TRAFFIC IMPACT ANALYSIS

The Streets at Southglenn

Prepared for:

Northwood Ravin, LLC
3015 Carrington Mill Boulevard, Suite 460
Morrisville, NC 26560

&

Alberta Development Partners, LLC
5750 DTC Parkway, Suite 210
Greenwood Village, CO 80111

Prepared by:

Felsburg Holt & Ullevig
6400 S Fiddlers Green Circle, Suite 1500
Greenwood Village, CO 80111
303.721.1440

Project Manager: Chris Fasching, PE, PTOE
Project Manager: Paul Brown, PE, PTOE

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I. EXECUTIVE SUMMARY

Northwood Ravin, LLC and Alberta Development Partners, LLC are proposing to redevelop both the Macy's and Sears within the Streets at Southglenn, a mid-size shopping center located at the southwest corner of Arapahoe Road (Rd) and University Boulevard (Blvd) in Centennial, Colorado. The proposed redevelopment will include demolition of the two anchor stores, reuse of existing structures, and include construction of new multiuse structures, creating a mix of entertainment, retail, residential, and office spaces. The redevelopment will be served by several existing access points onto the adjacent transportation network, including two existing access points onto Arapahoe Rd, three access points onto University Blvd, two access points onto Easter Avenue (Ave), and three access points onto S Race Street (St). Two future planning horizons were evaluated for the site, including a short-term future year (2022, full build-out) and long-term future (2040, planning horizon):

- **Short-Term Future –** Convert the intersection at S University Blvd and E Davies Ave to a Right-In/Right-Out (RIRO). Adjust signal timings at Arapahoe Rd and Vine St to run split phasing to meet the City of Centennial's LOS standards.
- **Long-Term Future –** No long-term mitigation measures were identified.

The study assessed the effects of project-related vehicle trips on the adjacent roadways and identified roadway improvements needed to accommodate anticipated traffic operations. The Streets at Southglenn redevelopment project is estimated to generate about 6,100 new daily trips while maintaining the same level of service (LOS). This report recommends two background mitigation measures to address operational and/or safety concerns identified during the evaluation of existing and background traffic. The two mitigation measures are summarized in more detail in **Section IV.C** of this report.

With these improvements, the study concludes that acceptable operations can be provided at study area intersections.

II. INTRODUCTION

Northwood Ravin, LLC and Alberta Development Partners, LLC are proposing to redevelop both the Macy's and Sears within the Streets at Southglenn, a mid-size mixed-use retail center located in Centennial, Colorado. **Figure 1** shows the site's location in relation to major roadways in the area. The proposed redevelopment will involve the construction of new multiuse structures, creating a mix of entertainment, retail, residential, and office spaces. Currently, the existing Macy's is in business. The Sears is no longer in business, but the building is currently occupied by a seasonal retail store. The two existing anchor stores host an available 307,700 square feet (sf) of space. After demolition of the existing sites and new construction, the proposed land uses include:

- Approximately 1,071 residential dwelling units (DUs)
  - 148 approved but not yet constructed units at or near the Macy's site, already approved in the existing Master Development Plan (MDP)
  - 225 new units at the Macy's site
  - 698 new units at the Sears site
- Approximately 280,000 sf of new entertainment, office, and retail space
  - 116 thousand square feet (ksf) of retail/entertainment and 129 ksf of office at the Macy's site
  - 35 ksf of retail at the Sears site

