



Cherry Hills Village

City-Wide Traffic Study

**OCTOBER 2017**

**CHERRY HILLS VILLAGE**  
**TRAFFIC STUDY**

***Prepared for:***

Cherry Hills Village

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## ES-1. EXECUTIVE SUMMARY

Existing traffic conditions along Cherry Hills Village roads and at intersections were evaluated in this study. The focus of this effort was to collect traffic speed data, volume data, and travel pattern data at key locations throughout the City. This section summarizes the major findings and recommendations developed based on this data.

### A. *Roadway Traffic Characteristics Study (Speed and Volume)*

A speed study was conducted along Quincy Avenue, Colorado Boulevard, Mansfield Avenue, Dahlia Street, Holly Street, Clarkson Street, and Franklin Street. At all locations, the 85<sup>th</sup> percentile speed was within traffic engineering practice limits except for northbound Colorado Boulevard and Franklin Street. These two streets showed the 85<sup>th</sup> percentile speed more than 5 miles per hour (mph) above the posted speed, suggesting that speeding was an issue.

Based on speed and volume studies, traffic calming treatments such as neighborhood traffic circles and speed humps were recommended at:

- **Colorado Boulevard** – dynamic speed monitoring displays
- **Franklin Street** – further speed studies and neighborhood meetings to gauge neighborhood interest in addressing vehicle speeds

### B. *Intersection Operations Study*

Study intersections along University, Belleview, and Hampden fall under the control of other jurisdictions such as the City and County of Denver and the Colorado Department of Transportation. Addressing operational issues at these intersections will require coordination and approval from these jurisdictions and needed improvements are typically capacity increases along the major street. In short, the City of Cherry Hills Village does not have the authority or the resources necessary to address operational issues along University, Belleview, and Hampden.

Other study intersections that fall under the jurisdictional control of the City generally include intersections along the Quincy and Happy Canyon corridors. The following intersections do experience some congestion during the peak hours.

- **Happy Canyon Road / Mansfield Avenue** – This is an all-way stop-controlled intersection and traffic on Happy Canyon Road experiences an average delay of more than 50 seconds per vehicle during the peak hours. However, this traffic does not exceed capacity. Recommendations include:
  - Leave traffic control as is
  - Construct roundabout to reduce delay on Happy Canyon Road.

- **Quincy Avenue / Colorado Boulevard** – This is an all-way stop-controlled intersection and traffic on Quincy Avenue experiences an average delay of more than 50 seconds per vehicle during the peak hours. However, this traffic does not exceed capacity. Recommendations include:
  - Leave traffic control as is
  - Construct roundabout to reduce delay on Quincy Avenue

### **C.      *Origin/Destination Study***

Vehicle travel patterns through Cherry Hills Village were evaluated through license plate recognition technology to record how vehicles entered and exited the City at five strategic locations in the City: Quincy Avenue west of Happy Canyon Road, Quincy Avenue east of University Boulevard, Colorado Boulevard south of Hampden Avenue, Holly Street south of Quincy Avenue, and Dahlia Street north of Quincy Avenue. Major findings of this effort are described below.

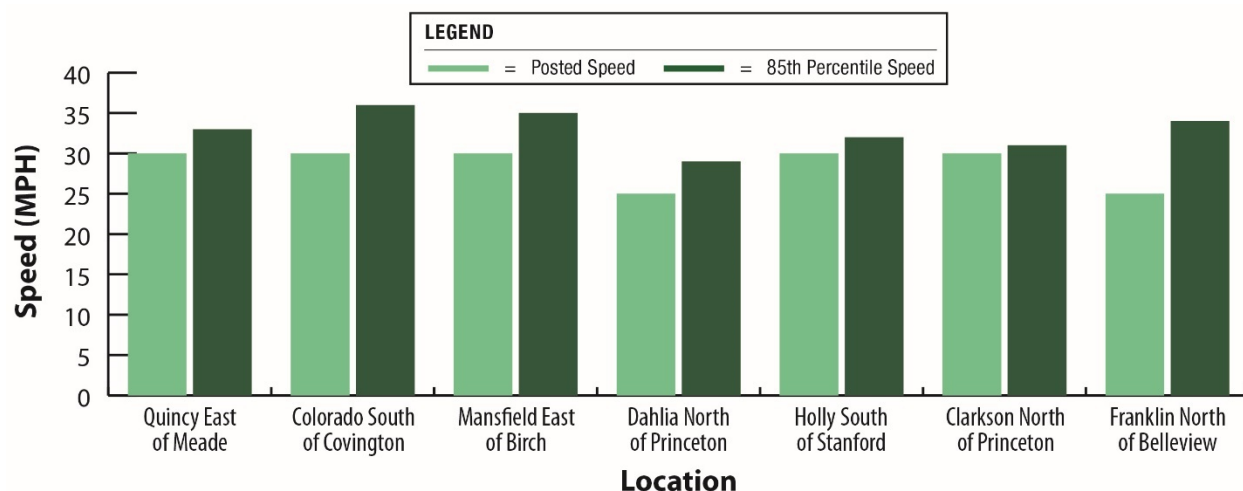
- During the peak periods, about 50 percent of vehicles entering the City could be considered a pass-through trip. In other words, 50 percent of traffic on Village Streets might be considered cut-through traffic.
- About 45 percent of the traffic on Colorado Avenue is cut-through traffic.
- In the PM peak period, nearly two-thirds of the vehicles on Quincy Avenue and on Holly Street are vehicles likely cutting through the City.

## I. ROADWAY TRAFFIC CHARACTERISTICS

Existing traffic conditions within the City of Cherry Hills Village were evaluated through an extensive data collection effort. This effort included speed and volume data collection along seven key roadway links. These seven roadways include: Quincy Avenue, Colorado Boulevard, Mansfield Avenue, Dahlia Street, Holly Street, Clarkson Street, and Franklin Street.

### A. Speed

**Figure 1** compares speed data against posted speed limits for seven key Cherry Hills Village streets. The speed data represent the 85<sup>th</sup> percentile speed recorded on these streets. This means that approximately 85 percent of vehicles are traveling at or under this speed while the remaining 15 percent are traveling over this speed. Standard traffic engineering practice is to determine the 85<sup>th</sup> percentile speed when evaluating speed conditions along a roadway. As shown on **Figure 1**, the speed studies show that 85<sup>th</sup> percentile speeds exceed the posted speed limit by 1 to 9 mph.



**Figure 1. Posted Speed vs. 85<sup>th</sup> Percentile Speed**

**Table 1** provides more detail about the vehicle speed and volume characteristics of the studied streets. At most locations, the 85<sup>th</sup> percentile speed is about the same in each direction except at one location. On Colorado Avenue, the 85<sup>th</sup> percentile speed in the northbound direction exceeds the southbound speed by 4 mph.

**Table 1. Traffic and Speed Characteristics of Studies Streets**

| Street and Location      |                                                                                                                          | 85 <sup>th</sup> Percentile Speed |    | Posted Speed Limit         | Classification |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----|----------------------------|----------------|
| Quincy - e/o Meade       | EB                                                                                                                       | 33                                | 30 | Minor Arterial / Collector |                |
|                          | WB                                                                                                                       | 33                                |    |                            |                |
| Colorado - s/o Covington | NB                                                                                                                       | 38                                | 30 | Minor Arterial / Collector |                |
|                          | SB                                                                                                                       | 34                                |    |                            |                |
| Mansfield - e/o Birch    | EB                                                                                                                       | 35                                | 30 | Local                      |                |
|                          | WB                                                                                                                       | 35                                |    |                            |                |
| Dahlia - n/o Princeton   | NB                                                                                                                       | 29                                | 25 | Local                      |                |
|                          | SB                                                                                                                       | 28                                |    |                            |                |
| Holly - s/o Stanford     | NB                                                                                                                       | 31                                | 30 | Minor Arterial / Collector |                |
|                          | SB                                                                                                                       | 33                                |    |                            |                |
| Clarkson - n/o Princeton | NB                                                                                                                       | 31                                | 30 | Minor Arterial / Collector |                |
|                          | SB                                                                                                                       | 31                                |    |                            |                |
| Franklin - n/o Belleview | NB                                                                                                                       | 35                                | 25 | Local                      |                |
|                          | SB                                                                                                                       | 33                                |    |                            |                |
|                          | Highlighted cells are locations where the 85 <sup>th</sup> percentile speed exceeds the posted speed by more than 5 mph. |                                   |    |                            |                |

The common practice when defining whether a street has a speeding issue is to consider more than just whether the 85<sup>th</sup> percentile speed exceeds the posted speed limit. Many jurisdictions have established minimum threshold criteria before they will consider measures to implement traffic calming on a street. Common criteria that are applicable to Cherry Hills Village streets could be:

- Road must be classified as a local or residential street. (Note: arterial and collector streets could be considered for traffic calming but not all engineering measures should be applied to these streets.)
- The 85<sup>th</sup> percentile speed must be greater than 5 mph.
- The average daily traffic should exceed 2,500 vehicles per day.
- Roadway design (i.e., sidewalks, curb/gutter, drainage features, etc.)
- Pedestrian usage

Several traffic calming measures are available to control speeds on city streets. **Appendix B** provides a list of applicable measures for Cherry Hills Village. Measures fall into two general categories: non-physical measures such as enforcement and education, and physical or engineered measures.

Based on the street and speed characteristics provided in **Table 1**, and the traffic calming threshold criteria described above, **Table 2** provides an assessment of whether a street has an issue with speeding and/or traffic volumes. Based on the analysis, Colorado Avenue and Franklin Street most likely have an issue with speeding while other streets do not. Both Mansfield Avenue and Dahlia Street seem to have more traffic volume than expected and it is likely due to cut-through traffic.

**Table 2. Traffic and Speed Characteristics of Studied Streets**

| Street and Location      | Local or Residential Street | Exceeds 2500 VPD | 85 <sup>th</sup> Percentile Speed 5 mph over speed limit | Speed or Volume Issue         |
|--------------------------|-----------------------------|------------------|----------------------------------------------------------|-------------------------------|
| Quincy - e/o Meade       | No                          | Yes              | No                                                       | None                          |
| Colorado - s/o Covington | No                          | Yes              | Yes                                                      | Speed for northbound vehicles |
| Mansfield - e/o Birch    | Yes                         | No               | No                                                       | None                          |
| Dahlia - n/o Princeton   | Yes                         | No               | No                                                       | None                          |
| Holly - s/o Stanford     | No                          | Yes              | No                                                       | None                          |
| Clarkson - n/o Princeton | No                          | Yes              | No                                                       | None                          |
| Franklin - n/o Belleview | Yes                         | No               | Yes                                                      | Speed                         |

Based on the evaluation presented in **Table 2**, the following discussion describes preliminary recommendations for next steps and traffic calming measures to implement along impacted streets.

**Colorado Boulevard** – Colorado Boulevard is a minor arterial/collector street, so speed control measures such as speed humps and neighborhood traffic circles should not be used to control speed. If the City desires to mitigate speeding for northbound Colorado Boulevard, the following is recommended.

**Possible Traffic Calming Measures:**

- Speed Monitoring Display northbound north of Mansfield

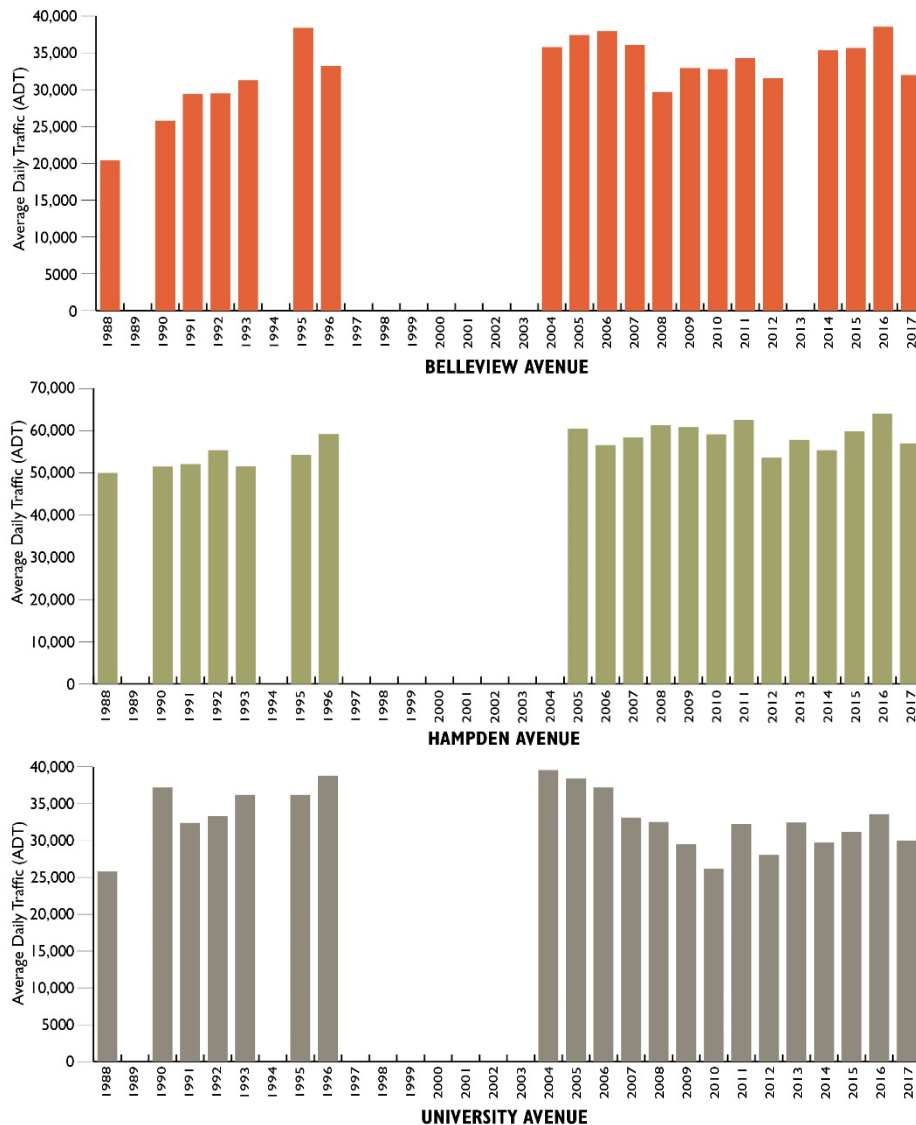
**Franklin Street** – Of the studied streets, Franklin Street likely has a neighborhood street speeding issue. If the City pursues efforts to mitigate speeding on Franklin Street, the following next steps and possible traffic calming measures are recommended:

**Next Steps:**

- Further speed studies north of Cherry Vale Drive to understand the extent of the speeding issues.
- Possible meetings with residents and City Council to develop a traffic calming plan.

**Possible Traffic Calming Measures:**

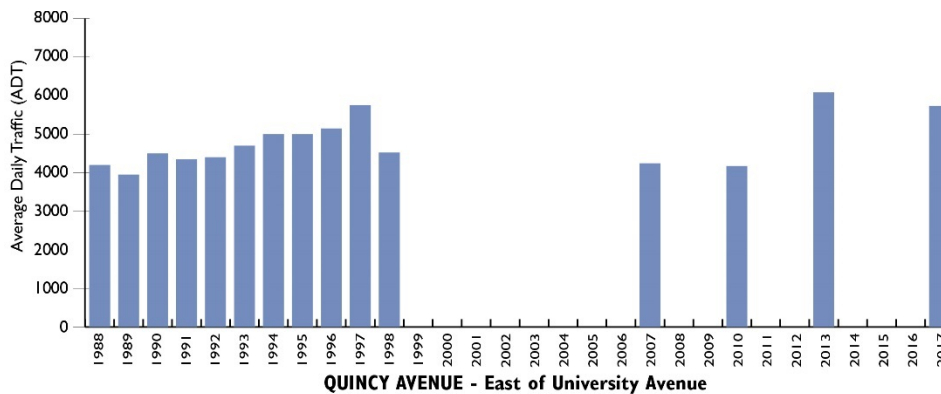
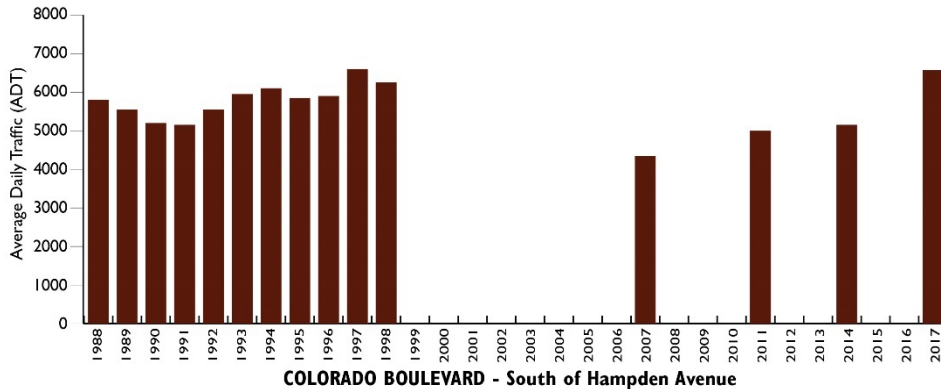
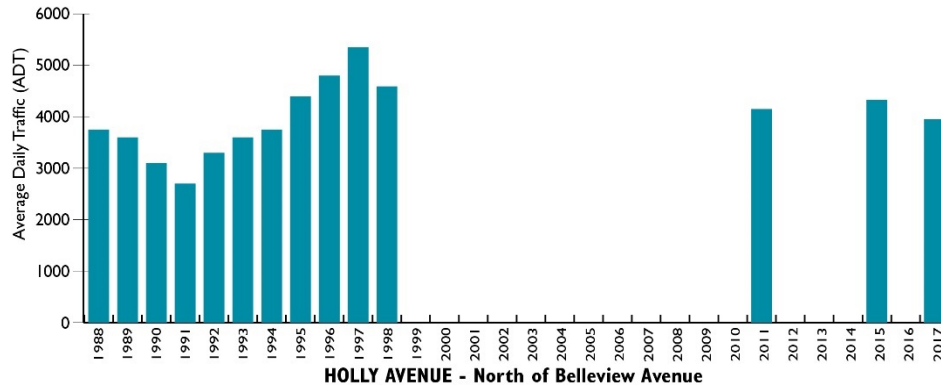
- Speed monitor displays at key mid-block locations depending on speed study findings
- Speed humps at key mid-block locations depending on speed study findings and work with Fire Department
- Neighborhood traffic circle at Layton Drive
- Neighborhood traffic circle at Tufts Avenue

**B. Historic Traffic Volumes**

As part of the study effort, traffic counts were collected along roadways both adjacent to and within the City. These roadway counts are shown on **Figure 2**. The charts on this page plus the charts on the next page compare these counts to past traffic counts.

The three charts on this page are historic data for the roadways adjacent to the City. As shown, recent counts on Bellevue and Hampden are lower than historic counts and the trend over the past 10 to 15 years is little to no growth in overall traffic along these roadways. Along University Boulevard, traffic counts over the last 10 years are 5,000 to 10,000 vehicles lower per day than counts in the 1990s

and early 2000s. University Boulevard parallels I-25 and one possible explanation for this change in University Boulevard traffic is the widening of I-25 and the light rail line. The main conclusion from these data is that it appears traffic on the streets adjacent to the City has not increased and in fact appears to be slightly lower than historic traffic volume levels.



The charts to the left show historic traffic volumes on streets within the boundaries of Cherry Hills Village. Historic data in the 1990s were available as the City regularly counted traffic on its local streets. Data in recent years were sparser and was available through other non-city sources such as DRCOG and CDOT. For each street presented here, there was a general trend of growing traffic through the 1990s. When count data were next available in 2007 and 2010, the overall traffic volumes on these city streets was about equal to or even lower than historic counts in the 1990s. More recent counts in 2014 and 2017 are higher than other counts in the 2000s but do not exceed the highest

counts in the 1990s. The general conclusion from these observations is that since the 1990s it appears that traffic volumes on the major city streets are about at historic levels.

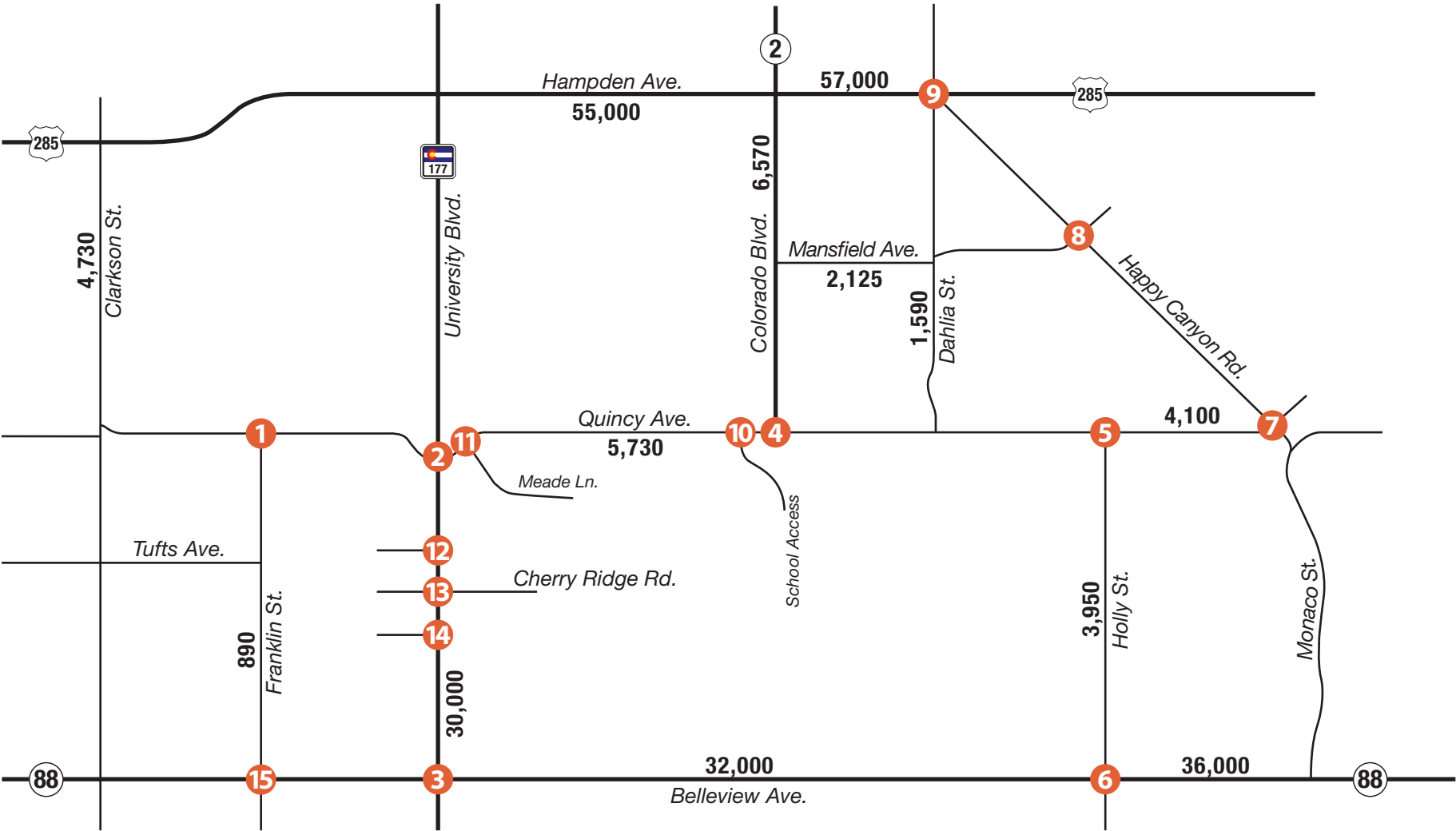


### C. Traffic Volumes

**Figure 2** provides the existing peak hour traffic volumes at intersections in the study area, as well as daily traffic volumes on the roadways. **Appendix A** provides traffic count data. As expected, the state highways bordering and running through Cherry Hills Village carry the most traffic with more than 50,000 vehicles per day (VPD) on Hampden Avenue and more than 30,000 VPD on University Boulevard and Belleview Avenue. On Cherry Hills Village streets, the major streets (such as Clarkson Street, Colorado Boulevard, Quincy Avenue, and Holly Street) carry significantly less traffic, between 4,000 and 6,500 VPD. On a few of the more minor streets, daily traffic volumes are even lower. For example, Franklin Street has a daily traffic volume of about 900 VPD, Dahlia Street north of Quincy Avenue has a daily traffic count of 1,600 vehicles, and Mansfield Avenue east of Colorado Boulevard has a daily count of 2,100 vehicles. Based on these daily traffic counts, the following conclusions can be made.

- Roadways such as Hampden Avenue, Belleview Avenue, and University Boulevard are part of the state highway system and, given their regional connectivity, have expressway and principal arterial functional classifications. As expected for these higher functional classifications, these roadways carry the highest levels of daily traffic through the Cherry Hills Village area.
- Roadways such as Colorado Boulevard, Holly Street, Quincy Avenue, and Clarkson Street, which provide connections between residential areas within Cherry Hills Village and provide connections to surrounding communities, have minor arterial and collector functional classifications. From a transportation planning perspective, minor arterials and collectors are intended to carry between 1,500 and 10,000 VPD. Existing counts on Colorado Boulevard, Quincy Avenue, Holly Street, and Clarkson Street are within the intended range of traffic volumes for minor arterials and collectors; suggesting that these roadways should continue to operate as two-lane roadways.
- Franklin Street, Mansfield Avenue, and Dahlia Street, given their lack of connectivity with the surrounding communities and the density of adjacent residential uses, could best be classified as local or residential streets. For streets such as these, the intended daily traffic volume is less than 2,500 VPD.

Key Map



**LEGEND**

XXX(XXX) = AM(PM) Peak Hour Traffic Volumes

XXXX = Daily Traffic Volumes



Figure 2  
Traffic Volumes

Figures 3 through 5 show diurnal 24-hour traffic volumes by 15-minute period for Quincy Avenue, Colorado Boulevard, and Mansfield Avenue, respectively. Diurnal patterns for other streets are available in **Appendix A**. The traffic volume pattern for Quincy Avenue shown on **Figure 3** represents a typical 24-hour pattern for an **urban** street. As shown, there are two peaks in the traffic volumes that represent the morning and evening commutes. Traffic volumes are typically higher in one direction than the other direction in the morning commute and this pattern is reversed in the evening commute. Also, during the off-peak times between the morning and evening commutes, traffic volumes are typically equal in both directions.

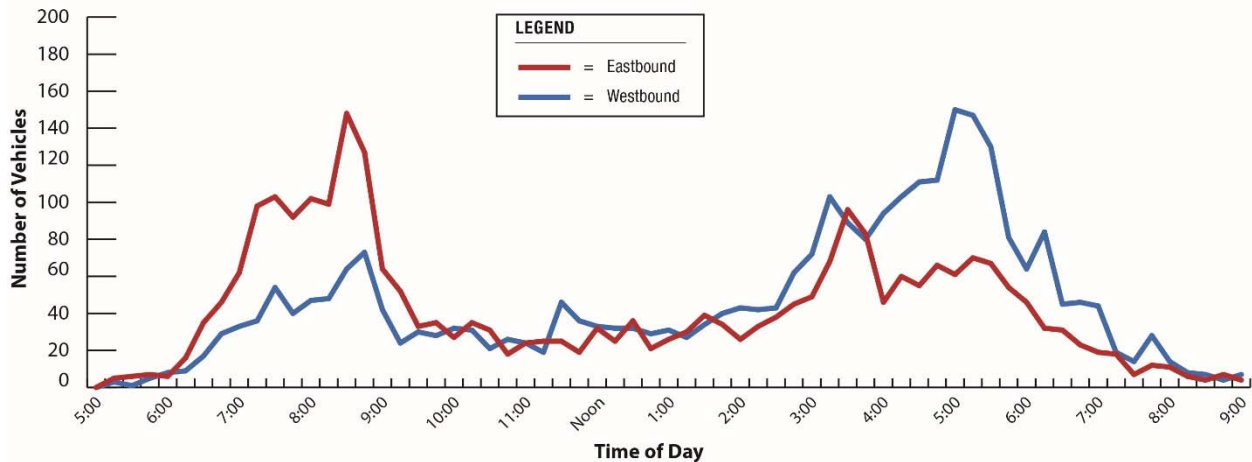


Figure 3. Quincy Avenue (typical) 24-hour Traffic Patterns

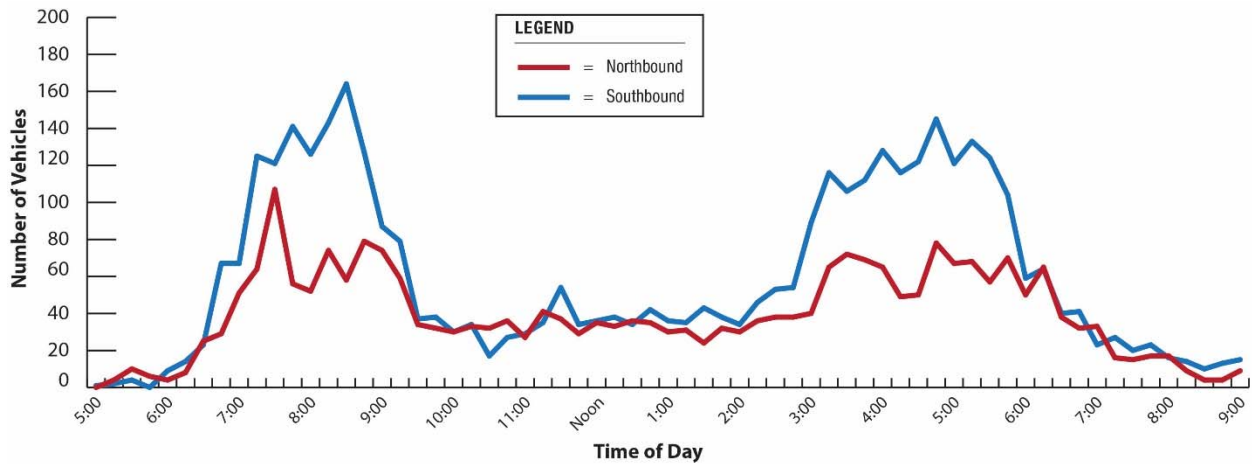
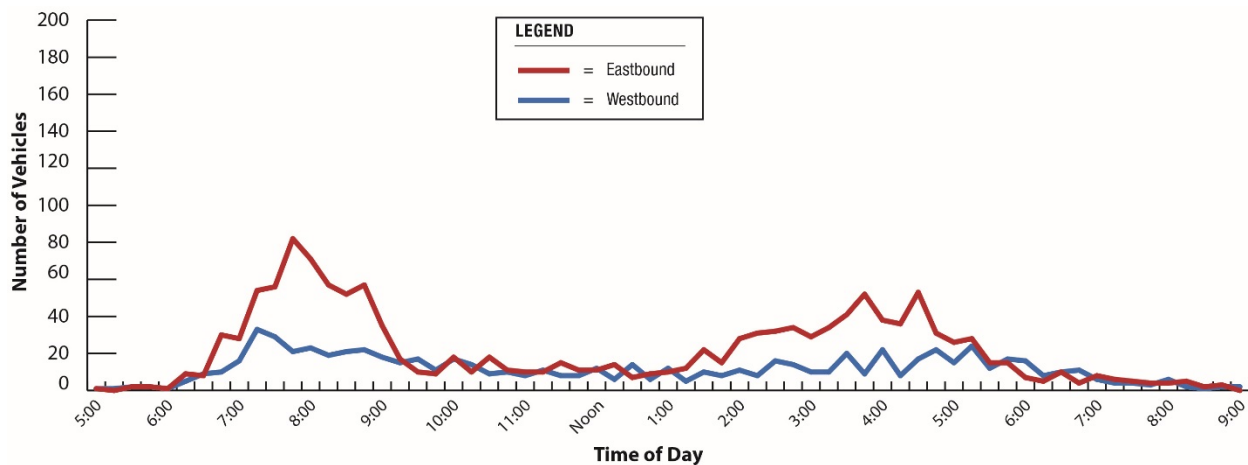


Figure 4. Colorado Boulevard 24-hour Traffic Patterns



**Figure 5. Mansfield Avenue 24-hour Traffic Patterns**

As mentioned, the 24-hour traffic volumes for Quincy Avenue follow patterns expected for an urban street. Franklin, Holly, Clarkson, and Dahlia streets all have similar traffic patterns to those observed on Quincy Avenue. However, traffic counts on Colorado Boulevard and Mansfield Avenue show that traffic volumes do not conform to typical travel patterns for urban streets. Note that both streets show peak traffic volumes during the morning and evening commutes but these volumes generally only peak in one direction of travel. For example, traffic volumes peak only in the southbound direction for Colorado Boulevard and only in the eastbound direction on Mansfield Avenue.

Daily traffic volumes and the 24-hour traffic patterns discussed in this section lead to the following conclusions:

- Daily traffic patterns along Cherry Hills Village streets generally follow patterns expected for urban roadways, except along Colorado Boulevard and Mansfield Avenue.
- The atypical travel patterns seen in the Colorado Boulevard and Mansfield Avenue counts suggest that drivers may be avoiding congestion on Hampden Avenue by traveling south on Colorado Boulevard and then traveling east on Mansfield Avenue.
- The atypical travel pattern on Mansfield Avenue has not created a speeding issue nor a volume issue. Therefore, there are no recommendations for this street at this time.
- The previously recommended traffic calming measure for northbound Colorado Boulevard could have a slight impact on traffic patterns and volume. There are no further recommendations at this time.

#### **D. Accidents Statistics**

**Appendix C** provides accident maps for 2015 through July 2017 prepared by the Cherry Hills Village police department. As expected, most accidents were along the major arterials bordering the City. **Table 3** shows that of the 677 accidents reported, only about 104 (15 percent) were reported on a city street. The other 573 accidents (85 percent) were reported on a state highway.

Accidents on City streets were mostly at Quincy Avenue intersections. These accidents tended to cluster at the Quincy intersections with Colorado Boulevard and Dahlia Street.

**Table 3.      Reported Accidents (2015 – July 2017)**

| Location                     | Number     |
|------------------------------|------------|
| Accidents within City Limits | 104        |
| Accidents on State Highways  | 573        |
| <b>Total Accidents</b>       | <b>677</b> |

## II. INTERSECTION TRAFFIC OPERATIONS

### A. Levels of Service

Peak hour volumes and traffic flows were used to evaluate traffic operations at intersections where peak traffic counts were recorded. Traffic operations were evaluated per techniques documented in the Highway Capacity Manual (HCM) 2010 (Transportation Research Board, 2010) using the existing traffic volumes and intersection geometry. The evaluation techniques of the HCM result in a Level of Service (LOS), which is a qualitative measure of traffic operational conditions based on roadway capacity and vehicle delay. LOS is described by a letter designation ranging from A to F, with LOS A representing almost free-flow travel, while LOS F represents congested conditions. Typically, in urban areas LOS D is considered an acceptable level of traffic operations.

**Figure 6** and **Table 3** show the LOS of each approach and of each intersection studied in this effort. **Appendix D** provides detailed level of service worksheets.

Highlighted cells in **Table 3** indicate turn movements operating at a poor LOS during either the AM or the PM peak hour. Blank cells are movements that do not exist at the intersection or they are turn movements that operate under a free condition (e.g., main street through movements that do not stop at stop-controlled intersections).

**Table 3** shows that most intersections have at least one movement with a LOS E or F. The major findings and conclusions of this analysis are as follows:

- The AM peak for the University Boulevard/Bellevue Avenue intersection is from 7:00 to 8:00 AM and the PM peak is from 4:45 to 5:45 PM. As expected, the traffic signals on University Boulevard, Bellevue Avenue, and Hampden Avenue have many turn movements operating at LOS E or F during the peak hours. At the University Boulevard/Bellevue Avenue (#3) and the Hampden Avenue/Happy Canyon Road (#9) intersections, most turn movements are LOS E or F, suggesting that volumes entering the intersections likely exceed the intersection's capacity.
- As expected, at stop-controlled intersections along University Boulevard and Bellevue Avenue, vehicles turning from the stop-controlled approaches operate at LOS F.
- The AM peak for the Quincy Avenue/Colorado Boulevard intersection is from 7:15 to 8:15 AM and the PM peak is from 4:30 to 5:30 PM. For the Quincy Avenue/Colorado Boulevard intersection, the AM peak is from 8:00 to 9:00 AM and the PM peak is from 4:45 to 5:45 PM. Unexpected results include the LOS E and F conditions at the Quincy Avenue/Colorado Boulevard (#4) intersection and the LOS F conditions for the eastbound right-turn movement at the Quincy Avenue/Happy Canyon Road intersection (#7).

