.6	16.6	12.4					
Lane LOS	A		A		C	C	B					
Approach Delay (s)	2.0		0.2		16.6	13.5						
Approach LOS					C	B						
Intersection Summary												
Average Delay			3.6									
Intersection Capacity Utilization			47.2%		ICU Level of Service		A					
Analysis Period (min)			15									

Lanes, Volumes, Timings
12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	371	63	177	499	57	21	10	71	7	4	2
Future Volume (vph)	12	371	63	177	499	57	21	10	71	7	4	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		225	50		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.978			0.984			0.868			0.950	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1822	0	1770	1833	0	1770	1617	0	1770	1770	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1822	0	1770	1833	0	1770	1617	0	1770	1770	0
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		980			161			3014			569	
Travel Time (s)		19.1			3.1			58.7			11.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	13	412	70	197	542	63	23	11	79	8	4	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	482	0	197	605	0	23	90	0	8	6	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	51.0%
Analysis Period (min)	15
	ICU Level of Service A












HCM Unsignalized Intersection Capacity Analysis
12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	371	63	177	499	57	21	10	71	7	4	2
Future Volume (Veh/h)	12	371	63	177	499	57	21	10	71	7	4	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	13	412	70	197	542	63	23	11	79	8	4	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					1175							
pX, platoon unblocked	0.86						0.86	0.86		0.86	0.86	0.86
vC, conflicting volume	605			482			1413	1472	447	1490	1476	574
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	456			482			1399	1467	447	1488	1471	419
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			82			72	88	87	86	95	100
cM capacity (veh/h)	947			1081			83	88	612	59	88	543
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	13	482	197	605	23	90	8	6				
Volume Left	13	0	197	0	23	0	8	0				
Volume Right	0	70	0	63	0	79	0	2				
cSH	947	1700	1081	1700	83	355	59	122				
Volume to Capacity	0.01	0.28	0.18	0.36	0.28	0.25	0.14	0.05				
Queue Length 95th (ft)	1	0	17	0	25	25	11	4				
Control Delay (s)	8.9	0.0	9.1	0.0	64.2	18.6	75.4	36.1				
Lane LOS	A		A		F	C	F	E				
Approach Delay (s)	0.2		2.2		27.9		58.5					
Approach LOS					D		F					
Intersection Summary												
Average Delay			4.1									
Intersection Capacity Utilization			51.0%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
13: Harden Street Ext & Slighs Ave.

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	128	213	1032	71	129	1386
Future Volume (vph)	128	213	1032	71	129	1386
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		50	100	
Storage Lanes	1	0		1	1	
Taper Length (ft)	25				50	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	0.916			0.850		
Flt Protected	0.982				0.950	
Satd. Flow (prot)	1579	0	3539	1583	1770	3539
Flt Permitted	0.982				0.152	
Satd. Flow (perm)	1579	0	3539	1583	283	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	72			20		
Link Speed (mph)	30		35			35
Link Distance (ft)	398		512			483
Travel Time (s)	9.0		10.0			9.4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.95
Heavy Vehicles (%)	7%	9%	2%	2%	2%	2%
Adj. Flow (vph)	142	237	1147	79	143	1459
Shared Lane Traffic (%)						
Lane Group Flow (vph)	379	0	1147	79	143	1459
Turn Type	Perm		NA	Perm	pm+pt	NA
Protected Phases			6		5	2
Permitted Phases	4			6	2	
Detector Phase	4		6	6	5	2
Switch Phase						
Minimum Initial (s)	16.0		16.0	16.0	11.0	16.0
Minimum Split (s)	30.0		30.0	30.0	17.0	30.0
Total Split (s)	49.0		63.0	63.0	18.0	81.0
Total Split (%)	37.7%		48.5%	48.5%	13.8%	62.3%
Maximum Green (s)	43.0		57.0	57.0	12.0	75.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0		-4.0	-2.0	-4.0	-4.0
Total Lost Time (s)	2.0		2.0	4.0	2.0	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		C-Max	C-Max	None	C-Max
Act Effct Green (s)	35.9		72.9	70.9	90.1	90.1
Actuated g/C Ratio	0.28		0.56	0.55	0.69	0.69
v/c Ratio	0.78		0.58	0.09	0.39	0.59
Control Delay	45.4		6.5	3.0	15.7	13.8
Queue Delay	0.0		0.0	0.0	0.0	0.4
Total Delay	45.4		6.5	3.0	15.7	14.1
LOS	D		A	A	B	B
Approach Delay	45.4		6.3			14.3

Lanes, Volumes, Timings
 13: Harden Street Ext & Slighs Ave.



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	D		A		B	
Queue Length 50th (ft)	243		58	2	41	238
Queue Length 95th (ft)	325		120	m6	m66	505
Internal Link Dist (ft)	318		432			403
Turn Bay Length (ft)				50	100	
Base Capacity (vph)	616		1985	872	379	2453
Starvation Cap Reductn	0		0	0	0	436
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.62		0.58	0.09	0.38	0.72

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 129 (99%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 14.9
 Intersection LOS: B
 Intersection Capacity Utilization 67.9%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 13: Harden Street Ext & Slighs Ave.



Lanes, Volumes, Timings
14: Colonial Drive & Farrow Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Lane Configurations		↗↗	↖	↑↑	↑↓		
Traffic Volume (vph)	0	203	169	628	1357	18	
Future Volume (vph)	0	203	169	628	1357	18	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0	330	550			0	
Storage Lanes	0	1	1			0	
Taper Length (ft)	25		125				
Lane Util. Factor	1.00	0.88	1.00	0.95	0.95	0.95	
Frt		0.850			0.998		
Flt Protected			0.950				
Satd. Flow (prot)	0	2787	1770	3539	3532	0	
Flt Permitted			0.950				
Satd. Flow (perm)	0	2787	1770	3539	3532	0	
Right Turn on Red		Yes				No	
Satd. Flow (RTOR)		35					
Link Speed (mph)	35			35	35		
Link Distance (ft)	930			658	2077		
Travel Time (s)	18.1			12.8	40.5		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.91	0.90	
Adj. Flow (vph)	0	226	188	698	1491	20	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	226	188	698	1511	0	
Turn Type		Over	Prot	NA	NA		
Protected Phases		8	8	8 6	2	6	
Permitted Phases							
Detector Phase		8	8	8 6	2		
Switch Phase							
Minimum Initial (s)		16.0	16.0		16.0	16.0	
Minimum Split (s)		30.0	30.0		30.0	30.0	
Total Split (s)		30.0	30.0		35.0	35.0	
Total Split (%)		46.2%	46.2%		53.8%	54%	
Maximum Green (s)		24.0	24.0		29.0	29.0	
Yellow Time (s)		4.0	4.0		4.0	4.0	
All-Red Time (s)		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-3.0	-3.0		-4.0		
Total Lost Time (s)		3.0	3.0		2.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0	3.0		3.0	3.0	
Recall Mode		None	None		C-Max	C-Max	
Act Effct Green (s)		20.6	20.6	65.0	39.4		
Actuated g/C Ratio		0.32	0.32	1.00	0.61		
v/c Ratio		0.25	0.34	0.20	0.71		
Control Delay		14.0	22.1	0.1	12.0		
Queue Delay		0.0	0.0	0.0	0.0		
Total Delay		14.0	22.1	0.1	12.0		
LOS		B	C	A	B		
Approach Delay				4.8	12.0		
Approach LOS				A	B		

Lanes, Volumes, Timings
 14: Colonial Drive & Farrow Road



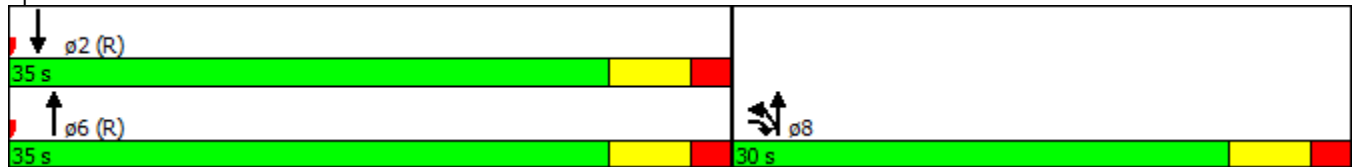
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Queue Length 50th (ft)		32	60	0	92		
Queue Length 95th (ft)		50	84	0	465		
Internal Link Dist (ft)	850			578	1997		
Turn Bay Length (ft)		330	550				
Base Capacity (vph)		1178	735	3533	2139		
Starvation Cap Reductn		0	0	0	0		
Spillback Cap Reductn		0	0	0	0		
Storage Cap Reductn		0	0	0	0		
Reduced v/c Ratio		0.19	0.26	0.20	0.71		

Intersection Summary

Area Type: Other
 Cycle Length: 65
 Actuated Cycle Length: 65
 Offset: 62 (95%), Referenced to phase 2:SBT and 6:NBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 9.7
 Intersection Capacity Utilization 58.1%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 14: Colonial Drive & Farrow Road



Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	415	4	259	564	198	0	471	162	290	1225	71
Future Volume (vph)	15	415	4	259	564	198	0	471	162	290	1225	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		0	300		0	0		225	200		0
Storage Lanes	1		0	2		1	0		1	1		0
Taper Length (ft)	125			100			25			125		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.999				0.850			0.850		0.992	
Flt Protected	0.950			0.950						0.950		
Satd. Flow (prot)	1770	3536	0	3433	3539	1583	0	3539	1583	1770	3511	0
Flt Permitted	0.414			0.950						0.356		
Satd. Flow (perm)	771	3536	0	3433	3539	1583	0	3539	1583	663	3511	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				163			180			8
Link Speed (mph)		35			35			35				35
Link Distance (ft)		1518			1183			2077				914
Travel Time (s)		29.6			23.0			40.5				17.8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91
Adj. Flow (vph)	17	461	4	288	627	220	0	523	180	322	1346	79
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	465	0	288	627	220	0	523	180	322	1425	0
Turn Type	Perm	NA		Prot	NA	pm+ov		NA	Free	pm+pt	NA	
Protected Phases		4		3	8	1		2		1	6	
Permitted Phases	4					8			Free	6		
Detector Phase	4	4		3	8	1		2		1	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0	5.0		15.0		5.0	15.0	
Minimum Split (s)	30.0	30.0		21.0	41.0	17.0		41.0		17.0	30.0	
Total Split (s)	30.0	30.0		21.0	51.0	28.0		51.0		28.0	79.0	
Total Split (%)	23.1%	23.1%		16.2%	39.2%	21.5%		39.2%		21.5%	60.8%	
Maximum Green (s)	25.0	25.0		16.0	46.0	23.0		46.0		23.0	74.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5		3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5	1.5		1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0		-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead		Lead		Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Recall Mode	None	None		None	None	None		C-Min		None	C-Min	
Walk Time (s)					18.0			18.0				
Flash Dont Walk (s)					5.0			5.0				
Pedestrian Calls (#/hr)					0			0				
Act Effct Green (s)	22.7	22.7		17.1	43.8	66.3		55.7	130.0	78.2	78.2	
Actuated g/C Ratio	0.17	0.17		0.13	0.34	0.51		0.43	1.00	0.60	0.60	
v/c Ratio	0.13	0.75		0.64	0.53	0.25		0.34	0.11	0.58	0.67	
Control Delay	46.2	58.8		60.4	36.1	4.7		30.8	0.1	21.7	24.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	46.2	58.8		60.4	36.1	4.7		30.8	0.1	21.7	24.5	

Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	E		E	D	A		C	A	C	C	
Approach Delay		58.4			36.2			23.0			24.0	
Approach LOS		E			D			C			C	
Queue Length 50th (ft)	12	196		120	222	24		208	0	160	517	
Queue Length 95th (ft)	35	251		168	270	56		159	0	211	403	
Internal Link Dist (ft)		1438			1103			1997			834	
Turn Bay Length (ft)	175			300					225	200		
Base Capacity (vph)	154	708		462	1289	947		1520	1583	602	2123	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.11	0.66		0.62	0.49	0.23		0.34	0.11	0.53	0.67	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 31.3
 Intersection Capacity Utilization 74.2%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service D

Splits and Phases: 15: Farrow Road & Beltline Blvd



Lanes, Volumes, Timings
16: Farrow Road & 277 NB RAMPS

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	0	9	0	0	0	0	344	353	44	1620	0
Future Volume (vph)	61	0	9	0	0	0	0	344	353	44	1620	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	0		0	0		0	250		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			25			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.850						0.924				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1770	1583	0	0	0	0	0	3270	0	1770	3539	0
Flt Permitted	0.950									0.354		
Satd. Flow (perm)	1770	1583	0	0	0	0	0	3270	0	659	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		48						392				
Link Speed (mph)		35			35			35				35
Link Distance (ft)		706			904			914				683
Travel Time (s)		13.8			17.6			17.8				13.3
Peak Hour Factor	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90
Adj. Flow (vph)	66	0	10	0	0	0	0	382	392	49	1723	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	66	10	0	0	0	0	0	774	0	49	1723	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						6			2	
Permitted Phases	4									2		
Detector Phase	4	4						6		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0						10.0		10.0	10.0	
Minimum Split (s)	30.0	30.0						30.0		30.0	30.0	
Total Split (s)	30.0	30.0						100.0		100.0	100.0	
Total Split (%)	23.1%	23.1%						76.9%		76.9%	76.9%	
Maximum Green (s)	25.0	25.0						95.0		95.0	95.0	
Yellow Time (s)	3.5	3.5						3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5						1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0						-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0						4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Recall Mode	None	None						C-Max		C-Max	C-Max	
Act Effct Green (s)	12.2	12.2						113.6		113.6	113.6	
Actuated g/C Ratio	0.09	0.09						0.87		0.87	0.87	
v/c Ratio	0.40	0.05						0.27		0.09	0.56	
Control Delay	62.3	0.6						2.1		1.7	2.1	
Queue Delay	0.0	0.0						0.0		0.0	0.5	
Total Delay	62.3	0.6						2.1		1.7	2.6	
LOS	E	A						A		A	A	
Approach Delay		54.2						2.1			2.6	
Approach LOS		D						A			A	

Lanes, Volumes, Timings
 16: Farrow Road & 277 NB RAMPS

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	54	0						0		4	90	
Queue Length 95th (ft)	99	0						3		m6	m165	
Internal Link Dist (ft)		626			824			834				603
Turn Bay Length (ft)	300									250		
Base Capacity (vph)	354	355						2906		575	3091	
Starvation Cap Reductn	0	0						0		0	797	
Spillback Cap Reductn	0	0						0		0	0	
Storage Cap Reductn	0	0						0		0	0	
Reduced v/c Ratio	0.19	0.03						0.27		0.09	0.75	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.56
 Intersection Signal Delay: 4.0
 Intersection Capacity Utilization 59.8%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 16: Farrow Road & 277 NB RAMPS



Lanes, Volumes, Timings
 17: Farrow Road & Lorick Avenue /277 SB Ramps

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	0	41	884	14	35	13	392	0	0	750	215
Future Volume (vph)	13	0	41	884	14	35	13	392	0	0	750	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	125		0	200		0	0		0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (ft)	25			150			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850		0.894							0.966
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1770	0	1583	1770	1665	0	1770	3539	0	0	3419	0
Flt Permitted	0.721			0.950			0.106					
Satd. Flow (perm)	1343	0	1583	1770	1665	0	197	3539	0	0	3419	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			18		39							29
Link Speed (mph)		35			35			35				35
Link Distance (ft)		681			1031			683				835
Travel Time (s)		13.3			20.1			13.3				16.3
Peak Hour Factor	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.92	0.90	0.90	0.93	0.90
Adj. Flow (vph)	14	0	46	951	16	39	14	426	0	0	806	239
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	0	46	951	55	0	14	426	0	0	1045	0
Turn Type	Perm		Perm	Perm	NA		Perm	NA			NA	
Protected Phases					4			2				6
Permitted Phases	8		8	4			2					
Detector Phase	8		8	4	4		2	2				6
Switch Phase												
Minimum Initial (s)	10.0		10.0	10.0	10.0		10.0	10.0				10.0
Minimum Split (s)	30.0		30.0	30.0	30.0		30.0	30.0				30.0
Total Split (s)	91.0		91.0	91.0	91.0		39.0	39.0				39.0
Total Split (%)	70.0%		70.0%	70.0%	70.0%		30.0%	30.0%				30.0%
Maximum Green (s)	86.0		86.0	86.0	86.0		34.0	34.0				34.0
Yellow Time (s)	3.5		3.5	3.5	3.5		3.5	3.5				3.5
All-Red Time (s)	1.5		1.5	1.5	1.5		1.5	1.5				1.5
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0		-1.0	-1.0				-1.0
Total Lost Time (s)	4.0		4.0	4.0	4.0		4.0	4.0				4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0				3.0
Recall Mode	None		None	None	None		C-Max	C-Max				C-Max
Act Effct Green (s)	84.2		84.2	84.2	84.2		37.8	37.8				37.8
Actuated g/C Ratio	0.65		0.65	0.65	0.65		0.29	0.29				0.29
v/c Ratio	0.02		0.04	0.83	0.05		0.25	0.41				1.03
Control Delay	7.3		5.1	24.8	3.2		50.8	31.7				80.3
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.0				0.0
Total Delay	7.3		5.1	24.8	3.2		50.8	31.7				80.3
LOS	A		A	C	A		D	C				F
Approach Delay					23.6			32.3				80.3
Approach LOS					C			C				F

Lanes, Volumes, Timings
 17: Farrow Road & Lorick Avenue /277 SB Ramps

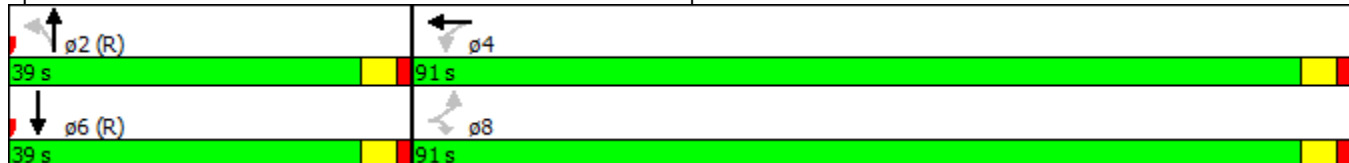


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	4		7	529	4		5	106			~520	
Queue Length 95th (ft)	11		21	741	18		33	227			#658	
Internal Link Dist (ft)		601			951			603			755	
Turn Bay Length (ft)				125			200					
Base Capacity (vph)	898		1065	1184	1127		57	1029			1015	
Starvation Cap Reductn	0		0	0	0		0	0			0	
Spillback Cap Reductn	0		0	0	0		0	0			0	
Storage Cap Reductn	0		0	0	0		0	0			0	
Reduced v/c Ratio	0.02		0.04	0.80	0.05		0.25	0.41			1.03	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.03
 Intersection Signal Delay: 47.9
 Intersection LOS: D
 Intersection Capacity Utilization 94.9%
 ICU Level of Service F
 Analysis Period (min) 15
 ~ 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: 17: Farrow Road & Lorick Avenue /277 SB Ramps



Lanes, Volumes, Timings
18: Assembly St./Assembly & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2527	470	638	1652	4	268	1	253	0	0	0
Future Volume (vph)	0	2527	470	638	1652	4	268	1	253	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		275	150		0	0		0	0		0
Storage Lanes	1		1	1		0	2		1	0		0
Taper Length (ft)	150			75			25			25		
Lane Util. Factor	1.00	0.86	0.86	0.97	0.91	0.91	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850					0.851	0.850			
Flt Protected				0.950			0.950					
Satd. Flow (prot)	1863	4806	1362	3433	5085	0	3433	1506	1504	0	1863	0
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	1863	4806	1362	3433	5085	0	3433	1506	1504	0	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			181		1			132	76			
Link Speed (mph)		30			30			30				35
Link Distance (ft)		3707			509			546				403
Travel Time (s)		84.3			11.6			12.4				7.9
Peak Hour Factor	0.90	0.98	0.90	0.92	0.96	0.90	0.92	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	2579	522	693	1721	4	291	1	281	0	0	0
Shared Lane Traffic (%)			0%						47%			
Lane Group Flow (vph)	0	2579	522	693	1725	0	291	133	149	0	0	0
Turn Type	Perm	NA	pm+ov	Prot	NA		Split	NA	pm+ov			
Protected Phases		2	3	1	6		3	3	1	4	4	
Permitted Phases	2		2						3			
Detector Phase	2	2	3	1	6		3	3	1	4	4	
Switch Phase												
Minimum Initial (s)	16.0	16.0	6.0	11.0	16.0		6.0	6.0	11.0	4.0	4.0	
Minimum Split (s)	30.0	30.0	21.0	17.0	30.0		21.0	21.0	17.0	10.0	10.0	
Total Split (s)	72.0	72.0	21.0	27.0	99.0		21.0	21.0	27.0	10.0	10.0	
Total Split (%)	55.4%	55.4%	16.2%	20.8%	76.2%		16.2%	16.2%	20.8%	7.7%	7.7%	
Maximum Green (s)	66.0	66.0	15.0	21.0	93.0		15.0	15.0	21.0	4.0	4.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	-4.0	-4.0	-4.0	-4.0		-4.0	-2.0	-4.0		-2.0	
Total Lost Time (s)	6.0	2.0	2.0	2.0	2.0		2.0	4.0	2.0		4.0	
Lead/Lag	Lead	Lead	Lead	Lag			Lead	Lead	Lag	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes					Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max	None	None	C-Max		None	None	None	None	None	
Walk Time (s)			5.0				5.0	5.0				
Flash Dont Walk (s)			10.0				10.0	10.0				
Pedestrian Calls (#/hr)			0				0	0				
Act Effct Green (s)		80.4	101.0	25.0	107.4		18.6	16.6	45.6			
Actuated g/C Ratio		0.62	0.78	0.19	0.83		0.14	0.13	0.35			
v/c Ratio		0.87	0.48	1.05	0.41		0.59	0.43	0.26			
Control Delay		24.7	4.6	91.8	1.5		57.6	13.2	15.9			
Queue Delay		0.0	0.0	0.0	0.1		0.0	0.0	0.0			
Total Delay		24.7	4.6	91.8	1.6		57.6	13.2	15.9			

Lanes, Volumes, Timings
 18: Assembly St./Assembly & Elmwood Avenue

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C	A	F	A		E	B	B			
Approach Delay		21.3			27.5			36.4				
Approach LOS		C			C			D				
Queue Length 50th (ft)		659	88	~337	52		119	1	44			
Queue Length 95th (ft)		741	150	m#439	m54		168	64	100			
Internal Link Dist (ft)		3627			429			466			323	
Turn Bay Length (ft)			275	150								
Base Capacity (vph)		2973	1098	660	4201		501	311	576			
Starvation Cap Reductn		0	0	0	1138		0	0	0			
Spillback Cap Reductn		9	0	0	0		0	0	0			
Storage Cap Reductn		0	0	0	0		0	0	0			
Reduced v/c Ratio		0.87	0.48	1.05	0.56		0.58	0.43	0.26			

Intersection Summary

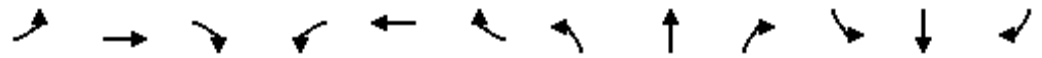
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 14 (11%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.05
 Intersection Signal Delay: 25.2 Intersection LOS: C
 Intersection Capacity Utilization 88.2% ICU Level of Service E
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Assembly St./Assembly & Elmwood Avenue



Lanes, Volumes, Timings
19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	212	2482	67	84	1651	52	19	103	24	258	509	595
Future Volume (vph)	212	2482	67	84	1651	52	19	103	24	258	509	595
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		175	150		0	200		0	175		425
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	75			75			100			75		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850		0.995				0.850		0.989	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	1770	5060	0	1770	3539	1583	1770	3353	1441
Flt Permitted	0.950			0.062			0.148			0.599		
Satd. Flow (perm)	3433	5085	1583	115	5060	0	276	3539	1583	1116	3353	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			35		5				126		6	149
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		509			563			474			3675	
Travel Time (s)		11.6			12.8			10.8			83.5	
Peak Hour Factor	0.90	0.93	0.90	0.90	0.97	0.90	0.90	0.90	0.90	0.90	0.93	0.94
Adj. Flow (vph)	236	2669	74	93	1702	58	21	114	27	287	547	633
Shared Lane Traffic (%)												7%
Lane Group Flow (vph)	236	2669	74	93	1760	0	21	114	27	287	591	589
Turn Type	Prot	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	pm+ov
Protected Phases	5	2	3		6		3	8		7	4	5
Permitted Phases			2	6			8		8	4		4
Detector Phase	5	2	3	6	6		3	8	8	7	4	5
Switch Phase												
Minimum Initial (s)	11.0	16.0	11.0	16.0	16.0		11.0	16.0	16.0	11.0	16.0	11.0
Minimum Split (s)	17.0	30.0	17.0	30.0	30.0		17.0	30.0	30.0	17.0	30.0	17.0
Total Split (s)	17.0	83.0	17.0	66.0	66.0		17.0	30.0	30.0	17.0	30.0	17.0
Total Split (%)	13.1%	63.8%	13.1%	50.8%	50.8%		13.1%	23.1%	23.1%	13.1%	23.1%	13.1%
Maximum Green (s)	11.0	77.0	11.0	60.0	60.0		11.0	24.0	24.0	11.0	24.0	11.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0	-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lead	Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	C-Max	C-Max		None	None	None	None	None	None
Act Effct Green (s)	15.0	82.6	99.6	65.6	65.6		41.4	26.4	26.4	41.8	29.8	46.8
Actuated g/C Ratio	0.12	0.64	0.77	0.50	0.50		0.32	0.20	0.20	0.32	0.23	0.36
v/c Ratio	0.60	0.83	0.06	1.63	0.69		0.08	0.16	0.06	0.66	0.77	0.96
Control Delay	79.8	7.0	0.1	367.9	24.8		29.0	42.5	0.3	43.0	54.4	58.8
Queue Delay	0.0	0.5	0.0	0.0	0.2		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.8	7.5	0.1	367.9	24.9		29.0	42.5	0.3	43.0	54.4	58.8
LOS	E	A	A	F	C		C	D	A	D	D	E
Approach Delay		13.0			42.1			33.7			53.9	
Approach LOS		B			D			C			D	

Lanes, Volumes, Timings
19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	102	116	0	~111	456		12	41	0	188	259	437
Queue Length 95th (ft)	m123	167	m0	#227	536		31	68	0	275	333	#716
Internal Link Dist (ft)		429			483			394			3595	
Turn Bay Length (ft)	175		175	150			200			175		425
Base Capacity (vph)	396	3231	1220	57	2555		260	762	439	434	772	614
Starvation Cap Reductn	0	189	0	0	160		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	0.60	0.88	0.06	1.63	0.73		0.08	0.15	0.06	0.66	0.77	0.96

Intersection Summary

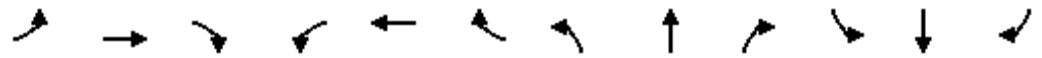
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 5 (4%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.63
 Intersection Signal Delay: 31.2
 Intersection LOS: C
 Intersection Capacity Utilization 92.2%
 ICU Level of Service F
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Main St. & Elmwood Avenue



Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕↕↗		↖	↕↕↗		↖	↕	↗		↕↗	
Traffic Volume (vph)	12	2025	275	100	1694	16	36	12	39	21	123	19
Future Volume (vph)	12	2025	275	100	1694	16	36	12	39	21	123	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	75		0	200		0	75		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			50			100			50		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.981			0.999				0.850		0.983	
Flt Protected	0.950			0.950			0.950				0.994	
Satd. Flow (prot)	1770	4989	0	1770	5080	0	1770	1863	1583	0	3458	0
Flt Permitted	0.104			0.047			0.505				0.922	
Satd. Flow (perm)	194	4989	0	88	5080	0	941	1863	1583	0	3208	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		59			3				25		10	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		563			1012			1692			1095	
Travel Time (s)		12.8			23.0			38.5			24.9	
Peak Hour Factor	0.90	0.95	0.90	0.90	0.95	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	13	2132	306	111	1783	18	40	13	43	23	137	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	2438	0	111	1801	0	40	13	43	0	181	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		6	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	100.0	100.0		100.0	100.0		30.0	30.0	30.0	30.0	30.0	
Total Split (%)	76.9%	76.9%		76.9%	76.9%		23.1%	23.1%	23.1%	23.1%	23.1%	
Maximum Green (s)	94.0	94.0		94.0	94.0		24.0	24.0	24.0	24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0		-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0		2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None	None	None	None	
Act Effct Green (s)	106.0	106.0		106.0	106.0		20.0	20.0	20.0		20.0	
Actuated g/C Ratio	0.82	0.82		0.82	0.82		0.15	0.15	0.15		0.15	
v/c Ratio	0.08	0.60		1.56	0.43		0.28	0.05	0.16		0.36	
Control Delay	1.3	1.0		302.9	2.3		54.5	47.5	27.1		48.8	
Queue Delay	0.0	0.2		0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	1.3	1.2		302.9	2.3		54.5	47.5	27.1		48.8	
LOS	A	A		F	A		D	D	C		D	
Approach Delay		1.2			19.8			41.3			48.8	
Approach LOS		A			B			D			D	

Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	0	29		~132	97		30	10	13		68	
Queue Length 95th (ft)	m1	33		m#147	m83		68	30	49		106	
Internal Link Dist (ft)		483			932			1612			1015	
Turn Bay Length (ft)	200			75			200					
Base Capacity (vph)	158	4078		71	4142		202	401	360		698	
Starvation Cap Reductn	0	685		0	0		0	0	0		0	
Spillback Cap Reductn	0	0		0	204		0	0	0		0	
Storage Cap Reductn	0	0		0	0		0	0	0		0	
Reduced v/c Ratio	0.08	0.72		1.56	0.46		0.20	0.03	0.12		0.26	

Intersection Summary

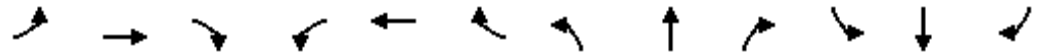
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 13 (10%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.56
 Intersection Signal Delay: 11.5 Intersection LOS: B
 Intersection Capacity Utilization 98.5% ICU Level of Service F
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 20: Sumter St. & Elmwood Avenue



Lanes, Volumes, Timings
21: Barnwell Street & Calhoun St.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM



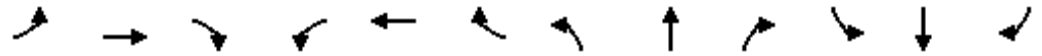
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	400	26	25	305	46	3	16	12	42	10	58
Future Volume (vph)	105	400	26	25	305	46	3	16	12	42	10	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	225		0	125		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	75			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.980			0.937				0.872
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1846	0	1770	1825	0	1770	1745	0	1770	1624	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1846	0	1770	1825	0	1770	1745	0	1770	1624	0
Link Speed (mph)		35			35			35				35
Link Distance (ft)		892			449			703				769
Travel Time (s)		17.4			8.7			13.7				15.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	117	444	29	28	339	51	3	18	13	47	11	64
Shared Lane Traffic (%)												
Lane Group Flow (vph)	117	473	0	28	390	0	3	31	0	47	75	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	45.0%
Analysis Period (min)	15
	ICU Level of Service A
















HCM Unsignalized Intersection Capacity Analysis
 21: Barnwell Street & Calhoun St.

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	400	26	25	305	46	3	16	12	42	10	58
Future Volume (Veh/h)	105	400	26	25	305	46	3	16	12	42	10	58
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	117	444	29	28	339	51	3	18	13	47	11	64
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh		2			2							
Upstream signal (ft)					1269							
pX, platoon unblocked												
vC, conflicting volume	390			473			1157	1138	458	1120	1128	364
vC1, stage 1 conf vol							692	692		420	420	
vC2, stage 2 conf vol							464	446		700	707	
vCu, unblocked vol	390			473			1157	1138	458	1120	1128	364
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			97			99	95	98	85	97	91
cM capacity (veh/h)	1169			1089			297	330	602	307	333	680
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	117	473	28	390	3	31	47	75				
Volume Left	117	0	28	0	3	0	47	0				
Volume Right	0	29	0	51	0	13	0	64				
cSH	1169	1700	1089	1700	297	407	307	590				
Volume to Capacity	0.10	0.28	0.03	0.23	0.01	0.08	0.15	0.13				
Queue Length 95th (ft)	8	0	2	0	1	6	13	11				
Control Delay (s)	8.4	0.0	8.4	0.0	17.2	14.6	18.8	12.0				
Lane LOS	A		A		C	B	C	B				
Approach Delay (s)	1.7		0.6		14.8		14.6					
Approach LOS					B		B					
Intersection Summary												
Average Delay			3.0									
Intersection Capacity Utilization			45.0%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
23: Bull St. & Access #3

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			  			  
Traffic Volume (vph)	104	28	1848	119	104	2589
Future Volume (vph)	104	28	1848	119	104	2589
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		75	150	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	0.91
Frt		0.850	0.991			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	5040	0	1770	5085
Flt Permitted	0.950				0.054	
Satd. Flow (perm)	1770	1583	5040	0	101	5085
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		31	13			
Link Speed (mph)	35		40			40
Link Distance (ft)	526		223			302
Travel Time (s)	10.2		3.8			5.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	116	31	2053	132	116	2877
Shared Lane Traffic (%)						
Lane Group Flow (vph)	116	31	2185	0	116	2877
Turn Type	Prot	Perm	NA		D.P+P	NA
Protected Phases	8		2		1	6
Permitted Phases		8			2	
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	6.0	6.0	11.0		6.0	11.0
Minimum Split (s)	12.0	12.0	17.0		12.0	17.0
Total Split (s)	27.0	27.0	78.0		25.0	103.0
Total Split (%)	20.8%	20.8%	60.0%		19.2%	79.2%
Maximum Green (s)	21.0	21.0	72.0		19.0	97.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0		4.0	4.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	C-Max		None	C-Max
Act Effct Green (s)	15.8	15.8	90.3		102.2	106.2
Actuated g/C Ratio	0.12	0.12	0.69		0.79	0.82
v/c Ratio	0.54	0.14	0.62		0.50	0.69
Control Delay	62.4	16.9	26.9		39.2	2.1
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	62.4	16.9	26.9		39.2	2.2
LOS	E	B	C		D	A
Approach Delay	52.8		26.9			3.6
Approach LOS	D		C			A



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Length 50th (ft)	93	0	585		39	67
Queue Length 95th (ft)	150	29	m629		m95	80
Internal Link Dist (ft)	446		143			222
Turn Bay Length (ft)					150	
Base Capacity (vph)	313	305	3504		352	4155
Starvation Cap Reductn	0	0	0		0	98
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.37	0.10	0.62		0.33	0.71

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBSB and 6:SBT, Start of 1st Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 14.5
 Intersection LOS: B
 Intersection Capacity Utilization 62.5%
 ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 23: Bull St. & Access #3



Lanes, Volumes, Timings
25: Access #5 & Colonial Drive

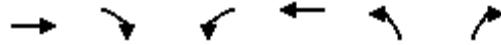


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↑		↻
Traffic Volume (vph)	497	14	0	276	0	11
Future Volume (vph)	497	14	0	276	0	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		75	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.996					0.865
Flt Protected						
Satd. Flow (prot)	1855	0	0	1863	0	1611
Flt Permitted						
Satd. Flow (perm)	1855	0	0	1863	0	1611
Link Speed (mph)	35			35	35	
Link Distance (ft)	312			348	305	
Travel Time (s)	6.1			6.8	5.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	552	16	0	307	0	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	568	0	0	307	0	12
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	37.0%
Analysis Period (min)	15
	ICU Level of Service A

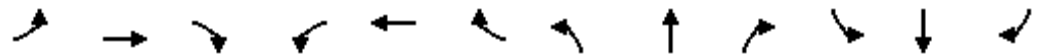
HCM Unsignalized Intersection Capacity Analysis
25: Access #5 & Colonial Drive



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↻		↻
Traffic Volume (veh/h)	497	14	0	276	0	11
Future Volume (Veh/h)	497	14	0	276	0	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	552	16	0	307	0	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	312					
pX, platoon unblocked			1.00		1.00	1.00
vC, conflicting volume			568		867	560
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			567		866	559
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	98
cM capacity (veh/h)			1004		323	528
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	568	307	12			
Volume Left	0	0	0			
Volume Right	16	0	12			
cSH	1700	1700	528			
Volume to Capacity	0.33	0.18	0.02			
Queue Length 95th (ft)	0	0	2			
Control Delay (s)	0.0	0.0	12.0			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	12.0			
Approach LOS			B			
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			37.0%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
26: Access #6/Boyce Street & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	414	7	19	258	171	16	0	11	6	0	1
Future Volume (vph)	86	414	7	19	258	171	16	0	11	6	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		0	0		0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.997			0.940			0.850				0.983
Flt Protected	0.950			0.950			0.950					0.958
Satd. Flow (prot)	1770	1857	0	1770	1751	0	1770	1583	0	0	1754	0
Flt Permitted	0.950			0.950			0.950					0.958
Satd. Flow (perm)	1770	1857	0	1770	1751	0	1770	1583	0	0	1754	0
Link Speed (mph)		35			35			35				35
Link Distance (ft)		348			414			406				406
Travel Time (s)		6.8			8.1			7.9				7.9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	96	460	8	21	287	190	18	0	12	7	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	96	468	0	21	477	0	18	12	0	0	8	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	44.1%
Analysis Period (min)	15
	ICU Level of Service A

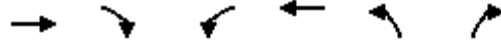
HCM Unsignalized Intersection Capacity Analysis
26: Access #6/Boyce Street & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	86	414	7	19	258	171	16	0	11	6	0	1
Future Volume (Veh/h)	86	414	7	19	258	171	16	0	11	6	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	96	460	8	21	287	190	18	0	12	7	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		660										
pX, platoon unblocked												
vC, conflicting volume	477			468			986	1175	464	1088	1084	382
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	477			468			986	1175	464	1088	1084	382
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			98			91	100	98	96	100	100
cM capacity (veh/h)	1085			1094			208	171	598	174	194	665
Direction, Lane #												
	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total	96	468	21	477	18	12	8					
Volume Left	96	0	21	0	18	0	7					
Volume Right	0	8	0	190	0	12	1					
cSH	1085	1700	1094	1700	208	598	192					
Volume to Capacity	0.09	0.28	0.02	0.28	0.09	0.02	0.04					
Queue Length 95th (ft)	7	0	1	0	7	2	3					
Control Delay (s)	8.6	0.0	8.4	0.0	23.9	11.1	24.6					
Lane LOS	A		A		C	B	C					
Approach Delay (s)	1.5		0.4		18.8		24.6					
Approach LOS					C		C					
Intersection Summary												
Average Delay			1.6									
Intersection Capacity Utilization			44.1%		ICU Level of Service		A					
Analysis Period (min)			15									

Lanes, Volumes, Timings
27: Boyce Street & Colonial Drive

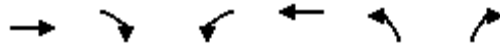


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	388	37	104	418	30	58
Future Volume (vph)	388	37	104	418	30	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		75	100		0	0
Storage Lanes		0	1		1	1
Taper Length (ft)			100		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.988					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1840	0	1770	1863	1770	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1840	0	1770	1863	1770	1583
Link Speed (mph)	35			35	35	
Link Distance (ft)	414			980	814	
Travel Time (s)	8.1			19.1	15.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	431	41	116	464	33	64
Shared Lane Traffic (%)						
Lane Group Flow (vph)	472	0	116	464	33	64
Sign Control	Free			Free	Stop	

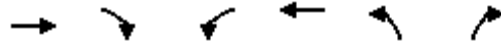
Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	41.8%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
27: Boyce Street & Colonial Drive



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→	↘	↙	←	↖	↗
Traffic Volume (veh/h)	388	37	104	418	30	58
Future Volume (Veh/h)	388	37	104	418	30	58
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	431	41	116	464	33	64
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	1074					
pX, platoon unblocked						
vC, conflicting volume			472	1148		452
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			472	1148		452
tC, single (s)			4.1	6.4		6.2
tC, 2 stage (s)						
tF (s)			2.2	3.5		3.3
p0 queue free %			89	83		89
cM capacity (veh/h)			1090	197		608
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	472	116	464	33	64	
Volume Left	0	116	0	33	0	
Volume Right	41	0	0	0	64	
cSH	1700	1090	1700	197	608	
Volume to Capacity	0.28	0.11	0.27	0.17	0.11	
Queue Length 95th (ft)	0	9	0	15	9	
Control Delay (s)	0.0	8.7	0.0	27.0	11.6	
Lane LOS	A		D		B	
Approach Delay (s)	0.0	1.7	16.8			
Approach LOS			C			
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			41.8%		ICU Level of Service	A
Analysis Period (min)			15			



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑↑		↗
Traffic Volume (vph)	438	11	22	734	0	12
Future Volume (vph)	438	11	22	734	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		75	100		0	0
Storage Lanes		1	1		0	1
Taper Length (ft)			100		25	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Frt		0.850				0.865
Flt Protected			0.950			
Satd. Flow (prot)	1863	1583	1770	3539	0	1611
Flt Permitted			0.950			
Satd. Flow (perm)	1863	1583	1770	3539	0	1611
Link Speed (mph)	35			35	35	
Link Distance (ft)	235			355	514	
Travel Time (s)	4.6			6.9	10.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	487	12	24	816	0	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	487	12	24	816	0	13
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	33.1%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
28: Access #7 & Colonial Drive



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑↑		↗
Traffic Volume (veh/h)	438	11	22	734	0	12
Future Volume (Veh/h)	438	11	22	734	0	12
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	487	12	24	816	0	13
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (ft)	779					
pX, platoon unblocked					0.90	
vC, conflicting volume			499		943	487
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			499		720	487
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	98
cM capacity (veh/h)			1061		320	526
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	487	12	24	408	408	13
Volume Left	0	0	24	0	0	0
Volume Right	0	12	0	0	0	13
cSH	1700	1700	1061	1700	1700	526
Volume to Capacity	0.29	0.01	0.02	0.24	0.24	0.02
Queue Length 95th (ft)	0	0	2	0	0	2
Control Delay (s)	0.0	0.0	8.5	0.0	0.0	12.0
Lane LOS			A	B		
Approach Delay (s)	0.0		0.2			12.0
Approach LOS						B
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			33.1%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
30: Harden Street Ext & Access #8



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	↘
Traffic Volume (vph)	0	6	0	1103	1469	45
Future Volume (vph)	0	6	0	1103	1469	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0			75
Storage Lanes	0	1	0			1
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3539	3539	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3539	3539	1583
Link Speed (mph)	30			35	35	
Link Distance (ft)	426			332	512	
Travel Time (s)	9.7			6.5	10.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	7	0	1226	1632	50
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	7	0	1226	1632	50
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	50.6%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 30: Harden Street Ext & Access #8



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	↗
Traffic Volume (veh/h)	0	6	0	1103	1469	45
Future Volume (Veh/h)	0	6	0	1103	1469	45
Sign Control	Stop			Free		Free
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	7	0	1226	1632	50
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)				783	512	
pX, platoon unblocked	0.81	0.78	0.78			
vC, conflicting volume	2245	816	1682			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1712	186	1302			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	66	640	410			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	7	613	613	816	816	50
Volume Left	0	0	0	0	0	0
Volume Right	7	0	0	0	0	50
cSH	640	1700	1700	1700	1700	1700
Volume to Capacity	0.01	0.36	0.36	0.48	0.48	0.03
Queue Length 95th (ft)	1	0	0	0	0	0
Control Delay (s)	10.7	0.0	0.0	0.0	0.0	0.0
Lane LOS						
Approach Delay (s)	10.7	0.0		0.0		
Approach LOS						
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			50.6%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
 31: Harden Street Ext & Access #9



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↘	↑↑	↑↑	↗
Traffic Volume (vph)	0	12	22	1103	1441	34
Future Volume (vph)	0	12	22	1103	1441	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			75
Storage Lanes	0	1	1			1
Taper Length (ft)	25		100			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected			0.950			
Satd. Flow (prot)	0	1611	1770	3539	3539	1583
Flt Permitted			0.950			
Satd. Flow (perm)	0	1611	1770	3539	3539	1583
Link Speed (mph)	30			35	35	
Link Distance (ft)	322			451	332	
Travel Time (s)	7.3			8.8	6.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	13	24	1226	1601	38
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	13	24	1226	1601	38
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	49.8% ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 31: Harden Street Ext & Access #9

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM



Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗	↘	↑↑	↑↑	↗	
Traffic Volume (veh/h)	0	12	22	1103	1441	34	
Future Volume (Veh/h)	0	12	22	1103	1441	34	
Sign Control	Stop			Free	Free		
Grade	0%			0%	0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly flow rate (vph)	0	13	24	1226	1601	38	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type							
Median storage veh							
Upstream signal (ft)							
pX, platoon unblocked							
vC, conflicting volume							
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol							
tC, single (s)							
tC, 2 stage (s)							
tF (s)							
p0 queue free %							
cM capacity (veh/h)							
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	13	24	613	613	800	800	38
Volume Left	0	24	0	0	0	0	0
Volume Right	13	0	0	0	0	0	38
cSH	661	430	1700	1700	1700	1700	1700
Volume to Capacity	0.02	0.06	0.36	0.36	0.47	0.47	0.02
Queue Length 95th (ft)	2	4	0	0	0	0	0
Control Delay (s)	10.6	13.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	B	B					
Approach Delay (s)	10.6	0.3			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay							
Intersection Capacity Utilization							
Analysis Period (min)							
			0.2				
			49.8%	ICU Level of Service		A	
			15				

Lanes, Volumes, Timings
32: Harden Street Ext & Access #10



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	87	40	90	1038	1375	78
Future Volume (vph)	87	40	90	1038	1375	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	200			75
Storage Lanes	1	1	1			1
Taper Length (ft)	25		100			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.950		0.153			
Satd. Flow (perm)	1770	1583	285	3539	3539	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		44				87
Link Speed (mph)	30			35	35	
Link Distance (ft)	333			378	451	
Travel Time (s)	7.6			7.4	8.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	97	44	100	1153	1528	87
Shared Lane Traffic (%)						
Lane Group Flow (vph)	97	44	100	1153	1528	87
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	6.0	6.0	11.0	11.0	11.0	11.0
Minimum Split (s)	12.0	12.0	17.0	17.0	17.0	17.0
Total Split (s)	14.0	14.0	116.0	116.0	116.0	116.0
Total Split (%)	10.8%	10.8%	89.2%	89.2%	89.2%	89.2%
Maximum Green (s)	8.0	8.0	110.0	110.0	110.0	110.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	10.0	10.0	112.0	112.0	112.0	112.0
Actuated g/C Ratio	0.08	0.08	0.86	0.86	0.86	0.86
v/c Ratio	0.71	0.27	0.41	0.38	0.50	0.06
Control Delay	86.2	20.3	21.6	12.6	1.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	86.2	20.3	21.6	12.6	1.1	0.1
LOS	F	C	C	B	A	A
Approach Delay	65.6			13.3	1.0	
Approach LOS	E			B	A	

Lanes, Volumes, Timings
 32: Harden Street Ext & Access #10

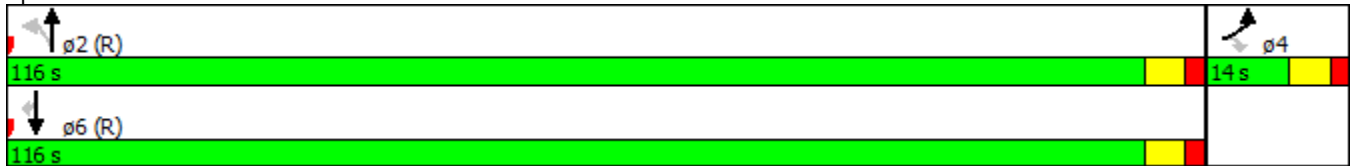


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Length 50th (ft)	81	0	59	345	33	0
Queue Length 95th (ft)	#168	38	138	416	27	m0
Internal Link Dist (ft)	253		298		371	
Turn Bay Length (ft)	200			75		
Base Capacity (vph)	136	162	245	3048	3048	1375
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.27	0.41	0.38	0.50	0.06

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 9.2 Intersection LOS: A
 Intersection Capacity Utilization 62.2% ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 32: Harden Street Ext & Access #10



Lanes, Volumes, Timings
 33: Harden Street Ext & Access #11



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	↘
Traffic Volume (vph)	0	6	0	1128	1404	11
Future Volume (vph)	0	6	0	1128	1404	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			75
Storage Lanes	0	1	0			1
Taper Length (ft)	25		100			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3539	3539	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3539	3539	1583
Link Speed (mph)	30			35	35	
Link Distance (ft)	385			351	378	
Travel Time (s)	8.8			6.8	7.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	7	0	1253	1560	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	7	0	1253	1560	12
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	48.8%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 33: Harden Street Ext & Access #11



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	↗
Traffic Volume (veh/h)	0	6	0	1128	1404	11
Future Volume (Veh/h)	0	6	0	1128	1404	11
Sign Control	Stop			Free		Free
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	7	0	1253	1560	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)				1314	378	
pX, platoon unblocked	0.90	0.88	0.88			
vC, conflicting volume	2186	780	1572			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1512	490	1385			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	100			
cM capacity (veh/h)	99	464	434			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	7	626	626	780	780	12
Volume Left	0	0	0	0	0	0
Volume Right	7	0	0	0	0	12
cSH	464	1700	1700	1700	1700	1700
Volume to Capacity	0.02	0.37	0.37	0.46	0.46	0.01
Queue Length 95th (ft)	1	0	0	0	0	0
Control Delay (s)	12.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	12.9	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay	0.0					
Intersection Capacity Utilization	48.8%			ICU Level of Service	A	
Analysis Period (min)	15					

Lanes, Volumes, Timings
 34: Harden Street Ext & Access #12



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	↘
Traffic Volume (vph)	0	6	22	1128	1399	11
Future Volume (vph)	0	6	22	1128	1399	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0			75
Storage Lanes	0	1	0			1
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected				0.999		
Satd. Flow (prot)	0	1611	0	3536	3539	1583
Flt Permitted				0.999		
Satd. Flow (perm)	0	1611	0	3536	3539	1583
Link Speed (mph)	30			35	35	
Link Distance (ft)	288			507	351	
Travel Time (s)	6.5			9.9	6.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	7	24	1253	1554	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	7	0	1277	1554	12
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	50.2%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 34: Harden Street Ext & Access #12

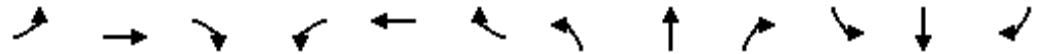
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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	↗
Traffic Volume (veh/h)	0	6	22	1128	1399	11
Future Volume (Veh/h)	0	6	22	1128	1399	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	7	24	1253	1554	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)				963	729	
pX, platoon unblocked	0.90	0.88	0.88			
vC, conflicting volume	2228	777	1566			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1548	474	1371			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	95			
cM capacity (veh/h)	89	472	437			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	7	442	835	777	777	12
Volume Left	0	24	0	0	0	0
Volume Right	7	0	0	0	0	12
cSH	472	437	1700	1700	1700	1700
Volume to Capacity	0.01	0.05	0.49	0.46	0.46	0.01
Queue Length 95th (ft)	1	4	0	0	0	0
Control Delay (s)	12.7	1.7	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	12.7	0.6		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			50.2%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	15	20	512	3	263	7	2566	224	83	1229	9
Future Volume (vph)	24	15	20	512	3	263	7	2566	224	83	1229	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		200	675		0	175		0	200		250
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100			75			50			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt		0.915			0.852				0.850		0.999	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3238	0	3433	1587	0	1770	3539	1583	1770	5080	0
Flt Permitted	0.950			0.950			0.197			0.053		
Satd. Flow (perm)	1770	3238	0	3433	1587	0	367	3539	1583	99	5080	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			292				134		1	
Link Speed (mph)		30			40			40			45	
Link Distance (ft)		619			1038			1208			1992	
Travel Time (s)		14.1			17.7			20.6			30.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.90	0.94	0.90
Adj. Flow (vph)	27	17	22	569	3	292	8	2820	246	92	1307	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	39	0	569	295	0	8	2820	246	92	1317	0
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	4	4		3	3			2	3	1	6	
Permitted Phases							2		2	6		
Detector Phase	4	4		3	3		2	2	3	1	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0		11.0	11.0		16.0	16.0	11.0	11.0	16.0	
Minimum Split (s)	30.0	30.0		17.0	17.0		30.0	30.0	17.0	17.0	30.0	
Total Split (s)	30.0	30.0		19.0	19.0		64.0	64.0	19.0	17.0	81.0	
Total Split (%)	23.1%	23.1%		14.6%	14.6%		49.2%	49.2%	14.6%	13.1%	62.3%	
Maximum Green (s)	24.0	24.0		13.0	13.0		58.0	58.0	13.0	11.0	75.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag	Lead	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	None	None	C-Max	
Walk Time (s)				5.0	5.0				5.0			
Flash Dont Walk (s)				10.0	10.0				10.0			
Pedestrian Calls (#/hr)				0	0				0			
Act Effct Green (s)	20.0	20.0		17.0	17.0		74.4	74.4	93.4	91.4	91.4	
Actuated g/C Ratio	0.15	0.15		0.13	0.13		0.57	0.57	0.72	0.70	0.70	
v/c Ratio	0.10	0.08		1.27	0.64		0.04	1.39	0.21	0.35	0.37	
Control Delay	48.5	26.5		181.5	19.4		6.9	204.3	4.3	18.7	8.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	48.5	26.5		181.5	19.4		6.9	204.3	4.3	18.7	8.8	

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	C		F	B		A	F	A	B	A	
Approach Delay		35.5			126.2			187.8				9.5
Approach LOS		D			F			F				A
Queue Length 50th (ft)	20	6		~318	70		2	~1771	52	25	167	
Queue Length 95th (ft)	49	24		#437	146		m3	#1895	m61	77	194	
Internal Link Dist (ft)		539			958			1128			1912	
Turn Bay Length (ft)	100			675			175			200		
Base Capacity (vph)	381	714		448	461		209	2025	1175	262	3572	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.05		1.27	0.64		0.04	1.39	0.21	0.35	0.37	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 119 (92%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.39
 Intersection Signal Delay: 129.7
 Intersection LOS: F
 Intersection Capacity Utilization 98.9%
 ICU Level of Service F
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Bull St. & Harden St. Ext.



Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	18	12	55	125	51	36	2661	9	7	1700	55
Future Volume (vph)	29	18	12	55	125	51	36	2661	9	7	1700	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	200		0	200		0	150		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			100			100			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Frt		0.941			0.956				0.850			0.995
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1753	0	1770	1781	0	1752	5085	1583	1770	5060	0
Flt Permitted	0.634			0.138			0.066			0.051		
Satd. Flow (perm)	1181	1753	0	257	1781	0	122	5085	1583	95	5060	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		602			376			654			1208	
Travel Time (s)		13.7			8.5			11.1			20.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.93	0.96
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%	2%
Adj. Flow (vph)	32	20	13	61	139	57	40	2801	10	8	1828	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	33	0	61	196	0	40	2801	10	8	1885	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			3			2				6
Permitted Phases	4			3			2		2	6		
Detector Phase	4	4		3	3		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	30.0	30.0		31.0	31.0		69.0	69.0	69.0	69.0	69.0	
Total Split (%)	23.1%	23.1%		23.8%	23.8%		53.1%	53.1%	53.1%	53.1%	53.1%	
Maximum Green (s)	24.0	24.0		25.0	25.0		63.0	63.0	63.0	63.0	63.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Act Effct Green (s)	20.0	20.0		29.0	29.0		79.4	79.4	79.4	79.4	79.4	
Actuated g/C Ratio	0.15	0.15		0.22	0.22		0.61	0.61	0.61	0.61	0.61	
v/c Ratio	0.18	0.12		1.07	0.49		0.54	0.90	0.01	0.14	0.61	
Control Delay	50.8	48.9		189.0	49.1		28.1	14.4	5.1	13.9	11.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	1.2	0.0	0.0	0.0	
Total Delay	50.8	48.9		189.0	49.1		28.1	15.7	5.1	13.9	11.8	
LOS	D	D		F	D		C	B	A	B	B	
Approach Delay		49.8			82.3			15.8			11.8	

Lanes, Volumes, Timings
 2: Bull St. & Confederate Ave.

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 PM

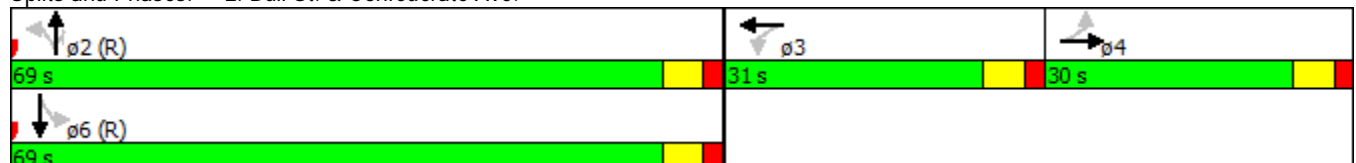


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Approach LOS	D			F			B			B			
Queue Length 50th (ft)	24	24		-57	145		7	698	1	2	212		
Queue Length 95th (ft)	56	57		#153	224		m14	m628	m2	m5	m209		
Internal Link Dist (ft)		522			296			574			1128		
Turn Bay Length (ft)	150			200			200			150			
Base Capacity (vph)	254	377		57	397		74	3105		967	57	3090	
Starvation Cap Reductn	0	0		0	0		0	138		0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	0	
Reduced v/c Ratio	0.13	0.09		1.07	0.49		0.54	0.94		0.01	0.14	0.61	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 88 (68%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.07
 Intersection Signal Delay: 18.1 Intersection LOS: B
 Intersection Capacity Utilization 82.2% ICU Level of Service E
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bull St. & Confederate Ave.



Lanes, Volumes, Timings
3: Bull St. & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗	↖	↔			↑↑↑		↘	↑↑↑	
Traffic Volume (vph)	0	0	4	409	7	153	0	2546	290	115	1604	25
Future Volume (vph)	0	0	4	409	7	153	0	2546	290	115	1604	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	150		0	0		0	200		0
Storage Lanes	0		1	1		0	0		0	1		0
Taper Length (ft)	25			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.865		0.925			0.984			0.998	
Flt Protected				0.950	0.977					0.950		
Satd. Flow (prot)	0	0	1611	1681	1599	0	0	5004	0	1770	5075	0
Flt Permitted				0.950	0.977					0.041		
Satd. Flow (perm)	0	0	1611	1681	1599	0	0	5004	0	76	5075	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)			52		9			48				
Link Speed (mph)		35			35			40				40
Link Distance (ft)		440			446			204				654
Travel Time (s)		8.6			8.7			3.5				11.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.97	0.90	0.90	0.94	0.90
Adj. Flow (vph)	0	0	4	454	8	170	0	2625	322	128	1706	28
Shared Lane Traffic (%)				36%								
Lane Group Flow (vph)	0	0	4	291	341	0	0	2947	0	128	1734	0
Turn Type			Perm	Perm	NA			NA		Perm	NA	
Protected Phases					8			2			6	
Permitted Phases			4	8						6		
Detector Phase			4	8	8			2		6	6	
Switch Phase												
Minimum Initial (s)			16.0	16.0	16.0			16.0		16.0	16.0	
Minimum Split (s)			30.0	30.0	30.0			30.0		30.0	30.0	
Total Split (s)			30.0	30.0	30.0			100.0		100.0	100.0	
Total Split (%)			23.1%	23.1%	23.1%			76.9%		76.9%	76.9%	
Maximum Green (s)			24.0	24.0	24.0			94.0		94.0	94.0	
Yellow Time (s)			4.0	4.0	4.0			4.0		4.0	4.0	
All-Red Time (s)			2.0	2.0	2.0			2.0		2.0	2.0	
Lost Time Adjust (s)			-4.0	-4.0	-4.0			-4.0		-4.0	-4.0	
Total Lost Time (s)			2.0	2.0	2.0			2.0		2.0	2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)			3.0	3.0	3.0			3.0		3.0	3.0	
Recall Mode			None	None	None			C-Max		C-Max	C-Max	
Act Effct Green (s)			28.0	28.0	28.0			98.0		98.0	98.0	
Actuated g/C Ratio			0.22	0.22	0.22			0.75		0.75	0.75	
v/c Ratio			0.01	0.80	0.97			0.78		2.25	0.45	
Control Delay			0.0	71.1	95.4			24.9		620.9	1.0	
Queue Delay			0.0	0.0	0.0			46.9		0.0	0.0	
Total Delay			0.0	71.1	95.4			71.8		620.9	1.0	
LOS			A	E	F			E		F	A	
Approach Delay					84.2			71.8			43.6	
Approach LOS					F			E			D	

Lanes, Volumes, Timings
3: Bull St. & Colonial Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)			0	257	304			873		-178	17	
Queue Length 95th (ft)			0	#400	#510			m914		m#305	m19	
Internal Link Dist (ft)		360			366			124			574	
Turn Bay Length (ft)				150						200		
Base Capacity (vph)			387	362	351			3784		57	3825	
Starvation Cap Reductn			0	0	0			1466		0	228	
Spillback Cap Reductn			0	0	0			235		0	0	
Storage Cap Reductn			0	0	0			0		0	0	
Reduced v/c Ratio			0.01	0.80	0.97			1.27		2.25	0.48	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 68 (52%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 2.25
 Intersection Signal Delay: 63.6
 Intersection LOS: E
 Intersection Capacity Utilization 95.2%
 ICU Level of Service F
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Bull St. & Colonial Drive



Lanes, Volumes, Timings
4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗		↑↑↑			↑↑↑	
Traffic Volume (vph)	0	0	6	0	0	51	0	2780	70	0	2003	6
Future Volume (vph)	0	0	6	0	0	51	0	2780	70	0	2003	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	50		0
Storage Lanes	0		1	0		1	0		0	0		0
Taper Length (ft)	25			25			75			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.865			0.865		0.996				
Flt Protected												
Satd. Flow (prot)	0	0	1611	0	0	1611	0	5065	0	0	5085	0
Flt Permitted												
Satd. Flow (perm)	0	0	1611	0	0	1611	0	5065	0	0	5085	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		519			596			242			224	
Travel Time (s)		10.1			11.6			4.1			3.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.94	0.90
Adj. Flow (vph)	0	0	7	0	0	57	0	2957	78	0	2131	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	7	0	0	57	0	3035	0	0	2138	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	65.3%
Analysis Period (min)	15
	ICU Level of Service C

HCM Unsignalized Intersection Capacity Analysis

4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗		↑↑↑			↑↑↑	
Traffic Volume (veh/h)	0	0	6	0	0	51	0	2780	70	0	2003	6
Future Volume (Veh/h)	0	0	6	0	0	51	0	2780	70	0	2003	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.94	0.90
Hourly flow rate (vph)	0	0	7	0	0	57	0	2957	78	0	2131	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked	0.43	0.43	0.87	0.43	0.43	0.37	0.87			0.37		
vC, conflicting volume	3177	5170	714	3713	5134	1025	2138			3035		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	4063	162	696	3981	0	1794			528		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	100	100	86	100			100		
cM capacity (veh/h)	379	1	745	141	1	400	297			382		
Direction, Lane #												
	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	7	57	1183	1183	669	852	852	433				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	7	57	0	0	78	0	0	7				
cSH	745	400	1700	1700	1700	1700	1700	1700				
Volume to Capacity	0.01	0.14	0.70	0.70	0.39	0.50	0.50	0.25				
Queue Length 95th (ft)	1	12	0	0	0	0	0	0				
Control Delay (s)	9.9	15.5	0.0	0.0	0.0	0.0	0.0	0.0				
Lane LOS	A	C										
Approach Delay (s)	9.9	15.5	0.0			0.0						
Approach LOS	A	C										
Intersection Summary												
Average Delay			0.2									
Intersection Capacity Utilization			65.3%		ICU Level of Service					C		
Analysis Period (min)			15									

Lanes, Volumes, Timings
5: Bull St. & Jefferson Street



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↘	↑↑↑	↑↑↑	
Traffic Volume (vph)	0	28	18	2920	2080	17
Future Volume (vph)	0	28	18	2920	2080	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	175			0
Storage Lanes	0	1	1			0
Taper Length (ft)	25		100			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Frt		0.865			0.999	
Flt Protected			0.950			
Satd. Flow (prot)	0	1611	1770	5085	5080	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	1611	1770	5085	5080	0
Link Speed (mph)	35			40	40	
Link Distance (ft)	257			774	213	
Travel Time (s)	5.0			13.2	3.6	
Peak Hour Factor	0.90	0.90	0.90	0.95	0.96	0.90
Adj. Flow (vph)	0	31	20	3074	2167	19
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	31	20	3074	2186	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	59.8%
Analysis Period (min)	15
	ICU Level of Service B

HCM Unsignalized Intersection Capacity Analysis

5: Bull St. & Jefferson Street

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM



Movement	EBL	EBR	NBL	NBT	SBT	SBR			
Lane Configurations									
Traffic Volume (veh/h)	0	28	18	2920	2080	17			
Future Volume (Veh/h)	0	28	18	2920	2080	17			
Sign Control	Stop			Free	Free				
Grade	0%			0%	0%				
Peak Hour Factor	0.90	0.90	0.90	0.95	0.96	0.90			
Hourly flow rate (vph)	0	31	20	3074	2167	19			
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type				None	None				
Median storage (veh)									
Upstream signal (ft)				774	213				
pX, platoon unblocked	0.83	0.86	0.86						
vC, conflicting volume	3241	732	2186						
vC1, stage 1 conf vol									
vC2, stage 2 conf vol									
vCu, unblocked vol	1831	109	1803						
tC, single (s)	6.8	6.9	4.1						
tC, 2 stage (s)									
tF (s)	3.5	3.3	2.2						
p0 queue free %	100	96	93						
cM capacity (veh/h)	52	793	290						
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	
Volume Total	31	20	1025	1025	1025	867	867	452	
Volume Left	0	20	0	0	0	0	0	0	
Volume Right	31	0	0	0	0	0	0	19	
cSH	793	290	1700	1700	1700	1700	1700	1700	
Volume to Capacity	0.04	0.07	0.60	0.60	0.60	0.51	0.51	0.27	
Queue Length 95th (ft)	3	6	0	0	0	0	0	0	
Control Delay (s)	9.7	18.3	0.0	0.0	0.0	0.0	0.0	0.0	
Lane LOS	A	C							
Approach Delay (s)	9.7	0.1					0.0		
Approach LOS	A								
Intersection Summary									
Average Delay			0.1						
Intersection Capacity Utilization			59.8%	ICU Level of Service	B				
Analysis Period (min)			15						

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1422	452	559	149	339	256	492	1282	129	63	716	1311
Future Volume (vph)	1422	452	559	149	339	256	492	1282	129	63	716	1311
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	775		250	125		0	175		0	100		0
Storage Lanes	1		1	1		0	1		0	1		1
Taper Length (ft)	50			50			125			50		
Lane Util. Factor	0.91	0.91	0.88	0.95	0.95	0.95	0.97	0.91	0.91	1.00	0.95	1.00
Frt			0.850		0.948			0.986				0.850
Flt Protected	0.950	0.971			0.990		0.950			0.950		
Satd. Flow (prot)	1610	3292	2787	0	3322	0	3433	5014	0	1770	3539	1583
Flt Permitted	0.950	0.971			0.990		0.950			0.105		
Satd. Flow (perm)	1610	3292	2787	0	3322	0	3433	5014	0	196	3539	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30				40
Link Distance (ft)		1012			282			526				774
Travel Time (s)		23.0			6.4			12.0				13.2
Peak Hour Factor	0.98	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1451	502	621	166	377	284	541	1424	143	70	796	1457
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	725	1228	621	0	827	0	541	1567	0	70	796	1457
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Perm	NA	Free
Protected Phases	4	4	5	3	3		5	2			6	
Permitted Phases			4							6		Free
Detector Phase	4	4	5	3	3		5	2		6	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0	11.0	11.0	11.0		11.0	16.0		16.0	16.0	
Minimum Split (s)	30.0	30.0	17.0	17.0	17.0		17.0	30.0		30.0	30.0	
Total Split (s)	45.0	45.0	19.0	26.0	26.0		19.0	59.0		40.0	40.0	
Total Split (%)	34.6%	34.6%	14.6%	20.0%	20.0%		14.6%	45.4%		30.8%	30.8%	
Maximum Green (s)	39.0	39.0	13.0	20.0	20.0		13.0	53.0		34.0	34.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0	-4.0		-4.0		-4.0	-4.0		-4.0	-4.0	
Total Lost Time (s)	2.0	2.0	2.0		2.0		2.0	2.0		2.0	2.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead		Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		C-Max	C-Max	
Act Effct Green (s)	43.0	43.0	62.0		24.0		17.0	57.0		38.0	38.0	130.0
Actuated g/C Ratio	0.33	0.33	0.48		0.18		0.13	0.44		0.29	0.29	1.00
v/c Ratio	1.36	1.31dl	0.47		1.35		1.21	0.71		1.23	0.77	0.92
Control Delay	202.4	99.6	13.4		208.3		151.2	24.7		231.2	57.4	26.0
Queue Delay	0.5	0.1	0.0		0.0		0.0	1.4		0.0	0.0	0.0
Total Delay	202.9	99.7	13.4		208.3		151.2	26.1		231.2	57.4	26.0
LOS	F	F	B		F		F	C		F	E	C
Approach Delay		107.9			208.3			58.2			42.9	
Approach LOS		F			F			E			D	

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM

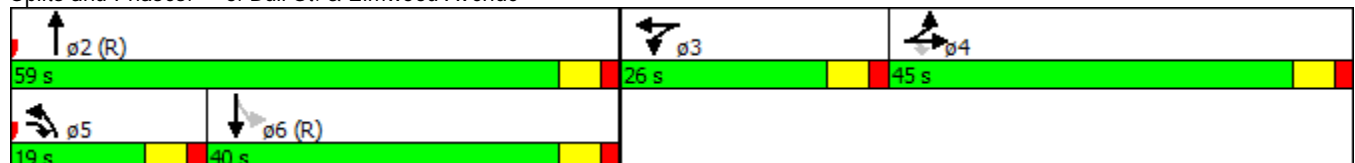


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	~879	~652	163		-479		-282	393		~71	303	818
Queue Length 95th (ft)	#1145	#800	209		#609		m#395	m393		m#166	m375	m#977
Internal Link Dist (ft)		932			202			446			694	
Turn Bay Length (ft)	775		250				175			100		
Base Capacity (vph)	532	1088	1329		613		448	2198		57	1034	1583
Starvation Cap Reductn	0	0	0		0		0	401		0	0	0
Spillback Cap Reductn	29	29	0		0		0	0		0	0	0
Storage Cap Reductn	0	0	0		0		0	0		0	0	0
Reduced v/c Ratio	1.44	1.16	0.47		1.35		1.21	0.87		1.23	0.77	0.92

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 100 (77%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.36
 Intersection Signal Delay: 85.9
 Intersection LOS: F
 Intersection Capacity Utilization 115.6%
 ICU Level of Service H
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 6: Bull St. & Elmwood Avenue



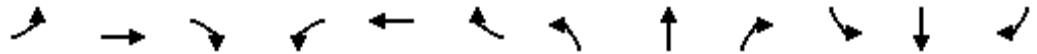
Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	247	29	89	347	184	34	1726	84	105	1227	85
Future Volume (vph)	85	247	29	89	347	184	34	1726	84	105	1227	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	50			50			75			75		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.984			0.948			0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3483	0	1770	3355	0	1770	3514	0	1770	3539	1583
Flt Permitted	0.192			0.436			0.157			0.054		
Satd. Flow (perm)	358	3483	0	812	3355	0	292	3514	0	101	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			33			10				94
Link Speed (mph)		30			30			30				30
Link Distance (ft)		937			677			1883				526
Travel Time (s)		21.3			15.4			42.8				12.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.92	0.90
Adj. Flow (vph)	94	274	32	99	386	204	38	1856	93	117	1334	94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	94	306	0	99	590	0	38	1949	0	117	1334	94
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	16.0
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	30.0
Total Split (s)	35.0	35.0		35.0	35.0		95.0	95.0		95.0	95.0	95.0
Total Split (%)	26.9%	26.9%		26.9%	26.9%		73.1%	73.1%		73.1%	73.1%	73.1%
Maximum Green (s)	29.0	29.0		29.0	29.0		89.0	89.0		89.0	89.0	89.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	33.0	33.0		33.0	33.0		93.0	93.0		93.0	93.0	93.0
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.72	0.72		0.72	0.72	0.72
v/c Ratio	1.04	0.34		0.48	0.67		0.18	0.77		1.62	0.53	0.08
Control Delay	155.2	39.7		54.9	50.0		8.5	14.5		343.5	6.2	0.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.1		0.0	0.2	0.0
Total Delay	155.2	39.7		54.9	50.0		8.5	14.5		343.5	6.5	0.2
LOS	F	D		D	D		A	B		F	A	A
Approach Delay		66.8			50.7			14.4			31.6	
Approach LOS		E			D			B			C	

Lanes, Volumes, Timings
7: Bull St. & Calhoun St.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	~85	107		76	233		9	492		~134	234	0
Queue Length 95th (ft)	#201	151		m139	303		25	587		m#202	m193	m1
Internal Link Dist (ft)		857			597			1803			446	
Turn Bay Length (ft)	150			175			150			150		
Base Capacity (vph)	90	890		206	876		208	2516		72	2531	1159
Starvation Cap Reductn	0	0		0	0		0	0		0	451	0
Spillback Cap Reductn	0	0		0	0		0	31		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.04	0.34		0.48	0.67		0.18	0.78		1.63	0.64	0.08

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 72 (55%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.63
 Intersection Signal Delay: 30.1
 Intersection LOS: C
 Intersection Capacity Utilization 105.9%
 ICU Level of Service G
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Bull St. & Calhoun St.



Lanes, Volumes, Timings
9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	673	152	559	513	53	97	394	1114	75	540	43
Future Volume (vph)	44	673	152	559	513	53	97	394	1114	75	540	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		800	175		0	225		0	300		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	100			75			75			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.972			0.986				0.850		0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3440	0	3433	3490	0	1770	3539	1583	1770	3498	0
Flt Permitted	0.413			0.950			0.285			0.411		
Satd. Flow (perm)	769	3440	0	3433	3490	0	531	3539	1583	766	3498	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			15				584			7
Link Speed (mph)		35			35			35				40
Link Distance (ft)		736			309			498				1949
Travel Time (s)		14.3			6.0			9.7				33.2
Peak Hour Factor	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Adj. Flow (vph)	49	748	169	601	570	59	108	438	1173	83	600	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	917	0	601	629	0	108	438	1173	83	648	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Free	Perm	NA	
Protected Phases		8		7	4			6				2
Permitted Phases	8						6		Free	2		
Detector Phase	8	8		7	4		6	6		2		2
Switch Phase												
Minimum Initial (s)	16.0	16.0		11.0	16.0		16.0	16.0		16.0		16.0
Minimum Split (s)	30.0	30.0		17.0	30.0		30.0	30.0		30.0		30.0
Total Split (s)	50.0	50.0		29.0	79.0		51.0	51.0		51.0		51.0
Total Split (%)	38.5%	38.5%		22.3%	60.8%		39.2%	39.2%		39.2%		39.2%
Maximum Green (s)	44.0	44.0		23.0	73.0		45.0	45.0		45.0		45.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0		-4.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0		3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max		C-Max
Act Effct Green (s)	43.8	43.8		26.8	72.6		53.4	53.4	130.0	53.4		53.4
Actuated g/C Ratio	0.34	0.34		0.21	0.56		0.41	0.41	1.00	0.41		0.41
v/c Ratio	0.19	0.78		0.85	0.32		0.50	0.30	0.74	0.26		0.45
Control Delay	28.3	39.7		72.0	10.0		34.3	25.3	11.2	34.7		34.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	28.3	39.7		72.0	10.0		34.3	25.3	11.2	34.7		34.6
LOS	C	D		E	A		C	C	B	C		C
Approach Delay		39.2			40.3			16.2				34.6

Lanes, Volumes, Timings
 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

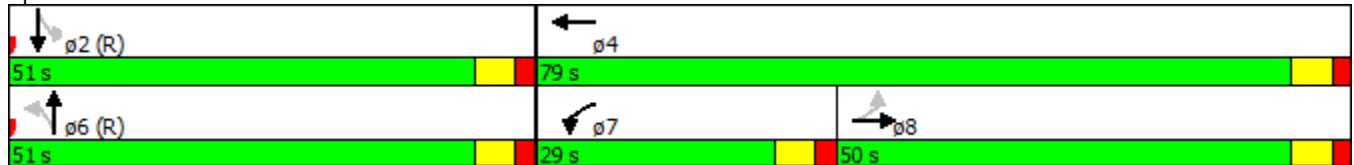


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			B			C	
Queue Length 50th (ft)	28	370		273	100		45	94	694	57	246	
Queue Length 95th (ft)	m48	m386		#348	160		m85	148	973	109	313	
Internal Link Dist (ft)		656			229			418			1869	
Turn Bay Length (ft)	225			175			225			300		
Base Capacity (vph)	283	1285		713	2073		218	1453	1583	314	1441	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.17	0.71		0.84	0.30		0.50	0.30	0.74	0.26	0.45	

Intersection Summary

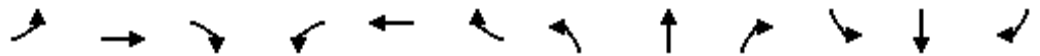
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 95 (73%), Referenced to phase 2:SBTL and 6:NBTL, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 30.3
 Intersection LOS: C
 Intersection Capacity Utilization 82.4%
 ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive



Lanes, Volumes, Timings
10: Harden St./Harden Street Ext & Calhoun St.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	140	58	291	22	39	11	293	1172	46	59	1060	82
Future Volume (vph)	140	58	291	22	39	11	293	1172	46	59	1060	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	50		0	0		325	300		200
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	100			25			25			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Frt		0.875			0.967			0.994				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1630	0	1770	1801	0	1770	5055	0	1770	3539	1583
Flt Permitted	0.721			0.174			0.143			0.187		
Satd. Flow (perm)	1343	1630	0	324	1801	0	266	5055	0	348	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		183			10			8				122
Link Speed (mph)		30			35			35				35
Link Distance (ft)		1071			821			1286				340
Travel Time (s)		24.3			16.0			25.1				6.6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	156	64	323	24	43	12	326	1302	51	66	1178	91
Shared Lane Traffic (%)												
Lane Group Flow (vph)	156	387	0	24	55	0	326	1353	0	66	1178	91
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	1.0	1.0		11.0	11.0		9.0	14.0		9.0	14.0	14.0
Minimum Split (s)	6.5	6.5		30.0	30.0		15.0	30.0		15.0	30.0	30.0
Total Split (s)	36.2	36.2		36.2	36.2		33.0	78.8		15.0	60.8	60.8
Total Split (%)	27.8%	27.8%		27.8%	27.8%		25.4%	60.6%		11.5%	46.8%	46.8%
Maximum Green (s)	30.7	30.7		30.7	30.7		27.0	72.8		9.0	54.8	54.8
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.5	1.5		1.5	1.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	0.0		0.0	0.0		-3.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	2.5	5.5		5.5	5.5		3.0	3.0		6.0	3.0	3.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	26.0	23.0		23.0	23.0		98.5	86.5		78.1	72.1	72.1
Actuated g/C Ratio	0.20	0.18		0.18	0.18		0.76	0.67		0.60	0.55	0.55
v/c Ratio	0.58	0.88		0.42	0.17		0.69	0.40		0.21	0.60	0.10
Control Delay	48.9	41.5		67.3	36.1		22.8	11.8		9.5	14.0	3.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	48.9	41.5		67.3	36.1		22.8	11.8		9.5	14.0	3.0
LOS	D	D		E	D		C	B		A	B	A
Approach Delay		43.6			45.6			14.0			13.0	
Approach LOS		D			D			B			B	

Lanes, Volumes, Timings
 10: Harden St./Harden Street Ext & Calhoun St.

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	124	188		18	32		112	195		10	295	4
Queue Length 95th (ft)	m171	m264		47	66		227	261		39	415	38
Internal Link Dist (ft)		991			741			1206			260	
Turn Bay Length (ft)	225			50						300		200
Base Capacity (vph)	348	524		76	432		548	3364		307	1962	932
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.45	0.74		0.32	0.13		0.59	0.40		0.21	0.60	0.10

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 34 (26%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.88
 Intersection Signal Delay: 18.7
 Intersection LOS: B
 Intersection Capacity Utilization 77.8%
 ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Harden St./Harden Street Ext & Calhoun St.



Lanes, Volumes, Timings
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	370	10	6	306	103	17	24	20	81	41	125
Future Volume (vph)	94	370	10	6	306	103	17	24	20	81	41	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	275		0	0		0	300		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	100			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.962			0.956				0.887
Flt Protected	0.950			0.950				0.986		0.950		
Satd. Flow (prot)	1770	1851	0	1770	1792	0	0	1756	0	1770	1652	0
Flt Permitted	0.950			0.950				0.986		0.950		
Satd. Flow (perm)	1770	1851	0	1770	1792	0	0	1756	0	1770	1652	0
Link Speed (mph)		35			30			35				35
Link Distance (ft)		449			1071			385				2969
Travel Time (s)		8.7			24.3			7.5				57.8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	11%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	104	411	11	7	340	114	19	27	22	90	46	139
Shared Lane Traffic (%)												
Lane Group Flow (vph)	104	422	0	7	454	0	0	68	0	90	185	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	54.2% ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	94	370	10	6	306	103	17	24	20	81	41	125	
Future Volume (Veh/h)	94	370	10	6	306	103	17	24	20	81	41	125	
Sign Control		Free			Free			Stop			Stop		
Grade		0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly flow rate (vph)	104	411	11	7	340	114	19	27	22	90	46	139	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	TWLTL				TWLTL								
Median storage veh	2				2								
Upstream signal (ft)					1071								
pX, platoon unblocked	0.95								0.95	0.95	0.95		0.95
vC, conflicting volume	454				422				1140	1092	416	1066	1041
vC1, stage 1 conf vol									624	624	411		411
vC2, stage 2 conf vol									516	468	654		630
vCu, unblocked vol	400				422				1122	1071	416	1043	1017
tC, single (s)	4.1				4.1				7.1	6.5	6.2	7.1	6.5
tC, 2 stage (s)									6.1	5.5	6.1		5.5
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0
p0 queue free %	91				99				93	92	97	73	88
cM capacity (veh/h)	1102				1137				258	350	636	335	377
Direction, Lane #													
	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2						
Volume Total	104	422	7	454	68	90	185						
Volume Left	104	0	7	0	19	90	0						
Volume Right	0	11	0	114	22	0	139						
cSH	1102	1700	1137	1700	367	335	560						
Volume to Capacity	0.09	0.25	0.01	0.27	0.19	0.27	0.33						
Queue Length 95th (ft)	8	0	0	0	17	27	36						
Control Delay (s)	8.6	0.0	8.2	0.0	17.0	19.7	14.6						
Lane LOS	A		A		C	C	B						
Approach Delay (s)	1.7		0.1		17.0	16.2							
Approach LOS					C	C							
Intersection Summary													
Average Delay	4.9												
Intersection Capacity Utilization	54.2%				ICU Level of Service				A				
Analysis Period (min)	15												

Lanes, Volumes, Timings
12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	515	61	159	526	10	60	2	200	39	12	29
Future Volume (vph)	1	515	61	159	526	10	60	2	200	39	12	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		225	50		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.984			0.997			0.851				0.893
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1822	0	1770	1857	0	1703	1585	0	1770	1663	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1822	0	1770	1857	0	1703	1585	0	1770	1663	0
Link Speed (mph)		35			35			35				35
Link Distance (ft)		949			210			2969				473
Travel Time (s)		18.5			4.1			57.8				9.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90
Heavy Vehicles (%)	2%	2%	8%	2%	2%	2%	6%	2%	2%	2%	2%	2%
Adj. Flow (vph)	1	572	68	177	584	11	67	2	222	43	13	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	640	0	177	595	0	67	224	0	43	45	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	68.8%
Analysis Period (min)	15
	ICU Level of Service C

HCM Unsignalized Intersection Capacity Analysis












12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	1	515	61	159	526	10	60	2	200	39	12	29	
Future Volume (Veh/h)	1	515	61	159	526	10	60	2	200	39	12	29	
Sign Control		Free			Free			Stop			Stop		
Grade		0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	
Hourly flow rate (vph)	1	572	68	177	584	11	67	2	222	43	13	32	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None					None							
Median storage (veh)													
Upstream signal (ft)	1217												
pX, platoon unblocked	0.88						0.88	0.88					0.88
vC, conflicting volume	595	640					1584	1557	606	1740	1586	590	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	471	640					1596	1565	606	1773	1597	465	
tC, single (s)	4.1	4.1					7.2	6.5	6.2	7.1	6.5	6.2	
tC, 2 stage (s)													
tF (s)	2.2	2.2					3.6	4.0	3.3	3.5	4.0	3.3	
p0 queue free %	100	81					0	97	55	0	83	94	
cM capacity (veh/h)	959	944					52	80	497	26	76	525	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2					
Volume Total	1	640	177	595	67	224	43	45					
Volume Left	1	0	177	0	67	0	43	0					
Volume Right	0	68	0	11	0	222	0	32					
cSH	959	1700	944	1700	52	475	26	194					
Volume to Capacity	0.00	0.38	0.19	0.35	1.29	0.47	1.63	0.23					
Queue Length 95th (ft)	0	0	17	0	151	62	130	22					
Control Delay (s)	8.8	0.0	9.7	0.0	350.9	19.2	629.5	29.1					
Lane LOS	A		A		F	C	F	D					
Approach Delay (s)	0.0		2.2		95.6		322.5						
Approach LOS					F		F						
Intersection Summary													
Average Delay			32.3										
Intersection Capacity Utilization			68.8%		ICU Level of Service				C				
Analysis Period (min)			15										

Lanes, Volumes, Timings
13: Harden Street Ext & Slighs Ave.