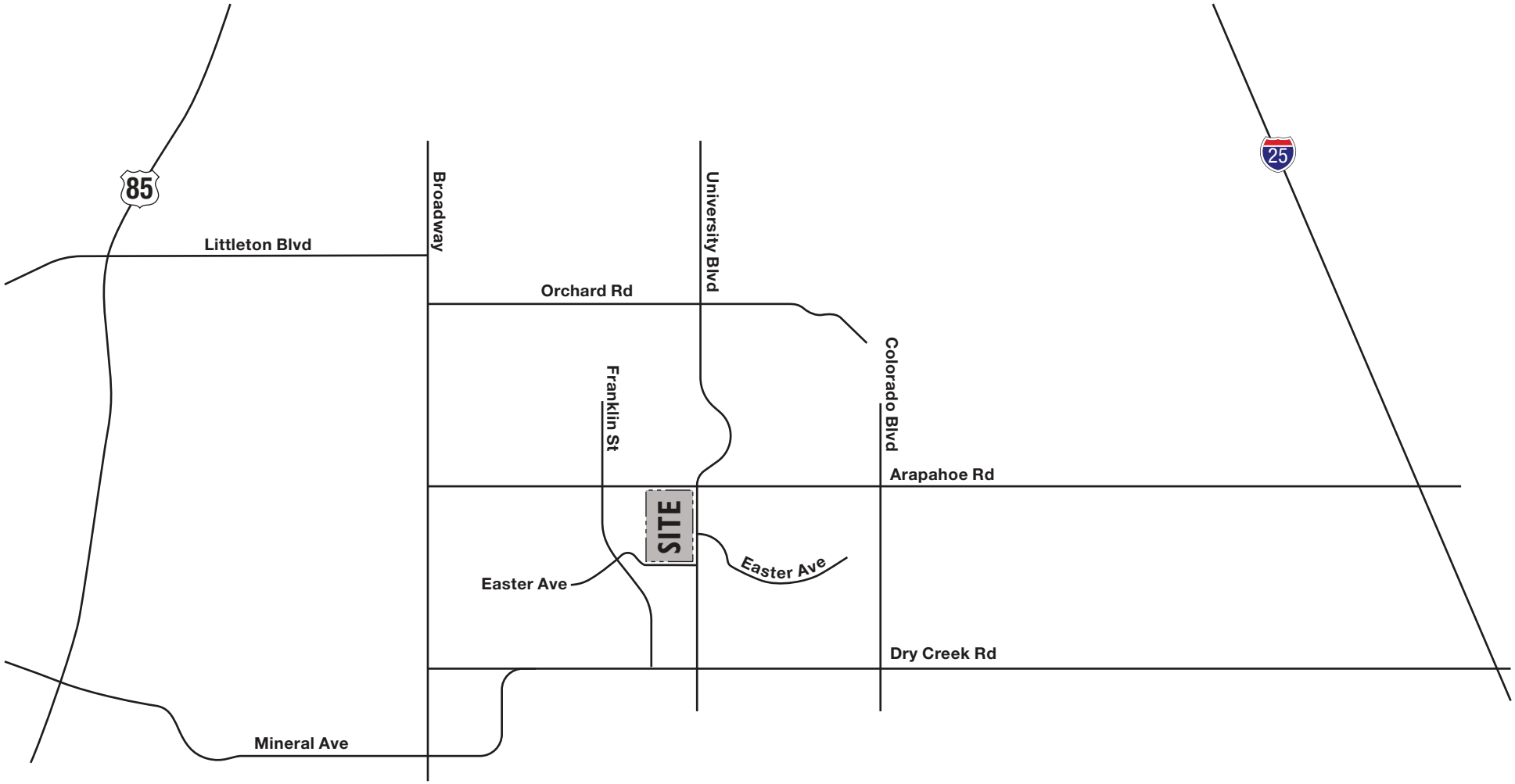
These land uses are anticipated maximums and represent a conservative analysis. Specific site plan submittals will be required that will define actual building square footages.

Several access points onto the adjacent transportation network will serve the redevelopment. The existing access points would remain and include two onto Arapahoe Rd, three onto University Blvd, two onto Easter Ave, and three onto S Race St. **Figure 2** shows the site plan and access points.

Two future planning horizons have been evaluated for the site:

- **Short-Term Future –** The Year 2022 time-period (three-year horizon) was chosen to determine the effects of proposed project-related traffic when the site reaches full build-out.
- **Long-Term Future –** The Year 2040 was selected for long-term analyses (20-year horizon), consistent with the current long-term planning timeframe used by the Denver Regional Council of Governments (DRCOG).

This study assesses the traffic impacts on the adjacent roadways related to the proposed redevelopment of the existing land uses and identifies roadway improvements needed to accommodate anticipated project-related vehicle trips. This report includes information pertaining to existing traffic and safety conditions, additional trips associated with the proposed redevelopment, and total traffic volume projections for the short-term and long-term planning horizons. Felsburg Holt & Ullevig (FHU) has completed this study based on development data provided by Northwood Ravin LLC, Alberta Development Partners LLC, the City of Centennial, and on local conditions documented in summer 2019 and early 2020.