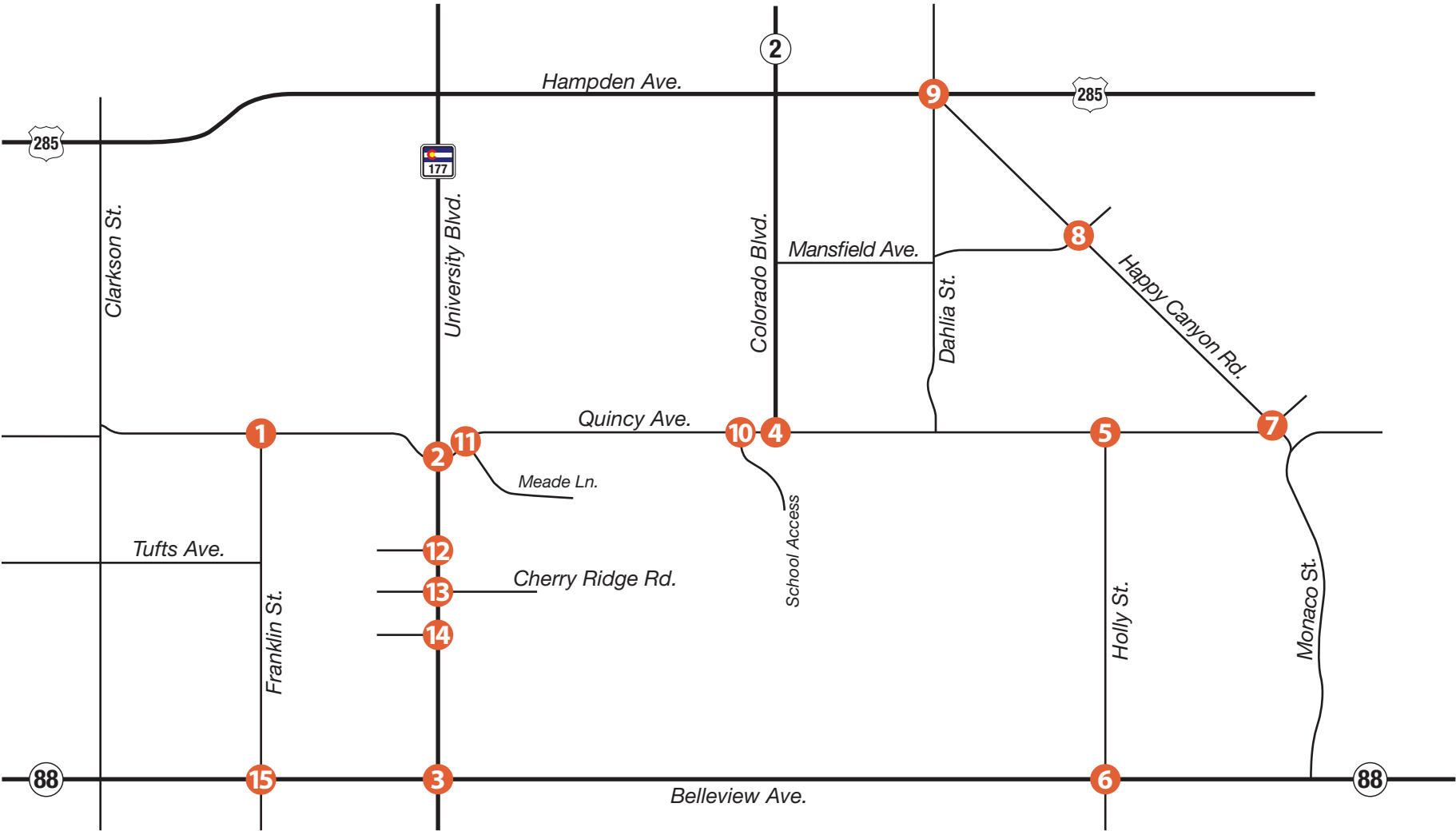
Table 3. Intersection Level of Service During Peak Hour

| Location                    | Intersection # & Traffic Control |    | EB |   |    | WB |   |    | NB |   |    | SB |   |    | NWB |   |    |
|-----------------------------|----------------------------------|----|----|---|----|----|---|----|----|---|----|----|---|----|-----|---|----|
|                             |                                  |    | LT | T | RT | LT | T | RT | LT | T | RT | LT | T | RT | LT  | T | RT |
| Quincy/Franklin             | 1 AWSC                           | AM | a  |   |    | a  |   |    | a  |   |    |    |   |    |     |   |    |
|                             |                                  | PM | a  |   |    | b  |   |    | a  |   |    |    |   |    |     |   |    |
| University/Quincy           | 2 Signal                         | AM | e  | d |    | e  | d |    | a  | b | b  | b  | b | a  |     |   |    |
|                             |                                  | PM | e  | c |    | d  | e |    | c  | c | c  | c  | c | b  |     |   |    |
| University/Bellevue         | 3 Signal                         | AM | e  | f | c  | f  | c | c  | e  | f | a  | f  | d | a  |     |   |    |
|                             |                                  | PM | f  | d | e  | e  | f | c  | f  | d | a  | f  | f | a  |     |   |    |
| Quincy/Colorado             | 4 AWSC                           | AM | f  |   |    | d  |   |    |    |   |    | c  |   | c  |     |   |    |
|                             |                                  | PM | c  |   |    | e  |   |    |    |   |    | c  |   | b  |     |   |    |
| Quincy/Holly                | 5 AWSC                           | AM | d  |   |    | b  |   |    | c  |   |    |    |   |    |     |   |    |
|                             |                                  | PM | c  |   |    | c  |   |    | c  |   |    |    |   |    |     |   |    |
| Bellevue/Holly              | 6 Signal                         | AM | c  | d | b  | c  | b | b  | e  | d |    | e  | d |    |     |   |    |
|                             |                                  | PM | c  | c | b  | d  | d | b  | e  | d |    | e  | d |    |     |   |    |
| Happy Canyon/Quincy         | 7 TWSC                           | AM | f  | e |    | f  | c |    | a  |   |    | b  |   |    |     |   |    |
|                             |                                  | PM | f  | c |    | f  | b |    | a  |   |    | a  |   |    |     |   |    |
| Happy Canyon/Mansfield      | 8 AWSC                           | AM | c  |   |    | c  |   |    | e  |   |    | f  |   |    |     |   |    |
|                             |                                  | PM | b  |   |    | b  |   |    | e  |   |    | b  |   |    |     |   |    |
| Hampden/Happy Canyon/Dahlia | 9 Signal                         | AM | b  | d | b  | c  | c |    | d  |   |    | e  | d |    | e   | e |    |
|                             |                                  | PM | b  | d | b  | c  | c |    | d  |   |    | d  | d |    | e   | e |    |
| Quincy/Kent Access          | 10 TWSC                          | AM |    |   |    | a  |   |    | c  |   | b  |    |   |    |     |   |    |
|                             |                                  | PM |    |   |    | a  |   |    | e  |   | b  |    |   |    |     |   |    |

| Location                                                                                                                                                                                                                                                                | Intersection # & Traffic Control                                                                                   |    | EB                                                                                                                                                                                                 |   |    | WB |   |    | NB                                                                                                                                                                                                                                                                    |   |    | SB |   |    | NWB |   |    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|----|----|---|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|----|----|---|----|-----|---|----|
|                                                                                                                                                                                                                                                                         |                                                                                                                    |    | LT                                                                                                                                                                                                 | T | RT | LT | T | RT | LT                                                                                                                                                                                                                                                                    | T | RT | LT | T | RT | LT  | T | RT |
| Quincy/Meade                                                                                                                                                                                                                                                            | 11 TWSC                                                                                                            | AM | a                                                                                                                                                                                                  |   |    | a  |   |    | b                                                                                                                                                                                                                                                                     |   |    | b  |   |    |     |   |    |
|                                                                                                                                                                                                                                                                         |                                                                                                                    | PM | a                                                                                                                                                                                                  |   |    | a  |   |    | b                                                                                                                                                                                                                                                                     |   |    | b  |   |    |     |   |    |
| University/N. St. Mary's                                                                                                                                                                                                                                                | 12 TWSC                                                                                                            | AM | f                                                                                                                                                                                                  |   | c  |    |   |    |                                                                                                                                                                                                                                                                       |   |    |    |   |    |     |   |    |
|                                                                                                                                                                                                                                                                         |                                                                                                                    | PM | f                                                                                                                                                                                                  |   | d  |    |   |    |                                                                                                                                                                                                                                                                       |   |    |    |   |    |     |   |    |
| University/Cherry Ridge                                                                                                                                                                                                                                                 | 13 TWSC                                                                                                            | AM |                                                                                                                                                                                                    |   |    | f  |   |    | b                                                                                                                                                                                                                                                                     |   |    | b  |   |    |     |   |    |
|                                                                                                                                                                                                                                                                         |                                                                                                                    | PM |                                                                                                                                                                                                    |   |    | f  |   |    | b                                                                                                                                                                                                                                                                     |   |    | c  |   |    |     |   |    |
| University/S. St. Mary's                                                                                                                                                                                                                                                | 14 None                                                                                                            | AM |                                                                                                                                                                                                    |   |    |    |   |    | b                                                                                                                                                                                                                                                                     |   |    |    |   |    |     |   |    |
|                                                                                                                                                                                                                                                                         |                                                                                                                    | PM |                                                                                                                                                                                                    |   |    |    |   |    | c                                                                                                                                                                                                                                                                     |   |    |    |   |    |     |   |    |
| Bellevue/Franklin                                                                                                                                                                                                                                                       | 15 TWSC                                                                                                            | AM | b                                                                                                                                                                                                  |   |    | c  |   |    | f                                                                                                                                                                                                                                                                     |   |    | f  |   |    |     |   |    |
|                                                                                                                                                                                                                                                                         |                                                                                                                    | PM | c                                                                                                                                                                                                  |   |    | b  |   |    | f                                                                                                                                                                                                                                                                     |   |    | f  |   |    |     |   |    |
| Signal = Traffic signal control<br>AWSC = All way stop control<br>TWSC = Two way stop control<br>LT = Left turn<br>T = Thru<br>RT = Right Turn                                                                                                                          |                                                                                                                    |    | 1 – Quincy/Franklin<br>2 – University/Quincy<br>3 – University/Bellevue<br>4 – Quincy/Colorado<br>5 – Quincy/Holly<br>6 – Bellevue/Holly<br>7 – Happy Canyon/Quincy<br>8 – Happy Canyon/ Mansfield |   |    |    |   |    | 9 – Hampden/Happy Canyon<br>10 – Quincy/Kent access<br>11 – Quincy/Meade<br>12 – University/N. St. Mary's<br>13 – University/Cherry Ridge<br>14 – University/S. St. Mary's<br>15 – Bellevue/Franklin                                                                  |   |    |    |   |    |     |   |    |
| Level of Service Delay Thresholds for Stop Signs<br>LOS A            0 – 10 sec/veh<br>LOS B            >10 – 15 sec/veh<br>LOS C            >15 – 25 sec/veh<br>LOS D            >25 – 35 sec/veh<br>LOS E            >35 – 50 sec/veh<br>LOS F            >50 sec/veh |                                                                                                                    |    |                                                                                                                                                                                                    |   |    |    |   |    | Level of Service Delay Threshold for Signals<br>LOS A            ≤ 10 sec/veh<br>LOS B            > 10 – 20 sec/veh<br>LOS C            > 20- 35 sec/veh<br>LOS D            > 35 – 55 sec/veh<br>LOS E            > 55 – 80 sec/veh<br>LOS F            > 80 veh/sec |   |    |    |   |    |     |   |    |
|                                                                                                                                                                                                                                                                         | Indicates an intersection on a CDOT state highway and if signalized, then the traffic signal is maintained by CDOT |    |                                                                                                                                                                                                    |   |    |    |   |    |                                                                                                                                                                                                                                                                       |   |    |    |   |    |     |   |    |
|                                                                                                                                                                                                                                                                         | Indicates that the approach to the intersection is outside of City boundaries                                      |    |                                                                                                                                                                                                    |   |    |    |   |    |                                                                                                                                                                                                                                                                       |   |    |    |   |    |     |   |    |



# Key Map



**LEGEND**

XXX(XXX)

= AM(PM) Peak Hour Traffic Volumes

X/X

= AM/PM Peak Hour Signalized Intersection Level of Service

x/x

= AM/PM Peak Hour Unsignalized Intersection Level of Service

STOP

= Stop Sign

= Traffic Signal

Figure 6  
Levels of Service

Cherry Hills Village Transportation Study

15-214

12.07.2017

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**B. Volume/Capacity Ratios**

As discussed in the previous section, LOS is one way to measure the quality of operations at an intersection. LOS is a measure of delay at an intersection; however, a poor LOS does not necessarily indicate that a turn movement at an intersection is an issue. For example, a stop-controlled approach to a high-volume roadway most likely will experience poor LOS, but the volume to capacity ratio is less than 1.0 because only a few vehicles experience this high delay. Therefore, increasing the capacity to reduce delay is not a prudent action because capacity is not an issue. On the other hand, for an intersection or a turn movement with a poor LOS and a high volume-to-capacity ratio, typically it is prudent to explore options to increase capacity and reduce delay.

**Table 4** shows the volume-to-capacity for turn movements at intersections. The table clearly shows that most turn movements at study intersections are below capacity. Not surprisingly, near capacity and over-capacity issues are at the intersections of University Boulevard and Belleview Avenue (intersection #3) and Hampden Avenue and Happy Canyon Road. Other turn movements near or over capacity occur at the intersections of Belleview Avenue / Holly Street (#6), Happy Canyon Road / Quincy Avenue (#7), and the stop approaches at the Belleview Avenue / Franklin Street (#15) intersection.

**C. Operational Analysis Summary**

Based on the operational analysis and the volume-capacity ratios, the following summarizes the key points and conclusions:

**Intersections under the control of other jurisdictions**

Intersection approaches along University Boulevard, Belleview Avenue, and Hampden Avenue, especially approaches to these facilities, have turn movements operating at LOS E or F and/or experience over-capacity conditions during peak hours. The intersection approaches that experience these conditions and fall within the jurisdictional control of the City are as follows:

*Signalized Intersections:*

- University / Belleview – southbound and westbound approaches
- University / Quincy – eastbound and westbound approaches
- Belleview / Holly – southbound approach
- Hampden / Happy Canyon – northbound approach

There are several constraints associated with improving operations on these approaches. Improvements would require coordination with other jurisdictions such as CDOT and/or the City of Denver. Improvements needed could require widening of existing roadways that could impact right-of-way and would be beyond the fiscal capabilities of the City. Signal timing changes to improve operations on these approaches are difficult because it would impact operations on approaches controlled by other jurisdictions.

*Stop-Controlled Intersections:*

- University / N. Saint Mary's access – eastbound approach
- University / Cherry Ridge – westbound approach
- Belleview / Franklin – southbound approach

Realistically, improving operations on these approaches would require signalization. However, traffic counts indicate that volumes are not sufficient to meet warrants for signalization at these intersections.

**Intersections mostly under the control of the City**

Of the intersections under the control of the City, traffic operations are generally LOS D or better for intersection approaches. Intersection approaches that are within city limits and experience LOS E or F conditions during the peak hours are as follows:

- Quincy / Colorado – eastbound and westbound approaches
- Happy Canyon / Mansfield – southbound approach
- Quincy / Kent Access – northbound approach

The Quincy / Colorado and Happy Canyon / Mansfield intersections have all-way stop control. The approaches at these intersections do not exceed capacity; therefore, improvements such as additional lanes or a change in traffic control at these intersections are not recommended. If future operational improvements are desired, then consideration should be given to a roundabout or a traffic signal at these intersections.

The Kent access operations are related to school traffic. Since the volume-to-capacity ratio is low and uniformed traffic control is currently provided during school hours, then changes in traffic control or intersection lanes are currently not recommended.

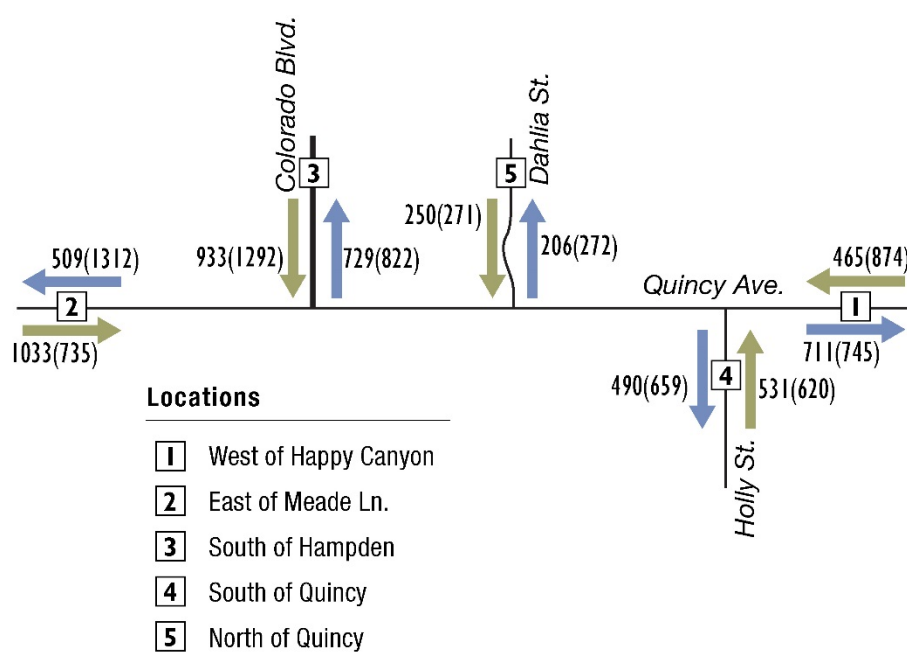
Table 4. Intersection Volume/Capacity

| Location                    | Intersection # & Traffic Control | EB |   |    | WB |   |    | NB |   |    | SB |   |    | NWB |   |    |
|-----------------------------|----------------------------------|----|---|----|----|---|----|----|---|----|----|---|----|-----|---|----|
|                             |                                  | LT | T | RT | LT | T | RT | LT | T | RT | LT | T | RT | LT  | T | RT |
| Quincy/Franklin             | 1 AWSC                           | AM |   |    |    |   |    |    |   |    |    |   |    |     |   |    |
|                             |                                  | PM |   |    |    |   |    |    |   |    |    |   |    |     |   |    |
| University/Quincy           | 2 Signal                         | AM |   |    |    |   |    |    |   |    |    |   |    |     |   |    |
|                             |                                  | PM |   |    |    |   |    |    |   |    |    |   |    |     |   |    |
| University/Bellevue         | 3 Signal                         | AM |   |    |    |   |    |    |   |    |    |   |    |     |   |    |
|                             |                                  | PM |   |    |    |   |    |    |   |    |    |   |    |     |   |    |
| Quincy/Colorado             | 4 AWSC                           | AM |   |    |    |   |    |    |   |    |    |   |    |     |   |    |
|                             |                                  | PM |   |    |    |   |    |    |   |    |    |   |    |     |   |    |
| Quincy/Holly                | 5 AWSC                           | AM |   |    |    |   |    |    |   |    |    |   |    |     |   |    |
|                             |                                  | PM |   |    |    |   |    |    |   |    |    |   |    |     |   |    |
| Bellevue/Holly              | 6 Signal                         | AM |   |    |    |   |    |    |   |    |    |   |    |     |   |    |
|                             |                                  | PM |   |    |    |   |    |    |   |    |    |   |    |     |   |    |
| Happy Canyon/Quincy         | 7 TWSC                           | AM |   |    |    |   |    |    |   |    |    |   |    |     |   |    |
|                             |                                  | PM |   |    |    |   |    |    |   |    |    |   |    |     |   |    |
| Happy Canyon/Mansfield      | 8 AWSC                           | AM |   |    |    |   |    |    |   |    |    |   |    |     |   |    |
|                             |                                  | PM |   |    |    |   |    |    |   |    |    |   |    |     |   |    |
| Hampden/Happy Canyon/Dahlia | 9 Signal                         | AM |   |    |    |   |    |    |   |    |    |   |    |     |   |    |
|                             |                                  | PM |   |    |    |   |    |    |   |    |    |   |    |     |   |    |
| Quincy/Kent Access          | 10 TWSC                          | AM |   |    |    |   |    |    |   |    |    |   |    |     |   |    |
|                             |                                  | PM |   |    |    |   |    |    |   |    |    |   |    |     |   |    |
| Quincy/Meade                | 11 TWSC                          | AM |   |    |    |   |    |    |   |    |    |   |    |     |   |    |
|                             |                                  | PM |   |    |    |   |    |    |   |    |    |   |    |     |   |    |

| Location                                                                                      | Intersection # &<br>Traffic Control                                                                                |    | EB |   |                                                                                                                                                                                                   | WB |   |    | NB |                                                                                                                                                                                                      |    | SB |   |    | NWB |   |    |
|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|----|----|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---|----|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|---|----|-----|---|----|
|                                                                                               |                                                                                                                    |    | LT | T | RT                                                                                                                                                                                                | LT | T | RT | LT | T                                                                                                                                                                                                    | RT | LT | T | RT | LT  | T | RT |
| University/N. St. Mary's                                                                      | 12 TWSC                                                                                                            | AM |    |   |                                                                                                                                                                                                   |    |   |    |    |                                                                                                                                                                                                      |    |    |   |    |     |   |    |
|                                                                                               |                                                                                                                    | PM |    |   |                                                                                                                                                                                                   |    |   |    |    |                                                                                                                                                                                                      |    |    |   |    |     |   |    |
| University/Cherry Ridge                                                                       | 13 TWSC                                                                                                            | AM |    |   |                                                                                                                                                                                                   |    |   |    |    |                                                                                                                                                                                                      |    |    |   |    |     |   |    |
|                                                                                               |                                                                                                                    | PM |    |   |                                                                                                                                                                                                   |    |   |    |    |                                                                                                                                                                                                      |    |    |   |    |     |   |    |
| University/S. St. Mary's                                                                      | 14 None                                                                                                            | AM |    |   |                                                                                                                                                                                                   |    |   |    |    |                                                                                                                                                                                                      |    |    |   |    |     |   |    |
|                                                                                               |                                                                                                                    | PM |    |   |                                                                                                                                                                                                   |    |   |    |    |                                                                                                                                                                                                      |    |    |   |    |     |   |    |
| Bellevue/Franklin                                                                             | 15 TWSC                                                                                                            | AM |    |   |                                                                                                                                                                                                   |    |   |    |    |                                                                                                                                                                                                      |    |    |   |    |     |   |    |
|                                                                                               |                                                                                                                    | PM |    |   |                                                                                                                                                                                                   |    |   |    |    |                                                                                                                                                                                                      |    |    |   |    |     |   |    |
| Signal = Traffic signal control<br>AWSC = All way stop control<br>TWSC = Two way stop control |                                                                                                                    |    |    |   | 1 – Quincy/Franklin<br>2 – University/Quincy<br>3 – University/Bellevue<br>4 – Quincy/Colorado<br>5 – Quincy/Holly<br>6 – Bellevue/Holly<br>7 – Happy Canyon/Quincy<br>8 – Happy Canyon/Mansfield |    |   |    |    | 9 – Hampden/Happy Canyon<br>10 – Quincy/Kent access<br>11 – Quincy/Meade<br>12 – University/N. St. Mary's<br>13 – University/Cherry Ridge<br>14 – University/S. St. Mary's<br>15 – Bellevue/Franklin |    |    |   |    |     |   |    |
| Over Capacity - V/C >= 1.00                                                                   |                                                                                                                    |    |    |   |                                                                                                                                                                                                   |    |   |    |    |                                                                                                                                                                                                      |    |    |   |    |     |   |    |
| At Capacity - V/C >= 0.95                                                                     |                                                                                                                    |    |    |   |                                                                                                                                                                                                   |    |   |    |    |                                                                                                                                                                                                      |    |    |   |    |     |   |    |
| Near Capacity - V/C >= 0.85                                                                   |                                                                                                                    |    |    |   |                                                                                                                                                                                                   |    |   |    |    |                                                                                                                                                                                                      |    |    |   |    |     |   |    |
| Below Capacity – V/C < 0.85                                                                   |                                                                                                                    |    |    |   |                                                                                                                                                                                                   |    |   |    |    |                                                                                                                                                                                                      |    |    |   |    |     |   |    |
|                                                                                               | Indicates an intersection on a CDOT state highway and if signalized, then the traffic signal is maintained by CDOT |    |    |   |                                                                                                                                                                                                   |    |   |    |    |                                                                                                                                                                                                      |    |    |   |    |     |   |    |
|                                                                                               | Indicates that the approach to the intersection is outside of City boundaries                                      |    |    |   |                                                                                                                                                                                                   |    |   |    |    |                                                                                                                                                                                                      |    |    |   |    |     |   |    |

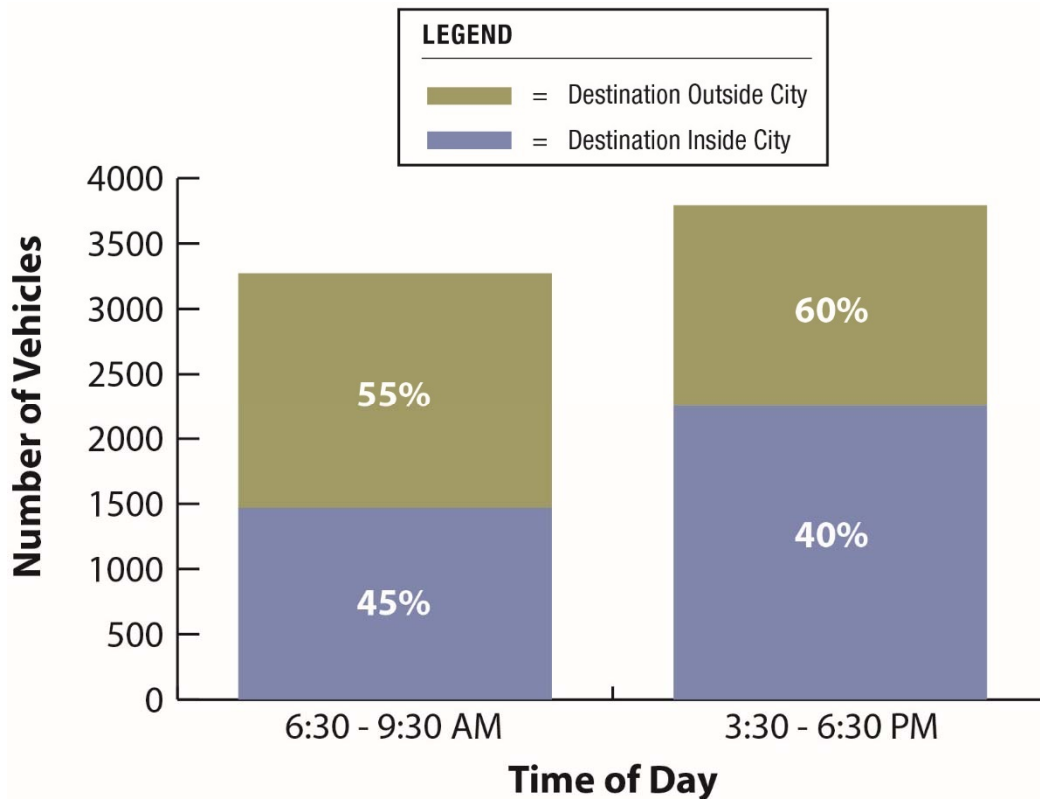
### III. ORIGIN / DESTINATION PATTERNS

Another aspect of the existing conditions analysis was an attempt to study travel patterns of drivers using Cherry Hills Village streets. This effort included setting up license plate recognition cameras at five strategic locations within Cherry Hills Village to track vehicles as they entered and exited the City. **Figure 7** generally shows camera locations and the volumes recorded in and out at those locations during the morning (6:30 to 9:30) period and the evening (3:30 to 6:30) period. For the purposes of this evaluation, the green arrows represent the volumes entering the City and the blue arrows represent the volumes leaving the City, and camera locations will be referred to as gates. For example, Gate 1 represents the camera location on Quincy Avenue just west of Happy Canyon Road. The exact locations of the other gates are listed on **Figure 7**.



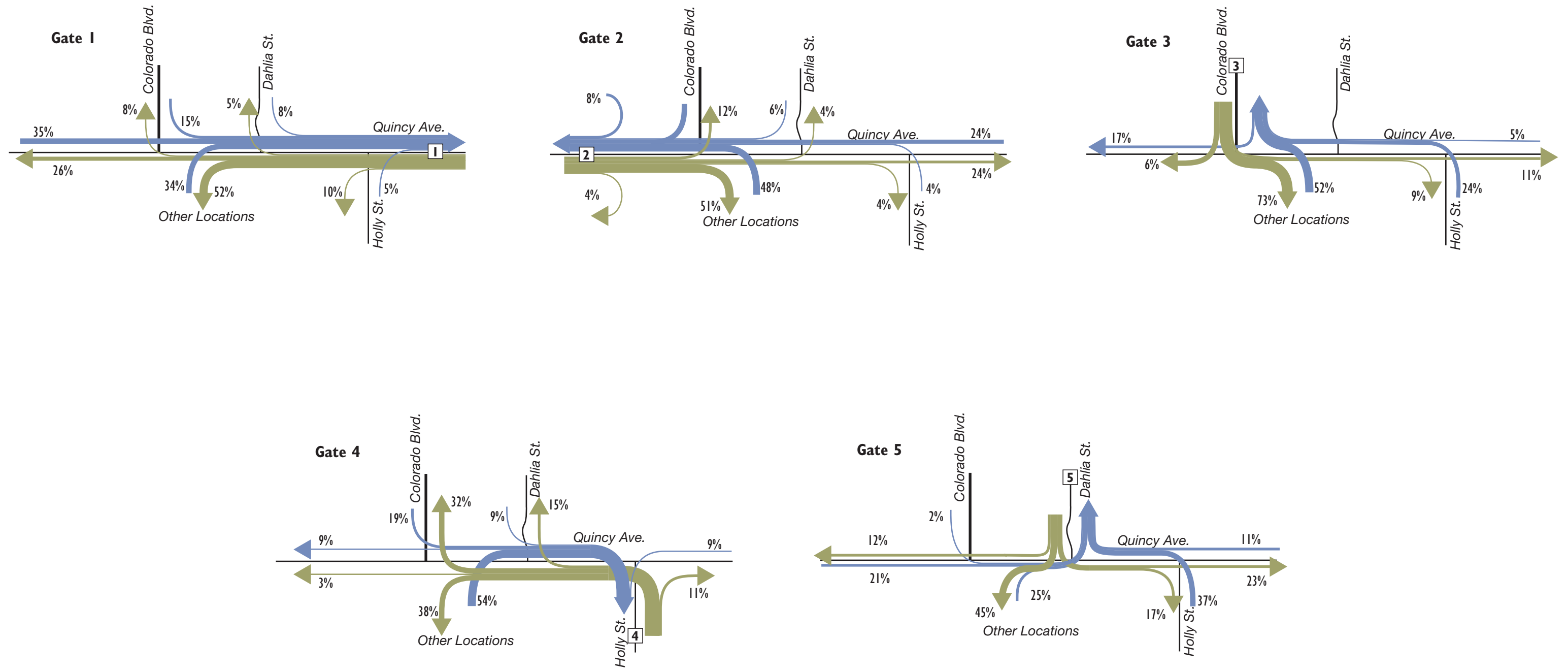
**Figure 7. AM (6:30 to 9:30) and PM (3:30 to 6:30) Period Volumes at License Plate Survey Gates**

**Figure 8** shows the destination of vehicles entering the City by period. As shown, during the morning period 55 percent of the vehicles entering the City have a destination within the City. While during the afternoon period, only 40 percent of vehicles entering the City have a destination within the City. These data suggest that during the peak periods of travel on a weekday, anywhere from 45 to 60 percent of vehicles entering the City are only passing through the City.



**Figure 8. Destinations of Inbound Vehicles**

The origin destination data can be further broken down by gate. **Figures 9 and 10** provide a graphic representation of the morning and afternoon travel patterns, respectively. The graphics display all O-D pairs and percentages at each gate. For example, on **Figure 9** at Gate 1, which was at the east end of Quincy Avenue, the O-D study shows that in the westbound direction 26 percent of vehicles passed Gate 2 at the west end of Quincy Avenue. Also on **Figure 9** at Gate 3, 73 percent of southbound vehicles on Colorado Avenue in the AM peak were not recorded at another gate and, therefore, were assumed to end their trip at a location within the City.



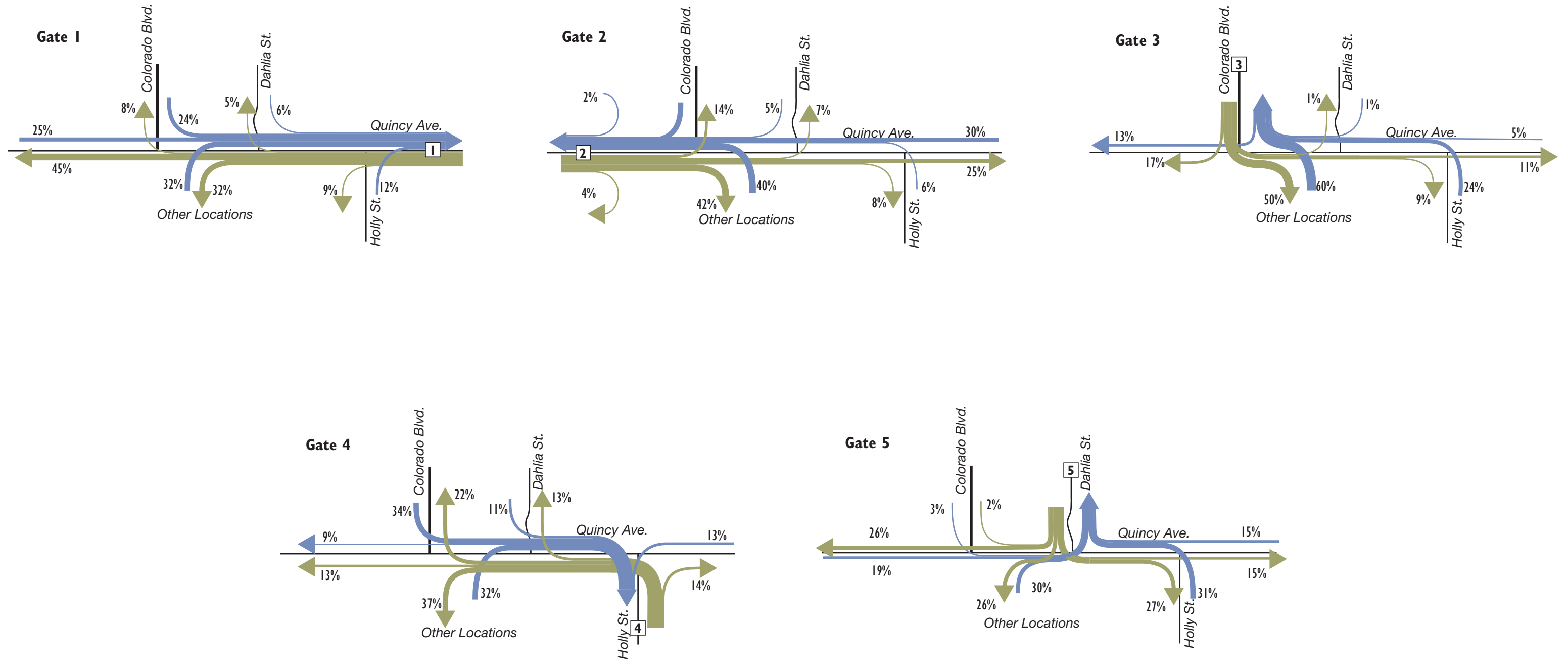
#### LEGEND

- XX% = AM Trip Distribution
- X = Gate Number
- XXX(XXX) = AM(PM) Period Total Volumes

**Figure 9**  
AM Origin Destination Data







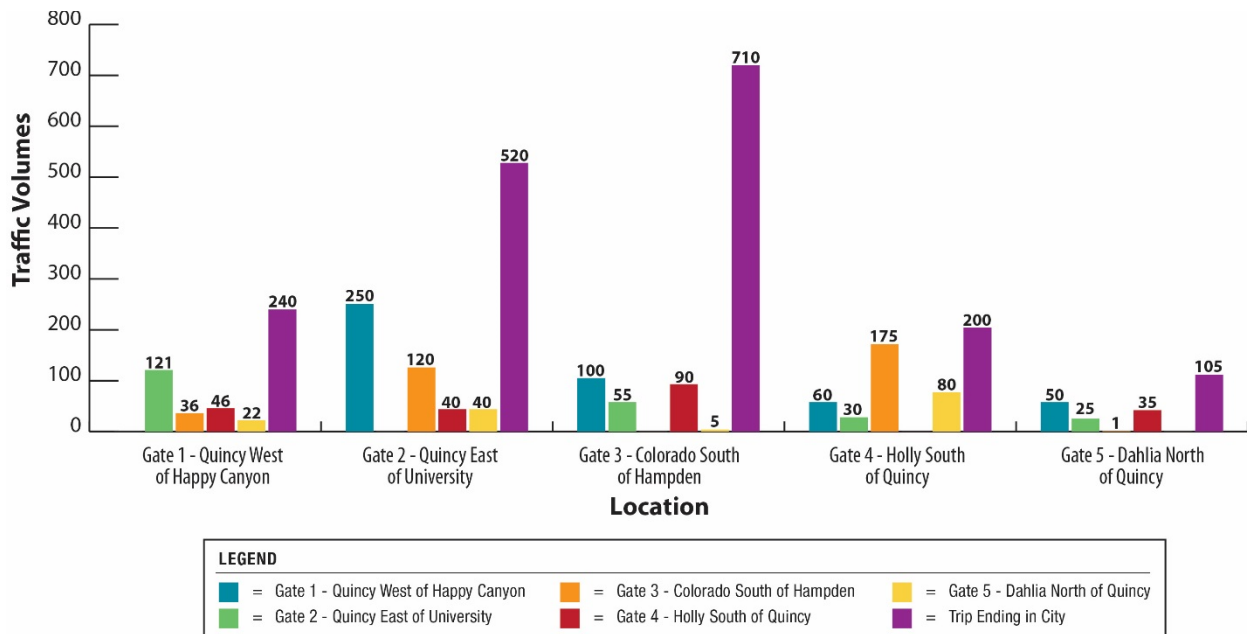
**LEGEND**

- XX% = AM Trip Distribution
- [X] = Gate Number
- XXX(XXX) = AM(PM) Period Total Volumes

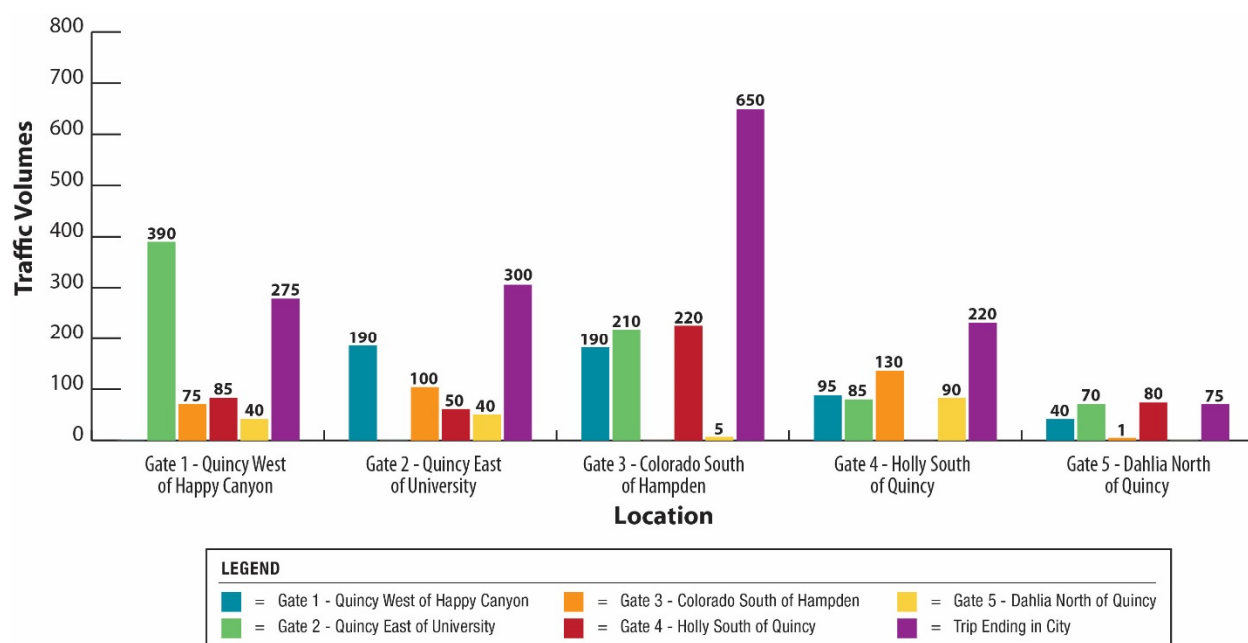
**Figure 10**  
PM Origin Destination Data



The following two figures combine the entering vehicle data of **Figure 8** with the percentages of **Figures 9** and **10**. **Figures 11** and **12** graph the distribution of the entering volume (green arrow in **Figure 8**) at each gate and among the other gates in the study area. For example, at Gate 1, of the 465 vehicles entering at Gate 1 in the AM peak 121 vehicles showed up at Gate 2 within 10 minutes or less of being recorded at Gate 1. Similarly, of the 465 vehicles entering at Gate 1, 36 vehicles exited at Gate 3 on Colorado Boulevard, 46 at Gate 4 on Holly Street, and 22 at Gate 5 on Dahlia Street. The 240 remaining vehicles that were not recorded at another gate within 10 minutes of passing through Gate 1 were assumed to be a trip that ended at a location within Cherry Hills Village.