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	84	215	1307	70	130	1140
Future Volume (vph)	84	215	1307	70	130	1140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		50	100	
Storage Lanes	1	0		1	1	
Taper Length (ft)	25				50	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	0.903			0.850		
Flt Protected	0.986				0.950	
Satd. Flow (prot)	1659	0	3539	1495	1736	3539
Flt Permitted	0.986				0.105	
Satd. Flow (perm)	1659	0	3539	1495	192	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	96			20		
Link Speed (mph)	30		35			35
Link Distance (ft)	359		632			498
Travel Time (s)	8.2		12.3			9.7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.91
Heavy Vehicles (%)	2%	2%	2%	8%	4%	2%
Adj. Flow (vph)	93	239	1452	78	144	1253
Shared Lane Traffic (%)						
Lane Group Flow (vph)	332	0	1452	78	144	1253
Turn Type	Perm		NA	Perm	pm+pt	NA
Protected Phases			6		5	2
Permitted Phases	8			6	2	
Detector Phase	8		6	6	5	2
Switch Phase						
Minimum Initial (s)	11.0		16.0	16.0	11.0	16.0
Minimum Split (s)	30.0		30.0	30.0	17.0	30.0
Total Split (s)	35.0		78.0	78.0	17.0	95.0
Total Split (%)	26.9%		60.0%	60.0%	13.1%	73.1%
Maximum Green (s)	29.5		72.0	72.0	11.0	89.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	1.5		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0		-4.0	-2.0	-4.0	-4.0
Total Lost Time (s)	1.5		2.0	4.0	2.0	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		C-Max	C-Max	None	C-Max
Act Effct Green (s)	27.7		81.8	79.8	98.8	98.8
Actuated g/C Ratio	0.21		0.63	0.61	0.76	0.76
v/c Ratio	0.78		0.65	0.08	0.44	0.47
Control Delay	46.1		11.6	4.4	21.3	3.0
Queue Delay	0.0		0.0	0.0	0.0	0.1
Total Delay	46.1		11.6	4.4	21.3	3.1
LOS	D		B	A	C	A
Approach Delay	46.1		11.3			4.9

Lanes, Volumes, Timings
 13: Harden Street Ext & Slighs Ave.



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	D		B		A	
Queue Length 50th (ft)	190		355	8	37	57
Queue Length 95th (ft)	290		452	22	m73	107
Internal Link Dist (ft)	279		552			418
Turn Bay Length (ft)				50	100	
Base Capacity (vph)	498		2227	925	324	2690
Starvation Cap Reductn	0		0	0	0	389
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.67		0.65	0.08	0.44	0.54

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 86 (66%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 12.1
 Intersection LOS: B
 Intersection Capacity Utilization 73.2%
 ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 13: Harden Street Ext & Slighs Ave.



Lanes, Volumes, Timings
14: Colonial Drive & Farrow Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Lane Configurations		↗↗	↖	↑↑	↑↑		
Traffic Volume (vph)	0	190	287	1459	850	26	
Future Volume (vph)	0	190	287	1459	850	26	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0	330	550			0	
Storage Lanes	0	1	1			0	
Taper Length (ft)	25		125				
Lane Util. Factor	1.00	0.88	1.00	0.95	0.95	0.95	
Frt		0.850			0.995		
Flt Protected			0.950				
Satd. Flow (prot)	0	2787	1770	3539	3522	0	
Flt Permitted			0.950				
Satd. Flow (perm)	0	2787	1770	3539	3522	0	
Right Turn on Red		Yes				No	
Satd. Flow (RTOR)		172					
Link Speed (mph)	35			35	35		
Link Distance (ft)	1114			689	2010		
Travel Time (s)	21.7			13.4	39.2		
Peak Hour Factor	0.90	0.90	0.96	0.90	0.92	0.90	
Adj. Flow (vph)	0	211	299	1621	924	29	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	211	299	1621	953	0	
Turn Type		Over	Prot	NA	NA		
Protected Phases		8	8	8 6	2	6	
Permitted Phases				8			
Detector Phase		8	8	8 6	2		
Switch Phase							
Minimum Initial (s)		16.0	16.0		16.0	11.0	
Minimum Split (s)		30.0	30.0		30.0	30.0	
Total Split (s)		30.0	30.0		35.0	35.0	
Total Split (%)		46.2%	46.2%		53.8%	54%	
Maximum Green (s)		24.0	24.0		29.0	29.5	
Yellow Time (s)		4.0	4.0		4.0	4.0	
All-Red Time (s)		2.0	2.0		2.0	1.5	
Lost Time Adjust (s)		-3.0	-3.0		-4.0		
Total Lost Time (s)		3.0	3.0		2.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0	3.0		3.0	3.0	
Recall Mode		None	None		C-Max	C-Max	
Act Effct Green (s)		24.9	24.9	65.0	35.1		
Actuated g/C Ratio		0.38	0.38	1.00	0.54		
v/c Ratio		0.18	0.44	0.46	0.50		
Control Delay		3.8	12.0	0.3	11.9		
Queue Delay		0.0	0.0	0.0	0.0		
Total Delay		3.8	12.0	0.3	11.9		
LOS		A	B	A	B		
Approach Delay				2.1	11.9		
Approach LOS				A	B		

Lanes, Volumes, Timings
 14: Colonial Drive & Farrow Road

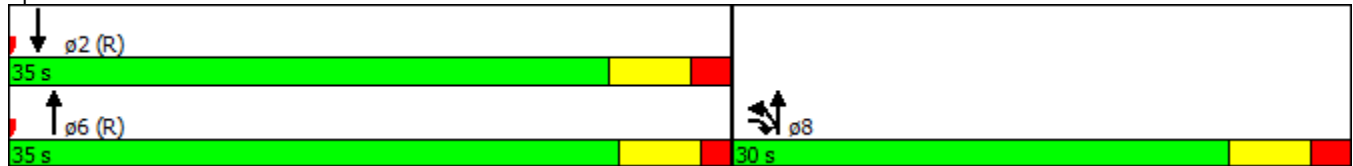


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Queue Length 50th (ft)		5	115	0	146		
Queue Length 95th (ft)		23	m138	0	m215		
Internal Link Dist (ft)	1034			609	1930		
Turn Bay Length (ft)		330	550				
Base Capacity (vph)		1258	735	3539	1903		
Starvation Cap Reductn		0	0	0	0		
Spillback Cap Reductn		0	0	0	0		
Storage Cap Reductn		0	0	0	0		
Reduced v/c Ratio		0.17	0.41	0.46	0.50		

Intersection Summary

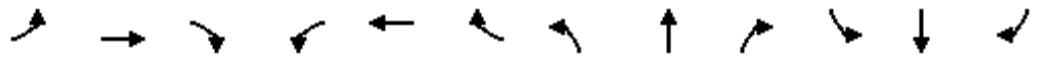
Area Type: Other
 Cycle Length: 65
 Actuated Cycle Length: 65
 Offset: 42 (65%), Referenced to phase 2:SBT and 6:NBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.50
 Intersection Signal Delay: 5.3
 Intersection LOS: A
 Intersection Capacity Utilization 46.9%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: Colonial Drive & Farrow Road



Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

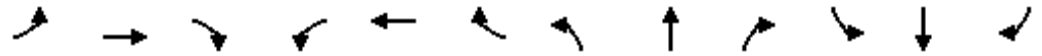
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	564	12	212	531	395	0	1428	321	294	726	51
Future Volume (vph)	94	564	12	212	531	395	0	1428	321	294	726	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		0	300		0	0		225	200		0
Storage Lanes	1		0	2		1	0		1	1		0
Taper Length (ft)	125			100			25			125		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.997				0.850			0.850		0.990	
Flt Protected	0.950			0.950						0.950		
Satd. Flow (prot)	1770	3529	0	3433	3539	1583	0	3539	1583	1770	3504	0
Flt Permitted	0.429			0.950						0.067		
Satd. Flow (perm)	799	3529	0	3433	3539	1583	0	3539	1583	125	3504	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				17			143		9	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1548			1446			2010			864	
Travel Time (s)		30.2			28.2			39.2			16.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	0.94	0.90	0.90
Adj. Flow (vph)	104	627	13	236	590	439	0	1587	334	313	807	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	104	640	0	236	590	439	0	1587	334	313	864	0
Turn Type	Perm	NA		Prot	NA	pm+ov		NA	Free	pm+pt	NA	
Protected Phases		4		3	8	1		2		1	6	
Permitted Phases	4					8			Free	6		
Detector Phase	4	4		3	8	1		2		1	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0	5.0		15.0		5.0	15.0	
Minimum Split (s)	30.0	30.0		21.0	41.0	17.0		41.0		17.0	30.0	
Total Split (s)	30.0	30.0		21.0	51.0	19.0		60.0		19.0	79.0	
Total Split (%)	23.1%	23.1%		16.2%	39.2%	14.6%		46.2%		14.6%	60.8%	
Maximum Green (s)	25.0	25.0		16.0	46.0	14.0		55.0		14.0	74.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5		3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5	1.5		1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0		-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead		Lead		Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Recall Mode	None	None		None	None	None		C-Min		None	C-Min	
Walk Time (s)					18.0			18.0				
Flash Dont Walk (s)					5.0			5.0				
Pedestrian Calls (#/hr)					0			0				
Act Effct Green (s)	26.2	26.2		16.3	46.5	66.0		56.0	130.0	75.5	75.5	
Actuated g/C Ratio	0.20	0.20		0.13	0.36	0.51		0.43	1.00	0.58	0.58	
v/c Ratio	0.65	0.90		0.55	0.47	0.54		1.04	0.21	1.17	0.42	
Control Delay	67.6	67.2		58.5	33.5	23.8		72.1	0.3	151.2	11.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	67.6	67.2		58.5	33.5	23.8		72.1	0.3	151.2	11.4	

Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	E		E	C	C		E	A	F	B	
Approach Delay		67.3			34.8			59.6			48.6	
Approach LOS		E			C			E			D	
Queue Length 50th (ft)	81	276		97	199	234		~765	0	-278	170	
Queue Length 95th (ft)	#163	#387		140	254	336		#909	0	#467	171	
Internal Link Dist (ft)		1468			1366			1930			784	
Turn Bay Length (ft)	175			300					225	200		
Base Capacity (vph)	162	718		448	1279	812		1524	1583	267	2037	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.64	0.89		0.53	0.46	0.54		1.04	0.21	1.17	0.42	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.17
 Intersection Signal Delay: 52.1
 Intersection LOS: D
 Intersection Capacity Utilization 97.6%
 ICU Level of Service F
 Analysis Period (min) 15
 ~ 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: 15: Farrow Road & Beltline Blvd



Lanes, Volumes, Timings
16: Farrow Road & 277 NB RAMPS

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	159	0	15	0	0	0	0	923	1016	66	1030	0
Future Volume (vph)	159	0	15	0	0	0	0	923	1016	66	1030	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	0		0	0		0	250		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			25			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.850						0.922				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1770	1583	0	0	0	0	0	3263	0	1770	3539	0
Flt Permitted	0.950									0.055		
Satd. Flow (perm)	1770	1583	0	0	0	0	0	3263	0	102	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		148						570				
Link Speed (mph)		35			35			35				35
Link Distance (ft)		827			779			864				694
Travel Time (s)		16.1			15.2			16.8				13.5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.92	0.90
Adj. Flow (vph)	177	0	17	0	0	0	0	1026	1104	73	1120	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	177	17	0	0	0	0	0	2130	0	73	1120	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						6			2	
Permitted Phases	4									2		
Detector Phase	4	4						6		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0						10.0		10.0	10.0	
Minimum Split (s)	30.0	30.0						30.0		30.0	30.0	
Total Split (s)	30.0	30.0						100.0		100.0	100.0	
Total Split (%)	23.1%	23.1%						76.9%		76.9%	76.9%	
Maximum Green (s)	25.0	25.0						95.0		95.0	95.0	
Yellow Time (s)	3.5	3.5						3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5						1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0						-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0						4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Recall Mode	None	None						C-Max		C-Max	C-Max	
Act Effct Green (s)	19.2	19.2						102.8		102.8	102.8	
Actuated g/C Ratio	0.15	0.15						0.79		0.79	0.79	
v/c Ratio	0.68	0.05						0.79		0.91	0.40	
Control Delay	65.0	0.3						6.4		96.7	5.1	
Queue Delay	0.0	0.0						1.5		0.0	0.2	
Total Delay	65.0	0.3						7.8		96.7	5.2	
LOS	E	A						A		F	A	
Approach Delay		59.3						7.8			10.8	
Approach LOS		E						A			B	

Lanes, Volumes, Timings
 16: Farrow Road & 277 NB RAMPS



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	143	0						91		43	101	
Queue Length 95th (ft)	211	0						m82		m#155	156	
Internal Link Dist (ft)		747			699			784			614	
Turn Bay Length (ft)	300									250		
Base Capacity (vph)	354	435						2699		80	2798	
Starvation Cap Reductn	0	0						358		0	693	
Spillback Cap Reductn	0	0						0		0	0	
Storage Cap Reductn	0	0						0		0	0	
Reduced v/c Ratio	0.50	0.04						0.91		0.91	0.53	

Intersection Summary

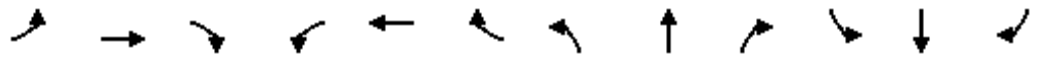
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.91
 Intersection Signal Delay: 11.7
 Intersection LOS: B
 Intersection Capacity Utilization 73.6%
 ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 16: Farrow Road & 277 NB RAMPS



Lanes, Volumes, Timings
 17: Farrow Road & Lorick Avenue /277 SB Ramps

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	0	41	518	17	49	25	1057	0	0	534	146
Future Volume (vph)	34	0	41	518	17	49	25	1057	0	0	534	146
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	125		0	200		0	0		0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (ft)	25			150			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850		0.889							0.968
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1770	0	1583	1770	1656	0	1770	3539	0	0	3426	0
Flt Permitted	0.709			0.950			0.295					
Satd. Flow (perm)	1321	0	1583	1770	1656	0	550	3539	0	0	3426	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			46		20							32
Link Speed (mph)		35		35			35			35		35
Link Distance (ft)		467		1041			694			870		870
Travel Time (s)		9.1		20.3			13.5			16.9		16.9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	38	0	46	576	19	54	28	1174	0	0	593	162
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	0	46	576	73	0	28	1174	0	0	755	0
Turn Type	Perm		Perm	Perm	NA		Perm	NA			NA	
Protected Phases					4			2				6
Permitted Phases	8		8	4			2					
Detector Phase	8		8	4	4		2	2				6
Switch Phase												
Minimum Initial (s)	10.0		10.0	10.0	10.0		10.0	10.0				10.0
Minimum Split (s)	30.0		30.0	30.0	30.0		30.0	30.0				30.0
Total Split (s)	74.0		74.0	74.0	74.0		56.0	56.0				56.0
Total Split (%)	56.9%		56.9%	56.9%	56.9%		43.1%	43.1%				43.1%
Maximum Green (s)	69.0		69.0	69.0	69.0		51.0	51.0				51.0
Yellow Time (s)	3.5		3.5	3.5	3.5		3.5	3.5				3.5
All-Red Time (s)	1.5		1.5	1.5	1.5		1.5	1.5				1.5
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0		-1.0	-1.0				-1.0
Total Lost Time (s)	4.0		4.0	4.0	4.0		4.0	4.0				4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0				3.0
Recall Mode	None		None	None	None		C-Max	C-Max				C-Max
Act Effct Green (s)	52.9		52.9	52.9	52.9		69.1	69.1				69.1
Actuated g/C Ratio	0.41		0.41	0.41	0.41		0.53	0.53				0.53
v/c Ratio	0.07		0.07	0.80	0.11		0.10	0.62				0.41
Control Delay	20.5		5.1	42.2	15.4		23.8	29.5				19.7
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.3				0.0
Total Delay	20.5		5.1	42.2	15.4		23.8	29.9				19.7
LOS	C		A	D	B		C	C				B
Approach Delay					39.1			29.7				19.7
Approach LOS					D			C				B

Lanes, Volumes, Timings
 17: Farrow Road & Lorick Avenue /277 SB Ramps

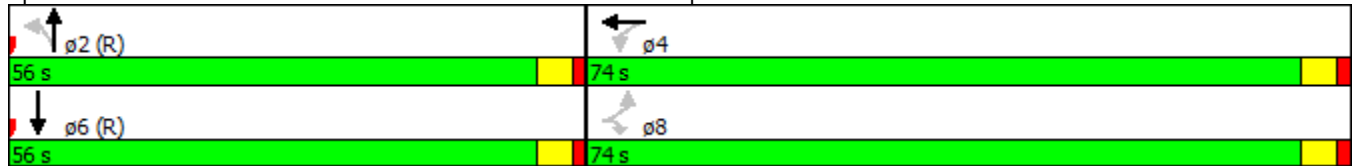


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	19		0	418	27		13	410			187	
Queue Length 95th (ft)	36		21	478	49		m21	510			286	
Internal Link Dist (ft)		387			961			614			790	
Turn Bay Length (ft)				125			200					
Base Capacity (vph)	711		873	953	900		292	1882			1837	
Starvation Cap Reductn	0		0	0	0		0	241			0	
Spillback Cap Reductn	0		0	0	0		0	0			0	
Storage Cap Reductn	0		0	0	0		0	0			0	
Reduced v/c Ratio	0.05		0.05	0.60	0.08		0.10	0.72			0.41	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 28.6
 Intersection LOS: C
 Intersection Capacity Utilization 66.5%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 17: Farrow Road & Lorick Avenue /277 SB Ramps



Lanes, Volumes, Timings
18: Assembly St./Assembly & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1989	279	369	2333	8	1062	9	615	0	0	1
Future Volume (vph)	0	1989	279	369	2333	8	1062	9	615	0	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		275	150		0	0		0	0		0
Storage Lanes	1		1	1		0	2		1	0		0
Taper Length (ft)	150			75			25			25		
Lane Util. Factor	1.00	0.86	0.86	0.97	0.91	0.91	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850		0.999				0.850			0.865
Flt Protected				0.950			0.950					
Satd. Flow (prot)	1863	4806	1362	3433	5080	0	3433	1770	1504	0	1611	0
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	1863	4806	1362	3433	5080	0	3433	1770	1504	0	1611	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			280		1				88			126
Link Speed (mph)		30			30			30				35
Link Distance (ft)		2522			509			585				432
Travel Time (s)		57.3			11.6			13.3				8.4
Peak Hour Factor	0.90	0.94	0.90	0.90	0.92	0.90	0.93	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	2116	310	410	2536	9	1142	10	683	0	0	1
Shared Lane Traffic (%)			0%						0%			
Lane Group Flow (vph)	0	2116	310	410	2545	0	1142	10	683	0	1	0
Turn Type	Perm	NA	pm+ov	Prot	NA		Split	NA	pm+ov		NA	
Protected Phases		2	3	1	6		3	3	1			4
Permitted Phases	2		2						3	4		
Detector Phase	2	2	3	1	6		3	3	1	4		4
Switch Phase												
Minimum Initial (s)	16.0	16.0	11.0	11.0	16.0		11.0	11.0	11.0	4.5	4.5	
Minimum Split (s)	30.0	30.0	17.0	17.0	30.0		17.0	17.0	17.0	10.0	10.0	
Total Split (s)	58.0	58.0	42.0	20.0	78.0		42.0	42.0	20.0	10.0	10.0	
Total Split (%)	44.6%	44.6%	32.3%	15.4%	60.0%		32.3%	32.3%	15.4%	7.7%	7.7%	
Maximum Green (s)	52.0	52.0	36.0	14.0	72.0		36.0	36.0	14.0	4.5	4.5	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	1.5	1.5	
Lost Time Adjust (s)	0.0	-4.0	-4.0	-4.0	-4.0		-4.0	0.0	-4.0			-1.5
Total Lost Time (s)	6.0	2.0	2.0	2.0	2.0		2.0	6.0	2.0			4.0
Lead/Lag	Lead	Lead	Lead	Lag			Lead	Lead	Lag	Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max	None	None	C-Max		None	None	None	None	None	
Act Effct Green (s)		64.0	105.6	18.0	84.0		40.0	36.0	60.0			6.0
Actuated g/C Ratio		0.49	0.81	0.14	0.65		0.31	0.28	0.46			0.05
v/c Ratio		0.89	0.27	0.86	0.78		1.08	0.02	0.92			0.01
Control Delay		36.3	1.0	61.6	11.6		95.1	34.6	47.9			0.0
Queue Delay		0.0	0.0	0.0	8.7		0.0	0.0	0.0			0.0
Total Delay		36.3	1.0	61.6	20.3		95.1	34.6	47.9			0.0
LOS		D	A	E	C		F	C	D			A
Approach Delay		31.8			26.0			77.2				0.0
Approach LOS		C			C			E				A

Lanes, Volumes, Timings
 18: Assembly St./Assembly & Elmwood Avenue

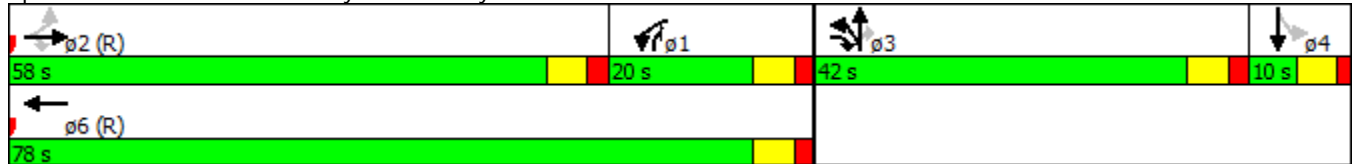


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		590	3	185	154		~554	6	503		0	
Queue Length 95th (ft)		#833	19	m209	m826		#689	22	#781		0	
Internal Link Dist (ft)		2442			429			505			352	
Turn Bay Length (ft)			275	150								
Base Capacity (vph)		2365	1158	475	3282		1056	490	741		194	
Starvation Cap Reductn		0	0	0	731		0	0	0		0	
Spillback Cap Reductn		0	0	0	0		0	0	0		0	
Storage Cap Reductn		0	0	0	0		0	0	0		0	
Reduced v/c Ratio		0.89	0.27	0.86	1.00		1.08	0.02	0.92		0.01	

Intersection Summary

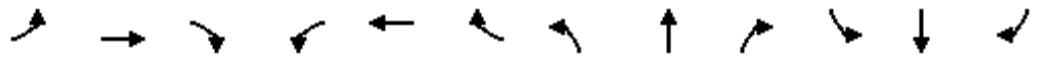
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 28 (22%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.08
 Intersection Signal Delay: 40.9
 Intersection LOS: D
 Intersection Capacity Utilization 108.9%
 ICU Level of Service G
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Assembly St./Assembly & Elmwood Avenue



Lanes, Volumes, Timings
19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↑↑↑	↗	↖	↑↑↑		↖	↑↑	↗	↖	↑↗	↖
Traffic Volume (vph)	517	1945	75	30	1942	125	150	496	70	185	209	498
Future Volume (vph)	517	1945	75	30	1942	125	150	496	70	185	209	498
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		175	150		0	200		0	175		425
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	75			75			100			75		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850		0.990				0.850		0.939	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	1770	5034	0	1770	3539	1583	1770	3183	1441
Flt Permitted	0.950			0.081			0.308			0.151		
Satd. Flow (perm)	3433	5085	1583	151	5034	0	574	3539	1583	281	3183	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			83		11				126		97	76
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		509			563			693			3655	
Travel Time (s)		11.6			12.8			15.8			83.1	
Peak Hour Factor	0.91	0.97	0.90	0.90	0.95	0.90	0.90	0.90	0.90	0.90	0.95	0.90
Adj. Flow (vph)	568	2005	83	33	2044	139	167	551	78	206	220	553
Shared Lane Traffic (%)												27%
Lane Group Flow (vph)	568	2005	83	33	2183	0	167	551	78	206	369	404
Turn Type	Prot	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	pm+ov
Protected Phases	5	2	3		6		3	8		7	4	5
Permitted Phases			2	6			8		8	4		4
Detector Phase	5	2	3	6	6		3	8	8	7	4	5
Switch Phase												
Minimum Initial (s)	11.0	16.0	11.0	16.0	16.0		11.0	16.0	16.0	11.0	16.0	11.0
Minimum Split (s)	17.0	30.0	17.0	30.0	30.0		17.0	30.0	30.0	17.0	30.0	17.0
Total Split (s)	23.0	83.0	17.0	60.0	60.0		17.0	30.0	30.0	17.0	30.0	23.0
Total Split (%)	17.7%	63.8%	13.1%	46.2%	46.2%		13.1%	23.1%	23.1%	13.1%	23.1%	17.7%
Maximum Green (s)	17.0	77.0	11.0	54.0	54.0		11.0	24.0	24.0	11.0	24.0	17.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0	-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lead	Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	C-Max	C-Max		None	None	None	None	None	None
Act Effct Green (s)	21.0	82.1	99.1	59.1	59.1		41.9	26.9	26.9	41.9	26.9	49.9
Actuated g/C Ratio	0.16	0.63	0.76	0.45	0.45		0.32	0.21	0.21	0.32	0.21	0.38
v/c Ratio	1.03	0.62	0.07	0.49	0.95		0.52	0.75	0.18	0.79	0.50	0.67
Control Delay	90.3	13.8	0.6	43.6	35.1		37.4	55.6	2.2	54.2	35.5	32.9
Queue Delay	0.0	0.6	0.0	0.0	16.2		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	90.3	14.4	0.6	43.6	51.3		37.4	55.6	2.2	54.2	35.5	32.9
LOS	F	B	A	D	D		D	E	A	D	D	C
Approach Delay		30.2			51.2			46.5			38.4	
Approach LOS		C			D			D			D	

Lanes, Volumes, Timings
 19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	~267	238	0	12	298		101	228	0	128	109	249
Queue Length 95th (ft)	m#324	360	m1	m21	#752		160	294	9	#234	163	381
Internal Link Dist (ft)		429			483			613			3575	
Turn Bay Length (ft)	175		175	150			200			175		425
Base Capacity (vph)	554	3211	1226	68	2294		322	762	439	262	761	599
Starvation Cap Reductn	0	715	0	0	34		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	178		0	0	0	0	1	2
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.03	0.80	0.07	0.49	1.03		0.52	0.72	0.18	0.79	0.49	0.68

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 120 (92%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green
 Natural Cycle: 125
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.03
 Intersection Signal Delay: 40.3
 Intersection LOS: D
 Intersection Capacity Utilization 92.3%
 ICU Level of Service F
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Main St. & Elmwood Avenue



Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕↕↕		↖	↕↕↕		↖	↕	↗		↕↕	
Traffic Volume (vph)	10	1842	88	50	2029	25	92	268	231	17	45	13
Future Volume (vph)	10	1842	88	50	2029	25	92	268	231	17	45	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	75		0	200		0	75		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			50			100			50		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.993			0.998				0.850		0.975	
Flt Protected	0.950			0.950			0.950				0.989	
Satd. Flow (prot)	1770	5050	0	1770	5075	0	1770	1863	1583	0	3413	0
Flt Permitted	0.058			0.063			0.686				0.743	
Satd. Flow (perm)	108	5050	0	117	5075	0	1278	1863	1583	0	2564	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			4				26		14	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		563			1012			3133			1095	
Travel Time (s)		12.8			23.0			71.2			24.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	2047	98	56	2182	28	102	298	257	19	50	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	2145	0	56	2210	0	102	298	257	0	83	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		6	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	99.0	99.0		99.0	99.0		31.0	31.0	31.0	31.0	31.0	
Total Split (%)	76.2%	76.2%		76.2%	76.2%		23.8%	23.8%	23.8%	23.8%	23.8%	
Maximum Green (s)	93.0	93.0		93.0	93.0		25.0	25.0	25.0	25.0	25.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0		-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0		2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None	None	None	None	
Act Effct Green (s)	98.9	98.9		98.9	98.9		27.1	27.1	27.1		27.1	
Actuated g/C Ratio	0.76	0.76		0.76	0.76		0.21	0.21	0.21		0.21	
v/c Ratio	0.13	0.56		0.63	0.57		0.38	0.77	0.73		0.15	
Control Delay	7.0	6.6		24.4	11.5		48.3	62.2	56.0		34.8	
Queue Delay	0.0	0.4		0.0	0.1		0.0	0.0	0.0		0.0	
Total Delay	7.0	7.0		24.4	11.5		48.3	62.2	56.0		34.8	
LOS	A	A		C	B		D	E	E		C	
Approach Delay		7.0			11.8			57.6			34.8	
Approach LOS		A			B			E			C	

Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	2	282		23	332		73	234	181		24	
Queue Length 95th (ft)	m4	394		m25	m335		129	338	280		48	
Internal Link Dist (ft)		483			932			3053			1015	
Turn Bay Length (ft)	200			75			200					
Base Capacity (vph)	82	3846		89	3861		285	415	373		582	
Starvation Cap Reductn	0	1011		0	0		0	0	0		0	
Spillback Cap Reductn	0	0		0	256		0	0	0		0	
Storage Cap Reductn	0	0		0	0		0	0	0		0	
Reduced v/c Ratio	0.13	0.76		0.63	0.61		0.36	0.72	0.69		0.14	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 18 (14%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 16.0
 Intersection LOS: B
 Intersection Capacity Utilization 75.2%
 ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 20: Sumter St. & Elmwood Avenue



Lanes, Volumes, Timings
21: Barnwell Street & Calhoun St.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	392	11	6	359	59	32	19	31	71	17	113
Future Volume (vph)	115	392	11	6	359	59	32	19	31	71	17	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	225		0	125		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	75			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.979			0.907				0.870
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1855	0	1770	1824	0	1770	1690	0	1770	1621	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1855	0	1770	1824	0	1770	1690	0	1770	1621	0
Link Speed (mph)		35			35			35				35
Link Distance (ft)		605			449			440				362
Travel Time (s)		11.8			8.7			8.6				7.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	128	436	12	7	399	66	36	21	34	79	19	126
Shared Lane Traffic (%)												
Lane Group Flow (vph)	128	448	0	7	465	0	36	55	0	79	145	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	53.4%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
21: Barnwell Street & Calhoun St.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR				
Lane Configurations																
Traffic Volume (veh/h)	115	392	11	6	359	59	32	19	31	71	17	113				
Future Volume (Veh/h)	115	392	11	6	359	59	32	19	31	71	17	113				
Sign Control		Free			Free			Stop			Stop					
Grade		0%			0%			0%			0%					
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90				
Hourly flow rate (vph)	128	436	12	7	399	66	36	21	34	79	19	126				
Pedestrians																
Lane Width (ft)																
Walking Speed (ft/s)																
Percent Blockage																
Right turn flare (veh)																
Median type	TWLTL				TWLTL											
Median storage veh	2				2											
Upstream signal (ft)																
pX, platoon unblocked																
vC, conflicting volume	465		448		1246		1177		442		1182		1150		432	
vC1, stage 1 conf vol					698		698				446		446			
vC2, stage 2 conf vol					548		479				736		704			
vCu, unblocked vol	465		448		1246		1177		442		1182		1150		432	
tC, single (s)	4.1		4.1		7.1		6.5		6.2		7.1		6.5		6.2	
tC, 2 stage (s)					6.1		5.5				6.1		5.5			
tF (s)	2.2		2.2		3.5		4.0		3.3		3.5		4.0		3.3	
p0 queue free %	88		99		85		93		94		73		94		80	
cM capacity (veh/h)	1096		1112		234		318		615		291		341		624	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2								
Volume Total	128	448	7	465	36	55	79	145								
Volume Left	128	0	7	0	36	0	79	0								
Volume Right	0	12	0	66	0	34	0	126								
cSH	1096	1700	1112	1700	234	454	291	563								
Volume to Capacity	0.12	0.26	0.01	0.27	0.15	0.12	0.27	0.26								
Queue Length 95th (ft)	10	0	0	0	13	10	27	26								
Control Delay (s)	8.7	0.0	8.3	0.0	23.1	14.0	21.9	13.6								
Lane LOS	A		A		C	B	C	B								
Approach Delay (s)	1.9		0.1		17.6		16.5									
Approach LOS					C		C									
Intersection Summary																
Average Delay			4.8													
Intersection Capacity Utilization			53.4%		ICU Level of Service				A							
Analysis Period (min)			15													

Lanes, Volumes, Timings
23: Bull St. & Access #3



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	204	80	2783	155	129	1899
Future Volume (vph)	204	80	2783	155	129	1899
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		75	150	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	0.91
Frt		0.850	0.992			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	5045	0	1770	5085
Flt Permitted	0.950				0.046	
Satd. Flow (perm)	1770	1583	5045	0	86	5085
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		89	14			
Link Speed (mph)	35		40			40
Link Distance (ft)	871		213			242
Travel Time (s)	17.0		3.6			4.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	227	89	3092	172	143	2110
Shared Lane Traffic (%)						
Lane Group Flow (vph)	227	89	3264	0	143	2110
Turn Type	Perm	Perm	NA		D.P+P	NA
Protected Phases			2		1	6
Permitted Phases	8	8			2	
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	6.0	6.0	11.0		11.0	11.0
Minimum Split (s)	12.0	12.0	17.0		17.0	17.0
Total Split (s)	22.0	22.0	91.0		17.0	108.0
Total Split (%)	16.9%	16.9%	70.0%		13.1%	83.1%
Maximum Green (s)	16.0	16.0	85.0		11.5	102.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		1.5	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0		3.5	4.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	C-Max		None	C-Max
Act Effct Green (s)	18.0	18.0	87.2		101.0	104.0
Actuated g/C Ratio	0.14	0.14	0.67		0.78	0.80
v/c Ratio	0.93	0.30	0.96		0.60	0.52
Control Delay	96.7	12.7	26.2		35.6	10.5
Queue Delay	0.0	0.1	43.9		0.0	0.2
Total Delay	96.7	12.9	70.0		35.6	10.7
LOS	F	B	E		D	B
Approach Delay	73.1		70.0			12.2
Approach LOS	E		E			B



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Length 50th (ft)	192	0	691		72	323
Queue Length 95th (ft)	#348	50	m604		m130	m348
Internal Link Dist (ft)	791		133			162
Turn Bay Length (ft)					150	
Base Capacity (vph)	245	295	3388		241	4068
Starvation Cap Reductn	0	0	112		0	862
Spillback Cap Reductn	0	18	961		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.93	0.32	1.34		0.59	0.66

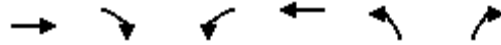
Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBSB and 6:SBT, Start of 1st Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 47.9
 Intersection LOS: D
 Intersection Capacity Utilization 87.7%
 ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 23: Bull St. & Access #3



Lanes, Volumes, Timings
25: Access #5 & Colonial Drive



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑		↑
Traffic Volume (vph)	381	24	0	569	0	19
Future Volume (vph)	381	24	0	569	0	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		75	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.992					0.865
Flt Protected						
Satd. Flow (prot)	1848	0	0	1863	0	1611
Flt Permitted						
Satd. Flow (perm)	1848	0	0	1863	0	1611
Link Speed (mph)	35			35	35	
Link Distance (ft)	446			270	299	
Travel Time (s)	8.7			5.3	5.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	423	27	0	632	0	21
Shared Lane Traffic (%)						
Lane Group Flow (vph)	450	0	0	632	0	21
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	33.3%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
25: Access #5 & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↻		↻
Traffic Volume (veh/h)	381	24	0	569	0	19
Future Volume (Veh/h)	381	24	0	569	0	19
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	423	27	0	632	0	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	446					
pX, platoon unblocked			1.00		1.00	1.00
vC, conflicting volume			450		1068	436
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			450		1068	436
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	97
cM capacity (veh/h)			1110		245	620
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	450	632	21			
Volume Left	0	0	0			
Volume Right	27	0	21			
cSH	1700	1700	620			
Volume to Capacity	0.26	0.37	0.03			
Queue Length 95th (ft)	0	0	3			
Control Delay (s)	0.0	0.0	11.0			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	11.0			
Approach LOS			B			
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			33.3%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
 26: Access #6/Mental Health Dwy. & Colonial Drive

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	380	15	25	515	1	19	0	19	134	0	34
Future Volume (vph)	6	380	15	25	515	1	19	0	19	134	0	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		0	0		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994						0.850				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1852	0	1770	1863	0	1770	1583	0	1770	1583	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1852	0	1770	1863	0	1770	1583	0	1770	1583	0
Link Speed (mph)		35			35			30				30
Link Distance (ft)		270			303			417				427
Travel Time (s)		5.3			5.9			9.5				9.7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	7	422	17	28	572	1	21	0	21	149	0	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	439	0	28	573	0	21	21	0	149	38	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	47.9%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 26: Access #6/Mental Health Dwy. & Colonial Drive

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	380	15	25	515	1	19	0	19	134	0	34
Future Volume (Veh/h)	6	380	15	25	515	1	19	0	19	134	0	34
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	7	422	17	28	572	1	21	0	21	149	0	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		716										
pX, platoon unblocked												
vC, conflicting volume	573			439			1110	1074	430	1086	1082	572
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	573			439			1110	1074	430	1086	1082	572
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			88	100	97	19	100	93
cM capacity (veh/h)	1000			1121			169	213	625	183	211	519
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	7	439	28	573	21	21	149	38				
Volume Left	7	0	28	0	21	0	149	0				
Volume Right	0	17	0	1	0	21	0	38				
cSH	1000	1700	1121	1700	169	625	183	519				
Volume to Capacity	0.01	0.26	0.02	0.34	0.12	0.03	0.81	0.07				
Queue Length 95th (ft)	1	0	2	0	10	3	141	6				
Control Delay (s)	8.6	0.0	8.3	0.0	29.4	11.0	77.6	12.5				
Lane LOS	A		A		D	B	F	B				
Approach Delay (s)	0.1		0.4		20.2		64.4					
Approach LOS					C		F					
Intersection Summary												
Average Delay			10.3									
Intersection Capacity Utilization			47.9%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
 27: Boyce Street & Colonial Drive



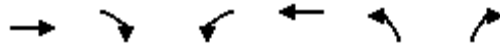
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	467	66	181	433	108	111
Future Volume (vph)	467	66	181	433	108	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		75	150		150	0
Storage Lanes		0	1		1	1
Taper Length (ft)			100		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.983					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1831	0	1770	1863	1770	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1831	0	1770	1863	1770	1583
Link Speed (mph)	35			35	35	
Link Distance (ft)	303			949	1007	
Travel Time (s)	5.9			18.5	19.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	519	73	201	481	120	123
Shared Lane Traffic (%)						
Lane Group Flow (vph)	592	0	201	481	120	123
Sign Control	Free			Free	Stop	

Intersection Summary

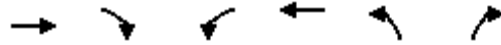
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	54.6%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
27: Boyce Street & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→	↘	↙	←	↖	↗
Traffic Volume (veh/h)	467	66	181	433	108	111
Future Volume (Veh/h)	467	66	181	433	108	111
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	519	73	201	481	120	123
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)	1019					
pX, platoon unblocked						
vC, conflicting volume			592		1438	556
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			592		1438	556
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			80		0	77
cM capacity (veh/h)			984		117	531
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	592	201	481	120	123	
Volume Left	0	201	0	120	0	
Volume Right	73	0	0	0	123	
cSH	1700	984	1700	117	531	
Volume to Capacity	0.35	0.20	0.28	1.03	0.23	
Queue Length 95th (ft)	0	19	0	173	22	
Control Delay (s)	0.0	9.6	0.0	162.2	13.8	
Lane LOS		A		F	B	
Approach Delay (s)	0.0	2.8		87.1		
Approach LOS				F		
Intersection Summary						
Average Delay			15.2			
Intersection Capacity Utilization			54.6%	ICU Level of Service	A	
Analysis Period (min)	15					



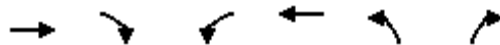
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑↑	↘	
Traffic Volume (vph)	738	16	25	687	7	32
Future Volume (vph)	738	16	25	687	7	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		75	100		0	0
Storage Lanes		1	1		1	0
Taper Length (ft)			100		25	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Frt		0.850			0.890	
Flt Protected			0.950		0.991	
Satd. Flow (prot)	1863	1583	1770	3539	1643	0
Flt Permitted			0.950		0.991	
Satd. Flow (perm)	1863	1583	1770	3539	1643	0
Link Speed (mph)	35			35	35	
Link Distance (ft)	271			736	462	
Travel Time (s)	5.3			14.3	9.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	820	18	28	763	8	36
Shared Lane Traffic (%)						
Lane Group Flow (vph)	820	18	28	763	44	0
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	48.8%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
28: Access #7 & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑↑	↘	
Traffic Volume (veh/h)	738	16	25	687	7	32
Future Volume (Veh/h)	738	16	25	687	7	32
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	820	18	28	763	8	36
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)	736					
pX, platoon unblocked					0.92	
vC, conflicting volume			838		1258	820
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			838		1109	820
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		96	89
cM capacity (veh/h)			792		181	318
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	820	18	28	382	382	44
Volume Left	0	0	28	0	0	8
Volume Right	0	18	0	0	0	36
cSH	1700	1700	792	1700	1700	280
Volume to Capacity	0.48	0.01	0.04	0.22	0.22	0.16
Queue Length 95th (ft)	0	0	3	0	0	14
Control Delay (s)	0.0	0.0	9.7	0.0	0.0	20.3
Lane LOS			A	C		
Approach Delay (s)	0.0		0.3	20.3		
Approach LOS						C
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			48.8%	ICU Level of Service	A	
Analysis Period (min)	15					

Lanes, Volumes, Timings
30: Harden Street Ext & Access #8



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	↘
Traffic Volume (vph)	0	14	0	1377	1186	38
Future Volume (vph)	0	14	0	1377	1186	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0			75
Storage Lanes	0	1	0			1
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3539	3539	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3539	3539	1583
Link Speed (mph)	30			35	35	
Link Distance (ft)	444			462	632	
Travel Time (s)	10.1			9.0	12.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	16	0	1530	1318	42
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	16	0	1530	1318	42
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	42.8%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
30: Harden Street Ext & Access #8

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↕↕	↕↕	↗
Traffic Volume (veh/h)	0	14	0	1377	1186	38
Future Volume (Veh/h)	0	14	0	1377	1186	38
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	16	0	1530	1318	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)				927	632	
pX, platoon unblocked	0.91	0.86	0.86			
vC, conflicting volume	2083	659	1360			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1323	291	1103			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	100			
cM capacity (veh/h)	134	609	544			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	16	765	765	659	659	42
Volume Left	0	0	0	0	0	0
Volume Right	16	0	0	0	0	42
cSH	609	1700	1700	1700	1700	1700
Volume to Capacity	0.03	0.45	0.45	0.39	0.39	0.02
Queue Length 95th (ft)	2	0	0	0	0	0
Control Delay (s)	11.1	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	11.1	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay	0.1					
Intersection Capacity Utilization	42.8%			ICU Level of Service	A	
Analysis Period (min)	15					

Lanes, Volumes, Timings
31: Harden Street Ext & Access #9



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↖	↑↑	↑↑	↗
Traffic Volume (vph)	0	26	20	1377	1171	29
Future Volume (vph)	0	26	20	1377	1171	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			75
Storage Lanes	0	1	1			1
Taper Length (ft)	25		100			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected			0.950			
Satd. Flow (prot)	0	1611	1770	3539	3539	1583
Flt Permitted			0.950			
Satd. Flow (perm)	0	1611	1770	3539	3539	1583
Link Speed (mph)	30			35	35	
Link Distance (ft)	525			465	462	
Travel Time (s)	11.9			9.1	9.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	29	22	1530	1301	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	29	22	1530	1301	32
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	42.4%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 31: Harden Street Ext & Access #9

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 PM



Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗	↖	↑↑	↑↑	↗	
Traffic Volume (veh/h)	0	26	20	1377	1171	29	
Future Volume (Veh/h)	0	26	20	1377	1171	29	
Sign Control	Stop			Free	Free		
Grade	0%			0%	0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly flow rate (vph)	0	29	22	1530	1301	32	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type				None	None		
Median storage veh							
Upstream signal (ft)				465	1094		
pX, platoon unblocked	0.91	0.87	0.87				
vC, conflicting volume	2110	650	1333				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1382	299	1084				
tC, single (s)	6.8	6.9	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.3	2.2				
p0 queue free %	100	95	96				
cM capacity (veh/h)	118	606	556				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	29	22	765	765	650	650	32
Volume Left	0	22	0	0	0	0	0
Volume Right	29	0	0	0	0	0	32
cSH	606	556	1700	1700	1700	1700	1700
Volume to Capacity	0.05	0.04	0.45	0.45	0.38	0.38	0.02
Queue Length 95th (ft)	4	3	0	0	0	0	0
Control Delay (s)	11.2	11.7	0.0	0.0	0.0	0.0	0.0
Lane LOS	B	B					
Approach Delay (s)	11.2	0.2	0.0				
Approach LOS	B						
Intersection Summary							
Average Delay			0.2				
Intersection Capacity Utilization			42.4%	ICU Level of Service	A		
Analysis Period (min)			15				

Lanes, Volumes, Timings
32: Harden Street Ext & Access #10



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	202	95	88	1199	1124	73
Future Volume (vph)	202	95	88	1199	1124	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	200			75
Storage Lanes	1	1	1			1
Taper Length (ft)	25		100			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.950		0.191			
Satd. Flow (perm)	1770	1583	356	3539	3539	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		94				42
Link Speed (mph)	30			35	35	
Link Distance (ft)	453			468	465	
Travel Time (s)	10.3			9.1	9.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	224	106	98	1332	1249	81
Shared Lane Traffic (%)						
Lane Group Flow (vph)	224	106	98	1332	1249	81
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	6.0	6.0	11.0	11.0	11.0	11.0
Minimum Split (s)	12.0	12.0	17.0	17.0	17.0	17.0
Total Split (s)	38.0	38.0	92.0	92.0	92.0	92.0
Total Split (%)	29.2%	29.2%	70.8%	70.8%	70.8%	70.8%
Maximum Green (s)	32.0	32.0	86.0	86.0	86.0	86.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	23.7	23.7	98.3	98.3	98.3	98.3
Actuated g/C Ratio	0.18	0.18	0.76	0.76	0.76	0.76
v/c Ratio	0.69	0.29	0.36	0.50	0.47	0.07
Control Delay	60.6	12.3	12.8	8.9	3.1	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.6	12.3	12.8	8.9	3.1	0.7
LOS	E	B	B	A	A	A
Approach Delay	45.1			9.2	3.0	
Approach LOS	D			A	A	

Lanes, Volumes, Timings
 32: Harden Street Ext & Access #10



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Length 50th (ft)	178	8	21	169	92	0
Queue Length 95th (ft)	252	56	78	298	151	m9
Internal Link Dist (ft)	373			388	385	
Turn Bay Length (ft)			200			75
Base Capacity (vph)	462	483	269	2675	2675	1206
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.22	0.36	0.50	0.47	0.07

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of 1st Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 10.3
 Intersection LOS: B
 Intersection Capacity Utilization 61.4%
 ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 32: Harden Street Ext & Access #10



Lanes, Volumes, Timings
 33: Harden Street Ext & Access #11



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	↘
Traffic Volume (vph)	0	14	0	1283	1208	11
Future Volume (vph)	0	14	0	1283	1208	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			75
Storage Lanes	0	1	0			1
Taper Length (ft)	25		100			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3539	3539	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3539	3539	1583
Link Speed (mph)	30			35	35	
Link Distance (ft)	421			392	468	
Travel Time (s)	9.6			7.6	9.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	16	0	1426	1342	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	16	0	1426	1342	12
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	43.4%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 33: Harden Street Ext & Access #11



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	↗
Traffic Volume (veh/h)	0	14	0	1283	1208	11
Future Volume (Veh/h)	0	14	0	1283	1208	11
Sign Control	Stop			Free		Free
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	16	0	1426	1342	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)				962	468	
pX, platoon unblocked	0.91	0.86	0.86			
vC, conflicting volume	2055	671	1354			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1269	297	1090			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	100			
cM capacity (veh/h)	145	602	548			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	16	713	713	671	671	12
Volume Left	0	0	0	0	0	0
Volume Right	16	0	0	0	0	12
cSH	602	1700	1700	1700	1700	1700
Volume to Capacity	0.03	0.42	0.42	0.39	0.39	0.01
Queue Length 95th (ft)	2	0	0	0	0	0
Control Delay (s)	11.1	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	11.1	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay	0.1					
Intersection Capacity Utilization	43.4%			ICU Level of Service	A	
Analysis Period (min)	15					

Lanes, Volumes, Timings
 34: Harden Street Ext & Access #12



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↖	↕↗	↕↖	↗
Traffic Volume (vph)	0	14	20	1283	1211	11
Future Volume (vph)	0	14	20	1283	1211	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			75
Storage Lanes	0	1	1			1
Taper Length (ft)	25		75			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected			0.950			
Satd. Flow (prot)	0	1611	1770	3539	3539	1583
Flt Permitted			0.950			
Satd. Flow (perm)	0	1611	1770	3539	3539	1583
Link Speed (mph)	30			35	35	
Link Distance (ft)	422			230	392	
Travel Time (s)	9.6			4.5	7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	16	22	1426	1346	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	16	22	1426	1346	12
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	43.5%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 34: Harden Street Ext & Access #12



Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗	↖	↕↗	↕↖	↗	
Traffic Volume (veh/h)	0	14	20	1283	1211	11	
Future Volume (Veh/h)	0	14	20	1283	1211	11	
Sign Control	Stop			Free	Free		
Grade	0%			0%	0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly flow rate (vph)	0	16	22	1426	1346	12	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type				None	None		
Median storage veh							
Upstream signal (ft)				570	860		
pX, platoon unblocked	0.92	0.86	0.86				
vC, conflicting volume	2103	673	1358				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1342	297	1093				
tC, single (s)	6.8	6.9	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.3	2.2				
p0 queue free %	100	97	96				
cM capacity (veh/h)	126	602	546				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	16	22	713	713	673	673	12
Volume Left	0	22	0	0	0	0	0
Volume Right	16	0	0	0	0	0	12
cSH	602	546	1700	1700	1700	1700	1700
Volume to Capacity	0.03	0.04	0.42	0.42	0.40	0.40	0.01
Queue Length 95th (ft)	2	3	0	0	0	0	0
Control Delay (s)	11.1	11.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	B	B					
Approach Delay (s)	11.1	0.2			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.2				
Intersection Capacity Utilization			43.5%	ICU Level of Service		A	
Analysis Period (min)			15				

2020 Build Conditions - IMPROVED
Phase III
Potential Project Buildout

Lanes, Volumes, Timings
12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	371	63	177	499	57	21	10	71	7	4	2
Future Volume (vph)	12	371	63	177	499	57	21	10	71	7	4	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		225	50		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.978			0.984			0.868			0.950	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1822	0	1770	1833	0	1770	1617	0	1770	1770	0
Flt Permitted	0.431			0.209			0.754			0.699		
Satd. Flow (perm)	803	1822	0	389	1833	0	1405	1617	0	1302	1770	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			11			79				2
Link Speed (mph)		35			35			35				35
Link Distance (ft)		980			161			3014				569
Travel Time (s)		19.1			3.1			58.7				11.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	13	412	70	197	542	63	23	11	79	8	4	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	482	0	197	605	0	23	90	0	8	6	0
Turn Type	Perm	NA		D.P+P	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2				6
Permitted Phases	4			4			2			6		
Detector Phase	4	4		3	8		2	2		6		6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0		6.0
Minimum Split (s)	30.0	30.0		17.0	30.0		30.0	30.0		30.0		30.0
Total Split (s)	42.0	42.0		17.0	59.0		31.0	31.0		31.0		31.0
Total Split (%)	46.7%	46.7%		18.9%	65.6%		34.4%	34.4%		34.4%		34.4%
Maximum Green (s)	36.0	36.0		11.0	53.0		25.0	25.0		25.0		25.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0		6.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0		3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max		C-Max
Act Effct Green (s)	28.7	28.7		39.1	45.1		32.9	32.9		32.9		32.9
Actuated g/C Ratio	0.32	0.32		0.43	0.50		0.37	0.37		0.37		0.37
v/c Ratio	0.05	0.82		0.60	0.65		0.04	0.14		0.02		0.01
Control Delay	18.6	38.9		20.1	19.3		22.5	7.8		22.6		19.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Delay	18.6	38.9		20.1	19.3		22.5	7.8		22.6		19.6
LOS	B	D		C	B		C	A		C		B
Approach Delay		38.3			19.5			10.8				21.3
Approach LOS		D			B			B				C

Lanes, Volumes, Timings
 12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM Improved



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	5	244		58	233		9	4		3	1	
Queue Length 95th (ft)	16	322		81	284		28	39		14	11	
Internal Link Dist (ft)		900			81			2934			489	
Turn Bay Length (ft)	100			100						50		
Base Capacity (vph)	321	735		340	1083		513	641		476	648	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.04	0.66		0.58	0.56		0.04	0.14		0.02	0.01	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 25.4
 Intersection Capacity Utilization 57.6%
 Analysis Period (min) 15











Intersection LOS: C
 ICU Level of Service B

Splits and Phases: 12: Gregg Street & Colonial Drive



Lanes, Volumes, Timings
23: Bull St. & Access #3

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	104	28	1848	119	104	2589
Future Volume (vph)	104	28	1848	119	104	2589
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		75	150	
Storage Lanes	2	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.95	0.91	0.91	1.00	0.91
Frt	0.968		0.991			
Flt Protected	0.962				0.950	
Satd. Flow (prot)	3365	0	5040	0	1770	5085
Flt Permitted	0.962				0.057	
Satd. Flow (perm)	3365	0	5040	0	106	5085
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	23		13			
Link Speed (mph)	35		40			40
Link Distance (ft)	526		223			302
Travel Time (s)	10.2		3.8			5.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	116	31	2053	132	116	2877
Shared Lane Traffic (%)						
Lane Group Flow (vph)	147	0	2185	0	116	2877
Turn Type	Prot		NA		D.P+P	NA
Protected Phases	8		2		1	6
Permitted Phases					2	
Detector Phase	8		2		1	6
Switch Phase						
Minimum Initial (s)	6.0		11.0		6.0	11.0
Minimum Split (s)	12.0		17.0		12.0	17.0
Total Split (s)	27.0		78.0		25.0	103.0
Total Split (%)	20.8%		60.0%		19.2%	79.2%
Maximum Green (s)	21.0		72.0		19.0	97.0
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	-2.0		-2.0		-2.0	-2.0
Total Lost Time (s)	4.0		4.0		4.0	4.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		C-Max		None	C-Max
Act Effct Green (s)	12.2		93.9		105.8	109.8
Actuated g/C Ratio	0.09		0.72		0.81	0.84
v/c Ratio	0.44		0.60		0.49	0.67
Control Delay	50.5		23.7		34.7	1.7
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	50.5		23.7		34.7	1.8
LOS	D		C		C	A
Approach Delay	50.5		23.7			3.0
Approach LOS	D		C			A

Lanes, Volumes, Timings
23: Bull St. & Access #3



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Length 50th (ft)	51		576		33	43
Queue Length 95th (ft)	84		m616		m92	52
Internal Link Dist (ft)	446		143			222
Turn Bay Length (ft)					150	
Base Capacity (vph)	614		3643		358	4296
Starvation Cap Reductn	0		0		0	105
Spillback Cap Reductn	0		0		0	0
Storage Cap Reductn	0		0		0	0
Reduced v/c Ratio	0.24		0.60		0.32	0.69

Intersection Summary

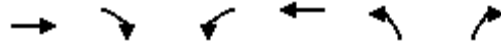
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBSB and 6:SBT, Start of 1st Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 12.8
 Intersection LOS: B
 Intersection Capacity Utilization 61.7%
 ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 23: Bull St. & Access #3



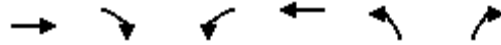
Lanes, Volumes, Timings
27: Boyce Street & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	388	37	104	418	30	58
Future Volume (vph)	388	37	104	418	30	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		75	100		0	0
Storage Lanes		0	1		1	1
Taper Length (ft)			100		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.988					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1840	0	1770	1863	1770	1583
Flt Permitted			0.194		0.950	
Satd. Flow (perm)	1840	0	361	1863	1770	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	6					64
Link Speed (mph)	35			35	35	
Link Distance (ft)	414			980	814	
Travel Time (s)	8.1			19.1	15.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	431	41	116	464	33	64
Shared Lane Traffic (%)						
Lane Group Flow (vph)	472	0	116	464	33	64
Turn Type	NA		D.P+P	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases			4			2
Detector Phase	4		3	8	2	2
Switch Phase						
Minimum Initial (s)	6.0		6.0	6.0	6.0	6.0
Minimum Split (s)	30.0		17.0	30.0	30.0	30.0
Total Split (s)	51.0		22.0	73.0	34.0	34.0
Total Split (%)	47.7%		20.6%	68.2%	31.8%	31.8%
Maximum Green (s)	45.0		16.0	67.0	28.0	28.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0		-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0		4.0	4.0	4.0	4.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	None	C-Max	C-Max
Act Effct Green (s)	35.4		47.0	51.0	48.0	48.0
Actuated g/C Ratio	0.33		0.44	0.48	0.45	0.45
v/c Ratio	0.77		0.37	0.52	0.04	0.09
Control Delay	40.1		17.5	20.8	20.6	6.1
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	40.1		17.5	20.8	20.6	6.1
LOS	D		B	C	C	A
Approach Delay	40.1			20.2	11.0	
Approach LOS	D			C	B	

Lanes, Volumes, Timings
 27: Boyce Street & Colonial Drive

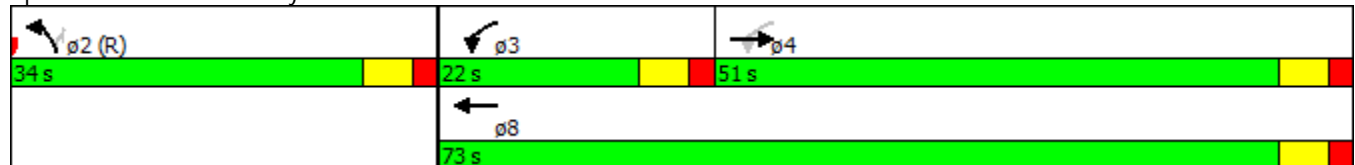


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Queue Length 50th (ft)	285		43	213	13	0
Queue Length 95th (ft)	355		60	241	37	29
Internal Link Dist (ft)	334			900	734	
Turn Bay Length (ft)			100			
Base Capacity (vph)	811		409	1201	794	746
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.58		0.28	0.39	0.04	0.09

Intersection Summary

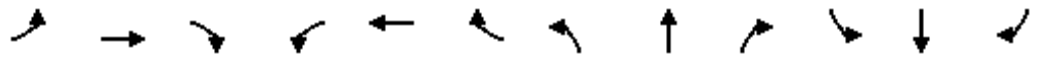
Area Type:	Other
Cycle Length:	107
Actuated Cycle Length:	107
Offset:	0 (0%), Referenced to phase 2:NBL and 6:, Start of 1st Green
Natural Cycle:	80
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.77
Intersection Signal Delay:	27.6
Intersection LOS:	C
Intersection Capacity Utilization	43.4%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 27: Boyce Street & Colonial Drive



Lanes, Volumes, Timings
12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	515	61	159	526	10	60	2	200	39	12	29
Future Volume (vph)	1	515	61	159	526	10	60	2	200	39	12	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		225	50		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.984			0.997			0.851			0.893	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1822	0	1770	1857	0	1703	1585	0	1770	1663	0
Flt Permitted	0.436			0.145			0.728			0.534		
Satd. Flow (perm)	812	1822	0	270	1857	0	1305	1585	0	995	1663	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			2			222			32	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		949			210			2969			473	
Travel Time (s)		18.5			4.1			57.8			9.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90
Heavy Vehicles (%)	2%	2%	8%	2%	2%	2%	6%	2%	2%	2%	2%	2%
Adj. Flow (vph)	1	572	68	177	584	11	67	2	222	43	13	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	640	0	177	595	0	67	224	0	43	45	0
Turn Type	Perm	NA		D.P+P	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			4			2			6		
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Minimum Split (s)	30.0	30.0		17.0	30.0		30.0	30.0		30.0	30.0	
Total Split (s)	58.0	58.0		17.0	75.0		32.0	32.0		32.0	32.0	
Total Split (%)	54.2%	54.2%		15.9%	70.1%		29.9%	29.9%		29.9%	29.9%	
Maximum Green (s)	52.5	52.5		11.5	69.5		26.5	26.5		26.5	26.5	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.5	5.5		5.5	5.5		5.5	5.5		5.5	5.5	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	44.3	44.3		55.5	61.0		35.0	35.0		35.0	35.0	
Actuated g/C Ratio	0.41	0.41		0.52	0.57		0.33	0.33		0.33	0.33	
v/c Ratio	0.00	0.84		0.59	0.56		0.16	0.34		0.13	0.08	
Control Delay	15.0	38.4		20.6	16.0		30.3	6.0		30.7	14.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.0	38.4		20.6	16.0		30.3	6.0		30.7	14.4	
LOS	B	D		C	B		C	A		C	B	
Approach Delay		38.4			17.1			11.6			22.4	

Lanes, Volumes, Timings
12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved

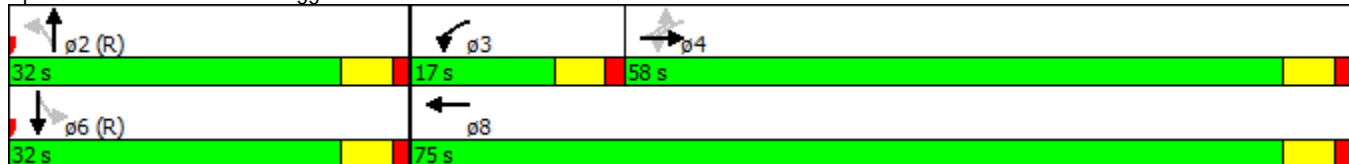


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D				B				C		
Queue Length 50th (ft)	0	376		53	235		33	1		21	6	
Queue Length 95th (ft)	3	468		85	271		75	60		54	36	
Internal Link Dist (ft)		869			130			2889			393	
Turn Bay Length (ft)	100			100						50		
Base Capacity (vph)	398	898		302	1206		426	667		325	564	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.00	0.71		0.59	0.49		0.16	0.34		0.13	0.08	

Intersection Summary

Area Type:	Other
Cycle Length:	107
Actuated Cycle Length:	107
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
Natural Cycle:	80
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.84
Intersection Signal Delay:	24.1
Intersection LOS:	C
Intersection Capacity Utilization	80.0%
ICU Level of Service	D
Analysis Period (min)	15

Splits and Phases: 12: Gregg Street & Colonial Drive



Lanes, Volumes, Timings
23: Bull St. & Access #3

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	←←		↑↑↑		↘	↑↑↑
Traffic Volume (vph)	204	80	2783	155	129	1899
Future Volume (vph)	204	80	2783	155	129	1899
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		75	150	
Storage Lanes	2	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.95	0.91	0.91	1.00	0.91
Frt	0.958		0.992			
Flt Protected	0.965				0.950	
Satd. Flow (prot)	3341	0	5045	0	1770	5085
Flt Permitted	0.965				0.038	
Satd. Flow (perm)	3341	0	5045	0	71	5085
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	33		14			
Link Speed (mph)	35		40			40
Link Distance (ft)	871		213			242
Travel Time (s)	17.0		3.6			4.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	227	89	3092	172	143	2110
Shared Lane Traffic (%)						
Lane Group Flow (vph)	316	0	3264	0	143	2110
Turn Type	Perm		NA		D.P+P	NA
Protected Phases			2		1	6
Permitted Phases	8				2	
Detector Phase	8		2		1	6
Switch Phase						
Minimum Initial (s)	6.0		11.0		11.0	11.0
Minimum Split (s)	12.0		17.0		17.0	17.0
Total Split (s)	21.0		109.0		17.0	126.0
Total Split (%)	14.3%		74.1%		11.6%	85.7%
Maximum Green (s)	15.0		103.0		11.5	120.0
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	2.0		2.0		1.5	2.0
Lost Time Adjust (s)	-2.0		-2.0		-2.0	-2.0
Total Lost Time (s)	4.0		4.0		3.5	4.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		C-Max		None	C-Max
Act Effct Green (s)	16.6		105.6		119.4	122.4
Actuated g/C Ratio	0.11		0.72		0.81	0.83
v/c Ratio	0.78		0.90		0.68	0.50
Control Delay	70.5		21.1		52.0	4.0
Queue Delay	0.0		4.5		0.0	0.5
Total Delay	70.5		25.6		52.0	4.5
LOS	E		C		D	A
Approach Delay	70.5		25.6			7.5
Approach LOS	E		C			A

Lanes, Volumes, Timings
 23: Bull St. & Access #3

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 PM Improved

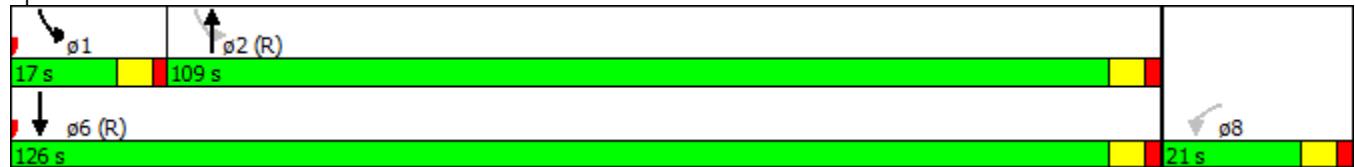


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Length 50th (ft)	138		843		81	174
Queue Length 95th (ft)	192		915		#162	193
Internal Link Dist (ft)	791		133			162
Turn Bay Length (ft)					150	
Base Capacity (vph)	415		3628		213	4234
Starvation Cap Reductn	0		315		0	1433
Spillback Cap Reductn	0		0		0	0
Storage Cap Reductn	0		0		0	0
Reduced v/c Ratio	0.76		0.99		0.67	0.75

Intersection Summary

Area Type: Other
 Cycle Length: 147
 Actuated Cycle Length: 147
 Offset: 0 (0%), Referenced to phase 2:NBSB and 6:SBT, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 21.0 Intersection LOS: C
 Intersection Capacity Utilization 84.7% ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 23: Bull St. & Access #3

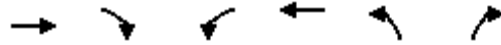


Lanes, Volumes, Timings
27: Boyce St. & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↖	↗	↖	↗
Traffic Volume (vph)	467	66	181	433	108	111
Future Volume (vph)	467	66	181	433	108	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		75	150		150	0
Storage Lanes		0	1		1	1
Taper Length (ft)			100		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.983					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1831	0	1770	1863	1770	1583
Flt Permitted			0.134		0.950	
Satd. Flow (perm)	1831	0	250	1863	1770	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	9					123
Link Speed (mph)	35			35	35	
Link Distance (ft)	303			949	1007	
Travel Time (s)	5.9			18.5	19.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	519	73	201	481	120	123
Shared Lane Traffic (%)						
Lane Group Flow (vph)	592	0	201	481	120	123
Turn Type	NA		D.P+P	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases			4			2
Detector Phase	4		3	8	2	2
Switch Phase						
Minimum Initial (s)	11.0		11.0	11.0	11.0	11.0
Minimum Split (s)	30.0		17.0	30.0	30.0	30.0
Total Split (s)	39.0		20.0	59.0	31.0	31.0
Total Split (%)	43.3%		22.2%	65.6%	34.4%	34.4%
Maximum Green (s)	33.5		14.5	53.5	25.5	25.5
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	1.5		1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-2.0		-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.5		3.5	3.5	3.5	3.5
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	None	C-Max	C-Max
Act Effct Green (s)	34.2		48.0	51.5	31.5	31.5
Actuated g/C Ratio	0.38		0.53	0.57	0.35	0.35
v/c Ratio	0.84		0.55	0.45	0.19	0.19
Control Delay	37.3		17.9	12.1	23.1	5.4
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	37.3		17.9	12.1	23.1	5.4
LOS	D		B	B	C	A
Approach Delay	37.3			13.8	14.2	
Approach LOS	D			B	B	

Lanes, Volumes, Timings
 27: Boyce St. & Colonial Drive

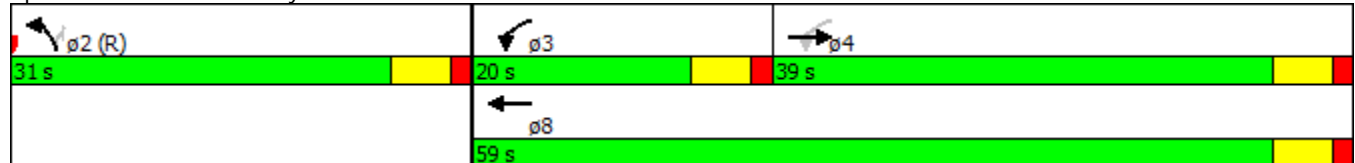


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Queue Length 50th (ft)	284		49	139	48	0
Queue Length 95th (ft)	#472		104	192	94	38
Internal Link Dist (ft)	223			869	927	
Turn Bay Length (ft)			150		150	
Base Capacity (vph)	744		419	1148	618	633
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.80		0.48	0.42	0.19	0.19

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 23.0
 Intersection LOS: C
 Intersection Capacity Utilization 57.8%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.



























Splits and Phases: 27: Boyce St. & Colonial Drive



2020 Build Conditions - IMPROVED
Phase III
Potential Project Buildout
COLONIAL DRIVE WIDENED

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 		 				 			  	
Traffic Volume (vph)	9	4	3	166	20	39	25	713	586	443	2549	21
Future Volume (vph)	9	4	3	166	20	39	25	713	586	443	2549	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		200	675		0	175		0	200		250
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100			75			50			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt		0.936			0.901				0.850		0.999	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3313	0	3433	1668	0	1770	3539	1583	1770	5080	0
Flt Permitted	0.950			0.950			0.062			0.257		
Satd. Flow (perm)	1770	3313	0	3433	1668	0	115	3539	1583	479	5080	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			43				456		2	
Link Speed (mph)		30			40			40		45		
Link Distance (ft)		552			905			1206		1658		
Travel Time (s)		12.5			15.4			20.6		25.1		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.92	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	10	4	3	184	22	43	28	767	651	492	2771	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	7	0	184	65	0	28	767	651	492	2794	0
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	4	4		3	3			2	3	1	6	
Permitted Phases							2		2	6		
Detector Phase	4	4		3	3		2	2	3	1	6	
Switch Phase												
Minimum Initial (s)	14.0	14.0		11.0	11.0		16.0	16.0	11.0	11.0	16.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		30.0	30.0	20.0	17.0	30.0	
Total Split (s)	20.0	20.0		25.0	25.0		47.0	47.0	25.0	38.0	85.0	
Total Split (%)	15.4%	15.4%		19.2%	19.2%		36.2%	36.2%	19.2%	29.2%	65.4%	
Maximum Green (s)	14.0	14.0		19.0	19.0		41.0	41.0	19.0	32.0	79.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag	Lead	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	None	None	C-Max	
Act Effct Green (s)	18.0	18.0		18.2	18.2		67.8	67.8	88.0	99.8	99.8	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.52	0.52	0.68	0.77	0.77	
v/c Ratio	0.04	0.02		0.38	0.24		0.47	0.42	0.53	0.74	0.72	
Control Delay	49.1	39.0		40.8	19.8		47.8	11.9	11.3	17.8	11.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	49.1	39.0		40.8	19.8		47.8	11.9	11.3	17.8	11.6	
LOS	D	D		D	B		D	B	B	B	B	
Approach Delay		44.9			35.4			12.3			12.5	

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

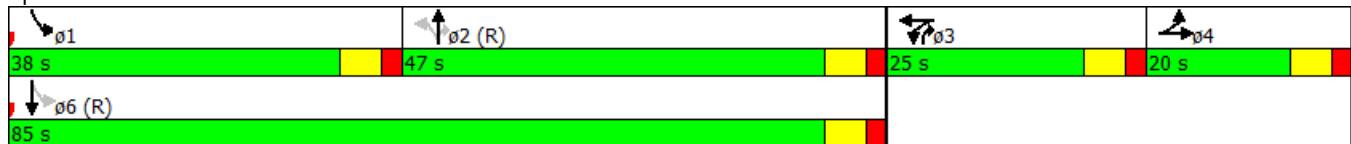
Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			B			B	
Queue Length 50th (ft)	7	1		72	18		9	124	173	86	256	
Queue Length 95th (ft)	25	9		109	55		#83	277	379	335	709	
Internal Link Dist (ft)		472			825			1126			1578	
Turn Bay Length (ft)	100			675			175			200		
Base Capacity (vph)	245	461		607	330		59	1844	1260	725	3900	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.04	0.02		0.30	0.20		0.47	0.42	0.52	0.68	0.72	

Intersection Summary























Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 13.7
 Intersection Capacity Utilization 84.7%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Bull St. & Harden St. Ext.



Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	2	13	17	12	8	17	1359	83	71	2646	2
Future Volume (vph)	6	2	13	17	12	8	17	1359	83	71	2646	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	200		0	200		0	150		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			100			100			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Frt		0.869			0.939				0.850			
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1619	0	1770	1749	0	1770	5085	1583	1770	5085	0
Flt Permitted	0.743			0.276			0.042			0.150		
Satd. Flow (perm)	1384	1619	0	514	1749	0	78	5085	1583	279	5085	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		602			715			682			1206	
Travel Time (s)		13.7			16.3			11.6			20.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.94	0.90
Adj. Flow (vph)	7	2	14	19	13	9	19	1446	92	79	2815	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	16	0	19	22	0	19	1446	92	79	2817	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			3			2			6	
Permitted Phases	4			3			2		2	6		
Detector Phase	4	4		3	3		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	25.0	25.0		25.0	25.0		80.0	80.0	80.0	80.0	80.0	
Total Split (%)	19.2%	19.2%		19.2%	19.2%		61.5%	61.5%	61.5%	61.5%	61.5%	
Maximum Green (s)	19.0	19.0		19.0	19.0		74.0	74.0	74.0	74.0	74.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Act Effect Green (s)	20.0	20.0		20.9	20.9		101.5	101.5	101.5	101.5	101.5	
Actuated g/C Ratio	0.15	0.15		0.16	0.16		0.78	0.78	0.78	0.78	0.78	
v/c Ratio	0.03	0.06		0.23	0.08		0.31	0.36	0.07	0.36	0.71	
Control Delay	47.5	47.9		54.7	46.6		34.6	11.2	11.7	17.5	13.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.1	
Total Delay	47.5	47.9		54.7	46.6		34.6	11.2	11.7	17.5	13.5	
LOS	D	D		D	D		C	B	B	B	B	
Approach Delay		47.8			50.4			11.5			13.6	
Approach LOS		D			D			B			B	

Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

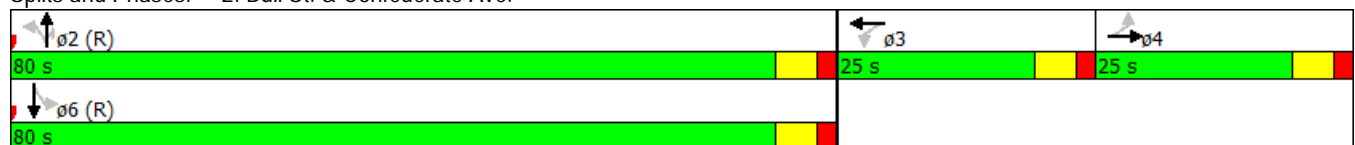
Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	5	12		14	16		5	149	25	26	681	
Queue Length 95th (ft)	20	34		40	41		m20	282	71	m53	510	
Internal Link Dist (ft)		522			635			602			1126	
Turn Bay Length (ft)	150			200			200			150		
Base Capacity (vph)	244	286		90	309		61	3969	1235	217	3969	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	138	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.03	0.06		0.21	0.07		0.31	0.36	0.07	0.36	0.74	

Intersection Summary




















Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 113 (87%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 13.4 Intersection LOS: B
 Intersection Capacity Utilization 79.0% ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bull St. & Confederate Ave.



Lanes, Volumes, Timings
3: Bull St. & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	6	217	1	58	0	1428	405	106	2467	11
Future Volume (vph)	0	0	6	217	1	58	0	1428	405	106	2467	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	150		0	0		0	200		0
Storage Lanes	0		1	0		0	0		0	1		0
Taper Length (ft)	25			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.865		0.946			0.967			0.999	
Flt Protected				0.950	0.969					0.950		
Satd. Flow (prot)	0	0	1611	1681	1622	0	0	4917	0	1770	5080	0
Flt Permitted				0.950	0.969					0.087		
Satd. Flow (perm)	0	0	1611	1681	1622	0	0	4917	0	162	5080	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)			25		20			158				
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		440			312			171			682	
Travel Time (s)		8.6			6.1			2.9			11.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.96	0.90	0.93	0.90
Adj. Flow (vph)	0	0	7	241	1	64	0	1503	422	118	2653	12
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	0	0	7	128	178	0	0	1925	0	118	2665	0
Turn Type			Perm	Perm	NA			NA		Perm	NA	
Protected Phases					8			2			6	
Permitted Phases			4	8						6		
Detector Phase			4	8	8			2		6	6	
Switch Phase												
Minimum Initial (s)			16.0	16.0	16.0			16.0		16.0	16.0	
Minimum Split (s)			30.0	30.0	30.0			30.0		30.0	30.0	
Total Split (s)			30.0	30.0	30.0			100.0		100.0	100.0	
Total Split (%)			23.1%	23.1%	23.1%			76.9%		76.9%	76.9%	
Maximum Green (s)			24.0	24.0	24.0			94.0		94.0	94.0	
Yellow Time (s)			4.0	4.0	4.0			4.0		4.0	4.0	
All-Red Time (s)			2.0	2.0	2.0			2.0		2.0	2.0	
Lost Time Adjust (s)			-4.0	-4.0	-4.0			-4.0		-4.0	-4.0	
Total Lost Time (s)			2.0	2.0	2.0			2.0		2.0	2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)			3.0	3.0	3.0			3.0		3.0	3.0	
Recall Mode			None	None	None			C-Max		C-Max	C-Max	
Act Effct Green (s)			23.0	23.0	23.0			103.0		103.0	103.0	
Actuated g/C Ratio			0.18	0.18	0.18			0.79		0.79	0.79	
v/c Ratio			0.02	0.43	0.59			0.49		0.92	0.66	
Control Delay			0.2	51.7	51.2			2.2		68.8	4.4	
Queue Delay			0.0	0.0	0.0			0.0		0.0	1.2	
Total Delay			0.2	51.7	51.2			2.2		68.8	5.7	
LOS			A	D	D			A		E	A	
Approach Delay					51.4			2.2			8.3	
Approach LOS					D			A			A	

Lanes, Volumes, Timings
3: Bull St. & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)			0	103	131			12		46	1	
Queue Length 95th (ft)			1	162	203			35		m#108	252	
Internal Link Dist (ft)		360				232		91			602	
Turn Bay Length (ft)				150						200		
Base Capacity (vph)			366	362	365			3927		128	4024	
Starvation Cap Reductn			0	0	0			229		0	1043	
Spillback Cap Reductn			0	0	0			0		0	0	
Storage Cap Reductn			0	0	0			0		0	0	
Reduced v/c Ratio			0.02	0.35	0.49			0.52		0.92	0.89	

Intersection Summary





















Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 8.6 Intersection LOS: A
 Intersection Capacity Utilization 84.6% ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Bull St. & Colonial Drive

φ2 (R) 100 s	φ4 30 s
φ6 (R) 100 s	φ8 30 s

Lanes, Volumes, Timings
 4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM Improved - Colonial Widened





















												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								  			  	
Traffic Volume (vph)	0	0	5	0	0	26	0	1775	68	0	2647	6
Future Volume (vph)	0	0	5	0	0	26	0	1775	68	0	2647	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	50		0
Storage Lanes	0		1	0		1	0		0	0		0
Taper Length (ft)	25			25			75			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.865			0.865		0.994				
Flt Protected												
Satd. Flow (prot)	0	0	1611	0	0	1611	0	5055	0	0	5085	0
Flt Permitted												
Satd. Flow (perm)	0	0	1611	0	0	1611	0	5055	0	0	5085	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		341			529			302			219	
Travel Time (s)		6.6			10.3			5.1			3.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.97	0.90
Adj. Flow (vph)	0	0	6	0	0	29	0	1868	76	0	2729	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	6	0	0	29	0	1944	0	0	2736	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	61.3%
Analysis Period (min)	15
	ICU Level of Service B















HCM Unsignalized Intersection Capacity Analysis
 4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM Improved - Colonial Widened

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								  			  	
Traffic Volume (veh/h)	0	0	5	0	0	26	0	1775	68	0	2647	6
Future Volume (Veh/h)	0	0	5	0	0	26	0	1775	68	0	2647	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.97	0.90
Hourly flow rate (vph)	0	0	6	0	0	29	0	1868	76	0	2729	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
								None			None	
Median storage (veh)												
Upstream signal (ft)												
								302			390	
pX, platoon unblocked	0.87	0.87	0.76	0.87	0.87	0.79	0.76				0.79	
vC, conflicting volume	3384	4676	913	2822	4642	661	2736				1944	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1588	3080	0	939	3040	0	2185				1271	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	99	100	100	97	100				100	
cM capacity (veh/h)	61	10	826	188	11	858	182				429	
Direction, Lane #												
	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	6	29	747	747	450	1092	1092	553				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	6	29	0	0	76	0	0	7				
cSH	826	858	1700	1700	1700	1700	1700	1700				
Volume to Capacity	0.01	0.03	0.44	0.44	0.26	0.64	0.64	0.33				
Queue Length 95th (ft)	1	3	0	0	0	0	0	0				
Control Delay (s)	9.4	9.3	0.0	0.0	0.0	0.0	0.0	0.0				
Lane LOS												
Approach Delay (s)	9.4	9.3	0.0			0.0						
Approach LOS	A	A										
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization			61.3%			ICU Level of Service					B	
Analysis Period (min)			15									

Lanes, Volumes, Timings
5: Bull St. & Jefferson Street

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened















						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				  	  	
Traffic Volume (vph)	0	29	7	1900	2662	10
Future Volume (vph)	0	29	7	1900	2662	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	175			0
Storage Lanes	0	1	1			0
Taper Length (ft)	25		100			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Frt		0.865			0.999	
Flt Protected			0.950			
Satd. Flow (prot)	0	1611	1770	5085	5080	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	1611	1770	5085	5080	0
Link Speed (mph)	35			40	40	
Link Distance (ft)	410			712	223	
Travel Time (s)	8.0			12.1	3.8	
Peak Hour Factor	0.90	0.90	0.90	0.94	0.97	0.90
Adj. Flow (vph)	0	32	8	2021	2744	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	32	8	2021	2755	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 61.7% ICU Level of Service B
 Analysis Period (min) 15






















HCM Unsignalized Intersection Capacity Analysis
5: Bull St. & Jefferson Street

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

									
Movement	EBL	EBR	NBL	NBT	SBT	SBR			
Lane Configurations				  	  				
Traffic Volume (veh/h)	0	29	7	1900	2662	10			
Future Volume (Veh/h)	0	29	7	1900	2662	10			
Sign Control	Stop			Free	Free				
Grade	0%			0%	0%				
Peak Hour Factor	0.90	0.90	0.90	0.94	0.97	0.90			
Hourly flow rate (vph)	0	32	8	2021	2744	11			
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type				None	None				
Median storage (veh)									
Upstream signal (ft)				712	223				
pX, platoon unblocked	0.83	0.79	0.79						
vC, conflicting volume	3439	920	2755						
vC1, stage 1 conf vol									
vC2, stage 2 conf vol									
vCu, unblocked vol	2591	0	2290						
tC, single (s)	6.8	6.9	4.1						
tC, 2 stage (s)									
tF (s)	3.5	3.3	2.2						
p0 queue free %	100	96	95						
cM capacity (veh/h)	16	856	172						
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	
Volume Total	32	8	674	674	674	1098	1098	560	
Volume Left	0	8	0	0	0	0	0	0	
Volume Right	32	0	0	0	0	0	0	11	
cSH	856	172	1700	1700	1700	1700	1700	1700	
Volume to Capacity	0.04	0.05	0.40	0.40	0.40	0.65	0.65	0.33	
Queue Length 95th (ft)	3	4	0	0	0	0	0	0	
Control Delay (s)	9.4	27.0	0.0	0.0	0.0	0.0	0.0	0.0	
Lane LOS	A	D							
Approach Delay (s)	9.4	0.1					0.0		
Approach LOS	A								
Intersection Summary									
Average Delay			0.1						
Intersection Capacity Utilization			61.7%	ICU Level of Service	B				
Analysis Period (min)	15								

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1246	336	919	23	155	21	373	655	122	67	1347	1272
Future Volume (vph)	1246	336	919	23	155	21	373	655	122	67	1347	1272
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	775		0	125		0	175		0	100		0
Storage Lanes	1		2	1		0	1		0	1		1
Taper Length (ft)	50			50			125			50		
Lane Util. Factor	0.91	0.91	0.88	0.95	0.95	0.95	0.97	0.91	0.91	1.00	0.95	1.00
Frt			0.850		0.984			0.976				0.850
Flt Protected	0.950	0.969			0.994		0.950			0.950		
Satd. Flow (prot)	1610	3285	2787	0	3462	0	3433	4963	0	1770	3539	1583
Flt Permitted	0.950	0.969			0.994		0.950			0.316		
Satd. Flow (perm)	1610	3285	2787	0	3462	0	3433	4963	0	589	3539	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			40	
Link Distance (ft)		1012			379			526			712	
Travel Time (s)		23.0			8.6			12.0			12.1	
Peak Hour Factor	0.97	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.90	0.94	0.97
Adj. Flow (vph)	1285	373	1021	26	172	23	410	728	136	74	1433	1311
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	642	1016	1021	0	221	0	410	864	0	74	1433	1311
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Perm	NA	Free
Protected Phases	4	4	5	3	3		5	2			6	
Permitted Phases			4							6		Free
Detector Phase	4	4	5	3	3		5	2		6	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0	11.0	5.0	5.0		11.0	16.0		16.0	16.0	
Minimum Split (s)	30.0	30.0	17.0	12.0	12.0		17.0	30.0		30.0	30.0	
Total Split (s)	49.0	49.0	17.0	12.0	12.0		17.0	69.0		52.0	52.0	
Total Split (%)	37.7%	37.7%	13.1%	9.2%	9.2%		13.1%	53.1%		40.0%	40.0%	
Maximum Green (s)	43.0	43.0	11.0	6.0	6.0		11.0	63.0		46.0	46.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0	-4.0		-4.0		-4.0	-4.0		-4.0	-4.0	
Total Lost Time (s)	2.0	2.0	2.0		2.0		2.0	2.0		2.0	2.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead		Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		C-Max	C-Max	
Act Effct Green (s)	47.0	47.0	64.0		10.0		15.0	67.0		50.0	50.0	130.0
Actuated g/C Ratio	0.36	0.36	0.49		0.08		0.12	0.52		0.38	0.38	1.00
v/c Ratio	1.10	1.06dl	0.74		0.83		1.04	0.34		0.33	1.05	0.83
Control Delay	98.1	35.8	26.9		84.3		101.7	17.9		31.8	71.8	12.3
Queue Delay	0.0	0.0	0.1		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	98.1	35.8	27.0		84.3		101.7	17.9		31.8	71.8	12.3
LOS	F	D	C		F		F	B		C	E	B
Approach Delay		47.4			84.3			44.9			43.1	
Approach LOS		D			F			D			D	

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

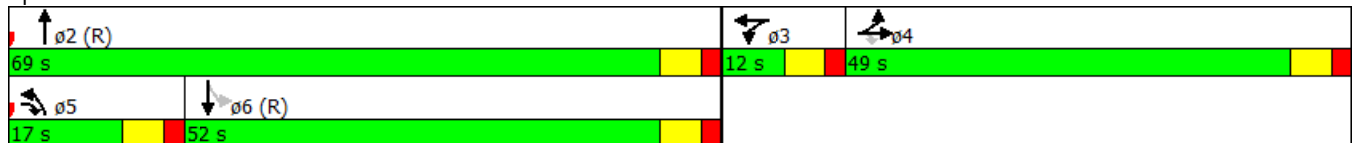
Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	~686	441	448		98		~192	175		32	~682	381
Queue Length 95th (ft)	#946	524	559		#167		#297	204		m60	#827	335
Internal Link Dist (ft)		932			299			446			632	
Turn Bay Length (ft)	775						175			100		
Base Capacity (vph)	582	1187	1372		266		396	2557		226	1361	1583
Starvation Cap Reductn	0	0	0		0		0	0		0	0	0
Spillback Cap Reductn	0	0	20		0		0	0		0	0	0
Storage Cap Reductn	0	0	0		0		0	0		0	0	0
Reduced v/c Ratio	1.10	0.86	0.76		0.83		1.04	0.34		0.33	1.05	0.83

Intersection Summary


























Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 126 (97%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.10
 Intersection Signal Delay: 46.3
 Intersection Capacity Utilization 101.3%
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 6: Bull St. & Elmwood Avenue



Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Traffic Volume (vph)	88	300	88	54	194	138	26	941	89	196	2016	100
Future Volume (vph)	88	300	88	54	194	138	26	941	89	196	2016	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	50			50			75			75		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.966			0.937			0.987				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3419	0	1770	3316	0	1770	3493	0	1770	3539	1583
Flt Permitted	0.319			0.248			0.046			0.216		
Satd. Flow (perm)	594	3419	0	462	3316	0	86	3493	0	402	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			129			22				111
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1044			459			1901				526
Travel Time (s)		23.7			10.4			43.2				12.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.94	0.90
Adj. Flow (vph)	98	333	98	60	211	153	29	1046	99	218	2145	111
Shared Lane Traffic (%)												
Lane Group Flow (vph)	98	431	0	60	364	0	29	1145	0	218	2145	111
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	16.0
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	30.0
Total Split (s)	30.0	30.0		30.0	30.0		100.0	100.0		100.0	100.0	100.0
Total Split (%)	23.1%	23.1%		23.1%	23.1%		76.9%	76.9%		76.9%	76.9%	76.9%
Maximum Green (s)	24.0	24.0		24.0	24.0		94.0	94.0		94.0	94.0	94.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Act Effect Green (s)	25.8	25.8		25.8	25.8		100.2	100.2		100.2	100.2	100.2
Actuated g/C Ratio	0.20	0.20		0.20	0.20		0.77	0.77		0.77	0.77	0.77
v/c Ratio	0.84	0.62		0.66	0.48		0.44	0.42		0.71	0.79	0.09
Control Delay	97.7	48.8		85.9	35.9		30.8	5.7		11.6	5.6	0.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	1.3	0.0
Total Delay	97.7	48.8		85.9	35.9		30.8	5.7		11.6	6.9	0.3
LOS	F	D		F	D		C	A		B	A	A
Approach Delay		57.8			43.0			6.4			7.0	
Approach LOS		E			D			A			A	

Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

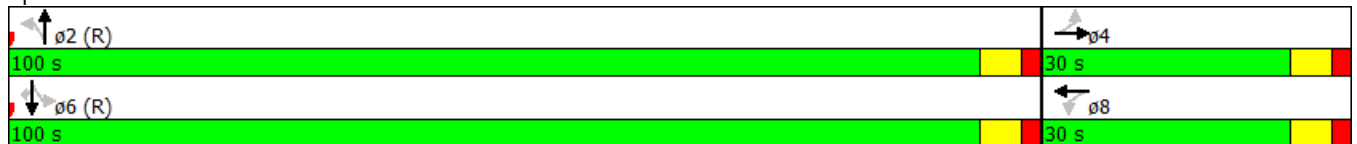
Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	78	163		47	95		8	158		59	375	1
Queue Length 95th (ft)	#179	220		#115	147		#62	191		m51	m233	m0
Internal Link Dist (ft)		964			379			1821			446	
Turn Bay Length (ft)	150			175			150			150		
Base Capacity (vph)	127	754		99	815		66	2696		309	2726	1245
Starvation Cap Reductn	0	0		0	0		0	0		0	356	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.77	0.57		0.61	0.45		0.44	0.42		0.71	0.91	0.09

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 106 (82%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 16.0 Intersection LOS: B
 Intersection Capacity Utilization 109.1% ICU Level of Service H
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.




