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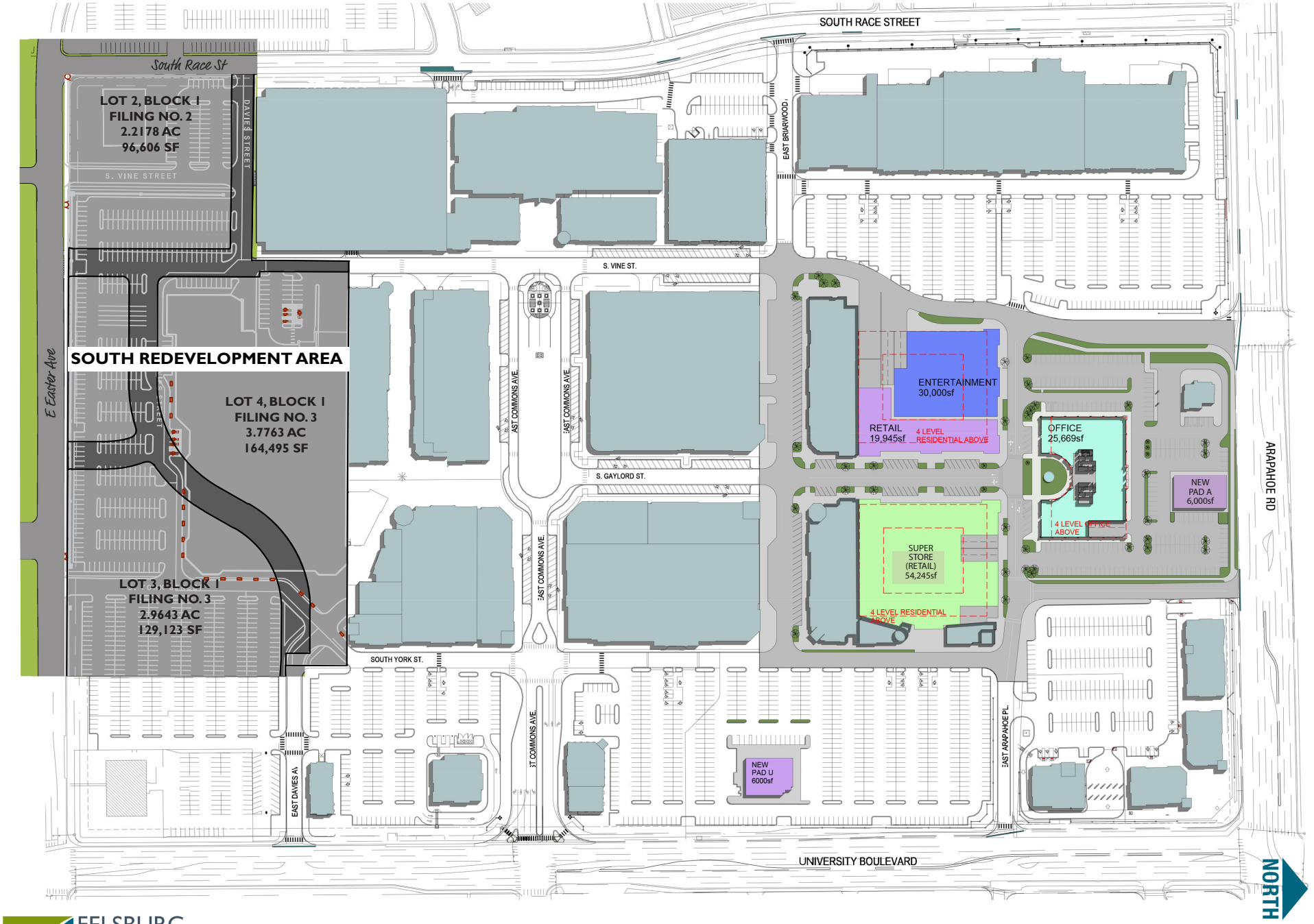
Vicinity Map | FIGURE 1



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Conceptual Site Plan

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FIGURE 2

III. EXISTING CONDITIONS

This chapter describes current roadway conditions in the study area, including geometry, volumes, and existing operations.

III.A. Surrounding Land Use

Most of the area surrounding the Streets at Southglenn is residential communities with some commercial land use adjacent to both Arapahoe Rd and University Blvd. There are two schools in close proximity to the project site, including Arapahoe High School about 2/3 of a mile south along University Blvd and Twain Elementary School about 1/3 mile to the west along S Franklin St.