**Figure 11. AM (6:30 to 9:30) Period Origin and Destination of Inbound Vehicle Trips at Each Gate**



**Figure 12. PM (3:30 to 6:30) Period Origin and Destination of Inbound Vehicle Trips at Each Gate**

Based on the AM origin-destination patterns at each gate, the following observations can be made.

- At Gates 1, 2, and 3, most vehicles entering the gate have a destination within Cherry Hills Village. This is especially the case at Gate 2 on Quincy Avenue east of University Boulevard and Gate 3 on Colorado Boulevard.
- Based on the traffic volumes on Mansfield Avenue east of Colorado Boulevard and the eastbound to southbound right-turn volume at the Mansfield Avenue / Happy Canyon Road intersection, some of the inbound vehicle-trips at Gate 3 (Colorado Boulevard) are likely using Mansfield Avenue to cut over to Happy Canyon Road and, therefore, may not have been a trip that ended in the City.
- Nearly one-third of the vehicle-trips entering at Gate 4 (Holly Street) use Gate 3 (Colorado Boulevard) to exit the City.
- Approximately 25 percent of the vehicle-trips on either end of Quincy Avenue (Gates 1 and 2) are vehicles cutting through the City

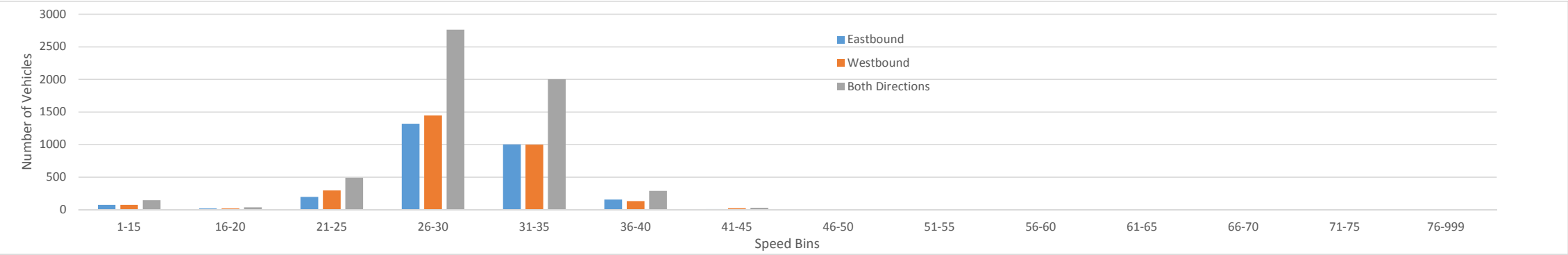
The PM period data suggest the following travel patterns.

- In the PM period, there are about 1,545 vehicle-trips entering the City at either end of Quincy Avenue (see data for Gate 1 and Gate 2 on **Figure 12**). The data show that of these vehicle-trips about 970 or 63 percent have an origin and destination outside of the City. In other words, nearly two-thirds of vehicles on Quincy Avenue in the evening are trips cutting through the City.
- On southbound Colorado Boulevard, 400 vehicle trips were recorded exiting through Gates 1 and 2 on Quincy Avenue and 220 vehicle-trips were recorded exiting through Gate 4 on Holly Street. These 620 vehicle-trips would be considered a vehicle cutting through the City and are about 50 percent of the nearly 1,300 vehicle-trips recorded on southbound Colorado Boulevard.
- The data suggest that approximately two-thirds (65 percent) of vehicle-trips entering the system at Holly Street are vehicle-trips that are cutting through the City.

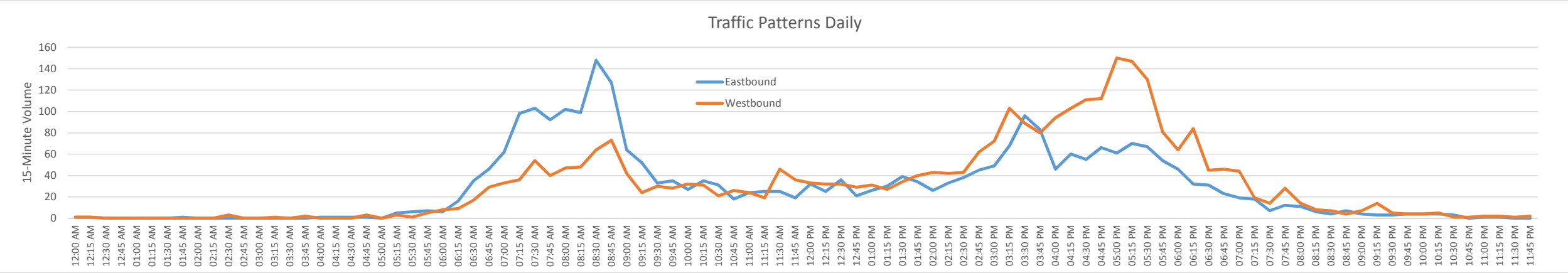
The origin-destination study confirms the prevailing thought that many of the vehicle-trips on City roadways such as Quincy Avenue and Colorado Boulevard are vehicle-trips cutting through the City. These data suggest that during the peak periods of the day, 44 to 60 percent of the traffic in the City might be a vehicle passing through the City.

**APPENDIX A      TRAFFIC COUNTS AND SPEED DATA**

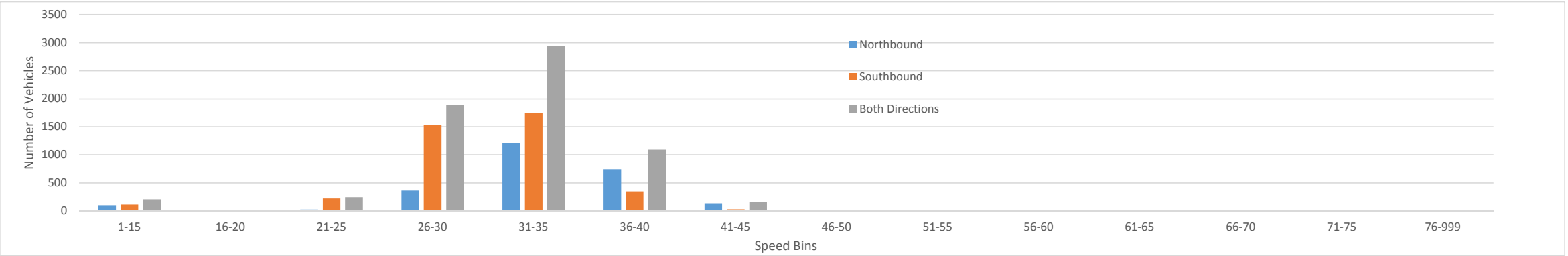
|                      |           |     |           |        |
|----------------------|-----------|-----|-----------|--------|
| Quincy               |           |     |           |        |
| Speed Data           | Eastbound |     | Westbound |        |
| 15th Percentile      | 25        | MPH | 25        | MPH    |
| 50th Percentile      | 29        | MPH | 28        | MPH    |
| 85th Percentile      | 33        | MPH | 33        | MPH    |
| 95th Percentile      | 35        | MPH | 35        | MPH    |
| Mean Speed           | 29        | MPH | 29        | MPH    |
| 10 MPH Pace Speed    | 26-35     | MPH | 26-35     | MPH    |
| Number in Pace       | 2321      |     | 2441      |        |
| Percent in Pace      | 16400.0%  |     | 15500.0%  |        |
| Vehicles over 55 MPH | 10        |     | 22        |        |
| Vehicles over Posted |           |     |           | 40.31% |



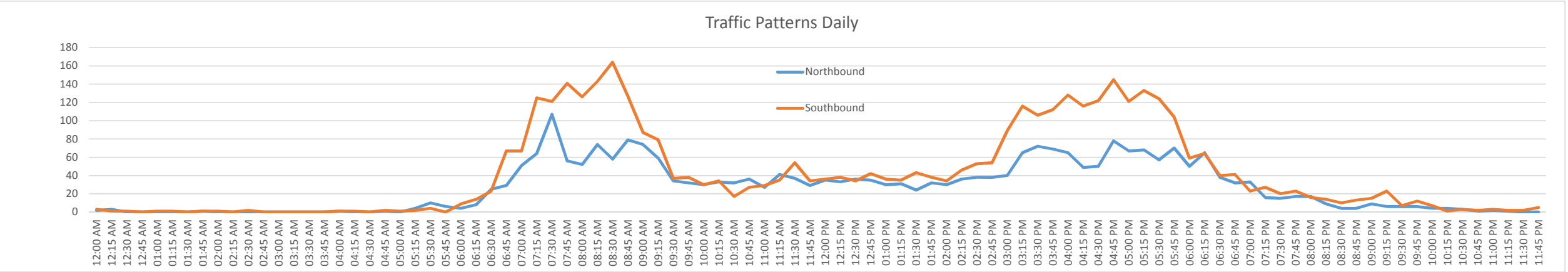
|                    |        |         |
|--------------------|--------|---------|
| Volume Data        | Number | Percent |
| Eastbound Total    | 2750   | 47.98%  |
| Westbound Total    | 2982   | 52.02%  |
| Total              | 5732   | 100.00% |
| Passenger Cars     | 5548   | 96.79%  |
| Single Unit        | 99     | 1.73%   |
| Combination Trucks | 20     | 0.35%   |
| Bicycles           | 28     | 0.49%   |
| Buses              | 37     | 0.65%   |



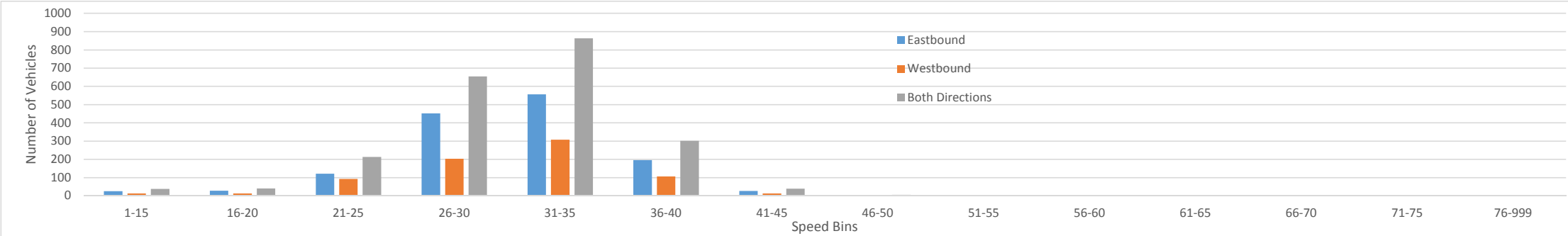
|                      |            |     |            |        |
|----------------------|------------|-----|------------|--------|
| Colorado             |            |     |            |        |
| Speed Data           | Northbound |     | Southbound |        |
| 15th Percentile      | 28         | MPH | 25         | MPH    |
| 50th Percentile      | 33         | MPH | 30         | MPH    |
| 85th Percentile      | 38         | MPH | 34         | MPH    |
| 95th Percentile      | 40         | MPH | 37         | MPH    |
| Mean Speed           | 33         | MPH | 30         | MPH    |
| 10 MPH Pace Speed    | 31-40      | MPH | 26-35      | MPH    |
| Number in Pace       | 1951       |     | 3271       |        |
| Percent in Pace      | 89800.0%   |     | 37100.0%   |        |
| Vehicles over 55 MPH | 153        |     | 26         |        |
| Vehicles over Posted |            |     |            | 64.11% |



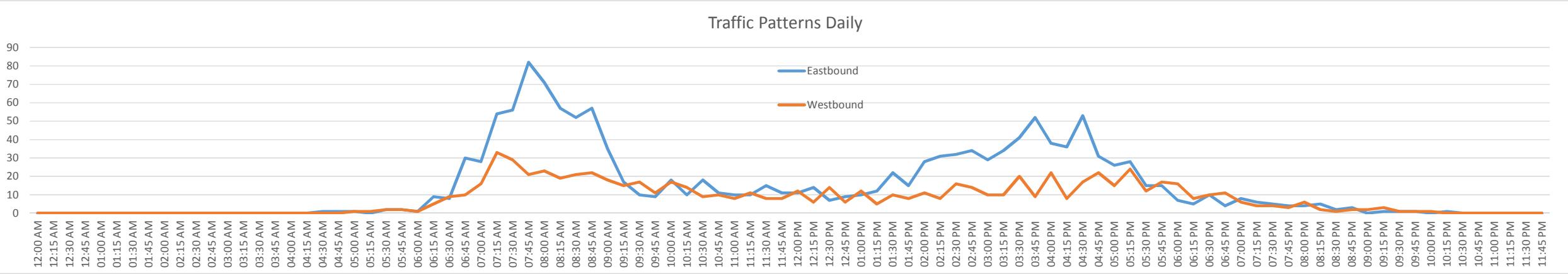
|                    |        |         |
|--------------------|--------|---------|
| Volume Data        | Number | Percent |
| Northbound Total   | 2589   | 39.37%  |
| Southbound Total   | 3987   | 60.63%  |
| Total              | 6576   | 100.00% |
| Passenger Cars     | 6344   | 96.47%  |
| Single Unit        | 142    | 2.16%   |
| Combination Trucks | 27     | 0.41%   |
| Bicycles           | 31     | 0.47%   |
| Buses              | 32     | 0.49%   |



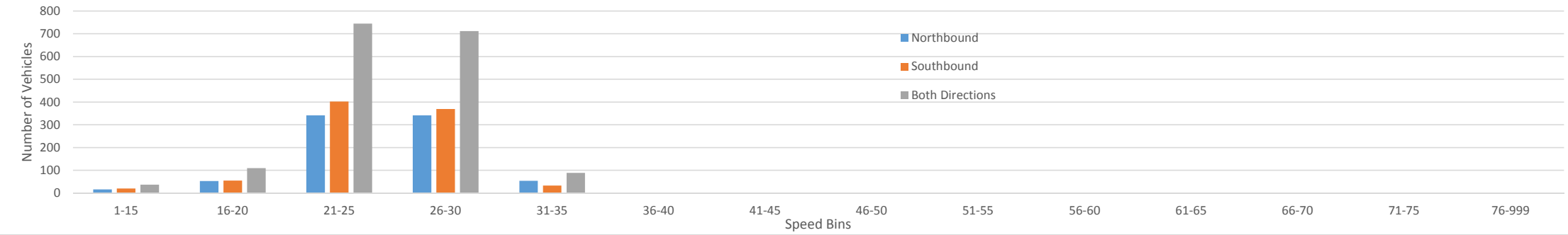
|                      |           |     |           |        |
|----------------------|-----------|-----|-----------|--------|
| Mansfield            |           |     |           |        |
| Speed Data           | Eastbound |     | Westbound |        |
| 15th Percentile      | 25        | MPH | 24        | MPH    |
| 50th Percentile      | 30        | MPH | 30        | MPH    |
| 85th Percentile      | 35        | MPH | 35        | MPH    |
| 95th Percentile      | 38        | MPH | 38        | MPH    |
| Mean Speed           | 31        | MPH | 31        | MPH    |
| 10 MPH Pace Speed    | 26-35     | MPH | 26-35     | MPH    |
| Number in Pace       | 1007      |     | 510       |        |
| Percent in Pace      | 22600.0%  |     | 68.0%     |        |
| Vehicles over 55 MPH | 1         |     | 1         |        |
| Vehicles over Posted |           |     |           | 56.17% |



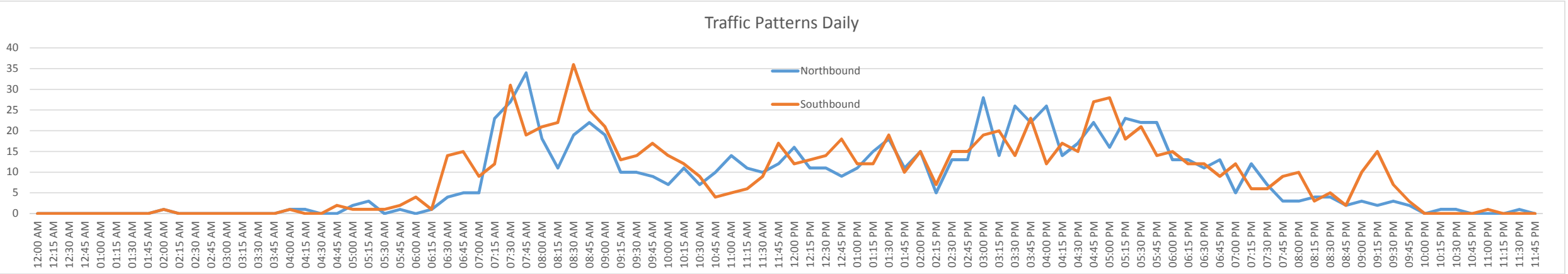
|                    |        |         |
|--------------------|--------|---------|
| Volume Data        | Number | Percent |
| Eastbound Total    | 1376   | 64.72%  |
| Westbound Total    | 750    | 35.28%  |
| Total              | 2126   | 100.00% |
| Passenger Cars     | 2050   | 96.43%  |
| Single Unit        | 51     | 2.40%   |
| Combination Trucks | 7      | 0.33%   |
| Bicycles           | 7      | 0.33%   |
| Buses              | 11     | 0.52%   |



|                      |            |     |            |        |
|----------------------|------------|-----|------------|--------|
| Dahila               |            |     |            |        |
| Speed Data           | Northbound |     | Southbound |        |
| 15th Percentile      | 20         | MPH | 20         | MPH    |
| 50th Percentile      | 24         | MPH | 24         | MPH    |
| 85th Percentile      | 29         | MPH | 28         | MPH    |
| 95th Percentile      | 31         | MPH | 29         | MPH    |
| Mean Speed           | 25         | MPH | 25         | MPH    |
| 10 MPH Pace Speed    | 21-30      | MPH | 21-30      | MPH    |
| Number in Pace       | 684        |     | 773        |        |
| Percent in Pace      | 5600.0%    |     | 3600.0%    |        |
| Vehicles over 55 MPH | 1          |     | 2          |        |
| Vehicles over Posted |            |     |            | 47.38% |



|                    |        |         |
|--------------------|--------|---------|
| Volume Data        | Number | Percent |
| Northbound Total   | 811    | 47.79%  |
| Southbound Total   | 886    | 52.21%  |
| Total              | 1697   | 100.00% |
| Passenger Cars     | 1586   | 93.46%  |
| Single Unit        | 73     | 4.30%   |
| Combination Trucks | 17     | 1.00%   |
| Bicycles           | 8      | 0.47%   |
| Buses              | 13     | 0.77%   |



Holly

Speed Data

15th Percentile

50th Percentile

85th Percentile

95th Percentile

Mean Speed

10 MPH Pace Speed

Number in Pace

Percent in Pace

Vehicles over 55 MPH

Vehicles over Posted

Northbound

23

MPH

27

MPH

31

MPH

34

MPH

28

MPH

26-35

MPH

1522

19

1

Southbound

23

MPH

28

MPH

33

MPH

34

MPH

28

MPH

26-35

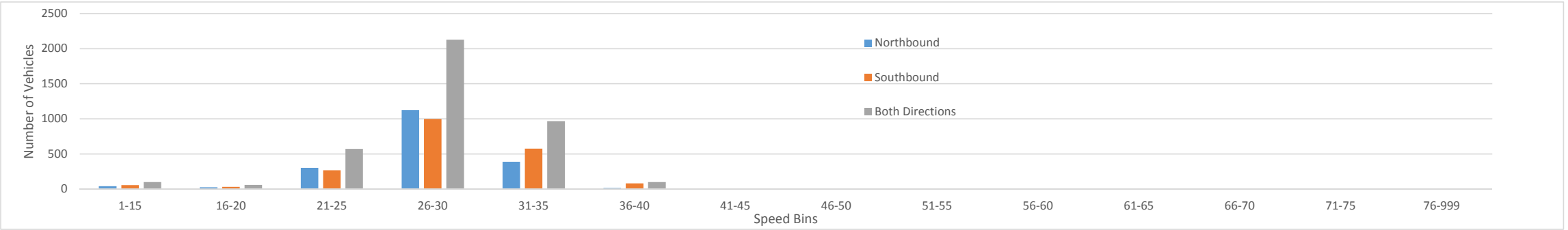
MPH

1579

9300.0%

9

27.39%



Volume Data

Northbound Total

Southbound Total

Total

Passenger Cars

Single Unit

Combination Trucks

Bicycles

Buses

Number

1918

2036

3954

3837

58

13

20

26

Percent

48.51%

51.49%

100.00%

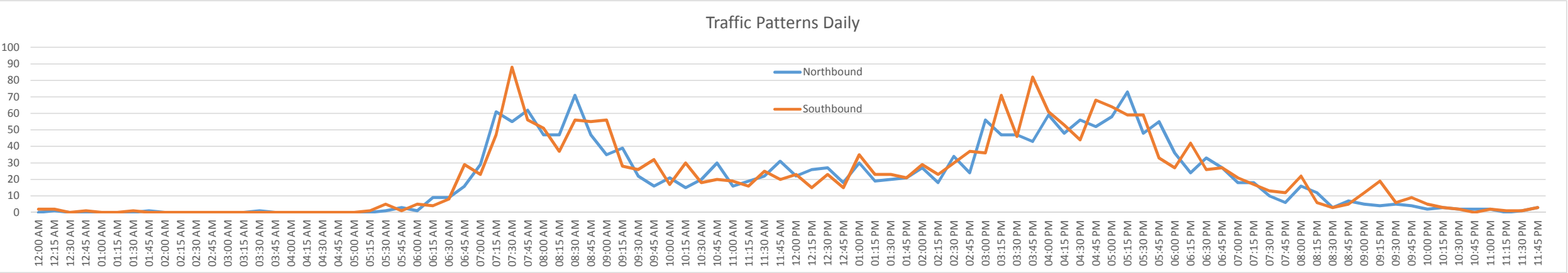
97.04%

1.47%

0.33%

0.51%

0.66%



Clarkson

Speed Data

15th Percentile

50th Percentile

85th Percentile

95th Percentile

Mean Speed

10 MPH Pace Speed

Number in Pace

Percent in Pace

Vehicles over 55 MPH

Vehicles over Posted

Northbound

20

MPH

27

MPH

31

MPH

34

MPH

26

MPH

24-33

MPH

1686

4500.0%

3

Southbound

21

MPH

27

MPH

31

MPH

34

MPH

26

MPH

24-33

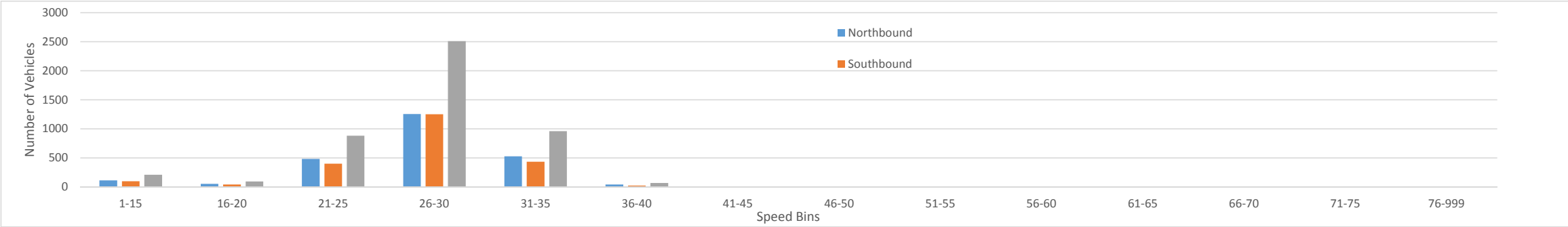
MPH

1605

2700.0%

2

21.85%



Volume Data

Northbound Total

Southbound Total

Total

Passenger Cars

Single Unit

Combination Trucks

Bicycles

Buses

Number

2478

2255

4733

4456

171

48

38

20

Percent

52.36%

47.64%

100.00%

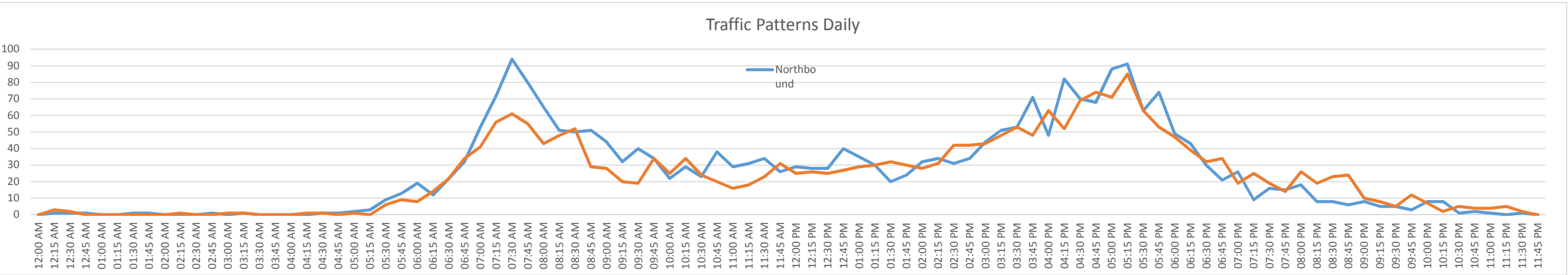
94.15%

3.61%

1.01%

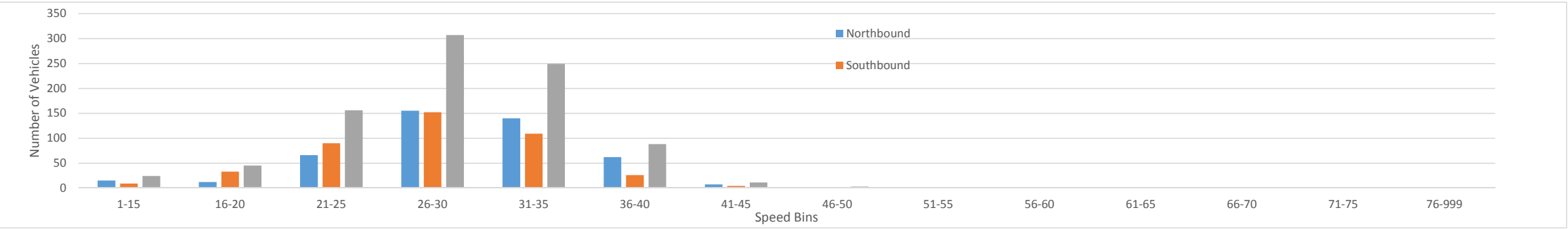
0.80%

0.42%

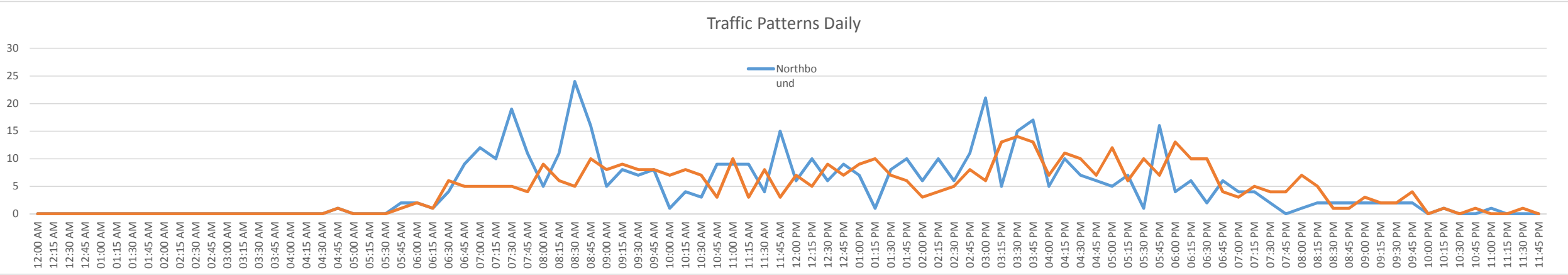




|                      |            |     |            |     |
|----------------------|------------|-----|------------|-----|
| Franklin             |            |     |            |     |
| Speed Data           | Northbound |     | Southbound |     |
| 15th Percentile      | 22         | MPH | 19         | MPH |
| 50th Percentile      | 29         | MPH | 27         | MPH |
| 85th Percentile      | 35         | MPH | 33         | MPH |
| 95th Percentile      | 38         | MPH | 36         | MPH |
| Mean Speed           | 29         | MPH | 27         | MPH |
| 10 MPH Pace Speed    | 26-35      | MPH | 24-33      | MPH |
| Number in Pace       | 265        |     | 240        |     |
| Percent in Pace      | 21100.0%   |     | 14000.0%   |     |
| Vehicles over 55 MPH | 71         |     | 31         |     |
| Vehicles over Posted |            |     | 74.52%     |     |



|                    |        |         |
|--------------------|--------|---------|
| Volume Data        | Number | Percent |
| Northbound Total   | 459    | 51.98%  |
| Southbound Total   | 424    | 48.02%  |
| Total              | 883    | 100.00% |
| Passenger Cars     | 807    | 91.39%  |
| Single Unit        | 49     | 5.55%   |
| Combination Trucks | 14     | 1.59%   |
| Bicycles           | 8      | 0.91%   |
| Buses              | 5      | 0.57%   |



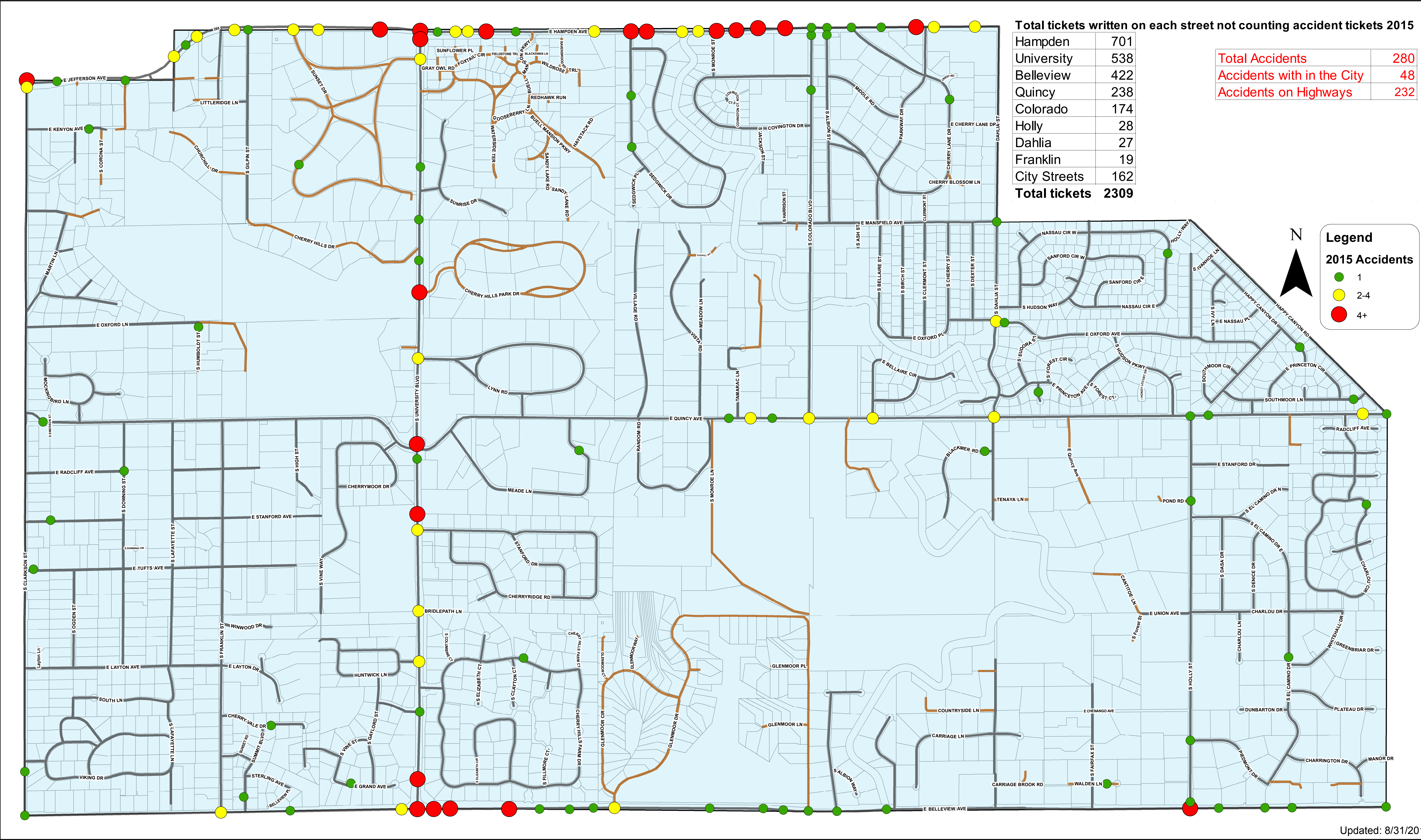
## APPENDIX B      TRAFFIC CALMING MEASURES LIST

|                                                        | Traffic Mitigation Measures           | Application       |                    |
|--------------------------------------------------------|---------------------------------------|-------------------|--------------------|
|                                                        |                                       | Local/Residential | Arterial/Collector |
| Education, Enforcement,<br>And Non-Physical Treatments | Neighborhood Education Programs       | X                 | X                  |
|                                                        | Speed Limit Signing                   | X                 | X                  |
|                                                        | Restricted Movement Signing           | X                 | X                  |
|                                                        | Truck Restriction Signing             | X                 | X                  |
|                                                        | Enhanced At-Grade Pedestrian Crossing | X                 | X                  |
|                                                        | Striping/Visual Narrowing             | X                 | X                  |
|                                                        | Speed Monitoring Display              | X                 | X                  |
|                                                        | Traditional Police Enforcement        | X                 | X                  |
| Physical (Engineering)<br>Treatments                   | Entry Islands                         | X                 | X                  |
|                                                        | Entrance Barrier                      | X                 | X                  |
|                                                        | Speed Hump                            | X                 |                    |
|                                                        | Raised Pedestrian Crossing            | X                 | X                  |
|                                                        | Curb Extensions                       | X                 | X                  |
|                                                        | Partial (not full-block) Medians      | X                 | X                  |
|                                                        | Traffic Circles                       | X                 |                    |
|                                                        | Restricted Movement Barrier           | X                 |                    |
|                                                        | Raised Intersection                   |                   | X                  |
|                                                        | Full-Block Medians                    | X                 | X                  |