Splits and Phases: 7: Bull St. & Calhoun St.

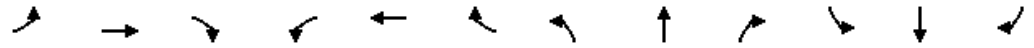


Lanes, Volumes, Timings

Bull Street Commons Traffic Study

9: Harden Street Ext/Harden St. Ext. & Colonial Drive 2020 Build-Out Phase 3 AM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 		 	 			 			 	
Traffic Volume (vph)	36	327	71	932	584	106	159	529	454	21	476	54
Future Volume (vph)	36	327	71	932	584	106	159	529	454	21	476	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		800	175		0	225		0	300		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	100			75			75			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.973			0.977				0.850		0.985	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3444	0	3433	3458	0	1770	3539	1583	1770	3486	0
Flt Permitted	0.361			0.950			0.326			0.341		
Satd. Flow (perm)	672	3444	0	3433	3458	0	607	3539	1583	635	3486	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			27				504		11	
Link Speed (mph)		35			35			35			40	
Link Distance (ft)		424			340			483			2110	
Travel Time (s)		8.3			6.6			9.4			36.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.90	0.90
Adj. Flow (vph)	40	363	79	1036	649	118	177	563	504	23	529	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	442	0	1036	767	0	177	563	504	23	589	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Free	Perm	NA	
Protected Phases		8		7	4			6			2	
Permitted Phases	8						6		Free	2		
Detector Phase	8	8		7	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	16.0	16.0		11.0	16.0		16.0	16.0		16.0	16.0	
Minimum Split (s)	30.0	30.0		17.0	30.0		30.0	30.0		30.0	30.0	
Total Split (s)	30.0	30.0		46.0	76.0		54.0	54.0		54.0	54.0	
Total Split (%)	23.1%	23.1%		35.4%	58.5%		41.5%	41.5%		41.5%	41.5%	
Maximum Green (s)	24.0	24.0		40.0	70.0		48.0	48.0		48.0	48.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	24.7	24.7		43.5	70.2		55.8	55.8	130.0	55.8	55.8	
Actuated g/C Ratio	0.19	0.19		0.33	0.54		0.43	0.43	1.00	0.43	0.43	
v/c Ratio	0.31	0.66		0.90	0.41		0.68	0.37	0.32	0.08	0.39	
Control Delay	51.4	51.5		46.6	16.5		54.3	38.0	0.4	30.2	31.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.1	
Total Delay	51.4	51.5		46.6	16.5		54.3	38.0	0.4	30.2	31.6	
LOS	D	D		D	B		D	D	A	C	C	
Approach Delay		51.5			33.8			25.1			31.5	
Approach LOS		D			C			C			C	

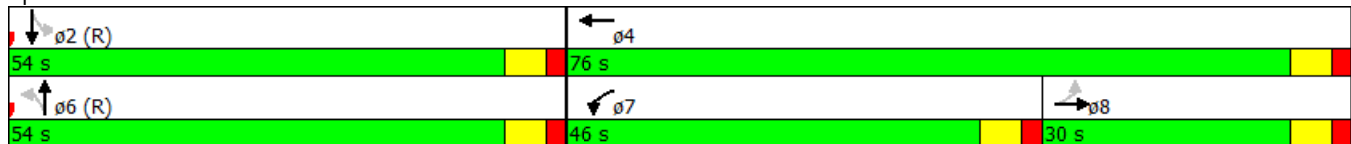


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	29	175		390	245		107	177	0	14	232	
Queue Length 95th (ft)	66	227		#497	216		#240	233	0	m28	323	
Internal Link Dist (ft)		344			260			403			2030	
Turn Bay Length (ft)	225			175			225			300		
Base Capacity (vph)	144	755		1161	1980		260	1517	1583	272	1501	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	137	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.28	0.59		0.89	0.39		0.68	0.37	0.32	0.08	0.43	

Intersection Summary























Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 121 (93%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 32.9 Intersection LOS: C
 Intersection Capacity Utilization 81.5% ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive



Lanes, Volumes, Timings
10: Harden St./Harden Street Ext & Calhoun St.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	36	207	7	42	2	288	961	17	42	1109	89
Future Volume (vph)	88	36	207	7	42	2	288	961	17	42	1109	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	50		0	0		325	300		200
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	100			25			25			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Frt		0.872			0.994			0.997				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1624	0	1770	1852	0	1770	5070	0	1770	3539	1583
Flt Permitted	0.725			0.261			0.161			0.186		
Satd. Flow (perm)	1350	1624	0	486	1852	0	300	5070	0	346	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		210			2			3				122
Link Speed (mph)		30			35			35			35	
Link Distance (ft)		820			1149			2515			490	
Travel Time (s)		18.6			22.4			49.0			9.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	98	40	230	8	47	2	320	1068	19	47	1232	99
Shared Lane Traffic (%)												
Lane Group Flow (vph)	98	270	0	8	49	0	320	1087	0	47	1232	99
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	1 2		1	2	2
Switch Phase												
Minimum Initial (s)	1.0	1.0		11.0	11.0		9.0	14.0		9.0	14.0	14.0
Minimum Split (s)	6.5	6.5		30.0	30.0		15.0	30.0		15.0	30.0	30.0
Total Split (s)	37.0	37.0		37.0	37.0		47.0	75.0		18.0	46.0	46.0
Total Split (%)	28.5%	28.5%		28.5%	28.5%		36.2%	57.7%		13.8%	35.4%	35.4%
Maximum Green (s)	31.5	31.5		31.5	31.5		41.0	69.0		12.0	40.0	40.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.5	1.5		1.5	1.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	0.0		0.0	0.0		-3.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	2.5	5.5		5.5	5.5		3.0	3.0		6.0	3.0	3.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Act Effect Green (s)	18.3	15.3		15.3	15.3		96.4	72.0		98.9	77.6	77.6
Actuated g/C Ratio	0.14	0.12		0.12	0.12		0.74	0.55		0.76	0.60	0.60
v/c Ratio	0.52	0.72		0.14	0.22		0.62	0.39		0.08	0.58	0.10
Control Delay	50.2	17.7		54.6	50.6		18.4	16.9		2.6	17.7	3.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	50.2	17.7		54.6	50.6		18.4	16.9		2.6	17.7	3.2
LOS	D	B		D	D		B	B		A	B	A
Approach Delay		26.4			51.1			17.3			16.2	
Approach LOS		C			D			B			B	

Lanes, Volumes, Timings
 10: Harden St./Harden Street Ext & Calhoun St.

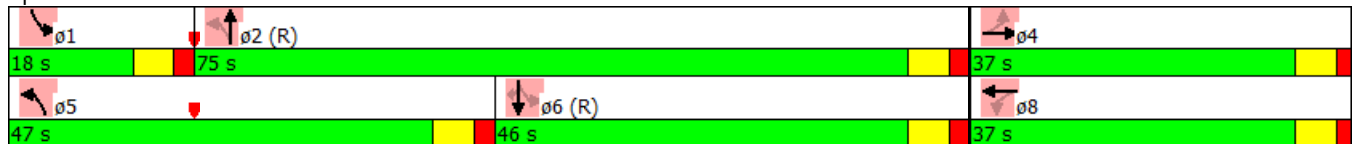
Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM Improved - Colonial Widened

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	81	67		6	37		84	182		3	331	13
Queue Length 95th (ft)	m132	153		22	73		170	215		m12	512	34
Internal Link Dist (ft)		740			1069			2435			410	
Turn Bay Length (ft)	225			50						300		200
Base Capacity (vph)	358	552		117	450		742	2809		572	2112	993
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.27	0.49		0.07	0.11		0.43	0.39		0.08	0.58	0.10

Intersection Summary




















Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 78 (60%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 18.4 Intersection LOS: B
 Intersection Capacity Utilization 72.5% ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Harden St./Harden Street Ext & Calhoun St.



Lanes, Volumes, Timings
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM Improved - Colonial Widened




















												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	103	297	38	10	304	87	15	38	12	34	20	74
Future Volume (vph)	103	297	38	10	304	87	15	38	12	34	20	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	275		0	0		0	300		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	100			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.983			0.967			0.976			0.882	
Flt Protected	0.950			0.950				0.988		0.950		
Satd. Flow (prot)	1770	1831	0	1770	1801	0	0	1796	0	1770	1643	0
Flt Permitted	0.950			0.950				0.988		0.950		
Satd. Flow (perm)	1770	1831	0	1770	1801	0	0	1796	0	1770	1643	0
Link Speed (mph)		35			30			35			35	
Link Distance (ft)		1005			820			504			3014	
Travel Time (s)		19.6			18.6			9.8			58.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	114	330	42	11	338	97	17	42	13	38	22	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	114	372	0	11	435	0	0	72	0	38	104	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	47.2%
Analysis Period (min)	15
	ICU Level of Service A

























HCM Unsignalized Intersection Capacity Analysis
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM Improved - Colonial Widened

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	103	297	38	10	304	87	15	38	12	34	20	74
Future Volume (Veh/h)	103	297	38	10	304	87	15	38	12	34	20	74
Sign Control	Free		Free				Stop				Stop	
Grade	0%		0%				0%				0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	114	330	42	11	338	97	17	42	13	38	22	82
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	TWLTL				TWLTL							
Median storage veh	2				2							
Upstream signal (ft)					820							
pX, platoon unblocked	0.92						0.92	0.92		0.92	0.92	0.92
vC, conflicting volume	435			372			1032	1036	351	1000	1008	386
vC1, stage 1 conf vol							579	579		408	408	
vC2, stage 2 conf vol							453	457		592	600	
vCu, unblocked vol	343			372			991	996	351	957	966	290
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			99			95	88	98	89	94	88
cM capacity (veh/h)	1119			1186			324	359	692	349	382	689
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total	114	372	11	435	72	38	104					
Volume Left	114	0	11	0	17	38	0					
Volume Right	0	42	0	97	13	0	82					
cSH	1119	1700	1186	1700	382	349	589					
Volume to Capacity	0.10	0.22	0.01	0.26	0.19	0.11	0.18					
Queue Length 95th (ft)	8	0	1	0	17	9	16					
Control Delay (s)	8.6	0.0	8.1	0.0	16.6	16.6	12.4					
Lane LOS	A		A		C	C	B					
Approach Delay (s)	2.0		0.2		16.6	13.5						
Approach LOS					C	B						
Intersection Summary												
Average Delay			3.6									
Intersection Capacity Utilization			47.2%		ICU Level of Service						A	
Analysis Period (min)			15									

Lanes, Volumes, Timings
12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Traffic Volume (vph)	12	371	63	177	499	57	21	10	71	7	4	2
Future Volume (vph)	12	371	63	177	499	57	21	10	71	7	4	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		225	50		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.978			0.984			0.868			0.950	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3461	0	1770	3483	0	1770	1617	0	1770	1770	0
Flt Permitted	0.423			0.323			0.754			0.699		
Satd. Flow (perm)	788	3461	0	602	3483	0	1405	1617	0	1302	1770	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25			24			79				2
Link Speed (mph)		35			35			35				35
Link Distance (ft)		980			161			3014				569
Travel Time (s)		19.1			3.1			58.7				11.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	13	412	70	197	542	63	23	11	79	8	4	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	482	0	197	605	0	23	90	0	8	6	0
Turn Type	Perm	NA		D.P+P	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			4			2			6		
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	30.0	30.0		17.0	30.0		30.0	30.0		30.0	30.0	
Total Split (s)	42.0	42.0		17.0	59.0		31.0	31.0		31.0	31.0	
Total Split (%)	46.7%	46.7%		18.9%	65.6%		34.4%	34.4%		34.4%	34.4%	
Maximum Green (s)	36.0	36.0		11.0	53.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effect Green (s)	18.0	18.0		28.5	34.5		43.5	43.5		43.5	43.5	
Actuated g/C Ratio	0.20	0.20		0.32	0.38		0.48	0.48		0.48	0.48	
v/c Ratio	0.08	0.68		0.60	0.45		0.03	0.11		0.01	0.01	
Control Delay	28.1	36.1		26.7	20.3		14.6	5.1		14.7	12.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	28.1	36.1		26.7	20.3		14.6	5.1		14.7	12.8	
LOS	C	D		C	C		B	A		B	B	
Approach Delay		35.9			21.9			7.0			13.9	
Approach LOS		D			C			A			B	

Lanes, Volumes, Timings
12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

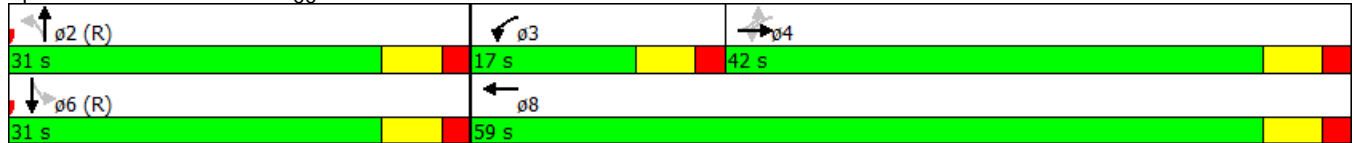
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	6	128		76	126		7	3		2	1	
Queue Length 95th (ft)	20	165		113	152		23	31		11	9	
Internal Link Dist (ft)		900			81			2934			489	
Turn Bay Length (ft)	100			100						50		
Base Capacity (vph)	315	1399		336	2060		679	822		629	856	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.04	0.34		0.59	0.29		0.03	0.11		0.01	0.01	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 25.5
 Intersection Capacity Utilization 44.9%
 Analysis Period (min) 15












Intersection LOS: C
 ICU Level of Service A

Splits and Phases: 12: Gregg Street & Colonial Drive



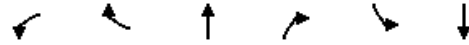
Lanes, Volumes, Timings
13: Harden Street Ext & Slighs Ave.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	128	213	1032	71	129	1386
Future Volume (vph)	128	213	1032	71	129	1386
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		50	100	
Storage Lanes	1	0		1	1	
Taper Length (ft)	25				50	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	0.916			0.850		
Flt Protected	0.982				0.950	
Satd. Flow (prot)	1579	0	3539	1583	1770	3539
Flt Permitted	0.982				0.152	
Satd. Flow (perm)	1579	0	3539	1583	283	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	72			20		
Link Speed (mph)	30		35			35
Link Distance (ft)	398		512			483
Travel Time (s)	9.0		10.0			9.4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.95
Heavy Vehicles (%)	7%	9%	2%	2%	2%	2%
Adj. Flow (vph)	142	237	1147	79	143	1459
Shared Lane Traffic (%)						
Lane Group Flow (vph)	379	0	1147	79	143	1459
Turn Type	Perm		NA	Perm	pm+pt	NA
Protected Phases			6		5	2
Permitted Phases	4			6	2	
Detector Phase	4		6	6	5	2
Switch Phase						
Minimum Initial (s)	16.0		16.0	16.0	11.0	16.0
Minimum Split (s)	30.0		30.0	30.0	17.0	30.0
Total Split (s)	49.0		63.0	63.0	18.0	81.0
Total Split (%)	37.7%		48.5%	48.5%	13.8%	62.3%
Maximum Green (s)	43.0		57.0	57.0	12.0	75.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0		-4.0	-2.0	-4.0	-4.0
Total Lost Time (s)	2.0		2.0	4.0	2.0	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		C-Max	C-Max	None	C-Max
Act Effct Green (s)	35.9		72.9	70.9	90.1	90.1
Actuated g/C Ratio	0.28		0.56	0.55	0.69	0.69
v/c Ratio	0.78		0.58	0.09	0.39	0.59
Control Delay	45.4		6.5	2.9	15.8	13.8
Queue Delay	0.0		0.0	0.0	0.0	0.4
Total Delay	45.4		6.5	2.9	15.8	14.2
LOS	D		A	A	B	B
Approach Delay	45.4		6.3			14.3

Lanes, Volumes, Timings
 13: Harden Street Ext & Slighs Ave.

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM Improved - Colonial Widened



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	D		A		B	
Queue Length 50th (ft)	243		58	2	41	238
Queue Length 95th (ft)	325		121	m6	m66	505
Internal Link Dist (ft)	318		432			403
Turn Bay Length (ft)				50	100	
Base Capacity (vph)	616		1985	872	379	2453
Starvation Cap Reductn	0		0	0	0	436
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.62		0.58	0.09	0.38	0.72

Intersection Summary












Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 129 (99%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 14.9
 Intersection Capacity Utilization 67.9%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 13: Harden Street Ext & Slighs Ave.



Lanes, Volumes, Timings
14: Colonial Drive & Farrow Road

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

							
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Lane Configurations							
Traffic Volume (vph)	0	203	169	628	1357	18	
Future Volume (vph)	0	203	169	628	1357	18	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0	330	550			0	
Storage Lanes	0	1	1			0	
Taper Length (ft)	25		125				
Lane Util. Factor	1.00	0.88	1.00	0.95	0.95	0.95	
Frt		0.850			0.998		
Flt Protected			0.950				
Satd. Flow (prot)	0	2787	1770	3539	3532	0	
Flt Permitted			0.950				
Satd. Flow (perm)	0	2787	1770	3539	3532	0	
Right Turn on Red		Yes				No	
Satd. Flow (RTOR)		35					
Link Speed (mph)	35			35	35		
Link Distance (ft)	930			658	2077		
Travel Time (s)	18.1			12.8	40.5		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.91	0.90	
Adj. Flow (vph)	0	226	188	698	1491	20	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	226	188	698	1511	0	
Turn Type		Over	Prot	NA	NA		
Protected Phases		8	8	8 6	2	6	
Permitted Phases							
Detector Phase		8	8	8 6	2		
Switch Phase							
Minimum Initial (s)		16.0	16.0		16.0	16.0	
Minimum Split (s)		30.0	30.0		30.0	30.0	
Total Split (s)		30.0	30.0		35.0	35.0	
Total Split (%)		46.2%	46.2%		53.8%	54%	
Maximum Green (s)		24.0	24.0		29.0	29.0	
Yellow Time (s)		4.0	4.0		4.0	4.0	
All-Red Time (s)		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-3.0	-3.0		-4.0		
Total Lost Time (s)		3.0	3.0		2.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0	3.0		3.0	3.0	
Recall Mode		None	None		C-Max	C-Max	
Act Effct Green (s)		20.6	20.6	65.0	39.4		
Actuated g/C Ratio		0.32	0.32	1.00	0.61		
v/c Ratio		0.25	0.34	0.20	0.71		
Control Delay		14.0	22.1	0.1	12.0		
Queue Delay		0.0	0.0	0.0	0.0		
Total Delay		14.0	22.1	0.1	12.0		
LOS		B	C	A	B		
Approach Delay				4.8	12.0		
Approach LOS				A	B		

Lanes, Volumes, Timings
 14: Colonial Drive & Farrow Road



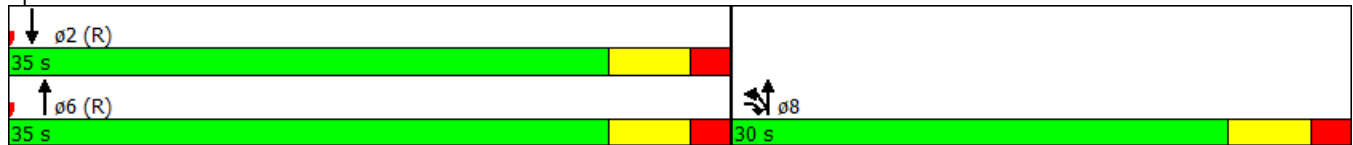
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Queue Length 50th (ft)		32	59	0	92		
Queue Length 95th (ft)		50	84	0	465		
Internal Link Dist (ft)	850			578	1997		
Turn Bay Length (ft)		330	550				
Base Capacity (vph)		1178	735	3533	2139		
Starvation Cap Reductn		0	0	0	0		
Spillback Cap Reductn		0	0	0	0		
Storage Cap Reductn		0	0	0	0		
Reduced v/c Ratio		0.19	0.26	0.20	0.71		

Intersection Summary

Area Type: Other
 Cycle Length: 65
 Actuated Cycle Length: 65
 Offset: 62 (95%), Referenced to phase 2:SBT and 6:NBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 9.7
 Intersection Capacity Utilization 58.1%
 Analysis Period (min) 15




























Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 14: Colonial Drive & Farrow Road



Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 		 	 			 			 	
Traffic Volume (vph)	15	415	4	259	564	198	0	471	162	290	1225	71
Future Volume (vph)	15	415	4	259	564	198	0	471	162	290	1225	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		0	300		0	0		225	200		0
Storage Lanes	1		0	2		1	0		1	1		0
Taper Length (ft)	125			100			25			125		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.999				0.850			0.850		0.992	
Flt Protected	0.950			0.950						0.950		
Satd. Flow (prot)	1770	3536	0	3433	3539	1583	0	3539	1583	1770	3511	0
Flt Permitted	0.414			0.950						0.356		
Satd. Flow (perm)	771	3536	0	3433	3539	1583	0	3539	1583	663	3511	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				163			180		8	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1518			1183			2077			914	
Travel Time (s)		29.6			23.0			40.5			17.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.90
Adj. Flow (vph)	17	461	4	288	627	220	0	523	180	322	1346	79
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	465	0	288	627	220	0	523	180	322	1425	0
Turn Type	Perm	NA		Prot	NA	pm+ov		NA	Free	pm+pt	NA	
Protected Phases		4		3	8	1		2		1	6	
Permitted Phases	4					8			Free	6		
Detector Phase	4	4		3	8	1		2		1	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0	5.0		15.0		5.0	15.0	
Minimum Split (s)	30.0	30.0		21.0	41.0	17.0		41.0		17.0	30.0	
Total Split (s)	30.0	30.0		21.0	51.0	28.0		51.0		28.0	79.0	
Total Split (%)	23.1%	23.1%		16.2%	39.2%	21.5%		39.2%		21.5%	60.8%	
Maximum Green (s)	25.0	25.0		16.0	46.0	23.0		46.0		23.0	74.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5		3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5	1.5		1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0		-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead		Lead		Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Recall Mode	None	None		None	None	None		C-Min		None	C-Min	
Walk Time (s)				18.0				18.0				
Flash Dont Walk (s)				5.0				5.0				
Pedestrian Calls (#/hr)				0				0				
Act Effct Green (s)	22.7	22.7		17.1	43.8	66.3		55.7	130.0	78.2	78.2	
Actuated g/C Ratio	0.17	0.17		0.13	0.34	0.51		0.43	1.00	0.60	0.60	
v/c Ratio	0.13	0.75		0.64	0.53	0.25		0.34	0.11	0.58	0.67	
Control Delay	46.2	58.8		60.4	36.1	4.7		30.8	0.1	21.7	24.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	46.2	58.8		60.4	36.1	4.7		30.8	0.1	21.7	24.5	

Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

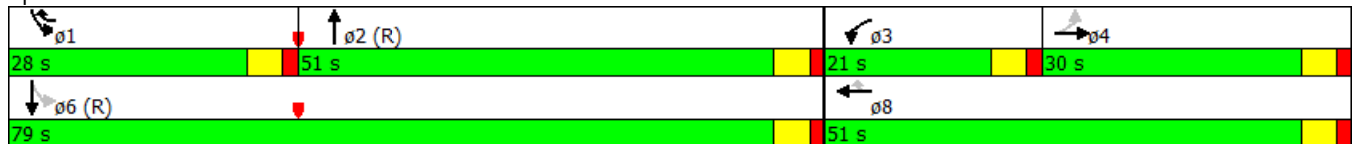
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	E		E	D	A		C	A	C	C	
Approach Delay		58.4			36.2			22.9			24.0	
Approach LOS		E			D			C			C	
Queue Length 50th (ft)	12	196		120	222	24		208	0	160	517	
Queue Length 95th (ft)	35	251		168	270	56		158	0	211	403	
Internal Link Dist (ft)		1438			1103			1997			834	
Turn Bay Length (ft)	175			300					225	200		
Base Capacity (vph)	154	708		462	1289	947		1520	1583	602	2123	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.11	0.66		0.62	0.49	0.23		0.34	0.11	0.53	0.67	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 31.3
 Intersection Capacity Utilization 74.2%
 Analysis Period (min) 15




















Intersection LOS: C
ICU Level of Service D

Splits and Phases: 15: Farrow Road & Beltline Blvd



Lanes, Volumes, Timings
16: Farrow Road & 277 NB RAMPS

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								 			 	
Traffic Volume (vph)	61	0	9	0	0	0	0	344	353	44	1620	0
Future Volume (vph)	61	0	9	0	0	0	0	344	353	44	1620	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	0		0	0		0	250		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			25			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.850						0.924				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1770	1583	0	0	0	0	0	3270	0	1770	3539	0
Flt Permitted	0.950									0.354		
Satd. Flow (perm)	1770	1583	0	0	0	0	0	3270	0	659	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		48						392				
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		706			904			914			683	
Travel Time (s)		13.8			17.6			17.8			13.3	
Peak Hour Factor	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90
Adj. Flow (vph)	66	0	10	0	0	0	0	382	392	49	1723	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	66	10	0	0	0	0	0	774	0	49	1723	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						6			2	
Permitted Phases	4									2		
Detector Phase	4	4						6		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0						10.0		10.0	10.0	
Minimum Split (s)	30.0	30.0						30.0		30.0	30.0	
Total Split (s)	30.0	30.0						100.0		100.0	100.0	
Total Split (%)	23.1%	23.1%						76.9%		76.9%	76.9%	
Maximum Green (s)	25.0	25.0						95.0		95.0	95.0	
Yellow Time (s)	3.5	3.5						3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5						1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0						-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0						4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Recall Mode	None	None						C-Max		C-Max	C-Max	
Act Effct Green (s)	12.2	12.2						113.6		113.6	113.6	
Actuated g/C Ratio	0.09	0.09						0.87		0.87	0.87	
v/c Ratio	0.40	0.05						0.27		0.09	0.56	
Control Delay	62.3	0.6						2.1		1.7	2.1	
Queue Delay	0.0	0.0						0.0		0.0	0.5	
Total Delay	62.3	0.6						2.1		1.7	2.6	
LOS	E	A						A		A	A	
Approach Delay		54.2						2.1			2.6	
Approach LOS		D						A			A	

Lanes, Volumes, Timings
 16: Farrow Road & 277 NB RAMPS

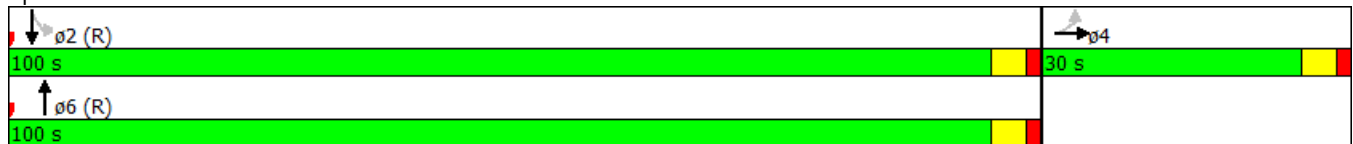
Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM Improved - Colonial Widened

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	54	0						0		4	90	
Queue Length 95th (ft)	99	0						3		m6	m165	
Internal Link Dist (ft)		626			824			834			603	
Turn Bay Length (ft)	300									250		
Base Capacity (vph)	354	355						2906		575	3091	
Starvation Cap Reductn	0	0						0		0	797	
Spillback Cap Reductn	0	0						0		0	0	
Storage Cap Reductn	0	0						0		0	0	
Reduced v/c Ratio	0.19	0.03						0.27		0.09	0.75	

Intersection Summary





















Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.56
 Intersection Signal Delay: 4.0 Intersection LOS: A
 Intersection Capacity Utilization 59.8% ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 16: Farrow Road & 277 NB RAMPS



Lanes, Volumes, Timings
17: Farrow Road & Lorick Avenue /277 SB Ramps

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	0	41	884	14	35	13	392	0	0	750	215
Future Volume (vph)	13	0	41	884	14	35	13	392	0	0	750	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	125		0	200		0	0		0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (ft)	25			150			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850		0.894							0.966
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1770	0	1583	1770	1665	0	1770	3539	0	0	3419	0
Flt Permitted	0.721			0.950			0.106					
Satd. Flow (perm)	1343	0	1583	1770	1665	0	197	3539	0	0	3419	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			18		39							29
Link Speed (mph)		35			35			35				35
Link Distance (ft)		681			1031			683				835
Travel Time (s)		13.3			20.1			13.3				16.3
Peak Hour Factor	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.92	0.90	0.90	0.93	0.90
Adj. Flow (vph)	14	0	46	951	16	39	14	426	0	0	806	239
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	0	46	951	55	0	14	426	0	0	1045	0
Turn Type	Perm		Perm	Perm	NA		Perm	NA			NA	
Protected Phases					4			2				6
Permitted Phases	8		8	4			2					
Detector Phase	8		8	4	4		2	2				6
Switch Phase												
Minimum Initial (s)	10.0		10.0	10.0	10.0		10.0	10.0				10.0
Minimum Split (s)	30.0		30.0	30.0	30.0		30.0	30.0				30.0
Total Split (s)	91.0		91.0	91.0	91.0		39.0	39.0				39.0
Total Split (%)	70.0%		70.0%	70.0%	70.0%		30.0%	30.0%				30.0%
Maximum Green (s)	86.0		86.0	86.0	86.0		34.0	34.0				34.0
Yellow Time (s)	3.5		3.5	3.5	3.5		3.5	3.5				3.5
All-Red Time (s)	1.5		1.5	1.5	1.5		1.5	1.5				1.5
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0		-1.0	-1.0				-1.0
Total Lost Time (s)	4.0		4.0	4.0	4.0		4.0	4.0				4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0				3.0
Recall Mode	None		None	None	None		C-Max	C-Max				C-Max
Act Effct Green (s)	84.2		84.2	84.2	84.2		37.8	37.8				37.8
Actuated g/C Ratio	0.65		0.65	0.65	0.65		0.29	0.29				0.29
v/c Ratio	0.02		0.04	0.83	0.05		0.25	0.41				1.03
Control Delay	7.3		5.1	24.8	3.2		50.8	31.7				80.3
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.0				0.0
Total Delay	7.3		5.1	24.8	3.2		50.8	31.7				80.3
LOS	A		A	C	A		D	C				F
Approach Delay					23.6			32.3				80.3
Approach LOS					C			C				F

Lanes, Volumes, Timings
 17: Farrow Road & Lorick Avenue /277 SB Ramps

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM Improved - Colonial Widened

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	4		7	529	4		5	106			~520	
Queue Length 95th (ft)	11		21	741	18		33	227			#658	
Internal Link Dist (ft)		601			951			603			755	
Turn Bay Length (ft)				125			200					
Base Capacity (vph)	898		1065	1184	1127		57	1029			1015	
Starvation Cap Reductn	0		0	0	0		0	0			0	
Spillback Cap Reductn	0		0	0	0		0	0			0	
Storage Cap Reductn	0		0	0	0		0	0			0	
Reduced v/c Ratio	0.02		0.04	0.80	0.05		0.25	0.41			1.03	

Intersection Summary






















Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.03
 Intersection Signal Delay: 47.9 Intersection LOS: D
 Intersection Capacity Utilization 94.9% ICU Level of Service F
 Analysis Period (min) 15
 ~ 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: 17: Farrow Road & Lorick Avenue /277 SB Ramps

φ2 (R) 39 s	φ4 91 s
φ6 (R) 39 s	φ8 91 s

Lanes, Volumes, Timings
18: Assembly St./Assembly & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2527	470	638	1652	4	268	1	253	0	0	0
Future Volume (vph)	0	2527	470	638	1652	4	268	1	253	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		275	150		0	0		0	0		0
Storage Lanes	1		1	1		0	2		1	0		0
Taper Length (ft)	150			75			25			25		
Lane Util. Factor	1.00	0.86	0.86	0.97	0.91	0.91	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850					0.851	0.850			
Flt Protected				0.950			0.950					
Satd. Flow (prot)	1863	4806	1362	3433	5085	0	3433	1506	1504	0	1863	0
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	1863	4806	1362	3433	5085	0	3433	1506	1504	0	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			181		1			132	76			
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		3707			509			546			403	
Travel Time (s)		84.3			11.6			12.4			7.9	
Peak Hour Factor	0.90	0.98	0.90	0.92	0.96	0.90	0.92	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	2579	522	693	1721	4	291	1	281	0	0	0
Shared Lane Traffic (%)			0%						47%			
Lane Group Flow (vph)	0	2579	522	693	1725	0	291	133	149	0	0	0
Turn Type	Perm	NA	pm+ov	Prot	NA		Split	NA	pm+ov			
Protected Phases		2	3	1	6		3	3	1	4	4	
Permitted Phases	2		2						3			
Detector Phase	2	2	3	1	6		3	3	1	4	4	
Switch Phase												
Minimum Initial (s)	16.0	16.0	6.0	11.0	16.0		6.0	6.0	11.0	4.0	4.0	
Minimum Split (s)	30.0	30.0	21.0	17.0	30.0		21.0	21.0	17.0	10.0	10.0	
Total Split (s)	72.0	72.0	21.0	27.0	99.0		21.0	21.0	27.0	10.0	10.0	
Total Split (%)	55.4%	55.4%	16.2%	20.8%	76.2%		16.2%	16.2%	20.8%	7.7%	7.7%	
Maximum Green (s)	66.0	66.0	15.0	21.0	93.0		15.0	15.0	21.0	4.0	4.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	-4.0	-4.0	-4.0	-4.0		-4.0	-2.0	-4.0		-2.0	
Total Lost Time (s)	6.0	2.0	2.0	2.0	2.0		2.0	4.0	2.0		4.0	
Lead/Lag	Lead	Lead	Lead	Lag			Lead	Lead	Lag	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes					Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max	None	None	C-Max		None	None	None	None	None	
Walk Time (s)			5.0				5.0	5.0				
Flash Dont Walk (s)			10.0				10.0	10.0				
Pedestrian Calls (#/hr)			0				0	0				
Act Effct Green (s)		80.4	101.0	25.0	107.4		18.6	16.6	45.6			
Actuated g/C Ratio		0.62	0.78	0.19	0.83		0.14	0.13	0.35			
v/c Ratio		0.87	0.48	1.05	0.41		0.59	0.43	0.26			
Control Delay		24.7	4.6	91.8	1.5		57.6	13.2	15.9			
Queue Delay		0.0	0.0	0.0	0.1		0.0	0.0	0.0			
Total Delay		24.7	4.6	91.8	1.6		57.6	13.2	15.9			

Lanes, Volumes, Timings
 18: Assembly St./Assembly & Elmwood Avenue

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM Improved - Colonial Widened

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C	A	F	A		E	B	B			
Approach Delay		21.3			27.5			36.4				
Approach LOS		C			C			D				
Queue Length 50th (ft)		659	88	~337	52		119	1	44			
Queue Length 95th (ft)		741	150	m#439	m54		168	64	100			
Internal Link Dist (ft)		3627			429			466			323	
Turn Bay Length (ft)			275	150								
Base Capacity (vph)		2973	1098	660	4201		501	311	576			
Starvation Cap Reductn		0	0	0	1138		0	0	0			
Spillback Cap Reductn		9	0	0	0		0	0	0			
Storage Cap Reductn		0	0	0	0		0	0	0			
Reduced v/c Ratio		0.87	0.48	1.05	0.56		0.58	0.43	0.26			

Intersection Summary
























Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 14 (11%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.05
 Intersection Signal Delay: 25.2 Intersection LOS: C
 Intersection Capacity Utilization 88.2% ICU Level of Service E
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Assembly St./Assembly & Elmwood Avenue



Lanes, Volumes, Timings
19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	212	2482	67	84	1651	52	19	103	24	258	509	595
Future Volume (vph)	212	2482	67	84	1651	52	19	103	24	258	509	595
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		175	150		0	200		0	175		425
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	75			75			100			75		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850		0.995				0.850		0.989	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	1770	5060	0	1770	3539	1583	1770	3353	1441
Flt Permitted	0.950			0.062			0.148			0.599		
Satd. Flow (perm)	3433	5085	1583	115	5060	0	276	3539	1583	1116	3353	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			35		5				126		6	149
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		509			563			474			3675	
Travel Time (s)		11.6			12.8			10.8			83.5	
Peak Hour Factor	0.90	0.93	0.90	0.90	0.97	0.90	0.90	0.90	0.90	0.90	0.93	0.94
Adj. Flow (vph)	236	2669	74	93	1702	58	21	114	27	287	547	633
Shared Lane Traffic (%)												7%
Lane Group Flow (vph)	236	2669	74	93	1760	0	21	114	27	287	591	589
Turn Type	Prot	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	pm+ov
Protected Phases	5	2	3		6		3	8		7	4	5
Permitted Phases			2	6			8		8	4		4
Detector Phase	5	2	3	6	6		3	8	8	7	4	5
Switch Phase												
Minimum Initial (s)	11.0	16.0	11.0	16.0	16.0		11.0	16.0	16.0	11.0	16.0	11.0
Minimum Split (s)	17.0	30.0	17.0	30.0	30.0		17.0	30.0	30.0	17.0	30.0	17.0
Total Split (s)	17.0	83.0	17.0	66.0	66.0		17.0	30.0	30.0	17.0	30.0	17.0
Total Split (%)	13.1%	63.8%	13.1%	50.8%	50.8%		13.1%	23.1%	23.1%	13.1%	23.1%	13.1%
Maximum Green (s)	11.0	77.0	11.0	60.0	60.0		11.0	24.0	24.0	11.0	24.0	11.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0	-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lead	Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	C-Max	C-Max		None	None	None	None	None	None
Act Effct Green (s)	15.0	82.6	99.6	65.6	65.6		41.4	26.4	26.4	41.8	29.8	46.8
Actuated g/C Ratio	0.12	0.64	0.77	0.50	0.50		0.32	0.20	0.20	0.32	0.23	0.36
v/c Ratio	0.60	0.83	0.06	1.63	0.69		0.08	0.16	0.06	0.66	0.77	0.96
Control Delay	79.8	7.0	0.1	367.8	24.5		29.0	42.5	0.3	43.0	54.4	58.8
Queue Delay	0.0	0.5	0.0	0.0	0.2		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.8	7.5	0.1	367.8	24.6		29.0	42.5	0.3	43.0	54.4	58.8
LOS	E	A	A	F	C		C	D	A	D	D	E
Approach Delay		13.0			41.8			33.7			53.9	
Approach LOS		B			D			C			D	

Lanes, Volumes, Timings
19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	102	116	0	~112	456		12	41	0	188	259	437
Queue Length 95th (ft)	m123	167	m0	#227	536		31	68	0	275	333	#716
Internal Link Dist (ft)		429			483			394			3595	
Turn Bay Length (ft)	175		175	150			200			175		425
Base Capacity (vph)	396	3231	1220	57	2555		260	762	439	434	772	614
Starvation Cap Reductn	0	189	0	0	160		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	0.60	0.88	0.06	1.63	0.73		0.08	0.15	0.06	0.66	0.77	0.96

Intersection Summary
























Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 5 (4%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.63
 Intersection Signal Delay: 31.1 Intersection LOS: C
 Intersection Capacity Utilization 92.2% ICU Level of Service F
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Main St. & Elmwood Avenue



Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (vph)	12	2025	275	100	1694	16	36	12	39	21	123	19
Future Volume (vph)	12	2025	275	100	1694	16	36	12	39	21	123	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	75		0	200		0	75		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			50			100			50		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.981			0.999				0.850		0.983	
Flt Protected	0.950			0.950			0.950				0.994	
Satd. Flow (prot)	1770	4989	0	1770	5080	0	1770	1863	1583	0	3458	0
Flt Permitted	0.104			0.047			0.505				0.922	
Satd. Flow (perm)	194	4989	0	88	5080	0	941	1863	1583	0	3208	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		59			3				25		10	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		563			1012			1692			1095	
Travel Time (s)		12.8			23.0			38.5			24.9	
Peak Hour Factor	0.90	0.95	0.90	0.90	0.95	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	13	2132	306	111	1783	18	40	13	43	23	137	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	2438	0	111	1801	0	40	13	43	0	181	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		6	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	100.0	100.0		100.0	100.0		30.0	30.0	30.0	30.0	30.0	
Total Split (%)	76.9%	76.9%		76.9%	76.9%		23.1%	23.1%	23.1%	23.1%	23.1%	
Maximum Green (s)	94.0	94.0		94.0	94.0		24.0	24.0	24.0	24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0		-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0		2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None	None	None	None	
Act Effect Green (s)	106.0	106.0		106.0	106.0		20.0	20.0	20.0		20.0	
Actuated g/C Ratio	0.82	0.82		0.82	0.82		0.15	0.15	0.15		0.15	
v/c Ratio	0.08	0.60		1.56	0.43		0.28	0.05	0.16		0.36	
Control Delay	1.3	1.0		303.1	2.3		54.5	47.5	27.1		48.8	
Queue Delay	0.0	0.2		0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	1.3	1.2		303.1	2.4		54.5	47.5	27.1		48.8	
LOS	A	A		F	A		D	D	C		D	
Approach Delay		1.2			19.8			41.3			48.8	
Approach LOS		A			B			D			D	

Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	0	29		~131	98		30	10	13		68	
Queue Length 95th (ft)	m1	33		m#139	m84		68	30	49		106	
Internal Link Dist (ft)		483			932			1612			1015	
Turn Bay Length (ft)	200			75			200					
Base Capacity (vph)	158	4078		71	4142		202	401	360		698	
Starvation Cap Reductn	0	685		0	0		0	0	0		0	
Spillback Cap Reductn	0	0		0	216		0	0	0		0	
Storage Cap Reductn	0	0		0	0		0	0	0		0	
Reduced v/c Ratio	0.08	0.72		1.56	0.46		0.20	0.03	0.12		0.26	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 13 (10%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.56
 Intersection Signal Delay: 11.5
 Intersection Capacity Utilization 98.5%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service F





















~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 20: Sumter St. & Elmwood Avenue

ρ2 (R)	ρ4
100 s	30 s
ρ6 (R)	ρ8
100 s	30 s

Lanes, Volumes, Timings
21: Barnwell Street & Calhoun St.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened






















												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	400	26	25	305	46	3	16	12	42	10	58
Future Volume (vph)	105	400	26	25	305	46	3	16	12	42	10	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	225		0	125		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	75			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.980			0.937			0.872	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1846	0	1770	1825	0	1770	1745	0	1770	1624	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1846	0	1770	1825	0	1770	1745	0	1770	1624	0
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		336			1005			905			609	
Travel Time (s)		6.5			19.6			17.6			11.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	117	444	29	28	339	51	3	18	13	47	11	64
Shared Lane Traffic (%)												
Lane Group Flow (vph)	117	473	0	28	390	0	3	31	0	47	75	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	45.0%
Analysis Period (min)	15
	ICU Level of Service A

















HCM Unsignalized Intersection Capacity Analysis
 21: Barnwell Street & Calhoun St.

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM Improved - Colonial Widened

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	400	26	25	305	46	3	16	12	42	10	58
Future Volume (Veh/h)	105	400	26	25	305	46	3	16	12	42	10	58
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	117	444	29	28	339	51	3	18	13	47	11	64
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh		2			2							
Upstream signal (ft)		1263										
pX, platoon unblocked				0.89			0.89	0.89	0.89	0.89	0.89	
vC, conflicting volume	390			473			1157	1138	458	1120	1128	364
vC1, stage 1 conf vol							692	692		420	420	
vC2, stage 2 conf vol							464	446		700	707	
vCu, unblocked vol	390			347			1115	1094	330	1074	1082	364
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			97			99	94	98	85	97	91
cM capacity (veh/h)	1169			1079			296	325	633	308	328	680
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	117	473	28	390	3	31	47	75				
Volume Left	117	0	28	0	3	0	47	0				
Volume Right	0	29	0	51	0	13	0	64				
cSH	1169	1700	1079	1700	296	408	308	588				
Volume to Capacity	0.10	0.28	0.03	0.23	0.01	0.08	0.15	0.13				
Queue Length 95th (ft)	8	0	2	0	1	6	13	11				
Control Delay (s)	8.4	0.0	8.4	0.0	17.3	14.5	18.8	12.0				
Lane LOS	A		A		C	B	C	B				
Approach Delay (s)	1.7		0.6		14.8		14.6					
Approach LOS					B		B					
Intersection Summary												
Average Delay			3.0									
Intersection Capacity Utilization			45.0%		ICU Level of Service			A				
Analysis Period (min)			15									

Lanes, Volumes, Timings
23: Bull St. & Access #3

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 		  		 	  
Traffic Volume (vph)	104	28	1848	119	104	2589
Future Volume (vph)	104	28	1848	119	104	2589
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		75	150	
Storage Lanes	2	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.95	0.91	0.91	1.00	0.91
Frt	0.968		0.991			
Flt Protected	0.962				0.950	
Satd. Flow (prot)	3365	0	5040	0	1770	5085
Flt Permitted	0.962				0.057	
Satd. Flow (perm)	3365	0	5040	0	106	5085
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	23		13			
Link Speed (mph)	35		40			40
Link Distance (ft)	526		223			302
Travel Time (s)	10.2		3.8			5.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	116	31	2053	132	116	2877
Shared Lane Traffic (%)						
Lane Group Flow (vph)	147	0	2185	0	116	2877
Turn Type	Prot		NA		D.P+P	NA
Protected Phases	8		2		1	6
Permitted Phases					2	
Detector Phase	8		2		1	6
Switch Phase						
Minimum Initial (s)	6.0		11.0		6.0	11.0
Minimum Split (s)	12.0		17.0		12.0	17.0
Total Split (s)	27.0		78.0		25.0	103.0
Total Split (%)	20.8%		60.0%		19.2%	79.2%
Maximum Green (s)	21.0		72.0		19.0	97.0
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	-2.0		-2.0		-2.0	-2.0
Total Lost Time (s)	4.0		4.0		4.0	4.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		C-Max		None	C-Max
Act Effct Green (s)	12.2		93.9		105.8	109.8
Actuated g/C Ratio	0.09		0.72		0.81	0.84
v/c Ratio	0.44		0.60		0.49	0.67
Control Delay	50.5		23.7		34.7	1.7
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	50.5		23.7		34.7	1.8
LOS	D		C		C	A
Approach Delay	50.5		23.7			3.0
Approach LOS	D		C			A

Lanes, Volumes, Timings
 23: Bull St. & Access #3

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM Improved - Colonial Widened

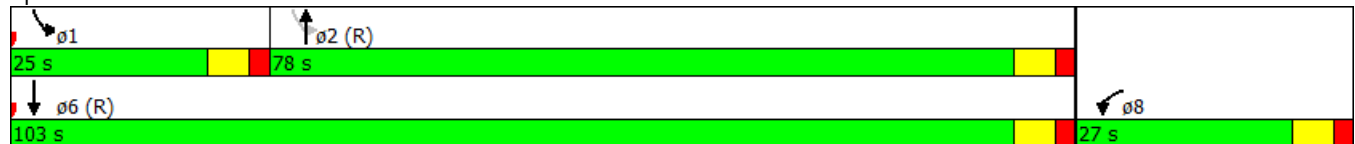


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Length 50th (ft)	51		576		33	43
Queue Length 95th (ft)	84		m616		m92	52
Internal Link Dist (ft)	446		143			222
Turn Bay Length (ft)					150	
Base Capacity (vph)	614		3643		358	4296
Starvation Cap Reductn	0		0		0	105
Spillback Cap Reductn	0		0		0	0
Storage Cap Reductn	0		0		0	0
Reduced v/c Ratio	0.24		0.60		0.32	0.69

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBSB and 6:SBT, Start of 1st Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 12.8
 Intersection Capacity Utilization 61.7%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 23: Bull St. & Access #3



Lanes, Volumes, Timings
25: Access #5 & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

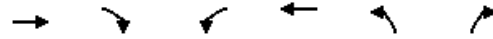
	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↗
Traffic Volume (vph)	497	14	0	276	0	11
Future Volume (vph)	497	14	0	276	0	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		75	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.996					0.865
Flt Protected						
Satd. Flow (prot)	3525	0	0	3539	0	1611
Flt Permitted						
Satd. Flow (perm)	3525	0	0	3539	0	1611
Link Speed (mph)	35			35	35	
Link Distance (ft)	312			348	305	
Travel Time (s)	6.1			6.8	5.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	552	16	0	307	0	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	568	0	0	307	0	12
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 24.2% ICU Level of Service A
 Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
 25: Access #5 & Colonial Drive

























Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM Improved - Colonial Widened



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↗
Traffic Volume (veh/h)	497	14	0	276	0	11
Future Volume (Veh/h)	497	14	0	276	0	11
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	552	16	0	307	0	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)	312		762			
pX, platoon unblocked						
vC, conflicting volume			568		714	284
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			568		714	284
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	98
cM capacity (veh/h)			1000		366	713
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	368	200	154	154	12	
Volume Left	0	0	0	0	0	
Volume Right	0	16	0	0	12	
cSH	1700	1700	1700	1700	713	
Volume to Capacity	0.22	0.12	0.09	0.09	0.02	
Queue Length 95th (ft)	0	0	0	0	1	
Control Delay (s)	0.0	0.0	0.0	0.0	10.1	
Lane LOS					B	
Approach Delay (s)	0.0	0.0		10.1		
Approach LOS					B	
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			24.2%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
 26: Access #6/Mental Health Dwy. & Colonial Drive

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM Improved - Colonial Widened























												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Traffic Volume (vph)	86	414	7	19	258	171	16	0	11	6	0	1
Future Volume (vph)	86	414	7	19	258	171	16	0	11	6	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		0	0		0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.997			0.940			0.850				0.983
Flt Protected	0.950			0.950			0.950					0.958
Satd. Flow (prot)	1770	3529	0	1770	3327	0	1770	1583	0	0	1754	0
Flt Permitted	0.950			0.950			0.950					0.958
Satd. Flow (perm)	1770	3529	0	1770	3327	0	1770	1583	0	0	1754	0
Link Speed (mph)		35			35			35				35
Link Distance (ft)		348			414			406				406
Travel Time (s)		6.8			8.1			7.9				7.9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	96	460	8	21	287	190	18	0	12	7	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	96	468	0	21	477	0	18	12	0	0	8	0
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	32.7%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 26: Access #6/Mental Health Dwy. & Colonial Drive

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM Improved - Colonial Widened

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations		 			 							 		
Traffic Volume (veh/h)	86	414	7	19	258	171	16	0	11	6	0	1		
Future Volume (Veh/h)	86	414	7	19	258	171	16	0	11	6	0	1		
Sign Control	Free			Free			Stop			Stop				
Grade	0%			0%			0%			0%				
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly flow rate (vph)	96	460	8	21	287	190	18	0	12	7	0	1		
Pedestrians														
Lane Width (ft)														
Walking Speed (ft/s)														
Percent Blockage														
Right turn flare (veh)														
Median type	None			None										
Median storage (veh)														
Upstream signal (ft)	660			414										
pX, platoon unblocked	0.91							0.91	0.91			0.91	0.91	0.91
vC, conflicting volume	477				468				842	1175	234	858	1084	238
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	229				468				630	995	234	647	895	0
tC, single (s)	4.1				4.1				7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)														
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92				98				94	100	98	98	100	100
cM capacity (veh/h)	1217				1090				308	200	768	295	229	987
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1					
Volume Total	96	307	161	21	191	286	18	12	8					
Volume Left	96	0	0	21	0	0	18	0	7					
Volume Right	0	0	8	0	0	190	0	12	1					
cSH	1217	1700	1700	1090	1700	1700	308	768	324					
Volume to Capacity	0.08	0.18	0.09	0.02	0.11	0.17	0.06	0.02	0.02					
Queue Length 95th (ft)	6	0	0	1	0	0	5	1	2					
Control Delay (s)	8.2	0.0	0.0	8.4	0.0	0.0	17.4	9.8	16.4					
Lane LOS	A				A				C	A	C			
Approach Delay (s)	1.4				0.4				14.3	16.4				
Approach LOS							B	C						
Intersection Summary														
Average Delay	1.4													
Intersection Capacity Utilization	32.7%			ICU Level of Service			A							
Analysis Period (min)	15													

Lanes, Volumes, Timings
27: Boyce Street & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘	↑↑	↘	↗
Traffic Volume (vph)	388	37	104	418	30	58
Future Volume (vph)	388	37	104	418	30	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		75	100		0	0
Storage Lanes		0	1		1	1
Taper Length (ft)			100		25	
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.987					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3493	0	1770	3539	1770	1583
Flt Permitted			0.273		0.950	
Satd. Flow (perm)	3493	0	509	3539	1770	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	12					64
Link Speed (mph)	35			35	35	
Link Distance (ft)	414			980	814	
Travel Time (s)	8.1			19.1	15.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	431	41	116	464	33	64
Shared Lane Traffic (%)						
Lane Group Flow (vph)	472	0	116	464	33	64
Turn Type	NA		D.P+P	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases			4			2
Detector Phase	4		3	8	2	2
Switch Phase						
Minimum Initial (s)	6.0		6.0	6.0	6.0	6.0
Minimum Split (s)	30.0		17.0	30.0	30.0	30.0
Total Split (s)	51.0		22.0	73.0	34.0	34.0
Total Split (%)	47.7%		20.6%	68.2%	31.8%	31.8%
Maximum Green (s)	45.0		16.0	67.0	28.0	28.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0		-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0		4.0	4.0	4.0	4.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	None	C-Max	C-Max
Act Effct Green (s)	22.1		34.8	38.8	60.2	60.2
Actuated g/C Ratio	0.21		0.33	0.36	0.56	0.56
v/c Ratio	0.64		0.37	0.36	0.03	0.07
Control Delay	41.6		25.1	25.0	13.0	3.9
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	41.6		25.1	25.0	13.0	3.9
LOS	D		C	C	B	A
Approach Delay	41.6			25.0	7.0	
Approach LOS	D			C	A	

Lanes, Volumes, Timings
 27: Boyce Street & Colonial Drive



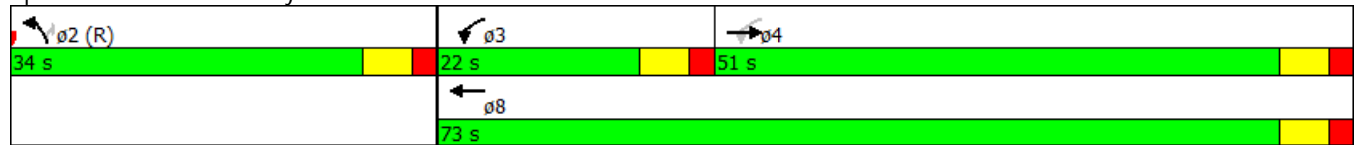
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Queue Length 50th (ft)	153		54	122	10	0
Queue Length 95th (ft)	193		82	141	29	22
Internal Link Dist (ft)	334			900	734	
Turn Bay Length (ft)			100			
Base Capacity (vph)	1541		394	2282	995	918
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.31		0.29	0.20	0.03	0.07

Intersection Summary

Area Type: Other
 Cycle Length: 107
 Actuated Cycle Length: 107
 Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 30.3
 Intersection Capacity Utilization 32.7%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service A

Splits and Phases: 27: Boyce Street & Colonial Drive



Lanes, Volumes, Timings
28: Access #7 & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened







	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↙	↑↑		↗
Traffic Volume (vph)	438	11	22	734	0	12
Future Volume (vph)	438	11	22	734	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		75	100		0	0
Storage Lanes		1	1		0	1
Taper Length (ft)			100		25	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt		0.850				0.865
Flt Protected			0.950			
Satd. Flow (prot)	3539	1583	1770	3539	0	1611
Flt Permitted			0.950			
Satd. Flow (perm)	3539	1583	1770	3539	0	1611
Link Speed (mph)	35			35	35	
Link Distance (ft)	235			355	514	
Travel Time (s)	4.6			6.9	10.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	487	12	24	816	0	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	487	12	24	816	0	13
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 23.6% ICU Level of Service A
 Analysis Period (min) 15













HCM Unsignalized Intersection Capacity Analysis
 28: Access #7 & Colonial Drive

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM Improved - Colonial Widened

							
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	↑↑	↗	↖	↑↑		↗	
Traffic Volume (veh/h)	438	11	22	734	0	12	
Future Volume (Veh/h)	438	11	22	734	0	12	
Sign Control	Free		Free		Stop		
Grade	0%		0%		0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly flow rate (vph)	487	12	24	816	0	13	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None		None				
Median storage (veh)							
Upstream signal (ft)	396		779				
pX, platoon unblocked			0.89		0.94	0.89	
vC, conflicting volume			499		943	244	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			193		343	0	
tC, single (s)			4.1		6.8	6.9	
tC, 2 stage (s)							
tF (s)			2.2		3.5	3.3	
p0 queue free %			98		100	99	
cM capacity (veh/h)			1227		578	966	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	244	244	12	24	408	408	13
Volume Left	0	0	0	24	0	0	0
Volume Right	0	0	12	0	0	0	13
cSH	1700	1700	1700	1227	1700	1700	966
Volume to Capacity	0.14	0.14	0.01	0.02	0.24	0.24	0.01
Queue Length 95th (ft)	0	0	0	1	0	0	1
Control Delay (s)	0.0	0.0	0.0	8.0	0.0	0.0	8.8
Lane LOS				A			A
Approach Delay (s)	0.0			0.2			8.8
Approach LOS							A
Intersection Summary							
Average Delay			0.2				
Intersection Capacity Utilization			23.6%	ICU Level of Service	A		
Analysis Period (min)	15						

Lanes, Volumes, Timings
30: Harden Street Ext & Access #8

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (vph)	0	6	0	1103	1469	45
Future Volume (vph)	0	6	0	1103	1469	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0			75
Storage Lanes	0	1	0			1
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3539	3539	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3539	3539	1583
Link Speed (mph)	30			35	35	
Link Distance (ft)	426			332	512	
Travel Time (s)	9.7			6.5	10.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	7	0	1226	1632	50
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	7	0	1226	1632	50
Sign Control	Stop			Free	Free	













Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 50.6% ICU Level of Service A
 Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis














30: Harden Street Ext & Access #8

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (veh/h)	0	6	0	1103	1469	45
Future Volume (Veh/h)	0	6	0	1103	1469	45
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	7	0	1226	1632	50
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				783	512	
pX, platoon unblocked	0.81	0.78	0.78			
vC, conflicting volume	2245	816	1682			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1712	186	1302			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	66	640	410			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	7	613	613	816	816	50
Volume Left	0	0	0	0	0	0
Volume Right	7	0	0	0	0	50
cSH	640	1700	1700	1700	1700	1700
Volume to Capacity	0.01	0.36	0.36	0.48	0.48	0.03
Queue Length 95th (ft)	1	0	0	0	0	0
Control Delay (s)	10.7	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	10.7	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay	0.0					
Intersection Capacity Utilization	50.6%			ICU Level of Service	A	
Analysis Period (min)	15					

Lanes, Volumes, Timings
31: Harden Street Ext & Access #9

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened














						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (vph)	0	12	22	1103	1441	34
Future Volume (vph)	0	12	22	1103	1441	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			75
Storage Lanes	0	1	1			1
Taper Length (ft)	25		100			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected			0.950			
Satd. Flow (prot)	0	1611	1770	3539	3539	1583
Flt Permitted			0.950			
Satd. Flow (perm)	0	1611	1770	3539	3539	1583
Link Speed (mph)	30			35	35	
Link Distance (ft)	322			451	332	
Travel Time (s)	7.3			8.8	6.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	13	24	1226	1601	38
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	13	24	1226	1601	38
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	49.8%
Analysis Period (min)	15
	ICU Level of Service A













HCM Unsignalized Intersection Capacity Analysis
 31: Harden Street Ext & Access #9

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM Improved - Colonial Widened

							
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations				 	 		
Traffic Volume (veh/h)	0	12	22	1103	1441	34	
Future Volume (Veh/h)	0	12	22	1103	1441	34	
Sign Control	Stop			Free	Free		
Grade	0%			0%	0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly flow rate (vph)	0	13	24	1226	1601	38	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type				None	None		
Median storage (veh)							
Upstream signal (ft)				451	844		
pX, platoon unblocked	0.81	0.78	0.78				
vC, conflicting volume	2262	800	1639				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1709	164	1245				
tC, single (s)	6.8	6.9	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.3	2.2				
p0 queue free %	100	98	94				
cM capacity (veh/h)	63	661	430				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	13	24	613	613	800	800	38
Volume Left	0	24	0	0	0	0	0
Volume Right	13	0	0	0	0	0	38
cSH	661	430	1700	1700	1700	1700	1700
Volume to Capacity	0.02	0.06	0.36	0.36	0.47	0.47	0.02
Queue Length 95th (ft)	2	4	0	0	0	0	0
Control Delay (s)	10.6	13.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	B	B					
Approach Delay (s)	10.6	0.3			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.2				
Intersection Capacity Utilization			49.8%		ICU Level of Service		A
Analysis Period (min)			15				

Lanes, Volumes, Timings
32: Harden Street Ext & Access #10

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	87	40	90	1038	1375	78
Future Volume (vph)	87	40	90	1038	1375	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	200			75
Storage Lanes	1	1	1			1
Taper Length (ft)	25		100			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.950		0.153			
Satd. Flow (perm)	1770	1583	285	3539	3539	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		44				87
Link Speed (mph)	30			35	35	
Link Distance (ft)	333			378	451	
Travel Time (s)	7.6			7.4	8.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	97	44	100	1153	1528	87
Shared Lane Traffic (%)						
Lane Group Flow (vph)	97	44	100	1153	1528	87
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	6.0	6.0	11.0	11.0	11.0	11.0
Minimum Split (s)	12.0	12.0	17.0	17.0	17.0	17.0
Total Split (s)	14.0	14.0	116.0	116.0	116.0	116.0
Total Split (%)	10.8%	10.8%	89.2%	89.2%	89.2%	89.2%
Maximum Green (s)	8.0	8.0	110.0	110.0	110.0	110.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	10.0	10.0	112.0	112.0	112.0	112.0
Actuated g/C Ratio	0.08	0.08	0.86	0.86	0.86	0.86
v/c Ratio	0.71	0.27	0.41	0.38	0.50	0.06
Control Delay	86.2	20.3	21.6	12.5	1.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	86.2	20.3	21.6	12.5	1.1	0.1
LOS	F	C	C	B	A	A
Approach Delay	65.6			13.3	1.0	
Approach LOS	E			B	A	

Lanes, Volumes, Timings
 32: Harden Street Ext & Access #10



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Length 50th (ft)	81	0	59	343	33	0
Queue Length 95th (ft)	#168	38	138	415	27	m0
Internal Link Dist (ft)	253			298	371	
Turn Bay Length (ft)			200			75
Base Capacity (vph)	136	162	245	3048	3048	1375
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.27	0.41	0.38	0.50	0.06

Intersection Summary













Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 9.1 Intersection LOS: A
 Intersection Capacity Utilization 62.2% ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 32: Harden Street Ext & Access #10

 02 (R) 116 s	 04 14 s
 06 (R) 116 s	

Lanes, Volumes, Timings
33: Harden Street Ext & Access #11

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (vph)	0	6	0	1128	1404	11
Future Volume (vph)	0	6	0	1128	1404	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			75
Storage Lanes	0	1	0			1
Taper Length (ft)	25		100			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3539	3539	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3539	3539	1583
Link Speed (mph)	30			35	35	
Link Distance (ft)	385			351	378	
Travel Time (s)	8.8			6.8	7.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	7	0	1253	1560	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	7	0	1253	1560	12
Sign Control	Stop			Free	Free	













Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 48.8% ICU Level of Service A
 Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis













33: Harden Street Ext & Access #11

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (veh/h)	0	6	0	1128	1404	11
Future Volume (Veh/h)	0	6	0	1128	1404	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	7	0	1253	1560	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				1313	378	
pX, platoon unblocked	0.90	0.88	0.88			
vC, conflicting volume	2186	780	1572			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1512	490	1385			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	100			
cM capacity (veh/h)	99	464	434			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	7	626	626	780	780	12
Volume Left	0	0	0	0	0	0
Volume Right	7	0	0	0	0	12
cSH	464	1700	1700	1700	1700	1700
Volume to Capacity	0.02	0.37	0.37	0.46	0.46	0.01
Queue Length 95th (ft)	1	0	0	0	0	0
Control Delay (s)	12.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	12.9	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			48.8%	ICU Level of Service	A	
Analysis Period (min)	15					

Lanes, Volumes, Timings
34: Harden Street Ext & Access #12

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 AM Improved - Colonial Widened













						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (vph)	0	6	22	1128	1399	11
Future Volume (vph)	0	6	22	1128	1399	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0			75
Storage Lanes	0	1	0			1
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected				0.999		
Satd. Flow (prot)	0	1611	0	3536	3539	1583
Flt Permitted				0.999		
Satd. Flow (perm)	0	1611	0	3536	3539	1583
Link Speed (mph)	30			35	35	
Link Distance (ft)	288			472	351	
Travel Time (s)	6.5			9.2	6.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	7	24	1253	1554	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	7	0	1277	1554	12
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 50.2% ICU Level of Service A
 Analysis Period (min) 15



























HCM Unsignalized Intersection Capacity Analysis
 34: Harden Street Ext & Access #12

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 AM Improved - Colonial Widened

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (veh/h)	0	6	22	1128	1399	11
Future Volume (Veh/h)	0	6	22	1128	1399	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	7	24	1253	1554	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				962	729	
pX, platoon unblocked	0.90	0.88	0.88			
vC, conflicting volume	2228	777	1566			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1548	474	1371			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	95			
cM capacity (veh/h)	89	472	437			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	7	442	835	777	777	12
Volume Left	0	24	0	0	0	0
Volume Right	7	0	0	0	0	12
cSH	472	437	1700	1700	1700	1700
Volume to Capacity	0.01	0.05	0.49	0.46	0.46	0.01
Queue Length 95th (ft)	1	4	0	0	0	0
Control Delay (s)	12.7	1.7	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	12.7	0.6		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			50.2%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 		 				 			  	
Traffic Volume (vph)	24	15	20	512	3	263	7	2566	224	83	1229	9
Future Volume (vph)	24	15	20	512	3	263	7	2566	224	83	1229	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		200	675		0	175		0	200		250
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100			75			50			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt		0.915			0.852				0.850		0.999	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3238	0	3433	1587	0	1770	3539	1583	1770	5080	0
Flt Permitted	0.950			0.950			0.197			0.053		
Satd. Flow (perm)	1770	3238	0	3433	1587	0	367	3539	1583	99	5080	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			292				134		1	
Link Speed (mph)		30			40			40			45	
Link Distance (ft)		619			1038			1208			1992	
Travel Time (s)		14.1			17.7			20.6			30.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.90	0.94	0.90
Adj. Flow (vph)	27	17	22	569	3	292	8	2820	246	92	1307	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	39	0	569	295	0	8	2820	246	92	1317	0
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	4	4		3	3			2	3	1	6	
Permitted Phases							2		2	6		
Detector Phase	4	4		3	3		2	2	3	1	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0		11.0	11.0		16.0	16.0	11.0	11.0	16.0	
Minimum Split (s)	30.0	30.0		17.0	17.0		30.0	30.0	17.0	17.0	30.0	
Total Split (s)	30.0	30.0		19.0	19.0		64.0	64.0	19.0	17.0	81.0	
Total Split (%)	23.1%	23.1%		14.6%	14.6%		49.2%	49.2%	14.6%	13.1%	62.3%	
Maximum Green (s)	24.0	24.0		13.0	13.0		58.0	58.0	13.0	11.0	75.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag	Lead	Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	None	None	C-Max	
Walk Time (s)				5.0	5.0				5.0			
Flash Dont Walk (s)				10.0	10.0				10.0			
Pedestrian Calls (#/hr)				0	0				0			
Act Effct Green (s)	20.0	20.0		17.0	17.0		74.4	74.4	93.4	91.4	91.4	
Actuated g/C Ratio	0.15	0.15		0.13	0.13		0.57	0.57	0.72	0.70	0.70	
v/c Ratio	0.10	0.08		1.27	0.64		0.04	1.39	0.21	0.35	0.37	
Control Delay	48.5	26.5		182.1	19.3		6.9	204.2	4.2	18.7	8.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	48.5	26.5		182.1	19.3		6.9	204.2	4.2	18.7	8.8	

Lanes, Volumes, Timings
1: Bull St. & Harden St. Ext.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	C		F	B		A	F	A	B	A	
Approach Delay		35.5			126.6			187.7			9.5	
Approach LOS		D			F			F			A	
Queue Length 50th (ft)	20	6		~318	70		2	~1772	52	25	167	
Queue Length 95th (ft)	49	24		#437	146		m0	#1893	m61	77	194	
Internal Link Dist (ft)		539			958			1128			1912	
Turn Bay Length (ft)	100			675			175			200		
Base Capacity (vph)	381	714		448	461		209	2025	1175	262	3572	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.07	0.05		1.27	0.64		0.04	1.39	0.21	0.35	0.37	

Intersection Summary























Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 119 (92%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.39
 Intersection Signal Delay: 129.7 Intersection LOS: F
 Intersection Capacity Utilization 98.9% ICU Level of Service F
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Bull St. & Harden St. Ext.

01	02 (R)	03	04
17 s	64 s	19 s	30 s
06 (R)			
81 s			

Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	18	12	55	125	51	36	2661	9	7	1700	55
Future Volume (vph)	29	18	12	55	125	51	36	2661	9	7	1700	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	200		0	200		0	150		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			100			100			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Frt		0.941			0.956				0.850		0.995	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1753	0	1770	1781	0	1752	5085	1583	1770	5060	0
Flt Permitted	0.634			0.143			0.067			0.051		
Satd. Flow (perm)	1181	1753	0	266	1781	0	124	5085	1583	95	5060	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		602			376			654			1208	
Travel Time (s)		13.7			8.5			11.1			20.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.93	0.96
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%	2%
Adj. Flow (vph)	32	20	13	61	139	57	40	2801	10	8	1828	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	33	0	61	196	0	40	2801	10	8	1885	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			3			2			6	
Permitted Phases	4			3			2		2	6		
Detector Phase	4	4		3	3		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	30.0	30.0		30.0	30.0		70.0	70.0	70.0	70.0	70.0	
Total Split (%)	23.1%	23.1%		23.1%	23.1%		53.8%	53.8%	53.8%	53.8%	53.8%	
Maximum Green (s)	24.0	24.0		24.0	24.0		64.0	64.0	64.0	64.0	64.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Act Effct Green (s)	20.0	20.0		28.0	28.0		80.4	80.4	80.4	80.4	80.4	
Actuated g/C Ratio	0.15	0.15		0.22	0.22		0.62	0.62	0.62	0.62	0.62	
v/c Ratio	0.18	0.12		1.07	0.51		0.53	0.89	0.01	0.14	0.60	
Control Delay	50.8	48.9		189.4	50.4		31.4	19.0	8.0	13.3	11.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	1.0	0.0	0.0	0.0	
Total Delay	50.8	48.9		189.4	50.4		31.4	20.0	8.0	13.3	11.3	
LOS	D	D		F	D		C	C	A	B	B	
Approach Delay		49.8			83.4			20.1			11.4	

Lanes, Volumes, Timings
2: Bull St. & Confederate Ave.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

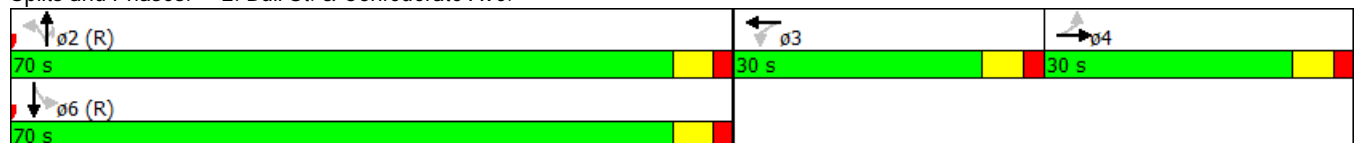
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	D			F			C			B		
Queue Length 50th (ft)	24	24		-57	147		12	781	2	2	209	
Queue Length 95th (ft)	56	57		#153	226		m18	m858	m3	m5	m206	
Internal Link Dist (ft)	522			296			574			1128		
Turn Bay Length (ft)	150			200			200			150		
Base Capacity (vph)	254	377		57	383		76	3144	979	58	3129	
Starvation Cap Reductn	0	0		0	0		0	144	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.13	0.09		1.07	0.51		0.53	0.93	0.01	0.14	0.60	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 88 (68%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.07
 Intersection Signal Delay: 20.4
 Intersection Capacity Utilization 82.2%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service E




















~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bull St. & Confederate Ave.



Lanes, Volumes, Timings
3: Bull St. & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	4	409	7	153	0	2546	290	115	1604	25
Future Volume (vph)	0	0	4	409	7	153	0	2546	290	115	1604	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	150		0	0		0	200		0
Storage Lanes	0		1	0		0	0		0	1		0
Taper Length (ft)	25			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.865		0.925			0.984			0.998	
Flt Protected				0.950	0.977					0.950		
Satd. Flow (prot)	0	0	1611	1681	1599	0	0	5004	0	1770	5075	0
Flt Permitted				0.950	0.977					0.041		
Satd. Flow (perm)	0	0	1611	1681	1599	0	0	5004	0	76	5075	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)			52		9			48				
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		440			446			204			654	
Travel Time (s)		8.6			8.7			3.5			11.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.97	0.90	0.90	0.94	0.90
Adj. Flow (vph)	0	0	4	454	8	170	0	2625	322	128	1706	28
Shared Lane Traffic (%)				36%								
Lane Group Flow (vph)	0	0	4	291	341	0	0	2947	0	128	1734	0
Turn Type			Perm	Perm	NA			NA		Perm	NA	
Protected Phases					8			2			6	
Permitted Phases			4	8						6		
Detector Phase			4	8	8			2		6	6	
Switch Phase												
Minimum Initial (s)			16.0	16.0	16.0			16.0		16.0	16.0	
Minimum Split (s)			30.0	30.0	30.0			30.0		30.0	30.0	
Total Split (s)			30.0	30.0	30.0			100.0		100.0	100.0	
Total Split (%)			23.1%	23.1%	23.1%			76.9%		76.9%	76.9%	
Maximum Green (s)			24.0	24.0	24.0			94.0		94.0	94.0	
Yellow Time (s)			4.0	4.0	4.0			4.0		4.0	4.0	
All-Red Time (s)			2.0	2.0	2.0			2.0		2.0	2.0	
Lost Time Adjust (s)			-4.0	-4.0	-4.0			-4.0		-4.0	-4.0	
Total Lost Time (s)			2.0	2.0	2.0			2.0		2.0	2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)			3.0	3.0	3.0			3.0		3.0	3.0	
Recall Mode			None	None	None			C-Max		C-Max	C-Max	
Act Effct Green (s)			28.0	28.0	28.0			98.0		98.0	98.0	
Actuated g/C Ratio			0.22	0.22	0.22			0.75		0.75	0.75	
v/c Ratio			0.01	0.80	0.97			0.78		2.25	0.45	
Control Delay			0.0	66.1	90.7			11.2		621.2	1.1	
Queue Delay			0.0	0.0	0.0			3.1		0.0	0.0	
Total Delay			0.0	66.1	90.7			14.4		621.2	1.2	
LOS			A	E	F			B		F	A	
Approach Delay					79.4			14.4			43.8	
Approach LOS					E			B			D	

Lanes, Volumes, Timings
3: Bull St. & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)			0	247	295			464		~178	20	
Queue Length 95th (ft)			0	#394	#503			518		m#305	m22	
Internal Link Dist (ft)		360				366		124			574	
Turn Bay Length (ft)				150						200		
Base Capacity (vph)			387	362	351			3784		57	3825	
Starvation Cap Reductn			0	0	0			719		0	228	
Spillback Cap Reductn			0	0	0			373		0	0	
Storage Cap Reductn			0	0	0			0		0	0	
Reduced v/c Ratio			0.01	0.80	0.97			0.96		2.25	0.48	

Intersection Summary





















Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 68 (52%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 2.25
 Intersection Signal Delay: 32.0 Intersection LOS: C
 Intersection Capacity Utilization 95.2% ICU Level of Service F
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Bull St. & Colonial Drive

φ2 (R) 100 s	φ4 30 s
φ6 (R) 100 s	φ8 30 s

Lanes, Volumes, Timings
4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								  			  	
Traffic Volume (vph)	0	0	6	0	0	51	0	2780	70	0	2003	6
Future Volume (vph)	0	0	6	0	0	51	0	2780	70	0	2003	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	50		0
Storage Lanes	0		1	0		1	0		0	0		0
Taper Length (ft)	25			25			75			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.865			0.865		0.996				
Flt Protected												
Satd. Flow (prot)	0	0	1611	0	0	1611	0	5065	0	0	5085	0
Flt Permitted												
Satd. Flow (perm)	0	0	1611	0	0	1611	0	5065	0	0	5085	0
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		519			596			242			224	
Travel Time (s)		10.1			11.6			4.1			3.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.94	0.90
Adj. Flow (vph)	0	0	7	0	0	57	0	2957	78	0	2131	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	7	0	0	57	0	3035	0	0	2138	0
Sign Control		Stop			Stop			Free			Free	





















Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	65.3%
Analysis Period (min)	15
	ICU Level of Service C

HCM Unsignalized Intersection Capacity Analysis















4: Bull St. & Franklin Street /Freed Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								  			  	
Traffic Volume (veh/h)	0	0	6	0	0	51	0	2780	70	0	2003	6
Future Volume (Veh/h)	0	0	6	0	0	51	0	2780	70	0	2003	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.94	0.90
Hourly flow rate (vph)	0	0	7	0	0	57	0	2957	78	0	2131	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
								None			None	
Median storage (veh)												
Upstream signal (ft)												
								242			428	
pX, platoon unblocked	0.52	0.52	0.87	0.52	0.52	0.46	0.87			0.46		
vC, conflicting volume	3177	5170	714	3713	5134	1025	2138			3035		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	328	4139	162	1354	4071	0	1794			1310		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	100	100	89	100			100		
cM capacity (veh/h)	278	1	745	56	1	498	297			241		
Direction, Lane #												
	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	7	57	1183	1183	669	852	852	433				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	7	57	0	0	78	0	0	7				
cSH	745	498	1700	1700	1700	1700	1700	1700				
Volume to Capacity	0.01	0.11	0.70	0.70	0.39	0.50	0.50	0.25				
Queue Length 95th (ft)	1	10	0	0	0	0	0	0				
Control Delay (s)	9.9	13.2	0.0	0.0	0.0	0.0	0.0	0.0				
Lane LOS												
Approach Delay (s)	9.9	13.2	0.0			0.0						
Approach LOS												
	A	B										
	A	B										
Intersection Summary												
Average Delay			0.2									
Intersection Capacity Utilization			65.3%			ICU Level of Service				C		
Analysis Period (min)			15									

Lanes, Volumes, Timings
5: Bull St. & Jefferson Street

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened
















						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				  	  	
Traffic Volume (vph)	0	28	18	2920	2080	17
Future Volume (vph)	0	28	18	2920	2080	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	175			0
Storage Lanes	0	1	1			0
Taper Length (ft)	25		100			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Frt		0.865			0.999	
Flt Protected			0.950			
Satd. Flow (prot)	0	1611	1770	5085	5080	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	1611	1770	5085	5080	0
Link Speed (mph)	35			40	40	
Link Distance (ft)	257			774	213	
Travel Time (s)	5.0			13.2	3.6	
Peak Hour Factor	0.90	0.90	0.90	0.95	0.96	0.90
Adj. Flow (vph)	0	31	20	3074	2167	19
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	31	20	3074	2186	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	59.8%
Analysis Period (min)	15
	ICU Level of Service B

HCM Unsignalized Intersection Capacity Analysis
 5: Bull St. & Jefferson Street

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 PM Improved - Colonial Widened

									
Movement	EBL	EBR	NBL	NBT	SBT	SBR			
Lane Configurations				  	  				
Traffic Volume (veh/h)	0	28	18	2920	2080	17			
Future Volume (Veh/h)	0	28	18	2920	2080	17			
Sign Control	Stop			Free	Free				
Grade	0%			0%	0%				
Peak Hour Factor	0.90	0.90	0.90	0.95	0.96	0.90			
Hourly flow rate (vph)	0	31	20	3074	2167	19			
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type				None	None				
Median storage (veh)									
Upstream signal (ft)				774	213				
pX, platoon unblocked	0.82	0.88	0.88						
vC, conflicting volume	3241	732	2186						
vC1, stage 1 conf vol									
vC2, stage 2 conf vol									
vCu, unblocked vol	1984	224	1874						
tC, single (s)	6.8	6.9	4.1						
tC, 2 stage (s)									
tF (s)	3.5	3.3	2.2						
p0 queue free %	100	95	93						
cM capacity (veh/h)	41	687	279						
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	
Volume Total	31	20	1025	1025	1025	867	867	452	
Volume Left	0	20	0	0	0	0	0	0	
Volume Right	31	0	0	0	0	0	0	19	
cSH	687	279	1700	1700	1700	1700	1700	1700	
Volume to Capacity	0.05	0.07	0.60	0.60	0.60	0.51	0.51	0.27	
Queue Length 95th (ft)	4	6	0	0	0	0	0	0	
Control Delay (s)	10.5	18.9	0.0	0.0	0.0	0.0	0.0	0.0	
Lane LOS	B	C							
Approach Delay (s)	10.5	0.1					0.0		
Approach LOS	B								
Intersection Summary									
Average Delay			0.1						
Intersection Capacity Utilization			59.8%	ICU Level of Service	B				
Analysis Period (min)			15						

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1422	452	559	149	339	256	492	1282	129	63	716	1311
Future Volume (vph)	1422	452	559	149	339	256	492	1282	129	63	716	1311
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	775		250	125		0	175		0	100		0
Storage Lanes	1		1	1		0	1		0	1		1
Taper Length (ft)	50			50			125			50		
Lane Util. Factor	0.91	0.91	0.88	0.95	0.95	0.95	0.97	0.91	0.91	1.00	0.95	1.00
Frt			0.850		0.948			0.986				0.850
Flt Protected	0.950	0.971			0.990		0.950			0.950		
Satd. Flow (prot)	1610	3292	2787	0	3322	0	3433	5014	0	1770	3539	1583
Flt Permitted	0.950	0.971			0.990		0.950			0.105		
Satd. Flow (perm)	1610	3292	2787	0	3322	0	3433	5014	0	196	3539	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			40	
Link Distance (ft)		1012			282			526			774	
Travel Time (s)		23.0			6.4			12.0			13.2	
Peak Hour Factor	0.98	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1451	502	621	166	377	284	541	1424	143	70	796	1457
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	725	1228	621	0	827	0	541	1567	0	70	796	1457
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Perm	NA	Free
Protected Phases	4	4	5	3	3		5	2			6	
Permitted Phases			4							6		Free
Detector Phase	4	4	5	3	3		5	2		6	6	
Switch Phase												
Minimum Initial (s)	16.0	16.0	11.0	11.0	11.0		11.0	16.0		16.0	16.0	
Minimum Split (s)	30.0	30.0	17.0	17.0	17.0		17.0	30.0		30.0	30.0	
Total Split (s)	45.0	45.0	19.0	26.0	26.0		19.0	59.0		40.0	40.0	
Total Split (%)	34.6%	34.6%	14.6%	20.0%	20.0%		14.6%	45.4%		30.8%	30.8%	
Maximum Green (s)	39.0	39.0	13.0	20.0	20.0		13.0	53.0		34.0	34.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0	-4.0		-4.0		-4.0	-4.0		-4.0	-4.0	
Total Lost Time (s)	2.0	2.0	2.0		2.0		2.0	2.0		2.0	2.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead		Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		C-Max	C-Max	
Act Effct Green (s)	43.0	43.0	62.0		24.0		17.0	57.0		38.0	38.0	130.0
Actuated g/C Ratio	0.33	0.33	0.48		0.18		0.13	0.44		0.29	0.29	1.00
v/c Ratio	1.36	1.31dl	0.47		1.35		1.21	0.71		1.23	0.77	0.92
Control Delay	202.4	99.6	13.4		208.3		151.2	24.7		233.6	47.9	11.3
Queue Delay	0.0	0.0	0.0		0.0		0.0	1.4		0.0	0.0	0.0
Total Delay	202.4	99.6	13.4		208.3		151.2	26.1		233.6	47.9	11.3
LOS	F	F	B		F		F	C		F	D	B
Approach Delay		107.7			208.3			58.2			30.6	
Approach LOS		F			F			E			C	

Lanes, Volumes, Timings
6: Bull St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

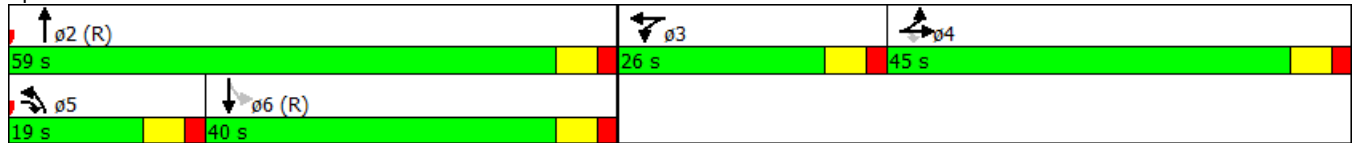
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	-879	-652	163		-479		-282	393		-72	322	0
Queue Length 95th (ft)	#1145	#800	209		#609		m#395	m393		#174	400	#44
Internal Link Dist (ft)		932			202			446			694	
Turn Bay Length (ft)	775		250				175			100		
Base Capacity (vph)	532	1088	1329		613		448	2198		57	1034	1583
Starvation Cap Reductn	0	0	0		0		0	401		0	0	0
Spillback Cap Reductn	0	0	0		0		0	0		0	0	0
Storage Cap Reductn	0	0	0		0		0	0		0	0	0
Reduced v/c Ratio	1.36	1.13	0.47		1.35		1.21	0.87		1.23	0.77	0.92

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 100 (77%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.36
 Intersection Signal Delay: 82.1
 Intersection Capacity Utilization 115.6%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service H


























~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 6: Bull St. & Elmwood Avenue



Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Traffic Volume (vph)	85	247	29	89	347	184	34	1726	84	105	1227	85
Future Volume (vph)	85	247	29	89	347	184	34	1726	84	105	1227	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	50			50			75			75		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.984			0.948			0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3483	0	1770	3355	0	1770	3514	0	1770	3539	1583
Flt Permitted	0.192			0.436			0.157			0.054		
Satd. Flow (perm)	358	3483	0	812	3355	0	292	3514	0	101	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			33			10				94
Link Speed (mph)		30			30			30				30
Link Distance (ft)		937			677			1883				526
Travel Time (s)		21.3			15.4			42.8				12.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.92	0.90
Adj. Flow (vph)	94	274	32	99	386	204	38	1856	93	117	1334	94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	94	306	0	99	590	0	38	1949	0	117	1334	94
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	16.0
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	30.0
Total Split (s)	35.0	35.0		35.0	35.0		95.0	95.0		95.0	95.0	95.0
Total Split (%)	26.9%	26.9%		26.9%	26.9%		73.1%	73.1%		73.1%	73.1%	73.1%
Maximum Green (s)	29.0	29.0		29.0	29.0		89.0	89.0		89.0	89.0	89.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Act Effect Green (s)	33.0	33.0		33.0	33.0		93.0	93.0		93.0	93.0	93.0
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.72	0.72		0.72	0.72	0.72
v/c Ratio	1.04	0.34		0.48	0.67		0.18	0.77		1.62	0.53	0.08
Control Delay	155.2	39.7		50.4	45.6		8.5	14.5		343.6	5.5	0.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.1		0.0	0.2	0.0
Total Delay	155.2	39.7		50.4	45.6		8.5	14.5		343.6	5.8	0.2
LOS	F	D		D	D		A	B		F	A	A
Approach Delay		66.8			46.3			14.4			31.0	
Approach LOS		E			D			B			C	

Lanes, Volumes, Timings
7: Bull St. & Calhoun St.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	-85	107		71	223		9	492		-136	203	0
Queue Length 95th (ft)	#201	151		133	290		25	587		m#202	m193	m0
Internal Link Dist (ft)		857			597			1803			446	
Turn Bay Length (ft)	150			175			150			150		
Base Capacity (vph)	90	890		206	876		208	2516		72	2531	1159
Starvation Cap Reductn	0	0		0	0		0	0		0	451	0
Spillback Cap Reductn	0	0		0	0		0	31		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.04	0.34		0.48	0.67		0.18	0.78		1.63	0.64	0.08

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 72 (55%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.63
 Intersection Signal Delay: 29.3 Intersection LOS: C
 Intersection Capacity Utilization 105.9% ICU Level of Service G
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.





