III.B. Other Relevant Studies

Two previous traffic analyses were identified as relevant for this evaluation:

- FHU evaluated the conversion and redevelopment of the Southglenn Mall to the Streets at Southglenn in October 2005. The *Southglenn Mall Redevelopment Traffic Impact Analysis* evaluated University Blvd, Arapahoe Rd, Race St, and Easter Ave in support of the changes envisioned for the mall.
- FHU evaluated traffic and roadway network changes along E Easter Ave associated with the redevelopment of the Sears Department Store in the Streets at Southglenn in December 2018. This was a follow-up to the 2005 traffic impact analysis for the overall mall redevelopment.

III.C. Existing Roadway Network

The Streets at Southglenn is surrounded by University Blvd on the east, Arapahoe Rd on the north, Race St on the west, and Easter Ave on the south. Each of these is described below.

South University Boulevard

South University Blvd (State Highway 177) is generally a four-lane north-south regional arterial in the study area with a ¼ mile six-lane segment surrounding the Arapahoe Rd intersection.

S University Boulevard and E Easter Avenue/E Easter Place

The intersection of S University Blvd and E Easter Ave/E Easter Place (Pl) is a four-leg, signalized intersection. The NB approach has a designated left-turn lane, a thru lane, and a thru/right-turn lane. The WB approach has a designated left-turn lane, a thru lane, and a right-turn lane. The SB approach has a designated left-turn lane, two thru lanes, and a right turn lane. The EB approach has a designated left-turn lane, a thru lane, and a right turn lane. Bicycle lanes are provided along both sides of E Easter Ave and E Easter Pl.

S University Boulevard and E Davies Avenue

The intersection of S University Blvd and E Davies Ave is three-leg unsignalized intersection. The NB approach has a left-turn lane and two thru lanes. The SB approach has two thru lanes and a dedicated right-turn lane. Free flow conditions exist for both S University Blvd approaches. Eastbound E Davies Ave has a single shared left/right lane with stop control.

S University Boulevard and E Commons Avenue/E Easter Avenue

The intersection of S University Blvd and E Commons Ave/E Easter Ave is four-leg signalized intersection. The NB approach of University Blvd has a designated left-turn lane, two thru lanes, and a right-turn lane. The SB approach of University Blvd has a designated left-turn lane, two thru lanes, and a right-turn lane. The EB approach on E Commons Ave has two designated left-turn lanes, one thru lane,

and a right-turn lane. The WB approach on E Easter Ave has a designated left-turn lane and a thru/right-turn lane.

S University Boulevard and E Arapahoe Place

The intersection of S University Blvd and E Arapahoe Pl is a three-leg unsignalized intersection. The E Arapahoe Pl EB approach is restricted to RIRO movements and is stop controlled. Free-flow conditions exist for both the NB and SB approaches on University Blvd. The NB approach has two thru lanes and a thru/right-turn lane. The SB approach has three thru lanes and a designated right-turn lane. The EB approach on E Arapahoe Pl has a single right-turn lane; no other movements are permitted.

S University Boulevard and E Arapahoe Road

The intersection of S University Blvd and E Arapahoe Rd is four-leg signalized intersection. This intersection experiences the highest traffic volumes in the study area. The EB approach on Arapahoe Rd has two designated left-turn lanes, three thru lanes, and a single right-turn lane. The WB approach has two designated left-turn lanes, three thru lanes, and a single right-turn lane. The SB and NB approaches on S University Blvd are identical and have two designated left-turn lanes, three thru lanes, and a single right-turn lane.

E Arapahoe Road

E Arapahoe Rd is generally a four-lane east-west regional arterial in the study area with a 1/3 mile six-lane segment surrounding the University Blvd intersection. The existing Arapahoe Rd bridge over Big Dry Creek is scheduled to be replaced by the City of Centennial as a six-lane structure in the next few years.

E Arapahoe Road and S Race Street

The intersection of E Arapahoe Rd and S Race St is a three-leg signalized intersection. The NB approach of S Race St has a designated left-turn lane and right-turn lane. The WB approach of E Arapahoe Rd has two thru lanes and a right-turn lane. The EB approach of E Arapahoe Road has a designated left-turn lane and three thru lanes.