**APPENDIX C      CHERRY HILLS VILLAGE ACCIDENT MAPS**

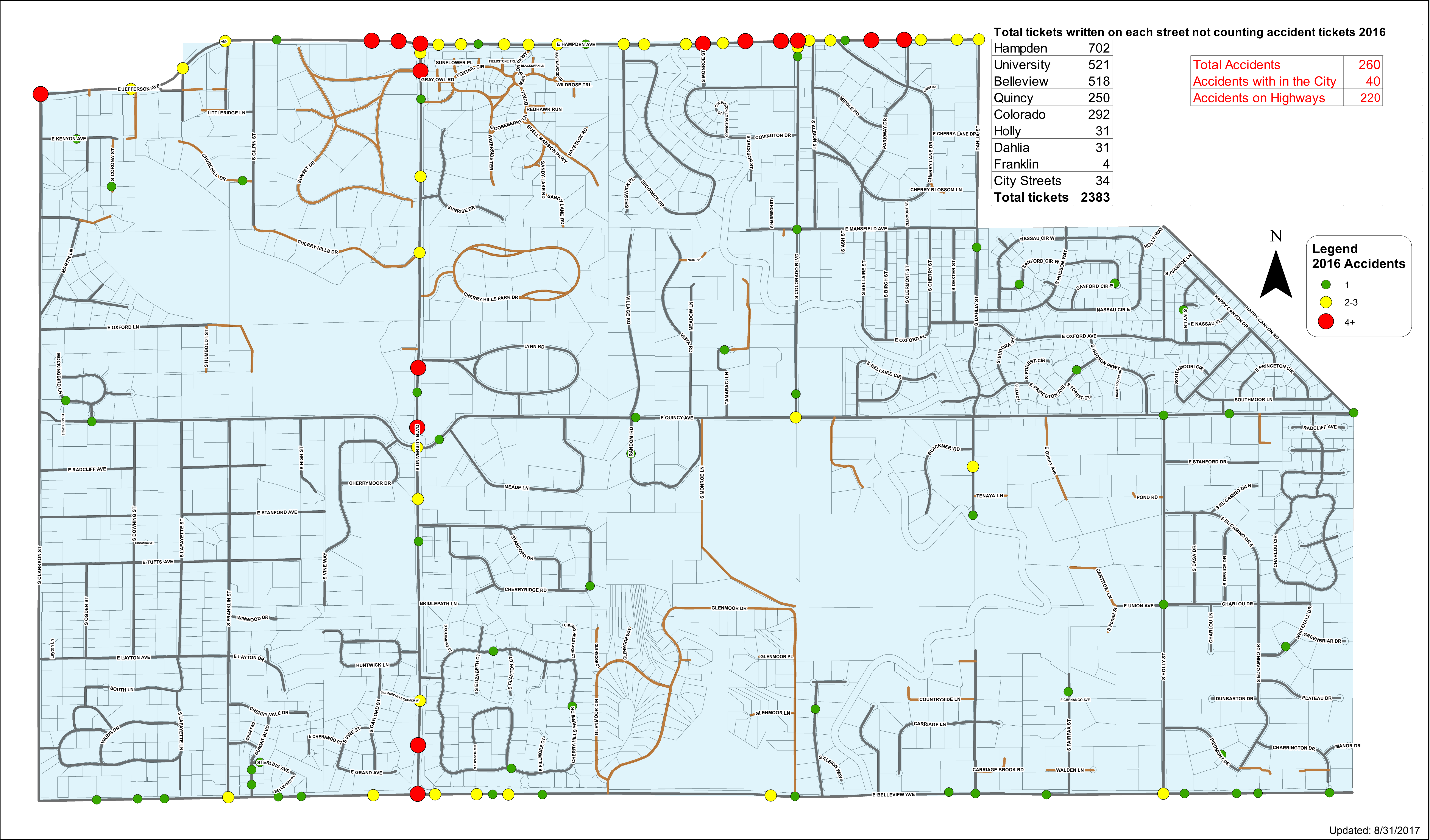


# CITY OF CHERRY HILLS VILLAGE: 2015 POLICE DEPARTMENT ACCIDENT MAP



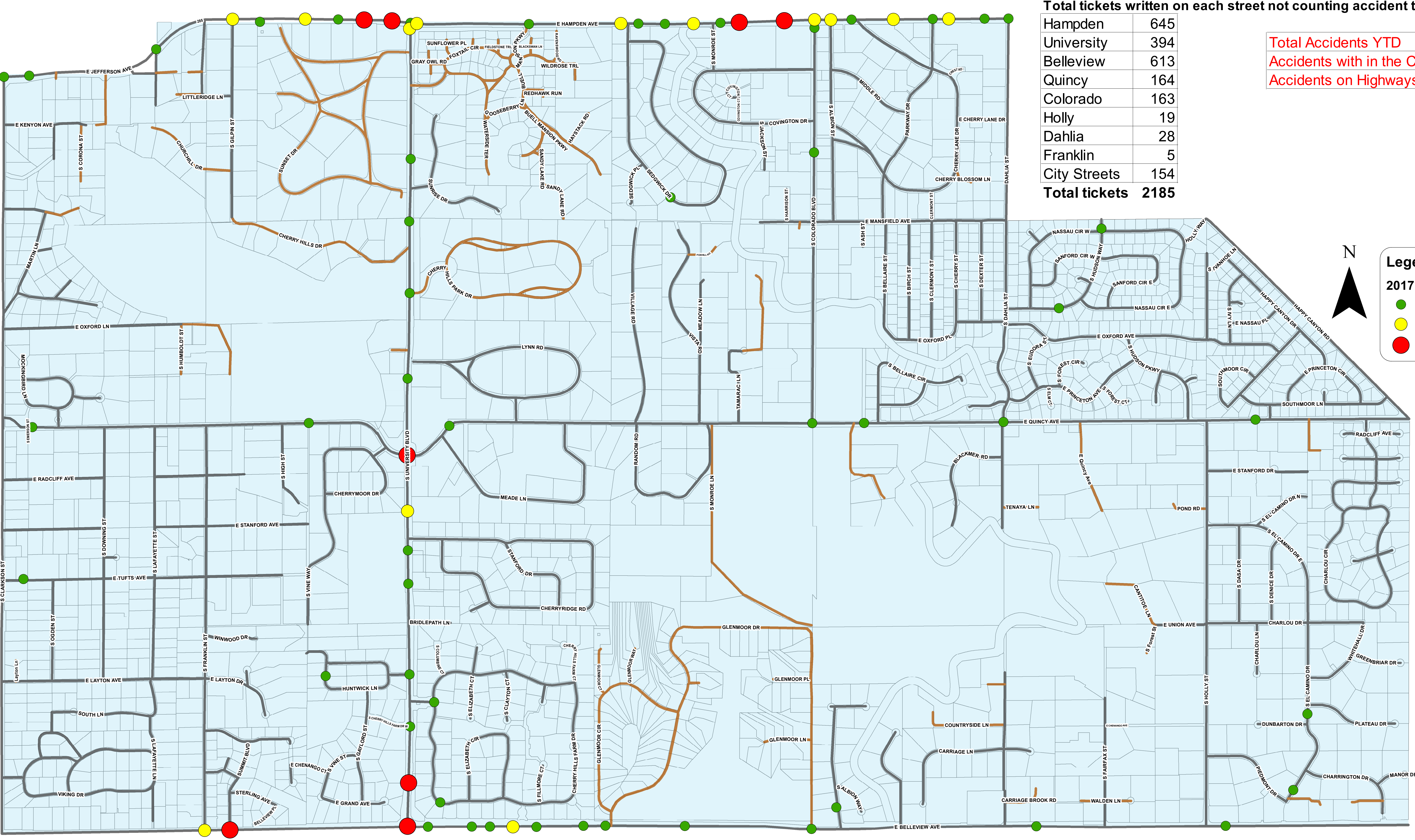


# CITY OF CHERRY HILLS VILLAGE: 2016 POLICE DEPARTMENT ACCIDENT MAP





# CITY OF CHERRY HILLS VILLAGE: 2017 THROUGH JULY POLICE DEPARTMENT ACCIDENT MAP



Total tickets written on each street not counting accident tickets

|                      |             |
|----------------------|-------------|
| Hampden              | 645         |
| University           | 394         |
| Bellevue             | 613         |
| Quincy               | 164         |
| Colorado             | 163         |
| Holly                | 19          |
| Dahlia               | 28          |
| Franklin             | 5           |
| City Streets         | 154         |
| <b>Total tickets</b> | <b>2185</b> |

|                            |     |
|----------------------------|-----|
| Total Accidents YTD        | 137 |
| Accidents with in the City | 16  |
| Accidents on Highways      | 121 |

N

**Legend**

**2017 Accidents**

- 1 (Green dot)
- 2-3 (Yellow dot)
- 4+ (Red dot)

**APPENDIX D      LEVEL OF SERVICE WORKSHEETS**

HCM 2010 AWSC  
1: S FRANKLIN ST & E QUINCY AVE

Existing  
Timing Plan: AM Peak

| Intersection              |     |
|---------------------------|-----|
| Intersection Delay, s/veh | 8.9 |
| Intersection LOS          | A   |

| Movement            | EBT                                                                               | EBR  | WBL  | WBT                                                                               | NBL                                                                               | NBR  |
|---------------------|-----------------------------------------------------------------------------------|------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|
| Lane Configurations |  |      |      |  |  |      |
| Traffic Vol, veh/h  | 241                                                                               | 10   | 20   | 74                                                                                | 5                                                                                 | 45   |
| Future Vol, veh/h   | 241                                                                               | 10   | 20   | 74                                                                                | 5                                                                                 | 45   |
| Peak Hour Factor    | 0.86                                                                              | 0.86 | 0.59 | 0.59                                                                              | 0.83                                                                              | 0.83 |
| Heavy Vehicles, %   | 2                                                                                 | 2    | 2    | 2                                                                                 | 2                                                                                 | 2    |
| Mvmt Flow           | 280                                                                               | 12   | 34   | 125                                                                               | 6                                                                                 | 54   |
| Number of Lanes     | 1                                                                                 | 0    | 0    | 1                                                                                 | 1                                                                                 | 0    |

| Approach                   | EB  | WB  | NB  |
|----------------------------|-----|-----|-----|
| Opposing Approach          | WB  | EB  |     |
| Opposing Lanes             | 1   | 1   | 0   |
| Conflicting Approach Left  |     | NB  | EB  |
| Conflicting Lanes Left     | 0   | 1   | 1   |
| Conflicting Approach Right | NB  |     | WB  |
| Conflicting Lanes Right    | 1   | 0   | 1   |
| HCM Control Delay          | 9.3 | 8.5 | 7.8 |
| HCM LOS                    | A   | A   | A   |

| Lane                   | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, %            | 10%   | 0%    | 21%   |
| Vol Thru, %            | 0%    | 96%   | 79%   |
| Vol Right, %           | 90%   | 4%    | 0%    |
| Sign Control           | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 50    | 251   | 94    |
| LT Vol                 | 5     | 0     | 20    |
| Through Vol            | 0     | 241   | 74    |
| RT Vol                 | 45    | 10    | 0     |
| Lane Flow Rate         | 60    | 292   | 159   |
| Geometry Grp           | 1     | 1     | 1     |
| Degree of Util (X)     | 0.074 | 0.335 | 0.195 |
| Departure Headway (Hd) | 4.394 | 4.138 | 4.412 |
| Convergence, Y/N       | Yes   | Yes   | Yes   |
| Cap                    | 819   | 855   | 819   |
| Service Time           | 2.4   | 2.225 | 2.412 |
| HCM Lane V/C Ratio     | 0.073 | 0.342 | 0.194 |
| HCM Control Delay      | 7.8   | 9.3   | 8.5   |
| HCM Lane LOS           | A     | A     | A     |
| HCM 95th-tile Q        | 0.2   | 1.5   | 0.7   |



# HCM 2010 Signalized Intersection Summary

## 2: S UNIVERSITY BLVD & E QUINCY AVE

Existing  
Timing Plan: AM Peak

|                                |  |  |  |  |  |  |  |  |  |  |  |  |
|--------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                       | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations            |  |  |                                                                                   |  |  |                                                                                   |  |  |                                                                                   |  |  |                                                                                     |
| Traffic Volume (veh/h)         | 55                                                                                | 99                                                                                | 55                                                                                | 40                                                                                | 50                                                                                | 70                                                                                | 35                                                                                | 1325                                                                              | 130                                                                               | 120                                                                                 | 1250                                                                                | 36                                                                                  |
| Future Volume (veh/h)          | 55                                                                                | 99                                                                                | 55                                                                                | 40                                                                                | 50                                                                                | 70                                                                                | 35                                                                                | 1325                                                                              | 130                                                                               | 120                                                                                 | 1250                                                                                | 36                                                                                  |
| Number                         | 7                                                                                 | 4                                                                                 | 14                                                                                | 3                                                                                 | 8                                                                                 | 18                                                                                | 5                                                                                 | 2                                                                                 | 12                                                                                | 1                                                                                   | 6                                                                                   | 16                                                                                  |
| Initial Q (Qb), veh            | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)            | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj               | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Adj Sat Flow, veh/h/ln         | 1863                                                                              | 1863                                                                              | 1900                                                                              | 1863                                                                              | 1863                                                                              | 1900                                                                              | 1863                                                                              | 1863                                                                              | 1900                                                                              | 1863                                                                                | 1863                                                                                | 1900                                                                                |
| Adj Flow Rate, veh/h           | 70                                                                                | 125                                                                               | 70                                                                                | 45                                                                                | 57                                                                                | 80                                                                                | 36                                                                                | 1352                                                                              | 133                                                                               | 130                                                                                 | 1359                                                                                | 39                                                                                  |
| Adj No. of Lanes               | 1                                                                                 | 1                                                                                 | 0                                                                                 | 1                                                                                 | 1                                                                                 | 0                                                                                 | 1                                                                                 | 2                                                                                 | 0                                                                                 | 1                                                                                   | 2                                                                                   | 0                                                                                   |
| Peak Hour Factor               | 0.79                                                                              | 0.79                                                                              | 0.79                                                                              | 0.88                                                                              | 0.88                                                                              | 0.88                                                                              | 0.98                                                                              | 0.98                                                                              | 0.98                                                                              | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Percent Heavy Veh, %           | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                   | 2                                                                                   | 2                                                                                   |
| Cap, veh/h                     | 175                                                                               | 186                                                                               | 104                                                                               | 133                                                                               | 117                                                                               | 164                                                                               | 285                                                                               | 2121                                                                              | 208                                                                               | 275                                                                                 | 2331                                                                                | 67                                                                                  |
| Arrive On Green                | 0.17                                                                              | 0.17                                                                              | 0.17                                                                              | 0.17                                                                              | 0.17                                                                              | 0.17                                                                              | 0.03                                                                              | 0.65                                                                              | 0.65                                                                              | 0.04                                                                                | 0.66                                                                                | 0.66                                                                                |
| Sat Flow, veh/h                | 1247                                                                              | 1123                                                                              | 629                                                                               | 1183                                                                              | 703                                                                               | 986                                                                               | 1774                                                                              | 3257                                                                              | 319                                                                               | 1774                                                                                | 3514                                                                                | 101                                                                                 |
| Grp Volume(v), veh/h           | 70                                                                                | 0                                                                                 | 195                                                                               | 45                                                                                | 0                                                                                 | 137                                                                               | 36                                                                                | 732                                                                               | 753                                                                               | 130                                                                                 | 684                                                                                 | 714                                                                                 |
| Grp Sat Flow(s),veh/h/ln       | 1247                                                                              | 0                                                                                 | 1752                                                                              | 1183                                                                              | 0                                                                                 | 1689                                                                              | 1774                                                                              | 1770                                                                              | 1806                                                                              | 1774                                                                                | 1770                                                                                | 1845                                                                                |
| Q Serve(g_s), s                | 6.5                                                                               | 0.0                                                                               | 12.5                                                                              | 4.5                                                                               | 0.0                                                                               | 8.8                                                                               | 0.8                                                                               | 29.5                                                                              | 29.9                                                                              | 2.9                                                                                 | 25.4                                                                                | 25.5                                                                                |
| Cycle Q Clear(g_c), s          | 15.3                                                                              | 0.0                                                                               | 12.5                                                                              | 17.0                                                                              | 0.0                                                                               | 8.8                                                                               | 0.8                                                                               | 29.5                                                                              | 29.9                                                                              | 2.9                                                                                 | 25.4                                                                                | 25.5                                                                                |
| Prop In Lane                   | 1.00                                                                              |                                                                                   | 0.36                                                                              | 1.00                                                                              |                                                                                   | 0.58                                                                              | 1.00                                                                              |                                                                                   | 0.18                                                                              | 1.00                                                                                |                                                                                     | 0.05                                                                                |
| Lane Grp Cap(c), veh/h         | 175                                                                               | 0                                                                                 | 291                                                                               | 133                                                                               | 0                                                                                 | 280                                                                               | 285                                                                               | 1152                                                                              | 1176                                                                              | 275                                                                                 | 1174                                                                                | 1224                                                                                |
| V/C Ratio(X)                   | 0.40                                                                              | 0.00                                                                              | 0.67                                                                              | 0.34                                                                              | 0.00                                                                              | 0.49                                                                              | 0.13                                                                              | 0.64                                                                              | 0.64                                                                              | 0.47                                                                                | 0.58                                                                                | 0.58                                                                                |
| Avail Cap(c_a), veh/h          | 207                                                                               | 0                                                                                 | 336                                                                               | 163                                                                               | 0                                                                                 | 324                                                                               | 322                                                                               | 1152                                                                              | 1176                                                                              | 350                                                                                 | 1174                                                                                | 1224                                                                                |
| HCM Platoon Ratio              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)             | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh       | 52.4                                                                              | 0.0                                                                               | 47.0                                                                              | 55.0                                                                              | 0.0                                                                               | 45.4                                                                              | 8.9                                                                               | 12.5                                                                              | 12.5                                                                              | 12.0                                                                                | 11.1                                                                                | 11.1                                                                                |
| Incr Delay (d2), s/veh         | 1.5                                                                               | 0.0                                                                               | 4.2                                                                               | 1.5                                                                               | 0.0                                                                               | 1.3                                                                               | 0.2                                                                               | 2.7                                                                               | 2.7                                                                               | 1.3                                                                                 | 2.1                                                                                 | 2.0                                                                                 |
| Initial Q Delay(d3),s/veh      | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln       | 2.3                                                                               | 0.0                                                                               | 6.4                                                                               | 1.5                                                                               | 0.0                                                                               | 4.2                                                                               | 0.4                                                                               | 15.1                                                                              | 15.7                                                                              | 1.8                                                                                 | 13.0                                                                                | 13.6                                                                                |
| LnGrp Delay(d),s/veh           | 53.9                                                                              | 0.0                                                                               | 51.2                                                                              | 56.5                                                                              | 0.0                                                                               | 46.8                                                                              | 9.1                                                                               | 15.1                                                                              | 15.2                                                                              | 13.3                                                                                | 13.2                                                                                | 13.1                                                                                |
| LnGrp LOS                      | D                                                                                 |                                                                                   | D                                                                                 | E                                                                                 |                                                                                   | D                                                                                 | A                                                                                 | B                                                                                 | B                                                                                 | B                                                                                   | B                                                                                   | B                                                                                   |
| Approach Vol, veh/h            | 265                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 182                                                                               |                                                                                   | 1521                                                                              |                                                                                   | 1528                                                                                |                                                                                     |                                                                                     |
| Approach Delay, s/veh          | 51.9                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 49.2                                                                              |                                                                                   | 15.0                                                                              |                                                                                   | 13.2                                                                                |                                                                                     |                                                                                     |
| Approach LOS                   | D                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   | D                                                                                 |                                                                                   | B                                                                                 |                                                                                   | B                                                                                   |                                                                                     |                                                                                     |
| Timer                          | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                 | 8                                                                                 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Assigned Phs                   | 1                                                                                 | 2                                                                                 |                                                                                   |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 | 8                                                                                 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s       | 10.0                                                                              | 84.1                                                                              |                                                                                   |                                                                                   | 25.9                                                                              | 8.5                                                                               | 85.6                                                                              | 25.9                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s        | 5.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                   | 6.0                                                                               | 5.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s    | 10.0                                                                              | 70.0                                                                              |                                                                                   |                                                                                   | 23.0                                                                              | 6.0                                                                               | 74.0                                                                              | 23.0                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+14.9), s | 14.9                                                                              | 31.9                                                                              |                                                                                   |                                                                                   | 17.3                                                                              | 2.8                                                                               | 27.5                                                                              | 19.0                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s        | 0.1                                                                               | 28.2                                                                              |                                                                                   |                                                                                   | 1.2                                                                               | 0.0                                                                               | 32.6                                                                              | 0.9                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary           |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 2010 Ctrl Delay            |                                                                                   |                                                                                   | 18.8                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 2010 LOS                   |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |

# HCM 2010 Signalized Intersection Summary

## 3: S UNIVERSITY BLVD & E BELLEVIEW AVE

Existing  
Timing Plan: AM Peak

|                             |  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
|-----------------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                    | EBL                                                                                | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                               | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations         |   |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)      | 125                                                                                | 1425                                                                              | 195                                                                               | 196                                                                               | 831                                                                               | 225                                                                               | 222                                                                               | 1188                                                                              | 266                                                                               | 308                                                                               | 839                                                                                 | 126                                                                                 |
| Future Volume (veh/h)       | 125                                                                                | 1425                                                                              | 195                                                                               | 196                                                                               | 831                                                                               | 225                                                                               | 222                                                                               | 1188                                                                              | 266                                                                               | 308                                                                               | 839                                                                                 | 126                                                                                 |
| Number                      | 7                                                                                  | 4                                                                                 | 14                                                                                | 3                                                                                 | 8                                                                                 | 18                                                                                | 5                                                                                 | 2                                                                                 | 12                                                                                | 1                                                                                 | 6                                                                                   | 16                                                                                  |
| Initial Q (Qb), veh         | 0                                                                                  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)         | 1.00                                                                               |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj            | 1.00                                                                               | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                |
| Adj Sat Flow, veh/h/ln      | 1863                                                                               | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                                | 1863                                                                                |
| Adj Flow Rate, veh/h        | 129                                                                                | 1469                                                                              | 201                                                                               | 220                                                                               | 934                                                                               | 253                                                                               | 252                                                                               | 1350                                                                              | 0                                                                                 | 335                                                                               | 912                                                                                 | 0                                                                                   |
| Adj No. of Lanes            | 2                                                                                  | 2                                                                                 | 1                                                                                 | 2                                                                                 | 2                                                                                 | 1                                                                                 | 2                                                                                 | 2                                                                                 | 1                                                                                 | 2                                                                                 | 2                                                                                   | 1                                                                                   |
| Peak Hour Factor            | 0.97                                                                               | 0.97                                                                              | 0.97                                                                              | 0.89                                                                              | 0.89                                                                              | 0.89                                                                              | 0.88                                                                              | 0.88                                                                              | 0.88                                                                              | 0.92                                                                              | 0.92                                                                                | 0.92                                                                                |
| Percent Heavy Veh, %        | 2                                                                                  | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                   | 2                                                                                   |
| Cap, veh/h                  | 172                                                                                | 1209                                                                              | 541                                                                               | 172                                                                               | 1209                                                                              | 541                                                                               | 306                                                                               | 1239                                                                              | 554                                                                               | 258                                                                               | 1190                                                                                | 532                                                                                 |
| Arrive On Green             | 0.05                                                                               | 0.34                                                                              | 0.34                                                                              | 0.05                                                                              | 0.34                                                                              | 0.34                                                                              | 0.09                                                                              | 0.35                                                                              | 0.00                                                                              | 0.08                                                                              | 0.34                                                                                | 0.00                                                                                |
| Sat Flow, veh/h             | 3442                                                                               | 3539                                                                              | 1583                                                                              | 3442                                                                              | 3539                                                                              | 1583                                                                              | 3442                                                                              | 3539                                                                              | 1583                                                                              | 3442                                                                              | 3539                                                                                | 1583                                                                                |
| Grp Volume(v), veh/h        | 129                                                                                | 1469                                                                              | 201                                                                               | 220                                                                               | 934                                                                               | 253                                                                               | 252                                                                               | 1350                                                                              | 0                                                                                 | 335                                                                               | 912                                                                                 | 0                                                                                   |
| Grp Sat Flow(s),veh/h/ln    | 1721                                                                               | 1770                                                                              | 1583                                                                              | 1721                                                                              | 1770                                                                              | 1583                                                                              | 1721                                                                              | 1770                                                                              | 1583                                                                              | 1721                                                                              | 1770                                                                                | 1583                                                                                |
| Q Serve(g_s), s             | 4.4                                                                                | 41.0                                                                              | 11.5                                                                              | 6.0                                                                               | 28.3                                                                              | 15.0                                                                              | 8.6                                                                               | 42.0                                                                              | 0.0                                                                               | 9.0                                                                               | 27.7                                                                                | 0.0                                                                                 |
| Cycle Q Clear(g_c), s       | 4.4                                                                                | 41.0                                                                              | 11.5                                                                              | 6.0                                                                               | 28.3                                                                              | 15.0                                                                              | 8.6                                                                               | 42.0                                                                              | 0.0                                                                               | 9.0                                                                               | 27.7                                                                                | 0.0                                                                                 |
| Prop In Lane                | 1.00                                                                               |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h      | 172                                                                                | 1209                                                                              | 541                                                                               | 172                                                                               | 1209                                                                              | 541                                                                               | 306                                                                               | 1239                                                                              | 554                                                                               | 258                                                                               | 1190                                                                                | 532                                                                                 |
| V/C Ratio(X)                | 0.75                                                                               | 1.21                                                                              | 0.37                                                                              | 1.28                                                                              | 0.77                                                                              | 0.47                                                                              | 0.82                                                                              | 1.09                                                                              | 0.00                                                                              | 1.30                                                                              | 0.77                                                                                | 0.00                                                                                |
| Avail Cap(c_a), veh/h       | 172                                                                                | 1209                                                                              | 541                                                                               | 172                                                                               | 1209                                                                              | 541                                                                               | 315                                                                               | 1239                                                                              | 554                                                                               | 258                                                                               | 1190                                                                                | 532                                                                                 |
| HCM Platoon Ratio           | 1.00                                                                               | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)          | 1.00                                                                               | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              | 1.00                                                                                | 0.00                                                                                |
| Uniform Delay (d), s/veh    | 56.3                                                                               | 39.5                                                                              | 29.8                                                                              | 57.0                                                                              | 35.3                                                                              | 30.9                                                                              | 53.7                                                                              | 39.0                                                                              | 0.0                                                                               | 55.5                                                                              | 35.6                                                                                | 0.0                                                                                 |
| Incr Delay (d2), s/veh      | 16.6                                                                               | 104.5                                                                             | 0.4                                                                               | 162.4                                                                             | 3.2                                                                               | 0.6                                                                               | 15.7                                                                              | 53.7                                                                              | 0.0                                                                               | 159.5                                                                             | 4.8                                                                                 | 0.0                                                                                 |
| Initial Q Delay(d3),s/veh   | 0.0                                                                                | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln    | 2.5                                                                                | 37.5                                                                              | 5.1                                                                               | 6.7                                                                               | 14.3                                                                              | 6.6                                                                               | 4.8                                                                               | 29.7                                                                              | 0.0                                                                               | 10.0                                                                              | 14.3                                                                                | 0.0                                                                                 |
| LnGrp Delay(d),s/veh        | 72.8                                                                               | 144.0                                                                             | 30.2                                                                              | 219.4                                                                             | 38.5                                                                              | 31.6                                                                              | 69.4                                                                              | 92.7                                                                              | 0.0                                                                               | 215.0                                                                             | 40.4                                                                                | 0.0                                                                                 |
| LnGrp LOS                   | E                                                                                  | F                                                                                 | C                                                                                 | F                                                                                 | D                                                                                 | C                                                                                 | E                                                                                 | F                                                                                 |                                                                                   | F                                                                                 | D                                                                                   |                                                                                     |
| Approach Vol, veh/h         | 1799                                                                               |                                                                                   |                                                                                   |                                                                                   | 1407                                                                              |                                                                                   |                                                                                   |                                                                                   | 1602                                                                              |                                                                                   |                                                                                     |                                                                                     |
| Approach Delay, s/veh       | 126.2                                                                              |                                                                                   |                                                                                   |                                                                                   | 65.5                                                                              |                                                                                   |                                                                                   |                                                                                   | 89.0                                                                              |                                                                                   |                                                                                     |                                                                                     |
| Approach LOS                | F                                                                                  |                                                                                   |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                   |                                                                                   | F                                                                                 |                                                                                   |                                                                                     |                                                                                     |
| Timer                       | 1                                                                                  | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                 | 8                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
| Assigned Phs                | 1                                                                                  | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                 | 8                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s    | 4.0                                                                                | 48.0                                                                              | 11.0                                                                              | 47.0                                                                              | 15.7                                                                              | 46.3                                                                              | 11.0                                                                              | 47.0                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s     | 5.0                                                                                | 6.0                                                                               | 5.0                                                                               | 6.0                                                                               | 5.0                                                                               | 6.0                                                                               | 5.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s | 42.0                                                                               | 6.0                                                                               | 41.0                                                                              | 11.0                                                                              | 40.0                                                                              | 6.0                                                                               | 41.0                                                                              | 6.0                                                                               |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+M), s | 44.0                                                                               | 8.0                                                                               | 43.0                                                                              | 10.6                                                                              | 29.7                                                                              | 6.4                                                                               | 30.3                                                                              | 9.7                                                                               |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s     | 0.0                                                                                | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 8.5                                                                               | 0.0                                                                               | 9.7                                                                               |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
| Intersection Summary        |                                                                                    |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
| HCM 2010 Ctrl Delay         | 94.2                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
| HCM 2010 LOS                | F                                                                                  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |

HCM 2010 AWSC  
4: E QUINCY AVE & S COLORADO BLVD

Existing  
Timing Plan: AM Peak

Intersection

Intersection Delay, s/veh36.6

Intersection LOS E

| Movement            | EBL  | EBT                                                                               | WBT                                                                               | WBR  | SBL                                                                               | SBR                                                                               |
|---------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Lane Configurations |      |  |  |      |  |  |
| Traffic Vol, veh/h  | 133  | 279                                                                               | 229                                                                               | 102  | 185                                                                               | 200                                                                               |
| Future Vol, veh/h   | 133  | 279                                                                               | 229                                                                               | 102  | 185                                                                               | 200                                                                               |
| Peak Hour Factor    | 0.74 | 0.74                                                                              | 0.74                                                                              | 0.74 | 0.78                                                                              | 0.78                                                                              |
| Heavy Vehicles, %   | 2    | 2                                                                                 | 2                                                                                 | 2    | 2                                                                                 | 2                                                                                 |
| Mvmt Flow           | 180  | 377                                                                               | 309                                                                               | 138  | 237                                                                               | 256                                                                               |
| Number of Lanes     | 0    | 1                                                                                 | 1                                                                                 | 0    | 1                                                                                 | 1                                                                                 |

| Approach                     | EB | WB   | SB   |
|------------------------------|----|------|------|
| Opposing Approach            | WB | EB   |      |
| Opposing Lanes               | 1  | 1    | 0    |
| Conflicting Approach Left SB |    |      | WB   |
| Conflicting Lanes Left       | 2  | 0    | 1    |
| Conflicting Approach Right   |    | SB   | EB   |
| Conflicting Lanes Right      | 0  | 2    | 1    |
| HCM Control Delay            | 60 | 28.8 | 17.3 |
| HCM LOS                      | F  | D    | C    |

| Lane                   | EBLn1WBLn1 | SBLn1 | SBLn2 |
|------------------------|------------|-------|-------|
| Vol Left, %            | 32%        | 0%    | 100%  |
| Vol Thru, %            | 68%        | 69%   | 0%    |
| Vol Right, %           | 0%         | 31%   | 0%    |
| Sign Control           | Stop       | Stop  | Stop  |
| Traffic Vol by Lane    | 412        | 331   | 185   |
| LT Vol                 | 133        | 0     | 185   |
| Through Vol            | 279        | 229   | 0     |
| RT Vol                 | 0          | 102   | 0     |
| Lane Flow Rate         | 557        | 447   | 237   |
| Geometry Grp           | 2          | 2     | 7     |
| Degree of Util (X)     | 0.988      | 0.786 | 0.524 |
| Departure Headway (Hd) | 6.388      | 6.328 | 7.953 |
| Convergence, Y/N       | Yes        | Yes   | Yes   |
| Cap                    | 573        | 573   | 453   |
| Service Time           | 4.388      | 4.369 | 5.699 |
| HCM Lane V/C Ratio     | 0.972      | 0.78  | 0.523 |
| HCM Control Delay      | 60         | 28.8  | 19.2  |
| HCM Lane LOS           | F          | D     | C     |
| HCM 95th-tile Q        | 14         | 7.4   | 3     |

Intersection

Intersection Delay, s/veh 23.7

Intersection LOS C

| Movement            | EBT                                                                               | EBR  | WBL  | WBT                                                                               | NBL                                                                               | NBR  |
|---------------------|-----------------------------------------------------------------------------------|------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|
| Lane Configurations |  |      |      |  |  |      |
| Traffic Vol, veh/h  | 340                                                                               | 180  | 23   | 168                                                                               | 192                                                                               | 36   |
| Future Vol, veh/h   | 340                                                                               | 180  | 23   | 168                                                                               | 192                                                                               | 36   |
| Peak Hour Factor    | 0.88                                                                              | 0.88 | 0.78 | 0.78                                                                              | 0.68                                                                              | 0.68 |
| Heavy Vehicles, %   | 2                                                                                 | 2    | 2    | 2                                                                                 | 2                                                                                 | 2    |
| Mvmt Flow           | 386                                                                               | 205  | 29   | 215                                                                               | 282                                                                               | 53   |
| Number of Lanes     | 1                                                                                 | 0    | 0    | 1                                                                                 | 1                                                                                 | 0    |

| Approach                   | EB   | WB | NB   |
|----------------------------|------|----|------|
| Opposing Approach          | WB   | EB |      |
| Opposing Lanes             | 1    | 1  | 0    |
| Conflicting Approach Left  |      | NB | EB   |
| Conflicting Lanes Left     | 0    | 1  | 1    |
| Conflicting Approach Right | NB   |    | WB   |
| Conflicting Lanes Right    | 1    | 0  | 1    |
| HCM Control Delay          | 31.8 | 13 | 17.3 |
| HCM LOS                    | D    | B  | C    |

| Lane                   | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, %            | 84%   | 0%    | 12%   |
| Vol Thru, %            | 0%    | 65%   | 88%   |
| Vol Right, %           | 16%   | 35%   | 0%    |
| Sign Control           | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 228   | 520   | 191   |
| LT Vol                 | 192   | 0     | 23    |
| Through Vol            | 0     | 340   | 168   |
| RT Vol                 | 36    | 180   | 0     |
| Lane Flow Rate         | 335   | 591   | 245   |
| Geometry Grp           | 1     | 1     | 1     |
| Degree of Util (X)     | 0.575 | 0.859 | 0.404 |
| Departure Headway (Hd) | 6.175 | 5.234 | 5.945 |
| Convergence, Y/N       | Yes   | Yes   | Yes   |
| Cap                    | 583   | 691   | 602   |
| Service Time           | 4.239 | 3.293 | 4.019 |
| HCM Lane V/C Ratio     | 0.575 | 0.855 | 0.407 |
| HCM Control Delay      | 17.3  | 31.8  | 13    |
| HCM Lane LOS           | C     | D     | B     |
| HCM 95th-tile Q        | 3.6   | 10    | 1.9   |