Splits and Phases: 7: Bull St. & Calhoun St.

ρ2 (R)	ρ4
95 s	35 s
ρ6 (R)	ρ8
95 s	35 s

Lanes, Volumes, Timings

Bull Street Commons Traffic Study

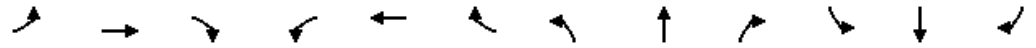
9: Harden Street Ext/Harden St. Ext. & Colonial Drive 2020 Build-Out Phase 3 PM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 		 	 			 		 	 	
Traffic Volume (vph)	44	673	152	559	513	53	97	394	1114	75	540	43
Future Volume (vph)	44	673	152	559	513	53	97	394	1114	75	540	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		800	175		0	225		0	300		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	100			75			75			100		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.972			0.986				0.850		0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3440	0	3433	3490	0	1770	3539	1583	1770	3498	0
Flt Permitted	0.413			0.950			0.285			0.411		
Satd. Flow (perm)	769	3440	0	3433	3490	0	531	3539	1583	766	3498	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			15				584		7	
Link Speed (mph)		35			35			35			40	
Link Distance (ft)		736			309			498			1949	
Travel Time (s)		14.3			6.0			9.7			33.2	
Peak Hour Factor	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Adj. Flow (vph)	49	748	169	601	570	59	108	438	1173	83	600	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	917	0	601	629	0	108	438	1173	83	648	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Free	Perm	NA	
Protected Phases		8		7	4			6				2
Permitted Phases	8						6		Free	2		
Detector Phase	8	8		7	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	16.0	16.0		11.0	16.0		16.0	16.0		16.0	16.0	
Minimum Split (s)	30.0	30.0		17.0	30.0		30.0	30.0		30.0	30.0	
Total Split (s)	50.0	50.0		29.0	79.0		51.0	51.0		51.0	51.0	
Total Split (%)	38.5%	38.5%		22.3%	60.8%		39.2%	39.2%		39.2%	39.2%	
Maximum Green (s)	44.0	44.0		23.0	73.0		45.0	45.0		45.0	45.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	43.8	43.8		26.8	72.6		53.4	53.4	130.0	53.4	53.4	
Actuated g/C Ratio	0.34	0.34		0.21	0.56		0.41	0.41	1.00	0.41	0.41	
v/c Ratio	0.19	0.78		0.85	0.32		0.50	0.30	0.74	0.26	0.45	
Control Delay	31.2	42.7		72.0	10.0		34.3	25.3	11.2	34.7	34.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	31.2	42.7		72.0	10.0		34.3	25.3	11.2	34.7	34.4	
LOS	C	D		E	A		C	C	B	C	C	
Approach Delay		42.1			40.3			16.2			34.5	

Lanes, Volumes, Timings

Bull Street Commons Traffic Study

9: Harden Street Ext/Harden St. Ext. & Colonial Drive 2020 Build-Out Phase 3 PM Improved - Colonial Widened



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			B			C	
Queue Length 50th (ft)	29	353		273	100		45	94	694	57	246	
Queue Length 95th (ft)	60	416		#348	160		m85	148	973	109	313	
Internal Link Dist (ft)		656			229			418			1869	
Turn Bay Length (ft)	225			175			225			300		
Base Capacity (vph)	283	1285		713	2073		218	1453	1583	314	1441	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.17	0.71		0.84	0.30		0.50	0.30	0.74	0.26	0.45	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 95 (73%), Referenced to phase 2:SBTL and 6:NBTL, Start of 1st Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 30.8

Intersection LOS: C

Intersection Capacity Utilization 82.4%

ICU Level of Service E

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.























m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive



Lanes, Volumes, Timings
10: Harden St./Harden Street Ext & Calhoun St.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	140	58	291	22	39	11	293	1172	46	59	1060	82
Future Volume (vph)	140	58	291	22	39	11	293	1172	46	59	1060	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	50		0	0		325	300		200
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	100			25			25			200		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Frt		0.875			0.967			0.994				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1630	0	1770	1801	0	1770	5055	0	1770	3539	1583
Flt Permitted	0.721			0.174			0.143			0.187		
Satd. Flow (perm)	1343	1630	0	324	1801	0	266	5055	0	348	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		183			10			8				122
Link Speed (mph)		30			35			35			35	
Link Distance (ft)		1071			821			1286			332	
Travel Time (s)		24.3			16.0			25.1			6.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	156	64	323	24	43	12	326	1302	51	66	1178	91
Shared Lane Traffic (%)												
Lane Group Flow (vph)	156	387	0	24	55	0	326	1353	0	66	1178	91
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	1.0	1.0		11.0	11.0		9.0	14.0		9.0	14.0	14.0
Minimum Split (s)	6.5	6.5		30.0	30.0		15.0	30.0		15.0	30.0	30.0
Total Split (s)	36.2	36.2		36.2	36.2		33.0	78.8		15.0	60.8	60.8
Total Split (%)	27.8%	27.8%		27.8%	27.8%		25.4%	60.6%		11.5%	46.8%	46.8%
Maximum Green (s)	30.7	30.7		30.7	30.7		27.0	72.8		9.0	54.8	54.8
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.5	1.5		1.5	1.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	0.0		0.0	0.0		-3.0	-3.0		0.0	-3.0	-3.0
Total Lost Time (s)	2.5	5.5		5.5	5.5		3.0	3.0		6.0	3.0	3.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Act Effect Green (s)	26.0	23.0		23.0	23.0		98.5	86.5		78.1	72.1	72.1
Actuated g/C Ratio	0.20	0.18		0.18	0.18		0.76	0.67		0.60	0.55	0.55
v/c Ratio	0.58	0.88		0.42	0.17		0.69	0.40		0.21	0.60	0.10
Control Delay	54.5	48.1		67.3	36.1		22.8	11.8		9.5	14.0	3.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	54.5	48.1		67.3	36.1		22.8	11.8		9.5	14.0	3.0
LOS	D	D		E	D		C	B		A	B	A
Approach Delay		50.0			45.6			14.0			13.0	
Approach LOS		D			D			B			B	

Lanes, Volumes, Timings
 10: Harden St./Harden Street Ext & Calhoun St.

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 PM Improved - Colonial Widened

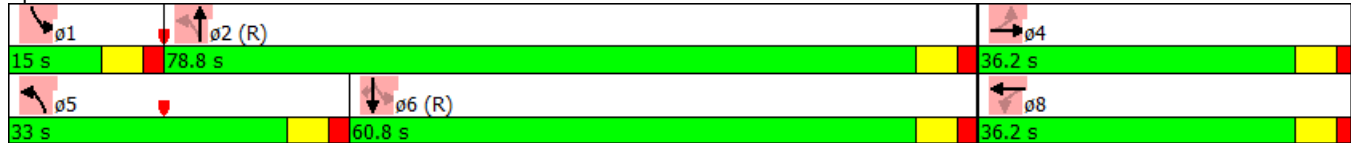
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	118	175		18	32		112	195		10	296	4
Queue Length 95th (ft)	181	287		47	66		227	261		39	415	38
Internal Link Dist (ft)		991			741			1206			252	
Turn Bay Length (ft)	225			50						300		200
Base Capacity (vph)	348	524		76	432		548	3364		307	1962	932
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.45	0.74		0.32	0.13		0.59	0.40		0.21	0.60	0.10

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 34 (26%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.88
 Intersection Signal Delay: 19.7
 Intersection Capacity Utilization 77.8%
 Analysis Period (min) 15




















Intersection LOS: B
 ICU Level of Service D

Splits and Phases: 10: Harden St./Harden Street Ext & Calhoun St.



Lanes, Volumes, Timings
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 PM Improved - Colonial Widened





















												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	370	10	6	306	103	17	24	20	81	41	125
Future Volume (vph)	94	370	10	6	306	103	17	24	20	81	41	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	275		0	0		0	300		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	100			100			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.962			0.956			0.887	
Flt Protected	0.950			0.950				0.986		0.950		
Satd. Flow (prot)	1770	1851	0	1770	1792	0	0	1756	0	1770	1652	0
Flt Permitted	0.950			0.950				0.986		0.950		
Satd. Flow (perm)	1770	1851	0	1770	1792	0	0	1756	0	1770	1652	0
Link Speed (mph)		35			30			35		35		35
Link Distance (ft)		763			1071			385			2969	
Travel Time (s)		14.9			24.3			7.5			57.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	11%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	104	411	11	7	340	114	19	27	22	90	46	139
Shared Lane Traffic (%)												
Lane Group Flow (vph)	104	422	0	7	454	0	0	68	0	90	185	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	54.2%
Analysis Period (min)	15
	ICU Level of Service A

























HCM Unsignalized Intersection Capacity Analysis
 11: Gregg Street/Gregg Street & Calhoun St.

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 PM Improved - Colonial Widened

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	94	370	10	6	306	103	17	24	20	81	41	125
Future Volume (Veh/h)	94	370	10	6	306	103	17	24	20	81	41	125
Sign Control	Free		Free		Stop		Stop					
Grade	0%		0%		0%		0%					
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	104	411	11	7	340	114	19	27	22	90	46	139
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	TWLTL				TWLTL							
Median storage veh	2				2							
Upstream signal (ft)	763				1071							
pX, platoon unblocked	0.95		0.86		0.88		0.88		0.86		0.88	
vC, conflicting volume	454		422		1140		1092		416		1066	
vC1, stage 1 conf vol					624		624		411		411	
vC2, stage 2 conf vol					516		468		654		630	
vCu, unblocked vol	400		243		967		912		237		882	
tC, single (s)	4.1		4.1		7.1		6.5		6.2		7.1	
tC, 2 stage (s)					6.1		5.5		6.1		5.5	
tF (s)	2.2		2.2		3.5		4.0		3.3		3.5	
p0 queue free %	91		99		93		92		97		74	
cM capacity (veh/h)	1102		1135		265		359		688		348	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2					
Volume Total	104	422	7	454	68	90	185					
Volume Left	104	0	7	0	19	90	0					
Volume Right	0	11	0	114	22	0	139					
cSH	1102	1700	1135	1700	380	348	564					
Volume to Capacity	0.09	0.25	0.01	0.27	0.18	0.26	0.33					
Queue Length 95th (ft)	8	0	0	0	16	25	36					
Control Delay (s)	8.6	0.0	8.2	0.0	16.5	18.9	14.5					
Lane LOS	A		A		C	C	B					
Approach Delay (s)	1.7		0.1		16.5	15.9						
Approach LOS					C	C						
Intersection Summary												
Average Delay			4.9									
Intersection Capacity Utilization			54.2%		ICU Level of Service						A	
Analysis Period (min)			15									

Lanes, Volumes, Timings
12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Traffic Volume (vph)	1	515	61	159	526	10	60	2	200	39	12	29
Future Volume (vph)	1	515	61	159	526	10	60	2	200	39	12	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		225	50		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.984			0.997			0.851			0.893	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3461	0	1770	3529	0	1703	1585	0	1770	1663	0
Flt Permitted	0.427			0.209			0.728			0.592		
Satd. Flow (perm)	795	3461	0	389	3529	0	1305	1585	0	1103	1663	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			3			222			32	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		949			210			2969			473	
Travel Time (s)		18.5			4.1			57.8			9.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90
Heavy Vehicles (%)	2%	2%	8%	2%	2%	2%	6%	2%	2%	2%	2%	2%
Adj. Flow (vph)	1	572	68	177	584	11	67	2	222	43	13	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	640	0	177	595	0	67	224	0	43	45	0
Turn Type	Perm	NA		D.P+P	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			4			2			6		
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Minimum Split (s)	30.0	30.0		17.0	30.0		30.0	30.0		30.0	30.0	
Total Split (s)	58.0	58.0		17.0	75.0		32.0	32.0		32.0	32.0	
Total Split (%)	54.2%	54.2%		15.9%	70.1%		29.9%	29.9%		29.9%	29.9%	
Maximum Green (s)	52.5	52.5		11.5	69.5		26.5	26.5		26.5	26.5	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.5	5.5		5.5	5.5		5.5	5.5		5.5	5.5	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	26.6	26.6		38.0	43.5		52.5	52.5		52.5	52.5	
Actuated g/C Ratio	0.25	0.25		0.36	0.41		0.49	0.49		0.49	0.49	
v/c Ratio	0.01	0.73		0.62	0.41		0.10	0.25		0.08	0.05	
Control Delay	27.0	40.8		30.2	22.9		17.1	3.3		17.2	8.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	27.0	40.8		30.2	22.9		17.1	3.3		17.2	8.2	
LOS	C	D		C	C		B	A		B	A	
Approach Delay		40.8			24.6			6.5			12.6	

Lanes, Volumes, Timings
12: Gregg Street & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

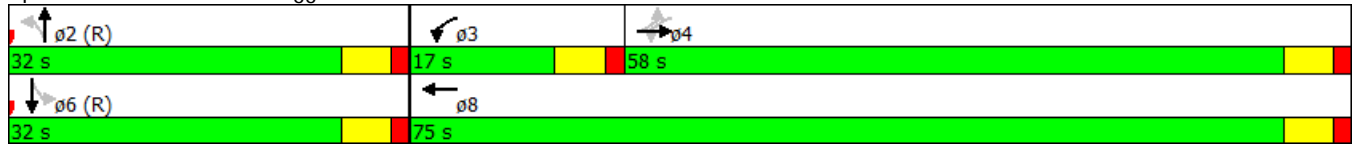
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	D			C			A			B		
Queue Length 50th (ft)	1	207		79	150		24	1		15	4	
Queue Length 95th (ft)	5	247		114	173		56	45		40	26	
Internal Link Dist (ft)	869			130			2889			393		
Turn Bay Length (ft)	100			100						50		
Base Capacity (vph)	390	1706		286	2293		640	891		541	832	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.00	0.38		0.62	0.26		0.10	0.25		0.08	0.05	

Intersection Summary

Area Type: Other
 Cycle Length: 107
 Actuated Cycle Length: 107
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 26.9
 Intersection Capacity Utilization 65.3%
 Analysis Period (min) 15












Intersection LOS: C
ICU Level of Service C

Splits and Phases: 12: Gregg Street & Colonial Drive



Lanes, Volumes, Timings
13: Harden Street Ext & Slighs Ave.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	84	215	1307	70	130	1140
Future Volume (vph)	84	215	1307	70	130	1140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		50	100	
Storage Lanes	1	0		1	1	
Taper Length (ft)	25				50	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	0.903			0.850		
Flt Protected	0.986				0.950	
Satd. Flow (prot)	1659	0	3539	1495	1736	3539
Flt Permitted	0.986				0.105	
Satd. Flow (perm)	1659	0	3539	1495	192	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	96			20		
Link Speed (mph)	30		35			35
Link Distance (ft)	359		632			498
Travel Time (s)	8.2		12.3			9.7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.91
Heavy Vehicles (%)	2%	2%	2%	8%	4%	2%
Adj. Flow (vph)	93	239	1452	78	144	1253
Shared Lane Traffic (%)						
Lane Group Flow (vph)	332	0	1452	78	144	1253
Turn Type	Perm		NA	Perm	pm+pt	NA
Protected Phases			6		5	2
Permitted Phases	8			6	2	
Detector Phase	8		6	6	5	2
Switch Phase						
Minimum Initial (s)	11.0		16.0	16.0	11.0	16.0
Minimum Split (s)	30.0		30.0	30.0	17.0	30.0
Total Split (s)	35.0		78.0	78.0	17.0	95.0
Total Split (%)	26.9%		60.0%	60.0%	13.1%	73.1%
Maximum Green (s)	29.5		72.0	72.0	11.0	89.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	1.5		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0		-4.0	-2.0	-4.0	-4.0
Total Lost Time (s)	1.5		2.0	4.0	2.0	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		C-Max	C-Max	None	C-Max
Act Effct Green (s)	27.7		81.8	79.8	98.8	98.8
Actuated g/C Ratio	0.21		0.63	0.61	0.76	0.76
v/c Ratio	0.78		0.65	0.08	0.44	0.47
Control Delay	46.1		11.6	4.4	21.3	3.0
Queue Delay	0.0		0.0	0.0	0.0	0.1
Total Delay	46.1		11.6	4.4	21.3	3.1
LOS	D		B	A	C	A
Approach Delay	46.1		11.3			4.9

Lanes, Volumes, Timings
 13: Harden Street Ext & Slighs Ave.



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	D		B			A
Queue Length 50th (ft)	190		355	8	37	57
Queue Length 95th (ft)	290		452	22	m73	108
Internal Link Dist (ft)	279		552			418
Turn Bay Length (ft)				50	100	
Base Capacity (vph)	498		2227	925	324	2690
Starvation Cap Reductn	0		0	0	0	389
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.67		0.65	0.08	0.44	0.54

Intersection Summary














Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 86 (66%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 12.1
 Intersection Capacity Utilization 73.2%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 13: Harden Street Ext & Slighs Ave.



Lanes, Volumes, Timings
14: Colonial Drive & Farrow Road

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

							ø6
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		 		 	 		
Traffic Volume (vph)	0	190	287	1459	850	26	
Future Volume (vph)	0	190	287	1459	850	26	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0	330	550			0	
Storage Lanes	0	1	1			0	
Taper Length (ft)	25		125				
Lane Util. Factor	1.00	0.88	1.00	0.95	0.95	0.95	
Frt		0.850			0.995		
Flt Protected			0.950				
Satd. Flow (prot)	0	2787	1770	3539	3522	0	
Flt Permitted			0.950				
Satd. Flow (perm)	0	2787	1770	3539	3522	0	
Right Turn on Red		Yes				No	
Satd. Flow (RTOR)		172					
Link Speed (mph)	35			35	35		
Link Distance (ft)	1114			689	2010		
Travel Time (s)	21.7			13.4	39.2		
Peak Hour Factor	0.90	0.90	0.96	0.90	0.92	0.90	
Adj. Flow (vph)	0	211	299	1621	924	29	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	211	299	1621	953	0	
Turn Type		Over	Prot	NA	NA		
Protected Phases		8	8	8 6	2	6	
Permitted Phases				8			
Detector Phase		8	8	8 6	2		
Switch Phase							
Minimum Initial (s)		16.0	16.0		16.0	11.0	
Minimum Split (s)		30.0	30.0		30.0	30.0	
Total Split (s)		30.0	30.0		35.0	35.0	
Total Split (%)		46.2%	46.2%		53.8%	54%	
Maximum Green (s)		24.0	24.0		29.0	29.5	
Yellow Time (s)		4.0	4.0		4.0	4.0	
All-Red Time (s)		2.0	2.0		2.0	1.5	
Lost Time Adjust (s)		-3.0	-3.0		-4.0		
Total Lost Time (s)		3.0	3.0		2.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0	3.0		3.0	3.0	
Recall Mode		None	None		C-Max	C-Max	
Act Effct Green (s)		24.9	24.9	65.0	35.1		
Actuated g/C Ratio		0.38	0.38	1.00	0.54		
v/c Ratio		0.18	0.44	0.46	0.50		
Control Delay		3.8	12.2	0.3	11.9		
Queue Delay		0.0	0.0	0.0	0.0		
Total Delay		3.8	12.2	0.3	11.9		
LOS		A	B	A	B		
Approach Delay				2.1	11.9		
Approach LOS				A	B		

Lanes, Volumes, Timings
 14: Colonial Drive & Farrow Road

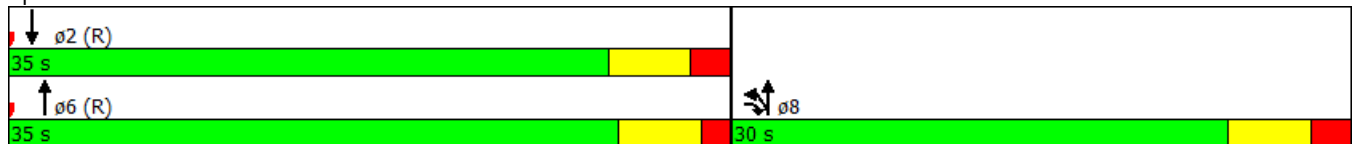


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Queue Length 50th (ft)		5	115	0	146		
Queue Length 95th (ft)		23	m138	0	m215		
Internal Link Dist (ft)	1034			609	1930		
Turn Bay Length (ft)		330	550				
Base Capacity (vph)		1258	735	3539	1903		
Starvation Cap Reductn		0	0	0	0		
Spillback Cap Reductn		0	0	0	0		
Storage Cap Reductn		0	0	0	0		
Reduced v/c Ratio		0.17	0.41	0.46	0.50		

Intersection Summary




























Area Type: Other
 Cycle Length: 65
 Actuated Cycle Length: 65
 Offset: 42 (65%), Referenced to phase 2:SBT and 6:NBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.50
 Intersection Signal Delay: 5.3
 Intersection Capacity Utilization 46.9%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: Colonial Drive & Farrow Road



Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 		 	 			 			 	
Traffic Volume (vph)	94	564	12	212	531	395	0	1428	321	294	726	51
Future Volume (vph)	94	564	12	212	531	395	0	1428	321	294	726	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		0	300		0	0		225	200		0
Storage Lanes	1		0	2		1	0		1	1		0
Taper Length (ft)	125			100			25			125		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.997				0.850			0.850		0.990	
Flt Protected	0.950			0.950						0.950		
Satd. Flow (prot)	1770	3529	0	3433	3539	1583	0	3539	1583	1770	3504	0
Flt Permitted	0.429			0.950						0.067		
Satd. Flow (perm)	799	3529	0	3433	3539	1583	0	3539	1583	125	3504	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				17			143		9	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1548			1446			2010			864	
Travel Time (s)		30.2			28.2			39.2			16.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	0.94	0.90	0.90
Adj. Flow (vph)	104	627	13	236	590	439	0	1587	334	313	807	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	104	640	0	236	590	439	0	1587	334	313	864	0
Turn Type	Perm	NA		Prot	NA	pm+ov		NA	Free	pm+pt	NA	
Protected Phases		4		3	8	1		2		1	6	
Permitted Phases	4					8			Free	6		
Detector Phase	4	4		3	8	1		2		1	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0	5.0		15.0		5.0	15.0	
Minimum Split (s)	30.0	30.0		21.0	41.0	17.0		41.0		17.0	30.0	
Total Split (s)	30.0	30.0		21.0	51.0	19.0		60.0		19.0	79.0	
Total Split (%)	23.1%	23.1%		16.2%	39.2%	14.6%		46.2%		14.6%	60.8%	
Maximum Green (s)	25.0	25.0		16.0	46.0	14.0		55.0		14.0	74.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5		3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5	1.5		1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0		-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead		Lead		Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Recall Mode	None	None		None	None	None		C-Min		None	C-Min	
Walk Time (s)				18.0				18.0				
Flash Dont Walk (s)				5.0				5.0				
Pedestrian Calls (#/hr)				0				0				
Act Effct Green (s)	26.2	26.2		16.3	46.5	66.0		56.0	130.0	75.5	75.5	
Actuated g/C Ratio	0.20	0.20		0.13	0.36	0.51		0.43	1.00	0.58	0.58	
v/c Ratio	0.65	0.90		0.55	0.47	0.54		1.04	0.21	1.17	0.42	
Control Delay	67.6	67.2		58.5	33.5	23.8		72.1	0.3	151.2	11.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	67.6	67.2		58.5	33.5	23.8		72.1	0.3	151.2	11.4	

Lanes, Volumes, Timings
15: Farrow Road & Beltline Blvd

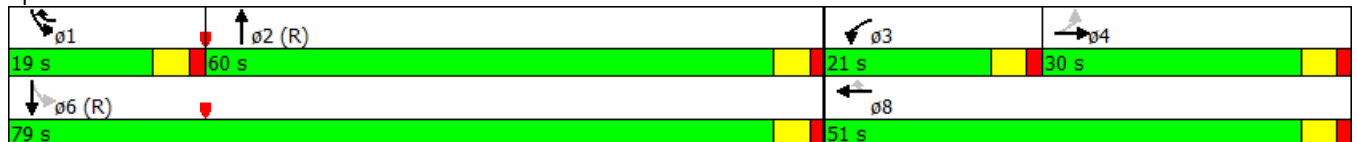
Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	E		E	C	C		E	A	F	B	
Approach Delay		67.3			34.8			59.6			48.6	
Approach LOS		E			C			E			D	
Queue Length 50th (ft)	81	276		97	199	234		-765	0	-278	170	
Queue Length 95th (ft)	#163	#387		140	254	336		#910	0	#467	171	
Internal Link Dist (ft)		1468			1366			1930			784	
Turn Bay Length (ft)	175			300					225	200		
Base Capacity (vph)	162	718		448	1279	812		1524	1583	267	2037	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.64	0.89		0.53	0.46	0.54		1.04	0.21	1.17	0.42	

Intersection Summary




















Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.17
 Intersection Signal Delay: 52.0 Intersection LOS: D
 Intersection Capacity Utilization 97.6% ICU Level of Service F
 Analysis Period (min) 15
 ~ 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: 15: Farrow Road & Beltline Blvd



Lanes, Volumes, Timings
16: Farrow Road & 277 NB RAMPS

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								 			 	
Traffic Volume (vph)	159	0	15	0	0	0	0	923	1016	66	1030	0
Future Volume (vph)	159	0	15	0	0	0	0	923	1016	66	1030	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	0		0	0		0	250		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			25			25			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.850						0.922				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1770	1583	0	0	0	0	0	3263	0	1770	3539	0
Flt Permitted	0.950									0.055		
Satd. Flow (perm)	1770	1583	0	0	0	0	0	3263	0	102	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		148						570				
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		827			779			864			694	
Travel Time (s)		16.1			15.2			16.8			13.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.92	0.90
Adj. Flow (vph)	177	0	17	0	0	0	0	1026	1104	73	1120	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	177	17	0	0	0	0	0	2130	0	73	1120	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						6			2	
Permitted Phases	4									2		
Detector Phase	4	4						6		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0						10.0		10.0	10.0	
Minimum Split (s)	30.0	30.0						30.0		30.0	30.0	
Total Split (s)	30.0	30.0						100.0		100.0	100.0	
Total Split (%)	23.1%	23.1%						76.9%		76.9%	76.9%	
Maximum Green (s)	25.0	25.0						95.0		95.0	95.0	
Yellow Time (s)	3.5	3.5						3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5						1.5		1.5	1.5	
Lost Time Adjust (s)	-1.0	-1.0						-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0	4.0						4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Recall Mode	None	None						C-Max		C-Max	C-Max	
Act Effct Green (s)	19.2	19.2						102.8		102.8	102.8	
Actuated g/C Ratio	0.15	0.15						0.79		0.79	0.79	
v/c Ratio	0.68	0.05						0.79		0.91	0.40	
Control Delay	65.0	0.3						6.4		96.7	5.1	
Queue Delay	0.0	0.0						1.5		0.0	0.2	
Total Delay	65.0	0.3						7.8		96.7	5.2	
LOS	E	A						A		F	A	
Approach Delay		59.3						7.8			10.8	
Approach LOS		E						A			B	

Lanes, Volumes, Timings
 16: Farrow Road & 277 NB RAMPS

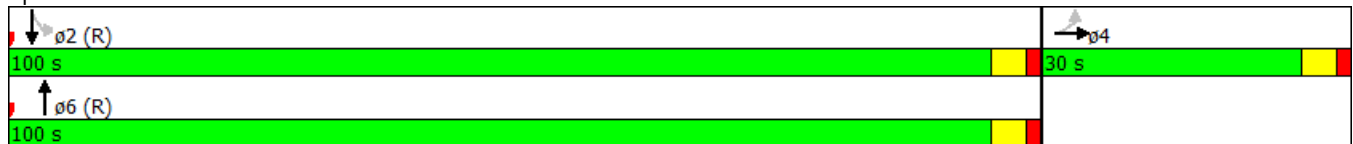
Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 PM Improved - Colonial Widened

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	143	0						90		43	101	
Queue Length 95th (ft)	211	0						m82		m#155	156	
Internal Link Dist (ft)		747			699			784			614	
Turn Bay Length (ft)	300									250		
Base Capacity (vph)	354	435						2699		80	2798	
Starvation Cap Reductn	0	0						358		0	693	
Spillback Cap Reductn	0	0						0		0	0	
Storage Cap Reductn	0	0						0		0	0	
Reduced v/c Ratio	0.50	0.04						0.91		0.91	0.53	

Intersection Summary





















Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBT, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.91
 Intersection Signal Delay: 11.7 Intersection LOS: B
 Intersection Capacity Utilization 73.6% ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 16: Farrow Road & 277 NB RAMPS



Lanes, Volumes, Timings
17: Farrow Road & Lorick Avenue /277 SB Ramps

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	0	41	518	17	49	25	1057	0	0	534	146
Future Volume (vph)	34	0	41	518	17	49	25	1057	0	0	534	146
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	125		0	200		0	0		0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (ft)	25			150			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850		0.889							0.968
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1770	0	1583	1770	1656	0	1770	3539	0	0	3426	0
Flt Permitted	0.709			0.950			0.295					
Satd. Flow (perm)	1321	0	1583	1770	1656	0	550	3539	0	0	3426	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			46		20							32
Link Speed (mph)		35			35			35				35
Link Distance (ft)		467			1041			694				870
Travel Time (s)		9.1			20.3			13.5				16.9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	38	0	46	576	19	54	28	1174	0	0	593	162
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	0	46	576	73	0	28	1174	0	0	755	0
Turn Type	Perm		Perm	Perm	NA		Perm	NA			NA	
Protected Phases					4			2				6
Permitted Phases	8		8	4			2					
Detector Phase	8		8	4	4		2	2				6
Switch Phase												
Minimum Initial (s)	10.0		10.0	10.0	10.0		10.0	10.0				10.0
Minimum Split (s)	30.0		30.0	30.0	30.0		30.0	30.0				30.0
Total Split (s)	74.0		74.0	74.0	74.0		56.0	56.0				56.0
Total Split (%)	56.9%		56.9%	56.9%	56.9%		43.1%	43.1%				43.1%
Maximum Green (s)	69.0		69.0	69.0	69.0		51.0	51.0				51.0
Yellow Time (s)	3.5		3.5	3.5	3.5		3.5	3.5				3.5
All-Red Time (s)	1.5		1.5	1.5	1.5		1.5	1.5				1.5
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0		-1.0	-1.0				-1.0
Total Lost Time (s)	4.0		4.0	4.0	4.0		4.0	4.0				4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0				3.0
Recall Mode	None		None	None	None		C-Max	C-Max				C-Max
Act Effct Green (s)	52.9		52.9	52.9	52.9		69.1	69.1				69.1
Actuated g/C Ratio	0.41		0.41	0.41	0.41		0.53	0.53				0.53
v/c Ratio	0.07		0.07	0.80	0.11		0.10	0.62				0.41
Control Delay	20.5		5.1	42.2	15.4		23.8	29.5				19.7
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.3				0.0
Total Delay	20.5		5.1	42.2	15.4		23.8	29.9				19.7
LOS	C		A	D	B		C	C				B
Approach Delay					39.1			29.7				19.7
Approach LOS					D			C				B

Lanes, Volumes, Timings
 17: Farrow Road & Lorick Avenue /277 SB Ramps

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 PM Improved - Colonial Widened

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	19		0	418	27		13	410			187	
Queue Length 95th (ft)	36		21	478	49		m21	510			286	
Internal Link Dist (ft)		387			961			614			790	
Turn Bay Length (ft)				125			200					
Base Capacity (vph)	711		873	953	900		292	1882			1837	
Starvation Cap Reductn	0		0	0	0		0	241			0	
Spillback Cap Reductn	0		0	0	0		0	0			0	
Storage Cap Reductn	0		0	0	0		0	0			0	
Reduced v/c Ratio	0.05		0.05	0.60	0.08		0.10	0.72			0.41	

Intersection Summary























Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 28.6 Intersection LOS: C
 Intersection Capacity Utilization 66.5% ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 17: Farrow Road & Lorick Avenue /277 SB Ramps

ϕ2 (R) 56 s	ϕ4 74 s
ϕ6 (R) 56 s	ϕ8 74 s

Lanes, Volumes, Timings
18: Assembly St./Assembly & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1989	279	369	2333	8	1062	9	615	0	0	1
Future Volume (vph)	0	1989	279	369	2333	8	1062	9	615	0	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		275	150		0	0		0	0		0
Storage Lanes	1		1	1		0	2		1	0		0
Taper Length (ft)	150			75			25			25		
Lane Util. Factor	1.00	0.86	0.86	0.97	0.91	0.91	0.97	0.95	0.95	1.00	1.00	1.00
Fr _t			0.850		0.999				0.850		0.865	
Fl _t Protected				0.950			0.950					
Satd. Flow (prot)	1863	4806	1362	3433	5080	0	3433	1770	1504	0	1611	0
Fl _t Permitted				0.950			0.950					
Satd. Flow (perm)	1863	4806	1362	3433	5080	0	3433	1770	1504	0	1611	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			280		1				88		126	
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		2522			509			585			432	
Travel Time (s)		57.3			11.6			13.3			8.4	
Peak Hour Factor	0.90	0.94	0.90	0.90	0.92	0.90	0.93	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	2116	310	410	2536	9	1142	10	683	0	0	1
Shared Lane Traffic (%)			0%						0%			
Lane Group Flow (vph)	0	2116	310	410	2545	0	1142	10	683	0	1	0
Turn Type	Perm	NA	pm+ov	Prot	NA		Split	NA	pm+ov		NA	
Protected Phases		2	3	1	6		3	3	1		4	
Permitted Phases	2		2						3	4		
Detector Phase	2	2	3	1	6		3	3	1	4	4	
Switch Phase												
Minimum Initial (s)	16.0	16.0	11.0	11.0	16.0		11.0	11.0	11.0	4.5	4.5	
Minimum Split (s)	30.0	30.0	17.0	17.0	30.0		17.0	17.0	17.0	10.0	10.0	
Total Split (s)	58.0	58.0	42.0	20.0	78.0		42.0	42.0	20.0	10.0	10.0	
Total Split (%)	44.6%	44.6%	32.3%	15.4%	60.0%		32.3%	32.3%	15.4%	7.7%	7.7%	
Maximum Green (s)	52.0	52.0	36.0	14.0	72.0		36.0	36.0	14.0	4.5	4.5	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	1.5	1.5	
Lost Time Adjust (s)	0.0	-4.0	-4.0	-4.0	-4.0		-4.0	0.0	-4.0		-1.5	
Total Lost Time (s)	6.0	2.0	2.0	2.0	2.0		2.0	6.0	2.0		4.0	
Lead/Lag	Lead	Lead	Lead	Lag			Lead	Lead	Lag	Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max	None	None	C-Max		None	None	None	None	None	
Act Effect Green (s)		64.0	105.6	18.0	84.0		40.0	36.0	60.0		6.0	
Actuated g/C Ratio		0.49	0.81	0.14	0.65		0.31	0.28	0.46		0.05	
v/c Ratio		0.89	0.27	0.86	0.78		1.08	0.02	0.92		0.01	
Control Delay		36.3	1.0	61.6	11.6		95.1	34.6	47.9		0.0	
Queue Delay		0.0	0.0	0.0	8.7		0.0	0.0	0.0		0.0	
Total Delay		36.3	1.0	61.6	20.3		95.1	34.6	47.9		0.0	
LOS		D	A	E	C		F	C	D		A	
Approach Delay		31.8			26.0			77.2			0.0	
Approach LOS		C			C			E			A	

Lanes, Volumes, Timings
 18: Assembly St./Assembly & Elmwood Avenue





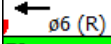
Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 PM Improved - Colonial Widened

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		590	3	185	154		-554	6	503		0	
Queue Length 95th (ft)		#833	19	m209	m826		#689	22	#781		0	
Internal Link Dist (ft)		2442			429			505			352	
Turn Bay Length (ft)			275	150								
Base Capacity (vph)		2365	1158	475	3282		1056	490	741		194	
Starvation Cap Reductn		0	0	0	731		0	0	0		0	
Spillback Cap Reductn		0	0	0	0		0	0	0		0	
Storage Cap Reductn		0	0	0	0		0	0	0		0	
Reduced v/c Ratio		0.89	0.27	0.86	1.00		1.08	0.02	0.92		0.01	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 28 (22%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.08
 Intersection Signal Delay: 40.9 Intersection LOS: D
 Intersection Capacity Utilization 108.9% ICU Level of Service G
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Assembly St./Assembly & Elmwood Avenue

 p2 (R)	 p1	 p3	 p4
58 s	20 s	42 s	10 s
 p6 (R)			
78 s			

Lanes, Volumes, Timings
19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	517	1945	75	30	1942	125	150	496	70	185	209	498
Future Volume (vph)	517	1945	75	30	1942	125	150	496	70	185	209	498
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		175	150		0	200		0	175		425
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	75			75			100			75		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850		0.990				0.850		0.939	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	1770	5034	0	1770	3539	1583	1770	3183	1441
Flt Permitted	0.950			0.081			0.308			0.151		
Satd. Flow (perm)	3433	5085	1583	151	5034	0	574	3539	1583	281	3183	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			83		11				126		97	76
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		509			563			693			3655	
Travel Time (s)		11.6			12.8			15.8			83.1	
Peak Hour Factor	0.91	0.97	0.90	0.90	0.95	0.90	0.90	0.90	0.90	0.90	0.95	0.90
Adj. Flow (vph)	568	2005	83	33	2044	139	167	551	78	206	220	553
Shared Lane Traffic (%)												27%
Lane Group Flow (vph)	568	2005	83	33	2183	0	167	551	78	206	369	404
Turn Type	Prot	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	pm+ov
Protected Phases	5	2	3		6		3	8		7	4	5
Permitted Phases			2	6			8		8	4		4
Detector Phase	5	2	3	6	6		3	8	8	7	4	5
Switch Phase												
Minimum Initial (s)	11.0	16.0	11.0	16.0	16.0		11.0	16.0	16.0	11.0	16.0	11.0
Minimum Split (s)	17.0	30.0	17.0	30.0	30.0		17.0	30.0	30.0	17.0	30.0	17.0
Total Split (s)	23.0	83.0	17.0	60.0	60.0		17.0	30.0	30.0	17.0	30.0	23.0
Total Split (%)	17.7%	63.8%	13.1%	46.2%	46.2%		13.1%	23.1%	23.1%	13.1%	23.1%	17.7%
Maximum Green (s)	17.0	77.0	11.0	54.0	54.0		11.0	24.0	24.0	11.0	24.0	17.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-4.0	-4.0	-4.0	-4.0		-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Total Lost Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lead	Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	C-Max	C-Max		None	None	None	None	None	None
Act Effct Green (s)	21.0	82.1	99.1	59.1	59.1		41.9	26.9	26.9	41.9	26.9	49.9
Actuated g/C Ratio	0.16	0.63	0.76	0.45	0.45		0.32	0.21	0.21	0.32	0.21	0.38
v/c Ratio	1.03	0.62	0.07	0.49	0.95		0.52	0.75	0.18	0.79	0.50	0.67
Control Delay	90.3	13.8	0.6	43.4	35.0		37.4	55.6	2.2	54.2	35.5	32.9
Queue Delay	0.0	0.6	0.0	0.0	16.2		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	90.3	14.4	0.6	43.4	51.3		37.4	55.6	2.2	54.2	35.5	32.9
LOS	F	B	A	D	D		D	E	A	D	D	C
Approach Delay		30.2			51.1			46.5			38.4	
Approach LOS		C			D			D			D	

Lanes, Volumes, Timings
19: Main St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	~267	238	0	12	297		101	228	0	128	109	249
Queue Length 95th (ft)	m#324	360	m1	m21	#752		160	294	9	#234	163	381
Internal Link Dist (ft)		429			483			613			3575	
Turn Bay Length (ft)	175		175	150			200			175		425
Base Capacity (vph)	554	3211	1226	68	2294		322	762	439	262	761	599
Starvation Cap Reductn	0	715	0	0	34		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	178		0	0	0	0	1	2
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.03	0.80	0.07	0.49	1.03		0.52	0.72	0.18	0.79	0.49	0.68

Intersection Summary






















Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 120 (92%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green
 Natural Cycle: 125
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.03
 Intersection Signal Delay: 40.3 Intersection LOS: D
 Intersection Capacity Utilization 92.3% ICU Level of Service F
 Analysis Period (min) 15
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Main St. & Elmwood Avenue



Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	1842	88	50	2029	25	92	268	231	17	45	13
Future Volume (vph)	10	1842	88	50	2029	25	92	268	231	17	45	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	75		0	200		0	75		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	75			50			100			50		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.993			0.998				0.850		0.975	
Flt Protected	0.950			0.950			0.950				0.989	
Satd. Flow (prot)	1770	5050	0	1770	5075	0	1770	1863	1583	0	3413	0
Flt Permitted	0.058			0.063			0.686				0.743	
Satd. Flow (perm)	108	5050	0	117	5075	0	1278	1863	1583	0	2564	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			4				26		14	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		563			1012			3133			1095	
Travel Time (s)		12.8			23.0			71.2			24.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	2047	98	56	2182	28	102	298	257	19	50	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	2145	0	56	2210	0	102	298	257	0	83	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		6	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	99.0	99.0		99.0	99.0		31.0	31.0	31.0	31.0	31.0	
Total Split (%)	76.2%	76.2%		76.2%	76.2%		23.8%	23.8%	23.8%	23.8%	23.8%	
Maximum Green (s)	93.0	93.0		93.0	93.0		25.0	25.0	25.0	25.0	25.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-4.0	-4.0		-4.0	-4.0		-4.0	-4.0	-4.0		-4.0	
Total Lost Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0		2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None	None	None	None	
Act Effct Green (s)	98.9	98.9		98.9	98.9		27.1	27.1	27.1		27.1	
Actuated g/C Ratio	0.76	0.76		0.76	0.76		0.21	0.21	0.21		0.21	
v/c Ratio	0.13	0.56		0.63	0.57		0.38	0.77	0.73		0.15	
Control Delay	7.0	6.6		24.5	11.4		48.3	62.2	56.0		34.8	
Queue Delay	0.0	0.4		0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	7.0	7.0		24.5	11.4		48.3	62.2	56.0		34.8	
LOS	A	A		C	B		D	E	E		C	
Approach Delay		7.0			11.8			57.6			34.8	
Approach LOS		A			B			E			C	

Lanes, Volumes, Timings
20: Sumter St. & Elmwood Avenue

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	2	282		25	354		73	234	181		24	
Queue Length 95th (ft)	m4	394		m25	m335		129	338	280		48	
Internal Link Dist (ft)		483			932			3053			1015	
Turn Bay Length (ft)	200			75			200					
Base Capacity (vph)	82	3846		89	3861		285	415	373		582	
Starvation Cap Reductn	0	1011		0	0		0	0	0		0	
Spillback Cap Reductn	0	0		0	219		0	0	0		0	
Storage Cap Reductn	0	0		0	0		0	0	0		0	
Reduced v/c Ratio	0.13	0.76		0.63	0.61		0.36	0.72	0.69		0.14	

Intersection Summary






















Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 18 (14%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 16.0 Intersection LOS: B
 Intersection Capacity Utilization 75.2% ICU Level of Service D
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 20: Sumter St. & Elmwood Avenue

ρ2 (R)	ρ4
99 s	31 s
ρ6 (R)	ρ8
99 s	31 s

Lanes, Volumes, Timings
21: Barnwell Street & Calhoun St.

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	392	11	6	359	59	32	19	31	71	17	113
Future Volume (vph)	115	392	11	6	359	59	32	19	31	71	17	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.996			0.979			0.907			0.870	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1855	0	1770	1824	0	1770	1690	0	1770	1621	0
Fl _t Permitted	0.281			0.303			0.665			0.721		
Satd. Flow (perm)	523	1855	0	564	1824	0	1239	1690	0	1343	1621	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			17			34			126	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		291			763			560			638	
Travel Time (s)		5.7			14.9			10.9			12.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	128	436	12	7	399	66	36	21	34	79	19	126
Shared Lane Traffic (%)												
Lane Group Flow (vph)	128	448	0	7	465	0	36	55	0	79	145	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	
Total Split (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	24.5	24.5		24.5	24.5		24.5	24.5		24.5	24.5	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.5	5.5		5.5	5.5		5.5	5.5		5.5	5.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	19.7	19.7		19.7	19.7		29.3	29.3		29.3	29.3	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.49	0.49		0.49	0.49	
v/c Ratio	0.75	0.73		0.04	0.76		0.06	0.07		0.12	0.17	
Control Delay	44.5	24.7		11.8	25.5		10.5	6.1		10.8	3.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	44.5	24.7		11.8	25.5		10.5	6.1		10.8	3.8	
LOS	D	C		B	C		B	A		B	A	
Approach Delay		29.1			25.3			7.8			6.3	
Approach LOS		C			C			A			A	
Queue Length 50th (ft)	40	137		2	140		7	4		15	3	
Queue Length 95th (ft)	#108	202		8	208		23	22		41	32	
Internal Link Dist (ft)		211			683			480			558	

Lanes, Volumes, Timings
21: Barnwell Street & Calhoun St.

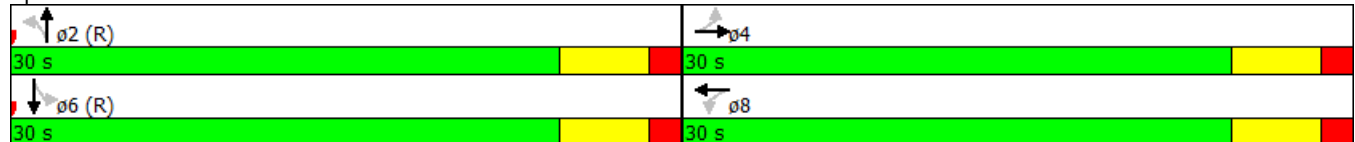
Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)												
Base Capacity (vph)	213	759		230	754		604	841		655	854	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.60	0.59		0.03	0.62		0.06	0.07		0.12	0.17	

Intersection Summary
















Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 22.6
 Intersection Capacity Utilization 68.3%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 21: Barnwell Street & Calhoun St.



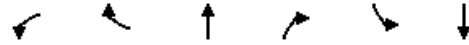
Lanes, Volumes, Timings
23: Bull St. & Access #3

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 		  			  
Traffic Volume (vph)	204	80	2783	155	129	1899
Future Volume (vph)	204	80	2783	155	129	1899
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		75	150	
Storage Lanes	2	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.95	0.91	0.91	1.00	0.91
Frt	0.958		0.992			
Flt Protected	0.965				0.950	
Satd. Flow (prot)	3341	0	5045	0	1770	5085
Flt Permitted	0.965				0.038	
Satd. Flow (perm)	3341	0	5045	0	71	5085
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	33		14			
Link Speed (mph)	35		40			40
Link Distance (ft)	871		213			242
Travel Time (s)	17.0		3.6			4.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	227	89	3092	172	143	2110
Shared Lane Traffic (%)						
Lane Group Flow (vph)	316	0	3264	0	143	2110
Turn Type	Perm		NA		D.P+P	NA
Protected Phases			2		1	6
Permitted Phases	8				2	
Detector Phase	8		2		1	6
Switch Phase						
Minimum Initial (s)	6.0		11.0		11.0	11.0
Minimum Split (s)	12.0		17.0		17.0	17.0
Total Split (s)	21.0		109.0		17.0	126.0
Total Split (%)	14.3%		74.1%		11.6%	85.7%
Maximum Green (s)	15.0		103.0		11.5	120.0
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	2.0		2.0		1.5	2.0
Lost Time Adjust (s)	-2.0		-2.0		-2.0	-2.0
Total Lost Time (s)	4.0		4.0		3.5	4.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		C-Max		None	C-Max
Act Effct Green (s)	16.6		105.6		119.4	122.4
Actuated g/C Ratio	0.11		0.72		0.81	0.83
v/c Ratio	0.78		0.90		0.68	0.50
Control Delay	70.5		21.1		52.0	4.0
Queue Delay	0.0		4.5		0.0	0.5
Total Delay	70.5		25.6		52.0	4.5
LOS	E		C		D	A
Approach Delay	70.5		25.6			7.5
Approach LOS	E		C			A

Lanes, Volumes, Timings
23: Bull St. & Access #3

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Queue Length 50th (ft)	138		843		81	174
Queue Length 95th (ft)	192		915		#162	193
Internal Link Dist (ft)	791		133			162
Turn Bay Length (ft)					150	
Base Capacity (vph)	415		3628		213	4234
Starvation Cap Reductn	0		315		0	1433
Spillback Cap Reductn	0		0		0	0
Storage Cap Reductn	0		0		0	0
Reduced v/c Ratio	0.76		0.99		0.67	0.75

Intersection Summary

Area Type: Other
 Cycle Length: 147
 Actuated Cycle Length: 147
 Offset: 0 (0%), Referenced to phase 2:NBSB and 6:SBT, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 21.0 Intersection LOS: C
 Intersection Capacity Utilization 84.7% ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 23: Bull St. & Access #3



Lanes, Volumes, Timings
25: Access #5 & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↗
Traffic Volume (vph)	381	24	0	569	0	19
Future Volume (vph)	381	24	0	569	0	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		75	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.991					0.865
Flt Protected						
Satd. Flow (prot)	3507	0	0	3539	0	1611
Flt Permitted						
Satd. Flow (perm)	3507	0	0	3539	0	1611
Link Speed (mph)	35			35	35	
Link Distance (ft)	446			270	299	
Travel Time (s)	8.7			5.3	5.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	423	27	0	632	0	21
Shared Lane Traffic (%)						
Lane Group Flow (vph)	450	0	0	632	0	21
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 21.3% ICU Level of Service A
 Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

25: Access #5 & Colonial Drive


























Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↑
Traffic Volume (veh/h)	381	24	0	569	0	19
Future Volume (Veh/h)	381	24	0	569	0	19
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	423	27	0	632	0	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	446			573		
pX, platoon unblocked					0.93	
vC, conflicting volume				450	752	225
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol				450	582	225
tC, single (s)				4.1	6.8	6.9
tC, 2 stage (s)						
tF (s)				2.2	3.5	3.3
p0 queue free %				100	100	97
cM capacity (veh/h)				1107	413	778
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	282	168	316	316	21	
Volume Left	0	0	0	0	0	
Volume Right	0	27	0	0	21	
cSH	1700	1700	1700	1700	778	
Volume to Capacity	0.17	0.10	0.19	0.19	0.03	
Queue Length 95th (ft)	0	0	0	0	2	
Control Delay (s)	0.0	0.0	0.0	0.0	9.8	
Lane LOS						A
Approach Delay (s)	0.0		0.0		9.8	
Approach LOS						A
Intersection Summary						
Average Delay				0.2		
Intersection Capacity Utilization				21.3%	ICU Level of Service	A
Analysis Period (min)				15		

Lanes, Volumes, Timings
 26: Access #6/Mental Health Dwy & Colonial Drive

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 PM Improved - Colonial Widened


























												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Traffic Volume (vph)	6	380	15	25	515	1	19	0	19	134	0	34
Future Volume (vph)	6	380	15	25	515	1	19	0	19	134	0	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		0	0		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994						0.850				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3518	0	1770	3539	0	1770	1583	0	1770	1583	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3518	0	1770	3539	0	1770	1583	0	1770	1583	0
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		270			303			417			427	
Travel Time (s)		5.3			5.9			9.5			9.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	7	422	17	28	572	1	21	0	21	149	0	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	439	0	28	573	0	21	21	0	149	38	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	41.5%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 26: Access #6/Mental Health Dwy & Colonial Drive

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 PM Improved - Colonial Widened

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		 			 			 			 		
Traffic Volume (veh/h)	6	380	15	25	515	1	19	0	19	134	0	34	
Future Volume (Veh/h)	6	380	15	25	515	1	19	0	19	134	0	34	
Sign Control	Free			Free			Stop			Stop			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly flow rate (vph)	7	422	17	28	572	1	21	0	21	149	0	38	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None					None							
Median storage (veh)													
Upstream signal (ft)	716					303							
pX, platoon unblocked	0.92						0.92	0.92			0.92	0.92	0.92
vC, conflicting volume	573				439			824	1074	220	874	1082	286
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	365				439			638	908	220	692	917	54
tC, single (s)	4.1				4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)													
tF (s)	2.2				2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99				97			93	100	97	48	100	96
cM capacity (veh/h)	1096				1117			311	244	785	289	241	923
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2			
Volume Total	7	281	158	28	381	192	21	21	149	38			
Volume Left	7	0	0	28	0	0	21	0	149	0			
Volume Right	0	0	17	0	0	1	0	21	0	38			
cSH	1096	1700	1700	1117	1700	1700	311	785	289	923			
Volume to Capacity	0.01	0.17	0.09	0.03	0.22	0.11	0.07	0.03	0.52	0.04			
Queue Length 95th (ft)	0	0	0	2	0	0	5	2	69	3			
Control Delay (s)	8.3	0.0	0.0	8.3	0.0	0.0	17.4	9.7	30.0	9.1			
Lane LOS	A				A			C	A	D	A		
Approach Delay (s)	0.1				0.4			13.6	25.7				
Approach LOS						B			D				
Intersection Summary													
Average Delay	4.4												
Intersection Capacity Utilization	41.5%			ICU Level of Service					A				
Analysis Period (min)	15												

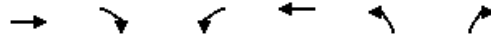
Lanes, Volumes, Timings
27: Boyce St. & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘	↑↑	↘	↗
Traffic Volume (vph)	467	66	181	433	108	111
Future Volume (vph)	467	66	181	433	108	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		75	150		150	0
Storage Lanes		0	1		1	1
Taper Length (ft)			100		25	
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.982					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3476	0	1770	3539	1770	1583
Flt Permitted			0.235		0.950	
Satd. Flow (perm)	3476	0	438	3539	1770	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	20					123
Link Speed (mph)	35			35	35	
Link Distance (ft)	303			949	1007	
Travel Time (s)	5.9			18.5	19.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	519	73	201	481	120	123
Shared Lane Traffic (%)						
Lane Group Flow (vph)	592	0	201	481	120	123
Turn Type	NA		D.P+P	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases			4			2
Detector Phase	4		3	8	2	2
Switch Phase						
Minimum Initial (s)	11.0		11.0	11.0	11.0	11.0
Minimum Split (s)	30.0		17.0	30.0	30.0	30.0
Total Split (s)	39.0		20.0	59.0	31.0	31.0
Total Split (%)	43.3%		22.2%	65.6%	34.4%	34.4%
Maximum Green (s)	33.5		14.5	53.5	25.5	25.5
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	1.5		1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-2.0		-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.5		3.5	3.5	3.5	3.5
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	None	C-Max	C-Max
Act Effct Green (s)	23.2		37.7	41.2	41.8	41.8
Actuated g/C Ratio	0.26		0.42	0.46	0.46	0.46
v/c Ratio	0.65		0.51	0.30	0.15	0.15
Control Delay	31.9		18.7	15.2	16.3	4.0
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	31.9		18.7	15.2	16.3	4.0
LOS	C		B	B	B	A
Approach Delay	31.9			16.2	10.1	
Approach LOS	C			B	B	

Lanes, Volumes, Timings
27: Boyce St. & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Queue Length 50th (ft)	152		68	87	38	0
Queue Length 95th (ft)	190		93	99	83	34
Internal Link Dist (ft)	223			869	927	
Turn Bay Length (ft)			150		150	
Base Capacity (vph)	1383		437	2182	822	801
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.43		0.46	0.22	0.15	0.15

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 21.3
 Intersection Capacity Utilization 44.2%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service A

Splits and Phases: 27: Boyce St. & Colonial Drive

φ2 (L) 31 s	φ3 20 s	φ4 39 s
	φ8 59 s	

Lanes, Volumes, Timings
28: Access #7 & Colonial Drive

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↓	↑↑	↓	
Traffic Volume (vph)	738	16	25	687	7	32
Future Volume (vph)	738	16	25	687	7	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		75	100		0	0
Storage Lanes		1	1		1	0
Taper Length (ft)			100		25	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt		0.850			0.890	
Flt Protected			0.950		0.991	
Satd. Flow (prot)	3539	1583	1770	3539	1643	0
Flt Permitted			0.950		0.991	
Satd. Flow (perm)	3539	1583	1770	3539	1643	0
Link Speed (mph)	35			35	35	
Link Distance (ft)	271			736	462	
Travel Time (s)	5.3			14.3	9.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	820	18	28	763	8	36
Shared Lane Traffic (%)						
Lane Group Flow (vph)	820	18	28	763	44	0
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	30.8%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis

28: Access #7 & Colonial Drive













Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened



Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	↑↑	↑	↑	↑↑	↑		
Traffic Volume (veh/h)	738	16	25	687	7	32	
Future Volume (Veh/h)	738	16	25	687	7	32	
Sign Control	Free			Free	Stop		
Grade	0%			0%	0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly flow rate (vph)	820	18	28	763	8	36	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None			None			
Median storage (veh)							
Upstream signal (ft)	481			736			
pX, platoon unblocked				0.84	0.88	0.84	
vC, conflicting volume				838	1258	410	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol				439	629	0	
tC, single (s)				4.1	6.8	6.9	
tC, 2 stage (s)							
tF (s)				2.2	3.5	3.3	
p0 queue free %				97	98	96	
cM capacity (veh/h)				943	355	916	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	410	410	18	28	382	382	44
Volume Left	0	0	0	28	0	0	8
Volume Right	0	0	18	0	0	0	36
cSH	1700	1700	1700	943	1700	1700	712
Volume to Capacity	0.24	0.24	0.01	0.03	0.22	0.22	0.06
Queue Length 95th (ft)	0	0	0	2	0	0	5
Control Delay (s)	0.0	0.0	0.0	8.9	0.0	0.0	10.4
Lane LOS				A	B		
Approach Delay (s)	0.0			0.3	10.4		
Approach LOS					B		
Intersection Summary							
Average Delay	0.4						
Intersection Capacity Utilization	30.8%			ICU Level of Service	A		
Analysis Period (min)	15						

Lanes, Volumes, Timings
30: Harden Street Ext & Access #8

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened













						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (vph)	0	14	0	1377	1186	38
Future Volume (vph)	0	14	0	1377	1186	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0			75
Storage Lanes	0	1	0			1
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3539	3539	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3539	3539	1583
Link Speed (mph)	30			35	35	
Link Distance (ft)	444			462	632	
Travel Time (s)	10.1			9.0	12.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	16	0	1530	1318	42
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	16	0	1530	1318	42
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 42.8% ICU Level of Service A
 Analysis Period (min) 15














HCM Unsignalized Intersection Capacity Analysis
 30: Harden Street Ext & Access #8

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 PM Improved - Colonial Widened

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (veh/h)	0	14	0	1377	1186	38
Future Volume (Veh/h)	0	14	0	1377	1186	38
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	16	0	1530	1318	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				927	632	
pX, platoon unblocked	0.91	0.86	0.86			
vC, conflicting volume	2083	659	1360			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1323	291	1103			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	100			
cM capacity (veh/h)	134	609	544			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	16	765	765	659	659	42
Volume Left	0	0	0	0	0	0
Volume Right	16	0	0	0	0	42
cSH	609	1700	1700	1700	1700	1700
Volume to Capacity	0.03	0.45	0.45	0.39	0.39	0.02
Queue Length 95th (ft)	2	0	0	0	0	0
Control Delay (s)	11.1	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	11.1	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay	0.1					
Intersection Capacity Utilization	42.8%			ICU Level of Service	A	
Analysis Period (min)	15					

Lanes, Volumes, Timings
31: Harden Street Ext & Access #9

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened














						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (vph)	0	26	20	1377	1171	29
Future Volume (vph)	0	26	20	1377	1171	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			75
Storage Lanes	0	1	1			1
Taper Length (ft)	25		100			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected			0.950			
Satd. Flow (prot)	0	1611	1770	3539	3539	1583
Flt Permitted			0.950			
Satd. Flow (perm)	0	1611	1770	3539	3539	1583
Link Speed (mph)	30			35	35	
Link Distance (ft)	525			465	462	
Travel Time (s)	11.9			9.1	9.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	29	22	1530	1301	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	29	22	1530	1301	32
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 42.4% ICU Level of Service A
 Analysis Period (min) 15













HCM Unsignalized Intersection Capacity Analysis
 31: Harden Street Ext & Access #9

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 PM Improved - Colonial Widened

							
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations				 	 		
Traffic Volume (veh/h)	0	26	20	1377	1171	29	
Future Volume (Veh/h)	0	26	20	1377	1171	29	
Sign Control	Stop			Free	Free		
Grade	0%			0%	0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly flow rate (vph)	0	29	22	1530	1301	32	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type				None	None		
Median storage (veh)							
Upstream signal (ft)				465	1094		
pX, platoon unblocked	0.91	0.87	0.87				
vC, conflicting volume	2110	650	1333				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1382	299	1084				
tC, single (s)	6.8	6.9	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.3	2.2				
p0 queue free %	100	95	96				
cM capacity (veh/h)	118	606	556				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	29	22	765	765	650	650	32
Volume Left	0	22	0	0	0	0	0
Volume Right	29	0	0	0	0	0	32
cSH	606	556	1700	1700	1700	1700	1700
Volume to Capacity	0.05	0.04	0.45	0.45	0.38	0.38	0.02
Queue Length 95th (ft)	4	3	0	0	0	0	0
Control Delay (s)	11.2	11.7	0.0	0.0	0.0	0.0	0.0
Lane LOS	B	B					
Approach Delay (s)	11.2	0.2			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.2				
Intersection Capacity Utilization			42.4%		ICU Level of Service		A
Analysis Period (min)			15				

Lanes, Volumes, Timings
32: Harden Street Ext & Access #10

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	202	95	88	1199	1124	73
Future Volume (vph)	202	95	88	1199	1124	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	200			75
Storage Lanes	1	1	1			1
Taper Length (ft)	25		100			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.950		0.191			
Satd. Flow (perm)	1770	1583	356	3539	3539	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		94				42
Link Speed (mph)	30			35	35	
Link Distance (ft)	453			468	465	
Travel Time (s)	10.3			9.1	9.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	224	106	98	1332	1249	81
Shared Lane Traffic (%)						
Lane Group Flow (vph)	224	106	98	1332	1249	81
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	6.0	6.0	11.0	11.0	11.0	11.0
Minimum Split (s)	12.0	12.0	17.0	17.0	17.0	17.0
Total Split (s)	38.0	38.0	92.0	92.0	92.0	92.0
Total Split (%)	29.2%	29.2%	70.8%	70.8%	70.8%	70.8%
Maximum Green (s)	32.0	32.0	86.0	86.0	86.0	86.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	23.7	23.7	98.3	98.3	98.3	98.3
Actuated g/C Ratio	0.18	0.18	0.76	0.76	0.76	0.76
v/c Ratio	0.69	0.29	0.36	0.50	0.47	0.07
Control Delay	60.6	12.3	12.8	8.9	3.1	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.6	12.3	12.8	8.9	3.1	0.7
LOS	E	B	B	A	A	A
Approach Delay	45.1			9.2	3.0	
Approach LOS	D			A	A	

Lanes, Volumes, Timings
 32: Harden Street Ext & Access #10

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 PM Improved - Colonial Widened



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Length 50th (ft)	178	8	21	169	91	0
Queue Length 95th (ft)	252	56	78	297	150	m9
Internal Link Dist (ft)	373			388	385	
Turn Bay Length (ft)			200			75
Base Capacity (vph)	462	483	269	2675	2675	1206
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.22	0.36	0.50	0.47	0.07

Intersection Summary













Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of 1st Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 10.3
 Intersection Capacity Utilization 61.4%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 32: Harden Street Ext & Access #10

φ2 (R) 92 s	φ4 38 s
φ6 (R) 92 s	

Lanes, Volumes, Timings
 33: Harden Street Ext & Access #11

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 PM Improved - Colonial Widened













						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (vph)	0	14	0	1283	1208	11
Future Volume (vph)	0	14	0	1283	1208	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			75
Storage Lanes	0	1	0			1
Taper Length (ft)	25		100			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3539	3539	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3539	3539	1583
Link Speed (mph)	30			35	35	
Link Distance (ft)	421			392	468	
Travel Time (s)	9.6			7.6	9.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	16	0	1426	1342	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	16	0	1426	1342	12
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 43.4% ICU Level of Service A
 Analysis Period (min) 15














HCM Unsignalized Intersection Capacity Analysis
 33: Harden Street Ext & Access #11

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 PM Improved - Colonial Widened

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (veh/h)	0	14	0	1283	1208	11
Future Volume (Veh/h)	0	14	0	1283	1208	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	16	0	1426	1342	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				958	468	
pX, platoon unblocked	0.91	0.86	0.86			
vC, conflicting volume	2055	671	1354			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1269	297	1090			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	100			
cM capacity (veh/h)	145	602	548			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	16	713	713	671	671	12
Volume Left	0	0	0	0	0	0
Volume Right	16	0	0	0	0	12
cSH	602	1700	1700	1700	1700	1700
Volume to Capacity	0.03	0.42	0.42	0.39	0.39	0.01
Queue Length 95th (ft)	2	0	0	0	0	0
Control Delay (s)	11.1	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	11.1	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay	0.1					
Intersection Capacity Utilization	43.4%			ICU Level of Service	A	
Analysis Period (min)	15					

Lanes, Volumes, Timings
34: Harden Street Ext & Access #12

Bull Street Commons Traffic Study
2020 Build-Out Phase 3 PM Improved - Colonial Widened














						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (vph)	0	14	20	1283	1211	11
Future Volume (vph)	0	14	20	1283	1211	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			75
Storage Lanes	0	1	1			1
Taper Length (ft)	25		75			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected			0.950			
Satd. Flow (prot)	0	1611	1770	3539	3539	1583
Flt Permitted			0.950			
Satd. Flow (perm)	0	1611	1770	3539	3539	1583
Link Speed (mph)	30			35	35	
Link Distance (ft)	422			234	392	
Travel Time (s)	9.6			4.6	7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	16	22	1426	1346	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	16	22	1426	1346	12
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	43.5%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 34: Harden Street Ext & Access #12

Bull Street Commons Traffic Study
 2020 Build-Out Phase 3 PM Improved - Colonial Widened

							
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations				 	 		
Traffic Volume (veh/h)	0	14	20	1283	1211	11	
Future Volume (Veh/h)	0	14	20	1283	1211	11	
Sign Control	Stop			Free	Free		
Grade	0%			0%	0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly flow rate (vph)	0	16	22	1426	1346	12	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type				None	None		
Median storage (veh)							
Upstream signal (ft)				566	860		
pX, platoon unblocked	0.92	0.86	0.86				
vC, conflicting volume	2103	673	1358				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1342	297	1093				
tC, single (s)	6.8	6.9	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.3	2.2				
p0 queue free %	100	97	96				
cM capacity (veh/h)	126	602	546				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	16	22	713	713	673	673	12
Volume Left	0	22	0	0	0	0	0
Volume Right	16	0	0	0	0	0	12
cSH	602	546	1700	1700	1700	1700	1700
Volume to Capacity	0.03	0.04	0.42	0.42	0.40	0.40	0.01
Queue Length 95th (ft)	2	3	0	0	0	0	0
Control Delay (s)	11.1	11.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	B	B					
Approach Delay (s)	11.1	0.2			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.2				
Intersection Capacity Utilization			43.5%	ICU Level of Service	A		
Analysis Period (min)			15				

INTERSECTION SIM TRAFFIC ANALYSIS

2015 Existing Conditions

Intersection: 1: Bull St. & Harden St. Ext.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	TR	L	T	T	R	L	T
Maximum Queue (ft)	31	31	30	157	175	110	81	129	159	206	300	1664
Average Queue (ft)	9	7	7	68	76	31	32	34	39	57	186	518
95th Queue (ft)	29	25	26	130	137	77	71	78	99	136	328	1504
Link Distance (ft)		496			816	816		1090	1090	1090		1612
Upstream Blk Time (%)												9
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	100		200	675			175				200	
Storage Blk Time (%)											2	23
Queuing Penalty (veh)											16	100

Intersection: 1: Bull St. & Harden St. Ext.

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	1627	400
Average Queue (ft)	509	192
95th Queue (ft)	1477	415
Link Distance (ft)	1612	
Upstream Blk Time (%)	5	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		250
Storage Blk Time (%)	19	17
Queuing Penalty (veh)	152	127

Intersection: 2: Bull St. & Confederate Ave.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	R	L	T	T
Maximum Queue (ft)	28	73	72	73	70	129	160	239	104	350	1115	1143
Average Queue (ft)	6	16	18	20	20	26	34	74	14	168	548	570
95th Queue (ft)	23	52	52	55	55	77	108	173	52	427	1180	1198
Link Distance (ft)		540		647		578	578	578	578		1090	1090
Upstream Blk Time (%)											8	9
Queuing Penalty (veh)											63	73
Storage Bay Dist (ft)	150		200		200					150		
Storage Blk Time (%)											48	
Queuing Penalty (veh)											32	

Intersection: 2: Bull St. & Confederate Ave.

Movement	SB
Directions Served	TR
Maximum Queue (ft)	1117
Average Queue (ft)	555
95th Queue (ft)	1177
Link Distance (ft)	1090
Upstream Blk Time (%)	8
Queuing Penalty (veh)	65
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Bull St. & Colonial Drive

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	R	L	LTR	T	T	TR	L	T	T	TR
Maximum Queue (ft)	56	160	179	104	135	322	300	610	618	659
Average Queue (ft)	7	72	97	42	57	99	70	489	507	487
95th Queue (ft)	33	143	158	90	118	242	266	799	803	799
Link Distance (ft)	381		635	406	406	406		578	578	578
Upstream Blk Time (%)								17	20	16
Queuing Penalty (veh)								133	156	120
Storage Bay Dist (ft)		150					200			
Storage Blk Time (%)		1	3					62		
Queuing Penalty (veh)		1	2					12		

Intersection: 4: Bull St. & Franklin Street /Freed Drive

Movement	EB	WB	SB	SB	SB
Directions Served	LTR	LTR	T	T	TR
Maximum Queue (ft)	28	29	451	476	468
Average Queue (ft)	7	2	366	383	367
95th Queue (ft)	22	14	590	589	588
Link Distance (ft)	281	470	406	406	406
Upstream Blk Time (%)			20	26	17
Queuing Penalty (veh)			159	213	134
Storage Bay Dist (ft)					
Storage Blk Time (%)			56		
Queuing Penalty (veh)			0		

Intersection: 5: Bull St. & Jefferson Street

Movement	EB	NB	SB	SB	SB
Directions Served	LR	L	T	T	TR
Maximum Queue (ft)	52	28	424	446	438
Average Queue (ft)	12	3	391	398	381
95th Queue (ft)	36	15	447	431	484
Link Distance (ft)	352		378	378	378
Upstream Blk Time (%)			36	43	32
Queuing Penalty (veh)			281	336	244
Storage Bay Dist (ft)		175			
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: Bull St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	LT	R	R	TR	L	L	T	TR	L	T	TR
Maximum Queue (ft)	825	956	939	920	51	300	483	428	240	149	687	674
Average Queue (ft)	730	865	841	785	12	254	353	94	102	20	647	651
95th Queue (ft)	951	998	1058	1080	39	346	540	305	214	83	666	666
Link Distance (ft)		901	901	901	288		418	418	418		634	634
Upstream Blk Time (%)		12	25	5			39	2			41	45
Queuing Penalty (veh)		60	128	28			130	8			322	355
Storage Bay Dist (ft)	775					175				100		
Storage Blk Time (%)	1	18				74	79				55	
Queuing Penalty (veh)	6	92				127	136				18	

Intersection: 6: Bull St. & Elmwood Avenue

Movement	SB
Directions Served	R
Maximum Queue (ft)	680
Average Queue (ft)	623
95th Queue (ft)	788
Link Distance (ft)	634
Upstream Blk Time (%)	21
Queuing Penalty (veh)	169
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 7: Bull St. & Calhoun St.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	T
Maximum Queue (ft)	200	995	990	52	181	384	225	1176	1221	168	218	222
Average Queue (ft)	142	267	202	24	80	158	27	257	289	58	139	154
95th Queue (ft)	226	703	641	46	156	330	97	781	801	116	199	214
Link Distance (ft)		981	981		374	374		1849	1849		418	418
Upstream Blk Time (%)		4	3			7						
Queuing Penalty (veh)		0	0			10						
Storage Bay Dist (ft)	150			175			150			150		
Storage Blk Time (%)	38	4			1			29		1	3	
Queuing Penalty (veh)	40	4			0			8		5	6	

Intersection: 7: Bull St. & Calhoun St.

Movement	SB
Directions Served	R
Maximum Queue (ft)	53
Average Queue (ft)	15
95th Queue (ft)	41
Link Distance (ft)	418
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 8: Pickens Street & Calhoun St.

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	271	45
Average Queue (ft)	27	15
95th Queue (ft)	142	38
Link Distance (ft)	1070	465
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	EB	EB	EB	WB	WB	WB	WB	B42	B42	NB	NB	NB
Directions Served	L	T	TR	L	L	T	TR	T	T	L	T	T
Maximum Queue (ft)	82	99	118	229	300	243	271	288	165	283	273	180
Average Queue (ft)	20	42	50	200	233	89	75	66	7	128	122	120
95th Queue (ft)	52	83	110	256	325	172	153	223	57	232	201	188
Link Distance (ft)		913			229	229	229	655	655		407	407
Upstream Blk Time (%)				1	8	0	0					
Queuing Penalty (veh)				0	29	2	1					
Storage Bay Dist (ft)	225		800	175						225		
Storage Blk Time (%)				12	22					4	0	
Queuing Penalty (veh)				46	82					10	0	

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (ft)	40	197	216
Average Queue (ft)	6	96	111
95th Queue (ft)	22	180	189
Link Distance (ft)		2006	2006
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	300		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 10: Harden St./Harden Street Ext & Calhoun St.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	93	208	52	74	118	332	373	314	50	253	297	50
Average Queue (ft)	46	46	10	26	68	176	189	81	12	85	103	15
95th Queue (ft)	81	121	34	59	108	262	286	221	36	188	191	41
Link Distance (ft)		727		1088	2481	2481	2481			374	374	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	225		50					325	300			200
Storage Blk Time (%)		0	1	4			0	0			1	
Queuing Penalty (veh)		0	0	0			1	0			1	

Intersection: 11: Gregg Street/Gregg Street & Calhoun St.

Movement	EB	WB	NB	SB	SB
Directions Served	L	L	LTR	L	TR
Maximum Queue (ft)	28	30	53	29	88
Average Queue (ft)	1	1	24	6	30
95th Queue (ft)	10	10	46	25	61
Link Distance (ft)			470		2947
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	125	275		300	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 12: Gregg Street & Colonial Drive

Movement	EB	WB	B36	NB	NB	SB	SB
Directions Served	LTR	LTR	T	L	TR	L	TR
Maximum Queue (ft)	92	161	221	29	31	27	30
Average Queue (ft)	7	44	9	7	12	5	7
95th Queue (ft)	40	137	77	27	36	23	27
Link Distance (ft)	1220	89	913	2947			533
Upstream Blk Time (%)		2					
Queuing Penalty (veh)		10					
Storage Bay Dist (ft)					225	50	
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 13: Harden Street Ext & Slighs Ave.

Movement	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	T	T	R	L	T	T
Maximum Queue (ft)	251	286	96	96	31	119	158	119
Average Queue (ft)	108	161	49	48	5	40	47	49
95th Queue (ft)	201	241	89	81	21	82	119	111
Link Distance (ft)	340	340	2486	2486			407	407
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)					50	100		
Storage Blk Time (%)				14	0	1	3	
Queuing Penalty (veh)				10	0	4	3	

Intersection: 14: Colonial Drive & Farrow Road

Movement	EB	EB	NB	B42	SB	SB
Directions Served	R	R	L	T	T	TR
Maximum Queue (ft)	107	17	141	32	323	256
Average Queue (ft)	58	5	58	1	126	105
95th Queue (ft)	102	17	104	11	215	187
Link Distance (ft)	861			229	1955	1955
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		330	550			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 15: Farrow Road & Beltline Blvd

Movement	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	T	T	R	T	T	L	T
Maximum Queue (ft)	67	261	266	138	151	245	234	94	144	144	268	320
Average Queue (ft)	16	154	133	52	87	147	124	42	37	51	106	157
95th Queue (ft)	51	219	209	116	145	229	206	81	92	107	207	262
Link Distance (ft)		1459	1459			1124	1124	1124	1955	1955		798
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	175			300	300						200	
Storage Blk Time (%)		5									3	4
Queuing Penalty (veh)		1									12	12

Intersection: 15: Farrow Road & Beltline Blvd

Movement	SB
Directions Served	TR
Maximum Queue (ft)	365
Average Queue (ft)	172
95th Queue (ft)	291
Link Distance (ft)	798
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Farrow Road & 277 NB RAMPS

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	L	TR	T	TR	L	T	T
Maximum Queue (ft)	152	28	13	45	44	104	140
Average Queue (ft)	60	6	1	9	16	37	20
95th Queue (ft)	114	25	7	31	40	85	68
Link Distance (ft)		655	798	798		602	602
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	300				250		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 17: Farrow Road & Lorick Avenue /277 SB Ramps

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	R	L	TR	L	T	T	T	TR
Maximum Queue (ft)	26	56	275	491	56	100	115	257	278
Average Queue (ft)	5	10	250	276	9	35	42	145	114
95th Queue (ft)	20	45	322	574	33	81	94	243	242
Link Distance (ft)	620	620		968		602	602	779	779
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			125		200				
Storage Blk Time (%)			43						
Queuing Penalty (veh)			21						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	TR	R	L	L	T	T	TR	L	L	TR
Maximum Queue (ft)	1065	1198	1230	450	225	418	43	100	127	182	179	144
Average Queue (ft)	591	709	734	357	174	265	9	24	58	116	105	74
95th Queue (ft)	1010	1153	1182	622	276	468	30	72	108	168	167	120
Link Distance (ft)	3646	3646	3646			410	410	410	410	442	442	442
Upstream Blk Time (%)						2						
Queuing Penalty (veh)						11						
Storage Bay Dist (ft)				275	150							
Storage Blk Time (%)	19		41		13	21						
Queuing Penalty (veh)	0		94		40	63						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	NB
Directions Served	R
Maximum Queue (ft)	94
Average Queue (ft)	37
95th Queue (ft)	69
Link Distance (ft)	442
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 19: Main St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	176	200	285	363	237	26	225	485	511	486	47	129
Average Queue (ft)	81	108	91	80	60	4	205	393	372	237	15	60
95th Queue (ft)	143	161	180	196	149	18	252	594	607	488	36	103
Link Distance (ft)		410	410	410	410			450	450	450		372
Upstream Blk Time (%)								43	25	1		
Queuing Penalty (veh)								203	116	3		
Storage Bay Dist (ft)	175					175	150					200
Storage Blk Time (%)	1	2			0		88	25				
Queuing Penalty (veh)	1	2			0		395	18				

Intersection: 19: Main St. & Elmwood Avenue

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	TR	R
Maximum Queue (ft)	102	21	250	505	494	479
Average Queue (ft)	37	4	214	314	308	95
95th Queue (ft)	79	17	302	475	462	234
Link Distance (ft)	372	372		3606	3606	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			175			425
Storage Blk Time (%)			31	26	2	
Queuing Penalty (veh)			77	59	6	

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	LT
Maximum Queue (ft)	274	470	473	458	124	931	932	949	120	30	53	125
Average Queue (ft)	18	228	216	156	102	641	569	497	56	3	11	43
95th Queue (ft)	105	478	490	388	167	1160	1159	1091	113	17	34	112
Link Distance (ft)		450	450	450		901	901	901		1633	1633	
Upstream Blk Time (%)		1	1	0		21	11	5				
Queuing Penalty (veh)		8	8	1		101	53	25				
Storage Bay Dist (ft)	200				75				200			75
Storage Blk Time (%)		22			50	56						8
Queuing Penalty (veh)		2			234	48						6

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	374
Average Queue (ft)	120
95th Queue (ft)	248
Link Distance (ft)	1034
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	35
Queuing Penalty (veh)	22

Intersection: 21: Barnwell St. & Calhoun St.