E Arapahoe Road and S Vine St

The intersection of E Arapahoe Rd and S Vine St is a four-leg signalized intersection. The NB approach of S Vine St has a thru/left-turn lane and a right-turn lane. The SB approach of S Vine St is identical to the NB approach with the same right-turn lane and thru/left-turn lane. The EB approach on E Arapahoe Rd has one designated left-turn lane, two thru lanes, and a thru/right-turn lane. The WB approach on E Arapahoe Rd is identical to the EB approach with the same single designated left-turn lane, two thru lanes, and a thru/right-turn lane.

E Arapahoe Road and S York Street

The intersection of E Arapahoe Road and S York St is a four-leg unsignalized intersection. The NB approach of S York St has a single lane approach with left, right, and thru movements permitted and is stop controlled. The SB approach has a single approach lane that allows for all movements. The EB approach of E Arapahoe Rd has a designated left-turn lane, three thru lanes, and a right-turn lane. The WB approach of E Arapahoe Rd has a designated left-turn lane, two thru lanes, and a thru/right-turn lane. Both approaches of E Arapahoe Rd allow free-flow conditions. This intersection is currently being converted to a ¾ movement intersection, which will restrict left turns and thru movements onto the mainline from the NB and SB approaches.

S Race Street

S Race St is generally a two-lane north-south local collector in the study area.

S Race Street and E Briarwood Avenue

The intersection of S Race St and E Briarwood Ave is a three-leg unsignalized intersection. The WB approach on E Briarwood Ave exiting the shopping district has one single lane that permits both left- and right-turn movements and is stop controlled. Both the NB and SB approaches of S Race St allow thru movements and permitted left- or right-turns onto E Briarwood Ave. The NB and SB movements are free flow.

S Race Street and E Davies Place (Garage Access)

The intersection of S Race St and E Davies Pl is a four-leg unsignalized intersection. It is important to note that the east leg on E Davies Pl is both the entrance/exit to the Streets at Southglenn parking garage and both approaches to the intersection on S Race St are in free-flow conditions. The NB and SB approaches on S Race St allow left, thru, and right movements. The EB and WB approaches on E Davies Pl allow left, thru, and right movements and are stop controlled.

S Race Street and E Davies Avenue

The intersection of S Race St and E Davies Ave is a three-leg unsignalized intersection. The EB approach on E Davies Ave exiting the shopping district has one single lane that permits both left- and right-turn movements and is stop controlled. Both the NB and SB approaches of S Race St allow thru movements and permitted left- or right-turns onto E Davies Ave. The NB and SB movements are free flow.

S Race Street and E Easter Avenue

The intersection of S Race St and E Easter Ave is a three-leg unsignalized intersection. The SB approach on S Race St allows both left- and right-turn movements and is stop controlled. Both the EB and WB approaches of E Easter Ave allow left- or right-turns onto S Race St and are stop controlled.

E Easter Avenue

E Easter Ave is generally a two-lane east-west local collector in the study area.

E Easter Avenue and S Vine Street

The intersection of E Easter Ave and S Vine St is a four-leg intersection with the southern approach being a private access to a residential community. The SB approach on S Vine St allows both left- and right-turn movements and is stop controlled. Both the EB and WB approaches of E Easter Ave allow left- or right-turns onto S Vine St. The EB and WB movements are free flow.

E Easter Avenue and Gaylord Street

The intersection of E Easter Ave and Gaylord St is a three-leg intersection. The NB approach on Gaylord St allows both left- and right-turn movements and is stop controlled. Both the EB and WB approaches of E Easter Ave allow left- or right-turns onto Gaylord St. The EB and WB movements are free flow.

E Easter Avenue and Mall Driveway (S York St)

The intersection of E Easter Ave and Mall Driveway/S York St is a three-leg intersection. The SB approach allows both left- and right-turn movements and is stop controlled. Both the EB and WB approaches of E Easter Ave allow left or right turns onto Mall Driveway. The EB and WB movements are free flow.

III.D. Existing Traffic Volumes

The traffic counts conducted for this study represent AM and PM peak hour conditions for a typical commuter day. The intersection counts were collected in 15-minute increments during the hours of 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM. The various counts were compiled and evaluated to determine peak hours. The morning peak hour was determined to be 8:00 AM to 9:00 AM, and the evening peak hour was determined to be 4:00 PM to 5:00 PM.