# HCM 2010 Signalized Intersection Summary

## 6: S HOLLY ST & E BELLEVIEW AVE

Existing  
Timing Plan: AM Peak

|                              | <div></div> |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
|------------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                                           | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |              |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 20                                                                                            | 1644                                                                              | 108                                                                               | 46                                                                                | 1122                                                                              | 133                                                                               | 115                                                                               | 147                                                                               | 251                                                                               | 77                                                                                  | 129                                                                                 | 23                                                                                  |
| Future Volume (veh/h)        | 20                                                                                            | 1644                                                                              | 108                                                                               | 46                                                                                | 1122                                                                              | 133                                                                               | 115                                                                               | 147                                                                               | 251                                                                               | 77                                                                                  | 129                                                                                 | 23                                                                                  |
| Number                       | 7                                                                                             | 4                                                                                 | 14                                                                                | 3                                                                                 | 8                                                                                 | 18                                                                                | 5                                                                                 | 2                                                                                 | 12                                                                                | 1                                                                                   | 6                                                                                   | 16                                                                                  |
| Initial Q (Qb), veh          | 0                                                                                             | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                                          |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                                          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Adj Sat Flow, veh/h/ln       | 1863                                                                                          | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1900                                                                              | 1863                                                                                | 1863                                                                                | 1900                                                                                |
| Adj Flow Rate, veh/h         | 22                                                                                            | 1827                                                                              | 120                                                                               | 56                                                                                | 1368                                                                              | 162                                                                               | 144                                                                               | 184                                                                               | 314                                                                               | 100                                                                                 | 168                                                                                 | 30                                                                                  |
| Adj No. of Lanes             | 1                                                                                             | 2                                                                                 | 1                                                                                 | 1                                                                                 | 2                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 0                                                                                 | 1                                                                                   | 1                                                                                   | 0                                                                                   |
| Peak Hour Factor             | 0.90                                                                                          | 0.90                                                                              | 0.90                                                                              | 0.82                                                                              | 0.82                                                                              | 0.82                                                                              | 0.80                                                                              | 0.80                                                                              | 0.80                                                                              | 0.77                                                                                | 0.77                                                                                | 0.77                                                                                |
| Percent Heavy Veh, %         | 2                                                                                             | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                   | 2                                                                                   | 2                                                                                   |
| Cap, veh/h                   | 164                                                                                           | 1740                                                                              | 778                                                                               | 122                                                                               | 1788                                                                              | 800                                                                               | 322                                                                               | 205                                                                               | 350                                                                               | 104                                                                                 | 369                                                                                 | 66                                                                                  |
| Arrive On Green              | 0.02                                                                                          | 0.49                                                                              | 0.49                                                                              | 0.04                                                                              | 0.51                                                                              | 0.51                                                                              | 0.05                                                                              | 0.33                                                                              | 0.33                                                                              | 0.24                                                                                | 0.24                                                                                | 0.24                                                                                |
| Sat Flow, veh/h              | 1774                                                                                          | 3539                                                                              | 1583                                                                              | 1774                                                                              | 3539                                                                              | 1583                                                                              | 1774                                                                              | 619                                                                               | 1057                                                                              | 896                                                                                 | 1539                                                                                | 275                                                                                 |
| Grp Volume(v), veh/h         | 22                                                                                            | 1827                                                                              | 120                                                                               | 56                                                                                | 1368                                                                              | 162                                                                               | 144                                                                               | 0                                                                                 | 498                                                                               | 100                                                                                 | 0                                                                                   | 198                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1774                                                                                          | 1770                                                                              | 1583                                                                              | 1774                                                                              | 1770                                                                              | 1583                                                                              | 1774                                                                              | 0                                                                                 | 1676                                                                              | 896                                                                                 | 0                                                                                   | 1814                                                                                |
| Q Serve(g_s), s              | 0.7                                                                                           | 59.0                                                                              | 5.0                                                                               | 1.9                                                                               | 37.4                                                                              | 6.8                                                                               | 6.0                                                                               | 0.0                                                                               | 33.9                                                                              | 5.9                                                                                 | 0.0                                                                                 | 11.2                                                                                |
| Cycle Q Clear(g_c), s        | 0.7                                                                                           | 59.0                                                                              | 5.0                                                                               | 1.9                                                                               | 37.4                                                                              | 6.8                                                                               | 6.0                                                                               | 0.0                                                                               | 33.9                                                                              | 28.8                                                                                | 0.0                                                                                 | 11.2                                                                                |
| Prop In Lane                 | 1.00                                                                                          |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.63                                                                              | 1.00                                                                                |                                                                                     | 0.15                                                                                |
| Lane Grp Cap(c), veh/h       | 164                                                                                           | 1740                                                                              | 778                                                                               | 122                                                                               | 1788                                                                              | 800                                                                               | 322                                                                               | 0                                                                                 | 556                                                                               | 104                                                                                 | 0                                                                                   | 435                                                                                 |
| V/C Ratio(X)                 | 0.13                                                                                          | 1.05                                                                              | 0.15                                                                              | 0.46                                                                              | 0.77                                                                              | 0.20                                                                              | 0.45                                                                              | 0.00                                                                              | 0.90                                                                              | 0.96                                                                                | 0.00                                                                                | 0.46                                                                                |
| Avail Cap(c_a), veh/h        | 214                                                                                           | 1740                                                                              | 778                                                                               | 149                                                                               | 1788                                                                              | 800                                                                               | 322                                                                               | 0                                                                                 | 556                                                                               | 104                                                                                 | 0                                                                                   | 435                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                                          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                                          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              | 1.00                                                                                | 0.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 20.1                                                                                          | 30.5                                                                              | 16.8                                                                              | 28.4                                                                              | 23.9                                                                              | 16.4                                                                              | 34.2                                                                              | 0.0                                                                               | 38.2                                                                              | 58.7                                                                                | 0.0                                                                                 | 38.9                                                                                |
| Incr Delay (d2), s/veh       | 0.4                                                                                           | 36.0                                                                              | 0.1                                                                               | 2.6                                                                               | 2.0                                                                               | 0.1                                                                               | 1.0                                                                               | 0.0                                                                               | 19.7                                                                              | 76.4                                                                                | 0.0                                                                                 | 0.7                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                                           | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 0.4                                                                                           | 37.5                                                                              | 2.2                                                                               | 1.0                                                                               | 18.7                                                                              | 3.0                                                                               | 1.4                                                                               | 0.0                                                                               | 18.7                                                                              | 5.5                                                                                 | 0.0                                                                                 | 5.7                                                                                 |
| LnGrp Delay(d),s/veh         | 20.5                                                                                          | 66.5                                                                              | 16.9                                                                              | 31.0                                                                              | 26.0                                                                              | 16.5                                                                              | 35.2                                                                              | 0.0                                                                               | 57.9                                                                              | 135.1                                                                               | 0.0                                                                                 | 39.7                                                                                |
| LnGrp LOS                    | C                                                                                             | F                                                                                 | B                                                                                 | C                                                                                 | C                                                                                 | B                                                                                 | D                                                                                 |                                                                                   | E                                                                                 | F                                                                                   |                                                                                     | D                                                                                   |
| Approach Vol, veh/h          | 1969                                                                                          |                                                                                   |                                                                                   |                                                                                   | 1586                                                                              |                                                                                   |                                                                                   |                                                                                   | 642                                                                               |                                                                                     | 298                                                                                 |                                                                                     |
| Approach Delay, s/veh        | 63.0                                                                                          |                                                                                   |                                                                                   |                                                                                   | 25.2                                                                              |                                                                                   |                                                                                   |                                                                                   | 52.8                                                                              |                                                                                     | 71.7                                                                                |                                                                                     |
| Approach LOS                 | E                                                                                             |                                                                                   |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   |                                                                                   | D                                                                                 |                                                                                     | E                                                                                   |                                                                                     |
| Timer                        | 1                                                                                             | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                 | 8                                                                                 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Assigned Phs                 |                                                                                               | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                 | 8                                                                                 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     |                                                                                               | 45.8                                                                              | 9.2                                                                               | 65.0                                                                              | 11.0                                                                              | 34.8                                                                              | 7.6                                                                               | 66.6                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      |                                                                                               | 6.0                                                                               | 5.0                                                                               | 6.0                                                                               | 5.0                                                                               | 6.0                                                                               | 5.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  |                                                                                               | 38.0                                                                              | 6.0                                                                               | 59.0                                                                              | 6.0                                                                               | 27.0                                                                              | 6.0                                                                               | 59.0                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s |                                                                                               | 35.9                                                                              | 3.9                                                                               | 61.0                                                                              | 8.0                                                                               | 30.8                                                                              | 2.7                                                                               | 39.4                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      |                                                                                               | 1.1                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 18.6                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 2010 Ctrl Delay          | 48.8                                                                                          |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 2010 LOS                 | D                                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |

HCM 2010 TWSC  
7: E HAPPY CANYON RD & E QUINCY AVE

Existing  
Timing Plan: AM Peak

| Intersection             |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |                                                                                     |                                                                                     |      |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------|
| Int Delay, s/veh         | 132                                                                               |                                                                                   |      |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |                                                                                     |                                                                                     |      |
| Movement                 | EBL                                                                               | EBT                                                                               | EBR  | WBL                                                                               | WBT                                                                               | WBR  | NBL                                                                               | NBT                                                                               | NBR  | SBL                                                                                 | SBT                                                                                 | SBR  |
| Lane Configurations      |  |  |      |  |  |      |  |  |      |  |  |      |
| Traffic Vol, veh/h       | 20                                                                                | 1                                                                                 | 346  | 20                                                                                | 1                                                                                 | 16   | 142                                                                               | 417                                                                               | 8    | 3                                                                                   | 615                                                                                 | 13   |
| Future Vol, veh/h        | 20                                                                                | 1                                                                                 | 346  | 20                                                                                | 1                                                                                 | 16   | 142                                                                               | 417                                                                               | 8    | 3                                                                                   | 615                                                                                 | 13   |
| Conflicting Peds, #/hr   | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                   | 0                                                                                   | 0    |
| Sign Control             | Stop                                                                              | Stop                                                                              | Stop | Stop                                                                              | Stop                                                                              | Stop | Free                                                                              | Free                                                                              | Free | Free                                                                                | Free                                                                                | Free |
| RT Channelized           | -                                                                                 | -                                                                                 | None | -                                                                                 | -                                                                                 | None | -                                                                                 | -                                                                                 | None | -                                                                                   | -                                                                                   | None |
| Storage Length           | 100                                                                               | -                                                                                 | -    | 0                                                                                 | -                                                                                 | -    | 125                                                                               | -                                                                                 | -    | 135                                                                                 | -                                                                                   | -    |
| Veh in Median Storage, # | -                                                                                 | 0                                                                                 | -    | -                                                                                 | 0                                                                                 | -    | -                                                                                 | 0                                                                                 | -    | -                                                                                   | 0                                                                                   | -    |
| Grade, %                 | -                                                                                 | 0                                                                                 | -    | -                                                                                 | 0                                                                                 | -    | -                                                                                 | 0                                                                                 | -    | -                                                                                   | 0                                                                                   | -    |
| Peak Hour Factor         | 80                                                                                | 80                                                                                | 80   | 77                                                                                | 77                                                                                | 77   | 73                                                                                | 73                                                                                | 73   | 92                                                                                  | 92                                                                                  | 92   |
| Heavy Vehicles, %        | 2                                                                                 | 2                                                                                 | 2    | 2                                                                                 | 2                                                                                 | 2    | 2                                                                                 | 2                                                                                 | 2    | 2                                                                                   | 2                                                                                   | 2    |
| Mvmt Flow                | 25                                                                                | 1                                                                                 | 433  | 26                                                                                | 1                                                                                 | 21   | 195                                                                               | 571                                                                               | 11   | 3                                                                                   | 668                                                                                 | 14   |

| Major/Minor          | Minor2 |       | Minor1 |       | Major1 |       | Major2 |   |   |       |   |   |
|----------------------|--------|-------|--------|-------|--------|-------|--------|---|---|-------|---|---|
| Conflicting Flow All | 1659   | 1653  | 676    | 1865  | 1655   | 577   | 683    | 0 | 0 | 582   | 0 | 0 |
| Stage 1              | 682    | 682   | -      | 966   | 966    | -     | -      | - | - | -     | - | - |
| Stage 2              | 977    | 971   | -      | 899   | 689    | -     | -      | - | - | -     | - | - |
| Critical Hdwy        | 7.12   | 6.52  | 6.22   | 7.12  | 6.52   | 6.22  | 4.12   | - | - | 4.12  | - | - |
| Critical Hdwy Stg 1  | 6.12   | 5.52  | -      | 6.12  | 5.52   | -     | -      | - | - | -     | - | - |
| Critical Hdwy Stg 2  | 6.12   | 5.52  | -      | 6.12  | 5.52   | -     | -      | - | - | -     | - | - |
| Follow-up Hdwy       | 3.518  | 4.018 | 3.318  | 3.518 | 4.018  | 3.318 | 2.218  | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver   | 78     | 98    | 453    | 56    | 98     | 516   | 910    | - | - | 992   | - | - |
| Stage 1              | 440    | 450   | -      | 306   | 333    | -     | -      | - | - | -     | - | - |
| Stage 2              | 302    | 331   | -      | 334   | 446    | -     | -      | - | - | -     | - | - |
| Platoon blocked, %   |        |       |        |       |        |       |        | - | - | -     | - | - |
| Mov Cap-1 Maneuver   | 62     | 77    | 453    | ~ 2   | 77     | 516   | 910    | - | - | 992   | - | - |
| Mov Cap-2 Maneuver   | 62     | 77    | -      | ~ 2   | 77     | -     | -      | - | - | -     | - | - |
| Stage 1              | 346    | 449   | -      | 240   | 262    | -     | -      | - | - | -     | - | - |
| Stage 2              | 227    | 260   | -      | ~ 15  | 445    | -     | -      | - | - | -     | - | - |

| Approach             | EB   | WB        | NB  | SB |
|----------------------|------|-----------|-----|----|
| HCM Control Delay, s | 67.8 | \$ 4720.5 | 2.5 | 0  |
| HCM LOS              | F    | F         |     |    |

| Minor Lane/Major Mvmt | NBL   | NBT | NBR | EBLn1 | EBLn2 | WBLn1  | WBLn2 | SBL   | SBT | SBR |
|-----------------------|-------|-----|-----|-------|-------|--------|-------|-------|-----|-----|
| Capacity (veh/h)      | 910   | -   | -   | 62    | 447   | 2      | 386   | 992   | -   | -   |
| HCM Lane V/C Ratio    | 0.214 | -   | -   | 0.403 | 0.97  | 12.987 | 0.057 | 0.003 | -   | -   |
| HCM Control Delay (s) | 10    | -   | -   | 97.8  | 66.1  | 8720.3 | 14.9  | 8.6   | -   | -   |
| HCM Lane LOS          | B     | -   | -   | F     | F     | F      | B     | A     | -   | -   |
| HCM 95th %tile Q(veh) | 0.8   | -   | -   | 1.5   | 12    | 5      | 0.2   | 0     | -   | -   |

| Notes                      |                        |                            |  |  |  |  |  |  |                                |  |  |  |
|----------------------------|------------------------|----------------------------|--|--|--|--|--|--|--------------------------------|--|--|--|
| ~: Volume exceeds capacity | \$: Delay exceeds 300s | +: Computation Not Defined |  |  |  |  |  |  | *: All major volume in platoon |  |  |  |



HCM 2010 AWSC  
8: E MANSFIELD AVE & E HAPPY CANYON RD

Existing  
Timing Plan: AM Peak

| Intersection              |      |
|---------------------------|------|
| Intersection Delay, s/veh | 37.7 |
| Intersection LOS          | E    |

| Movement            | SEU  | SEL  | SET                                                                               | SER  | NWL  | NWT                                                                               | NWR  | NEL  | NET                                                                                 | NER  | SWL  | SWT                                                                                 |
|---------------------|------|------|-----------------------------------------------------------------------------------|------|------|-----------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|
| Lane Configurations |      |      |  |      |      |  |      |      |  |      |      |  |
| Traffic Vol, veh/h  | 0    | 34   | 385                                                                               | 0    | 13   | 316                                                                               | 21   | 10   | 27                                                                                  | 159  | 53   | 9                                                                                   |
| Future Vol, veh/h   | 0    | 34   | 385                                                                               | 0    | 13   | 316                                                                               | 21   | 10   | 27                                                                                  | 159  | 53   | 9                                                                                   |
| Peak Hour Factor    | 0.92 | 0.87 | 0.87                                                                              | 0.87 | 0.87 | 0.87                                                                              | 0.87 | 0.86 | 0.86                                                                                | 0.86 | 0.34 | 0.34                                                                                |
| Heavy Vehicles, %   | 2    | 2    | 2                                                                                 | 2    | 2    | 2                                                                                 | 2    | 2    | 2                                                                                   | 2    | 2    | 2                                                                                   |
| Mvmt Flow           | 0    | 39   | 443                                                                               | 0    | 15   | 363                                                                               | 24   | 12   | 31                                                                                  | 185  | 156  | 26                                                                                  |
| Number of Lanes     | 0    | 0    | 1                                                                                 | 0    | 0    | 1                                                                                 | 0    | 0    | 1                                                                                   | 0    | 0    | 1                                                                                   |

| Approach                   | SE   | NW   | NE | SW   |
|----------------------------|------|------|----|------|
| Opposing Approach          | NW   | SE   | SW | NE   |
| Opposing Lanes             | 1    | 1    | 1  | 1    |
| Conflicting Approach Left  | SW   | NE   | SE | NW   |
| Conflicting Lanes Left     | 1    | 1    | 1  | 1    |
| Conflicting Approach Right | NE   | SW   | NW | SE   |
| Conflicting Lanes Right    | 1    | 1    | 1  | 1    |
| HCM Control Delay          | 57.8 | 35.5 | 18 | 22.3 |
| HCM LOS                    | F    | E    | C  | C    |

| Lane                   | NELn1 | NWLn1 | SELn1 | SWLn1 |
|------------------------|-------|-------|-------|-------|
| Vol Left, %            | 5%    | 4%    | 8%    | 56%   |
| Vol Thru, %            | 14%   | 90%   | 92%   | 10%   |
| Vol Right, %           | 81%   | 6%    | 0%    | 34%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 196   | 350   | 419   | 94    |
| LT Vol                 | 10    | 13    | 34    | 53    |
| Through Vol            | 27    | 316   | 385   | 9     |
| RT Vol                 | 159   | 21    | 0     | 32    |
| Lane Flow Rate         | 228   | 402   | 482   | 276   |
| Geometry Grp           | 1     | 1     | 1     | 1     |
| Degree of Util (X)     | 0.489 | 0.816 | 0.961 | 0.603 |
| Departure Headway (Hd) | 7.718 | 7.3   | 7.187 | 7.853 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 465   | 495   | 511   | 459   |
| Service Time           | 5.804 | 5.372 | 5.187 | 5.935 |
| HCM Lane V/C Ratio     | 0.49  | 0.812 | 0.943 | 0.601 |
| HCM Control Delay      | 18    | 35.5  | 57.8  | 22.3  |
| HCM Lane LOS           | C     | E     | F     | C     |
| HCM 95th-tile Q        | 2.6   | 7.8   | 12.3  | 3.9   |

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Intersection

Intersection Delay, s/veh

Intersection LOS

Movement SWR

Lane Configurations

Traffic Vol, veh/h 32

Future Vol, veh/h 32

Peak Hour Factor 0.34

Heavy Vehicles, % 2

Mvmt Flow 94

Number of Lanes 0

Approach

Opposing Approach

Opposing Lanes

Conflicting Approach Left

Conflicting Lanes Left

Conflicting Approach Right

Conflicting Lanes Right

HCM Control Delay

HCM LOS

# HCM Signalized Intersection Capacity Analysis

## 9: S DAHLIA ST & E HAPPY CANYON RD & E HAMPDEN AVE

Existing  
Timing Plan: AM Peak

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | EBR2                                                                              | WBL2                                                                              | WBL                                                                               | WBT                                                                                | WBR                                                                                 | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL2                                                                                |
| Lane Configurations               |  |  |  |                                                                                   |                                                                                   |  |  |                                                                                     |                                                                                     |  |                                                                                     |                                                                                     |
| Traffic Volume (vph)              | 4                                                                                 | 1818                                                                              | 281                                                                               | 5                                                                                 | 10                                                                                | 6                                                                                 | 1588                                                                               | 26                                                                                  | 19                                                                                  | 73                                                                                  | 20                                                                                  | 54                                                                                  |
| Future Volume (vph)               | 4                                                                                 | 1818                                                                              | 281                                                                               | 5                                                                                 | 10                                                                                | 6                                                                                 | 1588                                                                               | 26                                                                                  | 19                                                                                  | 73                                                                                  | 20                                                                                  | 54                                                                                  |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                               | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                   | 6.0                                                                               | 6.0                                                                                |                                                                                     |                                                                                     | 6.0                                                                                 |                                                                                     |                                                                                     |
| Lane Util. Factor                 | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              | 0.95                                                                               |                                                                                     |                                                                                     | 1.00                                                                                |                                                                                     |                                                                                     |
| Frt                               | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              |                                                                                   |                                                                                   | 1.00                                                                              | 1.00                                                                               |                                                                                     |                                                                                     | 0.98                                                                                |                                                                                     |                                                                                     |
| Flt Protected                     | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 0.95                                                                              | 1.00                                                                               |                                                                                     |                                                                                     | 0.99                                                                                |                                                                                     |                                                                                     |
| Satd. Flow (prot)                 | 1770                                                                              | 3539                                                                              | 1583                                                                              |                                                                                   |                                                                                   | 1770                                                                              | 3525                                                                               |                                                                                     |                                                                                     | 1801                                                                                |                                                                                     |                                                                                     |
| Flt Permitted                     | 0.05                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 0.05                                                                              | 1.00                                                                               |                                                                                     |                                                                                     | 0.93                                                                                |                                                                                     |                                                                                     |
| Satd. Flow (perm)                 | 96                                                                                | 3539                                                                              | 1583                                                                              |                                                                                   |                                                                                   | 96                                                                                | 3525                                                                               |                                                                                     |                                                                                     | 1693                                                                                |                                                                                     |                                                                                     |
| Peak-hour factor, PHF             | 0.50                                                                              | 0.94                                                                              | 0.76                                                                              | 0.31                                                                              | 0.62                                                                              | 0.50                                                                              | 0.95                                                                               | 0.58                                                                                | 0.59                                                                                | 0.73                                                                                | 0.71                                                                                | 0.71                                                                                |
| Adj. Flow (vph)                   | 8                                                                                 | 1934                                                                              | 370                                                                               | 16                                                                                | 16                                                                                | 12                                                                                | 1672                                                                               | 45                                                                                  | 32                                                                                  | 100                                                                                 | 28                                                                                  | 76                                                                                  |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 31                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 1                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 8                                                                                 | 1934                                                                              | 355                                                                               | 0                                                                                 | 0                                                                                 | 28                                                                                | 1716                                                                               | 0                                                                                   | 0                                                                                   | 160                                                                                 | 0                                                                                   | 0                                                                                   |
| Turn Type                         | Perm                                                                              | NA                                                                                | Perm                                                                              |                                                                                   | Perm                                                                              | Perm                                                                              | NA                                                                                 |                                                                                     | Perm                                                                                | NA                                                                                  |                                                                                     | Perm                                                                                |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 8                                                                                  |                                                                                     |                                                                                     | 2                                                                                   |                                                                                     |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   | 4                                                                                 |                                                                                   | 8                                                                                 | 8                                                                                 |                                                                                    |                                                                                     | 2                                                                                   |                                                                                     |                                                                                     | 6                                                                                   |
| Actuated Green, G (s)             | 78.0                                                                              | 78.0                                                                              | 78.0                                                                              |                                                                                   |                                                                                   | 78.0                                                                              | 78.0                                                                               |                                                                                     |                                                                                     | 32.8                                                                                |                                                                                     |                                                                                     |
| Effective Green, g (s)            | 78.0                                                                              | 78.0                                                                              | 78.0                                                                              |                                                                                   |                                                                                   | 78.0                                                                              | 78.0                                                                               |                                                                                     |                                                                                     | 32.8                                                                                |                                                                                     |                                                                                     |
| Actuated g/C Ratio                | 0.56                                                                              | 0.56                                                                              | 0.56                                                                              |                                                                                   |                                                                                   | 0.56                                                                              | 0.56                                                                               |                                                                                     |                                                                                     | 0.23                                                                                |                                                                                     |                                                                                     |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                   | 6.0                                                                               | 6.0                                                                                |                                                                                     |                                                                                     | 6.0                                                                                 |                                                                                     |                                                                                     |
| Vehicle Extension (s)             | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               |                                                                                   |                                                                                   | 3.0                                                                               | 3.0                                                                                |                                                                                     |                                                                                     | 3.0                                                                                 |                                                                                     |                                                                                     |
| Lane Grp Cap (vph)                | 53                                                                                | 1971                                                                              | 881                                                                               |                                                                                   |                                                                                   | 53                                                                                | 1963                                                                               |                                                                                     |                                                                                     | 396                                                                                 |                                                                                     |                                                                                     |
| v/s Ratio Prot                    |                                                                                   | c0.55                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 0.49                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Perm                    | 0.08                                                                              |                                                                                   | 0.22                                                                              |                                                                                   |                                                                                   | 0.29                                                                              |                                                                                    |                                                                                     |                                                                                     | 0.09                                                                                |                                                                                     |                                                                                     |
| v/c Ratio                         | 0.15                                                                              | 0.98                                                                              | 0.40                                                                              |                                                                                   |                                                                                   | 0.53                                                                              | 0.87                                                                               |                                                                                     |                                                                                     | 0.40                                                                                |                                                                                     |                                                                                     |
| Uniform Delay, d1                 | 15.0                                                                              | 30.3                                                                              | 17.7                                                                              |                                                                                   |                                                                                   | 19.5                                                                              | 26.8                                                                               |                                                                                     |                                                                                     | 45.3                                                                                |                                                                                     |                                                                                     |
| Progression Factor                | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              | 1.00                                                                               |                                                                                     |                                                                                     | 1.00                                                                                |                                                                                     |                                                                                     |
| Incremental Delay, d2             | 1.3                                                                               | 16.0                                                                              | 0.3                                                                               |                                                                                   |                                                                                   | 9.2                                                                               | 4.7                                                                                |                                                                                     |                                                                                     | 3.0                                                                                 |                                                                                     |                                                                                     |
| Delay (s)                         | 16.3                                                                              | 46.3                                                                              | 18.0                                                                              |                                                                                   |                                                                                   | 28.6                                                                              | 31.4                                                                               |                                                                                     |                                                                                     | 48.4                                                                                |                                                                                     |                                                                                     |
| Level of Service                  | B                                                                                 | D                                                                                 | B                                                                                 |                                                                                   |                                                                                   | C                                                                                 | C                                                                                  |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |
| Approach Delay (s)                |                                                                                   | 41.5                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 31.4                                                                               |                                                                                     |                                                                                     | 48.4                                                                                |                                                                                     |                                                                                     |
| Approach LOS                      |                                                                                   | D                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   | C                                                                                  |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 39.8                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                    |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.86                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 140.0                                                                             |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                    |                                                                                     |                                                                                     | 18.0                                                                                |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 86.9%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                    |                                                                                     |                                                                                     | E                                                                                   |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM Signalized Intersection Capacity Analysis

## 9: S DAHLIA ST & E HAPPY CANYON RD & E HAMPDEN AVE

Existing  
Timing Plan: AM Peak



| Movement               | SBL   | SBT  | SBR  | NWL2 | NWL  | NWR   | NWR2 |
|------------------------|-------|------|------|------|------|-------|------|
| Lane Configurations    |       |      |      |      |      |       |      |
| Traffic Volume (vph)   | 66    | 31   | 14   | 1    | 1    | 12    | 123  |
| Future Volume (vph)    | 66    | 31   | 14   | 1    | 1    | 12    | 123  |
| Ideal Flow (vphpl)     | 1900  | 1900 | 1900 | 1900 | 1900 | 1900  | 1900 |
| Total Lost time (s)    | 6.0   | 6.0  |      |      | 6.0  | 6.0   |      |
| Lane Util. Factor      | 1.00  | 1.00 |      |      | 0.97 | 1.00  |      |
| Frt                    | 1.00  | 0.95 |      |      | 1.00 | 0.85  |      |
| Flt Protected          | 0.95  | 1.00 |      |      | 0.95 | 1.00  |      |
| Satd. Flow (prot)      | 1770  | 1770 |      |      | 3433 | 1583  |      |
| Flt Permitted          | 0.56  | 1.00 |      |      | 0.95 | 1.00  |      |
| Satd. Flow (perm)      | 1048  | 1770 |      |      | 3433 | 1583  |      |
| Peak-hour factor, PHF  | 0.72  | 0.78 | 0.70 | 0.25 | 0.84 | 0.90  | 0.67 |
| Adj. Flow (vph)        | 92    | 40   | 20   | 4    | 1    | 13    | 184  |
| RTOR Reduction (vph)   | 0     | 12   | 0    | 0    | 0    | 129   | 0    |
| Lane Group Flow (vph)  | 168   | 48   | 0    | 0    | 5    | 68    | 0    |
| Turn Type              | Perm  | NA   |      | Prot | Prot | Perm  |      |
| Protected Phases       |       | 6    |      | 10   | 10   |       |      |
| Permitted Phases       | 6     |      |      |      |      | 10    |      |
| Actuated Green, G (s)  | 32.8  | 32.8 |      |      | 11.2 | 11.2  |      |
| Effective Green, g (s) | 32.8  | 32.8 |      |      | 11.2 | 11.2  |      |
| Actuated g/C Ratio     | 0.23  | 0.23 |      |      | 0.08 | 0.08  |      |
| Clearance Time (s)     | 6.0   | 6.0  |      |      | 6.0  | 6.0   |      |
| Vehicle Extension (s)  | 3.0   | 3.0  |      |      | 3.0  | 3.0   |      |
| Lane Grp Cap (vph)     | 245   | 414  |      |      | 274  | 126   |      |
| v/s Ratio Prot         |       | 0.03 |      |      | 0.00 |       |      |
| v/s Ratio Perm         | c0.16 |      |      |      |      | c0.04 |      |
| v/c Ratio              | 0.69  | 0.12 |      |      | 0.02 | 0.54  |      |
| Uniform Delay, d1      | 48.9  | 42.2 |      |      | 59.3 | 61.9  |      |
| Progression Factor     | 1.00  | 1.00 |      |      | 1.00 | 1.00  |      |
| Incremental Delay, d2  | 14.5  | 0.6  |      |      | 0.0  | 4.7   |      |
| Delay (s)              | 63.4  | 42.7 |      |      | 59.4 | 66.6  |      |
| Level of Service       | E     | D    |      |      | E    | E     |      |
| Approach Delay (s)     |       | 58.0 |      |      | 66.4 |       |      |
| Approach LOS           |       | E    |      |      | E    |       |      |
| Intersection Summary   |       |      |      |      |      |       |      |

HCM 2010 TWSC  
10: KENT DENVER SCHOOL & E QUINCY AVE

Existing  
Timing Plan: AM Peak

| Intersection             |                                                                                   |       |        |                                                                                   |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-------|--------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 3.1                                                                               |       |        |                                                                                   |                                                                                   |                                                                                   |
| Movement                 | EBT                                                                               | EBR   | WBL    | WBT                                                                               | NBL                                                                               | NBR                                                                               |
| Lane Configurations      |  |       |        |  |  |  |
| Traffic Vol, veh/h       | 301                                                                               | 110   | 141    | 169                                                                               | 14                                                                                | 44                                                                                |
| Future Vol, veh/h        | 301                                                                               | 110   | 141    | 169                                                                               | 14                                                                                | 44                                                                                |
| Conflicting Peds, #/hr   | 0                                                                                 | 0     | 0      | 0                                                                                 | 0                                                                                 | 0                                                                                 |
| Sign Control             | Free                                                                              | Free  | Free   | Free                                                                              | Stop                                                                              | Stop                                                                              |
| RT Channelized           | -                                                                                 | None  | -      | None                                                                              | -                                                                                 | None                                                                              |
| Storage Length           | -                                                                                 | -     | -      | -                                                                                 | 0                                                                                 | 175                                                                               |
| Veh in Median Storage, # | 0                                                                                 | -     | -      | 0                                                                                 | 0                                                                                 | -                                                                                 |
| Grade, %                 | 0                                                                                 | -     | -      | 0                                                                                 | 0                                                                                 | -                                                                                 |
| Peak Hour Factor         | 90                                                                                | 90    | 88     | 88                                                                                | 56                                                                                | 56                                                                                |
| Heavy Vehicles, %        | 2                                                                                 | 2     | 2      | 2                                                                                 | 2                                                                                 | 2                                                                                 |
| Mvmt Flow                | 334                                                                               | 122   | 160    | 192                                                                               | 25                                                                                | 79                                                                                |
|                          |                                                                                   |       |        |                                                                                   |                                                                                   |                                                                                   |
| Major/Minor              | Major1                                                                            |       | Major2 |                                                                                   | Minor1                                                                            |                                                                                   |
| Conflicting Flow All     | 0                                                                                 | 0     | 457    | 0                                                                                 | 909                                                                               | 396                                                                               |
| Stage 1                  | -                                                                                 | -     | -      | -                                                                                 | 396                                                                               | -                                                                                 |
| Stage 2                  | -                                                                                 | -     | -      | -                                                                                 | 513                                                                               | -                                                                                 |
| Critical Hdwy            | -                                                                                 | -     | 4.12   | -                                                                                 | 6.42                                                                              | 6.22                                                                              |
| Critical Hdwy Stg 1      | -                                                                                 | -     | -      | -                                                                                 | 5.42                                                                              | -                                                                                 |
| Critical Hdwy Stg 2      | -                                                                                 | -     | -      | -                                                                                 | 5.42                                                                              | -                                                                                 |
| Follow-up Hdwy           | -                                                                                 | -     | 2.218  | -                                                                                 | 3.518                                                                             | 3.318                                                                             |
| Pot Cap-1 Maneuver       | -                                                                                 | -     | 1104   | -                                                                                 | 305                                                                               | 653                                                                               |
| Stage 1                  | -                                                                                 | -     | -      | -                                                                                 | 680                                                                               | -                                                                                 |
| Stage 2                  | -                                                                                 | -     | -      | -                                                                                 | 601                                                                               | -                                                                                 |
| Platoon blocked, %       | -                                                                                 | -     |        | -                                                                                 |                                                                                   |                                                                                   |
| Mov Cap-1 Maneuver       | -                                                                                 | -     | 1104   | -                                                                                 | 256                                                                               | 653                                                                               |
| Mov Cap-2 Maneuver       | -                                                                                 | -     | -      | -                                                                                 | 256                                                                               | -                                                                                 |
| Stage 1                  | -                                                                                 | -     | -      | -                                                                                 | 680                                                                               | -                                                                                 |
| Stage 2                  | -                                                                                 | -     | -      | -                                                                                 | 504                                                                               | -                                                                                 |
|                          |                                                                                   |       |        |                                                                                   |                                                                                   |                                                                                   |
|                          |                                                                                   |       |        |                                                                                   |                                                                                   |                                                                                   |
| Approach                 | EB                                                                                |       | WB     |                                                                                   | NB                                                                                |                                                                                   |
| HCM Control Delay, s     | 0                                                                                 |       | 4      |                                                                                   | 13.5                                                                              |                                                                                   |
| HCM LOS                  |                                                                                   |       |        |                                                                                   | B                                                                                 |                                                                                   |
|                          |                                                                                   |       |        |                                                                                   |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBLn1                                                                             | NBLn2 | EBT    | EBR                                                                               | WBL                                                                               | WBT                                                                               |
| Capacity (veh/h)         | 256                                                                               | 653   | -      | -                                                                                 | 1104                                                                              | -                                                                                 |
| HCM Lane V/C Ratio       | 0.098                                                                             | 0.12  | -      | -                                                                                 | 0.145                                                                             | -                                                                                 |
| HCM Control Delay (s)    | 20.6                                                                              | 11.3  | -      | -                                                                                 | 8.8                                                                               | 0                                                                                 |
| HCM Lane LOS             | C                                                                                 | B     | -      | -                                                                                 | A                                                                                 | A                                                                                 |
| HCM 95th %tile Q(veh)    | 0.3                                                                               | 0.4   | -      | -                                                                                 | 0.5                                                                               | -                                                                                 |

| Intersection             |                                                                                   |          |                                                                                   |       |       |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------|-------|-------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 0.1                                                                               |          |                                                                                   |       |       |                                                                                   |
| Movement                 | NWL                                                                               | NWR      | NET                                                                               | NER   | SWL   | SWT                                                                               |
| Lane Configurations      |  |          |  |       |       |  |
| Traffic Vol, veh/h       | 0                                                                                 | 4        | 260                                                                               | 2     | 3     | 174                                                                               |
| Future Vol, veh/h        | 0                                                                                 | 4        | 260                                                                               | 2     | 3     | 174                                                                               |
| Conflicting Peds, #/hr   | 0                                                                                 | 0        | 0                                                                                 | 0     | 0     | 0                                                                                 |
| Sign Control             | Stop                                                                              | Stop     | Free                                                                              | Free  | Free  | Free                                                                              |
| RT Channelized           | -                                                                                 | None     | -                                                                                 | None  | -     | None                                                                              |
| Storage Length           | 0                                                                                 | -        | -                                                                                 | -     | -     | -                                                                                 |
| Veh in Median Storage, # | 0                                                                                 | -        | 0                                                                                 | -     | -     | 0                                                                                 |
| Grade, %                 | 0                                                                                 | -        | 0                                                                                 | -     | -     | 0                                                                                 |
| Peak Hour Factor         | 100                                                                               | 100      | 52                                                                                | 52    | 63    | 63                                                                                |
| Heavy Vehicles, %        | 2                                                                                 | 2        | 2                                                                                 | 2     | 2     | 2                                                                                 |
| Mvmt Flow                | 0                                                                                 | 4        | 500                                                                               | 4     | 5     | 276                                                                               |
| Major/Minor              | Minor1                                                                            | Major1   | Major2                                                                            |       |       |                                                                                   |
| Conflicting Flow All     | 788                                                                               | 502      | 0                                                                                 | 0     | 504   | 0                                                                                 |
| Stage 1                  | 502                                                                               | -        | -                                                                                 | -     | -     | -                                                                                 |
| Stage 2                  | 286                                                                               | -        | -                                                                                 | -     | -     | -                                                                                 |
| Critical Hdwy            | 6.42                                                                              | 6.22     | -                                                                                 | -     | 4.12  | -                                                                                 |
| Critical Hdwy Stg 1      | 5.42                                                                              | -        | -                                                                                 | -     | -     | -                                                                                 |
| Critical Hdwy Stg 2      | 5.42                                                                              | -        | -                                                                                 | -     | -     | -                                                                                 |
| Follow-up Hdwy           | 3.518                                                                             | 3.318    | -                                                                                 | -     | 2.218 | -                                                                                 |
| Pot Cap-1 Maneuver       | 360                                                                               | 569      | -                                                                                 | -     | 1061  | -                                                                                 |
| Stage 1                  | 608                                                                               | -        | -                                                                                 | -     | -     | -                                                                                 |
| Stage 2                  | 763                                                                               | -        | -                                                                                 | -     | -     | -                                                                                 |
| Platoon blocked, %       |                                                                                   |          | -                                                                                 | -     |       | -                                                                                 |
| Mov Cap-1 Maneuver       | 358                                                                               | 569      | -                                                                                 | -     | 1061  | -                                                                                 |
| Mov Cap-2 Maneuver       | 358                                                                               | -        | -                                                                                 | -     | -     | -                                                                                 |
| Stage 1                  | 608                                                                               | -        | -                                                                                 | -     | -     | -                                                                                 |
| Stage 2                  | 758                                                                               | -        | -                                                                                 | -     | -     | -                                                                                 |
| Approach                 | NW                                                                                | NE       | SW                                                                                |       |       |                                                                                   |
| HCM Control Delay, s     | 11.4                                                                              | 0        | 0.1                                                                               |       |       |                                                                                   |
| HCM LOS                  | B                                                                                 |          |                                                                                   |       |       |                                                                                   |
| Minor Lane/Major Mvmt    | NET                                                                               | NERNWLn1 | SWL                                                                               | SWT   |       |                                                                                   |
| Capacity (veh/h)         | -                                                                                 | -        | 569                                                                               | 1061  | -     |                                                                                   |
| HCM Lane V/C Ratio       | -                                                                                 | -        | 0.007                                                                             | 0.004 | -     |                                                                                   |
| HCM Control Delay (s)    | -                                                                                 | -        | 11.4                                                                              | 8.4   | 0     |                                                                                   |
| HCM Lane LOS             | -                                                                                 | -        | B                                                                                 | A     | A     |                                                                                   |
| HCM 95th %tile Q(veh)    | -                                                                                 | -        | 0                                                                                 | 0     | -     |                                                                                   |