Movement	WB	NB
Directions Served	L	R
Maximum Queue (ft)	31	29
Average Queue (ft)	3	10
95th Queue (ft)	18	31
Link Distance (ft)		602
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	225	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 26: Colonial Drive & Mental Health Dwy

Movement	EB	WB	SB
Directions Served	L	TR	LR
Maximum Queue (ft)	91	22	24
Average Queue (ft)	23	2	5
95th Queue (ft)	66	11	19
Link Distance (ft)		1220	344
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	100		
Storage Blk Time (%)	0		
Queuing Penalty (veh)	0		

Network Summary

Network wide Queuing Penalty: 5912

Intersection: 1: Bull St. & Harden St. Ext.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	TR	L	T	T	R	L	T
Maximum Queue (ft)	69	52	29	749	932	887	44	980	1005	710	157	209
Average Queue (ft)	32	13	8	522	553	438	5	503	538	68	73	80
95th Queue (ft)	65	40	29	763	842	752	22	1036	1109	313	147	200
Link Distance (ft)		561			948	948		1102	1102	1102		1951
Upstream Blk Time (%)					0							
Queuing Penalty (veh)					0							
Storage Bay Dist (ft)	100		200	675			175				200	
Storage Blk Time (%)				7	14			16				0
Queuing Penalty (veh)				18	35			1				0

Intersection: 1: Bull St. & Harden St. Ext.

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	184	171
Average Queue (ft)	85	49
95th Queue (ft)	200	143
Link Distance (ft)	1951	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		250
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Bull St. & Confederate Ave.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	R	L	T	T
Maximum Queue (ft)	95	94	153	212	50	356	412	277	19	69	295	333
Average Queue (ft)	35	27	47	110	13	190	211	142	2	17	129	149
95th Queue (ft)	81	71	110	178	37	280	315	240	10	54	246	264
Link Distance (ft)		542		307		557	557	557	557		1102	1102
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150		200		200					150		
Storage Blk Time (%)				1		10						4
Queuing Penalty (veh)				0		3						0

Intersection: 2: Bull St. & Confederate Ave.

Movement	SB
Directions Served	TR
Maximum Queue (ft)	258
Average Queue (ft)	121
95th Queue (ft)	234
Link Distance (ft)	1102
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Bull St. & Colonial Drive

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	R	L	LTR	T	T	TR	L	T	T	TR
Maximum Queue (ft)	27	250	477	255	269	224	121	332	342	330
Average Queue (ft)	2	181	245	177	197	153	24	76	96	91
95th Queue (ft)	11	272	397	241	257	232	76	211	225	234
Link Distance (ft)	380		625	293	293	293		557	557	557
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		150					200			
Storage Blk Time (%)		16	41					2		
Queuing Penalty (veh)		41	77					0		

Intersection: 4: Bull St. & Franklin Street /Freed Drive

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	TR	T	T	TR
Maximum Queue (ft)	52	71	24	16	328	336	320
Average Queue (ft)	8	25	0	1	179	192	186
95th Queue (ft)	29	65	0	6	411	434	423
Link Distance (ft)	460	536		459	293	293	293
Upstream Blk Time (%)					11	16	13
Queuing Penalty (veh)					64	91	73
Storage Bay Dist (ft)			150				
Storage Blk Time (%)					45		
Queuing Penalty (veh)					0		

Intersection: 5: Bull St. & Jefferson Street

Movement	EB	SB	SB	SB
Directions Served	LR	T	T	TR
Maximum Queue (ft)	50	504	494	501
Average Queue (ft)	15	350	362	356
95th Queue (ft)	43	660	665	669
Link Distance (ft)	197	459	459	459
Upstream Blk Time (%)		27	29	25
Queuing Penalty (veh)		158	170	146
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Bull St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	LT	R	R	LT	TR	L	L	T	TR	L	T
Maximum Queue (ft)	825	930	914	893	80	181	300	442	367	374	27	753
Average Queue (ft)	631	659	518	224	33	64	263	332	247	279	2	664
95th Queue (ft)	958	1024	1005	693	78	125	345	475	343	367	14	877
Link Distance (ft)		903	903	903		184		422	422	422		692
Upstream Blk Time (%)		3	1	0		0		3				32
Queuing Penalty (veh)		15	7	0		0		18				187
Storage Bay Dist (ft)	775				125		175				100	
Storage Blk Time (%)	6	13				1	45	57				78
Queuing Penalty (veh)	39	80				0	103	130				2

Intersection: 6: Bull St. & Elmwood Avenue

Movement	SB	SB
Directions Served	TR	R
Maximum Queue (ft)	741	746
Average Queue (ft)	671	671
95th Queue (ft)	879	867
Link Distance (ft)	692	692
Upstream Blk Time (%)	44	31
Queuing Penalty (veh)	253	177
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: Bull St. & Calhoun St.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	T
Maximum Queue (ft)	134	146	120	48	234	335	224	713	746	225	430	423
Average Queue (ft)	77	75	48	7	122	164	34	326	391	190	233	229
95th Queue (ft)	130	132	106	27	192	270	102	578	618	263	431	426
Link Distance (ft)		878	878		584	584		1085	1085		422	422
Upstream Blk Time (%)											0	0
Queuing Penalty (veh)											0	0
Storage Bay Dist (ft)	150			175			150			150		
Storage Blk Time (%)	0	0			2			9		70	0	
Queuing Penalty (veh)	0	0			0			3		377	0	

Intersection: 7: Bull St. & Calhoun St.

Movement	SB
Directions Served	R
Maximum Queue (ft)	53
Average Queue (ft)	21
95th Queue (ft)	51
Link Distance (ft)	422
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 8: Pickens Street & Calhoun St.

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	55	80
Average Queue (ft)	3	23
95th Queue (ft)	22	46
Link Distance (ft)	850	828
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	T	TR	L	T	T	L	T
Maximum Queue (ft)	93	216	266	216	223	131	120	128	158	94	97	234
Average Queue (ft)	21	114	144	140	148	68	44	42	43	40	35	130
95th Queue (ft)	63	180	242	199	212	117	97	89	96	84	79	207
Link Distance (ft)		901			217	217	217		407	407		1839
Upstream Blk Time (%)				1	0							
Queuing Penalty (veh)				0	1							
Storage Bay Dist (ft)	225		800	175				225			300	
Storage Blk Time (%)		0		3	6							
Queuing Penalty (veh)		0		5	13							

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	SB
Directions Served	TR
Maximum Queue (ft)	223
Average Queue (ft)	128
95th Queue (ft)	219
Link Distance (ft)	1839
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 10: Harden St./Harden Street Ext & Calhoun St.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	255	171	54	54	172	277	287	229	114	261	239	43
Average Queue (ft)	94	70	25	21	62	119	136	14	29	135	140	11
95th Queue (ft)	174	135	53	50	96	200	234	53	68	225	225	32
Link Distance (ft)		980		760	1249	1249	1249			334	334	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	225		50					325	300			200
Storage Blk Time (%)	0		5	5								1
Queuing Penalty (veh)	1		1	1								1

Intersection: 11: Gregg Street/Gregg Street & Calhoun St.

Movement	EB	WB	NB	SB	SB
Directions Served	L	L	LTR	L	TR
Maximum Queue (ft)	30	30	52	49	56
Average Queue (ft)	5	1	22	10	30
95th Queue (ft)	23	10	47	33	51
Link Distance (ft)			351		2889
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	125	275		300	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 12: Gregg Street & Colonial Drive

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	25	134	18	71	41	35
Average Queue (ft)	1	20	6	17	14	12
95th Queue (ft)	9	75	19	47	29	29
Link Distance (ft)	1144	130	2889			431
Upstream Blk Time (%)		0				
Queuing Penalty (veh)		0				
Storage Bay Dist (ft)				225	50	
Storage Blk Time (%)					0	0
Queuing Penalty (veh)					0	0

Intersection: 13: Harden Street Ext & Slighs Ave.

Movement	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	T	T	R	L	T	T
Maximum Queue (ft)	313	332	404	690	100	149	158	166
Average Queue (ft)	118	315	128	299	25	55	70	78
95th Queue (ft)	260	323	273	542	88	112	150	150
Link Distance (ft)	298	298	2529	2529			407	407
Upstream Blk Time (%)	3	92						
Queuing Penalty (veh)	0	0						
Storage Bay Dist (ft)					50	100		
Storage Blk Time (%)				27	0	3	4	
Queuing Penalty (veh)				18	1	14	5	

Intersection: 14: Colonial Drive & Farrow Road

Movement	EB	EB	NB	B38	B38	B38	SB	SB
Directions Served	R	R	L	T	T		T	TR
Maximum Queue (ft)	129	46	159	120	148	247	140	179
Average Queue (ft)	49	4	88	27	51	68	74	80
95th Queue (ft)	105	19	153	84	117	193	126	126
Link Distance (ft)	1035			217	217	217	1860	1860
Upstream Blk Time (%)						0		
Queuing Penalty (veh)						2		
Storage Bay Dist (ft)		330	550					
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 15: Farrow Road & Beltline Blvd

Movement	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	TR	L	L	T	T	R	T	T	R	L
Maximum Queue (ft)	299	366	341	108	94	257	229	294	864	916	350	322
Average Queue (ft)	59	217	198	26	65	132	130	162	565	605	291	163
95th Queue (ft)	147	334	302	69	98	212	213	270	866	907	499	285
Link Distance (ft)		1471	1471			1366	1366	1366	1860	1860		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	175			300	300						225	200
Storage Blk Time (%)		17							58			10
Queuing Penalty (veh)		15							149			17

Intersection: 15: Farrow Road & Beltline Blvd

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	246	81
Average Queue (ft)	35	20
95th Queue (ft)	138	56
Link Distance (ft)	730	730
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 16: Farrow Road & 277 NB RAMPS

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	L	TR	T	TR	L	T	T
Maximum Queue (ft)	238	28	202	403	70	88	88
Average Queue (ft)	133	13	90	114	34	38	22
95th Queue (ft)	205	35	175	271	69	83	63
Link Distance (ft)		775	730	730		627	627
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	300				250		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 17: Farrow Road & Lorick Avenue /277 SB Ramps

Movement	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	L	TR	L	T	T	T	TR
Maximum Queue (ft)	70	225	138	41	136	162	87	59
Average Queue (ft)	28	103	16	13	76	93	26	8
95th Queue (ft)	64	176	70	34	127	140	66	31
Link Distance (ft)	414		971		627	627	807	807
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)		125		200				
Storage Blk Time (%)		10	0					
Queuing Penalty (veh)		6	0					

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	TR	R	L	L	T	T	TR	L	L	TR
Maximum Queue (ft)	496	515	478	450	188	200	132	168	184	576	571	552
Average Queue (ft)	325	350	328	58	113	140	76	87	100	467	472	201
95th Queue (ft)	470	481	435	190	169	184	124	138	159	663	660	458
Link Distance (ft)	2460	2460	2460			409	409	409	409	480	480	480
Upstream Blk Time (%)										37	42	3
Queuing Penalty (veh)										0	0	0
Storage Bay Dist (ft)				275	150							
Storage Blk Time (%)	11		14		3	5						
Queuing Penalty (veh)	0		19		4	8						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	NB	B39	B39	B39	SB
Directions Served	R	T	T	T	LTR
Maximum Queue (ft)	480	396	411	454	28
Average Queue (ft)	99	130	137	73	1
95th Queue (ft)	285	351	367	300	10
Link Distance (ft)	480	3267	3267	3267	368
Upstream Blk Time (%)	0				
Queuing Penalty (veh)	0				
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 19: Main St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	250	341	306	218	178	52	53	428	452	458	214	305
Average Queue (ft)	183	215	182	151	114	10	15	229	289	307	84	164
95th Queue (ft)	259	311	284	224	184	37	44	437	456	490	148	253
Link Distance (ft)		409	409	409	409			452	452	452		588
Upstream Blk Time (%)									0	1		
Queuing Penalty (veh)									1	3		
Storage Bay Dist (ft)	175					175	150					200
Storage Blk Time (%)	14	29			0			11			0	4
Queuing Penalty (veh)	34	72			0			1			0	6

Intersection: 19: Main St. & Elmwood Avenue

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	TR	R
Maximum Queue (ft)	301	63	247	188	169	205
Average Queue (ft)	169	15	138	82	117	83
95th Queue (ft)	259	37	228	139	158	129
Link Distance (ft)	588	588		3580	3580	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			175			425
Storage Blk Time (%)			8	0		
Queuing Penalty (veh)			8	0		

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	LT
Maximum Queue (ft)	29	486	452	402	90	253	256	255	138	340	230	30
Average Queue (ft)	5	135	94	45	28	82	108	144	56	176	105	5
95th Queue (ft)	23	359	300	193	63	206	213	260	102	273	187	22
Link Distance (ft)		452	452	452		903	903	903		3075	3075	
Upstream Blk Time (%)		1	0									
Queuing Penalty (veh)		3	0									
Storage Bay Dist (ft)	200				75				200			75
Storage Blk Time (%)		10			2	4				5		
Queuing Penalty (veh)		1			10	1				5		

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	112
Average Queue (ft)	42
95th Queue (ft)	86
Link Distance (ft)	1034
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	4
Queuing Penalty (veh)	1

Intersection: 21: Barnwell St. & Calhoun St.

Movement	WB	NB	NB
Directions Served	L	L	R
Maximum Queue (ft)	30	48	48
Average Queue (ft)	1	14	22
95th Queue (ft)	10	40	47
Link Distance (ft)			503
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	225	125	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 26: Colonial Drive & Mental Health Dwy

Movement	SB
Directions Served	LR
Maximum Queue (ft)	115
Average Queue (ft)	63
95th Queue (ft)	99
Link Distance (ft)	198
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 2704

2016 Background Conditions

Intersection: 1: Bull St. & Harden St. Ext.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	TR	L	T	T	R	L	T
Maximum Queue (ft)	31	31	30	91	111	88	108	202	135	98	245	511
Average Queue (ft)	11	6	1	44	55	24	29	42	46	46	123	183
95th Queue (ft)	33	24	9	81	100	49	75	113	109	90	220	330
Link Distance (ft)		496			816	816		1090	1090	1090		1612
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	100		200	675			175				200	
Storage Blk Time (%)								0			2	5
Queuing Penalty (veh)								0			14	20

Intersection: 1: Bull St. & Harden St. Ext.

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	518	310
Average Queue (ft)	177	130
95th Queue (ft)	333	253
Link Distance (ft)	1612	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		250
Storage Blk Time (%)	2	0
Queuing Penalty (veh)	14	1

Intersection: 2: Bull St. & Confederate Ave.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	R	L	T	T
Maximum Queue (ft)	46	52	53	74	46	88	86	125	61	350	1058	1067
Average Queue (ft)	6	20	10	21	10	28	29	57	10	114	449	460
95th Queue (ft)	27	48	34	62	30	75	75	124	36	361	903	906
Link Distance (ft)		540		647		578	578	578	578		1090	1090
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150		200		200					150		
Storage Blk Time (%)												45
Queuing Penalty (veh)												30

Intersection: 2: Bull St. & Confederate Ave.

Movement	SB
Directions Served	TR
Maximum Queue (ft)	1058
Average Queue (ft)	424
95th Queue (ft)	868
Link Distance (ft)	1090
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Bull St. & Colonial Drive

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	R	L	LTR	T	T	TR	L	T	T	TR
Maximum Queue (ft)	27	123	151	151	168	229	300	617	652	635
Average Queue (ft)	4	59	93	53	69	116	68	468	486	464
95th Queue (ft)	20	111	145	106	134	232	268	823	833	832
Link Distance (ft)	381		613	406	406	406		578	578	578
Upstream Blk Time (%)								14	20	13
Queuing Penalty (veh)								108	155	97
Storage Bay Dist (ft)		150					200			
Storage Blk Time (%)			0					61		
Queuing Penalty (veh)			0					12		

Intersection: 4: Bull St. & Franklin Street /Freed Drive

Movement	EB	WB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	T	TR
Maximum Queue (ft)	29	29	26	455	470	464
Average Queue (ft)	4	2	1	373	380	368
95th Queue (ft)	18	14	9	585	592	593
Link Distance (ft)	281	470		406	406	406
Upstream Blk Time (%)				19	27	17
Queuing Penalty (veh)				149	214	137
Storage Bay Dist (ft)			150			
Storage Blk Time (%)				56		
Queuing Penalty (veh)				0		

Intersection: 5: Bull St. & Jefferson Street

Movement	EB	SB	SB	SB
Directions Served	LR	T	T	TR
Maximum Queue (ft)	97	452	443	449
Average Queue (ft)	19	374	380	365
95th Queue (ft)	60	497	500	523
Link Distance (ft)	352	378	378	378
Upstream Blk Time (%)		37	46	33
Queuing Penalty (veh)		290	356	257
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Bull St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	LT	R	R	LT	TR	L	L	T	TR	L	T
Maximum Queue (ft)	824	969	947	916	29	53	300	443	178	250	150	675
Average Queue (ft)	518	750	832	768	4	8	215	265	76	129	22	645
95th Queue (ft)	900	1151	1100	1139	19	33	364	463	145	203	83	662
Link Distance (ft)		901	901	901		288		418	418	418		634
Upstream Blk Time (%)		13	33	11				2				42
Queuing Penalty (veh)		69	173	58				7				329
Storage Bay Dist (ft)	775				125		175				100	
Storage Blk Time (%)	0	10					45	58				61
Queuing Penalty (veh)	1	50					76	98				20

Intersection: 6: Bull St. & Elmwood Avenue

Movement	SB	SB
Directions Served	TR	R
Maximum Queue (ft)	674	698
Average Queue (ft)	652	619
95th Queue (ft)	672	781
Link Distance (ft)	634	634
Upstream Blk Time (%)	46	23
Queuing Penalty (veh)	358	178
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: Bull St. & Calhoun St.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	T
Maximum Queue (ft)	190	234	195	70	118	179	90	251	269	112	233	189
Average Queue (ft)	86	133	79	17	68	94	22	78	126	48	114	129
95th Queue (ft)	148	210	160	53	111	157	57	165	215	95	185	177
Link Distance (ft)		981	981		376	376		1849	1849		418	418
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150			175			150			150		
Storage Blk Time (%)	2	9						0			1	
Queuing Penalty (veh)	2	8						0			2	

Intersection: 7: Bull St. & Calhoun St.

Movement	SB
Directions Served	R
Maximum Queue (ft)	30
Average Queue (ft)	7
95th Queue (ft)	26
Link Distance (ft)	418
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	EB	EB	EB	WB	WB	WB	WB	B42	NB	NB	NB	SB
Directions Served	L	T	TR	L	L	T	TR	T	L	T	T	L
Maximum Queue (ft)	84	102	139	229	300	257	228	399	173	176	174	40
Average Queue (ft)	21	48	59	214	260	112	91	41	82	82	87	7
95th Queue (ft)	56	94	124	253	329	195	167	176	160	157	146	25
Link Distance (ft)		913			229	229	229	655		407	407	
Upstream Blk Time (%)				2	11	1	0					
Queuing Penalty (veh)				0	39	2	0					
Storage Bay Dist (ft)	225		800	175					225			300
Storage Blk Time (%)				15	24							
Queuing Penalty (veh)				53	84							

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	170	180
Average Queue (ft)	90	97
95th Queue (ft)	143	157
Link Distance (ft)	2006	2006
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Harden St./Harden Street Ext & Calhoun St.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	135	144	29	96	141	234	264	190	48	308	346	65
Average Queue (ft)	45	56	3	28	66	142	161	47	14	134	149	16
95th Queue (ft)	94	119	17	69	117	217	233	162	38	252	256	40
Link Distance (ft)		728		1087	2481	2481	2481			429	429	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	225		50					325	300			200
Storage Blk Time (%)				11						0	3	
Queuing Penalty (veh)				1						0	2	

Intersection: 11: Gregg Street/Gregg Street & Calhoun St.

Movement	EB	WB	NB	SB	SB
Directions Served	L	L	LTR	L	TR
Maximum Queue (ft)	30	31	32	30	55
Average Queue (ft)	6	3	24	2	25
95th Queue (ft)	26	19	43	14	53
Link Distance (ft)			470		2947
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	125	275		300	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 12: Gregg Street & Colonial Drive

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	45	94	29	30	27	30
Average Queue (ft)	6	37	1	15	3	8
95th Queue (ft)	27	88	10	38	16	29
Link Distance (ft)	1244	89	2947			533
Upstream Blk Time (%)		0				
Queuing Penalty (veh)		1				
Storage Bay Dist (ft)				225	50	
Storage Blk Time (%)						0
Queuing Penalty (veh)						0

Intersection: 13: Harden Street Ext & Slighs Ave.

Movement	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	T	T	R	L	T	T
Maximum Queue (ft)	205	336	138	203	100	98	140	158
Average Queue (ft)	93	156	66	74	16	37	51	64
95th Queue (ft)	162	262	127	153	66	80	111	134
Link Distance (ft)	340	340	2429	2429			407	407
Upstream Blk Time (%)		0						
Queuing Penalty (veh)		0						
Storage Bay Dist (ft)					50	100		
Storage Blk Time (%)				19	0	1	2	
Queuing Penalty (veh)				12	0	4	2	

Intersection: 14: Colonial Drive & Farrow Road

Movement	EB	EB	NB	SB	SB
Directions Served	R	R	L	T	TR
Maximum Queue (ft)	131	56	117	226	173
Average Queue (ft)	60	8	49	80	72
95th Queue (ft)	115	29	94	163	146
Link Distance (ft)	861			1955	1955
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		330	550		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 15: Farrow Road & Beltline Blvd

Movement	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	T	T	R	T	T	L	T
Maximum Queue (ft)	45	240	237	177	212	260	238	97	108	122	324	372
Average Queue (ft)	13	161	138	53	96	165	146	47	38	62	119	155
95th Queue (ft)	39	215	210	133	164	230	220	84	84	101	230	273
Link Distance (ft)		1459	1459			1124	1124	1124	1955	1955		798
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	175			300	300						200	
Storage Blk Time (%)		6									1	3
Queuing Penalty (veh)		1									6	9

Intersection: 15: Farrow Road & Beltline Blvd

Movement	SB
Directions Served	TR
Maximum Queue (ft)	353
Average Queue (ft)	159
95th Queue (ft)	307
Link Distance (ft)	798
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Farrow Road & 277 NB RAMPS

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	L	TR	T	TR	L	T	T
Maximum Queue (ft)	132	28	14	56	22	101	139
Average Queue (ft)	48	3	2	11	9	52	62
95th Queue (ft)	94	17	10	39	27	90	117
Link Distance (ft)		655	798	798		602	602
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	300				250		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 17: Farrow Road & Lorick Avenue /277 SB Ramps

Movement	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	L	TR	L	T	T	T	TR
Maximum Queue (ft)	27	275	513	39	139	130	316	248
Average Queue (ft)	8	256	275	3	22	34	132	100
95th Queue (ft)	27	313	559	17	75	87	245	235
Link Distance (ft)	620		968		602	602	779	779
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)		125		200				
Storage Blk Time (%)		40	0					
Queuing Penalty (veh)		19	0					

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	TR	R	L	L	T	T	TR	L	L	TR
Maximum Queue (ft)	1959	2058	2042	450	225	417	88	67	138	178	148	137
Average Queue (ft)	774	858	885	348	192	247	8	25	53	102	92	75
95th Queue (ft)	1640	1736	1759	617	260	372	39	62	99	154	137	112
Link Distance (ft)	3646	3646	3646			410	410	410	410	442	442	442
Upstream Blk Time (%)						0						
Queuing Penalty (veh)						2						
Storage Bay Dist (ft)				275	150							
Storage Blk Time (%)	20		44		19	32						
Queuing Penalty (veh)	0		96		56	93						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	NB
Directions Served	R
Maximum Queue (ft)	111
Average Queue (ft)	38
95th Queue (ft)	86
Link Distance (ft)	442
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 19: Main St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	144	144	443	444	471	275	199	321	313	308	49	107
Average Queue (ft)	71	97	194	182	160	15	127	131	140	143	20	41
95th Queue (ft)	128	141	417	418	383	100	194	221	266	251	46	80
Link Distance (ft)		410	410	410	410			450	450	450		372
Upstream Blk Time (%)			1	1	1							
Queuing Penalty (veh)			4	3	4							
Storage Bay Dist (ft)	175					175	150				200	
Storage Blk Time (%)					13		27	3				
Queuing Penalty (veh)					8		122	2				

Intersection: 19: Main St. & Elmwood Avenue

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	TR	R
Maximum Queue (ft)	94	22	250	458	436	275
Average Queue (ft)	20	4	199	266	278	99
95th Queue (ft)	57	16	311	406	400	183
Link Distance (ft)	372	372		3606	3606	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			175			425
Storage Blk Time (%)			31	20	0	
Queuing Penalty (veh)			73	43	1	

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	LT
Maximum Queue (ft)	274	486	486	496	123	161	150	145	52	52	52	49
Average Queue (ft)	11	254	235	215	56	49	46	61	23	10	18	13
95th Queue (ft)	95	561	538	516	110	143	116	132	53	35	43	38
Link Distance (ft)		450	450	450		901	901	901		1633	1633	
Upstream Blk Time (%)		8	4	2								
Queuing Penalty (veh)		62	27	16								
Storage Bay Dist (ft)	200				75				200			75
Storage Blk Time (%)		28			10	1						
Queuing Penalty (veh)		3			48	1						

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	134
Average Queue (ft)	77
95th Queue (ft)	130
Link Distance (ft)	1034
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	18
Queuing Penalty (veh)	11

Intersection: 21: Barnwell St. & Calhoun St.

Movement	WB	NB	NB
Directions Served	L	L	R
Maximum Queue (ft)	31	28	28
Average Queue (ft)	7	3	8
95th Queue (ft)	28	17	28
Link Distance (ft)			811
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	225	125	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 26: Colonial Drive & Mental Health Dwy

Movement	EB	WB	SB
Directions Served	L	TR	LR
Maximum Queue (ft)	53	22	29
Average Queue (ft)	14	1	4
95th Queue (ft)	42	8	20
Link Distance (ft)		1244	295
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	100		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 4194

Intersection: 1: Bull St. & Harden St. Ext.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	TR	L	T	T	R	L	T
Maximum Queue (ft)	58	51	49	750	875	709	22	1039	1025	928	136	141
Average Queue (ft)	19	15	14	534	555	201	2	513	535	110	58	74
95th Queue (ft)	49	42	38	858	912	454	11	1008	1040	502	108	133
Link Distance (ft)		561			948	948		1102	1102	1102		1951
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	100		200	675			175				200	
Storage Blk Time (%)				16	25			22				
Queuing Penalty (veh)				37	58			1				

Intersection: 1: Bull St. & Harden St. Ext.

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	171	89
Average Queue (ft)	75	24
95th Queue (ft)	146	69
Link Distance (ft)	1951	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		250
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Bull St. & Confederate Ave.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	L	T	T	TR
Maximum Queue (ft)	94	72	133	283	90	224	236	246	66	217	276	294
Average Queue (ft)	28	24	42	125	20	159	174	120	12	100	119	111
95th Queue (ft)	79	62	97	218	60	219	230	207	45	183	219	213
Link Distance (ft)		542		307		557	557	557		1102	1102	1102
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150		200		200				150			
Storage Blk Time (%)				3		4				1		
Queuing Penalty (veh)				2		2				0		

Intersection: 3: Bull St. & Colonial Drive

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	R	L	LTR	T	T	TR	L	T	T	TR
Maximum Queue (ft)	51	249	289	286	284	202	38	59	96	72
Average Queue (ft)	3	143	179	134	159	115	10	16	35	27
95th Queue (ft)	20	218	254	228	251	198	31	46	72	59
Link Distance (ft)	380		586	293	293	293		557	557	557
Upstream Blk Time (%)				0	0					
Queuing Penalty (veh)				0	1					
Storage Bay Dist (ft)		150					200			
Storage Blk Time (%)		9	22							
Queuing Penalty (veh)		23	41							

Intersection: 4: Bull St. & Franklin Street /Freed Drive

Movement	EB	WB	NB
Directions Served	LTR	LTR	TR
Maximum Queue (ft)	72	25	25
Average Queue (ft)	11	1	1
95th Queue (ft)	47	10	9
Link Distance (ft)	460	536	459
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Bull St. & Jefferson Street

Movement	EB	NB	SB	SB	SB
Directions Served	LR	L	T	T	TR
Maximum Queue (ft)	30	27	149	162	188
Average Queue (ft)	12	1	11	27	26
95th Queue (ft)	35	9	69	110	115
Link Distance (ft)	197		459	459	459
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		175			
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: Bull St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	LT	R	R	LT	TR	L	L	T	TR	L	T
Maximum Queue (ft)	589	592	529	468	102	160	300	439	455	459	25	722
Average Queue (ft)	348	360	168	46	46	75	276	370	320	328	1	406
95th Queue (ft)	543	566	389	215	93	134	344	505	495	497	8	741
Link Distance (ft)		903	903	903		235		422	422	422		692
Upstream Blk Time (%)								41	2	4		1
Queuing Penalty (veh)								234	12	20		8
Storage Bay Dist (ft)	775				125		175				100	
Storage Blk Time (%)						3	70	79				65
Queuing Penalty (veh)						2	153	171				2

Intersection: 6: Bull St. & Elmwood Avenue

Movement	SB	SB
Directions Served	TR	R
Maximum Queue (ft)	715	717
Average Queue (ft)	441	421
95th Queue (ft)	774	792
Link Distance (ft)	692	692
Upstream Blk Time (%)	4	4
Queuing Penalty (veh)	25	24
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: Bull St. & Calhoun St.

Movement	EB	EB	EB	WB	WB	WB	B8	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	T	L	T	TR	L	T
Maximum Queue (ft)	190	891	847	48	324	643	855	224	1850	1874	224	356
Average Queue (ft)	118	328	289	5	99	331	168	61	1397	1415	142	122
95th Queue (ft)	228	901	865	24	236	699	681	203	2201	2190	259	265
Link Distance (ft)		878	878		592	592	844		1835	1835		422
Upstream Blk Time (%)		21				27	11		35	37		
Queuing Penalty (veh)		0				40	32		0	0		
Storage Bay Dist (ft)	150			175				150			150	
Storage Blk Time (%)	46				1				51		45	0
Queuing Penalty (veh)	35				0				17		221	0

Intersection: 7: Bull St. & Calhoun St.

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	341	54
Average Queue (ft)	131	15
95th Queue (ft)	241	43
Link Distance (ft)	422	422
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	T	TR	L	T	T	L	T
Maximum Queue (ft)	64	212	331	198	204	106	66	111	176	161	102	251
Average Queue (ft)	13	108	156	132	151	63	35	40	44	29	29	137
95th Queue (ft)	41	178	253	177	197	98	62	84	97	80	67	221
Link Distance (ft)		901			230	230	230		407	407		1839
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	225		800	175				225			300	
Storage Blk Time (%)		0		0	4							
Queuing Penalty (veh)		0		1	8							

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	SB
Directions Served	TR
Maximum Queue (ft)	243
Average Queue (ft)	114
95th Queue (ft)	193
Link Distance (ft)	1839
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 10: Harden St./Harden Street Ext & Calhoun St.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	133	194	48	72	94	279	247	149	47	180	222	51
Average Queue (ft)	65	58	17	15	49	110	129	20	21	108	115	15
95th Queue (ft)	113	129	42	47	88	214	229	69	44	189	199	43
Link Distance (ft)		980		761	1249	1249	1249			342	342	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	225		50					325	300			200
Storage Blk Time (%)			3	3								0
Queuing Penalty (veh)			1	1								0

Intersection: 11: Gregg Street/Gregg Street & Calhoun St.

Movement	EB	WB	WB	NB	SB	SB
Directions Served	L	L	TR	LTR	L	TR
Maximum Queue (ft)	30	30	224	31	29	93
Average Queue (ft)	2	2	4	24	10	25
95th Queue (ft)	14	12	39	43	32	51
Link Distance (ft)			980	351		2889
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	125	275			300	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 12: Gregg Street & Colonial Drive

Movement	WB	NB	NB	SB	SB
Directions Served	LTR	L	TR	L	TR
Maximum Queue (ft)	52	64	55	38	31
Average Queue (ft)	12	9	15	14	10
95th Queue (ft)	43	32	37	29	20
Link Distance (ft)	130	2889			431
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			225	50	
Storage Blk Time (%)				0	0
Queuing Penalty (veh)				0	0

Intersection: 13: Harden Street Ext & Slighs Ave.

Movement	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	T	T	R	L	T	T
Maximum Queue (ft)	160	313	309	507	100	115	148	118
Average Queue (ft)	61	187	111	311	34	62	52	62
95th Queue (ft)	123	302	209	483	102	106	117	112
Link Distance (ft)	298	298	2524	2524			407	407
Upstream Blk Time (%)		2						
Queuing Penalty (veh)		0						
Storage Bay Dist (ft)					50	100		
Storage Blk Time (%)				32	0	2	1	
Queuing Penalty (veh)				21	2	11	1	

Intersection: 14: Colonial Drive & Farrow Road

Movement	EB	EB	NB	B38	B38	B38	SB	SB
Directions Served	R	R	L	T	T		T	TR
Maximum Queue (ft)	129	32	180	137	162	251	118	118
Average Queue (ft)	48	3	85	45	61	85	75	62
95th Queue (ft)	103	14	149	108	132	217	119	107
Link Distance (ft)	1035			230	230	230	1860	1860
Upstream Blk Time (%)							0	
Queuing Penalty (veh)							2	
Storage Bay Dist (ft)		330	550					
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 15: Farrow Road & Beltline Blvd

Movement	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	TR	L	L	T	T	R	T	T	R	L
Maximum Queue (ft)	227	268	285	124	135	256	261	290	396	486	350	272
Average Queue (ft)	105	190	179	20	48	117	93	147	263	299	102	147
95th Queue (ft)	187	252	250	71	94	174	154	249	373	406	355	237
Link Distance (ft)		1471	1471			1366	1366	1366	1860	1860		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	175			300	300						225	200
Storage Blk Time (%)	3	12								18		6
Queuing Penalty (veh)	6	11								47		9

Intersection: 15: Farrow Road & Beltline Blvd

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	161	130
Average Queue (ft)	33	35
95th Queue (ft)	95	86
Link Distance (ft)	730	730
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 16: Farrow Road & 277 NB RAMPS

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	L	TR	T	TR	L	T	T
Maximum Queue (ft)	238	29	120	376	69	111	108
Average Queue (ft)	122	8	24	97	28	53	35
95th Queue (ft)	220	29	78	276	56	101	88
Link Distance (ft)		775	730	730		627	627
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	300				250		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 17: Farrow Road & Lorick Avenue /277 SB Ramps

Movement	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	L	TR	L	T	T	T	TR
Maximum Queue (ft)	70	212	217	24	108	693	110	60
Average Queue (ft)	27	94	24	9	40	64	31	6
95th Queue (ft)	58	170	95	28	91	271	89	28
Link Distance (ft)	414		971		627	627	807	807
Upstream Blk Time (%)						0		
Queuing Penalty (veh)						1		
Storage Bay Dist (ft)		125		200				
Storage Blk Time (%)		7						
Queuing Penalty (veh)		4						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	TR	R	L	L	T	T	TR	L	L	TR
Maximum Queue (ft)	412	436	480	450	157	191	135	159	171	571	552	259
Average Queue (ft)	270	318	293	53	89	118	57	87	106	419	428	136
95th Queue (ft)	377	417	409	221	150	172	113	140	159	603	601	210
Link Distance (ft)	2460	2460	2460			409	409	409	409	480	480	480
Upstream Blk Time (%)										16	20	
Queuing Penalty (veh)										0	0	
Storage Bay Dist (ft)				275	150							
Storage Blk Time (%)	5		10		0	4						
Queuing Penalty (veh)	0		14		1	6						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	NB	B27	B27	B27	SB
Directions Served	R	T	T	T	LTR
Maximum Queue (ft)	177	309	310	50	28
Average Queue (ft)	76	44	45	2	2
95th Queue (ft)	154	190	191	17	11
Link Distance (ft)	480	3267	3267	3267	368
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 19: Main St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	250	432	418	240	210	53	224	420	443	455	285	261
Average Queue (ft)	184	235	207	157	124	12	10	200	300	309	97	164
95th Queue (ft)	254	388	324	226	194	39	31	390	442	454	185	224
Link Distance (ft)		409	409	409	409			452	452	452		588
Upstream Blk Time (%)		3	2						0	0		
Queuing Penalty (veh)		14	9						0	2		
Storage Bay Dist (ft)	175					175	150				200	
Storage Blk Time (%)	21	32			1			8				5
Queuing Penalty (veh)	50	76			1			1				7

Intersection: 19: Main St. & Elmwood Avenue

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	TR	R
Maximum Queue (ft)	265	63	233	176	180	156
Average Queue (ft)	167	14	123	84	110	75
95th Queue (ft)	228	33	197	152	165	123
Link Distance (ft)	588	588		3580	3580	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			175		425	
Storage Blk Time (%)			4	0		
Queuing Penalty (veh)			4	0		

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	LT
Maximum Queue (ft)	29	293	234	97	72	194	185	257	292	272	246	30
Average Queue (ft)	7	68	47	14	20	52	94	111	64	174	83	9
95th Queue (ft)	26	178	139	49	54	152	179	222	147	259	172	29
Link Distance (ft)		452	452	452		903	903	903		3075	3075	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200				75				200			75
Storage Blk Time (%)		0			1	2				6		
Queuing Penalty (veh)		0			3	1				5		

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	96
Average Queue (ft)	44
95th Queue (ft)	81
Link Distance (ft)	1034
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	4
Queuing Penalty (veh)	1

Intersection: 21: Barnwell St. & Calhoun St.

Movement	WB	WB	NB	NB
Directions Served	L	T	L	R
Maximum Queue (ft)	30	374	51	51
Average Queue (ft)	1	31	20	20
95th Queue (ft)	10	191	44	45
Link Distance (ft)		362		564
Upstream Blk Time (%)		5		
Queuing Penalty (veh)		14		
Storage Bay Dist (ft)	225		125	
Storage Blk Time (%)		8		
Queuing Penalty (veh)		0		

Intersection: 26: Colonial Drive & Mental Health Dwy

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	29	112
Average Queue (ft)	2	52
95th Queue (ft)	14	90
Link Distance (ft)		432
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 1497

2016 Build Conditions
Phase I
Initial Project Development

Intersection: 1: Bull St. & Harden St. Ext.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	TR	L	T	T	R	L	T
Maximum Queue (ft)	52	30	30	307	320	45	45	88	93	81	300	1664
Average Queue (ft)	11	3	8	125	131	15	12	24	30	42	213	842
95th Queue (ft)	35	16	29	286	301	40	35	54	72	88	374	2032
Link Distance (ft)		496			816	816		1090	1090	1090		1612
Upstream Blk Time (%)												32
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	100		200	675			175				200	
Storage Blk Time (%)											3	43
Queuing Penalty (veh)											22	179

Intersection: 1: Bull St. & Harden St. Ext.

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	1664	400
Average Queue (ft)	846	248
95th Queue (ft)	2026	524
Link Distance (ft)	1612	
Upstream Blk Time (%)	23	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		250
Storage Blk Time (%)	42	38
Queuing Penalty (veh)	321	285

Intersection: 2: Bull St. & Confederate Ave.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	R	L	T	T
Maximum Queue (ft)	28	52	31	72	45	105	107	149	38	350	1131	1133
Average Queue (ft)	5	18	12	20	12	22	21	50	8	159	738	751
95th Queue (ft)	21	44	35	55	36	68	64	118	22	415	1494	1503
Link Distance (ft)		540		647		578	578	578	578		1090	1090
Upstream Blk Time (%)											20	25
Queuing Penalty (veh)											161	199
Storage Bay Dist (ft)	150		200		200					150		
Storage Blk Time (%)												58
Queuing Penalty (veh)												38

Intersection: 2: Bull St. & Confederate Ave.

Movement	SB
Directions Served	TR
Maximum Queue (ft)	1138
Average Queue (ft)	741
95th Queue (ft)	1503
Link Distance (ft)	1090
Upstream Blk Time (%)	20
Queuing Penalty (veh)	162
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Bull St. & Colonial Drive

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	R	L	LTR	T	T	TR	L	T	T	TR
Maximum Queue (ft)	29	131	203	165	145	348	300	616	644	623
Average Queue (ft)	8	65	96	54	64	102	114	495	510	503
95th Queue (ft)	28	128	163	112	126	244	343	799	797	796
Link Distance (ft)	381		541	406	406	406		578	578	578
Upstream Blk Time (%)								21	25	18
Queuing Penalty (veh)								162	197	142
Storage Bay Dist (ft)		150					200			
Storage Blk Time (%)		0	3					68		
Queuing Penalty (veh)		0	3					26		

Intersection: 4: Bull St. & Franklin Street /Freed Drive

Movement	EB	WB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	TR	L	T	T	TR
Maximum Queue (ft)	31	73	42	149	481	470	451
Average Queue (ft)	7	36	2	13	406	406	387
95th Queue (ft)	24	72	15	76	563	554	564
Link Distance (ft)	281	470	376		406	406	406
Upstream Blk Time (%)					26	34	24
Queuing Penalty (veh)					206	266	188
Storage Bay Dist (ft)				50			
Storage Blk Time (%)					66		
Queuing Penalty (veh)					4		

Intersection: 5: Bull St. & Jefferson Street /Williams Street

Movement	EB	EB	SB	SB	SB
Directions Served	L	R	T	T	TR
Maximum Queue (ft)	30	74	430	450	449
Average Queue (ft)	4	13	389	396	386
95th Queue (ft)	19	44	426	438	472
Link Distance (ft)	352	352	376	376	376
Upstream Blk Time (%)			44	51	35
Queuing Penalty (veh)			339	400	274
Storage Bay Dist (ft)					
Storage Blk Time (%)			69		
Queuing Penalty (veh)			0		

Intersection: 6: Bull St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	LT	R	R	LT	TR	L	L	T	TR	L	T
Maximum Queue (ft)	825	924	940	908	49	52	300	442	246	304	149	704
Average Queue (ft)	513	624	787	733	8	15	282	364	79	141	36	636
95th Queue (ft)	861	945	1008	967	32	43	330	484	173	263	124	662
Link Distance (ft)		901	901	901		288		418	418	418		621
Upstream Blk Time (%)		3	5	1				32				48
Queuing Penalty (veh)		13	25	5				104				377
Storage Bay Dist (ft)	775				125		175				100	
Storage Blk Time (%)	0	4					78	89				64
Queuing Penalty (veh)	2	22					131	148				23

Intersection: 6: Bull St. & Elmwood Avenue

Movement	SB	SB
Directions Served	TR	R
Maximum Queue (ft)	688	674
Average Queue (ft)	644	617
95th Queue (ft)	668	699
Link Distance (ft)	621	621
Upstream Blk Time (%)	55	26
Queuing Penalty (veh)	431	203
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: Bull St. & Calhoun St.

Movement	EB	EB	EB	WB	WB	WB	B8	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	T	L	T	TR	L	T
Maximum Queue (ft)	194	1015	956	71	446	447	591	224	759	799	130	153
Average Queue (ft)	109	328	257	23	71	178	29	46	232	249	53	86
95th Queue (ft)	212	922	850	59	126	403	187	154	573	605	93	148
Link Distance (ft)		981	981		376	376	1066		1849	1849		418
Upstream Blk Time (%)		16				13						
Queuing Penalty (veh)		0				16						
Storage Bay Dist (ft)	150			175				150			150	
Storage Blk Time (%)	31	2							29			0
Queuing Penalty (veh)	32	1							7			0

Intersection: 7: Bull St. & Calhoun St.

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	199	30
Average Queue (ft)	108	14
95th Queue (ft)	176	37
Link Distance (ft)	418	418
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	EB	EB	EB	WB	WB	WB	WB	B58	NB	NB	NB	SB
Directions Served	L	T	TR	L	L	T	TR	T	L	T	T	L
Maximum Queue (ft)	81	102	202	221	310	219	181	267	178	151	148	39
Average Queue (ft)	23	47	76	215	276	104	75	92	71	69	84	4
95th Queue (ft)	61	87	148	236	330	173	154	223	139	129	139	18
Link Distance (ft)		913			222	222	222	664		412	412	
Upstream Blk Time (%)				1	14	0						
Queuing Penalty (veh)				0	53	1						
Storage Bay Dist (ft)	225		800	175					225			300
Storage Blk Time (%)				18	28							
Queuing Penalty (veh)				62	97							

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	133	160
Average Queue (ft)	73	88
95th Queue (ft)	129	143
Link Distance (ft)	2005	2005
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Harden St./Harden Street Ext & Calhoun St.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	112	188	46	92	116	286	248	212	46	204	262	70
Average Queue (ft)	44	42	4	20	67	129	149	27	13	98	122	11
95th Queue (ft)	93	107	22	62	107	218	235	117	40	194	232	35
Link Distance (ft)		728		1087	2481	2481	2481			356	356	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	225		50					325	300			200
Storage Blk Time (%)			1	6								1
Queuing Penalty (veh)			0	0								1

Intersection: 11: Gregg Street/Gregg Street & Calhoun St.

Movement	EB	WB	NB	SB	SB
Directions Served	L	L	LTR	L	TR
Maximum Queue (ft)	31	31	54	30	53
Average Queue (ft)	9	2	23	4	26
95th Queue (ft)	31	15	50	21	47
Link Distance (ft)			470		2947
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	125	275		300	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 12: Gregg Street & Colonial Drive

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	46	115	29	30	26	29
Average Queue (ft)	3	30	9	19	5	5
95th Queue (ft)	20	86	29	41	20	22
Link Distance (ft)	1046	89	2947			533
Upstream Blk Time (%)		0				
Queuing Penalty (veh)		3				
Storage Bay Dist (ft)				225	50	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 13: Harden Street Ext & Slighs Ave.

Movement	WB	NB	NB	NB	SB	SB	SB
Directions Served	LR	T	T	R	L	T	T
Maximum Queue (ft)	355	109	159	53	150	380	412
Average Queue (ft)	201	55	71	12	89	215	221
95th Queue (ft)	330	104	138	40	171	329	335
Link Distance (ft)	340	2502	2502			412	412
Upstream Blk Time (%)	2						0
Queuing Penalty (veh)	0						0
Storage Bay Dist (ft)				50	100		
Storage Blk Time (%)			23	0	3	24	
Queuing Penalty (veh)			15	1	18	28	

Intersection: 14: Colonial Drive & Farrow Road

Movement	EB	EB	NB	SB	SB
Directions Served	R	R	L	T	TR
Maximum Queue (ft)	131	42	118	211	142
Average Queue (ft)	51	9	64	86	63
95th Queue (ft)	99	26	113	174	127
Link Distance (ft)	861			1955	1955
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		330	550		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 15: Farrow Road & Beltline Blvd

Movement	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	T	T	R	T	T	L	T
Maximum Queue (ft)	24	220	207	146	151	241	221	72	83	116	177	260
Average Queue (ft)	7	147	125	68	95	129	111	37	38	57	100	151
95th Queue (ft)	24	218	204	130	147	221	182	64	81	101	155	239
Link Distance (ft)		1459	1459			1124	1124	1124	1955	1955		798
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	175			300	300						200	
Storage Blk Time (%)			4									3
Queuing Penalty (veh)			1									7

Intersection: 15: Farrow Road & Beltline Blvd

Movement	SB
Directions Served	TR
Maximum Queue (ft)	276
Average Queue (ft)	159
95th Queue (ft)	252
Link Distance (ft)	798
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Farrow Road & 277 NB RAMPS

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	L	TR	T	TR	L	T	T
Maximum Queue (ft)	158	28	35	55	64	99	83
Average Queue (ft)	45	4	4	7	16	41	44
95th Queue (ft)	99	19	20	30	42	90	95
Link Distance (ft)		655	798	798		602	602
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	300				250		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 17: Farrow Road & Lorick Avenue /277 SB Ramps

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	R	L	TR	L	T	T	T	TR
Maximum Queue (ft)	27	56	275	670	39	79	670	262	264
Average Queue (ft)	6	2	253	294	4	17	49	156	132
95th Queue (ft)	23	19	312	613	22	50	250	251	225
Link Distance (ft)	620	620		968		602	602	779	779
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			125		200				
Storage Blk Time (%)			41						
Queuing Penalty (veh)			19						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	TR	R	L	L	T	T	TR	L	L	TR
Maximum Queue (ft)	735	804	858	450	225	416	44	86	108	154	166	140
Average Queue (ft)	426	513	520	267	170	239	5	28	59	108	99	72
95th Queue (ft)	687	765	796	591	269	435	24	72	104	152	159	123
Link Distance (ft)	3646	3646	3646			410	410	410	410	442	442	442
Upstream Blk Time (%)						4						
Queuing Penalty (veh)						21						
Storage Bay Dist (ft)				275	150							
Storage Blk Time (%)	9		31		16	26						
Queuing Penalty (veh)	0		66		46	76						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	NB
Directions Served	R
Maximum Queue (ft)	126
Average Queue (ft)	44
95th Queue (ft)	97
Link Distance (ft)	442
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 19: Main St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	197	178	189	149	124	49	225	502	480	509	49	108
Average Queue (ft)	83	109	103	90	66	9	198	390	367	223	13	56
95th Queue (ft)	139	164	174	133	113	34	274	602	616	497	38	99
Link Distance (ft)		410	410	410	410			450	450	450		372
Upstream Blk Time (%)								43	27	1		
Queuing Penalty (veh)								204	129	5		
Storage Bay Dist (ft)	175					175	150					200
Storage Blk Time (%)	0	1					84	22				
Queuing Penalty (veh)	0	1					384	16				

Intersection: 19: Main St. & Elmwood Avenue

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	TR	R
Maximum Queue (ft)	94	21	250	438	438	185
Average Queue (ft)	29	6	154	201	242	94
95th Queue (ft)	82	20	270	337	361	154
Link Distance (ft)	372	372		3606	3606	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			175			425
Storage Blk Time (%)			7	16	0	
Queuing Penalty (veh)			17	36	1	

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	LT
Maximum Queue (ft)	29	158	154	101	124	906	934	927	217	31	31	125
Average Queue (ft)	9	56	40	22	65	456	424	350	61	9	12	47
95th Queue (ft)	30	126	111	65	149	1047	1039	847	155	31	35	120
Link Distance (ft)		450	450	450		901	901	901		1633	1633	
Upstream Blk Time (%)						7	5	0				
Queuing Penalty (veh)						35	25	2				
Storage Bay Dist (ft)	200				75				200			75
Storage Blk Time (%)					9	60			3			2
Queuing Penalty (veh)					40	52			0			1

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	162
Average Queue (ft)	96
95th Queue (ft)	162
Link Distance (ft)	1034
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	30
Queuing Penalty (veh)	18

Intersection: 21: Barnwell St. & Calhoun St.

Movement	WB	NB	NB	SB
Directions Served	L	L	TR	TR
Maximum Queue (ft)	30	30	31	31
Average Queue (ft)	3	2	7	2
95th Queue (ft)	18	14	27	15
Link Distance (ft)			684	638
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	225	125		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 26: Colonial Drive & Mental Health Dwy

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	50	28
Average Queue (ft)	16	10
95th Queue (ft)	42	31
Link Distance (ft)		363
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 27: Boyce Street & Colonial Drive

Movement	WB	NB	NB
Directions Served	LT	L	R
Maximum Queue (ft)	56	30	27
Average Queue (ft)	7	1	2
95th Queue (ft)	31	9	13
Link Distance (ft)	1046	784	784
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 6600

Intersection: 1: Bull St. & Harden St. Ext.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	TR	L	T	T	R	L	T
Maximum Queue (ft)	56	51	29	733	770	726	22	1104	1075	482	116	177
Average Queue (ft)	23	15	11	571	587	321	3	482	473	49	55	94
95th Queue (ft)	57	44	33	712	742	646	15	995	991	193	99	168
Link Distance (ft)		561			948	948		1102	1102	1102		1951
Upstream Blk Time (%)								0				
Queuing Penalty (veh)								0				
Storage Bay Dist (ft)	100		200	675			175				200	
Storage Blk Time (%)				2	6			17				
Queuing Penalty (veh)				4	14			1				

Intersection: 1: Bull St. & Harden St. Ext.

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	202	196
Average Queue (ft)	91	40
95th Queue (ft)	160	110
Link Distance (ft)	1951	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		250
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Bull St. & Confederate Ave.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	R	L	T	T
Maximum Queue (ft)	52	53	92	266	300	571	610	518	20	27	182	197
Average Queue (ft)	24	21	42	134	71	323	358	259	3	3	112	127
95th Queue (ft)	52	49	87	249	248	520	537	446	14	17	170	188
Link Distance (ft)		542		307		557	557	557	557		1102	1102
Upstream Blk Time (%)						0	1					
Queuing Penalty (veh)						2	4					
Storage Bay Dist (ft)	150		200		200					150		
Storage Blk Time (%)				6		17					2	
Queuing Penalty (veh)				3		6					0	

Intersection: 2: Bull St. & Confederate Ave.

Movement	SB
Directions Served	TR
Maximum Queue (ft)	180
Average Queue (ft)	122
95th Queue (ft)	179
Link Distance (ft)	1102
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Bull St. & Colonial Drive

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LTR	T	T	TR	L	T	T	TR
Maximum Queue (ft)	250	602	315	309	273	122	156	232	182
Average Queue (ft)	229	481	150	168	112	56	36	53	41
95th Queue (ft)	296	713	307	327	253	112	105	157	122
Link Distance (ft)		587	293	293	293		557	557	557
Upstream Blk Time (%)		23	0	0					
Queuing Penalty (veh)		108	3	3					
Storage Bay Dist (ft)	150					200			
Storage Blk Time (%)	55	75							
Queuing Penalty (veh)	147	138							

Intersection: 4: Bull St. & Franklin Street /Freed Drive

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	L	T	L
Maximum Queue (ft)	116	58	24	27	51
Average Queue (ft)	39	11	2	1	14
95th Queue (ft)	87	38	14	9	43
Link Distance (ft)	459	536		456	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			150		50
Storage Blk Time (%)					4
Queuing Penalty (veh)					22

Intersection: 5: Bull St. & Jefferson Street

Movement	EB	EB	WB	NB
Directions Served	L	R	R	L
Maximum Queue (ft)	28	52	31	27
Average Queue (ft)	4	17	5	3
95th Queue (ft)	19	46	24	17
Link Distance (ft)	196	196	509	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				175
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Bull St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	LT	R	R	LT	TR	L	L	T	TR	L	T
Maximum Queue (ft)	467	495	425	387	174	288	300	442	442	459	150	545
Average Queue (ft)	306	338	107	26	123	166	298	431	280	304	60	404
95th Queue (ft)	417	475	224	144	205	258	302	442	429	450	152	574
Link Distance (ft)		903	903	903		244		422	422	422		680
Upstream Blk Time (%)						4		66	1	2		
Queuing Penalty (veh)						0		380	8	13		
Storage Bay Dist (ft)	775				125		175				100	
Storage Blk Time (%)					5	39	88	96			0	80
Queuing Penalty (veh)					6	43	191	208			0	17

Intersection: 6: Bull St. & Elmwood Avenue

Movement	SB	SB
Directions Served	TR	R
Maximum Queue (ft)	640	605
Average Queue (ft)	439	430
95th Queue (ft)	622	604
Link Distance (ft)	680	680
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: Bull St. & Calhoun St.

Movement	EB	EB	EB	WB	WB	WB	B8	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	T	L	T	TR	L	T
Maximum Queue (ft)	199	884	893	224	664	665	854	225	1874	1887	224	276
Average Queue (ft)	163	574	564	17	469	538	431	59	1530	1552	86	94
95th Queue (ft)	240	1135	1162	88	856	799	1084	188	2426	2380	177	165
Link Distance (ft)		878	878		592	592	839		1835	1835		422
Upstream Blk Time (%)		45	46		7	64	40		57	57		
Queuing Penalty (veh)		0	0		11	104	129		0	0		
Storage Bay Dist (ft)	150			175				150			150	
Storage Blk Time (%)	82	0			10				63		6	0
Queuing Penalty (veh)	69	0			2				20		32	0

Intersection: 7: Bull St. & Calhoun St.

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	151	56
Average Queue (ft)	101	14
95th Queue (ft)	140	41
Link Distance (ft)	422	422
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	T	TR	L	T	T	L	T
Maximum Queue (ft)	52	320	362	222	270	200	174	92	74	93	101	218
Average Queue (ft)	11	131	162	137	145	108	74	43	43	44	38	131
95th Queue (ft)	32	236	290	199	220	172	142	76	79	84	85	201
Link Distance (ft)		901			226	226	226		420	420		1839
Upstream Blk Time (%)				0	1							
Queuing Penalty (veh)				0	2							
Storage Bay Dist (ft)	225		800	175				225			300	
Storage Blk Time (%)		0		3	4							
Queuing Penalty (veh)		1		5	8							

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	SB
Directions Served	TR
Maximum Queue (ft)	217
Average Queue (ft)	122
95th Queue (ft)	192
Link Distance (ft)	1839
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 10: Harden St./Harden Street Ext & Calhoun St.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	134	164	74	245	651	203	231	56	99	336	363	251
Average Queue (ft)	59	68	17	49	134	95	115	9	27	115	128	44
95th Queue (ft)	121	124	54	145	358	172	192	34	61	273	302	136
Link Distance (ft)		967		761	1249	1249	1249			360	360	
Upstream Blk Time (%)												0
Queuing Penalty (veh)												1
Storage Bay Dist (ft)	225		50					325	300			200
Storage Blk Time (%)			2	24						0	6	0
Queuing Penalty (veh)			1	5						0	4	0

Intersection: 11: Gregg Street/Gregg Street & Calhoun St.

Movement	EB	WB	NB	SB	SB
Directions Served	L	TR	LTR	L	TR
Maximum Queue (ft)	30	971	336	53	1083
Average Queue (ft)	3	303	84	18	233
95th Queue (ft)	18	999	247	48	786
Link Distance (ft)		967	351		2891
Upstream Blk Time (%)		21	0		
Queuing Penalty (veh)		59	0		
Storage Bay Dist (ft)	125			300	
Storage Blk Time (%)		33			24
Queuing Penalty (veh)		2			9

Intersection: 12: Gregg Street & Colonial Drive

Movement	WB	NB	NB	SB	SB
Directions Served	LTR	L	TR	L	TR
Maximum Queue (ft)	118	71	55	91	56
Average Queue (ft)	41	19	20	27	18
95th Queue (ft)	90	49	38	65	40
Link Distance (ft)	142	2891	2891		433
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)				50	
Storage Blk Time (%)				8	0
Queuing Penalty (veh)				3	0

Intersection: 13: Harden Street Ext & Slighs Ave.

Movement	WB	NB	NB	NB	SB	SB	SB
Directions Served	LR	T	T	R	L	T	T
Maximum Queue (ft)	314	244	626	100	149	294	266
Average Queue (ft)	190	103	277	33	74	122	137
95th Queue (ft)	313	216	546	102	133	222	224
Link Distance (ft)	299	2508	2508			420	420
Upstream Blk Time (%)	1						
Queuing Penalty (veh)	0						
Storage Bay Dist (ft)				50	100		
Storage Blk Time (%)			30	0	6	10	
Queuing Penalty (veh)			19	0	30	12	

Intersection: 14: Colonial Drive & Farrow Road

Movement	EB	EB	NB	B40	B40	B40	SB	SB
Directions Served	R	R	L	T	T		T	TR
Maximum Queue (ft)	107	12	136	207	208	230	162	144
Average Queue (ft)	40	2	83	40	68	48	80	76
95th Queue (ft)	84	9	125	113	146	161	143	127
Link Distance (ft)	1034			226	226	226	1860	1860
Upstream Blk Time (%)				0	0	0		
Queuing Penalty (veh)				0	0	0		
Storage Bay Dist (ft)	330		550					
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 15: Farrow Road & Beltline Blvd

Movement	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB	SB	
Directions Served	L	T	TR	L	L	T	T	R	T	T	R	L	
Maximum Queue (ft)	126	255	262	137	153	208	214	361	596	701	350	300	
Average Queue (ft)	63	180	164	47	80	125	114	131	309	348	99	172	
95th Queue (ft)	128	243	228	111	138	187	188	224	481	540	359	282	
Link Distance (ft)	1471		1471				1366	1366	1366	1860	1860		
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (ft)	175				300	300						225	200
Storage Blk Time (%)	11									22	14		
Queuing Penalty (veh)	10									58	28		

Intersection: 15: Farrow Road & Beltline Blvd

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	192	159
Average Queue (ft)	43	33
95th Queue (ft)	107	103
Link Distance (ft)	730	730
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 16: Farrow Road & 277 NB RAMPS

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	L	TR	T	TR	L	T	T
Maximum Queue (ft)	266	28	141	390	69	157	144
Average Queue (ft)	145	6	30	81	30	99	71
95th Queue (ft)	226	25	79	246	60	155	128
Link Distance (ft)		775	730	730		627	627
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	300				250		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 17: Farrow Road & Lorick Avenue /277 SB Ramps

Movement	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	L	TR	L	T	T	T	TR
Maximum Queue (ft)	93	261	191	87	172	153	202	183
Average Queue (ft)	29	157	39	13	83	71	58	24
95th Queue (ft)	70	229	141	43	138	143	144	92
Link Distance (ft)	414		971		627	627	807	807
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)		125		200				
Storage Blk Time (%)		19	0					
Queuing Penalty (veh)		12	0					

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	TR	R	L	L	T	T	TR	L	L	TR
Maximum Queue (ft)	379	2442	376	72	166	175	127	148	187	465	486	328
Average Queue (ft)	264	364	282	35	97	119	61	78	93	332	350	138
95th Queue (ft)	346	1027	362	71	150	173	112	131	150	461	473	244
Link Distance (ft)	2460	2460	2460			409	409	409	409	480	480	480
Upstream Blk Time (%)		0								0	1	
Queuing Penalty (veh)		0								0	0	
Storage Bay Dist (ft)				275	150							
Storage Blk Time (%)	3		8		1	4						
Queuing Penalty (veh)	0		10		1	7						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	NB	SB
Directions Served	R	LTR
Maximum Queue (ft)	309	25
Average Queue (ft)	76	2
95th Queue (ft)	181	13
Link Distance (ft)	480	368
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 19: Main St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	250	425	319	259	168	53	221	450	463	441	236	239
Average Queue (ft)	198	229	190	150	112	11	29	201	308	309	86	156
95th Queue (ft)	269	340	286	232	179	37	121	416	445	457	174	225
Link Distance (ft)		409	409	409	409			452	452	452		588
Upstream Blk Time (%)		1						0	0	0		
Queuing Penalty (veh)		6						0	1	0		
Storage Bay Dist (ft)	175					175	150					200
Storage Blk Time (%)	22	31			0			8			1	2
Queuing Penalty (veh)	53	75			0			1			2	4

Intersection: 19: Main St. & Elmwood Avenue

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	TR	R
Maximum Queue (ft)	220	42	186	176	154	171
Average Queue (ft)	153	14	90	91	108	76
95th Queue (ft)	225	37	159	148	166	142
Link Distance (ft)	588	588		3580	3580	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			175			425
Storage Blk Time (%)			1	1		
Queuing Penalty (veh)			1	1		

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	LT
Maximum Queue (ft)	29	260	204	137	124	183	188	210	299	358	158	29
Average Queue (ft)	10	90	51	23	32	62	105	134	84	185	87	3
95th Queue (ft)	31	236	142	76	86	149	175	219	172	283	142	15
Link Distance (ft)		452	452	452		903	903	903		3075	3075	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200				75				200			75
Storage Blk Time (%)		1			0	3				9		
Queuing Penalty (veh)		0			0	1				8		

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	93
Average Queue (ft)	44
95th Queue (ft)	84
Link Distance (ft)	1034
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	5
Queuing Penalty (veh)	1

Intersection: 21: Barnwell St. & Calhoun St.

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	TR	L	TR	TR
Maximum Queue (ft)	27	376	144	411	115
Average Queue (ft)	3	150	59	88	28
95th Queue (ft)	15	441	152	282	72
Link Distance (ft)	839	363		844	668
Upstream Blk Time (%)		36			
Queuing Penalty (veh)		113			
Storage Bay Dist (ft)			125		
Storage Blk Time (%)		39	25		0
Queuing Penalty (veh)		2	8		0

Intersection: 26: Colonial Drive & Mental Health Dwy

Movement	EB	WB	SB
Directions Served	L	TR	LR
Maximum Queue (ft)	26	251	334
Average Queue (ft)	1	94	85
95th Queue (ft)	9	272	201
Link Distance (ft)		248	420
Upstream Blk Time (%)		5	
Queuing Penalty (veh)		21	
Storage Bay Dist (ft)	100		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 27: Boyce Street & Colonial Drive

Movement	WB	NB	NB
Directions Served	LT	L	R
Maximum Queue (ft)	182	68	44
Average Queue (ft)	39	23	17
95th Queue (ft)	122	50	38
Link Distance (ft)	875	971	971
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 2274

2018 Background Conditions

Intersection: 1: Bull St. & Harden St. Ext.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	TR	L	T	T	R	L	T
Maximum Queue (ft)	31	31	30	131	174	66	66	132	161	180	300	1646
Average Queue (ft)	7	4	6	62	72	25	22	38	49	65	232	822
95th Queue (ft)	26	18	24	115	141	54	62	91	118	141	383	1919
Link Distance (ft)		496			816	816		1090	1090	1090		1612
Upstream Blk Time (%)												19
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	100		200	675			175				200	
Storage Blk Time (%)											4	41
Queuing Penalty (veh)											32	177

Intersection: 1: Bull St. & Harden St. Ext.

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	1627	400
Average Queue (ft)	803	285
95th Queue (ft)	1904	497
Link Distance (ft)	1612	
Upstream Blk Time (%)	7	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		250
Storage Blk Time (%)	38	33
Queuing Penalty (veh)	302	255

Intersection: 2: Bull St. & Confederate Ave.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	R	L	T	T
Maximum Queue (ft)	28	52	51	53	45	99	194	230	106	350	1120	1135
Average Queue (ft)	6	17	12	19	9	29	31	60	19	127	805	823
95th Queue (ft)	23	48	38	51	29	70	97	157	68	380	1465	1453
Link Distance (ft)		540		647		578	578	578	578		1090	1090
Upstream Blk Time (%)											16	19
Queuing Penalty (veh)											129	160
Storage Bay Dist (ft)	150		200		200					150		
Storage Blk Time (%)											58	
Queuing Penalty (veh)											40	

Intersection: 2: Bull St. & Confederate Ave.

Movement	SB
Directions Served	TR
Maximum Queue (ft)	1133
Average Queue (ft)	802
95th Queue (ft)	1476
Link Distance (ft)	1090
Upstream Blk Time (%)	17
Queuing Penalty (veh)	142
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Bull St. & Colonial Drive

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	R	L	LTR	T	T	TR	L	T	T	TR
Maximum Queue (ft)	29	195	181	160	167	332	300	626	620	634
Average Queue (ft)	3	75	108	68	77	141	174	493	509	490
95th Queue (ft)	15	139	170	130	156	280	399	806	803	807
Link Distance (ft)	381		538	406	406	406		578	578	578
Upstream Blk Time (%)								15	22	14
Queuing Penalty (veh)								123	177	113
Storage Bay Dist (ft)		150					200			
Storage Blk Time (%)		0	3					64		
Queuing Penalty (veh)		0	3					25		

Intersection: 4: Bull St. & Franklin Street /Freed Drive

Movement	EB	WB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	TR	L	T	T	TR
Maximum Queue (ft)	52	53	24	48	149	448	452	448
Average Queue (ft)	7	6	1	2	15	364	376	357
95th Queue (ft)	28	27	8	16	79	599	599	590
Link Distance (ft)	281	470		376		406	406	406
Upstream Blk Time (%)						20	27	14
Queuing Penalty (veh)						164	222	113
Storage Bay Dist (ft)			150		50			
Storage Blk Time (%)					0	56		
Queuing Penalty (veh)					0	4		

Intersection: 5: Bull St. & Jefferson Street

Movement	EB	EB	WB	NB	SB	SB	SB
Directions Served	L	R	R	L	T	T	TR
Maximum Queue (ft)	28	158	28	27	440	436	433
Average Queue (ft)	4	69	1	1	373	385	366
95th Queue (ft)	17	147	10	9	495	497	521
Link Distance (ft)	352	352	472		376	376	376
Upstream Blk Time (%)					36	44	27
Queuing Penalty (veh)					290	357	217
Storage Bay Dist (ft)				175			
Storage Blk Time (%)					56		
Queuing Penalty (veh)					0		

Intersection: 6: Bull St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	LT	R	R	LT	TR	L	L	T	TR	L	T
Maximum Queue (ft)	824	949	934	913	51	53	300	453	427	416	149	663
Average Queue (ft)	496	799	859	796	10	14	244	306	78	151	37	633
95th Queue (ft)	889	1078	1027	1023	37	40	338	477	201	301	133	657
Link Distance (ft)		901	901	901		288		418	418	418		620
Upstream Blk Time (%)		13	27	5				19	0	0		39
Queuing Penalty (veh)		74	151	29				66	0	0		319
Storage Bay Dist (ft)	775				125		175				100	
Storage Blk Time (%)	0	9					62	71				60
Queuing Penalty (veh)	1	52					108	124				22

Intersection: 6: Bull St. & Elmwood Avenue

Movement	SB	SB
Directions Served	TR	R
Maximum Queue (ft)	676	668
Average Queue (ft)	642	597
95th Queue (ft)	665	741
Link Distance (ft)	620	620
Upstream Blk Time (%)	46	20
Queuing Penalty (veh)	371	160
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: Bull St. & Calhoun St.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	T
Maximum Queue (ft)	200	996	996	51	117	178	224	308	328	174	219	246
Average Queue (ft)	106	242	172	19	65	94	40	100	154	57	118	136
95th Queue (ft)	201	628	584	49	110	136	131	214	255	116	179	198
Link Distance (ft)		981	981		376	376		1849	1849		418	418
Upstream Blk Time (%)		1	1									
Queuing Penalty (veh)		0	0									
Storage Bay Dist (ft)	150			175			150			150		
Storage Blk Time (%)	22	7						8		1	2	
Queuing Penalty (veh)	23	6						2		6	3	

Intersection: 7: Bull St. & Calhoun St.

Movement	SB
Directions Served	R
Maximum Queue (ft)	50
Average Queue (ft)	15
95th Queue (ft)	40
Link Distance (ft)	418
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	EB	EB	EB	WB	WB	WB	WB	B58	B58	NB	NB	NB
Directions Served	L	T	TR	L	L	T	TR	T	T	L	T	T
Maximum Queue (ft)	62	82	135	229	300	241	229	596	473	190	152	170
Average Queue (ft)	23	43	59	217	278	129	107	168	33	70	74	85
95th Queue (ft)	57	80	115	255	348	208	206	486	227	140	131	144
Link Distance (ft)		913			229	229	229	655	655		412	412
Upstream Blk Time (%)				7	25	0	0					
Queuing Penalty (veh)				0	97	1	0					
Storage Bay Dist (ft)	225		800	175						225		
Storage Blk Time (%)				33	40							
Queuing Penalty (veh)				119	146							

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (ft)	64	236	264
Average Queue (ft)	8	94	101
95th Queue (ft)	32	174	182
Link Distance (ft)		2006	2006
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	300		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 10: Harden St./Harden Street Ext & Calhoun St.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	113	125	74	118	142	306	298	211	50	277	358	287
Average Queue (ft)	44	53	7	26	71	163	176	36	18	118	136	33
95th Queue (ft)	97	103	34	75	121	254	259	138	45	252	303	152
Link Distance (ft)		728		1088	2481	2481	2481			287	287	
Upstream Blk Time (%)										0	1	0
Queuing Penalty (veh)										0	9	0
Storage Bay Dist (ft)	225		50					325	300			200
Storage Blk Time (%)			0	6						0	3	
Queuing Penalty (veh)			0	0						0	3	

Intersection: 10: Harden St./Harden Street Ext & Calhoun St.

Movement	B29
Directions Served	T
Maximum Queue (ft)	37
Average Queue (ft)	1
95th Queue (ft)	13
Link Distance (ft)	2571
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 11: Gregg Street/Gregg Street & Calhoun St.

Movement	EB	WB	NB	SB	SB
Directions Served	L	L	LTR	L	TR
Maximum Queue (ft)	31	31	72	31	55
Average Queue (ft)	5	2	30	14	24
95th Queue (ft)	22	15	56	38	49
Link Distance (ft)			470		2947
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	125	275		300	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 12: Gregg Street & Colonial Drive

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	125	155	29	52	24	30
Average Queue (ft)	20	39	5	15	2	4
95th Queue (ft)	83	109	22	41	12	20
Link Distance (ft)	1046	89	2947			533
Upstream Blk Time (%)		1				
Queuing Penalty (veh)		7				
Storage Bay Dist (ft)				225	50	
Storage Blk Time (%)						0
Queuing Penalty (veh)						0

Intersection: 13: Harden Street Ext & Slighs Ave.

Movement	WB	NB	NB	NB	SB	SB	SB
Directions Served	LR	T	T	R	L	T	T
Maximum Queue (ft)	290	226	276	99	150	392	385
Average Queue (ft)	179	58	66	6	87	213	221
95th Queue (ft)	273	131	142	26	169	336	347
Link Distance (ft)	340	2571	2571			412	412
Upstream Blk Time (%)						0	
Queuing Penalty (veh)						0	
Storage Bay Dist (ft)				50	100		
Storage Blk Time (%)			18	0	7	22	
Queuing Penalty (veh)			13	0	43	28	

Intersection: 14: Colonial Drive & Farrow Road

Movement	EB	EB	NB	SB	SB
Directions Served	R	R	L	T	TR
Maximum Queue (ft)	129	41	140	329	286
Average Queue (ft)	59	7	57	111	103
95th Queue (ft)	102	23	106	247	214
Link Distance (ft)	861			1955	1955
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		330	550		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 15: Farrow Road & Beltline Blvd

Movement	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	T	T	R	T	T	L	T
Maximum Queue (ft)	24	234	227	139	152	262	242	90	126	184	325	344
Average Queue (ft)	8	153	133	58	90	149	142	42	39	62	155	184
95th Queue (ft)	25	213	219	112	146	232	233	77	93	124	284	291
Link Distance (ft)		1459	1459			1124	1124	1124	1955	1955		798
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	175			300	300						200	
Storage Blk Time (%)		5									5	7
Queuing Penalty (veh)		1									20	19

Intersection: 15: Farrow Road & Beltline Blvd

Movement	SB
Directions Served	TR
Maximum Queue (ft)	386
Average Queue (ft)	205
95th Queue (ft)	311
Link Distance (ft)	798
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Farrow Road & 277 NB RAMPS

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	L	TR	T	TR	L	T	T
Maximum Queue (ft)	114	54	14	36	44	147	112
Average Queue (ft)	58	8	3	6	11	52	54
95th Queue (ft)	105	33	12	24	33	109	108
Link Distance (ft)		655	798	798		602	602
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	300				250		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 17: Farrow Road & Lorick Avenue /277 SB Ramps

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	R	L	TR	L	T	T	T	TR
Maximum Queue (ft)	26	56	275	560	59	73	664	300	272
Average Queue (ft)	5	2	258	315	8	19	80	164	124
95th Queue (ft)	21	19	310	609	30	50	349	261	249
Link Distance (ft)	620	620		968		602	602	779	779
Upstream Blk Time (%)							0		
Queuing Penalty (veh)							0		
Storage Bay Dist (ft)			125		200				
Storage Blk Time (%)			43	0					
Queuing Penalty (veh)			20	1					

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	TR	R	L	L	T	T	TR	L	L	TR
Maximum Queue (ft)	2346	2354	2362	450	225	420	44	66	106	163	149	137
Average Queue (ft)	991	1096	1137	450	191	261	5	16	45	101	91	72
95th Queue (ft)	1886	1915	1954	450	264	411	22	49	87	147	143	119
Link Distance (ft)	3646	3646	3646			410	410	410	410	442	442	442
Upstream Blk Time (%)							2					
Queuing Penalty (veh)							8					
Storage Bay Dist (ft)				275	150							
Storage Blk Time (%)	25		55		21	34						
Queuing Penalty (veh)	0		126		63	104						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	NB
Directions Served	R
Maximum Queue (ft)	96
Average Queue (ft)	42
95th Queue (ft)	81
Link Distance (ft)	442
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 19: Main St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	122	429	430	444	461	27	225	482	453	439	70	90
Average Queue (ft)	67	97	214	214	196	3	186	250	174	145	20	49
95th Queue (ft)	115	210	432	445	431	15	257	479	381	293	51	80
Link Distance (ft)		410	410	410	410			450	450	450		372
Upstream Blk Time (%)		1	1	2	1			6	1	0		
Queuing Penalty (veh)		4	8	12	3			30	4	0		
Storage Bay Dist (ft)	175					175	150					200
Storage Blk Time (%)					15		72	12				
Queuing Penalty (veh)					10		343	8				

Intersection: 19: Main St. & Elmwood Avenue

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	TR	R
Maximum Queue (ft)	79	22	250	896	992	550
Average Queue (ft)	20	5	193	351	362	164
95th Queue (ft)	55	19	301	710	706	464
Link Distance (ft)	372	372		3606	3606	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			175			425
Storage Blk Time (%)			37	22	11	
Queuing Penalty (veh)			92	49	34	

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	LT
Maximum Queue (ft)	274	481	473	485	124	213	146	148	94	55	52	124
Average Queue (ft)	15	234	236	208	68	56	56	70	37	17	18	40
95th Queue (ft)	99	542	540	533	123	155	134	155	79	49	49	101
Link Distance (ft)		450	450	450		901	901	901		1633	1633	
Upstream Blk Time (%)		11	9	7								
Queuing Penalty (veh)		86	69	55								
Storage Bay Dist (ft)	200				75				200			75
Storage Blk Time (%)		25			12	7						2
Queuing Penalty (veh)		3			59	6						1

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	183
Average Queue (ft)	80
95th Queue (ft)	145
Link Distance (ft)	1034
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	19
Queuing Penalty (veh)	13

Intersection: 21: Barnwell St. & Calhoun St.

Movement	EB	WB	NB	NB	SB
Directions Served	L	L	L	TR	TR
Maximum Queue (ft)	29	30	27	29	31
Average Queue (ft)	1	5	1	10	4
95th Queue (ft)	10	23	9	31	20
Link Distance (ft)				816	971
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	125	225	125		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 26: Colonial Drive & Mental Healthy Dwy.

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	93	31
Average Queue (ft)	20	6
95th Queue (ft)	61	26
Link Distance (ft)		330
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	1	

Intersection: 27: Boyce Street & Colonial Drive

Movement	WB	NB	NB
Directions Served	LT	L	R
Maximum Queue (ft)	56	30	26
Average Queue (ft)	8	5	5
95th Queue (ft)	32	22	22
Link Distance (ft)	1046		784
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		150	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 6280

Intersection: 1: Bull St. & Harden St. Ext.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	TR	L	T	T	R	L	T
Maximum Queue (ft)	73	74	29	711	724	722	224	1144	1130	1144	115	195
Average Queue (ft)	25	16	13	560	570	368	9	1018	1027	894	58	102
95th Queue (ft)	64	54	35	765	801	743	77	1373	1369	1554	106	182
Link Distance (ft)		561			948	948		1102	1102	1102		1951
Upstream Blk Time (%)								11	18	13		
Queuing Penalty (veh)								94	150	109		
Storage Bay Dist (ft)	100		200	675			175				200	
Storage Blk Time (%)				2	5			42				0
Queuing Penalty (veh)				4	13			3				0

Intersection: 1: Bull St. & Harden St. Ext.

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	169	137
Average Queue (ft)	109	47
95th Queue (ft)	164	121
Link Distance (ft)	1951	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		250
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Bull St. & Confederate Ave.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	R	L	T	T
Maximum Queue (ft)	115	92	300	328	300	614	619	591	567	29	285	331
Average Queue (ft)	38	34	80	230	53	490	498	469	22	3	183	186
95th Queue (ft)	78	73	258	406	221	731	738	740	195	15	293	293
Link Distance (ft)		542		307		556	556	556	556		1102	1102
Upstream Blk Time (%)			0	41		19	18	10	0			
Queuing Penalty (veh)			0	0		117	112	58	1			
Storage Bay Dist (ft)	150		200		200					150		
Storage Blk Time (%)				51		52						13
Queuing Penalty (veh)				28		19						1

Intersection: 2: Bull St. & Confederate Ave.

Movement	SB
Directions Served	TR
Maximum Queue (ft)	328
Average Queue (ft)	179
95th Queue (ft)	295
Link Distance (ft)	1102
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Bull St. & Colonial Drive

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	R	L	LTR	T	T	TR	L	T	T	TR
Maximum Queue (ft)	28	250	445	339	331	366	239	35	46	32
Average Queue (ft)	4	173	232	241	255	233	106	3	10	7
95th Queue (ft)	19	278	350	372	377	392	216	12	32	25
Link Distance (ft)	380		536	293	293	293		556	556	556
Upstream Blk Time (%)				19	21	16				
Queuing Penalty (veh)				167	185	139				
Storage Bay Dist (ft)		150					200			
Storage Blk Time (%)		16	41				7			
Queuing Penalty (veh)		43	79				32			

Intersection: 4: Bull St. & Franklin Street /Freed Drive

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	T	TR	L	T	TR
Maximum Queue (ft)	29	94	28	477	497	503	48	74	70
Average Queue (ft)	8	19	3	205	215	201	11	3	3
95th Queue (ft)	29	55	17	560	571	562	35	25	19
Link Distance (ft)	459	536		454	454	454		293	293
Upstream Blk Time (%)				12	12	10			
Queuing Penalty (veh)				106	106	85			
Storage Bay Dist (ft)			150				50		
Storage Blk Time (%)				32			2		
Queuing Penalty (veh)				2			13		

Intersection: 5: Bull St. & Jefferson Street

Movement	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	R	L	T	T	TR	T	T	TR
Maximum Queue (ft)	28	74	30	274	707	717	698	449	470	469
Average Queue (ft)	6	10	6	11	208	211	195	161	180	168
95th Queue (ft)	21	43	22	95	706	708	676	433	455	444
Link Distance (ft)	196	196	543		680	680	680	454	454	454
Upstream Blk Time (%)					2	2	1	0	2	1
Queuing Penalty (veh)					19	13	5	1	10	4
Storage Bay Dist (ft)				175						
Storage Blk Time (%)					26			13		
Queuing Penalty (veh)					1			0		

Intersection: 6: Bull St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	LT	R	R	LT	TR	L	L	T	TR	L	T
Maximum Queue (ft)	809	893	801	150	174	228	300	439	462	483	149	710
Average Queue (ft)	458	500	257	30	84	112	297	418	352	358	40	638
95th Queue (ft)	700	759	647	91	161	197	304	479	494	491	122	815
Link Distance (ft)		903	903	903		244		422	422	422		680
Upstream Blk Time (%)		0				0		49	8	10		15
Queuing Penalty (veh)		0				0		300	47	59		93
Storage Bay Dist (ft)	775				125		175				100	
Storage Blk Time (%)	0	1			0	15	90	95			5	80
Queuing Penalty (veh)	1	5			0	17	202	214			15	17

Intersection: 6: Bull St. & Elmwood Avenue

Movement	SB	SB
Directions Served	TR	R
Maximum Queue (ft)	740	721
Average Queue (ft)	655	630
95th Queue (ft)	829	837
Link Distance (ft)	680	680
Upstream Blk Time (%)	27	18
Queuing Penalty (veh)	161	110
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: Bull St. & Calhoun St.

Movement	EB	EB	EB	WB	WB	WB	B8	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	T	L	T	TR	L	T
Maximum Queue (ft)	200	893	893	110	664	665	854	224	1898	1898	202	184
Average Queue (ft)	148	528	494	20	118	456	295	39	1214	1258	102	94
95th Queue (ft)	249	1113	1131	70	286	792	929	149	2409	2368	209	159
Link Distance (ft)		878	878		592	592	840		1835	1835		422
Upstream Blk Time (%)		41	37			45	22		45	49		
Queuing Penalty (veh)		0	0			76	71		0	0		
Storage Bay Dist (ft)	150			175				150			150	
Storage Blk Time (%)	71	6			6				46		23	1
Queuing Penalty (veh)	63	5			1				15		126	0

Intersection: 7: Bull St. & Calhoun St.

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	162	52
Average Queue (ft)	104	18
95th Queue (ft)	150	49
Link Distance (ft)	422	422
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	T	TR	L	T	T	L	T
Maximum Queue (ft)	70	258	256	250	262	217	201	90	113	114	78	213
Average Queue (ft)	19	125	151	161	167	98	53	40	64	63	29	125
95th Queue (ft)	53	201	226	224	234	161	102	78	109	104	66	197
Link Distance (ft)		901			253	253	253		419	419		1839
Upstream Blk Time (%)				1	0							
Queuing Penalty (veh)				0	0							
Storage Bay Dist (ft)	225		800	175				225			300	
Storage Blk Time (%)		0		6	7							
Queuing Penalty (veh)		1		13	14							

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	SB
Directions Served	TR
Maximum Queue (ft)	179
Average Queue (ft)	115
95th Queue (ft)	187
Link Distance (ft)	1839
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 10: Harden St./Harden Street Ext & Calhoun St.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	172	191	73	74	139	212	237	189	116	206	245	115
Average Queue (ft)	69	78	14	23	66	122	131	28	41	106	112	14
95th Queue (ft)	141	155	47	56	115	214	227	107	85	213	221	53
Link Distance (ft)		980		761	1249	1249	1249			415	415	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	225		50					325	300			200
Storage Blk Time (%)			1	3								1
Queuing Penalty (veh)			0	1								1

Intersection: 11: Gregg Street/Gregg Street & Calhoun St.