Counts along E Easter Ave were taken in December 2018 for an earlier evaluation of the Sears redevelopment. The 2018 counts included the intersections of S York St (Mall Driveway), Gaylord St, and S Vine St. Upon the inclusion of the redevelopment of Macy's within the project scope, counts were taken at the remaining intersections along S Race St, E Arapahoe Rd, and S University Blvd. The second set of counts was completed in July 2019.

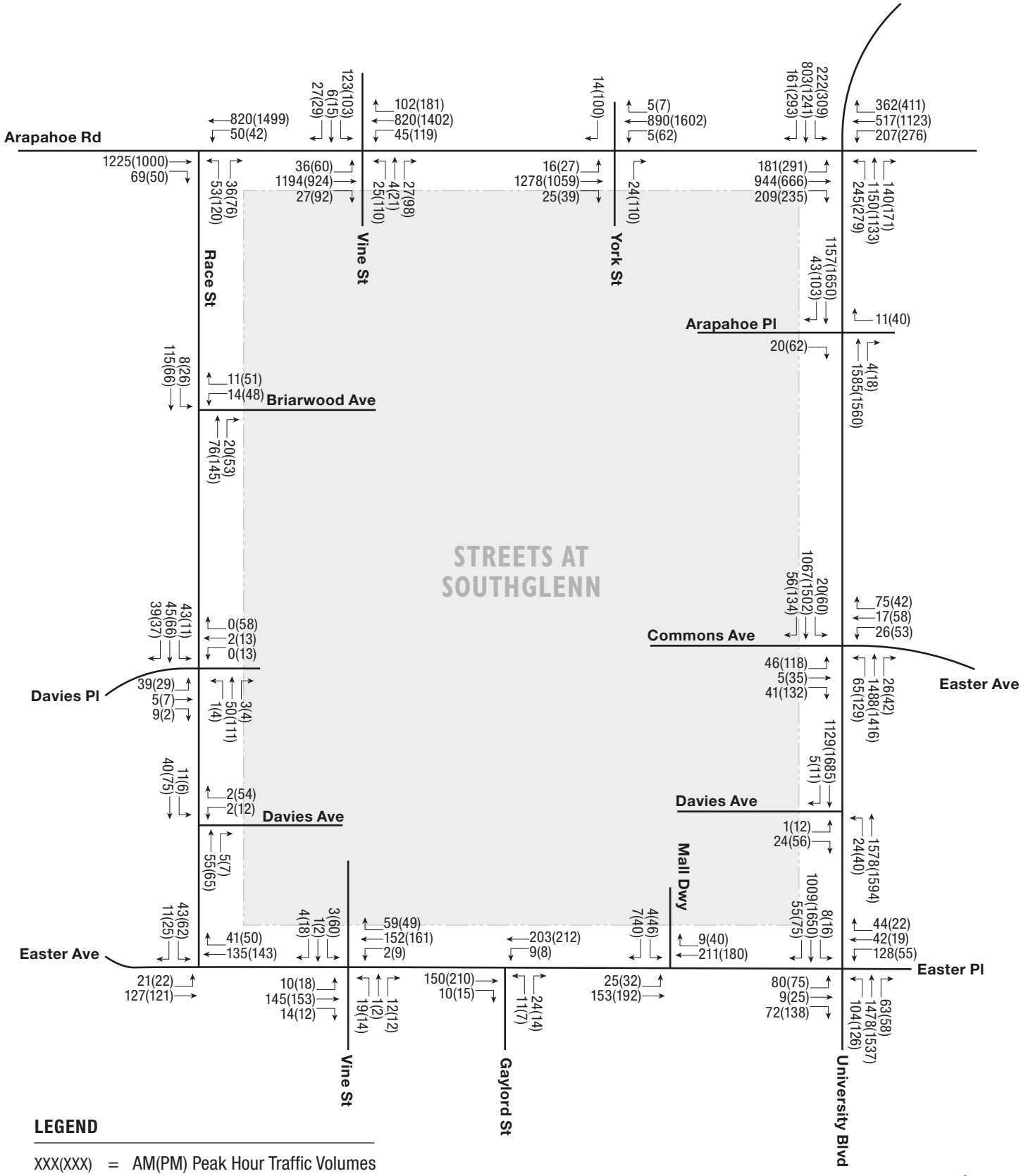
During discussions with the City of Centennial, Northwood Ravin LLC, and Alberta Development Partners LLC, school-related traffic flows were identified as a key need for this study. Since the majority of the project data were collected in July, when school is closed, two supplemental counts were conducted once schools opened in August 2019. These counts were used to develop an 8 percent school adjustment factor, and the July counts were increased by this amount to reflect school conditions. Due to ongoing concerns about morning traffic conditions, additional AM peak hour counts were taken in February 2020 and have been incorporated into the analyses in this study.