HCM 2010 TWSC  
12: S UNIVERSITY BLVD & DRIVEWAY

Existing  
Timing Plan: AM Peak

| Intersection               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |                                |
|----------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------------------|
| Int Delay, s/veh           | 4.1                                                                               |                                                                                   |       |                                                                                   |                                                                                   |                                |
| Movement                   | EBL                                                                               | EBR                                                                               | NBL   | NBT                                                                               | SBT                                                                               | SBR                            |
| Lane Configurations        |  |  |       |  |  |                                |
| Traffic Vol, veh/h         | 73                                                                                | 61                                                                                | 0     | 1430                                                                              | 1320                                                                              | 0                              |
| Future Vol, veh/h          | 73                                                                                | 61                                                                                | 0     | 1430                                                                              | 1320                                                                              | 0                              |
| Conflicting Peds, #/hr     | 0                                                                                 | 0                                                                                 | 0     | 0                                                                                 | 0                                                                                 | 0                              |
| Sign Control               | Stop                                                                              | Stop                                                                              | Free  | Free                                                                              | Free                                                                              | Free                           |
| RT Channelized             | -                                                                                 | None                                                                              | -     | None                                                                              | -                                                                                 | None                           |
| Storage Length             | 0                                                                                 | 0                                                                                 | -     | -                                                                                 | -                                                                                 | -                              |
| Veh in Median Storage, #   | 0                                                                                 | -                                                                                 | -     | 0                                                                                 | 0                                                                                 | -                              |
| Grade, %                   | 0                                                                                 | -                                                                                 | -     | 0                                                                                 | 0                                                                                 | -                              |
| Peak Hour Factor           | 67                                                                                | 67                                                                                | 94    | 94                                                                                | 91                                                                                | 91                             |
| Heavy Vehicles, %          | 2                                                                                 | 2                                                                                 | 2     | 2                                                                                 | 2                                                                                 | 2                              |
| Mvmt Flow                  | 109                                                                               | 91                                                                                | 0     | 1521                                                                              | 1451                                                                              | 0                              |
|                            |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |                                |
| Major/Minor                | Minor2                                                                            | Major1                                                                            |       | Major2                                                                            |                                                                                   |                                |
| Conflicting Flow All       | 2212                                                                              | 725                                                                               | -     | 0                                                                                 | -                                                                                 | 0                              |
| Stage 1                    | 1451                                                                              | -                                                                                 | -     | -                                                                                 | -                                                                                 | -                              |
| Stage 2                    | 761                                                                               | -                                                                                 | -     | -                                                                                 | -                                                                                 | -                              |
| Critical Hdwy              | 6.84                                                                              | 6.94                                                                              | -     | -                                                                                 | -                                                                                 | -                              |
| Critical Hdwy Stg 1        | 5.84                                                                              | -                                                                                 | -     | -                                                                                 | -                                                                                 | -                              |
| Critical Hdwy Stg 2        | 5.84                                                                              | -                                                                                 | -     | -                                                                                 | -                                                                                 | -                              |
| Follow-up Hdwy             | 3.52                                                                              | 3.32                                                                              | -     | -                                                                                 | -                                                                                 | -                              |
| Pot Cap-1 Maneuver         | ~ 37                                                                              | 368                                                                               | 0     | -                                                                                 | -                                                                                 | 0                              |
| Stage 1                    | 182                                                                               | -                                                                                 | 0     | -                                                                                 | -                                                                                 | 0                              |
| Stage 2                    | 422                                                                               | -                                                                                 | 0     | -                                                                                 | -                                                                                 | 0                              |
| Platoon blocked, %         |                                                                                   |                                                                                   |       | -                                                                                 | -                                                                                 |                                |
| Mov Cap-1 Maneuver         | ~ 37                                                                              | 368                                                                               | -     | -                                                                                 | -                                                                                 | -                              |
| Mov Cap-2 Maneuver         | 130                                                                               | -                                                                                 | -     | -                                                                                 | -                                                                                 | -                              |
| Stage 1                    | 182                                                                               | -                                                                                 | -     | -                                                                                 | -                                                                                 | -                              |
| Stage 2                    | 422                                                                               | -                                                                                 | -     | -                                                                                 | -                                                                                 | -                              |
|                            |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |                                |
| Approach                   | EB                                                                                | NB                                                                                |       | SB                                                                                |                                                                                   |                                |
| HCM Control Delay, s       | 65.3                                                                              | 0                                                                                 |       | 0                                                                                 |                                                                                   |                                |
| HCM LOS                    | F                                                                                 |                                                                                   |       |                                                                                   |                                                                                   |                                |
|                            |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |                                |
| Minor Lane/Major Mvmt      | NBT                                                                               | EBLn1                                                                             | EBLn2 | SBT                                                                               |                                                                                   |                                |
| Capacity (veh/h)           | -                                                                                 | 130                                                                               | 368   | -                                                                                 |                                                                                   |                                |
| HCM Lane V/C Ratio         | -                                                                                 | 0.838                                                                             | 0.247 | -                                                                                 |                                                                                   |                                |
| HCM Control Delay (s)      | -                                                                                 | 104.8                                                                             | 18    | -                                                                                 |                                                                                   |                                |
| HCM Lane LOS               | -                                                                                 | F                                                                                 | C     | -                                                                                 |                                                                                   |                                |
| HCM 95th %tile Q(veh)      | -                                                                                 | 5.2                                                                               | 1     | -                                                                                 |                                                                                   |                                |
| Notes                      |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |                                |
| ~: Volume exceeds capacity |                                                                                   | \$: Delay exceeds 300s                                                            |       | +: Computation Not Defined                                                        |                                                                                   | *: All major volume in platoon |



HCM 2010 TWSC  
13: S UNIVERSITY BLVD & DRIVEWAY/CHERRY RIDGE RD

Existing  
Timing Plan: AM Peak

Intersection

Int Delay, s/veh 1.5

| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations      |      |      |      |      | ↕    |      | ↕    | ↕    |      | ↕    | ↕    | ↕    |
| Traffic Vol, veh/h       | 0    | 0    | 0    | 5    | 0    | 30   | 92   | 1420 | 10   | 5    | 1260 | 150  |
| Future Vol, veh/h        | 0    | 0    | 0    | 5    | 0    | 30   | 92   | 1420 | 10   | 5    | 1260 | 150  |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | -    | -    | -    | -    | 100  | -    | -    | 100  | -    | 0    |
| Veh in Median Storage, # | -    | -    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 92   | 92   | 92   | 67   | 67   | 67   | 95   | 95   | 95   | 91   | 91   | 91   |
| Heavy Vehicles, %        | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Mvmt Flow                | 0    | 0    | 0    | 7    | 0    | 45   | 97   | 1495 | 11   | 5    | 1385 | 165  |

| Major/Minor          | Minor1    | Major1    | Major2       |
|----------------------|-----------|-----------|--------------|
| Conflicting Flow All | 2397 3090 | 753 1385  | 0 0 1505 0 0 |
| Stage 1              | 1694 1694 | - -       | - - - - -    |
| Stage 2              | 703 1396  | - -       | - - - - -    |
| Critical Hdwy        | 6.84 6.54 | 6.94 4.14 | - - 4.14 - - |
| Critical Hdwy Stg 1  | 5.84 5.54 | - -       | - - - - -    |
| Critical Hdwy Stg 2  | 5.84 5.54 | - -       | - - - - -    |
| Follow-up Hdwy       | 3.52 4.02 | 3.32 2.22 | - - 2.22 - - |
| Pot Cap-1 Maneuver   | 28 12     | 352 490   | - - 441 - -  |
| Stage 1              | 134 147   | - -       | - - - - -    |
| Stage 2              | 452 206   | - -       | - - - - -    |
| Platoon blocked, %   |           |           | - - - - -    |
| Mov Cap-1 Maneuver   | 22 0      | 352 490   | - - 441 - -  |
| Mov Cap-2 Maneuver   | 22 0      | - -       | - - - - -    |
| Stage 1              | 107 0     | - -       | - - - - -    |
| Stage 2              | 447 0     | - -       | - - - - -    |

| Approach             | WB   | NB  | SB |
|----------------------|------|-----|----|
| HCM Control Delay, s | 62.6 | 0.9 | 0  |
| HCM LOS              | F    |     |    |

| Minor Lane/Major Mvmt | NBL   | NBT | NBRWBLn1 | SBL   | SBT | SBR |
|-----------------------|-------|-----|----------|-------|-----|-----|
| Capacity (veh/h)      | 490   | -   | - 112    | 441   | -   | -   |
| HCM Lane V/C Ratio    | 0.198 | -   | - 0.466  | 0.012 | -   | -   |
| HCM Control Delay (s) | 14.1  | -   | - 62.6   | 13.3  | -   | -   |
| HCM Lane LOS          | B     | -   | - F      | B     | -   | -   |
| HCM 95th %tile Q(veh) | 0.7   | -   | - 2.1    | 0     | -   | -   |

HCM 2010 TWSC  
14: S UNIVERSITY BLVD & DRIVEWAY

Existing  
Timing Plan: AM Peak

| Intersection             |                                                                                   |        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 0.4                                                                               |        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Movement                 | EBL                                                                               | EBR    | NBL                                                                               | NBT                                                                               | SBT                                                                               | SBR                                                                               |
| Lane Configurations      |  |        |  |  |  |  |
| Traffic Vol, veh/h       | 0                                                                                 | 0      | 83                                                                                | 1510                                                                              | 1200                                                                              | 55                                                                                |
| Future Vol, veh/h        | 0                                                                                 | 0      | 83                                                                                | 1510                                                                              | 1200                                                                              | 55                                                                                |
| Conflicting Peds, #/hr   | 0                                                                                 | 0      | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 |
| Sign Control             | Stop                                                                              | Stop   | Free                                                                              | Free                                                                              | Free                                                                              | Free                                                                              |
| RT Channelized           | -                                                                                 | None   | -                                                                                 | None                                                                              | -                                                                                 | None                                                                              |
| Storage Length           | 0                                                                                 | -      | 100                                                                               | -                                                                                 | -                                                                                 | 0                                                                                 |
| Veh in Median Storage, # | 0                                                                                 | -      | -                                                                                 | 0                                                                                 | 0                                                                                 | -                                                                                 |
| Grade, %                 | 0                                                                                 | -      | -                                                                                 | 0                                                                                 | 0                                                                                 | -                                                                                 |
| Peak Hour Factor         | 92                                                                                | 92     | 93                                                                                | 93                                                                                | 95                                                                                | 95                                                                                |
| Heavy Vehicles, %        | 2                                                                                 | 2      | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 |
| Mvmt Flow                | 0                                                                                 | 0      | 89                                                                                | 1624                                                                              | 1263                                                                              | 58                                                                                |
| Major/Minor              | Minor2                                                                            | Major1 |                                                                                   | Major2                                                                            |                                                                                   |                                                                                   |
| Conflicting Flow All     | 2253                                                                              | 632    | 1263                                                                              | 0                                                                                 | -                                                                                 | 0                                                                                 |
| Stage 1                  | 1263                                                                              | -      | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 2                  | 990                                                                               | -      | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Critical Hdwy            | 6.84                                                                              | 6.94   | 4.14                                                                              | -                                                                                 | -                                                                                 | -                                                                                 |
| Critical Hdwy Stg 1      | 5.84                                                                              | -      | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Critical Hdwy Stg 2      | 5.84                                                                              | -      | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Follow-up Hdwy           | 3.52                                                                              | 3.32   | 2.22                                                                              | -                                                                                 | -                                                                                 | -                                                                                 |
| Pot Cap-1 Maneuver       | 35                                                                                | 423    | 546                                                                               | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 1                  | 230                                                                               | -      | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 2                  | 320                                                                               | -      | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |        |                                                                                   | -                                                                                 | -                                                                                 | -                                                                                 |
| Mov Cap-1 Maneuver       | 29                                                                                | 423    | 546                                                                               | -                                                                                 | -                                                                                 | -                                                                                 |
| Mov Cap-2 Maneuver       | 126                                                                               | -      | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 1                  | 230                                                                               | -      | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 2                  | 268                                                                               | -      | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Approach                 | EB                                                                                | NB     |                                                                                   | SB                                                                                |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 0                                                                                 | 0.7    |                                                                                   | 0                                                                                 |                                                                                   |                                                                                   |
| HCM LOS                  | A                                                                                 |        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBL                                                                               | NBT    | EBLn1                                                                             | SBT                                                                               | SBR                                                                               |                                                                                   |
| Capacity (veh/h)         | 546                                                                               | -      | -                                                                                 | -                                                                                 | -                                                                                 |                                                                                   |
| HCM Lane V/C Ratio       | 0.163                                                                             | -      | -                                                                                 | -                                                                                 | -                                                                                 |                                                                                   |
| HCM Control Delay (s)    | 12.9                                                                              | -      | 0                                                                                 | -                                                                                 | -                                                                                 |                                                                                   |
| HCM Lane LOS             | B                                                                                 | -      | A                                                                                 | -                                                                                 | -                                                                                 |                                                                                   |
| HCM 95th %tile Q(veh)    | 0.6                                                                               | -      | -                                                                                 | -                                                                                 | -                                                                                 |                                                                                   |

HCM 2010 TWSC  
15: Franklin St. & E BELLEVIEW AVE

Existing  
Timing Plan: AM Peak

| Intersection             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |      |                                                                                   |      |      |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 54.8                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |      |                                                                                   |      |      |                                                                                   |                                                                                   |
| Movement                 | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL  | NBT                                                                               | NBR  | SBL  | SBT                                                                               | SBR                                                                               |
| Lane Configurations      |  |  |  |  |  |  |      |  |      |      |  |  |
| Traffic Vol, veh/h       | 20                                                                                | 1745                                                                              | 23                                                                                | 10                                                                                | 1179                                                                              | 32                                                                                | 21   | 1                                                                                 | 5    | 35   | 5                                                                                 | 35                                                                                |
| Future Vol, veh/h        | 20                                                                                | 1745                                                                              | 23                                                                                | 10                                                                                | 1179                                                                              | 32                                                                                | 21   | 1                                                                                 | 5    | 35   | 5                                                                                 | 35                                                                                |
| Conflicting Peds, #/hr   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0    | 0    | 0                                                                                 | 0                                                                                 |
| Sign Control             | Free                                                                              | Free                                                                              | Free                                                                              | Free                                                                              | Free                                                                              | Free                                                                              | Stop | Stop                                                                              | Stop | Stop | Stop                                                                              | Stop                                                                              |
| RT Channelized           | -                                                                                 | -                                                                                 | None                                                                              | -                                                                                 | -                                                                                 | None                                                                              | -    | -                                                                                 | None | -    | -                                                                                 | None                                                                              |
| Storage Length           | 0                                                                                 | -                                                                                 | 0                                                                                 | 0                                                                                 | -                                                                                 | -                                                                                 | -    | -                                                                                 | -    | -    | -                                                                                 | -                                                                                 |
| Veh in Median Storage, # | -                                                                                 | 0                                                                                 | -                                                                                 | -                                                                                 | 0                                                                                 | -                                                                                 | -    | 0                                                                                 | -    | -    | 0                                                                                 | -                                                                                 |
| Grade, %                 | -                                                                                 | 0                                                                                 | -                                                                                 | -                                                                                 | 0                                                                                 | -                                                                                 | -    | 0                                                                                 | -    | -    | 0                                                                                 | -                                                                                 |
| Peak Hour Factor         | 92                                                                                | 92                                                                                | 92                                                                                | 92                                                                                | 92                                                                                | 92                                                                                | 92   | 92                                                                                | 92   | 92   | 92                                                                                | 92                                                                                |
| Heavy Vehicles, %        | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2    | 2                                                                                 | 2    | 2    | 2                                                                                 | 2                                                                                 |
| Mvmt Flow                | 22                                                                                | 1897                                                                              | 25                                                                                | 11                                                                                | 1282                                                                              | 35                                                                                | 23   | 1                                                                                 | 5    | 38   | 5                                                                                 | 38                                                                                |

| Major/Minor          | Major1 |   |   | Major2 |   |   | Minor1 |      |      | Minor2 |      |      |
|----------------------|--------|---|---|--------|---|---|--------|------|------|--------|------|------|
| Conflicting Flow All | 1316   | 0 | 0 | 1897   | 0 | 0 | 2605   | 3278 | 948  | 2313   | 3261 | 658  |
| Stage 1              | -      | - | - | -      | - | - | 1940   | 1940 | -    | 1321   | 1321 | -    |
| Stage 2              | -      | - | - | -      | - | - | 665    | 1338 | -    | 992    | 1940 | -    |
| Critical Hdwy        | 4.14   | - | - | 4.14   | - | - | 7.54   | 6.54 | 6.94 | 7.54   | 6.54 | 6.94 |
| Critical Hdwy Stg 1  | -      | - | - | -      | - | - | 6.54   | 5.54 | -    | 6.54   | 5.54 | -    |
| Critical Hdwy Stg 2  | -      | - | - | -      | - | - | 6.54   | 5.54 | -    | 6.54   | 5.54 | -    |
| Follow-up Hdwy       | 2.22   | - | - | 2.22   | - | - | 3.52   | 4.02 | 3.32 | 3.52   | 4.02 | 3.32 |
| Pot Cap-1 Maneuver   | 521    | - | - | 310    | - | - | ~ 12   | 9    | 262  | ~ 20   | 9    | 407  |
| Stage 1              | -      | - | - | -      | - | - | 67     | 111  | -    | 165    | 224  | -    |
| Stage 2              | -      | - | - | -      | - | - | 416    | 220  | -    | 264    | 111  | -    |
| Platoon blocked, %   |        | - | - |        | - | - |        |      |      |        |      |      |
| Mov Cap-1 Maneuver   | 521    | - | - | 310    | - | - | ~ 5    | 8    | 262  | ~ 17   | 8    | 407  |
| Mov Cap-2 Maneuver   | -      | - | - | -      | - | - | ~ 5    | 8    | -    | ~ 17   | 8    | -    |
| Stage 1              | -      | - | - | -      | - | - | 64     | 106  | -    | 158    | 216  | -    |
| Stage 2              | -      | - | - | -      | - | - | 355    | 212  | -    | 245    | 106  | -    |

| Approach             | EB  | WB  | NB        | SB        |
|----------------------|-----|-----|-----------|-----------|
| HCM Control Delay, s | 0.1 | 0.1 | \$ 2925.3 | \$ 1215.3 |
| HCM LOS              |     |     | F         | F         |

| Minor Lane/Major Mvmt | NBLn1     | EBL   | EBT | EBR | WBL   | WBT | WBR | SBLn1     |
|-----------------------|-----------|-------|-----|-----|-------|-----|-----|-----------|
| Capacity (veh/h)      | 6         | 521   | -   | -   | 310   | -   | -   | 27        |
| HCM Lane V/C Ratio    | 4.891     | 0.042 | -   | -   | 0.035 | -   | -   | 3.019     |
| HCM Control Delay (s) | \$ 2925.3 | 12.2  | -   | -   | 17    | -   | -   | \$ 1215.3 |
| HCM Lane LOS          | F         | B     | -   | -   | C     | -   | -   | F         |
| HCM 95th %tile Q(veh) | 5.1       | 0.1   | -   | -   | 0.1   | -   | -   | 9.9       |

| Notes                      |                        |                            |                                |
|----------------------------|------------------------|----------------------------|--------------------------------|
| ~: Volume exceeds capacity | \$: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |

HCM 2010 AWSC  
1: S FRANKLIN ST & E QUINCY AVE

Existing  
Timing Plan: PM Peak

| Intersection              |      |
|---------------------------|------|
| Intersection Delay, s/veh | 11.1 |
| Intersection LOS          | B    |

| Movement            | EBT                                                                               | EBR  | WBL  | WBT                                                                               | NBL                                                                               | NBR  |
|---------------------|-----------------------------------------------------------------------------------|------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|
| Lane Configurations |  |      |      |  |  |      |
| Traffic Vol, veh/h  | 88                                                                                | 3    | 40   | 380                                                                               | 6                                                                                 | 15   |
| Future Vol, veh/h   | 88                                                                                | 3    | 40   | 380                                                                               | 6                                                                                 | 15   |
| Peak Hour Factor    | 0.84                                                                              | 0.84 | 0.88 | 0.88                                                                              | 0.75                                                                              | 0.75 |
| Heavy Vehicles, %   | 2                                                                                 | 2    | 2    | 2                                                                                 | 2                                                                                 | 2    |
| Mvmt Flow           | 105                                                                               | 4    | 45   | 432                                                                               | 8                                                                                 | 20   |
| Number of Lanes     | 1                                                                                 | 0    | 0    | 1                                                                                 | 1                                                                                 | 0    |

| Approach                   | EB  | WB   | NB |
|----------------------------|-----|------|----|
| Opposing Approach          | WB  | EB   |    |
| Opposing Lanes             | 1   | 1    | 0  |
| Conflicting Approach Left  |     | NB   | EB |
| Conflicting Lanes Left     | 0   | 1    | 1  |
| Conflicting Approach Right | NB  |      | WB |
| Conflicting Lanes Right    | 1   | 0    | 1  |
| HCM Control Delay          | 8.1 | 11.9 | 8  |
| HCM LOS                    | A   | B    | A  |

| Lane                   | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, %            | 29%   | 0%    | 10%   |
| Vol Thru, %            | 0%    | 97%   | 90%   |
| Vol Right, %           | 71%   | 3%    | 0%    |
| Sign Control           | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 21    | 91    | 420   |
| LT Vol                 | 6     | 0     | 40    |
| Through Vol            | 0     | 88    | 380   |
| RT Vol                 | 15    | 3     | 0     |
| Lane Flow Rate         | 28    | 108   | 477   |
| Geometry Grp           | 1     | 1     | 1     |
| Degree of Util (X)     | 0.037 | 0.134 | 0.541 |
| Departure Headway (Hd) | 4.821 | 4.442 | 4.083 |
| Convergence, Y/N       | Yes   | Yes   | Yes   |
| Cap                    | 746   | 811   | 878   |
| Service Time           | 2.828 | 2.446 | 2.14  |
| HCM Lane V/C Ratio     | 0.038 | 0.133 | 0.543 |
| HCM Control Delay      | 8     | 8.1   | 11.9  |
| HCM Lane LOS           | A     | A     | B     |
| HCM 95th-tile Q        | 0.1   | 0.5   | 3.3   |

# HCM 2010 Signalized Intersection Summary

## 2: S UNIVERSITY BLVD & E QUINCY AVE

Existing  
Timing Plan: PM Peak

|                               |  |                                                                                   |      |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |                                                                                     |                                                                                     |      |
|-------------------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------|
| Movement                      | EBL                                                                                | EBT                                                                               | EBR  | WBL                                                                               | WBT                                                                               | WBR  | NBL                                                                               | NBT                                                                               | NBR  | SBL                                                                                 | SBT                                                                                 | SBR  |
| Lane Configurations           |   |  |      |  |  |      |  |  |      |  |  |      |
| Traffic Volume (veh/h)        | 22                                                                                 | 59                                                                                | 24   | 180                                                                               | 302                                                                               | 87   | 61                                                                                | 1429                                                                              | 112  | 88                                                                                  | 1456                                                                                | 87   |
| Future Volume (veh/h)         | 22                                                                                 | 59                                                                                | 24   | 180                                                                               | 302                                                                               | 87   | 61                                                                                | 1429                                                                              | 112  | 88                                                                                  | 1456                                                                                | 87   |
| Number                        | 7                                                                                  | 4                                                                                 | 14   | 3                                                                                 | 8                                                                                 | 18   | 5                                                                                 | 2                                                                                 | 12   | 1                                                                                   | 6                                                                                   | 16   |
| Initial Q (Qb), veh           | 0                                                                                  | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                   | 0                                                                                   | 0    |
| Ped-Bike Adj(A_pbT)           | 1.00                                                                               |                                                                                   | 1.00 | 1.00                                                                              |                                                                                   | 1.00 | 1.00                                                                              |                                                                                   | 1.00 | 1.00                                                                                |                                                                                     | 1.00 |
| Parking Bus, Adj              | 1.00                                                                               | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                                | 1.00                                                                                | 1.00 |
| Adj Sat Flow, veh/h/ln        | 1863                                                                               | 1863                                                                              | 1900 | 1863                                                                              | 1863                                                                              | 1900 | 1863                                                                              | 1863                                                                              | 1900 | 1863                                                                                | 1863                                                                                | 1900 |
| Adj Flow Rate, veh/h          | 30                                                                                 | 81                                                                                | 33   | 189                                                                               | 318                                                                               | 92   | 62                                                                                | 1458                                                                              | 114  | 104                                                                                 | 1713                                                                                | 102  |
| Adj No. of Lanes              | 1                                                                                  | 1                                                                                 | 0    | 1                                                                                 | 1                                                                                 | 0    | 1                                                                                 | 2                                                                                 | 0    | 1                                                                                   | 2                                                                                   | 0    |
| Peak Hour Factor              | 0.73                                                                               | 0.73                                                                              | 0.73 | 0.95                                                                              | 0.95                                                                              | 0.95 | 0.98                                                                              | 0.98                                                                              | 0.98 | 0.85                                                                                | 0.85                                                                                | 0.85 |
| Percent Heavy Veh, %          | 2                                                                                  | 2                                                                                 | 2    | 2                                                                                 | 2                                                                                 | 2    | 2                                                                                 | 2                                                                                 | 2    | 2                                                                                   | 2                                                                                   | 2    |
| Cap, veh/h                    | 97                                                                                 | 325                                                                               | 133  | 324                                                                               | 359                                                                               | 104  | 154                                                                               | 1862                                                                              | 145  | 201                                                                                 | 1914                                                                                | 113  |
| Arrive On Green               | 0.26                                                                               | 0.26                                                                              | 0.26 | 0.26                                                                              | 0.26                                                                              | 0.26 | 0.04                                                                              | 0.56                                                                              | 0.56 | 0.04                                                                                | 0.56                                                                                | 0.56 |
| Sat Flow, veh/h               | 972                                                                                | 1259                                                                              | 513  | 1273                                                                              | 1390                                                                              | 402  | 1774                                                                              | 3328                                                                              | 259  | 1774                                                                                | 3396                                                                                | 201  |
| Grp Volume(v), veh/h          | 30                                                                                 | 0                                                                                 | 114  | 189                                                                               | 0                                                                                 | 410  | 62                                                                                | 772                                                                               | 800  | 104                                                                                 | 886                                                                                 | 929  |
| Grp Sat Flow(s),veh/h/ln      | 972                                                                                | 0                                                                                 | 1772 | 1273                                                                              | 0                                                                                 | 1792 | 1774                                                                              | 1770                                                                              | 1817 | 1774                                                                                | 1770                                                                                | 1827 |
| Q Serve(g_s), s               | 3.7                                                                                | 0.0                                                                               | 6.1  | 16.6                                                                              | 0.0                                                                               | 26.4 | 1.8                                                                               | 40.9                                                                              | 41.6 | 3.0                                                                                 | 52.6                                                                                | 54.1 |
| Cycle Q Clear(g_c), s         | 30.1                                                                               | 0.0                                                                               | 6.1  | 22.7                                                                              | 0.0                                                                               | 26.4 | 1.8                                                                               | 40.9                                                                              | 41.6 | 3.0                                                                                 | 52.6                                                                                | 54.1 |
| Prop In Lane                  | 1.00                                                                               |                                                                                   | 0.29 | 1.00                                                                              |                                                                                   | 0.22 | 1.00                                                                              |                                                                                   | 0.14 | 1.00                                                                                |                                                                                     | 0.11 |
| Lane Grp Cap(c), veh/h        | 97                                                                                 | 0                                                                                 | 458  | 324                                                                               | 0                                                                                 | 463  | 154                                                                               | 990                                                                               | 1016 | 201                                                                                 | 997                                                                                 | 1030 |
| V/C Ratio(X)                  | 0.31                                                                               | 0.00                                                                              | 0.25 | 0.58                                                                              | 0.00                                                                              | 0.89 | 0.40                                                                              | 0.78                                                                              | 0.79 | 0.52                                                                                | 0.89                                                                                | 0.90 |
| Avail Cap(c_a), veh/h         | 97                                                                                 | 0                                                                                 | 458  | 324                                                                               | 0                                                                                 | 463  | 178                                                                               | 990                                                                               | 1016 | 233                                                                                 | 997                                                                                 | 1030 |
| HCM Platoon Ratio             | 1.00                                                                               | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                                | 1.00                                                                                | 1.00 |
| Upstream Filter(I)            | 1.00                                                                               | 0.00                                                                              | 1.00 | 1.00                                                                              | 0.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                                | 1.00                                                                                | 1.00 |
| Uniform Delay (d), s/veh      | 57.3                                                                               | 0.0                                                                               | 35.3 | 44.3                                                                              | 0.0                                                                               | 42.8 | 25.8                                                                              | 20.7                                                                              | 20.8 | 20.8                                                                                | 22.9                                                                                | 23.2 |
| Incr Delay (d2), s/veh        | 1.8                                                                                | 0.0                                                                               | 0.3  | 2.7                                                                               | 0.0                                                                               | 18.3 | 1.7                                                                               | 6.1                                                                               | 6.2  | 2.0                                                                                 | 11.7                                                                                | 12.5 |
| Initial Q Delay(d3),s/veh     | 0.0                                                                                | 0.0                                                                               | 0.0  | 0.0                                                                               | 0.0                                                                               | 0.0  | 0.0                                                                               | 0.0                                                                               | 0.0  | 0.0                                                                                 | 0.0                                                                                 | 0.0  |
| %ile BackOfQ(50%),veh/ln      | 1.0                                                                                | 0.0                                                                               | 3.0  | 6.1                                                                               | 0.0                                                                               | 15.4 | 1.2                                                                               | 21.6                                                                              | 22.4 | 1.8                                                                                 | 28.6                                                                                | 30.7 |
| LnGrp Delay(d),s/veh          | 59.0                                                                               | 0.0                                                                               | 35.6 | 46.9                                                                              | 0.0                                                                               | 61.1 | 27.5                                                                              | 26.7                                                                              | 27.0 | 22.8                                                                                | 34.6                                                                                | 35.7 |
| LnGrp LOS                     | E                                                                                  |                                                                                   | D    | D                                                                                 |                                                                                   | E    | C                                                                                 | C                                                                                 | C    | C                                                                                   | C                                                                                   | D    |
| Approach Vol, veh/h           | 144                                                                                |                                                                                   | 599  |                                                                                   |                                                                                   | 1634 |                                                                                   |                                                                                   | 1919 |                                                                                     |                                                                                     |      |
| Approach Delay, s/veh         | 40.4                                                                               |                                                                                   | 56.6 |                                                                                   |                                                                                   | 26.9 |                                                                                   |                                                                                   | 34.5 |                                                                                     |                                                                                     |      |
| Approach LOS                  | D                                                                                  |                                                                                   | E    |                                                                                   |                                                                                   | C    |                                                                                   |                                                                                   | C    |                                                                                     |                                                                                     |      |
| Timer                         | 1                                                                                  | 2                                                                                 | 3    | 4                                                                                 | 5                                                                                 | 6    | 7                                                                                 | 8                                                                                 |      |                                                                                     |                                                                                     |      |
| Assigned Phs                  | 1                                                                                  | 2                                                                                 |      | 4                                                                                 | 5                                                                                 | 6    |                                                                                   | 8                                                                                 |      |                                                                                     |                                                                                     |      |
| Phs Duration (G+Y+Rc), s      | 9.9                                                                                | 73.1                                                                              |      | 37.0                                                                              | 9.4                                                                               | 73.6 |                                                                                   | 37.0                                                                              |      |                                                                                     |                                                                                     |      |
| Change Period (Y+Rc), s       | 5.0                                                                                | 6.0                                                                               |      | 6.0                                                                               | 5.0                                                                               | 6.0  |                                                                                   | 6.0                                                                               |      |                                                                                     |                                                                                     |      |
| Max Green Setting (Gmax), s   | 7.0                                                                                | 65.0                                                                              |      | 31.0                                                                              | 6.0                                                                               | 66.0 |                                                                                   | 31.0                                                                              |      |                                                                                     |                                                                                     |      |
| Max Q Clear Time (g_c+1.5), s | 15.0                                                                               | 43.6                                                                              |      | 32.1                                                                              | 3.8                                                                               | 56.1 |                                                                                   | 28.4                                                                              |      |                                                                                     |                                                                                     |      |
| Green Ext Time (p_c), s       | 0.0                                                                                | 19.6                                                                              |      | 0.0                                                                               | 0.0                                                                               | 9.4  |                                                                                   | 1.1                                                                               |      |                                                                                     |                                                                                     |      |
| Intersection Summary          |                                                                                    |                                                                                   |      |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |                                                                                     |                                                                                     |      |
| HCM 2010 Ctrl Delay           |                                                                                    |                                                                                   | 34.9 |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |                                                                                     |                                                                                     |      |
| HCM 2010 LOS                  |                                                                                    |                                                                                   | C    |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |                                                                                     |                                                                                     |      |