Movement	EB	WB	NB	SB	SB
Directions Served	L	TR	LTR	L	TR
Maximum Queue (ft)	30	745	291	92	228
Average Queue (ft)	5	123	53	18	45
95th Queue (ft)	23	518	156	46	115
Link Distance (ft)		980	351		2889
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	125			300	
Storage Blk Time (%)		16			
Queuing Penalty (veh)		1			

Intersection: 12: Gregg Street & Colonial Drive

Movement	EB	WB	B36	NB	NB	SB	SB
Directions Served	LTR	LTR	T	L	TR	L	TR
Maximum Queue (ft)	27	202	62	18	35	60	36
Average Queue (ft)	2	49	2	8	15	14	12
95th Queue (ft)	11	125	21	21	30	36	29
Link Distance (ft)	862	130	901	2889			431
Upstream Blk Time (%)		0					
Queuing Penalty (veh)		2					
Storage Bay Dist (ft)					225	50	
Storage Blk Time (%)						1	0
Queuing Penalty (veh)						0	0

Intersection: 13: Harden Street Ext & Slighs Ave.

Movement	WB	NB	NB	NB	SB	SB	SB
Directions Served	LR	T	T	R	L	T	T
Maximum Queue (ft)	314	235	732	100	150	271	276
Average Queue (ft)	192	93	327	24	83	158	164
95th Queue (ft)	303	199	599	78	155	236	233
Link Distance (ft)	299	2450	2450			419	419
Upstream Blk Time (%)	2						
Queuing Penalty (veh)	0						
Storage Bay Dist (ft)				50	100		
Storage Blk Time (%)			33	0	4	18	
Queuing Penalty (veh)			23	1	20	23	

Intersection: 14: Colonial Drive & Farrow Road

Movement	EB	EB	NB	B40	B40	B40	SB	SB
Directions Served	R	R	L	T	T		T	TR
Maximum Queue (ft)	109	35	187	171	152	155	141	156
Average Queue (ft)	47	5	87	35	44	11	90	79
95th Queue (ft)	99	20	143	115	143	74	137	144
Link Distance (ft)	1035			253	253	253	1860	1860
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)		330	550					
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 15: Farrow Road & Beltline Blvd

Movement	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	TR	L	L	T	T	R	T	T	R	L
Maximum Queue (ft)	102	294	247	108	116	242	292	346	469	584	350	252
Average Queue (ft)	61	206	188	40	59	138	134	168	276	325	118	158
95th Queue (ft)	107	276	251	91	114	200	216	273	393	483	383	236
Link Distance (ft)		1471	1471			1366	1366	1366	1860	1860		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	175			300	300						225	200
Storage Blk Time (%)		21								21		6
Queuing Penalty (veh)		19								57		14

Intersection: 15: Farrow Road & Beltline Blvd

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	238	111
Average Queue (ft)	51	37
95th Queue (ft)	149	90
Link Distance (ft)	730	730
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 16: Farrow Road & 277 NB RAMPS

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	L	TR	T	TR	L	T	T
Maximum Queue (ft)	224	27	76	345	64	174	166
Average Queue (ft)	116	8	16	109	30	83	70
95th Queue (ft)	200	28	48	284	53	137	136
Link Distance (ft)		775	730	730		627	627
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	300				250		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 17: Farrow Road & Lorick Avenue /277 SB Ramps

Movement	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	L	TR	L	T	T	T	TR
Maximum Queue (ft)	70	275	332	24	170	192	111	79
Average Queue (ft)	27	164	57	6	89	77	42	14
95th Queue (ft)	58	267	199	23	153	160	98	49
Link Distance (ft)	414		971		627	627	807	807
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)		125		200				
Storage Blk Time (%)		22						
Queuing Penalty (veh)		14						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	TR	R	L	L	T	T	TR	L	L	TR
Maximum Queue (ft)	499	417	540	450	225	261	152	199	214	600	576	552
Average Queue (ft)	295	326	317	75	105	137	71	102	124	558	556	340
95th Queue (ft)	453	418	440	277	162	190	132	165	191	577	570	607
Link Distance (ft)	2460	2460	2460			409	409	409	409	480	480	480
Upstream Blk Time (%)										70	77	14
Queuing Penalty (veh)										0	0	0
Storage Bay Dist (ft)				275	150							
Storage Blk Time (%)	6		13		1	9						
Queuing Penalty (veh)	0		17		2	15						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	NB	B33	B33	B33	SB
Directions Served	R	T	T	T	LTR
Maximum Queue (ft)	553	601	632	641	28
Average Queue (ft)	167	310	329	245	2
95th Queue (ft)	393	589	617	608	11
Link Distance (ft)	480	3267	3267	3267	368
Upstream Blk Time (%)	2				
Queuing Penalty (veh)	0				
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 19: Main St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	250	425	418	451	230	31	93	470	476	467	240	241
Average Queue (ft)	226	285	239	188	136	7	20	232	292	300	108	169
95th Queue (ft)	284	416	361	308	219	29	62	461	479	470	191	232
Link Distance (ft)		409	409	409	409			452	452	452		588
Upstream Blk Time (%)		3	1	0				1	3	2		
Queuing Penalty (veh)		15	4	1				8	17	15		
Storage Bay Dist (ft)	175					175	150					200
Storage Blk Time (%)	33	48			2			10			1	4
Queuing Penalty (veh)	84	119			2			1			3	6

Intersection: 19: Main St. & Elmwood Avenue

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	TR	R
Maximum Queue (ft)	261	41	204	165	202	174
Average Queue (ft)	174	19	116	91	118	97
95th Queue (ft)	247	41	186	140	174	160
Link Distance (ft)	588	588		3580	3580	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			175			425
Storage Blk Time (%)			2	0		
Queuing Penalty (veh)			2	0		

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	LT	
Maximum Queue (ft)	29	328	345	167	124	241	271	251	158	292	247	47	
Average Queue (ft)	7	101	62	22	39	93	134	150	67	182	96	3	
95th Queue (ft)	26	244	197	84	99	191	250	248	120	269	187	19	
Link Distance (ft)		452	452	452		903	903	903		3075	3075		
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (ft)	200				75				200				75
Storage Blk Time (%)			2				4	7				7	
Queuing Penalty (veh)			0				22	2				6	

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	74
Average Queue (ft)	31
95th Queue (ft)	70
Link Distance (ft)	1034
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	2
Queuing Penalty (veh)	0

Intersection: 21: Barnwell St. & Calhoun St.

Movement	EB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR
Maximum Queue (ft)	27	377	140	31	29	118
Average Queue (ft)	2	98	41	19	2	16
95th Queue (ft)	13	361	111	41	15	57
Link Distance (ft)		362		657		586
Upstream Blk Time (%)		17				
Queuing Penalty (veh)		54				
Storage Bay Dist (ft)	125		125		125	
Storage Blk Time (%)		23	6			0
Queuing Penalty (veh)		1	2			0

Intersection: 26: Colonial Drive & Mental Healthy Dwy.

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	29	136
Average Queue (ft)	2	58
95th Queue (ft)	14	98
Link Distance (ft)		436
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 27: Boyce Street & Colonial Drive

Movement	WB	NB	NB
Directions Served	LT	L	R
Maximum Queue (ft)	86	44	41
Average Queue (ft)	17	16	12
95th Queue (ft)	53	37	31
Link Distance (ft)	862		971
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		150	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 3917

**2018 Build Conditions
Phase II
The Commons at BullStreet**

Intersection: 1: Bull St. & Harden St. Ext.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	TR	L	T	T	R	L	T
Maximum Queue (ft)	50	31	30	686	759	760	44	90	149	144	300	1664
Average Queue (ft)	9	8	3	237	251	49	7	40	51	58	237	948
95th Queue (ft)	34	28	15	636	662	229	28	90	113	114	396	2096
Link Distance (ft)		496			816	816		1090	1090	1090		1612
Upstream Blk Time (%)												43
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	100		200	675			175				200	
Storage Blk Time (%)				3	5						7	56
Queuing Penalty (veh)				2	4						55	245

Intersection: 1: Bull St. & Harden St. Ext.

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	1664	400
Average Queue (ft)	948	289
95th Queue (ft)	2098	499
Link Distance (ft)	1612	
Upstream Blk Time (%)	30	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		250
Storage Blk Time (%)	54	52
Queuing Penalty (veh)	438	413

Intersection: 2: Bull St. & Confederate Ave.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	R	L	T	T
Maximum Queue (ft)	28	91	92	94	23	201	213	258	63	350	1129	1136
Average Queue (ft)	5	20	23	24	4	42	63	116	17	145	829	839
95th Queue (ft)	22	59	68	69	18	108	159	224	52	417	1517	1507
Link Distance (ft)		540		647		582	582	582	582		1090	1090
Upstream Blk Time (%)											32	33
Queuing Penalty (veh)											265	280
Storage Bay Dist (ft)	150		200		200					150		
Storage Blk Time (%)							0				68	
Queuing Penalty (veh)							0				47	

Intersection: 2: Bull St. & Confederate Ave.

Movement	SB
Directions Served	TR
Maximum Queue (ft)	1169
Average Queue (ft)	823
95th Queue (ft)	1514
Link Distance (ft)	1090
Upstream Blk Time (%)	30
Queuing Penalty (veh)	254
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Bull St. & Colonial Drive

Movement	EB	WB	WB	NB	NB	NB	B24	B24	B24	SB	SB	SB
Directions Served	R	L	LTR	T	T	TR	T	T	T	L	T	T
Maximum Queue (ft)	28	156	183	178	214	224	136	224	241	300	645	650
Average Queue (ft)	2	95	131	48	57	73	8	15	17	87	508	528
95th Queue (ft)	15	164	195	121	135	153	60	106	120	291	796	780
Link Distance (ft)	382		157	108	108	108	169	169	169		582	582
Upstream Blk Time (%)		0	24	2	1	4		1	1		32	34
Queuing Penalty (veh)		0	57	10	5	21		7	8		262	276
Storage Bay Dist (ft)		150								200		
Storage Blk Time (%)		1	25								65	
Queuing Penalty (veh)		2	25								40	

Intersection: 3: Bull St. & Colonial Drive

Movement	SB
Directions Served	TR
Maximum Queue (ft)	630
Average Queue (ft)	503
95th Queue (ft)	799
Link Distance (ft)	582
Upstream Blk Time (%)	30
Queuing Penalty (veh)	248
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: Bull St. & Franklin Street /Freed Drive

Movement	EB	WB	NB	SB	SB	SB	B24	B24	B24
Directions Served	R	R	TR	T	T	TR	T	T	T
Maximum Queue (ft)	117	29	135	263	276	276	230	233	193
Average Queue (ft)	32	5	9	223	227	223	176	164	150
95th Queue (ft)	88	21	62	327	332	327	279	263	263
Link Distance (ft)	280	471	223	169	169	169	108	108	108
Upstream Blk Time (%)				69	81	59	48	57	38
Queuing Penalty (veh)				581	680	491	405	477	317
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: Bull St. & Jefferson Street

Movement	EB	NB	NB	NB	NB	SB	SB	SB
Directions Served	R	L	T	T	T	T	T	TR
Maximum Queue (ft)	297	29	79	194	273	227	210	221
Average Queue (ft)	125	4	3	21	73	161	168	155
95th Queue (ft)	289	19	27	102	188	238	247	233
Link Distance (ft)	351		629	629	629	162	162	162
Upstream Blk Time (%)						46	51	26
Queuing Penalty (veh)						382	424	216
Storage Bay Dist (ft)		175						
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 6: Bull St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	LT	R	R	LT	TR	L	L	T	TR	L	T
Maximum Queue (ft)	825	945	926	907	137	138	300	433	230	277	149	663
Average Queue (ft)	604	759	816	735	38	54	205	255	97	172	38	633
95th Queue (ft)	894	1016	974	976	90	113	308	407	195	292	126	671
Link Distance (ft)		901	901	901		288		418	418	418		629
Upstream Blk Time (%)		4	6	2				15				47
Queuing Penalty (veh)		24	36	10				50				395
Storage Bay Dist (ft)	775				125		175				100	
Storage Blk Time (%)	1	7			3	1	36	45			0	66
Queuing Penalty (veh)	6	39			1	0	60	77			0	29

Intersection: 6: Bull St. & Elmwood Avenue

Movement	SB	SB
Directions Served	TR	R
Maximum Queue (ft)	665	700
Average Queue (ft)	640	608
95th Queue (ft)	669	755
Link Distance (ft)	629	629
Upstream Blk Time (%)	52	26
Queuing Penalty (veh)	437	215
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: Bull St. & Calhoun St.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	T
Maximum Queue (ft)	199	306	253	93	149	355	49	1385	1413	170	156	213
Average Queue (ft)	81	126	68	33	61	111	18	198	289	59	81	105
95th Queue (ft)	152	203	155	76	103	219	43	716	761	120	134	161
Link Distance (ft)		981	981		376	376		1849	1849		418	418
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150			175			150			150		
Storage Blk Time (%)	6	10						16		1	0	
Queuing Penalty (veh)	7	8						4		14	0	

Intersection: 7: Bull St. & Calhoun St.

Movement	SB
Directions Served	R
Maximum Queue (ft)	54
Average Queue (ft)	13
95th Queue (ft)	42
Link Distance (ft)	418
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	EB	EB	EB	WB	WB	WB	WB	B28	NB	NB	NB	SB
Directions Served	L	T	TR	L	L	T	TR	T	L	T	T	L
Maximum Queue (ft)	83	170	185	243	333	247	236	341	194	170	186	40
Average Queue (ft)	27	71	81	231	292	142	115	68	82	83	103	7
95th Queue (ft)	62	128	141	265	355	198	180	215	147	140	163	26
Link Distance (ft)		679			244	244	244	641		411	411	
Upstream Blk Time (%)				2	15	0	0					
Queuing Penalty (veh)				0	63	1	0					
Storage Bay Dist (ft)	225		800	175					225			300
Storage Blk Time (%)				24	34							
Queuing Penalty (veh)				88	123							

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	198	224
Average Queue (ft)	96	107
95th Queue (ft)	177	189
Link Distance (ft)	2006	2006
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Harden St./Harden Street Ext & Calhoun St.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	113	206	26	76	141	225	257	177	48	344	338	21
Average Queue (ft)	52	77	2	20	87	144	146	29	14	94	111	5
95th Queue (ft)	98	169	13	60	134	210	229	116	42	222	253	19
Link Distance (ft)		728		1086	2481	2481	2481			385	385	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	225		50					325	300			200
Storage Blk Time (%)		0		8						0	2	
Queuing Penalty (veh)		0		0						0	1	

Intersection: 11: Gregg Street/Gregg Street & Calhoun St.

Movement	EB	WB	NB	SB	SB
Directions Served	L	L	LTR	L	TR
Maximum Queue (ft)	30	31	52	30	55
Average Queue (ft)	7	3	28	15	27
95th Queue (ft)	27	19	48	39	55
Link Distance (ft)			470		2948
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	125	275		300	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 12: Gregg Street & Colonial Drive

Movement	EB	WB	B36	NB	NB	SB	SB
Directions Served	LTR	LTR	T	L	TR	L	TR
Maximum Queue (ft)	88	162	150	30	51	26	28
Average Queue (ft)	11	65	7	13	18	3	3
95th Queue (ft)	57	159	55	35	43	16	17
Link Distance (ft)	900	91	179	2948			532
Upstream Blk Time (%)		3					
Queuing Penalty (veh)		22					
Storage Bay Dist (ft)					225	50	
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 13: Harden Street Ext & Slighs Ave.

Movement	WB	NB	NB	NB	SB	SB	SB
Directions Served	LR	T	T	R	L	T	T
Maximum Queue (ft)	399	153	157	94	150	397	398
Average Queue (ft)	240	60	80	19	83	254	243
95th Queue (ft)	352	127	145	68	162	351	348
Link Distance (ft)	340	2473	2473			411	411
Upstream Blk Time (%)	2					0	0
Queuing Penalty (veh)	0					0	0
Storage Bay Dist (ft)				50	100		
Storage Blk Time (%)			27	0	5	27	
Queuing Penalty (veh)			18	1	29	34	

Intersection: 14: Colonial Drive & Farrow Road

Movement	EB	EB	NB	B28	SB	SB
Directions Served	R	R	L	T	T	TR
Maximum Queue (ft)	135	41	116	158	264	295
Average Queue (ft)	62	6	46	6	115	110
95th Queue (ft)	109	22	95	54	236	236
Link Distance (ft)	861			244	1955	1955
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		330	550			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 15: Farrow Road & Beltline Blvd

Movement	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	T	T	R	T	T	L	T
Maximum Queue (ft)	45	249	249	143	172	306	248	99	168	209	323	334
Average Queue (ft)	10	155	126	67	100	138	119	41	64	86	132	212
95th Queue (ft)	33	216	208	139	160	225	214	78	126	155	243	333
Link Distance (ft)		1459	1459			1124	1124	1124	1955	1955		798
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	175			300	300						200	
Storage Blk Time (%)		5				0			0	1	11	
Queuing Penalty (veh)		1				0			0	5	33	

Intersection: 15: Farrow Road & Beltline Blvd

Movement	SB
Directions Served	TR
Maximum Queue (ft)	374
Average Queue (ft)	230
95th Queue (ft)	362
Link Distance (ft)	798
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Farrow Road & 277 NB RAMPS

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	L	TR	T	TR	L	T	T
Maximum Queue (ft)	113	28	14	69	60	144	117
Average Queue (ft)	56	5	2	13	11	57	53
95th Queue (ft)	99	23	10	44	34	108	103
Link Distance (ft)		655	798	798		602	602
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	300				250		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 17: Farrow Road & Lorick Avenue /277 SB Ramps

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	R	L	TR	L	T	T	T	TR
Maximum Queue (ft)	48	54	275	557	17	95	670	344	365
Average Queue (ft)	10	2	244	221	4	33	82	178	170
95th Queue (ft)	33	18	324	559	15	86	354	293	305
Link Distance (ft)	620	620		968		602	602	779	779
Upstream Blk Time (%)							0		
Queuing Penalty (veh)							0		
Storage Bay Dist (ft)			125		200				
Storage Blk Time (%)			35						
Queuing Penalty (veh)			17						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	TR	R	L	L	T	T	TR	L	L	TR
Maximum Queue (ft)	964	1073	1121	450	225	415	405	100	93	160	137	162
Average Queue (ft)	540	630	681	389	170	238	21	32	51	117	105	81
95th Queue (ft)	837	988	1102	608	258	414	145	77	91	154	144	132
Link Distance (ft)	3646	3646	3646			410	410	410	410	442	442	442
Upstream Blk Time (%)						2	0					
Queuing Penalty (veh)						8	0					
Storage Bay Dist (ft)				275	150							
Storage Blk Time (%)	13		39		16	26						
Queuing Penalty (veh)	0		88		49	79						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	NB
Directions Served	R
Maximum Queue (ft)	120
Average Queue (ft)	55
95th Queue (ft)	107
Link Distance (ft)	442
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 19: Main St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	153	178	353	351	180	26	225	489	503	473	47	125
Average Queue (ft)	75	103	152	133	95	2	187	331	308	209	16	41
95th Queue (ft)	128	165	257	237	161	12	259	602	604	475	37	86
Link Distance (ft)		410	410	410	410			450	450	450		372
Upstream Blk Time (%)								44	29	1		
Queuing Penalty (veh)								226	147	5		
Storage Bay Dist (ft)	175					175	150					200
Storage Blk Time (%)		0			0		70	10				
Queuing Penalty (veh)		0			0		342	7				

Intersection: 19: Main St. & Elmwood Avenue

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	TR	R
Maximum Queue (ft)	108	22	250	732	779	550
Average Queue (ft)	21	8	201	319	345	140
95th Queue (ft)	64	23	304	607	655	383
Link Distance (ft)	372	372		3606	3606	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			175			425
Storage Blk Time (%)			16	32	11	
Queuing Penalty (veh)			38	76	31	

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	LT
Maximum Queue (ft)	51	467	454	421	125	903	924	910	216	52	94	125
Average Queue (ft)	8	113	92	66	59	364	354	360	70	9	24	60
95th Queue (ft)	31	333	304	240	131	954	945	933	169	32	60	143
Link Distance (ft)		450	450	450		901	901	901		1633	1633	
Upstream Blk Time (%)		1	0			9	16	14				
Queuing Penalty (veh)		6	1			45	82	72				
Storage Bay Dist (ft)	200				75				200			75
Storage Blk Time (%)		8			4	54			2			3
Queuing Penalty (veh)		1			21	50			0			3

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	264
Average Queue (ft)	119
95th Queue (ft)	227
Link Distance (ft)	1034
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	41
Queuing Penalty (veh)	28

Intersection: 21: Barnwell St./Barnwell St & Calhoun St.

Movement	EB	WB	NB	NB	SB	SB
Directions Served	L	L	L	TR	L	TR
Maximum Queue (ft)	30	29	25	31	71	53
Average Queue (ft)	4	8	1	8	14	15
95th Queue (ft)	20	29	9	28	37	38
Link Distance (ft)				724		938
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	125	225	125		125	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 23: Bull St. & Access #3

Movement	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	R	T	T	T	R	L	T	T	T
Maximum Queue (ft)	265	48	162	198	218	150	174	294	279	296
Average Queue (ft)	100	9	86	112	140	18	48	224	231	228
95th Queue (ft)	248	30	175	214	248	67	159	330	327	336
Link Distance (ft)	457	457	162	162	162			223	223	223
Upstream Blk Time (%)			0	2	7	0		49	58	44
Queuing Penalty (veh)			2	9	37	0		403	482	363
Storage Bay Dist (ft)						75	150			
Storage Blk Time (%)					13			68		
Queuing Penalty (veh)					5			25		

Intersection: 25: Access #5 & Colonial Drive

Movement	WB	NB
Directions Served	T	R
Maximum Queue (ft)	224	29
Average Queue (ft)	54	7
95th Queue (ft)	190	26
Link Distance (ft)	201	126
Upstream Blk Time (%)	17	
Queuing Penalty (veh)	39	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 26: Access #5/Mental Health Dwy & Colonial Drive

Movement	EB	WB	WB	NB	NB	SB
Directions Served	L	L	TR	L	TR	LTR
Maximum Queue (ft)	49	123	465	48	20	43
Average Queue (ft)	19	11	74	15	3	4
95th Queue (ft)	45	63	330	39	14	20
Link Distance (ft)	201		451	264	264	365
Upstream Blk Time (%)			8			
Queuing Penalty (veh)			30			
Storage Bay Dist (ft)		100				
Storage Blk Time (%)			17			
Queuing Penalty (veh)			3			

Intersection: 27: Boyce Street & Colonial Drive

Movement	WB	NB	NB
Directions Served	LT	L	R
Maximum Queue (ft)	613	29	49
Average Queue (ft)	71	13	22
95th Queue (ft)	319	34	39
Link Distance (ft)	900	776	776
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 11589

Intersection: 1: Bull St. & Harden St. Ext.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	TR	L	T	T	R	L	T
Maximum Queue (ft)	73	51	29	749	756	588	22	1128	1134	1102	116	148
Average Queue (ft)	25	13	14	568	594	244	1	629	643	285	50	86
95th Queue (ft)	57	43	36	773	778	580	10	1202	1224	969	91	149
Link Distance (ft)		561			948	948		1102	1102	1102		1951
Upstream Blk Time (%)								1	3	0		
Queuing Penalty (veh)								9	25	1		
Storage Bay Dist (ft)	100		200	675			175				200	
Storage Blk Time (%)				5	11			38				
Queuing Penalty (veh)				12	26			2				

Intersection: 1: Bull St. & Harden St. Ext.

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	184	175
Average Queue (ft)	105	80
95th Queue (ft)	169	151
Link Distance (ft)	1951	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		250
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Bull St. & Confederate Ave.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	R	L	T	T
Maximum Queue (ft)	71	74	136	220	299	501	522	496	20	29	183	257
Average Queue (ft)	27	18	48	125	41	348	371	290	1	3	83	134
95th Queue (ft)	61	45	94	196	133	506	526	479	9	17	151	211
Link Distance (ft)		542		307		562	562	562	562		1102	1102
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150		200		200					150		
Storage Blk Time (%)				2		18						0
Queuing Penalty (veh)				1		7						0

Intersection: 2: Bull St. & Confederate Ave.

Movement	SB
Directions Served	TR
Maximum Queue (ft)	358
Average Queue (ft)	205
95th Queue (ft)	313
Link Distance (ft)	1102
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Bull St. & Colonial Drive

Movement	EB	WB	WB	NB	NB	NB	B24	B24	B24	SB	SB	SB
Directions Served	R	L	LTR	T	T	TR	T	T	T	L	T	T
Maximum Queue (ft)	29	164	187	232	243	242	198	209	171	106	166	312
Average Queue (ft)	3	20	171	195	196	175	77	109	52	43	17	187
95th Queue (ft)	17	102	181	236	242	248	179	232	155	83	85	278
Link Distance (ft)	379		164	137	137	137	167	167	167		562	562
Upstream Blk Time (%)		0	76	17	20	11	1	2	0			
Queuing Penalty (veh)		0	384	150	180	94	5	19	3			
Storage Bay Dist (ft)		150								200		
Storage Blk Time (%)		0	80									
Queuing Penalty (veh)		0	158									

Intersection: 3: Bull St. & Colonial Drive

Movement	SB
Directions Served	TR
Maximum Queue (ft)	349
Average Queue (ft)	231
95th Queue (ft)	294
Link Distance (ft)	562
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: Bull St. & Franklin Street /Freed Drive

Movement	EB	WB	NB
Directions Served	R	R	T
Maximum Queue (ft)	26	49	26
Average Queue (ft)	5	10	1
95th Queue (ft)	21	33	9
Link Distance (ft)	450	543	170
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Bull St. & Jefferson Street

Movement	EB	NB	NB	NB
Directions Served	R	T	T	T
Maximum Queue (ft)	54	156	142	120
Average Queue (ft)	18	14	24	12
95th Queue (ft)	47	76	83	58
Link Distance (ft)	197	687	687	687
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Intersection: 6: Bull St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	B28	NB	NB	NB	NB	SB
Directions Served	L	LT	R	R	LT	TR	T	L	L	T	TR	L
Maximum Queue (ft)	825	943	944	912	175	316	124	300	441	479	472	150
Average Queue (ft)	762	839	767	485	174	312	109	298	429	333	327	58
95th Queue (ft)	1003	1098	1145	1023	177	347	164	305	459	528	509	157
Link Distance (ft)		903	903	903		246	109		422	422	422	
Upstream Blk Time (%)		9	3	0		80	72		54	4	1	
Queuing Penalty (veh)		52	18	1		0	0		335	28	9	
Storage Bay Dist (ft)	775				125			175				100
Storage Blk Time (%)	8	27			49	89		91	96			
Queuing Penalty (veh)	71	183			93	133		205	216			

Intersection: 6: Bull St. & Elmwood Avenue

Movement	SB	SB	SB
Directions Served	T	TR	R
Maximum Queue (ft)	454	474	446
Average Queue (ft)	246	296	261
95th Queue (ft)	364	424	402
Link Distance (ft)	687	687	687
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)	56		
Queuing Penalty (veh)	20		

Intersection: 7: Bull St. & Calhoun St.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	T
Maximum Queue (ft)	200	893	893	90	265	290	225	1887	1898	224	319	338
Average Queue (ft)	184	596	558	32	150	187	58	1579	1596	91	167	185
95th Queue (ft)	236	1105	1100	69	230	285	204	2415	2402	175	251	265
Link Distance (ft)		878	878		592	592		1835	1835		422	422
Upstream Blk Time (%)		35	34					60	63			
Queuing Penalty (veh)		0	0					0	0			
Storage Bay Dist (ft)	150			175			150			150		
Storage Blk Time (%)	88	11			3			75		2	10	
Queuing Penalty (veh)	86	9			1			25		13	9	

Intersection: 7: Bull St. & Calhoun St.

Movement	SB
Directions Served	R
Maximum Queue (ft)	94
Average Queue (ft)	20
95th Queue (ft)	56
Link Distance (ft)	422
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	EB	EB	EB	WB	WB	WB	WB	B33	B33	B33	NB	NB
Directions Served	L	T	TR	L	L	T	TR	T	T	T	L	T
Maximum Queue (ft)	30	214	275	248	318	317	316	369	395	363	159	116
Average Queue (ft)	10	119	149	170	187	196	165	60	66	53	63	52
95th Queue (ft)	27	194	249	248	273	326	333	271	268	223	135	96
Link Distance (ft)		630			248	248	248	632	632	632		420
Upstream Blk Time (%)				0	1	26	23					
Queuing Penalty (veh)				0	4	68	58					
Storage Bay Dist (ft)	225		800	175							225	
Storage Blk Time (%)		0		10	14							
Queuing Penalty (veh)		0		21	27							

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	NB	SB	SB	SB
Directions Served	T	L	T	TR
Maximum Queue (ft)	102	81	216	217
Average Queue (ft)	49	29	125	116
95th Queue (ft)	87	67	211	195
Link Distance (ft)	420		1840	1840
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		300		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 10: Harden St./Harden Street Ext & Calhoun St.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	176	236	72	71	231	271	288	269	263	306	305	274
Average Queue (ft)	61	98	19	25	95	129	136	24	47	136	152	37
95th Queue (ft)	124	201	52	56	165	226	249	117	129	259	267	148
Link Distance (ft)		980		761	1249	1249	1249			274	274	
Upstream Blk Time (%)									0	0	0	0
Queuing Penalty (veh)									0	2	2	0
Storage Bay Dist (ft)	225		50					325	300			200
Storage Blk Time (%)		0	2	3					0	0	3	
Queuing Penalty (veh)		1	1	1					0	0	2	

Intersection: 10: Harden St./Harden Street Ext & Calhoun St.

Movement	B52
Directions Served	T
Maximum Queue (ft)	50
Average Queue (ft)	2
95th Queue (ft)	17
Link Distance (ft)	2589
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 11: Gregg Street/Gregg Street & Calhoun St.

Movement	EB	EB	WB	NB	SB	SB
Directions Served	L	TR	L	LTR	L	TR
Maximum Queue (ft)	51	19	30	53	70	116
Average Queue (ft)	9	0	1	23	23	32
95th Queue (ft)	34	0	10	46	50	57
Link Distance (ft)		390		351		2888
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	125		275		300	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 12: Gregg Street & Colonial Drive

Movement	EB	WB	B36	B40	B40	NB	NB	SB	SB
Directions Served	LTR	LTR	T	T	T	L	TR	L	TR
Maximum Queue (ft)	18	227	305	667	685	684	294	125	269
Average Queue (ft)	1	171	195	344	328	129	28	17	77
95th Queue (ft)	6	274	412	834	818	390	115	58	217
Link Distance (ft)	863	132	215	630	630	2888			433
Upstream Blk Time (%)		63	59	23	20				
Queuing Penalty (veh)		350	165	65	55				
Storage Bay Dist (ft)							225	50	
Storage Blk Time (%)						19		0	31
Queuing Penalty (veh)						20		0	12

Intersection: 13: Harden Street Ext & Slighs Ave.

Movement	WB	NB	NB	NB	SB	SB	SB
Directions Served	LR	T	T	R	L	T	T
Maximum Queue (ft)	314	265	658	100	149	241	248
Average Queue (ft)	163	91	258	28	81	151	152
95th Queue (ft)	278	195	529	93	142	231	232
Link Distance (ft)	299	2589	2589			420	420
Upstream Blk Time (%)	1						
Queuing Penalty (veh)	0						
Storage Bay Dist (ft)				50	100		
Storage Blk Time (%)			32	0	7	16	
Queuing Penalty (veh)			22	1	31	20	

Intersection: 14: Colonial Drive & Farrow Road

Movement	EB	EB	NB	B33	B33	B33	SB	SB
Directions Served	R	R	L	T	T		T	TR
Maximum Queue (ft)	149	131	136	181	221	248	180	163
Average Queue (ft)	62	10	61	42	62	31	96	97
95th Queue (ft)	114	51	111	131	167	145	165	157
Link Distance (ft)	1035			248	248	248	1860	1860
Upstream Blk Time (%)						0		
Queuing Penalty (veh)						0		
Storage Bay Dist (ft)		330	550					
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 15: Farrow Road & Beltline Blvd

Movement	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	TR	L	L	T	T	R	T	T	R	L
Maximum Queue (ft)	300	372	343	134	173	209	177	307	754	790	350	325
Average Queue (ft)	86	227	210	47	74	131	121	148	394	461	277	200
95th Queue (ft)	186	322	312	101	124	204	186	240	644	736	503	342
Link Distance (ft)		1471	1471			1366	1366	1366	1860	1860		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	175			300	300						225	200
Storage Blk Time (%)		24								34		21
Queuing Penalty (veh)		22								97		52

Intersection: 15: Farrow Road & Beltline Blvd

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	408	128
Average Queue (ft)	97	42
95th Queue (ft)	319	101
Link Distance (ft)	730	730
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 16: Farrow Road & 277 NB RAMPS

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	L	TR	T	TR	L	T	T
Maximum Queue (ft)	292	52	78	329	70	228	151
Average Queue (ft)	127	12	27	73	33	102	85
95th Queue (ft)	219	39	62	226	63	181	144
Link Distance (ft)		775	730	730		627	627
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	300				250		
Storage Blk Time (%)	0						
Queuing Penalty (veh)	0						

Intersection: 17: Farrow Road & Lorick Avenue /277 SB Ramps

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	R	L	TR	L	T	T	T	TR
Maximum Queue (ft)	108	45	275	434	46	258	688	175	162
Average Queue (ft)	33	2	231	120	13	131	155	67	40
95th Queue (ft)	86	15	305	358	37	219	347	165	123
Link Distance (ft)	414	414		971		627	627	807	807
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			125		200				
Storage Blk Time (%)			37			2			
Queuing Penalty (veh)			23			0			

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	TR	R	L	L	T	T	TR	L	L	TR
Maximum Queue (ft)	554	549	516	450	224	275	157	135	171	575	576	552
Average Queue (ft)	384	404	377	78	117	142	67	78	86	495	502	258
95th Queue (ft)	517	510	499	253	204	229	133	137	150	645	639	499
Link Distance (ft)	2460	2460	2460			409	409	409	409	480	480	480
Upstream Blk Time (%)										37	43	4
Queuing Penalty (veh)										0	0	0
Storage Bay Dist (ft)				275	150							
Storage Blk Time (%)	15		24		3	9						
Queuing Penalty (veh)	0		32		6	16						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	NB	B53	B53	B53	SB
Directions Served	R	T	T	T	LTR
Maximum Queue (ft)	480	308	333	314	29
Average Queue (ft)	184	99	116	30	1
95th Queue (ft)	451	265	294	148	10
Link Distance (ft)	480	3267	3267	3267	368
Upstream Blk Time (%)	0				
Queuing Penalty (veh)	0				
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 19: Main St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	250	443	450	426	402	54	160	463	472	465	299	390
Average Queue (ft)	237	364	295	249	203	14	25	186	265	271	95	185
95th Queue (ft)	277	487	423	377	310	45	78	417	449	449	201	302
Link Distance (ft)		409	409	409	409			452	452	452		588
Upstream Blk Time (%)		15	0	0	0			0	1	1		
Queuing Penalty (veh)		85	3	1	0			3	7	5		
Storage Bay Dist (ft)	175					175	150				200	
Storage Blk Time (%)	49	62			10		0	8				10
Queuing Penalty (veh)	121	152			7		0	1				14

Intersection: 19: Main St. & Elmwood Avenue

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	TR	R
Maximum Queue (ft)	358	62	249	328	219	207
Average Queue (ft)	180	26	117	96	112	80
95th Queue (ft)	292	55	206	185	171	155
Link Distance (ft)	588	588		3580	3580	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			175		425	
Storage Blk Time (%)			5	0		
Queuing Penalty (veh)			5	0		

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	LT
Maximum Queue (ft)	273	481	487	476	62	203	222	227	298	331	250	52
Average Queue (ft)	14	297	252	179	21	61	115	131	79	183	121	11
95th Queue (ft)	98	565	540	431	49	139	176	203	166	310	221	34
Link Distance (ft)		452	452	452		903	903	903		3075	3075	
Upstream Blk Time (%)		2	1	0								
Queuing Penalty (veh)		14	4	2								
Storage Bay Dist (ft)	200				75				200			75
Storage Blk Time (%)		26			0	2				9		
Queuing Penalty (veh)		3			0	1				8		

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	74
Average Queue (ft)	38
95th Queue (ft)	75
Link Distance (ft)	1034
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	4
Queuing Penalty (veh)	1

Intersection: 21: Barnwell St. & Calhoun St.

Movement	EB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR
Maximum Queue (ft)	50	20	51	49	30	75
Average Queue (ft)	12	1	21	25	20	29
95th Queue (ft)	38	7	45	46	42	54
Link Distance (ft)		390		1323		896
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	125		125		125	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 23: Bull St. & Access #3

Movement	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	R	T	T	T	R	L	T	T	T
Maximum Queue (ft)	93	46	170	187	165	52	94	138	186	157
Average Queue (ft)	46	12	89	126	97	9	41	57	97	70
95th Queue (ft)	87	37	166	196	178	33	83	116	159	135
Link Distance (ft)	801	801	153	153	153		170	170	170	170
Upstream Blk Time (%)			1	3	1				0	0
Queuing Penalty (veh)			13	23	13				1	0
Storage Bay Dist (ft)						75				
Storage Blk Time (%)					6					
Queuing Penalty (veh)					4					

Intersection: 25: Access #5 & Colonial Drive

Movement	WB	NB
Directions Served	T	R
Maximum Queue (ft)	249	29
Average Queue (ft)	245	13
95th Queue (ft)	251	35
Link Distance (ft)	236	264
Upstream Blk Time (%)	74	
Queuing Penalty (veh)	373	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 26: Access #6/Mental Health Dwy. & Colonial Drive

Movement	WB	WB	NB	NB	SB
Directions Served	L	TR	L	TR	LTR
Maximum Queue (ft)	125	387	118	52	338
Average Queue (ft)	27	378	60	11	309
95th Queue (ft)	111	384	120	37	409
Link Distance (ft)		370	316	316	322
Upstream Blk Time (%)		67			84
Queuing Penalty (veh)		321			0
Storage Bay Dist (ft)	100				
Storage Blk Time (%)	0	87			
Queuing Penalty (veh)	0	22			

Intersection: 27: Boyce Street & Colonial Drive

Movement	EB	WB	NB	NB
Directions Served	TR	LT	L	R
Maximum Queue (ft)	48	893	606	86
Average Queue (ft)	2	830	309	23
95th Queue (ft)	17	1068	571	48
Link Distance (ft)	370	863	964	964
Upstream Blk Time (%)		50		
Queuing Penalty (veh)		281		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 5249

2018 Build Conditions - IMPROVED
Phase II
The Commons at BullStreet

Intersection: 1: Bull St. & Harden St. Ext.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	TR	L	T	T	R	L	T
Maximum Queue (ft)	49	31	30	105	132	66	63	141	178	153	300	1646
Average Queue (ft)	9	3	5	49	73	18	11	39	48	54	250	1130
95th Queue (ft)	32	17	22	92	121	41	38	104	127	117	383	2235
Link Distance (ft)		496			816	816		1090	1090	1090		1612
Upstream Blk Time (%)												48
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	100		200	675			175				200	
Storage Blk Time (%)											0	59
Queuing Penalty (veh)											2	257

Intersection: 1: Bull St. & Harden St. Ext.

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	1664	400
Average Queue (ft)	1144	320
95th Queue (ft)	2232	534
Link Distance (ft)	1612	
Upstream Blk Time (%)	39	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		250
Storage Blk Time (%)	62	66
Queuing Penalty (veh)	504	517

Intersection: 2: Bull St. & Confederate Ave.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	R	L	T	T
Maximum Queue (ft)	28	120	93	31	68	159	188	221	85	349	1132	1153
Average Queue (ft)	3	22	15	17	12	32	50	83	15	174	951	971
95th Queue (ft)	18	67	48	39	42	79	134	212	53	443	1523	1498
Link Distance (ft)		540		647		582	582	582	582		1090	1090
Upstream Blk Time (%)											19	29
Queuing Penalty (veh)											157	245
Storage Bay Dist (ft)	150		200		200					150		
Storage Blk Time (%)												46
Queuing Penalty (veh)												32

Intersection: 2: Bull St. & Confederate Ave.

Movement	SB
Directions Served	TR
Maximum Queue (ft)	1131
Average Queue (ft)	966
95th Queue (ft)	1492
Link Distance (ft)	1090
Upstream Blk Time (%)	34
Queuing Penalty (veh)	289
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Bull St. & Colonial Drive

Movement	EB	WB	WB	NB	NB	NB	B24	SB	SB	SB	SB
Directions Served	R	L	LTR	T	T	TR	T	L	T	T	TR
Maximum Queue (ft)	28	156	174	84	97	108	50	299	638	634	632
Average Queue (ft)	5	6	148	27	21	32	2	46	540	600	596
95th Queue (ft)	22	28	193	64	63	84	17	167	797	647	628
Link Distance (ft)	382		157	108	108	108	167		582	582	582
Upstream Blk Time (%)		0	33		0	0			13	31	31
Queuing Penalty (veh)		0	82		0	2			105	252	258
Storage Bay Dist (ft)		150						200			
Storage Blk Time (%)		0	34						3		
Queuing Penalty (veh)		0	36						2		

Intersection: 4: Bull St. & Franklin Street /Freed Drive

Movement	EB	WB	NB	SB	SB	B24	B24	B24
Directions Served	R	R	TR	T	TR	T	T	T
Maximum Queue (ft)	26	52	25	262	276	82	216	193
Average Queue (ft)	4	10	1	233	233	5	187	180
95th Queue (ft)	20	34	8	309	308	35	249	256
Link Distance (ft)	272	477	225	167	167	108	108	108
Upstream Blk Time (%)				36	39		33	35
Queuing Penalty (veh)				304	331		274	297
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 5: Bull St. & Jefferson Street

Movement	EB	NB	NB	NB	NB	SB	SB	SB
Directions Served	R	L	T	T	T	T	T	TR
Maximum Queue (ft)	174	26	31	107	179	201	200	188
Average Queue (ft)	67	1	3	12	70	171	173	158
95th Queue (ft)	152	9	19	56	161	197	195	206
Link Distance (ft)	351		629	629	629	162	162	162
Upstream Blk Time (%)						36	45	21
Queuing Penalty (veh)						306	380	179
Storage Bay Dist (ft)		175						
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 6: Bull St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	WB	WB	NB	NB	NB	NB	SB
Directions Served	L	LT	T	R	R	LT	TR	L	L	T	TR	L
Maximum Queue (ft)	504	938	966	935	275	167	93	300	428	413	405	149
Average Queue (ft)	251	607	822	904	220	27	32	276	355	74	121	19
95th Queue (ft)	417	1042	1206	959	386	73	70	360	504	224	254	81
Link Distance (ft)		901	901	901			288		406	406	406	
Upstream Blk Time (%)		1	16	34					40	0	0	
Queuing Penalty (veh)		3	91	195					144	0	0	
Storage Bay Dist (ft)	775				250	125		175				100
Storage Blk Time (%)		0		68	7	1		81	81			
Queuing Penalty (veh)		1		293	30	0		141	142			

Intersection: 6: Bull St. & Elmwood Avenue

Movement	SB	SB	SB
Directions Served	T	TR	R
Maximum Queue (ft)	671	679	663
Average Queue (ft)	638	647	631
95th Queue (ft)	655	669	663
Link Distance (ft)	629	629	629
Upstream Blk Time (%)	45	49	33
Queuing Penalty (veh)	375	408	280
Storage Bay Dist (ft)			
Storage Blk Time (%)	61		
Queuing Penalty (veh)	27		

Intersection: 7: Bull St. & Calhoun St.

Movement	EB	EB	EB	WB	WB	WB	B8	B8	NB	NB	NB	SB
Directions Served	L	T	TR	L	T	TR	T	T	L	T	TR	L
Maximum Queue (ft)	199	980	976	68	380	446	265	245	224	590	649	201
Average Queue (ft)	135	433	389	23	131	207	11	27	40	191	212	67
95th Queue (ft)	240	1039	1034	57	305	456	93	135	130	443	466	152
Link Distance (ft)		981	981		376	376	412	412		1849	1849	
Upstream Blk Time (%)		26	25		2	20						
Queuing Penalty (veh)		0	0		2	30						
Storage Bay Dist (ft)	150			175					150			150
Storage Blk Time (%)	44	6			1					24		2
Queuing Penalty (veh)	53	5			0					6		19

Intersection: 7: Bull St. & Calhoun St.

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	160	178	53
Average Queue (ft)	100	117	16
95th Queue (ft)	154	161	44
Link Distance (ft)	406	406	406
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)	1		
Queuing Penalty (veh)	1		

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	EB	EB	EB	WB	WB	WB	WB	B28	NB	NB	NB	SB
Directions Served	L	T	TR	L	L	T	TR	T	L	T	T	L
Maximum Queue (ft)	62	165	181	243	337	268	243	280	157	154	190	17
Average Queue (ft)	21	84	88	218	268	160	121	26	82	74	86	4
95th Queue (ft)	51	134	156	275	350	231	210	120	135	122	152	14
Link Distance (ft)		679			244	244	244	641		411	411	
Upstream Blk Time (%)				1	11	0	0					
Queuing Penalty (veh)				0	46	1	0					
Storage Bay Dist (ft)	225		800	175					225			300
Storage Blk Time (%)				20	29							
Queuing Penalty (veh)				72	105							

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	196	218
Average Queue (ft)	66	85
95th Queue (ft)	139	158
Link Distance (ft)	2006	2006
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Harden St./Harden Street Ext & Calhoun St.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	133	188	46	135	156	255	269	212	26	278	250	81
Average Queue (ft)	42	65	5	29	86	156	179	63	9	86	91	12
95th Queue (ft)	100	143	23	82	138	234	270	183	28	193	204	39
Link Distance (ft)		728		1086	2481	2481	2481			416	416	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	225		50					325	300			200
Storage Blk Time (%)			1	13								1
Queuing Penalty (veh)			0	1								1

Intersection: 11: Gregg Street/Gregg Street & Calhoun St.

Movement	EB	WB	NB	SB	SB
Directions Served	L	L	LTR	L	TR
Maximum Queue (ft)	66	31	55	31	72
Average Queue (ft)	7	5	27	12	29
95th Queue (ft)	28	25	43	36	58
Link Distance (ft)			470		2942
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	125	275		300	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 12: Gregg Street & Colonial Drive

Movement	EB	WB	NB	NB	SB	SB
Directions Served	L	L	L	TR	L	TR
Maximum Queue (ft)	27	62	30	54	26	27
Average Queue (ft)	5	29	2	22	8	2
95th Queue (ft)	21	57	14	47	27	13
Link Distance (ft)			2942			526
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	100	100		225	50	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 13: Harden Street Ext & Slighs Ave.

Movement	WB	NB	NB	NB	SB	SB	SB
Directions Served	LR	T	T	R	L	T	T
Maximum Queue (ft)	355	138	139	90	149	333	351
Average Queue (ft)	224	64	69	9	85	195	205
95th Queue (ft)	346	119	128	41	166	306	315
Link Distance (ft)	340	2442	2442			411	411
Upstream Blk Time (%)	1						
Queuing Penalty (veh)	0						
Storage Bay Dist (ft)				50	100		
Storage Blk Time (%)			18	0	4	24	
Queuing Penalty (veh)			12	1	22	30	

Intersection: 14: Colonial Drive & Farrow Road

Movement	EB	EB	NB	B28	B28	SB	SB
Directions Served	R	R	L	T	T	T	TR
Maximum Queue (ft)	133	41	140	42	76	243	289
Average Queue (ft)	55	10	69	1	3	96	99
95th Queue (ft)	104	30	129	14	26	192	215
Link Distance (ft)	861		244		244	1955	1955
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	330		550				
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 15: Farrow Road & Beltline Blvd

Movement	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	SB	SB	
Directions Served	L	T	TR	L	L	T	T	R	T	T	L	T	
Maximum Queue (ft)	40	237	233	134	170	253	226	95	230	244	324	383	
Average Queue (ft)	13	142	123	58	109	144	126	47	67	92	146	190	
95th Queue (ft)	33	215	207	129	163	215	201	87	139	156	255	319	
Link Distance (ft)	1459		1459	1124			1124	1124	1955	1955	798		
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (ft)	175			300	300				200				
Storage Blk Time (%)	4									0	2	6	
Queuing Penalty (veh)	1									1	11	18	

Intersection: 15: Farrow Road & Beltline Blvd

Movement	SB
Directions Served	TR
Maximum Queue (ft)	399
Average Queue (ft)	207
95th Queue (ft)	339
Link Distance (ft)	798
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Farrow Road & 277 NB RAMPS

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	L	TR	T	TR	L	T	T
Maximum Queue (ft)	110	28	60	52	66	107	112
Average Queue (ft)	47	10	5	7	10	57	59
95th Queue (ft)	88	30	25	30	35	100	109
Link Distance (ft)		655	798	798		602	602
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	300				250		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 17: Farrow Road & Lorick Avenue /277 SB Ramps

Movement	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	L	TR	L	T	T	T	TR
Maximum Queue (ft)	27	275	752	17	75	89	293	219
Average Queue (ft)	11	259	295	2	29	33	155	130
95th Queue (ft)	30	320	646	12	64	76	275	261
Link Distance (ft)	620		968		602	602	779	779
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)		125		200				
Storage Blk Time (%)		41						
Queuing Penalty (veh)		20						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	TR	R	L	L	T	T	TR	L	L	TR
Maximum Queue (ft)	1613	1759	1789	450	225	425	378	324	107	159	180	140
Average Queue (ft)	744	840	898	381	190	295	34	40	53	97	87	67
95th Queue (ft)	1467	1529	1591	624	248	484	190	141	95	145	141	112
Link Distance (ft)	3646	3646	3646			410	410	410	410	442	442	442
Upstream Blk Time (%)							11					
Queuing Penalty (veh)							54					
Storage Bay Dist (ft)				275	150							
Storage Blk Time (%)	13		46		28	42						
Queuing Penalty (veh)	0		103		85	128						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	NB
Directions Served	R
Maximum Queue (ft)	96
Average Queue (ft)	54
95th Queue (ft)	94
Link Distance (ft)	442
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 19: Main St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	122	160	414	421	430	275	225	500	501	450	68	87
Average Queue (ft)	72	99	157	194	208	91	199	381	294	212	20	46
95th Queue (ft)	131	152	318	393	420	292	256	622	574	431	51	82
Link Distance (ft)		410	410	410	410			450	450	450		372
Upstream Blk Time (%)			0	0	1			46	7	0		
Queuing Penalty (veh)			2	2	6			240	35	2		
Storage Bay Dist (ft)	175					175	150					200
Storage Blk Time (%)		0			28		76	36				
Queuing Penalty (veh)		0			18		368	27				

Intersection: 19: Main St. & Elmwood Avenue

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	TR	R
Maximum Queue (ft)	73	22	250	1090	982	550
Average Queue (ft)	21	10	209	429	394	119
95th Queue (ft)	58	25	307	859	725	280
Link Distance (ft)	372	372		3606	3606	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			175			425
Storage Blk Time (%)			49	21	3	
Queuing Penalty (veh)			119	50	10	

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	LT
Maximum Queue (ft)	29	448	484	471	124	901	950	900	166	52	94	125
Average Queue (ft)	11	106	287	336	85	457	397	325	71	10	19	30
95th Queue (ft)	32	333	578	598	156	1018	973	875	154	34	53	82
Link Distance (ft)		450	450	450		901	901	901		1633	1633	
Upstream Blk Time (%)		0	6	14		1	1	0				
Queuing Penalty (veh)		0	47	115		4	5	0				
Storage Bay Dist (ft)	200				75				200			75
Storage Blk Time (%)		0			18	54						2
Queuing Penalty (veh)		0			89	50						2

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	159
Average Queue (ft)	81
95th Queue (ft)	135
Link Distance (ft)	1034
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	22
Queuing Penalty (veh)	15

Intersection: 21: Barnwell Street & Calhoun St.

Movement	EB	WB	NB	NB	SB	SB
Directions Served	L	L	L	TR	L	TR
Maximum Queue (ft)	30	30	30	30	50	31
Average Queue (ft)	3	4	3	13	19	13
95th Queue (ft)	18	22	18	35	46	37
Link Distance (ft)				518		355
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	125	225	125		125	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 23: Bull St. & Access #3

Movement	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	R	T	T	T	R	L	T	T	T
Maximum Queue (ft)	348	48	179	179	203	150	53	254	274	300
Average Queue (ft)	241	10	121	134	160	29	15	230	236	212
95th Queue (ft)	407	31	188	188	202	111	42	298	299	305
Link Distance (ft)	457	457	162	162	162		225	225	225	225
Upstream Blk Time (%)			1	2	5	0		37	38	10
Queuing Penalty (veh)			9	11	30	0		228	235	62
Storage Bay Dist (ft)						75				
Storage Blk Time (%)					15					
Queuing Penalty (veh)					6					

Intersection: 25: Access #5 & Colonial Drive

Movement	WB	NB
Directions Served	T	R
Maximum Queue (ft)	212	29
Average Queue (ft)	74	9
95th Queue (ft)	177	31
Link Distance (ft)	201	126
Upstream Blk Time (%)	5	
Queuing Penalty (veh)	14	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 26: Access #6/Mental Health Dwy. & Colonial Drive

Movement	EB	WB	WB	NB	NB	SB
Directions Served	L	L	TR	L	TR	LTR
Maximum Queue (ft)	48	124	224	26	21	23
Average Queue (ft)	18	9	18	12	5	3
95th Queue (ft)	46	49	111	33	20	15
Link Distance (ft)	201		450	264	264	365
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		100				
Storage Blk Time (%)			4			
Queuing Penalty (veh)			1			

Intersection: 27: Boyce Street & Colonial Drive

Movement	WB	NB	NB
Directions Served	L	L	R
Maximum Queue (ft)	54	48	27
Average Queue (ft)	17	17	18
95th Queue (ft)	43	43	35
Link Distance (ft)			776
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	100	150	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 9571

Queuing and Blocking Report
 Queuing and Blocking Report

Intersection: 1: Bull St. & Harden St. Ext.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	TR	L	T	T	R	L	T
Maximum Queue (ft)	49	96	51	750	1008	881	224	1141	1115	1115	94	138
Average Queue (ft)	17	20	14	635	709	496	13	649	649	296	47	60
95th Queue (ft)	38	54	42	810	960	931	82	1279	1275	1036	80	135
Link Distance (ft)		561			948	948		1102	1102	1102		1951
Upstream Blk Time (%)					2			1	1	0		
Queuing Penalty (veh)					6			8	10	2		
Storage Bay Dist (ft)	100		200	675			175				200	
Storage Blk Time (%)		0		6	44			34				
Queuing Penalty (veh)		0		14	112			2				

Intersection: 1: Bull St. & Harden St. Ext.

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	178	198
Average Queue (ft)	85	118
95th Queue (ft)	157	207
Link Distance (ft)	1951	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		250
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report
 Queuing and Blocking Report

Intersection: 2: Bull St. & Confederate Ave.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	R	L	T	T
Maximum Queue (ft)	94	113	93	238	299	572	600	561	19	29	190	261
Average Queue (ft)	30	34	44	133	36	331	360	271	2	3	98	143
95th Queue (ft)	64	71	90	182	127	512	557	461	10	18	158	231
Link Distance (ft)		542		307		562	562	562	562		1102	1102
Upstream Blk Time (%)						0	0	0				
Queuing Penalty (veh)						2	2	0				
Storage Bay Dist (ft)	150		200		200					150		
Storage Blk Time (%)				1		18					0	
Queuing Penalty (veh)				1		6					0	

Intersection: 2: Bull St. & Confederate Ave.

Movement	SB
Directions Served	TR
Maximum Queue (ft)	375
Average Queue (ft)	213
95th Queue (ft)	327
Link Distance (ft)	1102
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Bull St. & Colonial Drive

Movement	EB	WB	WB	NB	NB	NB	B24	B24	B24	SB	SB	SB
Directions Served	R	L	LTR	T	T	TR	T	T	T	L	T	T
Maximum Queue (ft)	28	164	188	208	225	229	229	239	171	297	322	355
Average Queue (ft)	3	19	174	159	168	147	45	61	31	129	48	133
95th Queue (ft)	15	102	185	262	256	241	151	182	121	260	167	292
Link Distance (ft)	379		164	137	137	137	167	167	167		562	562
Upstream Blk Time (%)		0	76	10	12	8	1	1	0			
Queuing Penalty (veh)		0	380	87	108	68	8	10	0			
Storage Bay Dist (ft)		150								200		
Storage Blk Time (%)		0	81							12	0	
Queuing Penalty (veh)		0	159							57	0	

Intersection: 3: Bull St. & Colonial Drive

Movement	SB
Directions Served	TR
Maximum Queue (ft)	544
Average Queue (ft)	298
95th Queue (ft)	468
Link Distance (ft)	562
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: Bull St. & Franklin Street /Freed Drive

Movement	EB	WB	NB	NB	SB	SB	B24
Directions Served	R	R	T	TR	T	TR	T
Maximum Queue (ft)	26	28	55	41	57	139	57
Average Queue (ft)	7	8	2	1	3	21	2
95th Queue (ft)	24	27	19	14	24	81	20
Link Distance (ft)	450	543	170	170	167	167	137
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 5: Bull St. & Jefferson Street

Movement	EB	NB	NB	NB	NB	SB
Directions Served	R	L	T	T	T	TR
Maximum Queue (ft)	77	30	141	165	152	29
Average Queue (ft)	19	5	16	21	24	1
95th Queue (ft)	51	22	79	90	102	10
Link Distance (ft)	197		687	687	687	153
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		175				
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 6: Bull St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	WB	WB	B28	NB	NB	NB	NB
Directions Served	L	LT	T	R	R	LT	TR	T	L	L	T	T
Maximum Queue (ft)	825	940	963	904	275	175	337	161	300	444	421	409
Average Queue (ft)	707	757	626	225	49	151	276	86	296	415	161	174
95th Queue (ft)	1034	1120	1155	485	188	226	392	184	315	430	359	321
Link Distance (ft)		904	904	904			243	109		410	410	410
Upstream Blk Time (%)		6	2	0			62	54		65	1	0
Queuing Penalty (veh)		32	11	0			0	0		300	7	1
Storage Bay Dist (ft)	775				250	125			175			
Storage Blk Time (%)	8	22		4	0	32	75		91	98		
Queuing Penalty (veh)	60	150		11	0	62	112		205	219		

Intersection: 6: Bull St. & Elmwood Avenue

Movement	NB	SB	SB	SB	SB
Directions Served	TR	L	T	T	R
Maximum Queue (ft)	272	149	321	374	404
Average Queue (ft)	166	34	199	207	68
95th Queue (ft)	272	114	288	298	253
Link Distance (ft)	410		687	687	687
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		100			
Storage Blk Time (%)			47		
Queuing Penalty (veh)			16		

Queuing and Blocking Report
 Queuing and Blocking Report

Intersection: 7: Bull St. & Calhoun St.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	T
Maximum Queue (ft)	200	893	912	88	316	395	225	1887	1898	224	401	420
Average Queue (ft)	188	746	713	25	184	235	76	1818	1823	105	211	221
95th Queue (ft)	205	1164	1206	63	304	370	232	2032	2022	217	322	325
Link Distance (ft)		878	878		580	580		1835	1835		410	410
Upstream Blk Time (%)		70	51					81	87		0	1
Queuing Penalty (veh)		0	0					0	0		0	3
Storage Bay Dist (ft)	150			175			150			150		
Storage Blk Time (%)	94	11			16			91		2	17	
Queuing Penalty (veh)	92	9			6			30		9	14	

Intersection: 7: Bull St. & Calhoun St.

Movement	SB
Directions Served	R
Maximum Queue (ft)	93
Average Queue (ft)	30
95th Queue (ft)	68
Link Distance (ft)	410
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	EB	EB	EB	WB	WB	WB	WB	B33	NB	NB	NB	SB
Directions Served	L	T	TR	L	L	T	TR	T	L	T	T	L
Maximum Queue (ft)	52	287	268	247	318	204	166	95	138	94	115	81
Average Queue (ft)	15	135	153	177	192	122	92	1	54	58	57	30
95th Queue (ft)	43	221	243	261	284	190	162	10	102	101	101	65
Link Distance (ft)		630			248	248	248	632		420	420	
Upstream Blk Time (%)				0	3							
Queuing Penalty (veh)				0	8							
Storage Bay Dist (ft)	225		800	175					225			300
Storage Blk Time (%)		0		8	15							
Queuing Penalty (veh)		2		17	30							

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	219	218
Average Queue (ft)	105	102
95th Queue (ft)	174	175
Link Distance (ft)	1840	1840
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Harden St./Harden Street Ext & Calhoun St.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	202	193	74	118	177	211	316	51	70	266	296	65
Average Queue (ft)	57	85	19	33	98	106	134	9	27	111	124	15
95th Queue (ft)	115	158	53	87	161	189	238	33	57	219	247	44
Link Distance (ft)		980		760	1249	1249	1249			334	334	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	225		50					325	300			200
Storage Blk Time (%)			6	8			0					2
Queuing Penalty (veh)			2	2			0					2

Intersection: 11: Gregg Street/Gregg Street & Calhoun St.

Movement	EB	WB	NB	SB	SB
Directions Served	L	L	LTR	L	TR
Maximum Queue (ft)	30	30	53	72	54
Average Queue (ft)	15	2	25	25	32
95th Queue (ft)	39	15	50	53	47
Link Distance (ft)			351		2881
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	125	275		300	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 12: Gregg Street & Colonial Drive

Movement	EB	WB	WB	B36	B40	B40	NB	NB	SB	SB
Directions Served	TR	L	TR	T	T	T	L	TR	L	TR
Maximum Queue (ft)	38	125	221	305	556	549	796	300	124	439
Average Queue (ft)	3	87	146	172	131	95	154	46	14	138
95th Queue (ft)	18	171	291	390	451	380	504	191	55	358
Link Distance (ft)	862		131	215	630	630	2881			426
Upstream Blk Time (%)		1	53	36						5
Queuing Penalty (veh)		0	295	101						0
Storage Bay Dist (ft)		100						225	50	
Storage Blk Time (%)		0	56				33		0	55
Queuing Penalty (veh)		0	58				37		0	21

Intersection: 13: Harden Street Ext & Slighs Ave.

Movement	WB	NB	NB	NB	SB	SB	SB
Directions Served	LR	T	T	R	L	T	T
Maximum Queue (ft)	290	363	566	100	150	285	262
Average Queue (ft)	207	114	268	35	81	157	171
95th Queue (ft)	300	257	538	105	147	249	262
Link Distance (ft)	299	2529	2529			420	420
Upstream Blk Time (%)	0						
Queuing Penalty (veh)	0						
Storage Bay Dist (ft)				50	100		
Storage Blk Time (%)			31	0	6	17	
Queuing Penalty (veh)			21	1	30	22	

Intersection: 14: Colonial Drive & Farrow Road

Movement	EB	EB	NB	B33	B33	B33	SB	SB
Directions Served	R	R	L	T	T		T	TR
Maximum Queue (ft)	96	12	178	237	222	321	153	187
Average Queue (ft)	50	3	80	53	56	38	93	107
95th Queue (ft)	84	11	153	173	175	174	145	163
Link Distance (ft)	1035			248	248	248	1860	1860
Upstream Blk Time (%)				0		1		
Queuing Penalty (veh)				0		3		
Storage Bay Dist (ft)	330		550					
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 15: Farrow Road & Beltline Blvd

Movement	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB	SB	
Directions Served	L	T	TR	L	L	T	T	R	T	T	R	L	
Maximum Queue (ft)	184	273	266	150	164	235	234	319	508	550	350	324	
Average Queue (ft)	73	195	183	43	81	144	130	173	314	353	169	181	
95th Queue (ft)	153	268	261	102	140	192	185	270	470	521	448	289	
Link Distance (ft)	1471		1471				1366	1366	1366	1860	1860		
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (ft)	175				300	300						225	200
Storage Blk Time (%)	1	17									24	15	
Queuing Penalty (veh)	4	16									69	39	

Intersection: 15: Farrow Road & Beltline Blvd

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	370	132
Average Queue (ft)	59	52
95th Queue (ft)	166	102
Link Distance (ft)	730	730
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 16: Farrow Road & 277 NB RAMPS

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	L	TR	T	TR	L	T	T
Maximum Queue (ft)	240	51	114	339	70	235	130
Average Queue (ft)	113	10	33	84	32	94	81
95th Queue (ft)	187	34	83	241	61	168	130
Link Distance (ft)		775	730	730		627	627
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	300				250		
Storage Blk Time (%)						0	
Queuing Penalty (veh)						0	

Intersection: 17: Farrow Road & Lorick Avenue /277 SB Ramps

Movement	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	L	TR	L	T	T	T	TR
Maximum Queue (ft)	72	274	483	46	196	233	175	128
Average Queue (ft)	22	200	67	13	113	107	66	31
95th Queue (ft)	55	294	278	39	187	191	148	99
Link Distance (ft)	414		971		627	627	807	807
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)		125		200				
Storage Blk Time (%)		34	0		0			
Queuing Penalty (veh)		21	0		0			

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	TR	R	L	L	T	T	TR	L	L	TR
Maximum Queue (ft)	485	525	525	450	220	218	107	135	160	576	589	552
Average Queue (ft)	343	372	369	90	110	133	51	73	102	555	557	354
95th Queue (ft)	492	495	484	330	186	202	88	115	143	567	573	586
Link Distance (ft)	2460	2460	2460			409	409	409	409	480	480	480
Upstream Blk Time (%)										77	84	9
Queuing Penalty (veh)										0	0	0
Storage Bay Dist (ft)				275	150							
Storage Blk Time (%)	14		21		3	9						
Queuing Penalty (veh)	0		28		5	16						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	NB	B53	B53	B53
Directions Served	R	T	T	T
Maximum Queue (ft)	480	675	713	761
Average Queue (ft)	180	421	456	390
95th Queue (ft)	351	660	706	768
Link Distance (ft)	480	3267	3267	3267
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	0			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 19: Main St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	250	416	420	285	280	275	224	474	465	464	299	339
Average Queue (ft)	203	236	253	194	179	27	15	202	283	279	122	184
95th Queue (ft)	271	355	378	294	264	113	91	408	459	442	219	263
Link Distance (ft)		409	409	409	409			452	452	452		588
Upstream Blk Time (%)		1	1					0	0	0		
Queuing Penalty (veh)		6	4					1	2	2		
Storage Bay Dist (ft)	175					175	150					200
Storage Blk Time (%)	24	35			11			14			6	5
Queuing Penalty (veh)	59	85			8			3			13	7

Intersection: 19: Main St. & Elmwood Avenue

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	TR	R
Maximum Queue (ft)	283	105	234	164	181	118
Average Queue (ft)	182	23	108	83	109	77
95th Queue (ft)	255	70	188	136	163	112
Link Distance (ft)	588	588		3580	3580	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			175		425	
Storage Blk Time (%)			4	0		
Queuing Penalty (veh)			4	0		

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	LT
Maximum Queue (ft)	274	440	404	291	92	112	138	167	155	273	310	49
Average Queue (ft)	21	165	107	79	24	39	75	104	68	161	119	6
95th Queue (ft)	104	376	314	204	72	80	136	163	134	239	225	27
Link Distance (ft)		452	452	452		904	904	904		3075	3075	
Upstream Blk Time (%)		0										
Queuing Penalty (veh)		0										
Storage Bay Dist (ft)	200				75				200			75
Storage Blk Time (%)		6			3	0				4		
Queuing Penalty (veh)		1			18	0				3		

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	94
Average Queue (ft)	39
95th Queue (ft)	70
Link Distance (ft)	1034
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	5
Queuing Penalty (veh)	1

Intersection: 21: Barnwell Street & Calhoun St.

Movement	EB	NB	NB	SB	SB
Directions Served	L	L	TR	L	TR
Maximum Queue (ft)	55	52	75	52	76
Average Queue (ft)	12	21	23	20	25
95th Queue (ft)	38	49	49	47	52
Link Distance (ft)			749		629
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	125	125		125	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 23: Bull St. & Access #3

Movement	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	R	T	T	T	R	L	T	T	T
Maximum Queue (ft)	111	105	166	165	184	150	92	102	165	186
Average Queue (ft)	35	20	94	113	91	14	34	33	48	88
95th Queue (ft)	84	61	169	183	171	38	74	83	136	192
Link Distance (ft)	801	801	153	153	153		170	170	170	170
Upstream Blk Time (%)			2	3	2	0			0	1
Queuing Penalty (veh)			19	26	18	0			0	6
Storage Bay Dist (ft)						75				
Storage Blk Time (%)					9					
Queuing Penalty (veh)					7					

Intersection: 25: Access #5 & Colonial Drive

Movement	WB	NB
Directions Served	T	R
Maximum Queue (ft)	251	27
Average Queue (ft)	246	13
95th Queue (ft)	251	35
Link Distance (ft)	236	264
Upstream Blk Time (%)	73	
Queuing Penalty (veh)	368	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 26: Access #6/Mental Health Dwy. & Colonial Drive

Movement	WB	WB	NB	NB	SB
Directions Served	L	TR	L	TR	LTR
Maximum Queue (ft)	124	384	310	31	338
Average Queue (ft)	26	372	143	11	317
95th Queue (ft)	109	405	308	35	328
Link Distance (ft)		370	316	316	322
Upstream Blk Time (%)		64	10		97
Queuing Penalty (veh)		306	0		0
Storage Bay Dist (ft)	100				
Storage Blk Time (%)	0	87			
Queuing Penalty (veh)	0	22			

Intersection: 27: Boyce Street & Colonial Drive

Movement	EB	WB	WB	NB	NB
Directions Served	TR	L	T	L	R
Maximum Queue (ft)	22	200	893	979	721
Average Queue (ft)	1	146	709	518	121
95th Queue (ft)	8	275	1227	1095	519
Link Distance (ft)	370		862	964	964
Upstream Blk Time (%)			46	17	
Queuing Penalty (veh)			261	0	
Storage Bay Dist (ft)		100			
Storage Blk Time (%)			76		
Queuing Penalty (veh)			110		

Network Summary

Network wide Queuing Penalty: 4604

2020 Background Conditions

Intersection: 1: Bull St. & Harden St. Ext.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	TR	L	T	T	R	L	T
Maximum Queue (ft)	68	50	52	171	153	45	66	133	139	169	300	1627
Average Queue (ft)	18	2	7	56	78	20	23	43	57	69	191	511
95th Queue (ft)	48	17	29	126	148	44	58	104	127	136	335	1497
Link Distance (ft)		496			816	816		1090	1090	1090		1612
Upstream Blk Time (%)												16
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	100		200	675			175				200	
Storage Blk Time (%)											4	25
Queuing Penalty (veh)											32	109

Intersection: 1: Bull St. & Harden St. Ext.

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	1643	400
Average Queue (ft)	624	258
95th Queue (ft)	1689	444
Link Distance (ft)	1612	
Upstream Blk Time (%)	17	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		250
Storage Blk Time (%)	26	29
Queuing Penalty (veh)	208	226

Intersection: 2: Bull St. & Confederate Ave.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	R	L	T	T
Maximum Queue (ft)	28	73	73	73	66	92	115	169	100	349	1135	1125
Average Queue (ft)	3	21	17	25	17	17	28	47	14	46	436	516
95th Queue (ft)	16	53	50	58	44	56	76	117	52	187	1147	1188
Link Distance (ft)		540		647		585	585	585	585		1090	1090
Upstream Blk Time (%)											15	17
Queuing Penalty (veh)											130	139
Storage Bay Dist (ft)	150		200		200					150		
Storage Blk Time (%)												18
Queuing Penalty (veh)												13

Intersection: 2: Bull St. & Confederate Ave.

Movement	SB
Directions Served	TR
Maximum Queue (ft)	1143
Average Queue (ft)	575
95th Queue (ft)	1192
Link Distance (ft)	1090
Upstream Blk Time (%)	20
Queuing Penalty (veh)	165
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Bull St. & Colonial Drive

Movement	EB	WB	WB	NB	NB	NB	B24	B24	SB	SB	SB	SB
Directions Served	R	L	LTR	T	T	TR	T	T	L	T	T	TR
Maximum Queue (ft)	29	23	193	88	132	128	56	53	292	632	625	655
Average Queue (ft)	9	4	171	40	51	56	2	2	70	345	445	479
95th Queue (ft)	28	17	204	76	114	121	19	18	201	732	722	759
Link Distance (ft)	382		180	108	108	108	243	243		585	585	585
Upstream Blk Time (%)			46	0	0	0				18	21	25
Queuing Penalty (veh)			116	0	2	3				149	178	214
Storage Bay Dist (ft)		150							200			
Storage Blk Time (%)			55						2	12		
Queuing Penalty (veh)			59						14	8		

Intersection: 4: Bull St. & Franklin Street /Freed Drive

Movement	EB	WB	SB	SB	SB	B24	B24
Directions Served	R	R	T	T	TR	T	T
Maximum Queue (ft)	25	53	203	332	314	196	193
Average Queue (ft)	2	10	21	139	156	36	88
95th Queue (ft)	12	34	119	370	397	145	244
Link Distance (ft)	273	476	243	243	243	108	108
Upstream Blk Time (%)				12	32	4	26
Queuing Penalty (veh)				108	278	33	231
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 5: Bull St. & Jefferson Street

Movement	EB	NB	NB	NB	SB	SB	SB
Directions Served	R	T	T	T	T	T	TR
Maximum Queue (ft)	184	53	77	292	169	184	187
Average Queue (ft)	62	2	5	39	77	94	81
95th Queue (ft)	166	18	33	141	197	211	217
Link Distance (ft)	351	641	641	641	161	161	161
Upstream Blk Time (%)					7	9	22
Queuing Penalty (veh)					70	84	193
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 6: Bull St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	WB	WB	NB	NB	NB	NB	NB
Directions Served	L	LT	T	R	R	LT	TR	L	L	T	T	TR
Maximum Queue (ft)	644	902	929	961	275	101	135	300	430	123	145	166
Average Queue (ft)	311	448	619	904	216	26	54	282	388	27	45	66
95th Queue (ft)	539	792	1126	961	388	72	109	335	491	75	99	145
Link Distance (ft)		902	902	902			284		406	406	406	406
Upstream Blk Time (%)		0	3	22					56			
Queuing Penalty (veh)		0	18	128					155			
Storage Bay Dist (ft)	775				250	125		175				
Storage Blk Time (%)		0		68	6		1	88	91			
Queuing Penalty (veh)		0		302	28		0	159	164			

Intersection: 6: Bull St. & Elmwood Avenue

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	149	673	673	677
Average Queue (ft)	30	524	611	299
95th Queue (ft)	94	858	722	832
Link Distance (ft)		641	641	641
Upstream Blk Time (%)		18	33	23
Queuing Penalty (veh)		156	288	195
Storage Bay Dist (ft)	100			
Storage Blk Time (%)		55		
Queuing Penalty (veh)		25		

Intersection: 7: Bull St. & Calhoun St.

Movement	EB	EB	EB	WB	WB	WB	B8	B8	B22	NB	NB	NB
Directions Served	L	T	TR	L	T	TR	T	T	T	L	T	TR
Maximum Queue (ft)	188	1013	992	46	185	433	452	483	800	224	1864	1883
Average Queue (ft)	132	491	449	18	50	247	126	137	142	40	632	649
95th Queue (ft)	232	1150	1160	45	116	502	440	478	597	147	1652	1665
Link Distance (ft)		981	981		363	363	412	412	789		1849	1849
Upstream Blk Time (%)		35	34			37	24	24	10		10	10
Queuing Penalty (veh)		0	0			57	35	35	30		0	0
Storage Bay Dist (ft)	150			175						150		
Storage Blk Time (%)	54	3				0						50
Queuing Penalty (veh)	67	3				0						13

Intersection: 7: Bull St. & Calhoun St.

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	225	420	442	52
Average Queue (ft)	133	197	207	16
95th Queue (ft)	252	376	366	41
Link Distance (ft)		406	406	406
Upstream Blk Time (%)		0	0	
Queuing Penalty (veh)		2	4	
Storage Bay Dist (ft)	150			
Storage Blk Time (%)	23	8		
Queuing Penalty (veh)	239	15		

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	EB	EB	EB	WB	WB	WB	WB	B33	NB	NB	NB	SB
Directions Served	L	T	TR	L	L	T	TR	T	L	T	T	L
Maximum Queue (ft)	88	151	139	250	369	323	276	249	150	148	168	20
Average Queue (ft)	27	77	80	237	323	181	98	97	80	84	95	4
95th Queue (ft)	60	128	133	285	406	267	192	228	150	142	154	17
Link Distance (ft)		330			274	274	274	610		409	409	
Upstream Blk Time (%)					19	1	0					
Queuing Penalty (veh)					78	6	0					
Storage Bay Dist (ft)	225		800	175					225			300
Storage Blk Time (%)				28	40							
Queuing Penalty (veh)				103	152							

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	176	198
Average Queue (ft)	87	95
95th Queue (ft)	150	169
Link Distance (ft)	2011	2011
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Harden St./Harden Street Ext & Calhoun St.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	128	169	26	69	162	231	271	177	47	372	360	300
Average Queue (ft)	54	61	1	26	89	164	176	32	14	142	134	27
95th Queue (ft)	106	123	10	55	140	228	250	120	40	314	292	153
Link Distance (ft)		728		1086	2481	2481	2481			302	302	
Upstream Blk Time (%)										2	0	0
Queuing Penalty (veh)										10	3	0
Storage Bay Dist (ft)	225		50					325	300			200
Storage Blk Time (%)				4						2	4	
Queuing Penalty (veh)				0						1	3	

Intersection: 10: Harden St./Harden Street Ext & Calhoun St.

Movement	B31
Directions Served	T
Maximum Queue (ft)	26
Average Queue (ft)	1
95th Queue (ft)	9
Link Distance (ft)	2555
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 11: Gregg Street/Gregg Street & Calhoun St.

Movement	EB	WB	WB	NB	SB	SB
Directions Served	L	L	TR	LTR	L	TR
Maximum Queue (ft)	31	30	423	53	55	55
Average Queue (ft)	8	0	12	25	14	26
95th Queue (ft)	30	0	101	49	38	53
Link Distance (ft)			728	470		2943
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	125	275			300	
Storage Blk Time (%)			3			
Queuing Penalty (veh)			0			

Intersection: 12: Gregg Street & Colonial Drive

Movement	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	TR	L	TR	L	TR
Maximum Queue (ft)	28	64	87	28	45	26	28
Average Queue (ft)	5	28	3	6	19	3	4
95th Queue (ft)	22	55	30	25	42	18	19
Link Distance (ft)			91	2943			526
Upstream Blk Time (%)			0				
Queuing Penalty (veh)			0				
Storage Bay Dist (ft)	100	100			225	50	
Storage Blk Time (%)			0				
Queuing Penalty (veh)			0				

Intersection: 13: Harden Street Ext & Slighs Ave.

Movement	WB	NB	NB	NB	SB	SB	SB
Directions Served	LR	T	T	R	L	T	T
Maximum Queue (ft)	355	138	124	96	150	406	362
Average Queue (ft)	219	65	71	24	99	254	254
95th Queue (ft)	325	121	119	76	172	375	369
Link Distance (ft)	340	2555	2555			409	409
Upstream Blk Time (%)	1					0	
Queuing Penalty (veh)	0					0	
Storage Bay Dist (ft)				50	100		
Storage Blk Time (%)			22	0	4	26	
Queuing Penalty (veh)			16	1	24	34	

Intersection: 14: Colonial Drive & Farrow Road

Movement	EB	EB	NB	SB	SB
Directions Served	R	R	L	T	TR
Maximum Queue (ft)	129	19	161	251	254
Average Queue (ft)	65	8	61	115	105
95th Queue (ft)	106	20	117	218	225
Link Distance (ft)	861			1955	1955
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		330	550		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 15: Farrow Road & Beltline Blvd

Movement	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	T	T	R	T	T	L	T
Maximum Queue (ft)	45	240	242	152	182	236	290	144	150	166	324	403
Average Queue (ft)	10	163	139	52	98	171	155	56	66	95	174	234
95th Queue (ft)	30	237	226	120	154	242	244	106	134	149	322	362
Link Distance (ft)		1459	1459			1124	1124	1124	1955	1955		798
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	175			300	300						200	
Storage Blk Time (%)		8									6	12
Queuing Penalty (veh)		1									30	36

Intersection: 15: Farrow Road & Beltline Blvd

Movement	SB
Directions Served	TR
Maximum Queue (ft)	405
Average Queue (ft)	248
95th Queue (ft)	372
Link Distance (ft)	798
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Farrow Road & 277 NB RAMPS

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	L	TR	T	TR	L	T	T
Maximum Queue (ft)	135	30	58	82	44	146	146
Average Queue (ft)	58	7	5	8	15	65	59
95th Queue (ft)	108	25	26	34	36	122	124
Link Distance (ft)		655	798	798		602	602
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	300				250		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 17: Farrow Road & Lorick Avenue /277 SB Ramps

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	R	L	TR	L	T	T	T	TR
Maximum Queue (ft)	27	87	275	776	57	121	113	337	279
Average Queue (ft)	7	7	256	275	8	39	48	206	175
95th Queue (ft)	26	42	311	649	30	88	101	313	298
Link Distance (ft)	620	620		968		602	602	779	779
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			125		200				
Storage Blk Time (%)			37						
Queuing Penalty (veh)			18						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	TR	R	L	L	T	T	TR	L	L	TR
Maximum Queue (ft)	1638	1665	1719	450	225	420	338	334	85	181	225	131
Average Queue (ft)	936	1054	1119	435	183	281	15	26	43	115	106	70
95th Queue (ft)	1541	1625	1663	556	277	474	118	66	83	166	169	114
Link Distance (ft)	3646	3646	3646			410	410	410	410	442	442	442
Upstream Blk Time (%)							5					
Queuing Penalty (veh)							25					
Storage Bay Dist (ft)				275	150							
Storage Blk Time (%)	21		44	0	26	38						
Queuing Penalty (veh)	0		104	2	81	123						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	NB
Directions Served	R
Maximum Queue (ft)	122
Average Queue (ft)	48
95th Queue (ft)	94
Link Distance (ft)	442
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 19: Main St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	175	158	243	228	196	47	225	499	489	493	89	132
Average Queue (ft)	81	101	124	111	119	8	199	396	337	276	23	62
95th Queue (ft)	136	149	195	174	176	30	281	603	594	552	63	104
Link Distance (ft)		410	410	410	410			450	450	450		372
Upstream Blk Time (%)								46	17	2		
Queuing Penalty (veh)								243	88	8		
Storage Bay Dist (ft)	175					175	150					200
Storage Blk Time (%)	0	0			1		85	19				
Queuing Penalty (veh)	0	0			1		432	15				

Intersection: 19: Main St. & Elmwood Avenue

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	TR	R
Maximum Queue (ft)	102	86	250	383	404	318
Average Queue (ft)	38	11	203	263	282	97
95th Queue (ft)	88	38	280	373	386	184
Link Distance (ft)	372	372		3606	3606	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			175		425	
Storage Blk Time (%)			14	27		
Queuing Penalty (veh)			37	63		

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	LT
Maximum Queue (ft)	51	441	472	459	125	925	927	1018	95	31	94	124
Average Queue (ft)	15	77	125	200	62	526	516	553	43	9	28	36
95th Queue (ft)	45	212	325	407	143	1152	1153	1269	90	30	66	100
Link Distance (ft)		450	450	450		902	902	902		1633	1633	
Upstream Blk Time (%)		0	0	0		16	19	32				
Queuing Penalty (veh)		0	3	2		85	101	176				
Storage Bay Dist (ft)	200				75				200			75
Storage Blk Time (%)					15	55						1
Queuing Penalty (veh)					78	52						1

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	202
Average Queue (ft)	97
95th Queue (ft)	170
Link Distance (ft)	1034
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	28
Queuing Penalty (veh)	20

Intersection: 21: Barnwell Street & Calhoun St.

Movement	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	TR	L	TR	L	TR
Maximum Queue (ft)	54	30	418	30	30	30	91
Average Queue (ft)	3	4	33	1	15	16	17
95th Queue (ft)	22	21	212	10	38	39	50
Link Distance (ft)			418		886		495
Upstream Blk Time (%)			6				
Queuing Penalty (veh)			19				
Storage Bay Dist (ft)	125	225		125		125	
Storage Blk Time (%)			7				
Queuing Penalty (veh)			2				

Intersection: 23: Bull St. & Access #3

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	R	T	T	TR	L	T	T	T
Maximum Queue (ft)	138	30	161	183	201	31	166	180	177
Average Queue (ft)	43	14	49	72	104	6	62	85	113
95th Queue (ft)	99	37	120	164	224	25	172	187	224
Link Distance (ft)	465	465	161	161	161	150	150	150	150
Upstream Blk Time (%)			0	1	3		5	3	25
Queuing Penalty (veh)			1	4	16		30	20	160
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 25: Access #5 & Colonial Drive

Movement	WB	NB
Directions Served	T	R
Maximum Queue (ft)	297	25
Average Queue (ft)	134	5
95th Queue (ft)	323	22
Link Distance (ft)	283	267
Upstream Blk Time (%)	17	
Queuing Penalty (veh)	40	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 26: Access #6/Mental Health Dwy. & Colonial Drive

Movement	EB	WB	WB	NB	NB	SB
Directions Served	L	L	TR	L	TR	LTR
Maximum Queue (ft)	52	29	369	49	27	28
Average Queue (ft)	18	3	56	10	5	5
95th Queue (ft)	49	18	248	34	23	22
Link Distance (ft)			360	318	318	222
Upstream Blk Time (%)			5			
Queuing Penalty (veh)			22			
Storage Bay Dist (ft)	100	100				
Storage Blk Time (%)			13			
Queuing Penalty (veh)			2			

Intersection: 27: Boyce St. & Colonial Drive

Movement	WB	WB	NB	NB
Directions Served	L	T	L	R
Maximum Queue (ft)	54	420	29	78
Average Queue (ft)	21	14	13	21
95th Queue (ft)	51	106	35	48
Link Distance (ft)		900		777
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	100		150	
Storage Blk Time (%)		5		
Queuing Penalty (veh)		4		

Network Summary

Network wide Queuing Penalty: 7455

Intersection: 1: Bull St. & Harden St. Ext.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	TR	L	T	T	R	L	T
Maximum Queue (ft)	64	71	29	749	761	693	22	1157	1146	1138	132	158
Average Queue (ft)	17	19	8	599	625	374	1	950	967	697	58	86
95th Queue (ft)	48	53	28	722	742	696	7	1414	1438	1515	103	153
Link Distance (ft)		561			948	948		1102	1102	1102		1951
Upstream Blk Time (%)								4	6	3		
Queuing Penalty (veh)								38	54	23		
Storage Bay Dist (ft)	100		200	675			175					200
Storage Blk Time (%)				6	9			38				
Queuing Penalty (veh)				15	22			3				

Intersection: 1: Bull St. & Harden St. Ext.