The PM peak hour traffic passing through the busier study area intersections tends to be greater than the AM peak hour, and S University Blvd east of the project site is the busiest roadway segment in the study area. The annual average daily traffic (AADT) used for the project site analysis was determined using the DRCOG Regional Traffic Counts. AADT for E Arapahoe Rd was found to be an estimated 32,000 veh/day, and AADT for S University Blvd was found to be an estimated 34,800 veh/day.

E Arapahoe Rd and S University Blvd peak hour traffic flows near the site display a distinct commuter pattern. E Arapahoe Rd experiences heavier traffic flows in the eastbound direction during the AM peak hour and vice versa in the PM peak hour. S University Blvd experiences less distinct commuter patterns, but traffic flows in the NB direction are heavier than those in the southbound direction during the AM peak hour and vice versa in the PM peak hour.

Traffic signal timing data along S University Blvd were collected from the Colorado Department of Transportation. Timings along E Arapahoe Rd were obtained from the City of Centennial.

Figure 3 shows the existing traffic volumes, and **Appendix A** includes the traffic count data**.**



LEGEND

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

XXXX = Average Daily Traffic

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NORTH
(NOT TO SCALE)

Existing Traffic Volumes

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FIGURE 3

III.E. Existing Traffic Operations

Existing operational conditions were analyzed at each study intersection near the project site. The analysis is based on procedures documented in the *Highway Capacity Manual*. This analysis procedure provides a LOS, a qualitative measure based on the average delay per vehicle at a controlled intersection described by a letter ranging from "A" to "F." LOS A represents minimal delay, while LOS F represents excessive congestion and delay. The City uses a target LOS D (indicative of an average of 35 seconds or 55 seconds [or less] of delay for vehicles passing through an unsignalized intersection or a signalized intersection, respectively) during the peak hours to determine acceptable vehicular delays. The signalized intersection analysis reports a LOS rating for the entire intersection, while the unsignalized analysis reports a movement LOS for left-turn movements and stop-controlled movements. Trafficware's Synchro traffic analysis software (Version 10.3) was used to perform the LOS calculations. The existing conditions analysis used the current traffic signal timing data for each intersection.