# HCM 2010 Signalized Intersection Summary

## 3: S UNIVERSITY BLVD & E BELLEVIEW AVE

Existing  
Timing Plan: PM Peak

|                              | <div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div> |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                               | SBT                                                                                | SBR                                                                                 |
| Lane Configurations          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 154                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 864                                                                               | 434                                                                               | 331                                                                               | 1478                                                                              | 302                                                                               | 338                                                                               | 1052                                                                              | 310                                                                               | 158                                                                               | 1250                                                                               | 164                                                                                 |
| Future Volume (veh/h)        | 154                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 864                                                                               | 434                                                                               | 331                                                                               | 1478                                                                              | 302                                                                               | 338                                                                               | 1052                                                                              | 310                                                                               | 158                                                                               | 1250                                                                               | 164                                                                                 |
| Number                       | 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 4                                                                                 | 14                                                                                | 3                                                                                 | 8                                                                                 | 18                                                                                | 5                                                                                 | 2                                                                                 | 12                                                                                | 1                                                                                 | 6                                                                                  | 16                                                                                  |
| Initial Q (Qb), veh          | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                    | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                |
| Adj Sat Flow, veh/h/ln       | 1863                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                               | 1863                                                                                |
| Adj Flow Rate, veh/h         | 157                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 882                                                                               | 443                                                                               | 338                                                                               | 1508                                                                              | 308                                                                               | 348                                                                               | 1085                                                                              | 0                                                                                 | 163                                                                               | 1289                                                                               | 0                                                                                   |
| Adj No. of Lanes             | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2                                                                                 | 1                                                                                 | 2                                                                                 | 2                                                                                 | 1                                                                                 | 2                                                                                 | 2                                                                                 | 1                                                                                 | 2                                                                                 | 2                                                                                  | 1                                                                                   |
| Peak Hour Factor             | 0.98                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0.98                                                                              | 0.98                                                                              | 0.98                                                                              | 0.98                                                                              | 0.98                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                               | 0.97                                                                                |
| Percent Heavy Veh, %         | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                  | 2                                                                                   |
| Cap, veh/h                   | 172                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1043                                                                              | 467                                                                               | 391                                                                               | 1268                                                                              | 567                                                                               | 287                                                                               | 1268                                                                              | 567                                                                               | 172                                                                               | 1150                                                                               | 515                                                                                 |
| Arrive On Green              | 0.05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0.29                                                                              | 0.29                                                                              | 0.11                                                                              | 0.36                                                                              | 0.36                                                                              | 0.08                                                                              | 0.36                                                                              | 0.00                                                                              | 0.05                                                                              | 0.32                                                                               | 0.00                                                                                |
| Sat Flow, veh/h              | 3442                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 3539                                                                              | 1583                                                                              | 3442                                                                              | 3539                                                                              | 1583                                                                              | 3442                                                                              | 3539                                                                              | 1583                                                                              | 3442                                                                              | 3539                                                                               | 1583                                                                                |
| Grp Volume(v), veh/h         | 157                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 882                                                                               | 443                                                                               | 338                                                                               | 1508                                                                              | 308                                                                               | 348                                                                               | 1085                                                                              | 0                                                                                 | 163                                                                               | 1289                                                                               | 0                                                                                   |
| Grp Sat Flow(s),veh/h/ln     | 1721                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1770                                                                              | 1583                                                                              | 1721                                                                              | 1770                                                                              | 1583                                                                              | 1721                                                                              | 1770                                                                              | 1583                                                                              | 1721                                                                              | 1770                                                                               | 1583                                                                                |
| Q Serve(g_s), s              | 5.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 28.1                                                                              | 32.9                                                                              | 11.6                                                                              | 43.0                                                                              | 18.6                                                                              | 10.0                                                                              | 34.0                                                                              | 0.0                                                                               | 5.7                                                                               | 39.0                                                                               | 0.0                                                                                 |
| Cycle Q Clear(g_c), s        | 5.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 28.1                                                                              | 32.9                                                                              | 11.6                                                                              | 43.0                                                                              | 18.6                                                                              | 10.0                                                                              | 34.0                                                                              | 0.0                                                                               | 5.7                                                                               | 39.0                                                                               | 0.0                                                                                 |
| Prop In Lane                 | 1.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                    | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 172                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1043                                                                              | 467                                                                               | 391                                                                               | 1268                                                                              | 567                                                                               | 287                                                                               | 1268                                                                              | 567                                                                               | 172                                                                               | 1150                                                                               | 515                                                                                 |
| V/C Ratio(X)                 | 0.91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0.85                                                                              | 0.95                                                                              | 0.86                                                                              | 1.19                                                                              | 0.54                                                                              | 1.21                                                                              | 0.86                                                                              | 0.00                                                                              | 0.95                                                                              | 1.12                                                                               | 0.00                                                                                |
| Avail Cap(c_a), veh/h        | 172                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1043                                                                              | 467                                                                               | 402                                                                               | 1268                                                                              | 567                                                                               | 287                                                                               | 1268                                                                              | 567                                                                               | 172                                                                               | 1150                                                                               | 515                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              | 1.00                                                                               | 0.00                                                                                |
| Uniform Delay (d), s/veh     | 56.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 39.8                                                                              | 41.4                                                                              | 52.3                                                                              | 38.5                                                                              | 30.7                                                                              | 55.0                                                                              | 35.6                                                                              | 0.0                                                                               | 56.8                                                                              | 40.5                                                                               | 0.0                                                                                 |
| Incr Delay (d2), s/veh       | 44.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 6.6                                                                               | 29.2                                                                              | 17.2                                                                              | 93.2                                                                              | 1.1                                                                               | 123.7                                                                             | 7.5                                                                               | 0.0                                                                               | 53.2                                                                              | 66.2                                                                               | 0.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 8.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 14.7                                                                              | 18.1                                                                              | 6.4                                                                               | 37.4                                                                              | 8.3                                                                               | 9.7                                                                               | 17.9                                                                              | 0.0                                                                               | 4.0                                                                               | 29.6                                                                               | 0.0                                                                                 |
| LnGrp Delay(d),s/veh         | 101.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 46.3                                                                              | 70.7                                                                              | 69.4                                                                              | 131.7                                                                             | 31.7                                                                              | 178.7                                                                             | 43.2                                                                              | 0.0                                                                               | 110.0                                                                             | 106.7                                                                              | 0.0                                                                                 |
| LnGrp LOS                    | F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | D                                                                                 | E                                                                                 | E                                                                                 | F                                                                                 | C                                                                                 | F                                                                                 | D                                                                                 |                                                                                   | F                                                                                 | F                                                                                  |                                                                                     |
| Approach Vol, veh/h          | 1482                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                   |                                                                                   | 2154                                                                              |                                                                                   |                                                                                   | 1433                                                                              |                                                                                   |                                                                                   | 1452                                                                              |                                                                                    |                                                                                     |
| Approach Delay, s/veh        | 59.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                   |                                                                                   | 107.7                                                                             |                                                                                   |                                                                                   | 76.1                                                                              |                                                                                   |                                                                                   | 107.1                                                                             |                                                                                    |                                                                                     |
| Approach LOS                 | E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                   |                                                                                   | F                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                   | F                                                                                 |                                                                                    |                                                                                     |
| Timer                        | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                 | 8                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |
| Assigned Phs                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                 | 8                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 41.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 49.0                                                                              | 18.6                                                                              | 41.4                                                                              | 15.0                                                                              | 45.0                                                                              | 11.0                                                                              | 49.0                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |
| Change Period (Y+Rc), s      | 5.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 6.0                                                                               | 5.0                                                                               | 6.0                                                                               | 5.0                                                                               | 6.0                                                                               | 5.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |
| Max Green Setting (Gmax), s  | 43.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 43.0                                                                              | 14.0                                                                              | 35.0                                                                              | 10.0                                                                              | 39.0                                                                              | 6.0                                                                               | 43.0                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 36.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 36.0                                                                              | 13.6                                                                              | 34.9                                                                              | 12.0                                                                              | 41.0                                                                              | 7.4                                                                               | 45.0                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 6.1                                                                               | 0.1                                                                               | 0.1                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |
| Intersection Summary         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |
| HCM 2010 Ctrl Delay          | 89.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |
| HCM 2010 LOS                 | F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |

HCM 2010 AWSC  
4: E QUINCY AVE & S COLORADO BLVD

Existing  
Timing Plan: PM Peak

Intersection

Intersection Delay, s/veh 29.4

Intersection LOS D

| Movement            | EBL  | EBT                                                                               | WBT                                                                               | WBR  | SBL                                                                               | SBR                                                                               |
|---------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Lane Configurations |      |  |  |      |  |  |
| Traffic Vol, veh/h  | 109  | 205                                                                               | 362                                                                               | 134  | 232                                                                               | 174                                                                               |
| Future Vol, veh/h   | 109  | 205                                                                               | 362                                                                               | 134  | 232                                                                               | 174                                                                               |
| Peak Hour Factor    | 0.84 | 0.84                                                                              | 0.86                                                                              | 0.86 | 0.91                                                                              | 0.91                                                                              |
| Heavy Vehicles, %   | 2    | 2                                                                                 | 2                                                                                 | 2    | 2                                                                                 | 2                                                                                 |
| Mvmt Flow           | 130  | 244                                                                               | 421                                                                               | 156  | 255                                                                               | 191                                                                               |
| Number of Lanes     | 0    | 1                                                                                 | 1                                                                                 | 0    | 1                                                                                 | 1                                                                                 |

| Approach                     | EB | WB | SB   |
|------------------------------|----|----|------|
| Opposing Approach            | WB | EB |      |
| Opposing Lanes               | 1  | 1  | 0    |
| Conflicting Approach Left SB |    |    | WB   |
| Conflicting Lanes Left       | 2  | 0  | 1    |
| Conflicting Approach Right   |    | SB | EB   |
| Conflicting Lanes Right      | 0  | 2  | 1    |
| HCM Control Delay            | 21 | 45 | 16.3 |
| HCM LOS                      | C  | E  | C    |

| Lane                   | EBLn1WBLn1 | SBLn1 | SBLn2 |
|------------------------|------------|-------|-------|
| Vol Left, %            | 35%        | 0%    | 100%  |
| Vol Thru, %            | 65%        | 73%   | 0%    |
| Vol Right, %           | 0%         | 27%   | 0%    |
| Sign Control           | Stop       | Stop  | Stop  |
| Traffic Vol by Lane    | 314        | 496   | 232   |
| LT Vol                 | 109        | 0     | 232   |
| Through Vol            | 205        | 362   | 0     |
| RT Vol                 | 0          | 134   | 0     |
| Lane Flow Rate         | 374        | 577   | 255   |
| Geometry Grp           | 2          | 2     | 7     |
| Degree of Util (X)     | 0.658      | 0.929 | 0.542 |
| Departure Headway (Hd) | 6.337      | 5.801 | 7.651 |
| Convergence, Y/N       | Yes        | Yes   | Yes   |
| Cap                    | 564        | 623   | 469   |
| Service Time           | 4.434      | 3.885 | 5.444 |
| HCM Lane V/C Ratio     | 0.663      | 0.926 | 0.544 |
| HCM Control Delay      | 21         | 45    | 19.2  |
| HCM Lane LOS           | C          | E     | C     |
| HCM 95th-tile Q        | 4.8        | 12.1  | 3.2   |



Intersection

Intersection Delay, s/veh 18.8

Intersection LOS C

| Movement            | EBT                                                                               | EBR  | WBL  | WBT                                                                               | NBL                                                                               | NBR  |
|---------------------|-----------------------------------------------------------------------------------|------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|
| Lane Configurations |  |      |      |  |  |      |
| Traffic Vol, veh/h  | 245                                                                               | 214  | 30   | 342                                                                               | 194                                                                               | 48   |
| Future Vol, veh/h   | 245                                                                               | 214  | 30   | 342                                                                               | 194                                                                               | 48   |
| Peak Hour Factor    | 0.92                                                                              | 0.92 | 0.89 | 0.89                                                                              | 0.86                                                                              | 0.86 |
| Heavy Vehicles, %   | 2                                                                                 | 2    | 2    | 2                                                                                 | 2                                                                                 | 2    |
| Mvmt Flow           | 266                                                                               | 233  | 34   | 384                                                                               | 226                                                                               | 56   |
| Number of Lanes     | 1                                                                                 | 0    | 0    | 1                                                                                 | 1                                                                                 | 0    |

| Approach                   | EB | WB   | NB   |
|----------------------------|----|------|------|
| Opposing Approach          | WB | EB   |      |
| Opposing Lanes             | 1  | 1    | 0    |
| Conflicting Approach Left  |    | NB   | EB   |
| Conflicting Lanes Left     | 0  | 1    | 1    |
| Conflicting Approach Right | NB |      | WB   |
| Conflicting Lanes Right    | 1  | 0    | 1    |
| HCM Control Delay          | 21 | 18.6 | 15.3 |
| HCM LOS                    | C  | C    | C    |

| Lane                   | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, %            | 80%   | 0%    | 8%    |
| Vol Thru, %            | 0%    | 53%   | 92%   |
| Vol Right, %           | 20%   | 47%   | 0%    |
| Sign Control           | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 242   | 459   | 372   |
| LT Vol                 | 194   | 0     | 30    |
| Through Vol            | 0     | 245   | 342   |
| RT Vol                 | 48    | 214   | 0     |
| Lane Flow Rate         | 281   | 499   | 418   |
| Geometry Grp           | 1     | 1     | 1     |
| Degree of Util (X)     | 0.491 | 0.726 | 0.651 |
| Departure Headway (Hd) | 6.276 | 5.235 | 5.61  |
| Convergence, Y/N       | Yes   | Yes   | Yes   |
| Cap                    | 571   | 688   | 640   |
| Service Time           | 4.343 | 3.297 | 3.676 |
| HCM Lane V/C Ratio     | 0.492 | 0.725 | 0.653 |
| HCM Control Delay      | 15.3  | 21    | 18.6  |
| HCM Lane LOS           | C     | C     | C     |
| HCM 95th-tile Q        | 2.7   | 6.3   | 4.8   |

# HCM 2010 Signalized Intersection Summary

## 6: S HOLLY ST & E BELLEVIEW AVE

Existing  
Timing Plan: PM Peak

|                              |  |      |      |      |      |      |      |      |      |      |      |      |
|------------------------------|------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|
| Movement                     | EBL                                                                                | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations          |                                                                                    |      |      |      |      |      |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 32                                                                                 | 1367 | 86   | 213  | 1903 | 46   | 184  | 163  | 162  | 54   | 160  | 30   |
| Future Volume (veh/h)        | 32                                                                                 | 1367 | 86   | 213  | 1903 | 46   | 184  | 163  | 162  | 54   | 160  | 30   |
| Number                       | 7                                                                                  | 4    | 14   | 3    | 8    | 18   | 5    | 2    | 12   | 1    | 6    | 16   |
| Initial Q (Qb), veh          | 0                                                                                  | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                               |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00                                                                               | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Adj Sat Flow, veh/h/ln       | 1863                                                                               | 1863 | 1863 | 1863 | 1863 | 1863 | 1863 | 1863 | 1900 | 1863 | 1863 | 1900 |
| Adj Flow Rate, veh/h         | 36                                                                                 | 1519 | 96   | 222  | 1982 | 48   | 188  | 166  | 165  | 70   | 208  | 39   |
| Adj No. of Lanes             | 1                                                                                  | 2    | 1    | 1    | 2    | 1    | 1    | 1    | 0    | 1    | 1    | 0    |
| Peak Hour Factor             | 0.90                                                                               | 0.90 | 0.90 | 0.96 | 0.96 | 0.96 | 0.98 | 0.98 | 0.98 | 0.77 | 0.77 | 0.77 |
| Percent Heavy Veh, %         | 2                                                                                  | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 112                                                                                | 1779 | 796  | 251  | 1976 | 884  | 209  | 233  | 231  | 160  | 261  | 49   |
| Arrive On Green              | 0.03                                                                               | 0.50 | 0.50 | 0.08 | 0.56 | 0.56 | 0.06 | 0.27 | 0.27 | 0.17 | 0.17 | 0.17 |
| Sat Flow, veh/h              | 1774                                                                               | 3539 | 1583 | 1774 | 3539 | 1583 | 1774 | 859  | 853  | 1045 | 1526 | 286  |
| Grp Volume(v), veh/h         | 36                                                                                 | 1519 | 96   | 222  | 1982 | 48   | 188  | 0    | 331  | 70   | 0    | 247  |
| Grp Sat Flow(s),veh/h/ln     | 1774                                                                               | 1770 | 1583 | 1774 | 1770 | 1583 | 1774 | 0    | 1712 | 1045 | 0    | 1812 |
| Q Serve(g_s), s              | 1.2                                                                                | 44.9 | 3.9  | 8.0  | 67.0 | 1.7  | 7.0  | 0.0  | 21.0 | 7.8  | 0.0  | 15.7 |
| Cycle Q Clear(g_c), s        | 1.2                                                                                | 44.9 | 3.9  | 8.0  | 67.0 | 1.7  | 7.0  | 0.0  | 21.0 | 16.8 | 0.0  | 15.7 |
| Prop In Lane                 | 1.00                                                                               |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 0.50 | 1.00 |      | 0.16 |
| Lane Grp Cap(c), veh/h       | 112                                                                                | 1779 | 796  | 251  | 1976 | 884  | 209  | 0    | 464  | 160  | 0    | 310  |
| V/C Ratio(X)                 | 0.32                                                                               | 0.85 | 0.12 | 0.89 | 1.00 | 0.05 | 0.90 | 0.00 | 0.71 | 0.44 | 0.00 | 0.80 |
| Avail Cap(c_a), veh/h        | 149                                                                                | 1779 | 796  | 307  | 1976 | 884  | 209  | 0    | 464  | 160  | 0    | 310  |
| HCM Platoon Ratio            | 1.00                                                                               | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00                                                                               | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh     | 28.6                                                                               | 26.0 | 15.8 | 29.3 | 26.5 | 12.1 | 45.1 | 0.0  | 39.5 | 52.5 | 0.0  | 47.8 |
| Incr Delay (d2), s/veh       | 1.6                                                                                | 4.3  | 0.1  | 22.0 | 21.0 | 0.0  | 36.5 | 0.0  | 9.0  | 1.9  | 0.0  | 13.6 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                                | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     | 0.7                                                                                | 22.8 | 1.7  | 8.7  | 38.1 | 0.7  | 4.9  | 0.0  | 11.1 | 2.3  | 0.0  | 9.1  |
| LnGrp Delay(d),s/veh         | 30.2                                                                               | 30.3 | 15.9 | 51.3 | 47.5 | 12.1 | 81.6 | 0.0  | 48.6 | 54.4 | 0.0  | 61.4 |
| LnGrp LOS                    | C                                                                                  | C    | B    | D    | F    | B    | F    |      | D    | D    |      | E    |
| Approach Vol, veh/h          | 1651                                                                               |      |      | 2252 |      |      | 519  |      |      | 317  |      |      |
| Approach Delay, s/veh        | 29.5                                                                               |      |      | 47.1 |      |      | 60.5 |      |      | 59.8 |      |      |
| Approach LOS                 | C                                                                                  |      |      | D    |      |      | E    |      |      | E    |      |      |
| Timer                        | 1                                                                                  | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Assigned Phs                 |                                                                                    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     |                                                                                    | 38.5 | 15.2 | 66.3 | 12.0 | 26.5 | 8.5  | 73.0 |      |      |      |      |
| Change Period (Y+Rc), s      |                                                                                    | 6.0  | 5.0  | 6.0  | 5.0  | 6.0  | 5.0  | 6.0  |      |      |      |      |
| Max Green Setting (Gmax), s  |                                                                                    | 30.0 | 14.0 | 59.0 | 7.0  | 18.0 | 6.0  | 67.0 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s |                                                                                    | 23.0 | 10.0 | 46.9 | 9.0  | 18.8 | 3.2  | 69.0 |      |      |      |      |
| Green Ext Time (p_c), s      |                                                                                    | 2.3  | 0.2  | 11.8 | 0.0  | 0.0  | 0.0  | 0.0  |      |      |      |      |
| Intersection Summary         |                                                                                    |      |      |      |      |      |      |      |      |      |      |      |
| HCM 2010 Ctrl Delay          |                                                                                    |      | 43.3 |      |      |      |      |      |      |      |      |      |
| HCM 2010 LOS                 |                                                                                    |      | D    |      |      |      |      |      |      |      |      |      |

HCM 2010 TWSC  
7: E HAPPY CANYON RD & E QUINCY AVE

Existing  
Timing Plan: PM Peak

| Intersection             |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |                                                                                     |                                                                                     |      |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------|
| Int Delay, s/veh         | 17.9                                                                              |                                                                                   |      |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |                                                                                     |                                                                                     |      |
| Movement                 | EBL                                                                               | EBT                                                                               | EBR  | WBL                                                                               | WBT                                                                               | WBR  | NBL                                                                               | NBT                                                                               | NBR  | SBL                                                                                 | SBT                                                                                 | SBR  |
| Lane Configurations      |  |  |      |  |  |      |  |  |      |  |  |      |
| Traffic Vol, veh/h       | 19                                                                                | 4                                                                                 | 266  | 10                                                                                | 1                                                                                 | 5    | 370                                                                               | 699                                                                               | 31   | 13                                                                                  | 316                                                                                 | 20   |
| Future Vol, veh/h        | 19                                                                                | 4                                                                                 | 266  | 10                                                                                | 1                                                                                 | 5    | 370                                                                               | 699                                                                               | 31   | 13                                                                                  | 316                                                                                 | 20   |
| Conflicting Peds, #/hr   | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                   | 0                                                                                   | 0    |
| Sign Control             | Stop                                                                              | Stop                                                                              | Stop | Stop                                                                              | Stop                                                                              | Stop | Free                                                                              | Free                                                                              | Free | Free                                                                                | Free                                                                                | Free |
| RT Channelized           | -                                                                                 | -                                                                                 | None | -                                                                                 | -                                                                                 | None | -                                                                                 | -                                                                                 | None | -                                                                                   | -                                                                                   | None |
| Storage Length           | 100                                                                               | -                                                                                 | -    | 0                                                                                 | -                                                                                 | -    | 125                                                                               | -                                                                                 | -    | 135                                                                                 | -                                                                                   | -    |
| Veh in Median Storage, # | -                                                                                 | 0                                                                                 | -    | -                                                                                 | 0                                                                                 | -    | -                                                                                 | 0                                                                                 | -    | -                                                                                   | 0                                                                                   | -    |
| Grade, %                 | -                                                                                 | 0                                                                                 | -    | -                                                                                 | 0                                                                                 | -    | -                                                                                 | 0                                                                                 | -    | -                                                                                   | 0                                                                                   | -    |
| Peak Hour Factor         | 90                                                                                | 90                                                                                | 90   | 47                                                                                | 47                                                                                | 47   | 89                                                                                | 89                                                                                | 89   | 91                                                                                  | 91                                                                                  | 91   |
| Heavy Vehicles, %        | 2                                                                                 | 2                                                                                 | 2    | 2                                                                                 | 2                                                                                 | 2    | 2                                                                                 | 2                                                                                 | 2    | 2                                                                                   | 2                                                                                   | 2    |
| Mvmt Flow                | 21                                                                                | 4                                                                                 | 296  | 21                                                                                | 2                                                                                 | 11   | 416                                                                               | 785                                                                               | 35   | 14                                                                                  | 347                                                                                 | 22   |

| Major/Minor          | Minor2 |       | Minor1 |       | Major1 |       | Major2 |   |   |       |   |   |
|----------------------|--------|-------|--------|-------|--------|-------|--------|---|---|-------|---|---|
| Conflicting Flow All | 2028   | 2039  | 358    | 2171  | 2032   | 803   | 369    | 0 | 0 | 820   | 0 | 0 |
| Stage 1              | 387    | 387   | -      | 1634  | 1634   | -     | -      | - | - | -     | - | - |
| Stage 2              | 1641   | 1652  | -      | 537   | 398    | -     | -      | - | - | -     | - | - |
| Critical Hdwy        | 7.12   | 6.52  | 6.22   | 7.12  | 6.52   | 6.22  | 4.12   | - | - | 4.12  | - | - |
| Critical Hdwy Stg 1  | 6.12   | 5.52  | -      | 6.12  | 5.52   | -     | -      | - | - | -     | - | - |
| Critical Hdwy Stg 2  | 6.12   | 5.52  | -      | 6.12  | 5.52   | -     | -      | - | - | -     | - | - |
| Follow-up Hdwy       | 3.518  | 4.018 | 3.318  | 3.518 | 4.018  | 3.318 | 2.218  | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver   | 43     | 57    | 686    | 34    | 57     | 383   | 1190   | - | - | 809   | - | - |
| Stage 1              | 637    | 610   | -      | 127   | 159    | -     | -      | - | - | -     | - | - |
| Stage 2              | 126    | 156   | -      | 528   | 603    | -     | -      | - | - | -     | - | - |
| Platoon blocked, %   |        |       |        |       |        |       |        | - | - | -     | - | - |
| Mov Cap-1 Maneuver   | 29     | 36    | 686    | ~ 13  | 36     | 383   | 1190   | - | - | 809   | - | - |
| Mov Cap-2 Maneuver   | 29     | 36    | -      | ~ 13  | 36     | -     | -      | - | - | -     | - | - |
| Stage 1              | 414    | 599   | -      | 83    | 103    | -     | -      | - | - | -     | - | - |
| Stage 2              | 78     | 101   | -      | 293   | 593    | -     | -      | - | - | -     | - | - |

| Approach             | EB   | WB       | NB  | SB  |
|----------------------|------|----------|-----|-----|
| HCM Control Delay, s | 36.6 | \$ 573.8 | 3.2 | 0.4 |
| HCM LOS              | E    | F        |     |     |

| Minor Lane/Major Mvmt | NBL   | NBT | NBR | EBLn1 | EBLn2 | WBLn1  | WBLn2 | SBL   | SBT | SBR |
|-----------------------|-------|-----|-----|-------|-------|--------|-------|-------|-----|-----|
| Capacity (veh/h)      | 1190  | -   | -   | 29    | 541   | 13     | 147   | 809   | -   | -   |
| HCM Lane V/C Ratio    | 0.349 | -   | -   | 0.728 | 0.555 | 1.637  | 0.087 | 0.018 | -   | -   |
| HCM Control Delay (s) | 9.6   | -   | -   | 278.7 | 19.6  | \$ 899 | 31.8  | 9.5   | -   | -   |
| HCM Lane LOS          | A     | -   | -   | F     | C     | F      | D     | A     | -   | -   |
| HCM 95th %tile Q(veh) | 1.6   | -   | -   | 2.4   | 3.4   | 3.4    | 0.3   | 0.1   | -   | -   |

| Notes                      |                        |                            |  |  |  |  |  |  |                                |  |  |  |
|----------------------------|------------------------|----------------------------|--|--|--|--|--|--|--------------------------------|--|--|--|
| ~: Volume exceeds capacity | \$: Delay exceeds 300s | +: Computation Not Defined |  |  |  |  |  |  | *: All major volume in platoon |  |  |  |

HCM 2010 AWSC  
8: E MANSFIELD AVE & E HAPPY CANYON RD

Existing  
Timing Plan: PM Peak

| Intersection              |      |
|---------------------------|------|
| Intersection Delay, s/veh | 29.4 |
| Intersection LOS          | D    |

| Movement            | SEU  | SEL  | SET                                                                               | SER  | NWL  | NWT                                                                               | NWR  | NEL  | NET                                                                                 | NER  | SWL  | SWT                                                                                 |
|---------------------|------|------|-----------------------------------------------------------------------------------|------|------|-----------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|
| Lane Configurations |      |      |  |      |      |  |      |      |  |      |      |  |
| Traffic Vol, veh/h  | 0    | 12   | 207                                                                               | 5    | 30   | 586                                                                               | 10   | 11   | 23                                                                                  | 67   | 8    | 19                                                                                  |
| Future Vol, veh/h   | 0    | 12   | 207                                                                               | 5    | 30   | 586                                                                               | 10   | 11   | 23                                                                                  | 67   | 8    | 19                                                                                  |
| Peak Hour Factor    | 0.92 | 0.84 | 0.84                                                                              | 0.84 | 0.91 | 0.91                                                                              | 0.91 | 0.81 | 0.81                                                                                | 0.81 | 0.68 | 0.68                                                                                |
| Heavy Vehicles, %   | 2    | 2    | 2                                                                                 | 2    | 2    | 2                                                                                 | 2    | 2    | 2                                                                                   | 2    | 2    | 2                                                                                   |
| Mvmt Flow           | 0    | 14   | 246                                                                               | 6    | 33   | 644                                                                               | 11   | 14   | 28                                                                                  | 83   | 12   | 28                                                                                  |
| Number of Lanes     | 0    | 0    | 1                                                                                 | 0    | 0    | 1                                                                                 | 0    | 0    | 1                                                                                   | 0    | 0    | 1                                                                                   |

| Approach                   | SE | NW   | NE   | SW   |
|----------------------------|----|------|------|------|
| Opposing Approach          | NW | SE   | SW   | NE   |
| Opposing Lanes             | 1  | 1    | 1    | 1    |
| Conflicting Approach Left  | SW | NE   | SE   | NW   |
| Conflicting Lanes Left     | 1  | 1    | 1    | 1    |
| Conflicting Approach Right | NE | SW   | NW   | SE   |
| Conflicting Lanes Right    | 1  | 1    | 1    | 1    |
| HCM Control Delay          | 12 | 41.1 | 10.7 | 10.3 |
| HCM LOS                    | B  | E    | B    | B    |

| Lane                   | NELn1 | NWLn1 | SELn1 | SWLn1 |
|------------------------|-------|-------|-------|-------|
| Vol Left, %            | 11%   | 5%    | 5%    | 21%   |
| Vol Thru, %            | 23%   | 94%   | 92%   | 50%   |
| Vol Right, %           | 66%   | 2%    | 2%    | 29%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 101   | 626   | 224   | 38    |
| LT Vol                 | 11    | 30    | 12    | 8     |
| Through Vol            | 23    | 586   | 207   | 19    |
| RT Vol                 | 67    | 10    | 5     | 11    |
| Lane Flow Rate         | 125   | 688   | 267   | 56    |
| Geometry Grp           | 1     | 1     | 1     | 1     |
| Degree of Util (X)     | 0.209 | 0.935 | 0.4   | 0.1   |
| Departure Headway (Hd) | 6.029 | 4.892 | 5.404 | 6.464 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 594   | 743   | 664   | 552   |
| Service Time           | 4.085 | 2.921 | 3.446 | 4.529 |
| HCM Lane V/C Ratio     | 0.21  | 0.926 | 0.402 | 0.101 |
| HCM Control Delay      | 10.7  | 41.1  | 12    | 10.3  |
| HCM Lane LOS           | B     | E     | B     | B     |
| HCM 95th-tile Q        | 0.8   | 13.3  | 1.9   | 0.3   |

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Intersection

Intersection Delay, s/veh

Intersection LOS

Movement SWR

Lane Configurations

Traffic Vol, veh/h 11

Future Vol, veh/h 11

Peak Hour Factor 0.68

Heavy Vehicles, % 2

Mvmt Flow 16

Number of Lanes 0

Approach

Opposing Approach

Opposing Lanes

Conflicting Approach Left

Conflicting Lanes Left

Conflicting Approach Right

Conflicting Lanes Right

HCM Control Delay

HCM LOS

# HCM Signalized Intersection Capacity Analysis

## 9: S DAHLIA ST & E HAPPY CANYON RD & E HAMPDEN AVE

Existing  
Timing Plan: PM Peak

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | EBR2                                                                              | WBL2                                                                              | WBL                                                                               | WBT                                                                                | WBR                                                                                 | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL2                                                                                |
| Lane Configurations               |  |  |  |                                                                                   |                                                                                   |  |  |                                                                                     |                                                                                     |  |                                                                                     |                                                                                     |
| Traffic Volume (vph)              | 8                                                                                 | 1764                                                                              | 127                                                                               | 1                                                                                 | 10                                                                                | 7                                                                                 | 1680                                                                               | 26                                                                                  | 18                                                                                  | 32                                                                                  | 27                                                                                  | 18                                                                                  |
| Future Volume (vph)               | 8                                                                                 | 1764                                                                              | 127                                                                               | 1                                                                                 | 10                                                                                | 7                                                                                 | 1680                                                                               | 26                                                                                  | 18                                                                                  | 32                                                                                  | 27                                                                                  | 18                                                                                  |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                               | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                   | 6.0                                                                               | 6.0                                                                                |                                                                                     |                                                                                     | 6.0                                                                                 |                                                                                     |                                                                                     |
| Lane Util. Factor                 | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              | 0.95                                                                               |                                                                                     |                                                                                     | 1.00                                                                                |                                                                                     |                                                                                     |
| Frt                               | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              |                                                                                   |                                                                                   | 1.00                                                                              | 1.00                                                                               |                                                                                     |                                                                                     | 0.96                                                                                |                                                                                     |                                                                                     |
| Flt Protected                     | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 0.95                                                                              | 1.00                                                                               |                                                                                     |                                                                                     | 0.99                                                                                |                                                                                     |                                                                                     |
| Satd. Flow (prot)                 | 1770                                                                              | 3539                                                                              | 1583                                                                              |                                                                                   |                                                                                   | 1770                                                                              | 3529                                                                               |                                                                                     |                                                                                     | 1760                                                                                |                                                                                     |                                                                                     |
| Flt Permitted                     | 0.05                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 0.05                                                                              | 1.00                                                                               |                                                                                     |                                                                                     | 0.91                                                                                |                                                                                     |                                                                                     |
| Satd. Flow (perm)                 | 92                                                                                | 3539                                                                              | 1583                                                                              |                                                                                   |                                                                                   | 92                                                                                | 3529                                                                               |                                                                                     |                                                                                     | 1624                                                                                |                                                                                     |                                                                                     |
| Peak-hour factor, PHF             | 0.67                                                                              | 0.94                                                                              | 0.93                                                                              | 0.25                                                                              | 0.75                                                                              | 0.88                                                                              | 0.94                                                                               | 0.72                                                                                | 0.64                                                                                | 0.67                                                                                | 0.75                                                                                | 0.67                                                                                |
| Adj. Flow (vph)                   | 12                                                                                | 1877                                                                              | 137                                                                               | 4                                                                                 | 13                                                                                | 8                                                                                 | 1787                                                                               | 36                                                                                  | 28                                                                                  | 48                                                                                  | 36                                                                                  | 27                                                                                  |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 12                                                                                | 1877                                                                              | 141                                                                               | 0                                                                                 | 0                                                                                 | 21                                                                                | 1823                                                                               | 0                                                                                   | 0                                                                                   | 112                                                                                 | 0                                                                                   | 0                                                                                   |
| Turn Type                         | Perm                                                                              | NA                                                                                | Perm                                                                              |                                                                                   | Perm                                                                              | Perm                                                                              | NA                                                                                 |                                                                                     | Perm                                                                                | NA                                                                                  |                                                                                     | Perm                                                                                |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 8                                                                                  |                                                                                     |                                                                                     | 2                                                                                   |                                                                                     |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   | 4                                                                                 |                                                                                   | 8                                                                                 | 8                                                                                 |                                                                                    |                                                                                     | 2                                                                                   |                                                                                     |                                                                                     | 6                                                                                   |
| Actuated Green, G (s)             | 80.6                                                                              | 80.6                                                                              | 80.6                                                                              |                                                                                   |                                                                                   | 80.6                                                                              | 80.6                                                                               |                                                                                     |                                                                                     | 30.4                                                                                |                                                                                     |                                                                                     |
| Effective Green, g (s)            | 80.6                                                                              | 80.6                                                                              | 80.6                                                                              |                                                                                   |                                                                                   | 80.6                                                                              | 80.6                                                                               |                                                                                     |                                                                                     | 30.4                                                                                |                                                                                     |                                                                                     |
| Actuated g/C Ratio                | 0.58                                                                              | 0.58                                                                              | 0.58                                                                              |                                                                                   |                                                                                   | 0.58                                                                              | 0.58                                                                               |                                                                                     |                                                                                     | 0.22                                                                                |                                                                                     |                                                                                     |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                   | 6.0                                                                               | 6.0                                                                                |                                                                                     |                                                                                     | 6.0                                                                                 |                                                                                     |                                                                                     |
| Vehicle Extension (s)             | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               |                                                                                   |                                                                                   | 3.0                                                                               | 3.0                                                                                |                                                                                     |                                                                                     | 3.0                                                                                 |                                                                                     |                                                                                     |
| Lane Grp Cap (vph)                | 52                                                                                | 2037                                                                              | 911                                                                               |                                                                                   |                                                                                   | 52                                                                                | 2031                                                                               |                                                                                     |                                                                                     | 352                                                                                 |                                                                                     |                                                                                     |
| v/s Ratio Prot                    |                                                                                   | c0.53                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 0.52                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Perm                    | 0.13                                                                              |                                                                                   | 0.09                                                                              |                                                                                   |                                                                                   | 0.23                                                                              |                                                                                    |                                                                                     |                                                                                     | 0.07                                                                                |                                                                                     |                                                                                     |
| v/c Ratio                         | 0.23                                                                              | 0.92                                                                              | 0.15                                                                              |                                                                                   |                                                                                   | 0.40                                                                              | 0.90                                                                               |                                                                                     |                                                                                     | 0.32                                                                                |                                                                                     |                                                                                     |
| Uniform Delay, d1                 | 14.5                                                                              | 26.8                                                                              | 13.8                                                                              |                                                                                   |                                                                                   | 16.4                                                                              | 26.1                                                                               |                                                                                     |                                                                                     | 46.1                                                                                |                                                                                     |                                                                                     |
| Progression Factor                | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              | 1.00                                                                               |                                                                                     |                                                                                     | 1.00                                                                                |                                                                                     |                                                                                     |
| Incremental Delay, d2             | 2.3                                                                               | 7.5                                                                               | 0.1                                                                               |                                                                                   |                                                                                   | 5.1                                                                               | 5.7                                                                                |                                                                                     |                                                                                     | 2.4                                                                                 |                                                                                     |                                                                                     |
| Delay (s)                         | 16.8                                                                              | 34.3                                                                              | 13.9                                                                              |                                                                                   |                                                                                   | 21.5                                                                              | 31.8                                                                               |                                                                                     |                                                                                     | 48.5                                                                                |                                                                                     |                                                                                     |
| Level of Service                  | B                                                                                 | C                                                                                 | B                                                                                 |                                                                                   |                                                                                   | C                                                                                 | C                                                                                  |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |
| Approach Delay (s)                |                                                                                   | 32.8                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 31.7                                                                               |                                                                                     |                                                                                     | 48.5                                                                                |                                                                                     |                                                                                     |
| Approach LOS                      |                                                                                   | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   | C                                                                                  |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 35.0                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                    |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.78                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 140.0                                                                             |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                    |                                                                                     |                                                                                     | 18.0                                                                                |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 83.9%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                    |                                                                                     |                                                                                     | E                                                                                   |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM Signalized Intersection Capacity Analysis