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	184	159
Average Queue (ft)	88	83
95th Queue (ft)	171	166
Link Distance (ft)	1951	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		250
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Bull St. & Confederate Ave.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	R	L	T	T
Maximum Queue (ft)	116	72	134	259	299	597	607	596	21	46	195	276
Average Queue (ft)	39	30	44	131	88	566	572	525	2	12	110	143
95th Queue (ft)	81	63	92	217	290	628	635	716	11	34	171	221
Link Distance (ft)		542		307		566	566	566	566		1102	1102
Upstream Blk Time (%)						11	13	5				
Queuing Penalty (veh)						73	81	34				
Storage Bay Dist (ft)	150		200		200					150		
Storage Blk Time (%)				3		45					1	
Queuing Penalty (veh)				2		17					0	

Intersection: 2: Bull St. & Confederate Ave.

Movement	SB
Directions Served	TR
Maximum Queue (ft)	376
Average Queue (ft)	163
95th Queue (ft)	281
Link Distance (ft)	1102
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Bull St. & Colonial Drive

Movement	EB	WB	WB	NB	NB	NB	B24	B24	B24	SB	SB	SB
Directions Served	R	L	LTR	T	T	TR	T	T	T	L	T	T
Maximum Queue (ft)	29	205	232	255	234	241	272	259	240	180	206	342
Average Queue (ft)	6	126	216	210	209	206	224	223	196	80	62	139
95th Queue (ft)	24	223	232	222	223	220	296	270	289	164	130	268
Link Distance (ft)	379		205	137	137	137	168	168	168		566	566
Upstream Blk Time (%)		0	68	45	52	37	30	33	21			
Queuing Penalty (veh)		0	354	419	479	342	281	308	190			
Storage Bay Dist (ft)		150								200		
Storage Blk Time (%)		5	79								0	
Queuing Penalty (veh)		16	162								0	

Intersection: 3: Bull St. & Colonial Drive

Movement	SB
Directions Served	TR
Maximum Queue (ft)	370
Average Queue (ft)	184
95th Queue (ft)	321
Link Distance (ft)	566
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: Bull St. & Franklin Street /Freed Drive

Movement	EB	WB	NB	NB	NB	SB
Directions Served	R	R	T	T	TR	TR
Maximum Queue (ft)	28	52	216	243	252	73
Average Queue (ft)	6	15	120	132	121	4
95th Queue (ft)	23	45	241	256	253	28
Link Distance (ft)	458	538	168	168	168	168
Upstream Blk Time (%)			9	12	8	
Queuing Penalty (veh)			89	113	80	
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 5: Bull St. & Jefferson Street

Movement	EB	NB	NB	NB	NB	SB
Directions Served	R	L	T	T	T	TR
Maximum Queue (ft)	52	30	730	734	736	55
Average Queue (ft)	22	4	291	339	308	4
95th Queue (ft)	49	21	791	849	830	24
Link Distance (ft)	197		699	699	699	153
Upstream Blk Time (%)			0	2	1	
Queuing Penalty (veh)			4	15	10	
Storage Bay Dist (ft)		175				
Storage Blk Time (%)			23			
Queuing Penalty (veh)			1			

Intersection: 6: Bull St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	WB	WB	B33	NB	NB	NB	NB
Directions Served	L	LT	T	R	R	LT	TR	T	L	L	T	T
Maximum Queue (ft)	825	942	907	700	255	175	325	206	300	434	426	475
Average Queue (ft)	725	766	558	230	68	161	288	168	299	414	217	235
95th Queue (ft)	924	990	1019	388	217	198	309	239	301	428	371	384
Link Distance (ft)		904	904	904			217	172		410	410	410
Upstream Blk Time (%)		3	1				82	58		34	0	2
Queuing Penalty (veh)		19	4				0	0		164	1	9
Storage Bay Dist (ft)	775				230	125			175			
Storage Blk Time (%)	5	12		8	0	41	88		85	93		
Queuing Penalty (veh)	38	88		23	0	79	133		198	217		

Intersection: 6: Bull St. & Elmwood Avenue

Movement	NB	SB	SB	SB	SB
Directions Served	TR	L	T	T	R
Maximum Queue (ft)	434	149	477	507	538
Average Queue (ft)	248	58	233	240	19
95th Queue (ft)	380	153	358	362	184
Link Distance (ft)	410		699	699	699
Upstream Blk Time (%)	1				
Queuing Penalty (veh)	5				
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		2	66		
Queuing Penalty (veh)		5	23		

Intersection: 7: Bull St. & Calhoun St.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	T
Maximum Queue (ft)	200	888	814	224	262	336	225	1887	1898	225	418	415
Average Queue (ft)	174	490	437	25	134	178	67	1554	1577	156	258	239
95th Queue (ft)	262	951	903	61	194	263	206	2363	2384	261	404	365
Link Distance (ft)		878	878		580	580		1835	1835		410	410
Upstream Blk Time (%)		0						50	55		10	0
Queuing Penalty (veh)		0						0	0		42	1
Storage Bay Dist (ft)	150			175			150			150		
Storage Blk Time (%)	78	9			3			38		45	14	
Queuing Penalty (veh)	80	8			1			13		265	12	

Intersection: 7: Bull St. & Calhoun St.

Movement	SB
Directions Served	R
Maximum Queue (ft)	74
Average Queue (ft)	29
95th Queue (ft)	71
Link Distance (ft)	410
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	T	TR	L	T	T	L	T
Maximum Queue (ft)	79	197	228	250	311	233	201	242	134	128	82	250
Average Queue (ft)	18	138	146	160	177	125	79	76	58	57	23	109
95th Queue (ft)	55	189	210	228	263	200	167	162	102	105	61	189
Link Distance (ft)		327			271	271	271		420	420		1842
Upstream Blk Time (%)					1							
Queuing Penalty (veh)					4							
Storage Bay Dist (ft)	225		800	175				225			300	
Storage Blk Time (%)				7	10			0				
Queuing Penalty (veh)				15	20			1				

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	SB
Directions Served	TR
Maximum Queue (ft)	174
Average Queue (ft)	95
95th Queue (ft)	155
Link Distance (ft)	1842
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 10: Harden St./Harden Street Ext & Calhoun St.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	281	252	52	114	238	270	281	186	75	312	313	78
Average Queue (ft)	76	98	19	28	104	120	136	29	33	160	161	21
95th Queue (ft)	164	199	52	82	189	212	237	106	59	295	297	56
Link Distance (ft)		979		761	1249	1249	1249			423	423	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	225		50					325	300			200
Storage Blk Time (%)	1	0	8	6						0	4	
Queuing Penalty (veh)	2	0	3	1						0	3	

Intersection: 11: Gregg Street/Gregg Street & Calhoun St.

Movement	EB	WB	NB	SB	SB
Directions Served	L	L	LTR	L	TR
Maximum Queue (ft)	53	31	76	92	76
Average Queue (ft)	14	1	27	32	36
95th Queue (ft)	41	11	55	60	64
Link Distance (ft)			351		2881
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	125	275		300	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 12: Gregg Street & Colonial Drive

Movement	EB	WB	WB	B36	B41	NB	NB	SB	SB
Directions Served	TR	L	TR	T	T	L	TR	L	TR
Maximum Queue (ft)	51	106	202	44	20	38	80	66	35
Average Queue (ft)	4	26	10	2	1	11	23	20	11
95th Queue (ft)	22	61	72	15	7	30	60	46	23
Link Distance (ft)	862		131	215	249	2881			426
Upstream Blk Time (%)			0						
Queuing Penalty (veh)			2						
Storage Bay Dist (ft)		100					225	50	
Storage Blk Time (%)		0	0					2	0
Queuing Penalty (veh)		3	0					1	0

Intersection: 13: Harden Street Ext & Slighs Ave.

Movement	WB	NB	NB	NB	SB	SB	SB
Directions Served	LR	T	T	R	L	T	T
Maximum Queue (ft)	314	515	841	100	150	255	268
Average Queue (ft)	192	133	361	28	95	150	156
95th Queue (ft)	310	334	674	90	159	234	242
Link Distance (ft)	299	2444	2444			420	420
Upstream Blk Time (%)	3						
Queuing Penalty (veh)	0						
Storage Bay Dist (ft)				50	100		
Storage Blk Time (%)			36	0	9	16	
Queuing Penalty (veh)			25	1	47	21	

Intersection: 14: Colonial Drive & Farrow Road

Movement	EB	EB	NB	B40	B40	B40	SB	SB
Directions Served	R	R	L	T	T		T	TR
Maximum Queue (ft)	112	11	141	254	240	356	174	278
Average Queue (ft)	49	3	84	59	81	45	89	108
95th Queue (ft)	91	9	135	193	232	212	147	197
Link Distance (ft)	1034			271	271	271	1860	1860
Upstream Blk Time (%)				0		1		
Queuing Penalty (veh)				0		4		
Storage Bay Dist (ft)		330	550					
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 15: Farrow Road & Beltline Blvd

Movement	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	TR	L	L	T	T	R	T	T	R	L
Maximum Queue (ft)	300	370	376	112	94	258	232	272	672	728	350	321
Average Queue (ft)	148	226	217	41	58	149	127	172	389	450	217	175
95th Queue (ft)	285	334	337	95	92	216	205	252	618	716	490	283
Link Distance (ft)		1471	1471			1366	1366	1366	1860	1860		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	175			300	300						225	200
Storage Blk Time (%)	25	23								37		11
Queuing Penalty (veh)	71	23								110		29

Intersection: 15: Farrow Road & Beltline Blvd

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	227	147
Average Queue (ft)	52	52
95th Queue (ft)	123	105
Link Distance (ft)	730	730
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 16: Farrow Road & 277 NB RAMPS

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	L	TR	T	TR	L	T	T
Maximum Queue (ft)	222	30	117	342	67	201	162
Average Queue (ft)	134	12	33	88	31	102	81
95th Queue (ft)	227	35	82	243	58	177	144
Link Distance (ft)		775	730	730		627	627
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	300				250		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 17: Farrow Road & Lorick Avenue /277 SB Ramps

Movement	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	L	TR	L	T	T	T	TR
Maximum Queue (ft)	91	274	379	46	230	233	167	172
Average Queue (ft)	17	207	104	14	144	142	68	34
95th Queue (ft)	48	298	321	36	220	222	135	108
Link Distance (ft)	414		971		627	627	807	807
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)		125		200				
Storage Blk Time (%)		32	0		2			
Queuing Penalty (veh)		21	0		0			

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	TR	R	L	L	T	T	TR	L	L	TR
Maximum Queue (ft)	1618	1672	1659	450	225	348	134	156	169	576	576	578
Average Queue (ft)	761	782	778	290	143	179	69	90	98	555	556	471
95th Queue (ft)	1601	1630	1600	616	221	285	117	142	151	566	569	679
Link Distance (ft)	2460	2460	2460			409	409	409	409	480	480	480
Upstream Blk Time (%)										76	80	47
Queuing Penalty (veh)										0	0	0
Storage Bay Dist (ft)				275	150							
Storage Blk Time (%)	37		39		8	23						
Queuing Penalty (veh)	0		55		15	41						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	NB	B53	B53	B53
Directions Served	R	T	T	T
Maximum Queue (ft)	554	1156	1183	1197
Average Queue (ft)	383	753	775	781
95th Queue (ft)	649	1131	1149	1168
Link Distance (ft)	480	3267	3267	3267
Upstream Blk Time (%)	7			
Queuing Penalty (veh)	0			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 19: Main St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	250	452	442	331	314	55	48	453	469	470	261	235
Average Queue (ft)	237	375	255	201	189	15	12	244	287	297	116	167
95th Queue (ft)	286	516	407	305	296	44	36	461	475	474	210	221
Link Distance (ft)		409	409	409	409			452	452	452		588
Upstream Blk Time (%)		30	3					0	1	5		
Queuing Penalty (veh)		185	17					1	6	29		
Storage Bay Dist (ft)	175					175	150					200
Storage Blk Time (%)	55	66			14			6			3	2
Queuing Penalty (veh)	143	173			10			1			7	3

Intersection: 19: Main St. & Elmwood Avenue

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	TR	R
Maximum Queue (ft)	265	87	249	286	155	178
Average Queue (ft)	173	28	150	82	110	91
95th Queue (ft)	237	64	245	161	160	152
Link Distance (ft)	588	588		3580	3580	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			175		425	
Storage Blk Time (%)			14			
Queuing Penalty (veh)			14			

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB		
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	LT		
Maximum Queue (ft)	29	317	287	248	46	123	194	249	195	269	200	47		
Average Queue (ft)	13	136	88	66	24	51	91	118	76	162	98	8		
95th Queue (ft)	35	279	232	168	50	108	163	193	158	248	165	31		
Link Distance (ft)		452	452	452		904	904	904		3075	3075			
Upstream Blk Time (%)														
Queuing Penalty (veh)														
Storage Bay Dist (ft)	200					75					200			75
Storage Blk Time (%)			2					1			1	5		
Queuing Penalty (veh)			0					1			2	4		

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	92
Average Queue (ft)	37
95th Queue (ft)	73
Link Distance (ft)	1034
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	4
Queuing Penalty (veh)	1

Intersection: 21: Barnwell Street & Calhoun St.

Movement	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	TR	L	TR	L	TR
Maximum Queue (ft)	53	30	22	68	78	70	50
Average Queue (ft)	12	4	1	24	17	18	25
95th Queue (ft)	39	21	8	57	47	50	42
Link Distance (ft)			449		693		427
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	125	225		125		125	
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 23: Bull St. & Williams St

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	R	T	T	TR	L	T	T	T
Maximum Queue (ft)	161	92	195	187	192	167	174	143	184
Average Queue (ft)	62	24	132	152	138	36	10	13	50
95th Queue (ft)	124	64	214	213	208	90	66	72	148
Link Distance (ft)		809	153	153	153		168	168	168
Upstream Blk Time (%)			16	21	15	0	1		1
Queuing Penalty (veh)			153	202	144	0	6		5
Storage Bay Dist (ft)	150					150			
Storage Blk Time (%)	1					1	2		
Queuing Penalty (veh)	0					3	1		

Intersection: 25: Access #5 & Colonial Drive

Movement	WB	NB
Directions Served	T	R
Maximum Queue (ft)	327	28
Average Queue (ft)	311	11
95th Queue (ft)	340	33
Link Distance (ft)	309	265
Upstream Blk Time (%)	58	
Queuing Penalty (veh)	304	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 26: Access #6/Mental Health Dwy. & Colonial Drive

Movement	EB	WB	WB	NB	NB	SB
Directions Served	L	L	TR	L	TR	LTR
Maximum Queue (ft)	29	124	270	100	331	192
Average Queue (ft)	2	24	225	71	103	155
95th Queue (ft)	14	94	356	118	316	216
Link Distance (ft)			255		336	177
Upstream Blk Time (%)			35		5	79
Queuing Penalty (veh)			172		0	0
Storage Bay Dist (ft)	100	100		75		
Storage Blk Time (%)			61	79		
Queuing Penalty (veh)			16	13		

Intersection: 27: Boyce Street & Colonial Drive

Movement	EB	WB	WB	NB	NB
Directions Served	R	L	T	L	R
Maximum Queue (ft)	22	200	268	175	662
Average Queue (ft)	1	46	101	92	163
95th Queue (ft)	8	122	243	194	538
Link Distance (ft)			862		950
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	75	100		150	
Storage Blk Time (%)			18	35	
Queuing Penalty (veh)			26	29	

Network Summary

Network wide Queuing Penalty: 6844

2020 Build Conditions
Phase III
Potential Project Buildout

Intersection: 1: Bull St. & Harden St. Ext.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	TR	L	T	T	R	L	T
Maximum Queue (ft)	31	31	72	608	690	529	43	156	178	190	300	1646
Average Queue (ft)	9	4	12	143	174	63	14	38	47	69	177	688
95th Queue (ft)	30	20	47	414	474	223	40	104	128	143	346	1789
Link Distance (ft)		496			816	816		1090	1090	1090		1612
Upstream Blk Time (%)												28
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	100		200	675			175				200	
Storage Blk Time (%)					1			0			4	38
Queuing Penalty (veh)					1			0			36	171

Intersection: 1: Bull St. & Harden St. Ext.

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	1646	400
Average Queue (ft)	696	247
95th Queue (ft)	1792	474
Link Distance (ft)	1612	
Upstream Blk Time (%)	29	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		250
Storage Blk Time (%)	37	36
Queuing Penalty (veh)	322	305

Intersection: 2: Bull St. & Confederate Ave.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	R	L	T	T
Maximum Queue (ft)	49	51	52	75	46	166	204	171	82	349	1130	1116
Average Queue (ft)	6	12	17	30	12	49	54	84	22	91	631	648
95th Queue (ft)	27	37	44	63	36	122	137	166	60	308	1315	1309
Link Distance (ft)		540		647		585	585	585	585		1090	1090
Upstream Blk Time (%)											26	29
Queuing Penalty (veh)											243	264
Storage Bay Dist (ft)	150		200		200					150		
Storage Blk Time (%)											51	
Queuing Penalty (veh)											37	

Intersection: 2: Bull St. & Confederate Ave.

Movement	SB
Directions Served	TR
Maximum Queue (ft)	1133
Average Queue (ft)	651
95th Queue (ft)	1328
Link Distance (ft)	1090
Upstream Blk Time (%)	30
Queuing Penalty (veh)	273
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Bull St. & Colonial Drive

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	R	L	LTR	T	T	TR	L	T	T	TR
Maximum Queue (ft)	53	194	206	45	108	170	299	609	651	612
Average Queue (ft)	10	76	169	16	21	29	74	393	411	416
95th Queue (ft)	37	203	226	38	56	82	206	809	821	814
Link Distance (ft)	382		194	108	108	108		585	585	585
Upstream Blk Time (%)		9	46		0	1		27	30	31
Queuing Penalty (veh)		0	130		0	5		245	273	280
Storage Bay Dist (ft)		150					200			
Storage Blk Time (%)		11	59					35		
Queuing Penalty (veh)		18	65					38		

Intersection: 4: Bull St. & Franklin Street /Freed Drive

Movement	EB	WB	NB	SB	SB	SB	B24	B24	B24
Directions Served	R	R	TR	T	T	TR	T	T	T
Maximum Queue (ft)	29	53	27	160	267	239	121	196	193
Average Queue (ft)	4	14	1	29	130	155	15	84	101
95th Queue (ft)	18	41	9	122	298	330	74	217	226
Link Distance (ft)	282	470	234	161	161	161	108	108	108
Upstream Blk Time (%)				0	27	63	0	19	50
Queuing Penalty (veh)				1	240	574	1	169	456
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: Bull St. & Jefferson Street

Movement	EB	NB	NB	NB	NB	SB	SB	SB
Directions Served	R	L	T	T	T	T	T	TR
Maximum Queue (ft)	184	31	144	227	297	161	177	200
Average Queue (ft)	55	7	20	65	118	14	66	128
95th Queue (ft)	138	26	84	193	259	81	183	241
Link Distance (ft)	351		641	641	641	161	161	161
Upstream Blk Time (%)						0	9	40
Queuing Penalty (veh)						0	86	372
Storage Bay Dist (ft)		175						
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 6: Bull St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	WB	WB	B42	NB	NB	NB	NB
Directions Served	L	LT	T	R	R	LT	TR	T	L	L	T	T
Maximum Queue (ft)	825	937	947	932	907	174	354	551	300	428	408	141
Average Queue (ft)	715	801	682	755	704	131	218	152	286	402	33	45
95th Queue (ft)	908	1009	1126	1003	976	200	399	517	323	449	159	126
Link Distance (ft)		901	901	901	901		284	499		406	406	406
Upstream Blk Time (%)		6	9	13	1		37	20		67	1	
Queuing Penalty (veh)		33	46	67	7		0	0		198	3	
Storage Bay Dist (ft)	775					125			175			
Storage Blk Time (%)	4	20				40	49		97	98		
Queuing Penalty (veh)	35	125				40	50		180	183		

Intersection: 6: Bull St. & Elmwood Avenue

Movement	NB	SB	SB	SB	SB
Directions Served	TR	L	T	T	R
Maximum Queue (ft)	212	149	668	707	676
Average Queue (ft)	60	35	335	420	424
95th Queue (ft)	161	103	691	780	917
Link Distance (ft)	406		641	641	641
Upstream Blk Time (%)			1	4	38
Queuing Penalty (veh)			12	37	339
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	40		
Queuing Penalty (veh)		0	27		

Intersection: 7: Bull St. & Calhoun St.

Movement	EB	EB	EB	WB	WB	WB	B8	B8	B22	NB	NB	NB
Directions Served	L	T	TR	L	T	TR	T	T	T	L	T	TR
Maximum Queue (ft)	199	996	990	91	434	433	483	485	840	224	1888	1864
Average Queue (ft)	158	699	665	33	101	330	221	249	274	55	1114	1141
95th Queue (ft)	251	1302	1334	84	297	544	566	621	886	174	2379	2368
Link Distance (ft)		981	981		363	363	412	412	830		1849	1849
Upstream Blk Time (%)		58	56		3	61	40	41	28		36	38
Queuing Penalty (veh)		0	0		6	114	74	78	101		0	0
Storage Bay Dist (ft)	150			175						150		
Storage Blk Time (%)	76	3			6						69	
Queuing Penalty (veh)	114	3			3						18	

Intersection: 7: Bull St. & Calhoun St.

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	212	169	153	30
Average Queue (ft)	78	86	97	4
95th Queue (ft)	157	150	149	20
Link Distance (ft)		406	406	406
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	150			
Storage Blk Time (%)	3	0		
Queuing Penalty (veh)	34	0		

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	EB	EB	EB	WB	WB	WB	WB	B46	B46	B46	NB	NB
Directions Served	L	T	TR	L	L	T	TR	T	T	T	L	T
Maximum Queue (ft)	86	146	190	250	358	339	357	624	634	648	297	421
Average Queue (ft)	21	92	92	242	328	199	157	284	150	107	126	168
95th Queue (ft)	56	140	153	282	390	320	319	634	558	477	257	305
Link Distance (ft)		330			268	268	268	614	614	614		409
Upstream Blk Time (%)				0	29	21	19	8	9	6		5
Queuing Penalty (veh)				0	153	106	95	38	43	31		20
Storage Bay Dist (ft)	225		800	175							225	
Storage Blk Time (%)				41	52						15	0
Queuing Penalty (veh)				191	244						39	0

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	NB	SB	SB	SB
Directions Served	T	L	T	TR
Maximum Queue (ft)	409	64	174	198
Average Queue (ft)	180	12	90	110
95th Queue (ft)	294	39	175	181
Link Distance (ft)	409		2011	2011
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	0			
Storage Bay Dist (ft)		300		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 10: Harden St./Harden Street Ext & Calhoun St.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	111	132	51	138	964	852	838	241	381	398	400	299
Average Queue (ft)	39	51	9	30	182	205	210	82	26	139	167	34
95th Queue (ft)	86	107	36	78	480	353	277	222	141	308	331	139
Link Distance (ft)		728		1087	2481	2481	2481			388	388	
Upstream Blk Time (%)									0	0	1	
Queuing Penalty (veh)									0	2	3	
Storage Bay Dist (ft)	225		50					325	300			200
Storage Blk Time (%)			3	9						3	9	1
Queuing Penalty (veh)			1	1						1	8	7

Intersection: 11: Gregg Street/Gregg Street & Calhoun St.

Movement	EB	WB	WB	NB	SB	SB
Directions Served	L	L	TR	LTR	L	TR
Maximum Queue (ft)	74	31	738	140	54	137
Average Queue (ft)	13	1	149	37	10	41
95th Queue (ft)	43	11	614	82	37	82
Link Distance (ft)			728	470		2943
Upstream Blk Time (%)			16			
Queuing Penalty (veh)			64			
Storage Bay Dist (ft)	125	275			300	
Storage Blk Time (%)			19			
Queuing Penalty (veh)			2			

Intersection: 12: Gregg Street & Colonial Drive

Movement	EB	EB	WB	WB	B36	NB	NB	SB	SB
Directions Served	L	TR	L	TR	T	L	TR	L	TR
Maximum Queue (ft)	26	35	90	168	251	93	54	26	51
Average Queue (ft)	3	2	31	44	67	27	27	5	12
95th Queue (ft)	15	14	70	159	244	69	57	22	36
Link Distance (ft)		900		91	179	2943			526
Upstream Blk Time (%)			0	27	26				
Queuing Penalty (veh)			0	198	93				
Storage Bay Dist (ft)	100		100				225	50	
Storage Blk Time (%)			0	27					10
Queuing Penalty (veh)			0	48					1

Intersection: 13: Harden Street Ext & Slighs Ave.

Movement	WB	NB	NB	NB	SB	SB	SB
Directions Served	LR	T	T	R	L	T	T
Maximum Queue (ft)	355	272	235	100	150	444	390
Average Queue (ft)	216	51	78	27	73	218	234
95th Queue (ft)	319	107	163	86	150	348	350
Link Distance (ft)	340	456	456			409	409
Upstream Blk Time (%)	2					0	0
Queuing Penalty (veh)	0					3	0
Storage Bay Dist (ft)				50	100		
Storage Blk Time (%)			26	0	4	25	
Queuing Penalty (veh)			18	2	27	32	

Intersection: 14: Colonial Drive & Farrow Road

Movement	EB	EB	NB	SB	SB
Directions Served	R	R	L	T	TR
Maximum Queue (ft)	293	238	96	1971	1961
Average Queue (ft)	94	22	57	378	364
95th Queue (ft)	187	110	98	1136	1114
Link Distance (ft)	861			1955	1955
Upstream Blk Time (%)				2	2
Queuing Penalty (veh)				13	13
Storage Bay Dist (ft)		330	550		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 15: Farrow Road & Beltline Blvd

Movement	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	T	T	R	T	T	L	T
Maximum Queue (ft)	66	324	267	179	214	264	239	112	225	226	325	588
Average Queue (ft)	18	178	162	84	120	141	121	54	74	109	173	285
95th Queue (ft)	48	293	273	176	204	218	207	98	159	191	332	442
Link Distance (ft)		1459	1459			1124	1124	1124	1955	1955		798
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	175			300	300						200	
Storage Blk Time (%)		12							0	3	18	
Queuing Penalty (veh)		2							0	16	51	

Intersection: 15: Farrow Road & Beltline Blvd

Movement	SB
Directions Served	TR
Maximum Queue (ft)	628
Average Queue (ft)	310
95th Queue (ft)	468
Link Distance (ft)	798
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Farrow Road & 277 NB RAMPS

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	L	TR	T	TR	L	T	T
Maximum Queue (ft)	175	27	57	140	44	123	157
Average Queue (ft)	65	3	6	20	14	52	54
95th Queue (ft)	116	16	31	70	36	107	119
Link Distance (ft)		655	798	798		602	602
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	300				250		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 17: Farrow Road & Lorick Avenue /277 SB Ramps

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	R	L	TR	L	T	T	T	TR
Maximum Queue (ft)	27	245	275	983	37	180	156	521	500
Average Queue (ft)	5	40	265	408	4	58	70	283	274
95th Queue (ft)	23	159	302	800	18	119	138	448	433
Link Distance (ft)	620	620		968		602	602	779	779
Upstream Blk Time (%)				1					
Queuing Penalty (veh)				0					
Storage Bay Dist (ft)			125		200				
Storage Blk Time (%)			33	0					
Queuing Penalty (veh)			16	0					

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	TR	R	L	L	T	T	TR	L	L	TR
Maximum Queue (ft)	3709	3698	3685	450	225	432	408	396	122	221	182	167
Average Queue (ft)	2854	2879	2869	413	190	276	35	31	49	107	97	82
95th Queue (ft)	4328	4310	4274	590	272	452	203	152	97	167	167	133
Link Distance (ft)	3646	3646	3646			410	410	410	410	442	442	442
Upstream Blk Time (%)	25	29	29			5	0	0				
Queuing Penalty (veh)	0	0	0			30	0	0				
Storage Bay Dist (ft)				275	150							
Storage Blk Time (%)	20		47		28	37						
Queuing Penalty (veh)	0		110		88	118						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	NB
Directions Served	R
Maximum Queue (ft)	168
Average Queue (ft)	62
95th Queue (ft)	118
Link Distance (ft)	442
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 19: Main St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	158	157	340	462	441	275	225	487	498	517	49	110
Average Queue (ft)	70	91	170	182	188	27	219	446	375	237	22	47
95th Queue (ft)	127	143	257	339	349	142	231	530	616	538	48	85
Link Distance (ft)		410	410	410	410			450	450	450		372
Upstream Blk Time (%)				0	0			65	20	1		
Queuing Penalty (veh)				2	3			378	118	7		
Storage Bay Dist (ft)	175					175	150				200	
Storage Blk Time (%)	0	0			17		98	19				
Queuing Penalty (veh)	0	0			11		540	16				

Intersection: 19: Main St. & Elmwood Avenue

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	TR	R
Maximum Queue (ft)	114	85	250	608	657	550
Average Queue (ft)	35	15	233	391	398	186
95th Queue (ft)	83	51	293	613	623	500
Link Distance (ft)	372	372		3606	3606	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			175			425
Storage Blk Time (%)			53	33	12	
Queuing Penalty (veh)			137	85	37	

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	LT
Maximum Queue (ft)	29	450	460	458	124	926	932	1036	149	65	114	125
Average Queue (ft)	4	126	119	146	75	720	691	705	37	13	29	65
95th Queue (ft)	19	329	365	412	163	1189	1204	1329	97	45	67	144
Link Distance (ft)		450	450	450		901	901	901		1620	1620	
Upstream Blk Time (%)		0	1	5		27	31	36				
Queuing Penalty (veh)		2	8	48		165	185	216				
Storage Bay Dist (ft)	200				75				200			75
Storage Blk Time (%)		6			24	85						8
Queuing Penalty (veh)		1			136	85						7

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	200
Average Queue (ft)	101
95th Queue (ft)	182
Link Distance (ft)	1034
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	32
Queuing Penalty (veh)	27

Intersection: 21: Barnwell Street & Calhoun St.

Movement	EB	WB	WB	NB	SB	SB
Directions Served	L	L	TR	TR	L	TR
Maximum Queue (ft)	31	31	380	54	31	736
Average Queue (ft)	11	2	100	23	18	130
95th Queue (ft)	35	15	369	49	41	445
Link Distance (ft)			380	668		734
Upstream Blk Time (%)			24			1
Queuing Penalty (veh)			90			0
Storage Bay Dist (ft)	125	225			125	
Storage Blk Time (%)			25			23
Queuing Penalty (veh)			6			9

Intersection: 23: Bull St. & Access #3

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	R	T	T	TR	L	T	T	T
Maximum Queue (ft)	482	504	187	207	246	174	241	295	274
Average Queue (ft)	252	66	124	148	166	45	61	145	182
95th Queue (ft)	526	309	200	213	221	108	184	341	347
Link Distance (ft)	466	466	161	161	161		234	234	234
Upstream Blk Time (%)	30	6	2	5	9		1	21	51
Queuing Penalty (veh)	0	0	12	34	60		8	191	456
Storage Bay Dist (ft)						150			
Storage Blk Time (%)							2		
Queuing Penalty (veh)							3		

Intersection: 25: Access #5 & Colonial Drive

Movement	WB	NB
Directions Served	T	R
Maximum Queue (ft)	308	25
Average Queue (ft)	168	9
95th Queue (ft)	395	28
Link Distance (ft)	282	267
Upstream Blk Time (%)	38	
Queuing Penalty (veh)	108	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 26: Access #6/Boyce Street & Colonial Drive

Movement	EB	WB	WB	NB	NB	SB
Directions Served	L	L	TR	L	TR	LTR
Maximum Queue (ft)	66	25	347	91	19	21
Average Queue (ft)	13	3	141	25	6	5
95th Queue (ft)	43	15	402	70	20	17
Link Distance (ft)			333	364	364	362
Upstream Blk Time (%)			32			
Queuing Penalty (veh)			146			
Storage Bay Dist (ft)	100	100				
Storage Blk Time (%)			37			
Queuing Penalty (veh)			7			

Intersection: 27: Boyce Street & Colonial Drive

Movement	WB	WB	NB	NB
Directions Served	L	T	L	R
Maximum Queue (ft)	200	913	183	44
Average Queue (ft)	30	299	62	21
95th Queue (ft)	111	982	168	39
Link Distance (ft)		900	777	777
Upstream Blk Time (%)		26		
Queuing Penalty (veh)		136		
Storage Bay Dist (ft)	100			
Storage Blk Time (%)		33		
Queuing Penalty (veh)		35		

Intersection: 28: Access #7 & Colonial Drive

Movement	WB	WB	WB	B47	B47	NB
Directions Served	L	T	T	T	T	R
Maximum Queue (ft)	199	368	364	356	380	21
Average Queue (ft)	11	99	87	84	82	4
95th Queue (ft)	74	361	336	323	318	17
Link Distance (ft)		298	298	330	330	466
Upstream Blk Time (%)		26	24	23	8	
Queuing Penalty (veh)		98	92	87	31	
Storage Bay Dist (ft)	100					
Storage Blk Time (%)		27				
Queuing Penalty (veh)		6				

Intersection: 30: Harden Street Ext & Access #8

Movement	EB
Directions Served	R
Maximum Queue (ft)	24
Average Queue (ft)	5
95th Queue (ft)	20
Link Distance (ft)	373
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 31: Harden Street Ext & Access #9

Movement	EB	NB	SB
Directions Served	R	L	R
Maximum Queue (ft)	23	74	22
Average Queue (ft)	7	13	1
95th Queue (ft)	23	43	7
Link Distance (ft)	262		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	100		75
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 32: Harden Street Ext & Access #10

Movement	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	L	T	T	T	T	R
Maximum Queue (ft)	260	63	93	191	171	72	89	25
Average Queue (ft)	129	22	49	86	116	22	32	2
95th Queue (ft)	234	50	85	145	163	58	79	12
Link Distance (ft)	273	273		317	317	387	387	
Upstream Blk Time (%)	0							
Queuing Penalty (veh)	0							
Storage Bay Dist (ft)				200				75
Storage Blk Time (%)					0	1		
Queuing Penalty (veh)					0	0		

Intersection: 33: Harden Street Ext & Access #11

Movement	EB
Directions Served	R
Maximum Queue (ft)	22
Average Queue (ft)	6
95th Queue (ft)	22
Link Distance (ft)	325
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 34: Harden Street Ext & Access #12

Movement	EB	NB
Directions Served	R	LT
Maximum Queue (ft)	21	75
Average Queue (ft)	3	6
95th Queue (ft)	14	33
Link Distance (ft)	233	452
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 12290

Intersection: 1: Bull St. & Harden St. Ext.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	TR	L	T	T	R	L	T
Maximum Queue (ft)	52	29	29	750	894	600	224	1071	1077	760	141	184
Average Queue (ft)	24	8	16	672	701	301	16	472	498	136	63	108
95th Queue (ft)	55	28	37	766	814	653	110	914	942	519	108	197
Link Distance (ft)		561			948	948		1102	1102	1102		1951
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	100		200	675			175				200	
Storage Blk Time (%)				20	32			20				0
Queuing Penalty (veh)				51	82			1				0

Intersection: 1: Bull St. & Harden St. Ext.

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	189	161
Average Queue (ft)	117	96
95th Queue (ft)	179	168
Link Distance (ft)	1951	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		250
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Bull St. & Confederate Ave.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	L	T	T	TR
Maximum Queue (ft)	115	118	154	265	69	574	261	203	29	629	700	803
Average Queue (ft)	33	32	52	128	21	124	125	68	2	242	274	293
95th Queue (ft)	80	83	106	225	54	306	239	165	11	478	540	599
Link Distance (ft)		542		307		558	558	558		1102	1102	1102
Upstream Blk Time (%)						0						
Queuing Penalty (veh)						0						
Storage Bay Dist (ft)	150		200		200				150			
Storage Blk Time (%)				3		1				20		
Queuing Penalty (veh)				2		0				1		

Intersection: 3: Bull St. & Colonial Drive

Movement	EB	WB	WB	NB	NB	NB	B24	B24	B24	SB	SB	SB
Directions Served	R	L	LTR	T	T	TR	T	T	T	L	T	T
Maximum Queue (ft)	27	250	346	207	224	241	240	247	227	300	611	586
Average Queue (ft)	2	220	333	206	206	194	125	145	103	118	229	252
95th Queue (ft)	13	328	340	211	212	236	222	235	215	285	650	688
Link Distance (ft)	379		328	137	137	137	168	168	168		558	558
Upstream Blk Time (%)			66	19	23	13	2	4	1		7	9
Queuing Penalty (veh)			380	181	213	126	18	40	14		45	54
Storage Bay Dist (ft)		150								200		
Storage Blk Time (%)		14	87							0	7	
Queuing Penalty (veh)		51	179							0	9	

Intersection: 3: Bull St. & Colonial Drive

Movement	SB
Directions Served	TR
Maximum Queue (ft)	594
Average Queue (ft)	271
95th Queue (ft)	696
Link Distance (ft)	558
Upstream Blk Time (%)	17
Queuing Penalty (veh)	99
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: Bull St. & Franklin Street /Freed Drive

Movement	EB	WB	NB	NB	NB	SB	SB	SB	B24	B24	B24
Directions Served	R	R	T	T	TR	T	T	TR	T	T	T
Maximum Queue (ft)	52	72	34	63	44	263	259	277	251	228	224
Average Queue (ft)	15	28	2	4	4	134	143	160	105	110	110
95th Queue (ft)	43	50	13	27	22	328	333	329	283	290	277
Link Distance (ft)	458	538	167	167	167	168	168	168	137	137	137
Upstream Blk Time (%)						25	31	51	17	24	31
Queuing Penalty (veh)						174	217	351	119	164	216
Storage Bay Dist (ft)											
Storage Blk Time (%)											
Queuing Penalty (veh)											

Intersection: 5: Bull St. & Jefferson Street

Movement	EB	NB	NB	NB	NB	SB	SB	SB
Directions Served	R	L	T	T	T	T	T	TR
Maximum Queue (ft)	206	29	280	377	290	195	211	242
Average Queue (ft)	114	3	146	178	168	107	112	103
95th Queue (ft)	242	16	254	302	278	240	252	251
Link Distance (ft)	197		699	699	699	153	153	153
Upstream Blk Time (%)	31					41	33	17
Queuing Penalty (veh)	0					297	239	129
Storage Bay Dist (ft)		175						
Storage Blk Time (%)			3					
Queuing Penalty (veh)			1					

Intersection: 6: Bull St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	WB	WB	B41	NB	NB	NB	NB
Directions Served	L	LT	T	R	R	LT	TR	T	L	L	T	T
Maximum Queue (ft)	825	949	958	929	275	175	276	275	300	443	425	403
Average Queue (ft)	786	880	882	731	133	162	257	229	275	365	167	153
95th Queue (ft)	926	1043	1005	1224	343	204	268	245	350	507	365	258
Link Distance (ft)		904	904	904			186	212		410	410	410
Upstream Blk Time (%)		21	16	26		3	78	84		41	3	0
Queuing Penalty (veh)		142	110	190		0	0	0		207	16	0
Storage Bay Dist (ft)	775				250	125			175			
Storage Blk Time (%)	20	39		54	0	31	76		72	78		
Queuing Penalty (veh)	184	277		153	0	128	241		179	195		

Intersection: 6: Bull St. & Elmwood Avenue

Movement	NB	SB	SB	SB	SB
Directions Served	TR	L	T	T	R
Maximum Queue (ft)	271	150	718	747	750
Average Queue (ft)	171	51	596	609	324
95th Queue (ft)	265	146	889	906	901
Link Distance (ft)	410		699	699	699
Upstream Blk Time (%)			50	42	8
Queuing Penalty (veh)			353	296	60
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		4	94		
Queuing Penalty (veh)		14	60		

Intersection: 7: Bull St. & Calhoun St.

Movement	EB	EB	EB	WB	WB	WB	B8	B8	B22	NB	NB	NB
Directions Served	L	T	TR	L	T	TR	T	T	T	L	T	TR
Maximum Queue (ft)	200	941	912	224	666	687	300	302	560	224	1874	1898
Average Queue (ft)	185	530	468	112	385	481	98	130	236	49	1624	1647
95th Queue (ft)	220	1032	1042	250	776	815	312	348	669	170	2321	2290
Link Distance (ft)		878	878		580	580	229	229	537		1835	1835
Upstream Blk Time (%)		26	16		25	52	13	35	24		54	62
Queuing Penalty (veh)		0	0		63	135	33	92	128		0	0
Storage Bay Dist (ft)	150			175						150		
Storage Blk Time (%)	86	19		26	23						36	
Queuing Penalty (veh)	107	15		46	21						12	

Intersection: 7: Bull St. & Calhoun St.

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	225	426	450	50
Average Queue (ft)	218	397	149	11
95th Queue (ft)	232	513	366	37
Link Distance (ft)		410	410	410
Upstream Blk Time (%)		55	1	
Queuing Penalty (veh)		264	4	
Storage Bay Dist (ft)	150			
Storage Blk Time (%)	100	0		
Queuing Penalty (veh)	613	0		

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	EB	EB	EB	WB	WB	WB	WB	B40	NB	NB	NB	SB
Directions Served	L	T	TR	L	L	T	TR	T	L	T	T	L
Maximum Queue (ft)	54	308	340	235	343	232	229	226	138	135	117	101
Average Queue (ft)	13	164	198	220	279	151	108	62	51	80	73	42
95th Queue (ft)	37	260	309	264	347	234	208	171	102	126	119	91
Link Distance (ft)		637			235	235	235	645		420	420	
Upstream Blk Time (%)				5	20	0	0					
Queuing Penalty (veh)				0	69	2	0					
Storage Bay Dist (ft)	225		800	175					225			300
Storage Blk Time (%)		3		29	45							
Queuing Penalty (veh)		17		80	125							

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	235	210
Average Queue (ft)	134	124
95th Queue (ft)	211	208
Link Distance (ft)	1840	1840
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Harden St./Harden Street Ext & Calhoun St.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	165	288	75	133	331	264	298	211	71	293	333	272
Average Queue (ft)	74	135	22	48	143	139	156	30	33	144	154	24
95th Queue (ft)	136	246	55	101	237	233	258	118	62	273	272	106
Link Distance (ft)		980		761	1249	1249	1249			272	272	
Upstream Blk Time (%)										0	0	0
Queuing Penalty (veh)										2	2	0
Storage Bay Dist (ft)	225		50					325	300			200
Storage Blk Time (%)		2	3	15						0	4	
Queuing Penalty (veh)		2	2	3						0	3	

Intersection: 11: Gregg Street/Gregg Street & Calhoun St.

Movement	EB	WB	WB	NB	SB	SB
Directions Served	L	L	TR	LTR	L	TR
Maximum Queue (ft)	75	50	990	74	400	521
Average Queue (ft)	23	4	112	41	56	103
95th Queue (ft)	55	23	536	63	169	296
Link Distance (ft)			980	351		2881
Upstream Blk Time (%)			2			
Queuing Penalty (veh)			9			
Storage Bay Dist (ft)	125	275			300	
Storage Blk Time (%)			9			8
Queuing Penalty (veh)			1			6

Intersection: 12: Gregg Street & Colonial Drive

Movement	EB	WB	WB	B36	NB	NB	SB	SB
Directions Served	TR	L	TR	T	L	TR	L	TR
Maximum Queue (ft)	19	125	222	279	234	139	125	400
Average Queue (ft)	2	70	76	94	70	45	26	79
95th Queue (ft)	12	131	236	305	192	96	77	248
Link Distance (ft)	862		131	207	2881			426
Upstream Blk Time (%)		0	27	21				
Queuing Penalty (veh)		0	191	71				
Storage Bay Dist (ft)		100				225	50	
Storage Blk Time (%)		0	28		9		1	33
Queuing Penalty (veh)		1	45		17		1	13

Intersection: 13: Harden Street Ext & Slighs Ave.

Movement	WB	NB	NB	NB	SB	SB	SB
Directions Served	LR	T	T	R	L	T	T
Maximum Queue (ft)	314	281	600	100	149	178	180
Average Queue (ft)	208	133	483	46	73	107	125
95th Queue (ft)	314	251	738	124	127	164	165
Link Distance (ft)	299	571	571			420	420
Upstream Blk Time (%)	4		16				
Queuing Penalty (veh)	0		116				
Storage Bay Dist (ft)				50	100		
Storage Blk Time (%)			42	0	2	12	
Queuing Penalty (veh)			30	1	12	15	

Intersection: 14: Colonial Drive & Farrow Road

Movement	EB	EB	NB	B40	B40	B40	SB	SB
Directions Served	R	R	L	T	T		T	TR
Maximum Queue (ft)	121	34	204	267	271	350	206	168
Average Queue (ft)	61	5	83	81	111	131	114	106
95th Queue (ft)	110	20	146	192	207	326	181	155
Link Distance (ft)	1034			235	235	235	1860	1860
Upstream Blk Time (%)				0	0	2		
Queuing Penalty (veh)				2	1	14		
Storage Bay Dist (ft)		330	550					
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 15: Farrow Road & Beltline Blvd

Movement	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	TR	L	L	T	T	R	T	T	R	L
Maximum Queue (ft)	300	374	365	125	137	230	235	278	1511	1547	350	324
Average Queue (ft)	106	218	211	50	74	157	148	159	1176	1259	337	250
95th Queue (ft)	248	329	322	106	124	226	221	229	1552	1613	444	343
Link Distance (ft)		1471	1471			1366	1366	1366	1860	1860		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	175			300	300						225	200
Storage Blk Time (%)	4	23							69	0	40	
Queuing Penalty (veh)	12	22							220	0	147	

Intersection: 15: Farrow Road & Beltline Blvd

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	398	384
Average Queue (ft)	154	120
95th Queue (ft)	360	244
Link Distance (ft)	730	730
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 16: Farrow Road & 277 NB RAMPS

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	L	TR	T	TR	L	T	T
Maximum Queue (ft)	246	73	75	471	50	178	171
Average Queue (ft)	128	10	21	147	22	100	92
95th Queue (ft)	220	38	58	410	50	164	149
Link Distance (ft)		775	730	730		627	627
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	300				250		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 17: Farrow Road & Lorick Avenue /277 SB Ramps

Movement	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	L	TR	L	T	T	T	TR
Maximum Queue (ft)	68	275	503	300	398	385	213	164
Average Queue (ft)	23	259	266	28	196	196	111	60
95th Queue (ft)	57	304	560	121	317	316	201	148
Link Distance (ft)	414		971		627	627	807	807
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)		125		200				
Storage Blk Time (%)		39	0		9			
Queuing Penalty (veh)		26	0		2			

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	TR	R	L	L	T	T	TR	L	L	TR
Maximum Queue (ft)	2523	2499	2499	450	224	260	130	140	201	571	571	571
Average Queue (ft)	1602	1609	1610	361	110	141	60	89	108	553	553	390
95th Queue (ft)	3145	3119	3111	643	189	218	116	137	162	571	560	626
Link Distance (ft)	2460	2460	2460			409	409	409	409	480	480	480
Upstream Blk Time (%)	38	41	40							74	77	24
Queuing Penalty (veh)	0	0	0							0	0	0
Storage Bay Dist (ft)				275	150							
Storage Blk Time (%)	70		54		2	11						
Queuing Penalty (veh)	0		76		4	21						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	NB	B53	B53	B53	SB
Directions Served	R	T	T	T	LTR
Maximum Queue (ft)	511	2611	2602	2583	28
Average Queue (ft)	300	1103	1115	1062	2
95th Queue (ft)	548	2449	2469	2476	14
Link Distance (ft)	480	3267	3267	3267	368
Upstream Blk Time (%)	3				
Queuing Penalty (veh)	0				
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 19: Main St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	250	435	442	448	448	275	114	427	423	376	260	239
Average Queue (ft)	246	415	297	266	238	52	42	172	244	257	104	153
95th Queue (ft)	256	437	465	440	424	201	95	331	345	346	179	234
Link Distance (ft)		409	409	409	409			452	452	452		588
Upstream Blk Time (%)		53	7	3	6							
Queuing Penalty (veh)		345	45	22	42							
Storage Bay Dist (ft)	175					175	150				200	
Storage Blk Time (%)	73	87			28			11			1	3
Queuing Penalty (veh)	189	226			22			3			2	5

Intersection: 19: Main St. & Elmwood Avenue

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	TR	R
Maximum Queue (ft)	265	103	250	541	429	202
Average Queue (ft)	164	32	237	292	161	89
95th Queue (ft)	256	67	280	536	298	143
Link Distance (ft)	588	588		3580	3580	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			175			425
Storage Blk Time (%)			81	0	0	
Queuing Penalty (veh)			84	0	0	

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	LT
Maximum Queue (ft)	274	492	516	490	124	890	884	256	299	752	1037	48
Average Queue (ft)	35	360	350	303	42	151	202	208	87	239	422	12
95th Queue (ft)	173	573	602	560	102	392	426	264	207	491	981	37
Link Distance (ft)		452	452	452		904	904	904		3075	3075	
Upstream Blk Time (%)		11	7	12		0	0					
Queuing Penalty (veh)		84	56	88		0	0					
Storage Bay Dist (ft)	200				75				200			75
Storage Blk Time (%)		56			3	9			2	17		
Queuing Penalty (veh)		6			21	4			5	17		

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	108
Average Queue (ft)	37
95th Queue (ft)	83
Link Distance (ft)	1034
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	5
Queuing Penalty (veh)	2

Intersection: 21: Barnwell Street & Calhoun St.

Movement	EB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR
Maximum Queue (ft)	121	376	149	353	150	338
Average Queue (ft)	28	105	44	54	42	141
95th Queue (ft)	80	366	117	195	121	367
Link Distance (ft)		374		400		323
Upstream Blk Time (%)		15				32
Queuing Penalty (veh)		73				0
Storage Bay Dist (ft)	125		125		125	
Storage Blk Time (%)	0	19	9			37
Queuing Penalty (veh)	2	1	5			26

Intersection: 23: Bull St. & Access #3

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	R	T	T	TR	L	T	T	T
Maximum Queue (ft)	824	807	184	205	202	167	206	225	241
Average Queue (ft)	511	192	159	171	164	97	148	158	185
95th Queue (ft)	975	721	175	199	180	191	237	252	254
Link Distance (ft)	808	808	153	153	153		167	167	167
Upstream Blk Time (%)	43	19	13	17	14	0	28	31	31
Queuing Penalty (veh)	0	0	128	162	136	0	195	210	210
Storage Bay Dist (ft)						150			
Storage Blk Time (%)						1	34		
Queuing Penalty (veh)						5	46		

Intersection: 25: Access #5 & Colonial Drive

Movement	WB	NB
Directions Served	T	R
Maximum Queue (ft)	229	50
Average Queue (ft)	215	13
95th Queue (ft)	239	37
Link Distance (ft)	208	262
Upstream Blk Time (%)	53	
Queuing Penalty (veh)	307	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 26: Access #6/Mental Health Dwy. & Colonial Drive

Movement	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	TR	L	TR	L	TR
Maximum Queue (ft)	29	124	239	88	51	78	386
Average Queue (ft)	1	12	168	23	15	42	103
95th Queue (ft)	10	65	311	61	41	72	236
Link Distance (ft)			225	381	381	391	391
Upstream Blk Time (%)			39				1
Queuing Penalty (veh)			218				0
Storage Bay Dist (ft)	100	100					
Storage Blk Time (%)			52				
Queuing Penalty (veh)			13				

Intersection: 27: Boyce Street & Colonial Drive

Movement	EB	WB	WB	NB	NB
Directions Served	TR	L	T	L	R
Maximum Queue (ft)	49	250	893	172	980
Average Queue (ft)	3	89	375	107	406
95th Queue (ft)	19	259	1062	212	1118
Link Distance (ft)	225		862		965
Upstream Blk Time (%)			25		31
Queuing Penalty (veh)			155		0
Storage Bay Dist (ft)		150		150	
Storage Blk Time (%)			38		48
Queuing Penalty (veh)			72		55

Intersection: 28: Access #7 & Colonial Drive

Movement	WB	WB	WB	NB
Directions Served	L	T	T	LR
Maximum Queue (ft)	200	676	660	42
Average Queue (ft)	18	137	121	15
95th Queue (ft)	103	510	458	29
Link Distance (ft)		637	637	412
Upstream Blk Time (%)		1	1	
Queuing Penalty (veh)		3	2	
Storage Bay Dist (ft)	100			
Storage Blk Time (%)		20		
Queuing Penalty (veh)		5		

Intersection: 30: Harden Street Ext & Access #8

Movement	EB	NB	NB
Directions Served	R	T	T
Maximum Queue (ft)	42	434	440
Average Queue (ft)	8	145	236
95th Queue (ft)	27	435	565
Link Distance (ft)	387	406	406
Upstream Blk Time (%)		2	16
Queuing Penalty (veh)		16	114
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 31: Harden Street Ext & Access #9

Movement	EB	NB	NB	NB
Directions Served	R	L	T	T
Maximum Queue (ft)	68	32	427	433
Average Queue (ft)	15	8	145	214
95th Queue (ft)	41	30	449	545
Link Distance (ft)	464		404	404
Upstream Blk Time (%)			2	9
Queuing Penalty (veh)			17	65
Storage Bay Dist (ft)		100		
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 32: Harden Street Ext & Access #10

Movement	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	L	T	T	T	T	R
Maximum Queue (ft)	433	409	299	406	418	163	227	150
Average Queue (ft)	223	60	74	192	252	81	97	21
95th Queue (ft)	407	223	205	395	451	156	199	85
Link Distance (ft)	394	394		404	404	404	404	
Upstream Blk Time (%)	12	2		0	6			
Queuing Penalty (veh)	0	0		2	39			
Storage Bay Dist (ft)			200					75
Storage Blk Time (%)				6			7	
Queuing Penalty (veh)				5			5	

Intersection: 33: Harden Street Ext & Access #11

Movement	EB	NB	NB
Directions Served	R	T	T
Maximum Queue (ft)	21	152	273
Average Queue (ft)	6	10	24
95th Queue (ft)	20	70	120
Link Distance (ft)	360	338	338
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 34: Harden Street Ext & Access #12

Movement	EB	NB
Directions Served	R	L
Maximum Queue (ft)	22	32
Average Queue (ft)	8	17
95th Queue (ft)	24	42
Link Distance (ft)	362	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		100
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 12732

2020 Build Conditions - IMPROVED
Phase III
Potential Project Buildout

Intersection: 1: Bull St. & Harden St. Ext.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	TR	L	T	T	R	L	T
Maximum Queue (ft)	56	31	30	479	539	139	109	181	153	158	300	1663
Average Queue (ft)	13	4	2	162	185	44	19	46	52	62	207	945
95th Queue (ft)	39	20	14	386	405	102	60	127	132	135	382	2141
Link Distance (ft)		496			816	816		1090	1090	1090		1612
Upstream Blk Time (%)												39
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	100		200	675			175				200	
Storage Blk Time (%)								1			6	52
Queuing Penalty (veh)								0			50	237

Intersection: 1: Bull St. & Harden St. Ext.

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	1646	400
Average Queue (ft)	940	281
95th Queue (ft)	2134	497
Link Distance (ft)	1612	
Upstream Blk Time (%)	33	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		250
Storage Blk Time (%)	50	51
Queuing Penalty (veh)	445	445

Intersection: 2: Bull St. & Confederate Ave.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	R	L	T	T
Maximum Queue (ft)	50	69	53	74	46	226	446	326	77	350	1119	1124
Average Queue (ft)	5	16	17	19	11	49	75	114	17	89	719	731
95th Queue (ft)	24	46	41	49	31	132	216	223	56	315	1488	1474
Link Distance (ft)		540		647		585	585	585	585		1090	1090
Upstream Blk Time (%)											36	37
Queuing Penalty (veh)											331	339
Storage Bay Dist (ft)	150		200		200					150		
Storage Blk Time (%)							0				54	
Queuing Penalty (veh)							0				39	

Intersection: 2: Bull St. & Confederate Ave.

Movement	SB
Directions Served	TR
Maximum Queue (ft)	1125
Average Queue (ft)	736
95th Queue (ft)	1475
Link Distance (ft)	1090
Upstream Blk Time (%)	39
Queuing Penalty (veh)	366
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Bull St. & Colonial Drive

Movement	EB	WB	WB	NB	NB	NB	B24	B24	B24	SB	SB	SB
Directions Served	R	L	LTR	T	T	TR	T	T	T	L	T	T
Maximum Queue (ft)	28	194	203	179	215	202	234	178	234	300	610	646
Average Queue (ft)	7	51	176	26	32	50	14	21	26	93	409	436
95th Queue (ft)	24	147	233	98	124	142	100	108	142	259	805	823
Link Distance (ft)	382		194	108	108	108	161	161	161		585	585
Upstream Blk Time (%)		0	61	6	6	8	4	6	7		34	38
Queuing Penalty (veh)		0	172	39	39	50	22	36	43		309	343
Storage Bay Dist (ft)		150								200		
Storage Blk Time (%)		0	65									37
Queuing Penalty (veh)		1	71									40

Intersection: 3: Bull St. & Colonial Drive

Movement	SB
Directions Served	TR
Maximum Queue (ft)	650
Average Queue (ft)	447
95th Queue (ft)	827
Link Distance (ft)	585
Upstream Blk Time (%)	40
Queuing Penalty (veh)	357
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: Bull St. & Franklin Street /Freed Drive

Movement	EB	WB	NB	NB	NB	SB	SB	SB	B24	B24	B24
Directions Served	R	R	T	T	TR	T	T	TR	T	T	T
Maximum Queue (ft)	118	70	239	285	246	231	234	229	218	196	258
Average Queue (ft)	38	19	9	14	11	80	159	178	51	98	134
95th Queue (ft)	106	53	82	103	88	243	315	328	170	237	279
Link Distance (ft)	282	470	239	239	239	161	161	161	108	108	108
Upstream Blk Time (%)			0	2	2	12	36	67	9	25	56
Queuing Penalty (veh)			1	15	15	105	321	609	77	221	510
Storage Bay Dist (ft)											
Storage Blk Time (%)											
Queuing Penalty (veh)											

Intersection: 5: Bull St. & Jefferson Street

Movement	EB	NB	NB	NB	NB	SB	SB	SB
Directions Served	R	L	T	T	T	T	T	TR
Maximum Queue (ft)	335	31	164	222	355	166	216	195
Average Queue (ft)	85	4	35	57	159	45	107	134
95th Queue (ft)	241	20	119	161	332	159	235	237
Link Distance (ft)	351		641	641	641	156	156	156
Upstream Blk Time (%)	0					5	17	46
Queuing Penalty (veh)	0					40	156	423
Storage Bay Dist (ft)		175						
Storage Blk Time (%)			0					
Queuing Penalty (veh)			0					

Intersection: 6: Bull St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	WB	WB	B42	NB	NB	NB	NB
Directions Served	L	LT	T	R	R	LT	TR	T	L	L	T	T
Maximum Queue (ft)	824	994	958	941	901	175	378	533	300	426	113	169
Average Queue (ft)	536	747	817	882	844	163	296	160	266	350	26	48
95th Queue (ft)	813	1083	1060	1005	986	196	421	477	344	493	77	128
Link Distance (ft)		901	901	901	901		284	499		406	406	406
Upstream Blk Time (%)		2	18	26	1		54	5		52		
Queuing Penalty (veh)		9	91	137	5		0	0		156		
Storage Bay Dist (ft)	775					125			175			
Storage Blk Time (%)	0	0				68	94		76	85		
Queuing Penalty (veh)	1	3				68	94		143	160		

Intersection: 6: Bull St. & Elmwood Avenue

Movement	NB	SB	SB	SB	SB
Directions Served	TR	L	T	T	R
Maximum Queue (ft)	211	149	661	680	696
Average Queue (ft)	69	34	334	493	510
95th Queue (ft)	165	97	706	856	951
Link Distance (ft)	406		641	641	641
Upstream Blk Time (%)			7	17	44
Queuing Penalty (veh)			60	156	394
Storage Bay Dist (ft)		100			
Storage Blk Time (%)			42		
Queuing Penalty (veh)			28		

Intersection: 7: Bull St. & Calhoun St.

Movement	EB	EB	EB	WB	WB	WB	B8	B8	B22	NB	NB	NB
Directions Served	L	T	TR	L	T	TR	T	T	T	L	T	TR
Maximum Queue (ft)	200	996	957	224	434	433	432	484	303	225	1912	1901
Average Queue (ft)	172	602	547	85	136	302	182	207	89	55	841	886
95th Queue (ft)	235	1200	1155	235	404	543	492	554	306	190	2146	2137
Link Distance (ft)		981	981		363	363	412	412	271		1849	1849
Upstream Blk Time (%)		42			17	56	32	32	29		29	30
Queuing Penalty (veh)		0			33	105	59	59	104		0	0
Storage Bay Dist (ft)	150			175						150		
Storage Blk Time (%)	67	23		21	6						56	
Queuing Penalty (veh)	101	20		20	3						15	

Intersection: 7: Bull St. & Calhoun St.

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	201	216	165	50
Average Queue (ft)	80	83	94	7
95th Queue (ft)	177	154	154	28
Link Distance (ft)		406	406	406
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	150			
Storage Blk Time (%)	6	0		
Queuing Penalty (veh)	56	0		

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	EB	EB	EB	WB	WB	WB	WB	B46	B46	B46	NB	NB
Directions Served	L	T	TR	L	L	T	TR	T	T	T	L	T
Maximum Queue (ft)	109	171	190	250	339	339	362	647	626	610	299	415
Average Queue (ft)	25	95	103	216	295	208	197	413	269	164	160	213
95th Queue (ft)	66	166	184	349	475	372	380	736	677	544	311	415
Link Distance (ft)		330			268	268	268	614	614	614		409
Upstream Blk Time (%)				0	36	32	31	19	16	1		18
Queuing Penalty (veh)				0	187	166	159	95	81	6		70
Storage Bay Dist (ft)	225		800	175							225	
Storage Blk Time (%)				39	47						25	2
Queuing Penalty (veh)				183	223						66	2

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	NB	SB	SB	SB
Directions Served	T	L	T	TR
Maximum Queue (ft)	408	19	199	226
Average Queue (ft)	166	4	100	112
95th Queue (ft)	302	16	185	201
Link Distance (ft)	409		2011	2011
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	1			
Storage Bay Dist (ft)		300		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 10: Harden St./Harden Street Ext & Calhoun St.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	110	217	30	96	258	288	350	265	28	439	476	300
Average Queue (ft)	43	49	1	37	127	176	197	86	10	141	158	39
95th Queue (ft)	93	117	10	85	220	265	305	227	31	334	363	162
Link Distance (ft)		728		1088	2481	2481	2481			424	424	
Upstream Blk Time (%)										0	1	
Queuing Penalty (veh)										2	5	
Storage Bay Dist (ft)	225		50					325	300			200
Storage Blk Time (%)		0	0	11			0			2	7	
Queuing Penalty (veh)		0	0	1			1			1	6	

Intersection: 11: Gregg Street/Gregg Street & Calhoun St.

Movement	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	TR	L	TR	LTR	L	TR
Maximum Queue (ft)	51	20	31	731	309	52	140
Average Queue (ft)	18	1	2	66	45	15	33
95th Queue (ft)	47	7	15	356	152	41	83
Link Distance (ft)		934		728	470		2942
Upstream Blk Time (%)				3			
Queuing Penalty (veh)				13			
Storage Bay Dist (ft)	125		275			300	
Storage Blk Time (%)				9			
Queuing Penalty (veh)				1			

Intersection: 12: Gregg Street & Colonial Drive

Movement	EB	EB	WB	WB	B36	NB	NB	SB	SB
Directions Served	L	TR	L	TR	T	L	TR	L	TR
Maximum Queue (ft)	27	308	90	200	251	52	54	26	27
Average Queue (ft)	6	146	53	159	163	17	33	5	1
95th Queue (ft)	23	302	107	187	326	43	57	21	9
Link Distance (ft)		900		91	179	2942			526
Upstream Blk Time (%)			3	58	45				
Queuing Penalty (veh)			0	432	169				
Storage Bay Dist (ft)	100		100				225	50	
Storage Blk Time (%)		13	3	58					
Queuing Penalty (veh)		2	17	104					

Intersection: 13: Harden Street Ext & Slighs Ave.

Movement	WB	NB	NB	NB	SB	SB	SB
Directions Served	LR	T	T	R	L	T	T
Maximum Queue (ft)	386	461	471	100	150	370	374
Average Queue (ft)	261	151	175	32	72	218	230
95th Queue (ft)	392	367	397	99	148	377	405
Link Distance (ft)	340	456	456			409	409
Upstream Blk Time (%)	12	7	1				
Queuing Penalty (veh)	0	40	4				
Storage Bay Dist (ft)				50	100		
Storage Blk Time (%)			34	0	2	25	
Queuing Penalty (veh)			24	0	18	33	

Intersection: 14: Colonial Drive & Farrow Road

Movement	EB	EB	NB	SB	SB
Directions Served	R	R	L	T	TR
Maximum Queue (ft)	221	185	158	1961	1957
Average Queue (ft)	95	16	71	564	562
95th Queue (ft)	163	80	129	1601	1612
Link Distance (ft)	861			1955	1955
Upstream Blk Time (%)				8	8
Queuing Penalty (veh)				58	58
Storage Bay Dist (ft)		330	550		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 15: Farrow Road & Beltline Blvd

Movement	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	T	T	R	T	T	L	T
Maximum Queue (ft)	67	235	204	350	388	414	355	139	186	202	325	815
Average Queue (ft)	15	154	132	84	122	166	157	55	99	131	183	303
95th Queue (ft)	42	226	223	196	213	257	263	104	169	202	320	521
Link Distance (ft)		1459	1459			1124	1124	1124	1955	1955		798
Upstream Blk Time (%)												4
Queuing Penalty (veh)												31
Storage Bay Dist (ft)	175			300	300						200	
Storage Blk Time (%)		6		1	3	0					3	23
Queuing Penalty (veh)		1		4	8	0					21	67

Intersection: 15: Farrow Road & Beltline Blvd

Movement	SB
Directions Served	TR
Maximum Queue (ft)	834
Average Queue (ft)	331
95th Queue (ft)	538
Link Distance (ft)	798
Upstream Blk Time (%)	4
Queuing Penalty (veh)	31
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Farrow Road & 277 NB RAMPS

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	L	TR	T	TR	L	T	T
Maximum Queue (ft)	110	52	35	417	46	639	626
Average Queue (ft)	59	6	2	25	16	64	66
95th Queue (ft)	108	24	13	153	41	179	167
Link Distance (ft)		655	798	798		602	602
Upstream Blk Time (%)						1	1
Queuing Penalty (veh)						8	9
Storage Bay Dist (ft)	300				250		
Storage Blk Time (%)						2	
Queuing Penalty (veh)						1	

Intersection: 17: Farrow Road & Lorick Avenue /277 SB Ramps

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	R	L	TR	L	T	T	T	TR
Maximum Queue (ft)	26	105	275	970	57	141	179	570	542
Average Queue (ft)	2	17	267	535	10	61	72	321	298
95th Queue (ft)	12	68	296	977	30	135	142	483	471
Link Distance (ft)	620	620		968		602	602	779	779
Upstream Blk Time (%)				0					
Queuing Penalty (veh)				0					
Storage Bay Dist (ft)			125		200				
Storage Blk Time (%)			39						
Queuing Penalty (veh)			19						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	TR	R	L	L	T	T	TR	L	L	TR
Maximum Queue (ft)	3698	3680	3710	450	225	419	344	95	127	221	171	206
Average Queue (ft)	2382	2439	2453	450	176	254	19	30	48	121	108	96
95th Queue (ft)	4318	4278	4263	450	262	448	124	78	99	178	169	154
Link Distance (ft)	3646	3646	3646			410	410	410	410	442	442	442
Upstream Blk Time (%)	23	36	36			4						
Queuing Penalty (veh)	0	0	0			20						
Storage Bay Dist (ft)				275	150							
Storage Blk Time (%)	24		54		18	31						
Queuing Penalty (veh)	0		128		57	97						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	NB
Directions Served	R
Maximum Queue (ft)	192
Average Queue (ft)	77
95th Queue (ft)	146
Link Distance (ft)	442
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 19: Main St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	179	200	444	451	439	275	225	481	475	500	49	114
Average Queue (ft)	69	94	241	244	234	44	218	436	395	265	19	41
95th Queue (ft)	129	154	405	432	419	200	233	545	596	567	43	83
Link Distance (ft)		410	410	410	410			450	450	450		372
Upstream Blk Time (%)			1	2	2			68	26	1		
Queuing Penalty (veh)			6	13	11			399	148	6		
Storage Bay Dist (ft)	175					175	150				200	
Storage Blk Time (%)	1	1			30		100	18				
Queuing Penalty (veh)	1	1			21		550	15				

Intersection: 19: Main St. & Elmwood Avenue

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	TR	R
Maximum Queue (ft)	114	64	250	821	811	550
Average Queue (ft)	22	21	231	453	402	152
95th Queue (ft)	73	53	283	817	707	385
Link Distance (ft)	372	372		3606	3606	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			175			425
Storage Blk Time (%)			68	12	8	
Queuing Penalty (veh)			175	30	24	

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	LT
Maximum Queue (ft)	50	489	483	468	125	925	949	1023	207	48	76	125
Average Queue (ft)	9	217	231	279	77	711	712	707	63	12	28	40
95th Queue (ft)	33	506	550	567	165	1212	1235	1379	151	34	64	92
Link Distance (ft)		450	450	450		901	901	901		1620	1620	
Upstream Blk Time (%)		1	2	11		21	29	45				
Queuing Penalty (veh)		9	21	103		130	172	268				
Storage Bay Dist (ft)	200				75				200			75
Storage Blk Time (%)		2			26	85			2			1
Queuing Penalty (veh)		0			145	85			0			1

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	225
Average Queue (ft)	81
95th Queue (ft)	149
Link Distance (ft)	1034
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	24
Queuing Penalty (veh)	19

Intersection: 21: Barnwell Street & Calhoun St.

Movement	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	TR	L	TR	L	TR
Maximum Queue (ft)	74	72	936	30	48	51	572
Average Queue (ft)	14	8	208	4	19	18	108
95th Queue (ft)	43	38	811	21	41	49	375
Link Distance (ft)			934		868		572
Upstream Blk Time (%)			15				6
Queuing Penalty (veh)			58				0
Storage Bay Dist (ft)	125	225		125		125	
Storage Blk Time (%)			25				21
Queuing Penalty (veh)			6				8

Intersection: 23: Bull St. & Access #3

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LR	T	T	TR	L	T	T	T
Maximum Queue (ft)	116	264	176	219	182	174	262	312	270
Average Queue (ft)	53	121	123	148	150	31	113	209	200
95th Queue (ft)	104	246	203	227	207	87	290	388	369
Link Distance (ft)	465	465	156	156	156		239	239	239
Upstream Blk Time (%)			4	6	11		10	49	57
Queuing Penalty (veh)			22	38	72		84	432	508
Storage Bay Dist (ft)						150			
Storage Blk Time (%)							11		
Queuing Penalty (veh)							11		

Intersection: 25: Access #5 & Colonial Drive

Movement	WB	NB
Directions Served	T	R
Maximum Queue (ft)	294	25
Average Queue (ft)	186	8
95th Queue (ft)	405	27
Link Distance (ft)	282	267
Upstream Blk Time (%)	56	
Queuing Penalty (veh)	157	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 26: Access #6/Mental Health Dwy. & Colonial Drive

Movement	EB	WB	WB	NB	NB	SB
Directions Served	L	L	TR	L	TR	LTR
Maximum Queue (ft)	47	124	354	135	21	21
Average Queue (ft)	12	6	204	47	7	3
95th Queue (ft)	38	45	473	122	22	14
Link Distance (ft)			333	364	364	362
Upstream Blk Time (%)			53			
Queuing Penalty (veh)			241			
Storage Bay Dist (ft)	100	100				
Storage Blk Time (%)			57			
Queuing Penalty (veh)			11			

Intersection: 27: Boyce Street & Colonial Drive

Movement	EB	WB	WB	NB	NB
Directions Served	TR	L	T	L	R
Maximum Queue (ft)	306	200	914	134	64
Average Queue (ft)	127	60	542	31	25
95th Queue (ft)	268	178	1123	92	48
Link Distance (ft)	333		900	777	777
Upstream Blk Time (%)			36		
Queuing Penalty (veh)			193		
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		2	63		
Queuing Penalty (veh)		8	67		

Intersection: 28: Access #7 & Colonial Drive

Movement	WB	WB	WB	B47	B47	NB
Directions Served	L	T	T	T	T	R
Maximum Queue (ft)	51	382	367	374	378	21
Average Queue (ft)	6	169	130	144	120	7
95th Queue (ft)	29	453	399	420	367	22
Link Distance (ft)		298	298	330	330	466
Upstream Blk Time (%)		40	26	32	10	
Queuing Penalty (veh)		163	103	130	41	
Storage Bay Dist (ft)	100					
Storage Blk Time (%)		40				
Queuing Penalty (veh)		9				

Intersection: 30: Harden Street Ext & Access #8

Movement	EB	NB	NB
Directions Served	R	T	T
Maximum Queue (ft)	24	266	274
Average Queue (ft)	4	12	10
95th Queue (ft)	17	96	94
Link Distance (ft)	373	274	274
Upstream Blk Time (%)		0	0
Queuing Penalty (veh)		0	1
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 31: Harden Street Ext & Access #9

Movement	EB	NB	NB
Directions Served	R	L	T
Maximum Queue (ft)	22	51	78
Average Queue (ft)	4	7	3
95th Queue (ft)	16	29	27
Link Distance (ft)	262		387
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		100	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 32: Harden Street Ext & Access #10

Movement	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	L	T	T	T	T	R
Maximum Queue (ft)	108	67	117	141	150	74	74	52
Average Queue (ft)	61	21	53	58	97	18	21	8
95th Queue (ft)	101	44	85	111	150	51	59	31
Link Distance (ft)	273	273		317	317	387	387	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			200					75
Storage Blk Time (%)							0	
Queuing Penalty (veh)							0	

Intersection: 33: Harden Street Ext & Access #11

Movement	EB
Directions Served	R
Maximum Queue (ft)	66
Average Queue (ft)	5
95th Queue (ft)	27
Link Distance (ft)	325
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 34: Harden Street Ext & Access #12

Movement	EB	NB	NB
Directions Served	R	LT	T
Maximum Queue (ft)	21	143	98
Average Queue (ft)	3	37	7
95th Queue (ft)	15	106	46
Link Distance (ft)	233	417	417
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 15795

Intersection: 1: Bull St. & Harden St. Ext.

Movement	EB	EB	EB	WB	WB	WB	B35	B35	NB	NB	NB	NB
Directions Served	L	T	TR	L	L	TR	T	T	L	T	T	R
Maximum Queue (ft)	72	51	29	750	1055	1018	121	107	22	1059	1063	814
Average Queue (ft)	24	11	15	671	775	602	12	6	3	395	452	75
95th Queue (ft)	55	35	38	829	1070	1055	62	41	14	841	912	405
Link Distance (ft)		561			948	948	1840	1840		1102	1102	1102
Upstream Blk Time (%)					16	2						
Queuing Penalty (veh)					40	4						
Storage Bay Dist (ft)	100		200	675					175			
Storage Blk Time (%)				39	55					21		
Queuing Penalty (veh)				103	145					2		

Intersection: 1: Bull St. & Harden St. Ext.

Movement	SB	SB	SB	SB
Directions Served	L	T	T	TR
Maximum Queue (ft)	181	237	238	171
Average Queue (ft)	59	104	105	89
95th Queue (ft)	127	192	182	165
Link Distance (ft)		1951	1951	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	200			250
Storage Blk Time (%)	0	0	0	
Queuing Penalty (veh)	0	0	0	

Intersection: 2: Bull St. & Confederate Ave.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	L	T	T	TR
Maximum Queue (ft)	73	96	115	262	92	369	487	261	28	248	263	288
Average Queue (ft)	19	27	55	114	25	166	203	120	5	122	146	170
95th Queue (ft)	52	72	108	195	61	286	345	240	20	206	237	250
Link Distance (ft)		542		307		558	558	558		1102	1102	1102
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150		200		200				150			
Storage Blk Time (%)				2		6				4		
Queuing Penalty (veh)				1		2				0		

Intersection: 3: Bull St. & Colonial Drive

Movement	EB	WB	WB	NB	NB	NB	B24	B24	B24	SB	SB	SB
Directions Served	R	L	LTR	T	T	TR	T	T	T	L	T	T
Maximum Queue (ft)	52	250	338	230	224	240	194	240	211	231	201	302
Average Queue (ft)	5	180	310	128	145	112	35	44	29	114	36	62
95th Queue (ft)	25	343	394	249	248	222	135	163	136	223	132	195
Link Distance (ft)	379		328	137	137	137	168	168	168		558	558
Upstream Blk Time (%)			59	8	10	6	1	1	1			
Queuing Penalty (veh)			338	80	97	53	10	11	5			
Storage Bay Dist (ft)		150								200		
Storage Blk Time (%)		7	79							7	0	
Queuing Penalty (veh)		26	163							39	0	

Intersection: 3: Bull St. & Colonial Drive

Movement	SB
Directions Served	TR
Maximum Queue (ft)	328
Average Queue (ft)	84
95th Queue (ft)	233
Link Distance (ft)	558
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: Bull St. & Franklin Street /Freed Drive

Movement	EB	WB	NB	NB	SB	SB	SB	B24	B24	B24
Directions Served	R	R	T	TR	T	T	TR	T	T	T
Maximum Queue (ft)	26	72	144	166	228	240	260	124	168	224
Average Queue (ft)	2	33	1	4	25	74	112	9	31	61
95th Queue (ft)	14	63	9	21	129	226	286	61	128	212
Link Distance (ft)	458	538	173	173	168	168	168	137	137	137
Upstream Blk Time (%)				0	1	5	27	0	2	14
Queuing Penalty (veh)				0	7	33	181	0	14	92
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 5: Bull St. & Jefferson Street

Movement	EB	NB	NB	NB	NB	SB	SB	SB
Directions Served	R	L	T	T	T	T	T	TR
Maximum Queue (ft)	94	30	288	321	293	191	189	196
Average Queue (ft)	38	5	52	65	49	61	81	97
95th Queue (ft)	77	23	187	213	181	179	206	232
Link Distance (ft)	197		699	699	699	147	147	147
Upstream Blk Time (%)						7	9	13
Queuing Penalty (veh)						47	60	90
Storage Bay Dist (ft)		175						
Storage Blk Time (%)			1					
Queuing Penalty (veh)			0					

Intersection: 6: Bull St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	WB	WB	B41	NB	NB	NB	NB
Directions Served	L	LT	T	R	R	LT	TR	T	L	L	T	T
Maximum Queue (ft)	825	963	973	946	275	175	282	264	300	435	420	253
Average Queue (ft)	824	920	921	635	60	166	259	231	287	397	146	158
95th Queue (ft)	827	946	972	1154	214	203	269	246	347	482	262	235
Link Distance (ft)		904	904	904			186	212		410	410	410
Upstream Blk Time (%)		28	22	4		1	78	84		40	2	
Queuing Penalty (veh)		198	153	26		0	0	0		200	8	
Storage Bay Dist (ft)	775				250	125			175			
Storage Blk Time (%)	29	51		5	0	23	79		77	88		
Queuing Penalty (veh)	272	361		14	0	97	250		190	217		

Intersection: 6: Bull St. & Elmwood Avenue

Movement	NB	SB	SB	SB	SB
Directions Served	TR	L	T	T	R
Maximum Queue (ft)	322	150	708	743	760
Average Queue (ft)	178	92	553	560	385
95th Queue (ft)	280	204	891	901	978
Link Distance (ft)	410		699	699	699
Upstream Blk Time (%)			23	23	9
Queuing Penalty (veh)			161	162	62
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		21	90		
Queuing Penalty (veh)		76	57		

Queuing and Blocking Report
 Queuing and Blocking Report

Intersection: 7: Bull St. & Calhoun St.

Movement	EB	EB	EB	WB	WB	WB	B8	B8	NB	NB	NB	SB
Directions Served	L	T	TR	L	T	TR	T	T	L	T	TR	L
Maximum Queue (ft)	200	826	807	225	651	651	185	191	225	1898	1898	225
Average Queue (ft)	162	287	276	76	296	390	6	5	58	1823	1828	222
95th Queue (ft)	239	671	632	193	561	617	59	44	191	2038	2005	230
Link Distance (ft)		878	878		580	580	229	229		1835	1835	
Upstream Blk Time (%)					6	6				71	83	
Queuing Penalty (veh)					14	15				0	0	
Storage Bay Dist (ft)	150			175					150			150
Storage Blk Time (%)	71	3			17					35		100
Queuing Penalty (veh)	88	2			16					12		613

Intersection: 7: Bull St. & Calhoun St.

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	429	442	30
Average Queue (ft)	409	185	11
95th Queue (ft)	458	433	34
Link Distance (ft)	410	410	410
Upstream Blk Time (%)	46	1	
Queuing Penalty (veh)	221	4	
Storage Bay Dist (ft)			
Storage Blk Time (%)	0		
Queuing Penalty (veh)	0		

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	EB	EB	EB	WB	WB	WB	WB	B40	B40	B40	NB	NB
Directions Served	L	T	TR	L	L	T	TR	T	T	T	L	T
Maximum Queue (ft)	49	353	386	235	343	305	304	659	684	645	299	439
Average Queue (ft)	11	189	226	194	233	201	170	185	174	157	112	142
95th Queue (ft)	34	304	363	313	386	343	339	606	616	572	276	362
Link Distance (ft)		637			235	235	235	645	645	645		420
Upstream Blk Time (%)				2	13	34	33	16	11	10		15
Queuing Penalty (veh)				0	45	119	114	55	36	32		73
Storage Bay Dist (ft)	225		800	175							225	
Storage Blk Time (%)		4		17	29						20	6
Queuing Penalty (veh)		20		49	81						38	5

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	NB	SB	SB	SB
Directions Served	T	L	T	TR
Maximum Queue (ft)	420	400	444	457
Average Queue (ft)	102	48	171	191
95th Queue (ft)	216	171	318	356
Link Distance (ft)	420		1840	1840
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	1			
Storage Bay Dist (ft)		300		
Storage Blk Time (%)			3	
Queuing Penalty (veh)			2	

Intersection: 10: Harden St./Harden Street Ext & Calhoun St.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	325	434	74	117	180	341	363	210	258	273	288	270
Average Queue (ft)	90	152	18	43	109	162	181	18	41	142	160	40
95th Queue (ft)	192	300	60	96	170	283	308	100	95	254	272	151
Link Distance (ft)		967		761	1249	1249	1249			270	270	
Upstream Blk Time (%)									0	0	1	0
Queuing Penalty (veh)									0	1	5	0
Storage Bay Dist (ft)	225		50					325	300			200
Storage Blk Time (%)		5	3	17			1		0	0	4	
Queuing Penalty (veh)		8	2	4			3		0	0	4	

Intersection: 11: Gregg Street/Gregg Street & Calhoun St.

Movement	EB	WB	NB	SB	SB
Directions Served	L	L	LTR	L	TR
Maximum Queue (ft)	72	26	54	96	54
Average Queue (ft)	19	2	29	35	38
95th Queue (ft)	48	12	53	69	63
Link Distance (ft)			351		2869
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	125	275		300	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 12: Gregg Street & Colonial Drive

Movement	EB	WB	WB	B36	NB	NB	SB	SB
Directions Served	TR	L	TR	T	L	TR	L	TR
Maximum Queue (ft)	506	125	240	279	207	136	60	123
Average Queue (ft)	199	80	182	151	60	47	20	30
95th Queue (ft)	394	164	256	334	158	99	47	89
Link Distance (ft)	862		131	207	2869	2869		426
Upstream Blk Time (%)		1	53	42				
Queuing Penalty (veh)		0	378	149				
Storage Bay Dist (ft)		100					50	
Storage Blk Time (%)	24	1	57				1	17
Queuing Penalty (veh)	0	4	92				1	7

Intersection: 13: Harden Street Ext & Slighs Ave.