## 9: S DAHLIA ST & E HAPPY CANYON RD & E HAMPDEN AVE

Existing  
Timing Plan: PM Peak



| Movement               | SBL   | SBT  | SBR  | NWL2 | NWL  | NWR   | NWR2 |
|------------------------|-------|------|------|------|------|-------|------|
| Lane Configurations    |       |      |      |      |      |       |      |
| Traffic Volume (vph)   | 75    | 52   | 18   | 1    | 1    | 12    | 123  |
| Future Volume (vph)    | 75    | 52   | 18   | 1    | 1    | 12    | 123  |
| Ideal Flow (vphpl)     | 1900  | 1900 | 1900 | 1900 | 1900 | 1900  | 1900 |
| Total Lost time (s)    | 6.0   | 6.0  |      |      | 6.0  | 6.0   |      |
| Lane Util. Factor      | 1.00  | 1.00 |      |      | 0.97 | 1.00  |      |
| Frt                    | 1.00  | 0.96 |      |      | 1.00 | 0.85  |      |
| Flt Protected          | 0.95  | 1.00 |      |      | 0.95 | 1.00  |      |
| Satd. Flow (prot)      | 1770  | 1783 |      |      | 3433 | 1583  |      |
| Flt Permitted          | 0.64  | 1.00 |      |      | 0.95 | 1.00  |      |
| Satd. Flow (perm)      | 1193  | 1783 |      |      | 3433 | 1583  |      |
| Peak-hour factor, PHF  | 0.76  | 0.87 | 0.75 | 0.25 | 0.91 | 0.70  | 0.64 |
| Adj. Flow (vph)        | 99    | 60   | 24   | 4    | 1    | 17    | 192  |
| RTOR Reduction (vph)   | 0     | 0    | 0    | 0    | 0    | 145   | 0    |
| Lane Group Flow (vph)  | 126   | 84   | 0    | 0    | 5    | 64    | 0    |
| Turn Type              | Perm  | NA   |      | Prot | Prot | Perm  |      |
| Protected Phases       |       | 6    |      | 10   | 10   |       |      |
| Permitted Phases       | 6     |      |      |      |      | 10    |      |
| Actuated Green, G (s)  | 30.4  | 30.4 |      |      | 11.0 | 11.0  |      |
| Effective Green, g (s) | 30.4  | 30.4 |      |      | 11.0 | 11.0  |      |
| Actuated g/C Ratio     | 0.22  | 0.22 |      |      | 0.08 | 0.08  |      |
| Clearance Time (s)     | 6.0   | 6.0  |      |      | 6.0  | 6.0   |      |
| Vehicle Extension (s)  | 3.0   | 3.0  |      |      | 3.0  | 3.0   |      |
| Lane Grp Cap (vph)     | 259   | 387  |      |      | 269  | 124   |      |
| v/s Ratio Prot         |       | 0.05 |      |      | 0.00 |       |      |
| v/s Ratio Perm         | c0.11 |      |      |      |      | c0.04 |      |
| v/c Ratio              | 0.49  | 0.22 |      |      | 0.02 | 0.52  |      |
| Uniform Delay, d1      | 48.0  | 45.0 |      |      | 59.5 | 62.0  |      |
| Progression Factor     | 1.00  | 1.00 |      |      | 1.00 | 1.00  |      |
| Incremental Delay, d2  | 1.4   | 0.3  |      |      | 0.0  | 3.6   |      |
| Delay (s)              | 49.4  | 45.3 |      |      | 59.5 | 65.6  |      |
| Level of Service       | D     | D    |      |      | E    | E     |      |
| Approach Delay (s)     |       | 47.8 |      |      | 65.4 |       |      |
| Approach LOS           |       | D    |      |      | E    |       |      |

### Intersection Summary



HCM 2010 TWSC  
10: KENT DENVER SCHOOL & E QUINCY AVE

Existing  
Timing Plan: PM Peak

| Intersection             |                                                                                   |        |       |                                                                                   |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|--------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 8.1                                                                               |        |       |                                                                                   |                                                                                   |                                                                                   |
| Movement                 | EBT                                                                               | EBR    | WBL   | WBT                                                                               | NBL                                                                               | NBR                                                                               |
| Lane Configurations      |  |        |       |  |  |  |
| Traffic Vol, veh/h       | 206                                                                               | 71     | 98    | 251                                                                               | 95                                                                                | 160                                                                               |
| Future Vol, veh/h        | 206                                                                               | 71     | 98    | 251                                                                               | 95                                                                                | 160                                                                               |
| Conflicting Peds, #/hr   | 0                                                                                 | 0      | 0     | 0                                                                                 | 0                                                                                 | 0                                                                                 |
| Sign Control             | Free                                                                              | Free   | Free  | Free                                                                              | Stop                                                                              | Stop                                                                              |
| RT Channelized           | -                                                                                 | None   | -     | None                                                                              | -                                                                                 | None                                                                              |
| Storage Length           | -                                                                                 | -      | -     | -                                                                                 | 0                                                                                 | 175                                                                               |
| Veh in Median Storage, # | 0                                                                                 | -      | -     | 0                                                                                 | 0                                                                                 | -                                                                                 |
| Grade, %                 | 0                                                                                 | -      | -     | 0                                                                                 | 0                                                                                 | -                                                                                 |
| Peak Hour Factor         | 67                                                                                | 67     | 77    | 77                                                                                | 63                                                                                | 63                                                                                |
| Heavy Vehicles, %        | 2                                                                                 | 2      | 2     | 2                                                                                 | 2                                                                                 | 2                                                                                 |
| Mvmt Flow                | 307                                                                               | 106    | 127   | 326                                                                               | 151                                                                               | 254                                                                               |
|                          |                                                                                   |        |       |                                                                                   |                                                                                   |                                                                                   |
| Major/Minor              | Major1                                                                            | Major2 |       | Minor1                                                                            |                                                                                   |                                                                                   |
| Conflicting Flow All     | 0                                                                                 | 0      | 413   | 0                                                                                 | 941                                                                               | 360                                                                               |
| Stage 1                  | -                                                                                 | -      | -     | -                                                                                 | 360                                                                               | -                                                                                 |
| Stage 2                  | -                                                                                 | -      | -     | -                                                                                 | 581                                                                               | -                                                                                 |
| Critical Hdwy            | -                                                                                 | -      | 4.12  | -                                                                                 | 6.42                                                                              | 6.22                                                                              |
| Critical Hdwy Stg 1      | -                                                                                 | -      | -     | -                                                                                 | 5.42                                                                              | -                                                                                 |
| Critical Hdwy Stg 2      | -                                                                                 | -      | -     | -                                                                                 | 5.42                                                                              | -                                                                                 |
| Follow-up Hdwy           | -                                                                                 | -      | 2.218 | -                                                                                 | 3.518                                                                             | 3.318                                                                             |
| Pot Cap-1 Maneuver       | -                                                                                 | -      | 1146  | -                                                                                 | 292                                                                               | 684                                                                               |
| Stage 1                  | -                                                                                 | -      | -     | -                                                                                 | 706                                                                               | -                                                                                 |
| Stage 2                  | -                                                                                 | -      | -     | -                                                                                 | 559                                                                               | -                                                                                 |
| Platoon blocked, %       | -                                                                                 | -      |       | -                                                                                 |                                                                                   |                                                                                   |
| Mov Cap-1 Maneuver       | -                                                                                 | -      | 1146  | -                                                                                 | 253                                                                               | 684                                                                               |
| Mov Cap-2 Maneuver       | -                                                                                 | -      | -     | -                                                                                 | 253                                                                               | -                                                                                 |
| Stage 1                  | -                                                                                 | -      | -     | -                                                                                 | 706                                                                               | -                                                                                 |
| Stage 2                  | -                                                                                 | -      | -     | -                                                                                 | 484                                                                               | -                                                                                 |
|                          |                                                                                   |        |       |                                                                                   |                                                                                   |                                                                                   |
| Approach                 | EB                                                                                | WB     |       | NB                                                                                |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 0                                                                                 | 2.4    |       | 22.6                                                                              |                                                                                   |                                                                                   |
| HCM LOS                  | C                                                                                 |        |       |                                                                                   |                                                                                   |                                                                                   |
|                          |                                                                                   |        |       |                                                                                   |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBLn1                                                                             | NBLn2  | EBT   | EBR                                                                               | WBL                                                                               | WBT                                                                               |
| Capacity (veh/h)         | 253                                                                               | 684    | -     | -                                                                                 | 1146                                                                              | -                                                                                 |
| HCM Lane V/C Ratio       | 0.596                                                                             | 0.371  | -     | -                                                                                 | 0.111                                                                             | -                                                                                 |
| HCM Control Delay (s)    | 38.2                                                                              | 13.3   | -     | -                                                                                 | 8.5                                                                               | 0                                                                                 |
| HCM Lane LOS             | E                                                                                 | B      | -     | -                                                                                 | A                                                                                 | A                                                                                 |
| HCM 95th %tile Q(veh)    | 3.5                                                                               | 1.7    | -     | -                                                                                 | 0.4                                                                               | -                                                                                 |

| Intersection             |                                                                                   |          |                                                                                   |       |       |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------|-------|-------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 0.6                                                                               |          |                                                                                   |       |       |                                                                                   |
| Movement                 | NWL                                                                               | NWR      | NET                                                                               | NER   | SWL   | SWT                                                                               |
| Lane Configurations      |  |          |  |       |       |  |
| Traffic Vol, veh/h       | 0                                                                                 | 12       | 216                                                                               | 1     | 7     | 330                                                                               |
| Future Vol, veh/h        | 0                                                                                 | 12       | 216                                                                               | 1     | 7     | 330                                                                               |
| Conflicting Peds, #/hr   | 0                                                                                 | 0        | 0                                                                                 | 0     | 0     | 0                                                                                 |
| Sign Control             | Stop                                                                              | Stop     | Free                                                                              | Free  | Free  | Free                                                                              |
| RT Channelized           | -                                                                                 | None     | -                                                                                 | None  | -     | None                                                                              |
| Storage Length           | 0                                                                                 | -        | -                                                                                 | -     | -     | -                                                                                 |
| Veh in Median Storage, # | 0                                                                                 | -        | 0                                                                                 | -     | -     | 0                                                                                 |
| Grade, %                 | 0                                                                                 | -        | 0                                                                                 | -     | -     | 0                                                                                 |
| Peak Hour Factor         | 30                                                                                | 30       | 60                                                                                | 60    | 73    | 73                                                                                |
| Heavy Vehicles, %        | 2                                                                                 | 2        | 2                                                                                 | 2     | 2     | 2                                                                                 |
| Mvmt Flow                | 0                                                                                 | 40       | 360                                                                               | 2     | 10    | 452                                                                               |
| Major/Minor              | Minor1                                                                            | Major1   | Major2                                                                            |       |       |                                                                                   |
| Conflicting Flow All     | 832                                                                               | 361      | 0                                                                                 | 0     | 362   | 0                                                                                 |
| Stage 1                  | 361                                                                               | -        | -                                                                                 | -     | -     | -                                                                                 |
| Stage 2                  | 471                                                                               | -        | -                                                                                 | -     | -     | -                                                                                 |
| Critical Hdwy            | 6.42                                                                              | 6.22     | -                                                                                 | -     | 4.12  | -                                                                                 |
| Critical Hdwy Stg 1      | 5.42                                                                              | -        | -                                                                                 | -     | -     | -                                                                                 |
| Critical Hdwy Stg 2      | 5.42                                                                              | -        | -                                                                                 | -     | -     | -                                                                                 |
| Follow-up Hdwy           | 3.518                                                                             | 3.318    | -                                                                                 | -     | 2.218 | -                                                                                 |
| Pot Cap-1 Maneuver       | 339                                                                               | 684      | -                                                                                 | -     | 1197  | -                                                                                 |
| Stage 1                  | 705                                                                               | -        | -                                                                                 | -     | -     | -                                                                                 |
| Stage 2                  | 628                                                                               | -        | -                                                                                 | -     | -     | -                                                                                 |
| Platoon blocked, %       |                                                                                   |          | -                                                                                 | -     |       | -                                                                                 |
| Mov Cap-1 Maneuver       | 335                                                                               | 684      | -                                                                                 | -     | 1197  | -                                                                                 |
| Mov Cap-2 Maneuver       | 335                                                                               | -        | -                                                                                 | -     | -     | -                                                                                 |
| Stage 1                  | 705                                                                               | -        | -                                                                                 | -     | -     | -                                                                                 |
| Stage 2                  | 621                                                                               | -        | -                                                                                 | -     | -     | -                                                                                 |
| Approach                 | NW                                                                                | NE       | SW                                                                                |       |       |                                                                                   |
| HCM Control Delay, s     | 10.6                                                                              | 0        | 0.2                                                                               |       |       |                                                                                   |
| HCM LOS                  | B                                                                                 |          |                                                                                   |       |       |                                                                                   |
| Minor Lane/Major Mvmt    | NET                                                                               | NERNWLn1 | SWL                                                                               | SWT   |       |                                                                                   |
| Capacity (veh/h)         | -                                                                                 | -        | 684                                                                               | 1197  | -     |                                                                                   |
| HCM Lane V/C Ratio       | -                                                                                 | -        | 0.058                                                                             | 0.008 | -     |                                                                                   |
| HCM Control Delay (s)    | -                                                                                 | -        | 10.6                                                                              | 8     | 0     |                                                                                   |
| HCM Lane LOS             | -                                                                                 | -        | B                                                                                 | A     | A     |                                                                                   |
| HCM 95th %tile Q(veh)    | -                                                                                 | -        | 0.2                                                                               | 0     | -     |                                                                                   |

HCM 2010 TWSC  
12: S UNIVERSITY BLVD & DRIVEWAY

Existing  
Timing Plan: PM Peak

| Intersection               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |                                |
|----------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------------------|
| Int Delay, s/veh           | 27                                                                                |                                                                                   |       |                                                                                   |                                                                                   |                                |
| Movement                   | EBL                                                                               | EBR                                                                               | NBL   | NBT                                                                               | SBT                                                                               | SBR                            |
| Lane Configurations        |  |  |       |  |  |                                |
| Traffic Vol, veh/h         | 99                                                                                | 99                                                                                | 0     | 1115                                                                              | 1410                                                                              | 0                              |
| Future Vol, veh/h          | 99                                                                                | 99                                                                                | 0     | 1115                                                                              | 1410                                                                              | 0                              |
| Conflicting Peds, #/hr     | 0                                                                                 | 0                                                                                 | 0     | 0                                                                                 | 0                                                                                 | 0                              |
| Sign Control               | Stop                                                                              | Stop                                                                              | Free  | Free                                                                              | Free                                                                              | Free                           |
| RT Channelized             | -                                                                                 | None                                                                              | -     | None                                                                              | -                                                                                 | None                           |
| Storage Length             | 0                                                                                 | 0                                                                                 | -     | -                                                                                 | -                                                                                 | -                              |
| Veh in Median Storage, #   | 0                                                                                 | -                                                                                 | -     | 0                                                                                 | 0                                                                                 | -                              |
| Grade, %                   | 0                                                                                 | -                                                                                 | -     | 0                                                                                 | 0                                                                                 | -                              |
| Peak Hour Factor           | 54                                                                                | 54                                                                                | 89    | 89                                                                                | 82                                                                                | 82                             |
| Heavy Vehicles, %          | 2                                                                                 | 2                                                                                 | 2     | 2                                                                                 | 2                                                                                 | 2                              |
| Mvmt Flow                  | 183                                                                               | 183                                                                               | 0     | 1253                                                                              | 1720                                                                              | 0                              |
|                            |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |                                |
| Major/Minor                | Minor2                                                                            | Major1                                                                            |       | Major2                                                                            |                                                                                   |                                |
| Conflicting Flow All       | 2346                                                                              | 860                                                                               | -     | 0                                                                                 | -                                                                                 | 0                              |
| Stage 1                    | 1720                                                                              | -                                                                                 | -     | -                                                                                 | -                                                                                 | -                              |
| Stage 2                    | 626                                                                               | -                                                                                 | -     | -                                                                                 | -                                                                                 | -                              |
| Critical Hdwy              | 6.84                                                                              | 6.94                                                                              | -     | -                                                                                 | -                                                                                 | -                              |
| Critical Hdwy Stg 1        | 5.84                                                                              | -                                                                                 | -     | -                                                                                 | -                                                                                 | -                              |
| Critical Hdwy Stg 2        | 5.84                                                                              | -                                                                                 | -     | -                                                                                 | -                                                                                 | -                              |
| Follow-up Hdwy             | 3.52                                                                              | 3.32                                                                              | -     | -                                                                                 | -                                                                                 | -                              |
| Pot Cap-1 Maneuver         | ~ 30                                                                              | 299                                                                               | 0     | -                                                                                 | -                                                                                 | 0                              |
| Stage 1                    | ~ 130                                                                             | -                                                                                 | 0     | -                                                                                 | -                                                                                 | 0                              |
| Stage 2                    | 495                                                                               | -                                                                                 | 0     | -                                                                                 | -                                                                                 | 0                              |
| Platoon blocked, %         |                                                                                   |                                                                                   |       | -                                                                                 | -                                                                                 |                                |
| Mov Cap-1 Maneuver         | ~ 30                                                                              | 299                                                                               | -     | -                                                                                 | -                                                                                 | -                              |
| Mov Cap-2 Maneuver         | ~ 103                                                                             | -                                                                                 | -     | -                                                                                 | -                                                                                 | -                              |
| Stage 1                    | ~ 130                                                                             | -                                                                                 | -     | -                                                                                 | -                                                                                 | -                              |
| Stage 2                    | 495                                                                               | -                                                                                 | -     | -                                                                                 | -                                                                                 | -                              |
|                            |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |                                |
| Approach                   | EB                                                                                | NB                                                                                |       | SB                                                                                |                                                                                   |                                |
| HCM Control Delay, s       | 246.2                                                                             | 0                                                                                 |       | 0                                                                                 |                                                                                   |                                |
| HCM LOS                    | F                                                                                 |                                                                                   |       |                                                                                   |                                                                                   |                                |
|                            |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |                                |
| Minor Lane/Major Mvmt      | NBT                                                                               | EBLn1                                                                             | EBLn2 | SBT                                                                               |                                                                                   |                                |
| Capacity (veh/h)           | -                                                                                 | 103                                                                               | 299   | -                                                                                 |                                                                                   |                                |
| HCM Lane V/C Ratio         | -                                                                                 | 1.78                                                                              | 0.613 | -                                                                                 |                                                                                   |                                |
| HCM Control Delay (s)      | -\$                                                                               | 457.9                                                                             | 34.4  | -                                                                                 |                                                                                   |                                |
| HCM Lane LOS               | -                                                                                 | F                                                                                 | D     | -                                                                                 |                                                                                   |                                |
| HCM 95th %tile Q(veh)      | -                                                                                 | 14.7                                                                              | 3.8   | -                                                                                 |                                                                                   |                                |
| Notes                      |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |                                |
| ~: Volume exceeds capacity |                                                                                   | \$: Delay exceeds 300s                                                            |       | +: Computation Not Defined                                                        |                                                                                   | *: All major volume in platoon |

HCM 2010 TWSC  
 13: S UNIVERSITY BLVD & DRIVEWAY/CHERRY RIDGE RD

Existing  
 Timing Plan: PM Peak

| Intersection             |       |      |      |        |       |        |      |        |      |      |      |      |
|--------------------------|-------|------|------|--------|-------|--------|------|--------|------|------|------|------|
| Int Delay, s/veh         | 3.6   |      |      |        |       |        |      |        |      |      |      |      |
| Movement                 | EBL   | EBT  | EBR  | WBL    | WBT   | WBR    | NBL  | NBT    | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |       |      |      |        | ↕     |        | ↕    | ↕      |      | ↕    | ↕    | ↕    |
| Traffic Vol, veh/h       | 0     | 0    | 0    | 15     | 0     | 30     | 53   | 1090   | 20   | 15   | 1380 | 150  |
| Future Vol, veh/h        | 0     | 0    | 0    | 15     | 0     | 30     | 53   | 1090   | 20   | 15   | 1380 | 150  |
| Conflicting Peds, #/hr   | 0     | 0    | 0    | 0      | 0     | 0      | 0    | 0      | 0    | 0    | 0    | 0    |
| Sign Control             | Free  | Free | Free | Stop   | Stop  | Stop   | Free | Free   | Free | Free | Free | Free |
| RT Channelized           | -     | -    | None | -      | -     | None   | -    | -      | None | -    | -    | None |
| Storage Length           | -     | -    | -    | -      | -     | -      | 100  | -      | -    | 100  | -    | 0    |
| Veh in Median Storage, # | -     | -    | -    | -      | 0     | -      | -    | 0      | -    | -    | 0    | -    |
| Grade, %                 | -     | 0    | -    | -      | 0     | -      | -    | 0      | -    | -    | 0    | -    |
| Peak Hour Factor         | 92    | 92   | 92   | 63     | 63    | 63     | 91   | 91     | 91   | 83   | 83   | 83   |
| Heavy Vehicles, %        | 2     | 2    | 2    | 2      | 2     | 2      | 2    | 2      | 2    | 2    | 2    | 2    |
| Mvmt Flow                | 0     | 0    | 0    | 24     | 0     | 48     | 58   | 1198   | 22   | 18   | 1663 | 181  |
| Major/Minor              |       |      |      | Minor1 |       | Major1 |      | Major2 |      |      |      |      |
| Conflicting Flow All     |       |      |      | 2192   | 3024  | 610    | 1663 | 0      | 0    | 1220 | 0    | 0    |
| Stage 1                  |       |      |      | 1325   | 1325  | -      | -    | -      | -    | -    | -    | -    |
| Stage 2                  |       |      |      | 867    | 1699  | -      | -    | -      | -    | -    | -    | -    |
| Critical Hdwy            |       |      |      | 6.84   | 6.54  | 6.94   | 4.14 | -      | -    | 4.14 | -    | -    |
| Critical Hdwy Stg 1      |       |      |      | 5.84   | 5.54  | -      | -    | -      | -    | -    | -    | -    |
| Critical Hdwy Stg 2      |       |      |      | 5.84   | 5.54  | -      | -    | -      | -    | -    | -    | -    |
| Follow-up Hdwy           |       |      |      | 3.52   | 4.02  | 3.32   | 2.22 | -      | -    | 2.22 | -    | -    |
| Pot Cap-1 Maneuver       |       |      |      | 39     | 13    | 437    | 383  | -      | -    | 567  | -    | -    |
| Stage 1                  |       |      |      | 213    | 223   | -      | -    | -      | -    | -    | -    | -    |
| Stage 2                  |       |      |      | 372    | 146   | -      | -    | -      | -    | -    | -    | -    |
| Platoon blocked, %       |       |      |      |        |       |        |      | -      | -    | -    | -    | -    |
| Mov Cap-1 Maneuver       |       |      |      | 32     | 0     | 437    | 383  | -      | -    | 567  | -    | -    |
| Mov Cap-2 Maneuver       |       |      |      | 32     | 0     | -      | -    | -      | -    | -    | -    | -    |
| Stage 1                  |       |      |      | 181    | 0     | -      | -    | -      | -    | -    | -    | -    |
| Stage 2                  |       |      |      | 360    | 0     | -      | -    | -      | -    | -    | -    | -    |
| Approach                 |       |      |      | WB     |       | NB     |      | SB     |      |      |      |      |
| HCM Control Delay, s     |       |      |      | 146.6  |       | 0.7    |      | 0.1    |      |      |      |      |
| HCM LOS                  |       |      |      | F      |       |        |      |        |      |      |      |      |
| Minor Lane/Major Mvmt    | NBL   | NBT  | NBR  | WBLn1  | SBL   | SBT    | SBR  |        |      |      |      |      |
| Capacity (veh/h)         | 383   | -    | -    | 84     | 567   | -      | -    |        |      |      |      |      |
| HCM Lane V/C Ratio       | 0.152 | -    | -    | 0.85   | 0.032 | -      | -    |        |      |      |      |      |
| HCM Control Delay (s)    | 16.1  | -    | -    | 146.6  | 11.6  | -      | -    |        |      |      |      |      |
| HCM Lane LOS             | C     | -    | -    | F      | B     | -      | -    |        |      |      |      |      |
| HCM 95th %tile Q(veh)    | 0.5   | -    | -    | 4.4    | 0.1   | -      | -    |        |      |      |      |      |

HCM 2010 TWSC  
14: S UNIVERSITY BLVD & DRIVEWAY

Existing  
Timing Plan: PM Peak

| Intersection             |                                                                                   |        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 0.5                                                                               |        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Movement                 | EBL                                                                               | EBR    | NBL                                                                               | NBT                                                                               | SBT                                                                               | SBR                                                                               |
| Lane Configurations      |  |        |  |  |  |  |
| Traffic Vol, veh/h       | 0                                                                                 | 0      | 75                                                                                | 1160                                                                              | 1390                                                                              | 45                                                                                |
| Future Vol, veh/h        | 0                                                                                 | 0      | 75                                                                                | 1160                                                                              | 1390                                                                              | 45                                                                                |
| Conflicting Peds, #/hr   | 0                                                                                 | 0      | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 |
| Sign Control             | Stop                                                                              | Stop   | Free                                                                              | Free                                                                              | Free                                                                              | Free                                                                              |
| RT Channelized           | -                                                                                 | None   | -                                                                                 | None                                                                              | -                                                                                 | None                                                                              |
| Storage Length           | 0                                                                                 | -      | 100                                                                               | -                                                                                 | -                                                                                 | 0                                                                                 |
| Veh in Median Storage, # | 0                                                                                 | -      | -                                                                                 | 0                                                                                 | 0                                                                                 | -                                                                                 |
| Grade, %                 | 0                                                                                 | -      | -                                                                                 | 0                                                                                 | 0                                                                                 | -                                                                                 |
| Peak Hour Factor         | 92                                                                                | 92     | 91                                                                                | 91                                                                                | 81                                                                                | 81                                                                                |
| Heavy Vehicles, %        | 2                                                                                 | 2      | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 |
| Mvmt Flow                | 0                                                                                 | 0      | 82                                                                                | 1275                                                                              | 1716                                                                              | 56                                                                                |
| Major/Minor              | Minor2                                                                            | Major1 |                                                                                   | Major2                                                                            |                                                                                   |                                                                                   |
| Conflicting Flow All     | 2518                                                                              | 858    | 1716                                                                              | 0                                                                                 | -                                                                                 | 0                                                                                 |
| Stage 1                  | 1716                                                                              | -      | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 2                  | 802                                                                               | -      | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Critical Hdwy            | 6.84                                                                              | 6.94   | 4.14                                                                              | -                                                                                 | -                                                                                 | -                                                                                 |
| Critical Hdwy Stg 1      | 5.84                                                                              | -      | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Critical Hdwy Stg 2      | 5.84                                                                              | -      | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Follow-up Hdwy           | 3.52                                                                              | 3.32   | 2.22                                                                              | -                                                                                 | -                                                                                 | -                                                                                 |
| Pot Cap-1 Maneuver       | 23                                                                                | 300    | 365                                                                               | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 1                  | 130                                                                               | -      | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 2                  | 402                                                                               | -      | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |        |                                                                                   | -                                                                                 | -                                                                                 | -                                                                                 |
| Mov Cap-1 Maneuver       | 18                                                                                | 300    | 365                                                                               | -                                                                                 | -                                                                                 | -                                                                                 |
| Mov Cap-2 Maneuver       | 90                                                                                | -      | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 1                  | 130                                                                               | -      | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 2                  | 312                                                                               | -      | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Approach                 | EB                                                                                | NB     |                                                                                   | SB                                                                                |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 0                                                                                 | 1.1    |                                                                                   | 0                                                                                 |                                                                                   |                                                                                   |
| HCM LOS                  | A                                                                                 |        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBL                                                                               | NBT    | EBLn1                                                                             | SBT                                                                               | SBR                                                                               |                                                                                   |
| Capacity (veh/h)         | 365                                                                               | -      | -                                                                                 | -                                                                                 | -                                                                                 |                                                                                   |
| HCM Lane V/C Ratio       | 0.226                                                                             | -      | -                                                                                 | -                                                                                 | -                                                                                 |                                                                                   |
| HCM Control Delay (s)    | 17.7                                                                              | -      | 0                                                                                 | -                                                                                 | -                                                                                 |                                                                                   |
| HCM Lane LOS             | C                                                                                 | -      | A                                                                                 | -                                                                                 | -                                                                                 |                                                                                   |
| HCM 95th %tile Q(veh)    | 0.9                                                                               | -      | -                                                                                 | -                                                                                 | -                                                                                 |                                                                                   |

HCM 2010 TWSC  
15: E BELLEVIEW AVE

Existing  
Timing Plan: PM Peak

| Intersection             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |      |      |                                                                                   |      |      |                                                                                     |      |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|------|-----------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|
| Int Delay, s/veh         | 46.9                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |      |      |                                                                                   |      |      |                                                                                     |      |
| Movement                 | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR  | NBL  | NBT                                                                               | NBR  | SBL  | SBT                                                                                 | SBR  |
| Lane Configurations      |  |  |  |  |  |      |      |  |      |      |  |      |
| Traffic Vol, veh/h       | 25                                                                                | 1452                                                                              | 22                                                                                | 6                                                                                 | 1980                                                                              | 26   | 12   | 1                                                                                 | 10   | 12   | 10                                                                                  | 23   |
| Future Vol, veh/h        | 25                                                                                | 1452                                                                              | 22                                                                                | 6                                                                                 | 1980                                                                              | 26   | 12   | 1                                                                                 | 10   | 12   | 10                                                                                  | 23   |
| Conflicting Peds, #/hr   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0    | 0    | 0                                                                                 | 0    | 0    | 0                                                                                   | 0    |
| Sign Control             | Free                                                                              | Free                                                                              | Free                                                                              | Free                                                                              | Free                                                                              | Free | Stop | Stop                                                                              | Stop | Stop | Stop                                                                                | Stop |
| RT Channelized           | -                                                                                 | -                                                                                 | None                                                                              | -                                                                                 | -                                                                                 | None | -    | -                                                                                 | None | -    | -                                                                                   | None |
| Storage Length           | 0                                                                                 | -                                                                                 | 0                                                                                 | 0                                                                                 | -                                                                                 | -    | -    | -                                                                                 | -    | -    | -                                                                                   | -    |
| Veh in Median Storage, # | -                                                                                 | 0                                                                                 | -                                                                                 | -                                                                                 | 0                                                                                 | -    | -    | 0                                                                                 | -    | -    | 0                                                                                   | -    |
| Grade, %                 | -                                                                                 | 0                                                                                 | -                                                                                 | -                                                                                 | 0                                                                                 | -    | -    | 0                                                                                 | -    | -    | 0                                                                                   | -    |
| Peak Hour Factor         | 92                                                                                | 92                                                                                | 92                                                                                | 92                                                                                | 92                                                                                | 92   | 92   | 92                                                                                | 92   | 92   | 92                                                                                  | 92   |
| Heavy Vehicles, %        | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2    | 2    | 2                                                                                 | 2    | 2    | 2                                                                                   | 2    |
| Mvmt Flow                | 27                                                                                | 1578                                                                              | 24                                                                                | 7                                                                                 | 2152                                                                              | 28   | 13   | 1                                                                                 | 11   | 13   | 11                                                                                  | 25   |

| Major/Minor          | Major1 |   |   | Major2 |   |   | Minor1 |      |      | Minor2 |      |      |
|----------------------|--------|---|---|--------|---|---|--------|------|------|--------|------|------|
| Conflicting Flow All | 2180   | 0 | 0 | 1578   | 0 | 0 | 2728   | 3826 | 789  | 3023   | 3812 | 1090 |
| Stage 1              | -      | - | - | -      | - | - | 1633   | 1633 | -    | 2179   | 2179 | -    |
| Stage 2              | -      | - | - | -      | - | - | 1095   | 2193 | -    | 844    | 1633 | -    |
| Critical Hdwy        | 4.14   | - | - | 4.14   | - | - | 7.54   | 6.54 | 6.94 | 7.54   | 6.54 | 6.94 |
| Critical Hdwy Stg 1  | -      | - | - | -      | - | - | 6.54   | 5.54 | -    | 6.54   | 5.54 | -    |
| Critical Hdwy Stg 2  | -      | - | - | -      | - | - | 6.54   | 5.54 | -    | 6.54   | 5.54 | -    |
| Follow-up Hdwy       | 2.22   | - | - | 2.22   | - | - | 3.52   | 4.02 | 3.32 | 3.52   | 4.02 | 3.32 |
| Pot Cap-1 Maneuver   | 240    | - | - | 413    | - | - | ~ 10   | 4    | 333  | ~ 6    | ~ 4  | 210  |
| Stage 1              | -      | - | - | -      | - | - | 105    | 158  | -    | 47     | 84   | -    |
| Stage 2              | -      | - | - | -      | - | - | 228    | 82   | -    | 324    | 158  | -    |
| Platoon blocked, %   |        | - | - |        | - | - |        |      |      |        |      |      |
| Mov Cap-1 Maneuver   | 240    | - | - | 413    | - | - | -      | 3    | 333  | ~ 4    | ~ 3  | 210  |
| Mov Cap-2 Maneuver   | -      | - | - | -      | - | - | -      | 3    | -    | ~ 4    | ~ 3  | -    |
| Stage 1              | -      | - | - | -      | - | - | 93     | 140  | -    | 42     | 83   | -    |
| Stage 2              | -      | - | - | -      | - | - | 172    | 81   | -    | 276    | 140  | -    |

| Approach             | EB  | WB | NB | SB        |
|----------------------|-----|----|----|-----------|
| HCM Control Delay, s | 0.4 | 0  |    | \$ 3719.1 |
| HCM LOS              |     |    | -  | F         |

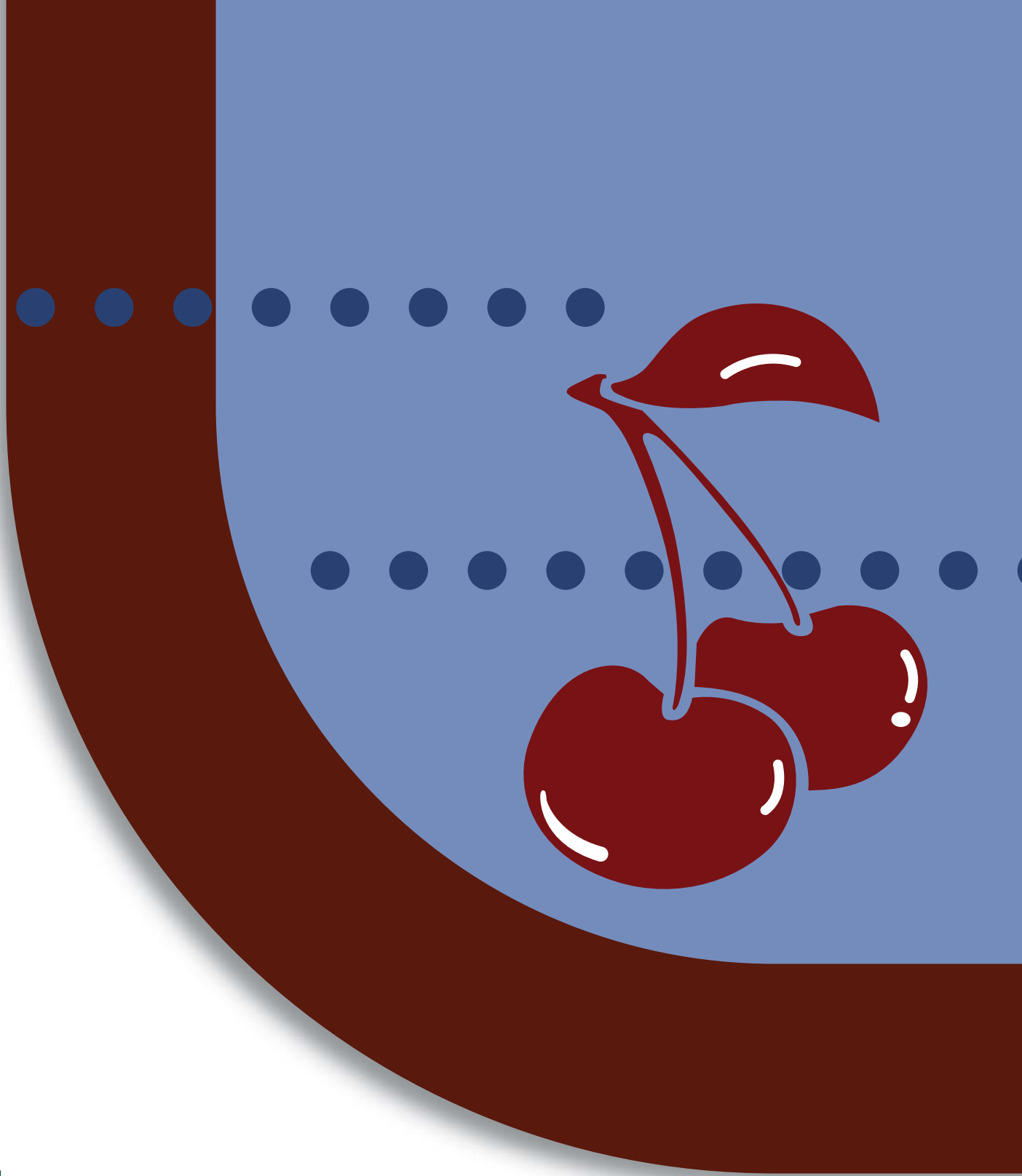
| Minor Lane/Major Mvmt | NBLn1 | EBL   | EBT | EBR | WBL   | WBT | WBR | SBLn1     |
|-----------------------|-------|-------|-----|-----|-------|-----|-----|-----------|
| Capacity (veh/h)      | -     | 240   | -   | -   | 413   | -   | -   | 7         |
| HCM Lane V/C Ratio    | -     | 0.113 | -   | -   | 0.016 | -   | -   | 6.988     |
| HCM Control Delay (s) | -     | 21.9  | -   | -   | 13.9  | -   | -   | \$ 3719.1 |
| HCM Lane LOS          | -     | C     | -   | -   | B     | -   | -   | F         |
| HCM 95th %tile Q(veh) | -     | 0.4   | -   | -   | 0     | -   | -   | 7.6       |

| Notes                      |                        |                            |                                |
|----------------------------|------------------------|----------------------------|--------------------------------|
| ~: Volume exceeds capacity | \$: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |

**APPENDIX E      ORIGIN DESTINATION SUMMARY**







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