Movement	WB	NB	NB	NB	SB	SB	SB
Directions Served	LR	T	T	R	L	T	T
Maximum Queue (ft)	314	555	586	100	113	156	165
Average Queue (ft)	221	189	476	19	67	78	101
95th Queue (ft)	348	489	758	67	115	142	155
Link Distance (ft)	299	571	571			420	420
Upstream Blk Time (%)	13	0	15				
Queuing Penalty (veh)	0	0	102				
Storage Bay Dist (ft)				50	100		
Storage Blk Time (%)			36	0	4	6	
Queuing Penalty (veh)			25	0	22	8	

Intersection: 14: Colonial Drive & Farrow Road

Movement	EB	EB	NB	B40	B40	B40	SB	SB
Directions Served	R	R	L	T	T		T	TR
Maximum Queue (ft)	291	171	171	278	232	350	1878	1880
Average Queue (ft)	71	19	94	105	123	156	283	284
95th Queue (ft)	164	86	149	228	229	374	960	965
Link Distance (ft)	1034			235	235	235	1860	1860
Upstream Blk Time (%)				0	0	5	0	1
Queuing Penalty (veh)				1	1	28	2	4
Storage Bay Dist (ft)		330	550					
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 15: Farrow Road & Beltline Blvd

Movement	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	TR	L	L	T	T	R	T	T	R	L
Maximum Queue (ft)	300	366	355	166	181	246	214	322	1596	1662	350	325
Average Queue (ft)	123	224	214	97	118	137	131	177	1195	1264	340	279
95th Queue (ft)	261	335	335	165	178	197	195	282	1741	1766	428	384
Link Distance (ft)		1471	1471			1366	1366	1366	1860	1860		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	175			300	300						225	200
Storage Blk Time (%)	18	26								67		62
Queuing Penalty (veh)	56	25								215		230

Intersection: 15: Farrow Road & Beltline Blvd

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	678	702
Average Queue (ft)	338	263
95th Queue (ft)	678	630
Link Distance (ft)	730	730
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 16: Farrow Road & 277 NB RAMPS

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	L	TR	T	TR	L	T	T
Maximum Queue (ft)	266	50	222	448	65	154	187
Average Queue (ft)	134	9	45	135	26	97	97
95th Queue (ft)	237	31	124	382	51	147	159
Link Distance (ft)		775	730	730		627	627
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	300				250		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 17: Farrow Road & Lorick Avenue /277 SB Ramps

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	R	L	TR	L	T	T	T	TR
Maximum Queue (ft)	71	56	275	447	47	300	320	193	173
Average Queue (ft)	18	2	251	238	15	190	198	112	80
95th Queue (ft)	50	19	305	510	40	284	300	189	171
Link Distance (ft)	414	414		971		627	627	807	807
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			125		200				
Storage Blk Time (%)			40	0		8			
Queuing Penalty (veh)			26	0		2			

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	TR	R	L	L	T	T	TR	L	L	TR
Maximum Queue (ft)	2523	2499	2499	450	225	306	155	184	196	576	589	552
Average Queue (ft)	1430	1441	1422	334	118	144	49	71	95	552	556	437
95th Queue (ft)	2829	2799	2786	637	181	216	99	133	159	588	586	675
Link Distance (ft)	2460	2460	2460			409	409	409	409	480	480	480
Upstream Blk Time (%)	26	28	27							73	77	45
Queuing Penalty (veh)	0	0	0							0	0	0
Storage Bay Dist (ft)				275	150							
Storage Blk Time (%)	70		46		4	11						
Queuing Penalty (veh)	0		64		8	20						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	NB	B53	B53	B53
Directions Served	R	T	T	T
Maximum Queue (ft)	538	2472	2459	2408
Average Queue (ft)	327	1111	1127	1105
95th Queue (ft)	593	2374	2368	2386
Link Distance (ft)	480	3267	3267	3267
Upstream Blk Time (%)	3			
Queuing Penalty (veh)	0			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 19: Main St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	250	433	439	427	456	275	71	495	494	489	173	275
Average Queue (ft)	245	418	331	318	288	66	21	343	384	384	100	172
95th Queue (ft)	263	426	442	451	443	227	57	535	531	529	166	242
Link Distance (ft)		409	409	409	409			452	452	452		588
Upstream Blk Time (%)		59	3	1	3			4	10	15		
Queuing Penalty (veh)		388	17	5	19			33	73	114		
Storage Bay Dist (ft)	175					175	150					200
Storage Blk Time (%)	76	88			29			17				4
Queuing Penalty (veh)	197	227			22			5				6

Intersection: 19: Main St. & Elmwood Avenue

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	TR	R
Maximum Queue (ft)	257	126	250	1484	1381	186
Average Queue (ft)	170	32	214	600	234	85
95th Queue (ft)	232	79	300	1459	764	147
Link Distance (ft)	588	588		3580	3580	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			175		425	
Storage Blk Time (%)			68	0		
Queuing Penalty (veh)			72	0		

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	LT
Maximum Queue (ft)	275	485	502	488	124	287	344	345	300	609	308	70
Average Queue (ft)	62	406	396	357	38	148	203	216	170	277	157	27
95th Queue (ft)	245	609	631	593	100	265	312	298	354	544	244	60
Link Distance (ft)		452	452	452		904	904	904		3075	3075	
Upstream Blk Time (%)		26	15	3								
Queuing Penalty (veh)		194	108	21								
Storage Bay Dist (ft)	200				75				200			75
Storage Blk Time (%)		75			0	13			27	22		2
Queuing Penalty (veh)		8			0	7			75	21		1

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	118
Average Queue (ft)	49
95th Queue (ft)	97
Link Distance (ft)	1034
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	16
Queuing Penalty (veh)	6

Intersection: 21: Barnwell Street & Calhoun St.

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	198	292	29	257	73	50	71	114
Average Queue (ft)	86	125	1	126	16	23	29	36
95th Queue (ft)	156	246	10	206	48	45	63	78
Link Distance (ft)	226	226	688	688	517	517	594	594
Upstream Blk Time (%)		3						
Queuing Penalty (veh)		7						
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 23: Bull St. & Access #3

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LR	T	T	TR	L	T	T	T
Maximum Queue (ft)	824	848	183	189	182	172	187	248	203
Average Queue (ft)	214	439	101	121	108	70	75	121	144
95th Queue (ft)	706	845	202	217	197	132	178	244	247
Link Distance (ft)	809	809	147	147	147		173	173	173
Upstream Blk Time (%)	8	20	5	7	5	0	2	12	22
Queuing Penalty (veh)	0	0	52	69	45	0	15	82	150
Storage Bay Dist (ft)						150			
Storage Blk Time (%)							3		
Queuing Penalty (veh)							4		

Intersection: 25: Access #5 & Colonial Drive

Movement	WB	NB
Directions Served	T	R
Maximum Queue (ft)	225	27
Average Queue (ft)	172	10
95th Queue (ft)	317	31
Link Distance (ft)	208	262
Upstream Blk Time (%)	56	
Queuing Penalty (veh)	323	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 26: Access #6/Mental Health Dwy & Colonial Drive

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	30	140	124	244	219	51	402	406
Average Queue (ft)	3	15	14	173	112	19	84	197
95th Queue (ft)	18	71	77	333	234	47	241	452
Link Distance (ft)		208		225	381	381	391	391
Upstream Blk Time (%)				48			4	16
Queuing Penalty (veh)				265			0	0
Storage Bay Dist (ft)	100		100					
Storage Blk Time (%)		1		61				
Queuing Penalty (veh)		0		15				

Intersection: 27: Boyce St. & Colonial Drive

Movement	EB	WB	WB	NB	NB
Directions Served	TR	L	T	L	R
Maximum Queue (ft)	246	250	895	174	471
Average Queue (ft)	162	130	609	104	63
95th Queue (ft)	279	298	1161	188	220
Link Distance (ft)	225		862		965
Upstream Blk Time (%)	4		41		
Queuing Penalty (veh)	24		259		
Storage Bay Dist (ft)		150		150	
Storage Blk Time (%)		0	61	16	
Queuing Penalty (veh)		2	112	18	

Intersection: 28: Access #7 & Colonial Drive

Movement	WB	WB	WB	NB
Directions Served	L	T	T	LR
Maximum Queue (ft)	52	686	668	341
Average Queue (ft)	8	286	274	70
95th Queue (ft)	34	795	778	235
Link Distance (ft)		637	637	412
Upstream Blk Time (%)		32	29	
Queuing Penalty (veh)		104	93	
Storage Bay Dist (ft)	100			
Storage Blk Time (%)		42		
Queuing Penalty (veh)		11		

Intersection: 30: Harden Street Ext & Access #8

Movement	EB	NB	NB
Directions Served	R	T	T
Maximum Queue (ft)	43	444	430
Average Queue (ft)	10	140	234
95th Queue (ft)	29	413	544
Link Distance (ft)	387	406	406
Upstream Blk Time (%)		1	11
Queuing Penalty (veh)		8	71
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 31: Harden Street Ext & Access #9

Movement	EB	NB	NB	NB
Directions Served	R	L	T	T
Maximum Queue (ft)	58	31	448	418
Average Queue (ft)	13	11	82	129
95th Queue (ft)	40	34	321	396
Link Distance (ft)	464		404	404
Upstream Blk Time (%)			1	2
Queuing Penalty (veh)			6	16
Storage Bay Dist (ft)		100		
Storage Blk Time (%)			1	
Queuing Penalty (veh)			0	

Intersection: 32: Harden Street Ext & Access #10

Movement	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	L	T	T	T	T	R
Maximum Queue (ft)	264	62	136	404	405	173	150	144
Average Queue (ft)	157	28	52	136	200	56	54	15
95th Queue (ft)	239	56	96	281	365	131	131	62
Link Distance (ft)	394	394		404	404	404	404	
Upstream Blk Time (%)				0	0			
Queuing Penalty (veh)				0	1			
Storage Bay Dist (ft)			200					75
Storage Blk Time (%)				3			3	
Queuing Penalty (veh)				3			2	

Intersection: 33: Harden Street Ext & Access #11

Movement	EB	NB
Directions Served	R	T
Maximum Queue (ft)	21	94
Average Queue (ft)	8	3
95th Queue (ft)	24	32
Link Distance (ft)	360	338
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 34: Harden Street Ext & Access #12

Movement	EB	NB
Directions Served	R	L
Maximum Queue (ft)	22	53
Average Queue (ft)	8	14
95th Queue (ft)	25	43
Link Distance (ft)	362	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		100
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 10672

2020 Build Conditions - IMPROVED
Phase III
Potential Project Buildout
COLONIAL DRIVE WIDENED

Queuing and Blocking Report
 Queuing and Blocking Report

Intersection: 1: Bull St. & Harden St. Ext.

Movement	EB	EB	EB	WB	WB	WB	B41	NB	NB	NB	NB	SB
Directions Served	L	T	TR	L	L	TR	T	L	T	T	R	L
Maximum Queue (ft)	50	31	30	731	883	519	34	84	88	114	167	300
Average Queue (ft)	7	6	5	174	211	25	0	18	24	39	55	180
95th Queue (ft)	29	26	20	493	556	63	0	63	70	95	123	356
Link Distance (ft)		496			816	816	2011		1090	1090	1090	
Upstream Blk Time (%)					1							
Queuing Penalty (veh)					3							
Storage Bay Dist (ft)	100		200	675				175				200
Storage Blk Time (%)					5							1
Queuing Penalty (veh)					4							12

Intersection: 1: Bull St. & Harden St. Ext.

Movement	SB	SB	SB
Directions Served	T	T	TR
Maximum Queue (ft)	1627	1664	400
Average Queue (ft)	927	985	285
95th Queue (ft)	2105	2150	481
Link Distance (ft)	1612	1612	
Upstream Blk Time (%)	40	37	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (ft)			250
Storage Blk Time (%)	49	48	47
Queuing Penalty (veh)	222	427	408

Queuing and Blocking Report
Queuing and Blocking Report

Intersection: 2: Bull St. & Confederate Ave.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	R	L	T	T
Maximum Queue (ft)	48	71	75	97	25	108	146	206	84	350	1119	1144
Average Queue (ft)	5	22	20	21	6	29	43	91	15	94	682	701
95th Queue (ft)	23	52	55	61	21	79	107	172	55	317	1443	1452
Link Distance (ft)		540		647		581	581	581	581		1090	1090
Upstream Blk Time (%)											36	39
Queuing Penalty (veh)											331	359
Storage Bay Dist (ft)	150		200		200					150		
Storage Blk Time (%)											52	
Queuing Penalty (veh)											38	

Intersection: 2: Bull St. & Confederate Ave.

Movement	SB
Directions Served	TR
Maximum Queue (ft)	1132
Average Queue (ft)	702
95th Queue (ft)	1446
Link Distance (ft)	1090
Upstream Blk Time (%)	39
Queuing Penalty (veh)	362
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Bull St. & Colonial Drive

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	R	L	LTR	T	T	TR	L	T	T	TR
Maximum Queue (ft)	51	197	205	74	74	156	300	598	614	613
Average Queue (ft)	9	88	175	18	22	37	80	402	411	419
95th Queue (ft)	34	203	234	50	55	96	243	776	778	774
Link Distance (ft)	382	190	190	108	108	108		581	581	581
Upstream Blk Time (%)		10	52			0		37	39	40
Queuing Penalty (veh)		13	73			2		331	350	361
Storage Bay Dist (ft)							200			
Storage Blk Time (%)								49		
Queuing Penalty (veh)								52		

Intersection: 4: Bull St. & Franklin Street /Freed Drive

Movement	EB	WB	NB	SB	SB	SB	B24	B24	B24
Directions Served	R	R	TR	T	T	TR	T	T	T
Maximum Queue (ft)	52	88	48	231	277	248	179	234	193
Average Queue (ft)	22	19	2	48	153	161	32	86	104
95th Queue (ft)	50	45	17	181	318	329	124	244	232
Link Distance (ft)	282	470	239	161	161	161	108	108	108
Upstream Blk Time (%)				6	51	66	1	23	56
Queuing Penalty (veh)				58	460	602	8	212	510
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: Bull St. & Jefferson Street

Movement	EB	NB	NB	NB	NB	SB	SB	SB
Directions Served	R	L	T	T	T	T	T	TR
Maximum Queue (ft)	114	54	99	236	326	169	189	219
Average Queue (ft)	47	7	18	44	136	37	90	131
95th Queue (ft)	93	28	72	148	311	139	220	242
Link Distance (ft)	351		641	641	641	156	156	156
Upstream Blk Time (%)						1	23	50
Queuing Penalty (veh)						9	214	458
Storage Bay Dist (ft)		175						
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 6: Bull St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	WB	WB	B42	NB	NB	NB	NB
Directions Served	L	LT	T	R	R	LT	TR	T	L	L	T	T
Maximum Queue (ft)	824	920	965	970	927	174	354	514	300	449	413	123
Average Queue (ft)	614	721	710	863	814	136	254	234	269	386	37	41
95th Queue (ft)	944	1017	1116	992	995	205	447	618	338	502	163	112
Link Distance (ft)		901	901	901	901		284	499		406	406	406
Upstream Blk Time (%)		1	10	19	4		55	35		64	2	
Queuing Penalty (veh)		7	52	100	19		0	0		188	4	
Storage Bay Dist (ft)	775					125			175			
Storage Blk Time (%)	1	5				56	70		87	92		
Queuing Penalty (veh)	5	33				56	71		163	172		

Intersection: 6: Bull St. & Elmwood Avenue

Movement	NB	SB	SB	SB	SB
Directions Served	TR	L	T	T	R
Maximum Queue (ft)	225	149	656	686	681
Average Queue (ft)	65	53	339	511	466
95th Queue (ft)	169	145	716	788	952
Link Distance (ft)	406		641	641	641
Upstream Blk Time (%)			3	15	49
Queuing Penalty (veh)			24	135	441
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	43		
Queuing Penalty (veh)		0	29		

Queuing and Blocking Report
 Queuing and Blocking Report

Intersection: 7: Bull St. & Calhoun St.

Movement	EB	EB	EB	WB	WB	WB	B8	B8	B22	NB	NB	NB
Directions Served	L	T	TR	L	T	TR	T	T	T	L	T	TR
Maximum Queue (ft)	199	996	979	225	453	433	483	494	344	45	1864	1864
Average Queue (ft)	159	615	583	77	140	292	151	200	105	9	1005	1052
95th Queue (ft)	250	1250	1249	195	377	536	489	548	329	31	2266	2258
Link Distance (ft)		981	981		363	363	412	412	271		1849	1849
Upstream Blk Time (%)		49	47		8	52	19	37	30		32	34
Queuing Penalty (veh)		0	0		14	99	37	69	112		0	0
Storage Bay Dist (ft)	150			175						150		
Storage Blk Time (%)	64	7			12						62	
Queuing Penalty (veh)	98	6			6						17	

Intersection: 7: Bull St. & Calhoun St.

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	222	251	299	30
Average Queue (ft)	81	99	108	4
95th Queue (ft)	184	196	195	20
Link Distance (ft)		406	406	406
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	150			
Storage Blk Time (%)	6	1		
Queuing Penalty (veh)	63	2		

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	EB	EB	EB	WB	WB	WB	WB	B46	B46	NB	NB	NB
Directions Served	L	T	TR	L	L	T	TR	T	T	L	T	T
Maximum Queue (ft)	87	154	174	250	376	259	237	665	603	222	240	278
Average Queue (ft)	24	91	110	246	339	112	113	354	203	100	148	156
95th Queue (ft)	57	152	168	260	354	180	193	705	571	166	229	238
Link Distance (ft)		330	330		268	268	268	614	614		409	409
Upstream Blk Time (%)				0	38	0		2	0			
Queuing Penalty (veh)				0	197	0		9	0			
Storage Bay Dist (ft)	225			175						225		
Storage Blk Time (%)				48	56					0	3	
Queuing Penalty (veh)				224	258					1	4	

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (ft)	65	204	242
Average Queue (ft)	12	84	103
95th Queue (ft)	36	169	187
Link Distance (ft)		2011	2011
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	300		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 10: Harden St./Harden Street Ext & Calhoun St.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	110	171	74	118	248	246	271	264	49	276	265	294
Average Queue (ft)	35	56	9	46	110	171	182	61	13	122	142	17
95th Queue (ft)	83	125	39	94	198	226	241	169	37	236	272	47
Link Distance (ft)		728		1088	2481	2481	2481			424	424	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	225		50					325	300			200
Storage Blk Time (%)			1	12								4
Queuing Penalty (veh)			0	1								3

Intersection: 11: Gregg Street/Gregg Street & Calhoun St.

Movement	EB	WB	WB	NB	SB	SB
Directions Served	L	L	TR	LTR	L	TR
Maximum Queue (ft)	74	30	694	144	51	74
Average Queue (ft)	20	3	52	42	17	34
95th Queue (ft)	49	18	273	84	43	60
Link Distance (ft)			728	470		2930
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	125	275			300	
Storage Blk Time (%)			6			
Queuing Penalty (veh)			1			

Intersection: 12: Gregg Street & Colonial Drive

Movement	EB	EB	EB	WB	WB	WB	B36	B36	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	T	T	L	TR	L	TR
Maximum Queue (ft)	26	147	173	90	162	189	205	205	51	52	26	30
Average Queue (ft)	7	72	94	57	120	131	40	47	8	16	3	7
95th Queue (ft)	24	147	162	106	187	194	142	158	31	45	16	26
Link Distance (ft)		898	898		90	90	180	180	2930			514
Upstream Blk Time (%)				1	22	30	8	9				
Queuing Penalty (veh)				0	80	108	29	32				
Storage Bay Dist (ft)	100			100						225	50	
Storage Blk Time (%)		9		1	22							
Queuing Penalty (veh)		1		1	39							

Intersection: 13: Harden Street Ext & Slighs Ave.

Movement	WB	NB	NB	NB	SB	SB	SB
Directions Served	LR	T	T	R	L	T	T
Maximum Queue (ft)	355	194	220	98	150	320	367
Average Queue (ft)	217	51	87	16	98	238	257
95th Queue (ft)	383	118	182	56	171	312	327
Link Distance (ft)	340	456	456			409	409
Upstream Blk Time (%)	2						
Queuing Penalty (veh)	0						
Storage Bay Dist (ft)				50	100		
Storage Blk Time (%)			28	0	6	26	
Queuing Penalty (veh)			20	2	44	34	

Intersection: 14: Colonial Drive & Farrow Road

Movement	EB	EB	NB	B46	SB	SB
Directions Served	R	R	L	T	T	TR
Maximum Queue (ft)	171	18	158	214	606	614
Average Queue (ft)	65	8	79	8	272	259
95th Queue (ft)	126	21	139	73	490	476
Link Distance (ft)	861			268	1955	1955
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		330	550			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 15: Farrow Road & Beltline Blvd

Movement	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	L	T	T	R	T	T	L	T
Maximum Queue (ft)	43	262	234	164	214	213	197	117	206	204	325	554
Average Queue (ft)	9	178	159	81	114	151	133	53	93	121	197	295
95th Queue (ft)	28	253	239	164	192	214	198	102	184	203	354	484
Link Distance (ft)		1459	1459				1124	1124	1124	1955	1955	798
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	175			300	300						200	
Storage Blk Time (%)		11									3	17
Queuing Penalty (veh)		2									18	49

Intersection: 15: Farrow Road & Beltline Blvd

Movement	SB
Directions Served	TR
Maximum Queue (ft)	516
Average Queue (ft)	320
95th Queue (ft)	495
Link Distance (ft)	798
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Farrow Road & 277 NB RAMPS

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	L	TR	T	TR	L	T	T
Maximum Queue (ft)	152	30	36	56	66	122	146
Average Queue (ft)	72	6	6	16	21	58	59
95th Queue (ft)	138	24	24	48	52	119	124
Link Distance (ft)		655	798	798		602	602
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	300				250		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 17: Farrow Road & Lorick Avenue /277 SB Ramps

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	R	L	TR	L	T	T	T	TR
Maximum Queue (ft)	27	93	274	611	146	184	666	612	718
Average Queue (ft)	3	17	265	387	30	72	104	329	320
95th Queue (ft)	16	70	310	679	102	146	302	510	506
Link Distance (ft)	620	620		968		602	602	779	779
Upstream Blk Time (%)							0		
Queuing Penalty (veh)							0		
Storage Bay Dist (ft)			125		200				
Storage Blk Time (%)			34			0			
Queuing Penalty (veh)			16			0			

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	TR	R	L	L	T	T	TR	L	L	TR
Maximum Queue (ft)	3698	3698	3686	450	225	416	46	88	124	285	251	187
Average Queue (ft)	2798	2817	2816	423	175	265	5	25	45	149	129	93
95th Queue (ft)	4286	4276	4240	579	280	467	24	70	105	240	224	155
Link Distance (ft)	3646	3646	3646			410	410	410	410	442	442	442
Upstream Blk Time (%)	22	37	38			8						
Queuing Penalty (veh)	0	0	0			47						
Storage Bay Dist (ft)				275	150							
Storage Blk Time (%)	13		45		27	36						
Queuing Penalty (veh)	0		105		86	115						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	NB
Directions Served	R
Maximum Queue (ft)	189
Average Queue (ft)	74
95th Queue (ft)	132
Link Distance (ft)	442
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report
 Queuing and Blocking Report

Intersection: 19: Main St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	117	152	237	266	286	50	225	484	483	488	27	88
Average Queue (ft)	68	93	166	150	158	6	204	430	392	168	9	55
95th Queue (ft)	106	138	238	219	222	30	255	573	567	428	28	95
Link Distance (ft)		410	410	410	410			450	450	450		372
Upstream Blk Time (%)								70	32	0		
Queuing Penalty (veh)								405	188	1		
Storage Bay Dist (ft)	175					175	150				200	
Storage Blk Time (%)					6		90	23				
Queuing Penalty (veh)					4		495	19				

Intersection: 19: Main St. & Elmwood Avenue

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	TR	R
Maximum Queue (ft)	110	60	250	679	864	550
Average Queue (ft)	38	14	225	339	345	149
95th Queue (ft)	87	39	290	545	580	386
Link Distance (ft)	372	372		3606	3606	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			175			425
Storage Blk Time (%)			27	33	7	
Queuing Penalty (veh)			70	86	20	

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	LT
Maximum Queue (ft)	51	403	471	480	125	929	962	1036	212	48	115	125
Average Queue (ft)	4	103	113	168	78	735	728	800	88	10	33	55
95th Queue (ft)	24	240	335	437	162	1205	1249	1380	190	36	70	127
Link Distance (ft)		450	450	450		901	901	901		1620	1620	
Upstream Blk Time (%)			0	3		35	40	56				
Queuing Penalty (veh)			1	29		208	241	334				
Storage Bay Dist (ft)	200				75				200			75
Storage Blk Time (%)		1			14	86			8			2
Queuing Penalty (veh)		0			82	86			1			2

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	450
Average Queue (ft)	142
95th Queue (ft)	308
Link Distance (ft)	1034
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	42
Queuing Penalty (veh)	34

Intersection: 21: Barnwell Street & Calhoun St.

Movement	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	TR	L	TR	L	TR
Maximum Queue (ft)	54	30	941	47	29	150	574
Average Queue (ft)	14	5	238	13	12	21	118
95th Queue (ft)	42	23	832	42	33	55	390
Link Distance (ft)			934		868		572
Upstream Blk Time (%)			11				4
Queuing Penalty (veh)			41				0
Storage Bay Dist (ft)	125	225		125		125	
Storage Blk Time (%)			27				28
Queuing Penalty (veh)			7				11

Queuing and Blocking Report
Queuing and Blocking Report

Intersection: 23: Bull St. & Access #3

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LR	T	T	TR	L	T	T	T
Maximum Queue (ft)	338	480	190	205	222	111	277	326	277
Average Queue (ft)	58	180	104	128	151	27	89	192	189
95th Queue (ft)	193	435	198	219	228	68	258	374	352
Link Distance (ft)	465	465	156	156	156		239	239	239
Upstream Blk Time (%)		7	2	4	9		1	52	58
Queuing Penalty (veh)		0	14	26	56		11	457	519
Storage Bay Dist (ft)						150			
Storage Blk Time (%)							1		
Queuing Penalty (veh)							2		

Intersection: 25: Access #5 & Colonial Drive

Movement	WB	WB	NB
Directions Served	T	T	R
Maximum Queue (ft)	252	302	25
Average Queue (ft)	62	137	7
95th Queue (ft)	224	345	25
Link Distance (ft)	282	282	255
Upstream Blk Time (%)		36	
Queuing Penalty (veh)		50	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 26: Access #6/Mental Health Dwy. & Colonial Drive

Movement	EB	WB	WB	WB	NB	NB	SB
Directions Served	L	L	T	TR	L	TR	LTR
Maximum Queue (ft)	66	124	320	338	132	20	21
Average Queue (ft)	14	12	17	116	40	4	5
95th Queue (ft)	42	65	125	360	113	17	20
Link Distance (ft)			329	329	351	351	350
Upstream Blk Time (%)			0	28			
Queuing Penalty (veh)			0	61			
Storage Bay Dist (ft)	100	100					
Storage Blk Time (%)			5				
Queuing Penalty (veh)			1				

Intersection: 27: Boyce Street & Colonial Drive

Movement	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	TR	L	T	T	L	R
Maximum Queue (ft)	161	202	199	901	906	154	64
Average Queue (ft)	66	98	56	270	319	24	25
95th Queue (ft)	145	182	132	810	809	87	54
Link Distance (ft)	329	329		898	898	765	765
Upstream Blk Time (%)				11	11		
Queuing Penalty (veh)				29	29		
Storage Bay Dist (ft)			100				
Storage Blk Time (%)			3	3			
Queuing Penalty (veh)			6	3			

Intersection: 28: Access #7 & Colonial Drive

Movement	WB	WB	WB	B47	B47	NB
Directions Served	L	T	T	T	T	R
Maximum Queue (ft)	30	368	367	311	313	19
Average Queue (ft)	3	22	23	4	5	2
95th Queue (ft)	18	156	159	38	47	13
Link Distance (ft)		298	298	330	330	454
Upstream Blk Time (%)		4	5	0	0	
Queuing Penalty (veh)		15	19	0	0	
Storage Bay Dist (ft)	100					
Storage Blk Time (%)		7				
Queuing Penalty (veh)		2				

Intersection: 30: Harden Street Ext & Access #8

Movement	EB
Directions Served	R
Maximum Queue (ft)	24
Average Queue (ft)	4
95th Queue (ft)	18
Link Distance (ft)	373
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 31: Harden Street Ext & Access #9

Movement	EB	NB
Directions Served	R	L
Maximum Queue (ft)	23	74
Average Queue (ft)	8	22
95th Queue (ft)	25	56
Link Distance (ft)	262	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 32: Harden Street Ext & Access #10

Movement	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	L	T	T	T	T	R
Maximum Queue (ft)	209	63	116	181	170	70	73	31
Average Queue (ft)	100	27	50	74	107	24	31	10
95th Queue (ft)	171	57	92	134	176	60	67	30
Link Distance (ft)	273	273		317	317	387	387	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	200							75
Storage Blk Time (%)	0				0			
Queuing Penalty (veh)	0				0			

Intersection: 33: Harden Street Ext & Access #11

Movement	EB
Directions Served	R
Maximum Queue (ft)	22
Average Queue (ft)	2
95th Queue (ft)	11
Link Distance (ft)	325
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 34: Harden Street Ext & Access #12

Movement	EB	NB	NB	SB
Directions Served	R	LT	T	R
Maximum Queue (ft)	21	141	149	20
Average Queue (ft)	3	25	8	1
95th Queue (ft)	15	90	57	7
Link Distance (ft)	233	417	417	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				75
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 43: Bend

Movement	SB
Directions Served	T
Maximum Queue (ft)	42
Average Queue (ft)	2
95th Queue (ft)	14
Link Distance (ft)	442
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 13093

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Queuing and Blocking Report

Intersection: 1: Bull St. & Harden St. Ext.

Movement	EB	EB	EB	WB	WB	WB	B35	B35	NB	NB	NB	NB
Directions Served	L	T	TR	L	L	TR	T	T	L	T	T	R
Maximum Queue (ft)	92	73	29	750	1018	1037	98	59	21	1042	1085	638
Average Queue (ft)	30	13	9	635	725	530	8	5	1	426	474	87
95th Queue (ft)	70	45	29	826	1030	1033	49	28	10	910	1001	375
Link Distance (ft)		561			948	948	1840	1840		1102	1102	1102
Upstream Blk Time (%)					11	7						0
Queuing Penalty (veh)					26	17						0
Storage Bay Dist (ft)	100		200	675					175			
Storage Blk Time (%)	0			31	39					19		
Queuing Penalty (veh)	0			79	100					1		

Intersection: 1: Bull St. & Harden St. Ext.

Movement	SB	SB	SB	SB
Directions Served	L	T	T	TR
Maximum Queue (ft)	116	197	174	161
Average Queue (ft)	51	105	96	80
95th Queue (ft)	95	194	167	163
Link Distance (ft)		1951	1951	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	200			250
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Intersection: 2: Bull St. & Confederate Ave.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	L	T	T	TR
Maximum Queue (ft)	72	118	90	234	69	342	331	251	29	257	335	370
Average Queue (ft)	31	29	36	122	21	172	191	124	5	133	164	199
95th Queue (ft)	65	73	82	205	53	288	300	225	22	228	276	311
Link Distance (ft)		542		307		555	555	555		1102	1102	1102
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150		200		200				150			
Storage Blk Time (%)				2		5				5		
Queuing Penalty (veh)				1		2				0		

Intersection: 3: Bull St. & Colonial Drive

Movement	EB	WB	WB	NB	NB	NB	B24	B24	B24	SB	SB	SB
Directions Served	R	L	LTR	T	T	TR	T	T	T	L	T	T
Maximum Queue (ft)	28	345	397	207	206	204	194	238	163	297	345	76
Average Queue (ft)	4	207	331	111	125	102	17	23	14	118	35	22
95th Queue (ft)	18	376	360	215	226	204	85	110	76	247	181	55
Link Distance (ft)	379	325	325	137	137	137	168	168	168		555	555
Upstream Blk Time (%)		7	61	5	8	4	0	1	0			
Queuing Penalty (veh)		20	176	48	76	33	4	6	1			
Storage Bay Dist (ft)										200		
Storage Blk Time (%)										9	0	
Queuing Penalty (veh)										52	0	

Intersection: 3: Bull St. & Colonial Drive

Movement	SB
Directions Served	TR
Maximum Queue (ft)	134
Average Queue (ft)	34
95th Queue (ft)	90
Link Distance (ft)	555
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: Bull St. & Franklin Street /Freed Drive

Movement	EB	WB	NB	SB	SB	SB
Directions Served	R	R	T	T	T	TR
Maximum Queue (ft)	28	56	53	31	167	192
Average Queue (ft)	4	23	3	1	11	29
95th Queue (ft)	20	53	20	10	68	103
Link Distance (ft)	458	538	173	168	168	168
Upstream Blk Time (%)					0	0
Queuing Penalty (veh)					0	1
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Queuing and Blocking Report
 Queuing and Blocking Report

Intersection: 5: Bull St. & Jefferson Street

Movement	EB	NB	NB	NB	NB	SB
Directions Served	R	L	T	T	T	TR
Maximum Queue (ft)	55	52	263	246	274	94
Average Queue (ft)	24	7	28	39	35	5
95th Queue (ft)	52	29	132	155	144	32
Link Distance (ft)	197		699	699	699	147
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		175				
Storage Blk Time (%)			0			
Queuing Penalty (veh)			0			

Intersection: 6: Bull St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	WB	WB	B41	NB	NB	NB	NB
Directions Served	L	LT	T	R	R	LT	TR	T	L	L	T	T
Maximum Queue (ft)	825	959	940	919	266	175	305	246	300	431	416	216
Average Queue (ft)	824	916	898	377	22	174	259	227	290	399	119	136
95th Queue (ft)	826	953	1003	886	56	177	274	228	339	483	246	202
Link Distance (ft)		904	904	904			186	212		410	410	410
Upstream Blk Time (%)		25	16	2		1	76	82		54	1	
Queuing Penalty (veh)		173	113	11		0	0	0		269	4	
Storage Bay Dist (ft)	775				250	125			175			
Storage Blk Time (%)	22	51		2	0	39	81		80	91		
Queuing Penalty (veh)	202	362		7	0	166	258		196	223		

Intersection: 6: Bull St. & Elmwood Avenue

Movement	NB	SB	SB	SB	SB
Directions Served	TR	L	T	T	R
Maximum Queue (ft)	268	149	342	360	698
Average Queue (ft)	153	93	187	198	25
95th Queue (ft)	234	179	279	289	239
Link Distance (ft)	410		699	699	699
Upstream Blk Time (%)					0
Queuing Penalty (veh)					0
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		7	36		
Queuing Penalty (veh)		25	23		

Queuing and Blocking Report
 Queuing and Blocking Report

Intersection: 7: Bull St. & Calhoun St.

Movement	EB	EB	EB	WB	WB	WB	B8	B8	B22	NB	NB	NB
Directions Served	L	T	TR	L	T	TR	T	T	T	L	T	TR
Maximum Queue (ft)	199	893	872	225	651	651	266	248	236	225	1887	1898
Average Queue (ft)	163	515	506	67	402	456	63	62	41	58	1717	1736
95th Queue (ft)	248	1122	1082	187	733	765	232	222	185	203	2137	2114
Link Distance (ft)		878	878		580	580	229	229	226		1835	1835
Upstream Blk Time (%)		43	42		28	33	18	18	17		65	71
Queuing Penalty (veh)		0	0		69	84	45	44	81		0	0
Storage Bay Dist (ft)	150			175						150		
Storage Blk Time (%)	75	0			21						55	
Queuing Penalty (veh)	94	0			19						19	

Intersection: 7: Bull St. & Calhoun St.

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	224	373	343	31
Average Queue (ft)	143	116	96	15
95th Queue (ft)	247	282	213	38
Link Distance (ft)		410	410	410
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	150			
Storage Blk Time (%)	37	1		
Queuing Penalty (veh)	223	1		

Queuing and Blocking Report
 Queuing and Blocking Report

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	EB	EB	EB	WB	WB	WB	WB	B40	NB	NB	NB	SB
Directions Served	L	T	TR	L	L	T	TR	T	L	T	T	L
Maximum Queue (ft)	324	389	407	235	322	244	211	48	163	188	186	77
Average Queue (ft)	31	201	228	201	232	131	112	4	77	102	92	24
95th Queue (ft)	166	342	389	257	321	212	197	22	137	172	172	60
Link Distance (ft)		638	638		235	235	235	645		420	420	
Upstream Blk Time (%)				1	5	0						
Queuing Penalty (veh)				0	19	1						
Storage Bay Dist (ft)	225			175					225			300
Storage Blk Time (%)		8		11	19							
Queuing Penalty (veh)		3		31	53							

Intersection: 9: Harden Street Ext/Harden St. Ext. & Colonial Drive

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	214	220
Average Queue (ft)	124	130
95th Queue (ft)	195	203
Link Distance (ft)	1840	1840
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Harden St./Harden Street Ext & Calhoun St.

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	323	333	74	135	248	277	296	242	270	340	340	270
Average Queue (ft)	81	168	18	33	125	137	166	20	58	150	176	39
95th Queue (ft)	171	302	52	84	208	259	264	94	162	313	340	173
Link Distance (ft)		967		761	1249	1249	1249			270	270	
Upstream Blk Time (%)									0	1	3	0
Queuing Penalty (veh)									0	8	19	0
Storage Bay Dist (ft)	225		50					325	300			200
Storage Blk Time (%)		5	4	10					0	1	6	
Queuing Penalty (veh)		7	2	2					0	1	5	

Intersection: 10: Harden St./Harden Street Ext & Calhoun St.

Movement	B64	B64
Directions Served	T	T
Maximum Queue (ft)	38	47
Average Queue (ft)	1	3
95th Queue (ft)	13	19
Link Distance (ft)	179	179
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 11: Gregg Street/Gregg Street & Calhoun St.

Movement	EB	WB	WB	NB	SB	SB
Directions Served	L	L	TR	LTR	L	TR
Maximum Queue (ft)	51	26	977	54	108	372
Average Queue (ft)	13	4	85	30	36	75
95th Queue (ft)	39	20	488	52	77	200
Link Distance (ft)			967	351		2856
Upstream Blk Time (%)			4			
Queuing Penalty (veh)			15			
Storage Bay Dist (ft)	125	275			300	
Storage Blk Time (%)			10			6
Queuing Penalty (veh)			1			4

Queuing and Blocking Report
Queuing and Blocking Report

Intersection: 12: Gregg Street & Colonial Drive

Movement	EB	EB	WB	WB	WB	B36	B36	NB	NB	SB	SB
Directions Served	T	TR	L	T	TR	T	T	L	TR	L	TR
Maximum Queue (ft)	304	316	124	200	200	253	196	60	55	41	38
Average Queue (ft)	119	145	86	133	120	18	15	17	20	7	11
95th Queue (ft)	230	250	141	202	187	109	90	49	49	27	28
Link Distance (ft)	861	861		128	128	206	206	2856	2856		414
Upstream Blk Time (%)			0	8	8	1	0				
Queuing Penalty (veh)			0	27	27	3	0				
Storage Bay Dist (ft)			100							50	
Storage Blk Time (%)	16		6	15						0	0
Queuing Penalty (veh)	0		17	24						0	0

Intersection: 13: Harden Street Ext & Slighs Ave.

Movement	WB	NB	NB	NB	SB	SB	SB
Directions Served	LR	T	T	R	L	T	T
Maximum Queue (ft)	314	335	584	100	144	185	182
Average Queue (ft)	199	117	455	18	62	79	98
95th Queue (ft)	319	266	697	77	109	164	169
Link Distance (ft)	299	571	571			420	420
Upstream Blk Time (%)	6		12				
Queuing Penalty (veh)	0		83				
Storage Bay Dist (ft)				50	100		
Storage Blk Time (%)			38	0	4	6	
Queuing Penalty (veh)			27	0	25	8	

Intersection: 14: Colonial Drive & Farrow Road

Movement	EB	EB	NB	B40	B40	B40	SB	SB
Directions Served	R	R	L	T	T		T	TR
Maximum Queue (ft)	128	115	160	287	243	351	246	276
Average Queue (ft)	56	12	99	95	118	137	109	125
95th Queue (ft)	103	50	151	227	214	349	188	216
Link Distance (ft)	1034			235	235	235	1860	1860
Upstream Blk Time (%)				0	0	3		
Queuing Penalty (veh)				2	1	21		
Storage Bay Dist (ft)		330	550					
Storage Blk Time (%)								
Queuing Penalty (veh)								

Queuing and Blocking Report
Queuing and Blocking Report

Intersection: 15: Farrow Road & Beltline Blvd

Movement	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	TR	L	L	T	T	R	T	T	R	L
Maximum Queue (ft)	291	321	270	124	138	247	235	438	1510	1562	350	325
Average Queue (ft)	115	216	203	42	69	163	144	185	1026	1092	329	255
95th Queue (ft)	215	292	282	110	131	239	224	361	1632	1676	454	386
Link Distance (ft)		1471	1471			1366	1366	1366	1860	1860		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	175			300	300						225	200
Storage Blk Time (%)	12	24								64		53
Queuing Penalty (veh)	32	22								204		195

Intersection: 15: Farrow Road & Beltline Blvd

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	734	733
Average Queue (ft)	310	270
95th Queue (ft)	690	627
Link Distance (ft)	730	730
Upstream Blk Time (%)	1	0
Queuing Penalty (veh)	6	0
Storage Bay Dist (ft)		
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 16: Farrow Road & 277 NB RAMPS

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	L	TR	T	TR	L	T	T
Maximum Queue (ft)	194	28	138	550	90	152	182
Average Queue (ft)	119	12	42	168	28	87	76
95th Queue (ft)	187	33	99	459	61	138	145
Link Distance (ft)		775	730	730		627	627
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	300				250		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Queuing and Blocking Report
 Queuing and Blocking Report

Intersection: 17: Farrow Road & Lorick Avenue /277 SB Ramps

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	R	L	TR	L	T	T	T	TR
Maximum Queue (ft)	92	56	275	446	46	274	313	216	202
Average Queue (ft)	28	7	242	169	13	182	184	92	67
95th Queue (ft)	77	34	293	445	33	250	270	188	158
Link Distance (ft)	414	414		971		627	627	807	807
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			125		200				
Storage Blk Time (%)			33	0		5			
Queuing Penalty (veh)			22	0		1			

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	TR	R	L	L	T	T	TR	L	L	TR
Maximum Queue (ft)	2494	2494	2512	450	225	286	163	176	188	576	589	565
Average Queue (ft)	1470	1551	1556	347	137	164	74	85	106	554	558	463
95th Queue (ft)	2906	2971	2961	640	213	244	141	143	169	565	577	666
Link Distance (ft)	2460	2460	2460			409	409	409	409	480	480	480
Upstream Blk Time (%)	30	31	31							78	82	47
Queuing Penalty (veh)	0	0	0							0	0	0
Storage Bay Dist (ft)				275	150							
Storage Blk Time (%)	72		41		7	17						
Queuing Penalty (veh)	0		58		13	31						

Intersection: 18: Assembly St./Assembly & Elmwood Avenue

Movement	NB	B53	B53	B53	SB
Directions Served	R	T	T	T	LTR
Maximum Queue (ft)	508	2308	2319	2286	28
Average Queue (ft)	362	951	971	964	2
95th Queue (ft)	621	2008	2025	2039	14
Link Distance (ft)	480	3267	3267	3267	368
Upstream Blk Time (%)	3				
Queuing Penalty (veh)	0				
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Queuing and Blocking Report
 Queuing and Blocking Report

Intersection: 19: Main St. & Elmwood Avenue

Movement	EB	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	T	R	L	T	T	TR	L	T
Maximum Queue (ft)	250	441	467	471	286	31	224	497	475	478	224	278
Average Queue (ft)	241	398	255	220	178	15	32	299	355	370	103	181
95th Queue (ft)	273	506	432	385	260	40	92	534	527	526	193	260
Link Distance (ft)		409	409	409	409			452	452	452		588
Upstream Blk Time (%)		55	5	0				9	19	21		
Queuing Penalty (veh)		358	34	2				68	139	152		
Storage Bay Dist (ft)	175					175	150				200	
Storage Blk Time (%)	64	82			10			15			2	9
Queuing Penalty (veh)	167	212			8			5			6	14

Intersection: 19: Main St. & Elmwood Avenue

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	TR	R
Maximum Queue (ft)	278	62	250	452	194	161
Average Queue (ft)	190	30	159	154	121	83
95th Queue (ft)	273	60	264	366	171	137
Link Distance (ft)	588	588		3580	3580	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			175		425	
Storage Blk Time (%)			25	0		
Queuing Penalty (veh)			25	0		

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	LT
Maximum Queue (ft)	275	482	503	462	125	537	568	571	299	2247	2248	124
Average Queue (ft)	57	356	329	238	41	218	274	293	155	555	333	31
95th Queue (ft)	225	563	568	468	113	435	500	502	333	1525	1143	92
Link Distance (ft)		452	452	452		904	904	904		3075	3075	
Upstream Blk Time (%)		4	1	0								
Queuing Penalty (veh)		26	10	3								
Storage Bay Dist (ft)	200				75				200			75
Storage Blk Time (%)		61			0	19			41	13		3
Queuing Penalty (veh)		6			2	10			111	12		1

Intersection: 20: Sumter St. & Elmwood Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	156
Average Queue (ft)	62
95th Queue (ft)	137
Link Distance (ft)	1034
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	31
Queuing Penalty (veh)	12

Intersection: 21: Barnwell Street & Calhoun St.

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	126	274	50	691	225	73	71	393
Average Queue (ft)	42	98	5	217	32	19	30	59
95th Queue (ft)	93	215	26	547	93	45	64	201
Link Distance (ft)	226	226	688	688	517	517	594	594
Upstream Blk Time (%)		1		12				
Queuing Penalty (veh)		3		26				
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Queuing and Blocking Report
 Queuing and Blocking Report

Intersection: 23: Bull St. & Access #3

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LR	T	T	TR	L	T	T	T
Maximum Queue (ft)	821	843	180	204	165	136	188	192	203
Average Queue (ft)	229	601	86	109	105	63	48	92	130
95th Queue (ft)	659	906	176	213	189	111	126	184	221
Link Distance (ft)	809	809	147	147	147		173	173	173
Upstream Blk Time (%)	0	15	3	5	4		1	1	3
Queuing Penalty (veh)	0	0	27	52	38		4	4	19
Storage Bay Dist (ft)						150			
Storage Blk Time (%)						0	1		
Queuing Penalty (veh)						0	1		

Intersection: 25: Access #5 & Colonial Drive

Movement	WB	WB	NB
Directions Served	T	T	R
Maximum Queue (ft)	290	244	27
Average Queue (ft)	121	181	13
95th Queue (ft)	311	311	35
Link Distance (ft)	208	208	250
Upstream Blk Time (%)	24	54	
Queuing Penalty (veh)	70	156	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 26: Access #6/Mental Health Dwy & Colonial Drive

Movement	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	48	124	277	250	205	50	394	325
Average Queue (ft)	2	11	114	145	87	14	118	78
95th Queue (ft)	16	64	309	316	208	39	273	215
Link Distance (ft)			222	222	369	369	379	379
Upstream Blk Time (%)			16	34			1	
Queuing Penalty (veh)			42	96			0	
Storage Bay Dist (ft)	100	100						
Storage Blk Time (%)		0	12					
Queuing Penalty (veh)		0	3					

Intersection: 27: Boyce St. & Colonial Drive

Movement	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	TR	L	T	T	L	R
Maximum Queue (ft)	221	226	250	802	823	174	652
Average Queue (ft)	89	115	133	240	279	80	122
95th Queue (ft)	164	187	266	658	685	185	408
Link Distance (ft)	222	222		861	861		952
Upstream Blk Time (%)	0	0					
Queuing Penalty (veh)	0	1					
Storage Bay Dist (ft)			150			150	
Storage Blk Time (%)			1	21		22	1
Queuing Penalty (veh)			2	37		25	1

Intersection: 28: Access #7 & Colonial Drive

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	31	43
Average Queue (ft)	6	15
95th Queue (ft)	26	35
Link Distance (ft)		400
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 30: Harden Street Ext & Access #8

Movement	EB	NB	NB
Directions Served	R	T	T
Maximum Queue (ft)	42	419	442
Average Queue (ft)	7	108	174
95th Queue (ft)	25	371	486
Link Distance (ft)	387	406	406
Upstream Blk Time (%)		1	8
Queuing Penalty (veh)		10	63
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 31: Harden Street Ext & Access #9

Movement	EB	NB	NB	NB
Directions Served	R	L	T	T
Maximum Queue (ft)	58	55	390	436
Average Queue (ft)	13	14	76	106
95th Queue (ft)	34	41	294	383
Link Distance (ft)	464		404	404
Upstream Blk Time (%)			0	2
Queuing Penalty (veh)			0	13
Storage Bay Dist (ft)		100		
Storage Blk Time (%)			1	
Queuing Penalty (veh)			0	

Intersection: 32: Harden Street Ext & Access #10

Movement	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	L	T	T	T	T	R
Maximum Queue (ft)	350	62	117	282	371	178	192	139
Average Queue (ft)	175	28	54	136	189	55	58	14
95th Queue (ft)	274	51	104	250	331	117	133	61
Link Distance (ft)	394	394		404	404	404	404	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			200					75
Storage Blk Time (%)				2			3	
Queuing Penalty (veh)				2			2	

Intersection: 33: Harden Street Ext & Access #11

Movement	EB
Directions Served	R
Maximum Queue (ft)	21
Average Queue (ft)	8
95th Queue (ft)	24
Link Distance (ft)	360
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 34: Harden Street Ext & Access #12

Movement	EB	NB
Directions Served	R	L
Maximum Queue (ft)	22	31
Average Queue (ft)	6	9
95th Queue (ft)	22	32
Link Distance (ft)	362	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		100
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 6458

SUPPORTING DOCUMENTS AND GRAPHICS

Table 2(b) Intersection Improvement Projects (Continued)

NOTE: All amounts in this document are shown in thousands of dollars and represent the year the work is planned to begin										
Project	Rank	District	Phase of Work	CY 2015	CY 2016	CY 2017	CY 2018	CY 2019	Total CTIP Cost	Cost to Complete
Wilson Blvd. and Killian Rd. Intersection ²	1	7	PE							
			ROW							
			CONST							
TOTAL										
Clemson Rd. and Sparkleberry Ln. (to Mallet Hill Rd.) Intersection	2	9, 10	PE	\$510					\$510	
			ROW		\$1,000				\$1,000	
			CONST			\$3,809			\$3,809	
TOTAL				\$510	\$1,000	\$3,809			\$5,319	
Bull St. and Elmwood Ave. Intersection	3	4	PE		\$200				\$200	
			ROW			\$300			\$300	
			CONST				\$2,513		\$2,513	
TOTAL				\$200	\$300	\$300	\$2,513		\$3,013	
North Main St. and Monticello Rd. Intersection ³	4	4	PE							
			ROW							
			CONST							
TOTAL										
Hardscrabble Rd. and Kelly Mill Rd./Rimer Pond Rd. Intersection ⁴	5	2, 9	PE							
			ROW							
			CONST							
TOTAL										
Garners Ferry Rd. and Harmon Rd. Intersection	6	11	PE		\$100				\$100	
			ROW			\$100			\$100	
			CONST				\$874		\$874	
TOTAL				\$100	\$100	\$100	\$874		\$1,074	
North Springs Rd. and Harrington Rd. Intersection	7	8, 9	PE		\$100				\$100	
			ROW			\$200			\$200	
			CONST				\$765		\$765	
TOTAL				\$100	\$200	\$765			\$1,065	

KEY: PE - Preliminary Engineering (Design); ROW - Right of Way; CONST - Construction; DB - Design Build

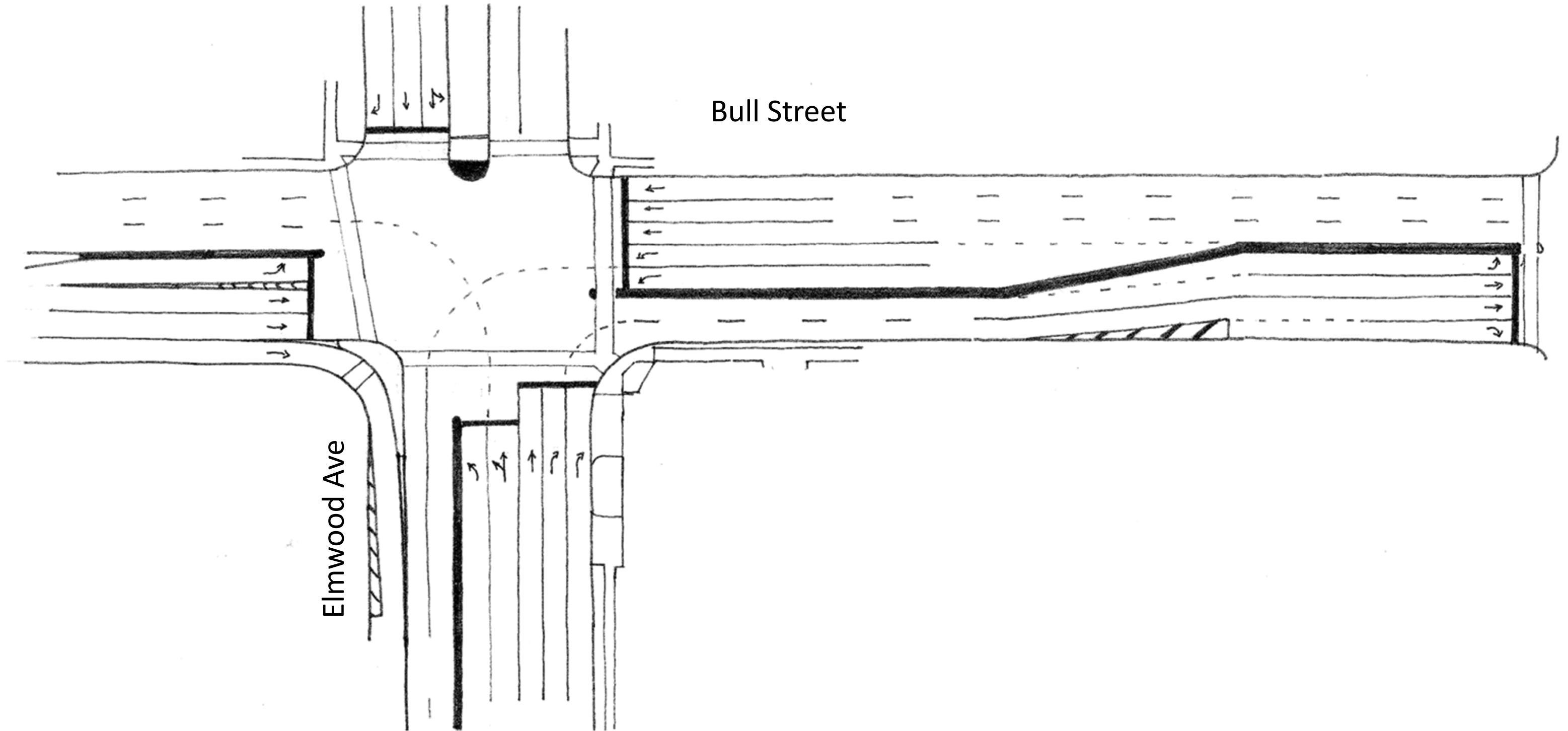
BullStreet Mixed-Use Development

Bull Street at Elmwood Avenue



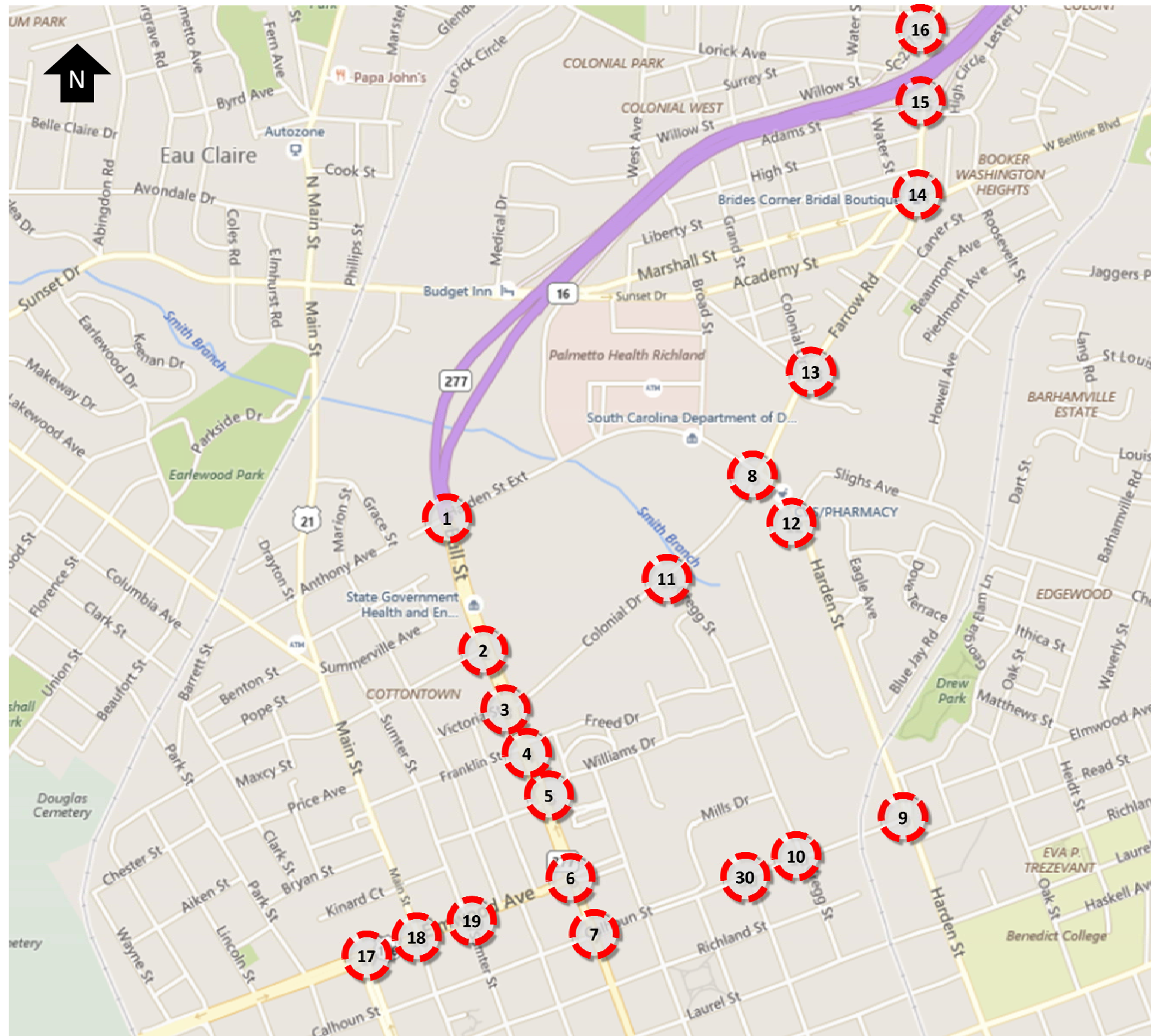
BullStreet Mixed-Use Development

Bull Street at Elmwood Avenue



BullStreet Mixed-Use Development

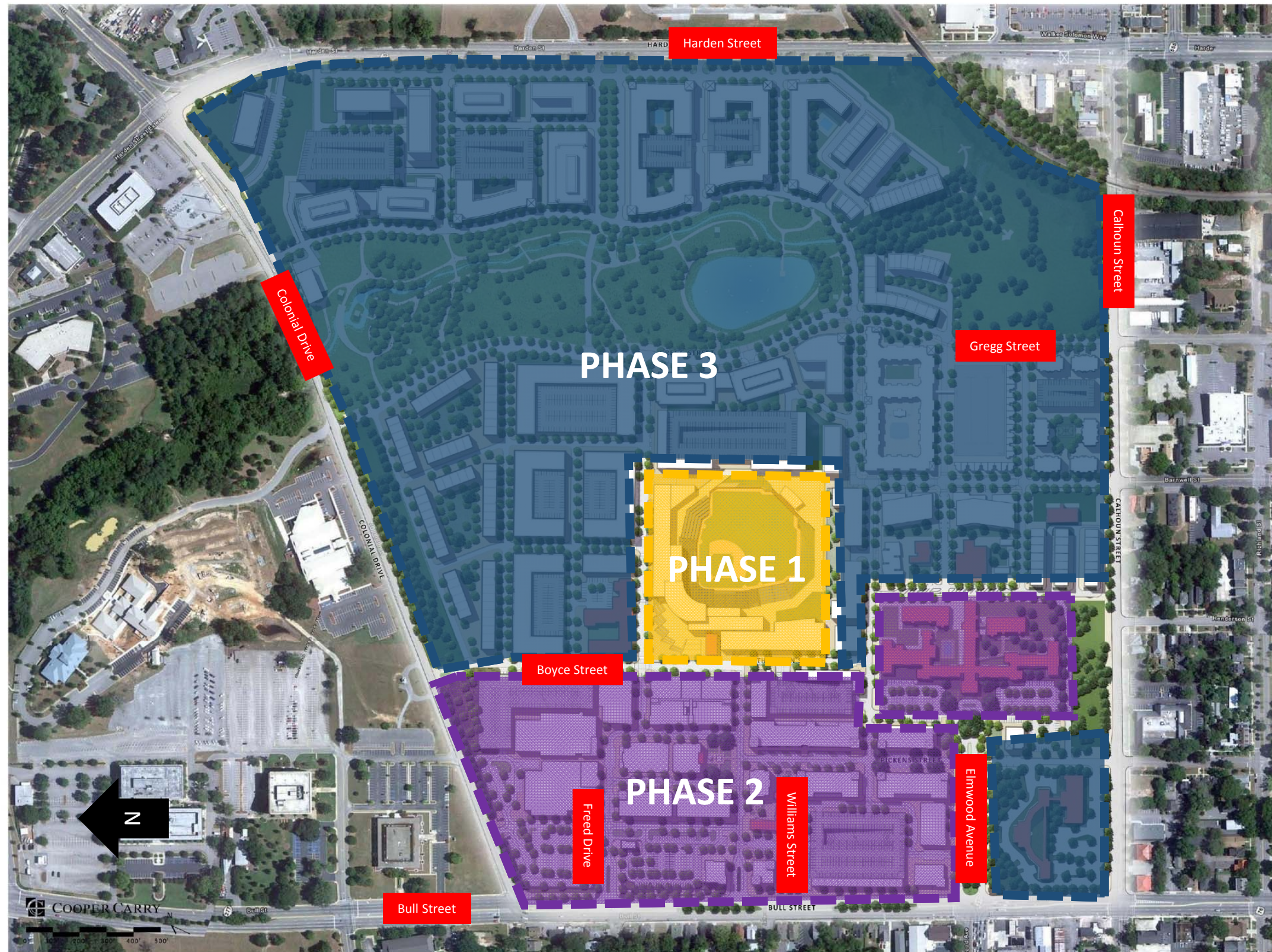
Figure 1 – Study Area/ Site Location



1. Bull Street at Harden Street Extension
2. Bull Street at Confederate Avenue
3. Bull Street at Colonial Drive
4. Bull Street at Franklin Street/Freed Drive
5. Bull Street at Jefferson Street
6. Bull Street at Elmwood Avenue
7. Bull Street at Calhoun Street
8. Colonial Drive at Harden Street
9. Harden Street at Calhoun Street
10. Calhoun Street at Gregg Street
11. Gregg Street at Colonial Drive
12. Harden Street at Slighs Avenue
13. Colonial Drive at Farrow Road
14. Farrow Road at Beltline Boulevard
15. Farrow Road at 277 NB Ramps
16. Farrow Road at Lorick Avenue/ 277 SB Ramps
17. Elmwood Avenue at Assembly Street
18. Elmwood Avenue at Main Street
19. Elmwood Avenue at Sumter Street
20. Calhoun Street at Barnwell Street

BullStreet Mixed-Use Development

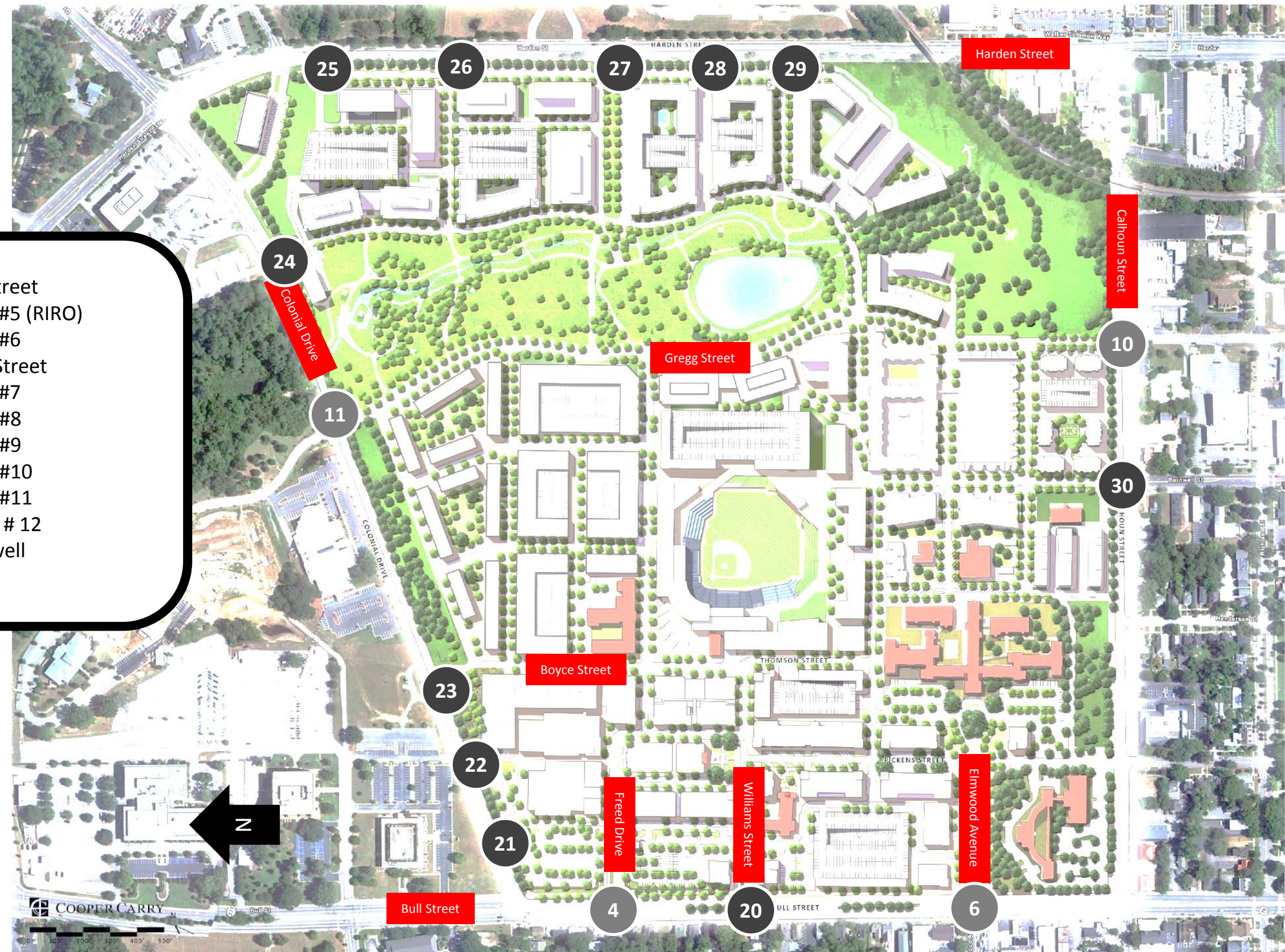
Figure 2 – Site Plan



BullStreet Mixed-Use Development

Figure 2A – Site Access Key

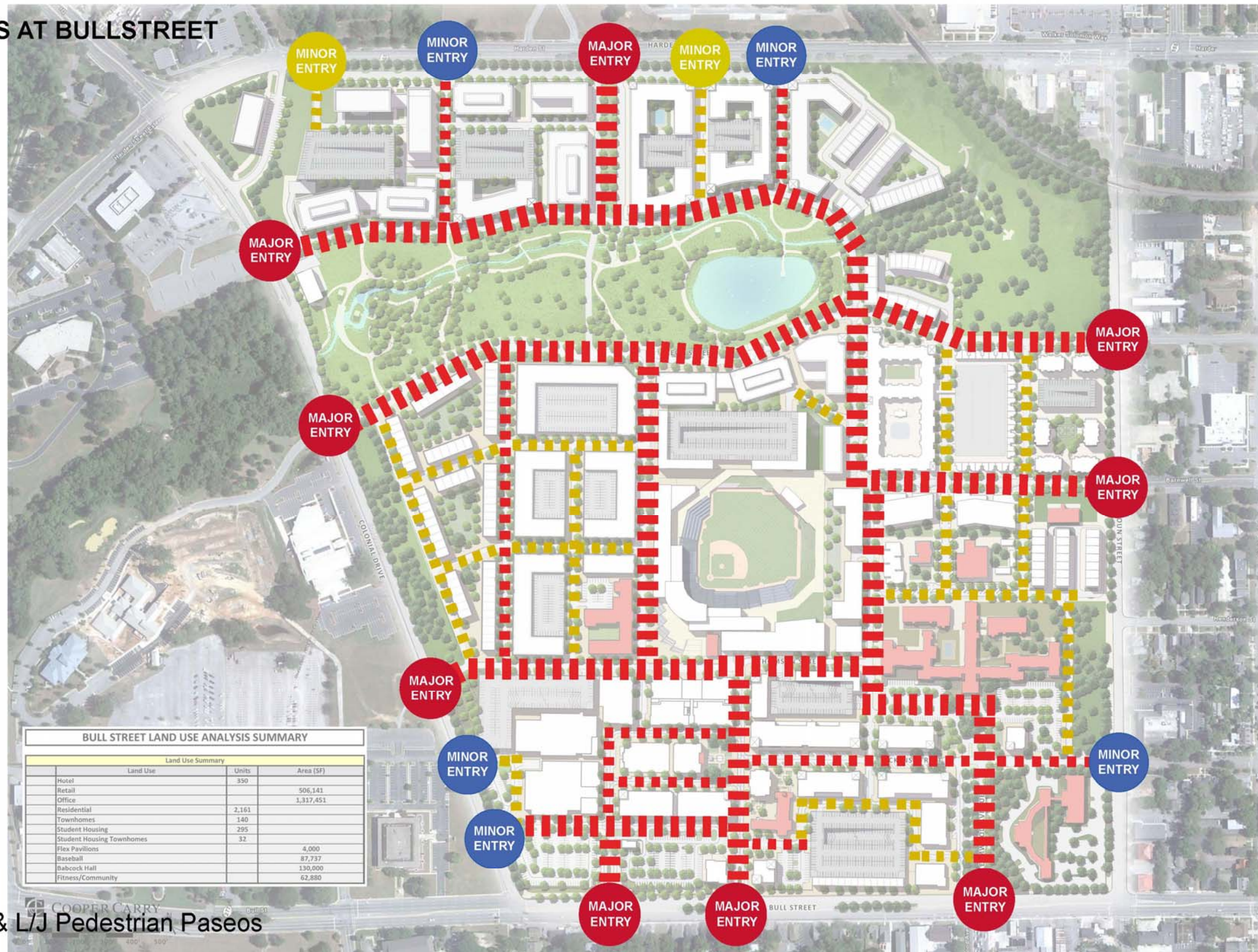
- 20. Bull Street at Williams Street
- 21. Colonial Drive at Access #5 (RIRO)
- 22. Colonial Drive at Access #6
- 23. Colonial Drive at Boyce Street
- 24. Colonial Drive at Access #7
- 25. Harden Street at Access #8
- 26. Harden Street at Access #9
- 27. Harden Street at Access #10
- 28. Harden Street at Access #11
- 29. Harden Street at Access # 12
- 30. Calhoun Street at Barnwell Street/Access # 13



BullStreet Mixed-Use Development

Figure 2C – Site Access Key

THE COMMONS AT BULLSTREET
Vehicular Access

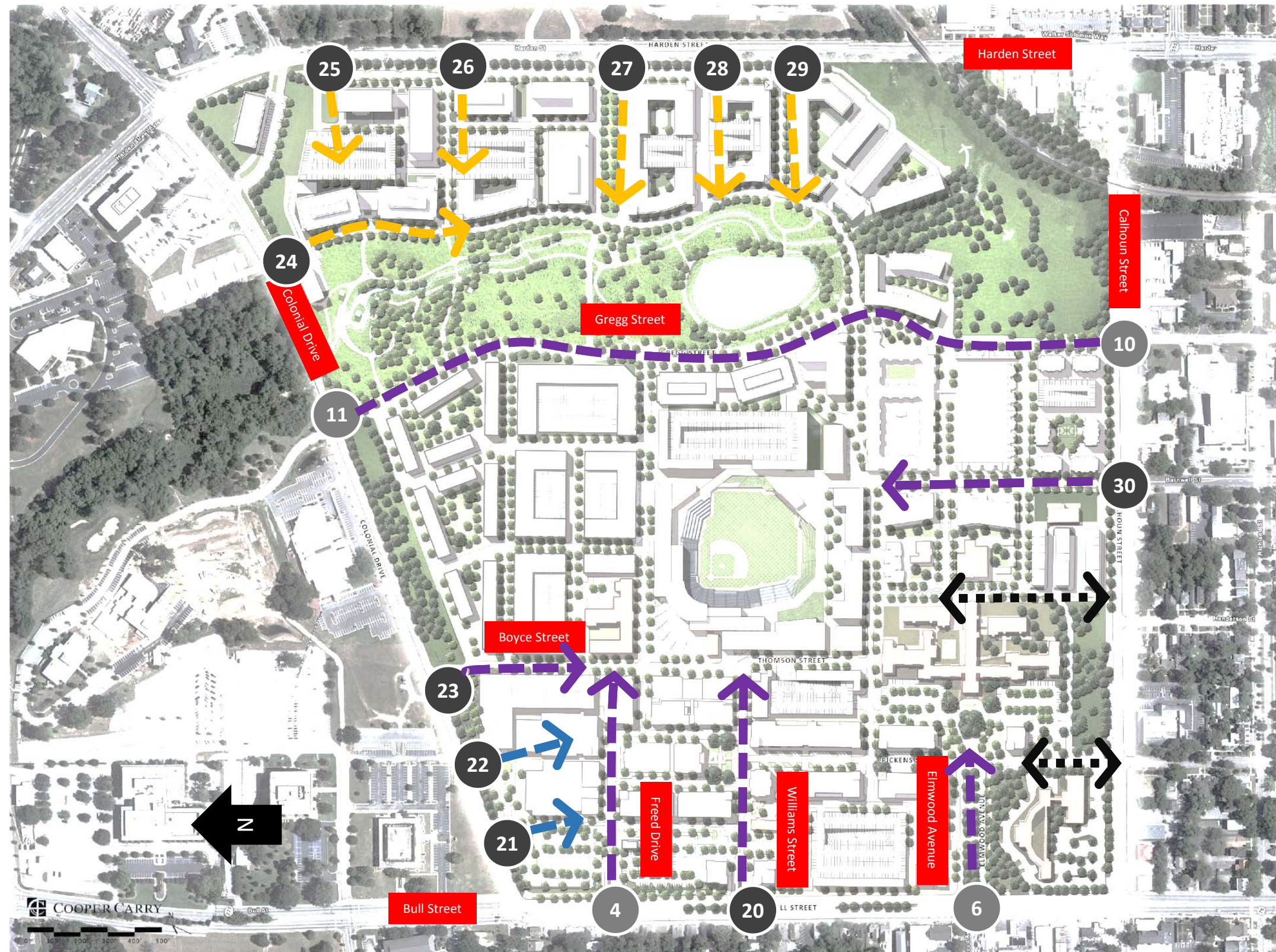


OPTION A - H/I & L/J Pedestrian Paseos

BullStreet Mixed-Use Development




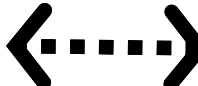



Figure 2B – Site Access Key

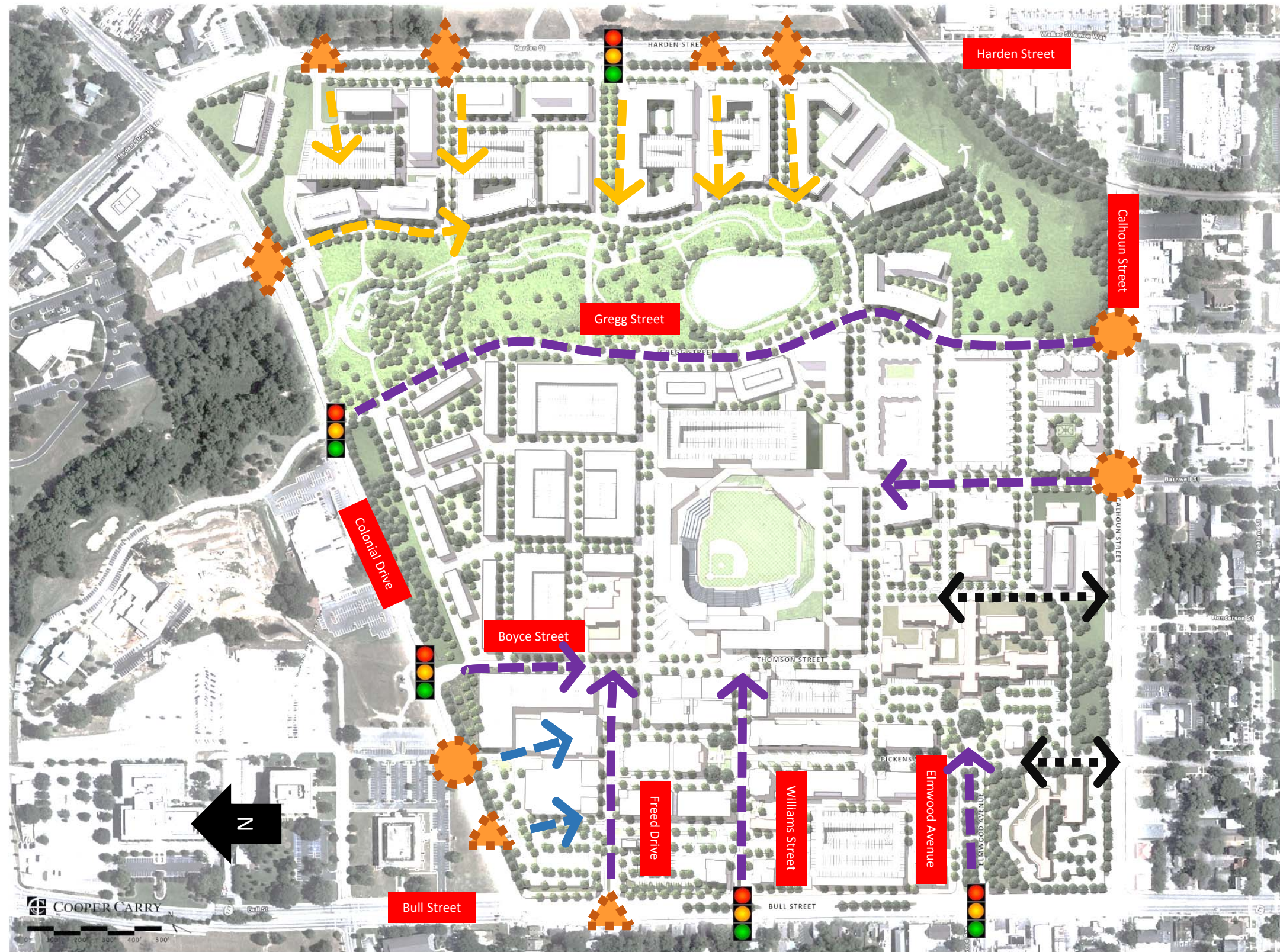
- All Phases
- Phase 2
- Phase 3
- ↔ Bike/Ped



BullStreet Mixed-Use Development

Figure 2D – Site Access Key

-  All Phases
-  Phase 2
-  Phase 3
-  Bike/Ped
-  Full Movement
-  Left-over
-  RIRO



BullStreet Mixed-Use Development

Regional Distribution



SIGNAL WARRANTS

Columbia Commons

TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

Based on 2009 MUTCD

INTERSECTION NAME: Bull Street at Williams Drive

DATE: 03/01/16

INTERSECTION CONDITION: 2018 Build Phase II

MAJOR STREET: Bull Street
 MINOR STREET: Williams Drive

OF APPROACH LANES: 3
 # OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N
 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

USE 56% REDUCTION (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	WARRANT 1, Condition A			WARRANT 1, Condition B			WARRANT 1, Combination Warrant						WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	CONDITION A			CONDITION B				
									MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES →			600	150		900	75		480	120		720	60			
12:00 AM TO 01:00 AM																
01:00 AM TO 02:00 AM																
02:00 AM TO 03:00 AM																
03:00 AM TO 04:00 AM																
04:00 AM TO 05:00 AM																
05:00 AM TO 06:00 AM																
06:00 AM TO 07:00 AM																
07:00 AM TO 08:00 AM	4,208	51	Y			Y			Y			Y				
08:00 AM TO 09:00 AM																
09:00 AM TO 10:00 AM																
10:00 AM TO 11:00 AM																
11:00 AM TO 12:00 PM																
12:00 PM TO 01:00 PM																
01:00 PM TO 02:00 PM																
02:00 PM TO 03:00 PM																
03:00 PM TO 04:00 PM																
04:00 PM TO 05:00 PM																
05:00 PM TO 06:00 PM	4,481	78	Y			Y	Y	Y	Y			Y	Y	Y		
06:00 PM TO 07:00 PM																
07:00 PM TO 08:00 PM																
08:00 PM TO 09:00 PM																
09:00 PM TO 10:00 PM																
10:00 PM TO 11:00 PM																
11:00 PM TO 12:00 AM																
	8,689	129	0			1			0			1			0	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			8 HOURS OF BOTH COND. A AND COND. B NEEDED NOT SATISFIED						4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 -- Eight-Hour Vehicular Volume Warrant
 Condition A : Minimum Vehicular Volume
 Condition B : Interruption of Continuous Traffic
 Combination : Combination of Condition A and Condition B
 WARRANT 2 -- Four-Hour Vehicular Volume Warrant
 WARRANT 3 -- Peak Hour Warrant

Columbia Commons

TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

Based on 2009 MUTCD

INTERSECTION NAME: Bull Street at Williams Drive

DATE: 03/01/16

INTERSECTION CONDITION: 2020 Build Phase III

MAJOR STREET: Bull Street
 MINOR STREET: Williams Drive

OF APPROACH LANES: 3
 # OF APPROACH LANES: 2

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N
 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

USE 56% REDUCTION (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	WARRANT 1, Condition A			WARRANT 1, Condition B			WARRANT 1, Combination Warrant						WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	CONDITION A			CONDITION B				
									MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES →			600	200		900	100		480	160		720	80			
12:00 AM TO 01:00 AM																
01:00 AM TO 02:00 AM																
02:00 AM TO 03:00 AM																
03:00 AM TO 04:00 AM																
04:00 AM TO 05:00 AM																
05:00 AM TO 06:00 AM																
06:00 AM TO 07:00 AM																
07:00 AM TO 08:00 AM	4,437	132	Y			Y	Y	Y	Y			Y	Y	Y	Y	
08:00 AM TO 09:00 AM																
09:00 AM TO 10:00 AM																
10:00 AM TO 11:00 AM																
11:00 AM TO 12:00 PM																
12:00 PM TO 01:00 PM																
01:00 PM TO 02:00 PM																
02:00 PM TO 03:00 PM																
03:00 PM TO 04:00 PM																
04:00 PM TO 05:00 PM																
05:00 PM TO 06:00 PM	4,682	284	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
06:00 PM TO 07:00 PM																
07:00 PM TO 08:00 PM																
08:00 PM TO 09:00 PM																
09:00 PM TO 10:00 PM																
10:00 PM TO 11:00 PM																
11:00 PM TO 12:00 AM																
	9,119	416	1			2			1			2			2	1
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			8 HOURS OF BOTH COND. A AND COND. B NEEDED NOT SATISFIED						4 HRS NEEDED NOT SATISFIED	1 HR NEEDED SATISFIED

WARRANT 1 -- Eight-Hour Vehicular Volume Warrant
 Condition A : Minimum Vehicular Volume
 Condition B : Interruption of Continuous Traffic
 Combination : Combination of Condition A and Condition B
 WARRANT 2 -- Four-Hour Vehicular Volume Warrant
 WARRANT 3 -- Peak Hour Warrant

Columbia Commons

TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

Based on 2009 MUTCD

INTERSECTION NAME: Colonial Drive at Boyce Street

DATE: 03/01/16

INTERSECTION CONDITION: 2020 Build Phase III

MAJOR STREET: Colonial Drive
 MINOR STREET: Boyce Street

OF APPROACH LANES: 1
 # OF APPROACH LANES: 2

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N
 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

USE 56% REDUCTION (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	WARRANT 1, Condition A			WARRANT 1, Condition B			WARRANT 1, Combination Warrant						WARRANT 2	WARRANT 3	
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	CONDITION A			CONDITION B					
									MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET			
THRESHOLD VALUES →			500	200		750	100		400	160		600	80				
12:00 AM TO 01:00 AM																	
01:00 AM TO 02:00 AM																	
02:00 AM TO 03:00 AM																	
03:00 AM TO 04:00 AM																	
04:00 AM TO 05:00 AM																	
05:00 AM TO 06:00 AM																	
06:00 AM TO 07:00 AM																	
07:00 AM TO 08:00 AM	806	88	Y			Y			Y			Y	Y	Y			
08:00 AM TO 09:00 AM																	
09:00 AM TO 10:00 AM																	
10:00 AM TO 11:00 AM																	
11:00 AM TO 12:00 PM																	
12:00 PM TO 01:00 PM																	
01:00 PM TO 02:00 PM																	
02:00 PM TO 03:00 PM																	
03:00 PM TO 04:00 PM																	
04:00 PM TO 05:00 PM																	
05:00 PM TO 06:00 PM	900	219	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		
06:00 PM TO 07:00 PM																	
07:00 PM TO 08:00 PM																	
08:00 PM TO 09:00 PM																	
09:00 PM TO 10:00 PM																	
10:00 PM TO 11:00 PM																	
11:00 PM TO 12:00 AM																	
	1,706	307	1			1			1						2	1	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			8 HOURS OF BOTH COND. A AND COND. B NEEDED NOT SATISFIED						4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED	

WARRANT 1 -- Eight-Hour Vehicular Volume Warrant
 Condition A : Minimum Vehicular Volume
 Condition B : Interruption of Continuous Traffic
 Combination : Combination of Condition A and Condition B
 WARRANT 2 -- Four-Hour Vehicular Volume Warrant
 WARRANT 3 -- Peak Hour Warrant

Columbia Commons

TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

Based on 2009 MUTCD

INTERSECTION NAME: Harden Street at Access 10

DATE: 03/01/16

INTERSECTION CONDITION: 2020 Build Phase III

MAJOR STREET: Harden Street
 MINOR STREET: Access 10

OF APPROACH LANES: 2
 # OF APPROACH LANES: 2

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N
 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

USE 56% REDUCTION (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	WARRANT 1, Condition A			WARRANT 1, Condition B			WARRANT 1, Combination Warrant						WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	CONDITION A			CONDITION B				
									MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES →			600	200		900	100		480	160		720	80			
12:00 AM TO 01:00 AM																
01:00 AM TO 02:00 AM																
02:00 AM TO 03:00 AM																
03:00 AM TO 04:00 AM																
04:00 AM TO 05:00 AM																
05:00 AM TO 06:00 AM																
06:00 AM TO 07:00 AM																
07:00 AM TO 08:00 AM	2,413	127	Y			Y	Y	Y	Y			Y	Y	Y	Y	
08:00 AM TO 09:00 AM																
09:00 AM TO 10:00 AM																
10:00 AM TO 11:00 AM																
11:00 AM TO 12:00 PM																
12:00 PM TO 01:00 PM																
01:00 PM TO 02:00 PM																
02:00 PM TO 03:00 PM																
03:00 PM TO 04:00 PM																
04:00 PM TO 05:00 PM																
05:00 PM TO 06:00 PM	2,323	297	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
06:00 PM TO 07:00 PM																
07:00 PM TO 08:00 PM																
08:00 PM TO 09:00 PM																
09:00 PM TO 10:00 PM																
10:00 PM TO 11:00 PM																
11:00 PM TO 12:00 AM																
	4,736	424	1			2			1			2			2	1
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			8 HOURS OF BOTH COND. A AND COND. B NEEDED NOT SATISFIED						4 HRS NEEDED NOT SATISFIED	1 HR NEEDED SATISFIED

WARRANT 1 -- Eight-Hour Vehicular Volume Warrant
 Condition A : Minimum Vehicular Volume
 Condition B : Interruption of Continuous Traffic
 Combination : Combination of Condition A and Condition B
 WARRANT 2 -- Four-Hour Vehicular Volume Warrant
 WARRANT 3 -- Peak Hour Warrant