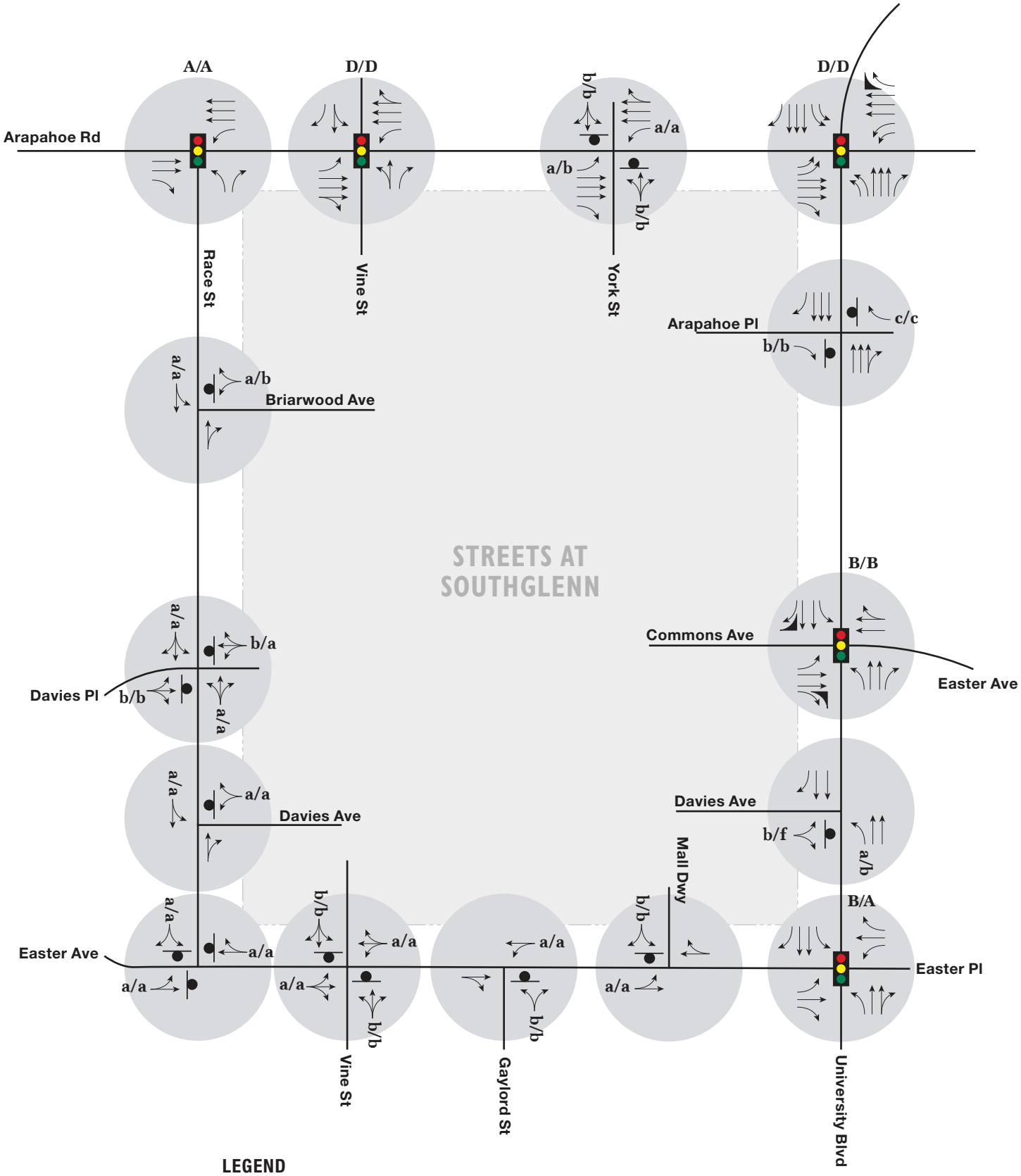
Signalized traffic operations at the study area intersections currently meet the City's target of LOS D, except for the intersection of Arapahoe Rd and Vine St. This intersection operates at an overall LOS F in the PM peak hour and has specific approaches that operate at LOS E or LOS F in the AM peak hour. Most signalized intersections also have approaches that currently operate at LOS E or LOS F but operate at LOS D overall (meeting city standards), including:

- **Arapahoe Rd/Race St** – The NB approach operates at LOS E in the PM peak hour.
- **University Blvd/Commons Ave** – The WB approach operates at LOS F in the AM peak hour and LOS E in the PM peak hour.

Individual movements at the unsignalized study intersections generally operate with acceptable LOS (LOS D or better), with the exception of the following:

- **University Blvd/Davies Ave** – The EB stop-controlled approach is currently operating at LOS F in the PM peak hour.

Figure 4 shows the existing lane geometry and LOS. **Appendix B** includes operational analysis worksheets for existing conditions.



LEGEND

X/X = AM/PM Peak Hour Signalized Intersection Level of Service

x/x = AM/PM Peak Hour Unsignalized Intersection Level of Service

NORTH
(NOT TO SCALE)

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Existing Levels of Service

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FIGURE 4

III.F. Safety

A safety review was completed for the 15 study area intersections to address City of Centennial Traffic Impact Study requirements. The safety review focused on understanding the magnitude and nature of safety problems within the project limits and related crash causality to roadway geometrics, roadside features, traffic control devices, traffic operations, driver behavior, and vehicle type. To uniformly evaluate across all data sources, the crash history of each facility was prepared using 5 years of data from January 1, 2013, through December 31, 2017. DiExSys™ Vision Zero Suite software was used to perform the safety review for each intersection. The software is a sophisticated and comprehensive suite of analytical tools designed to provide decision support analysis and to incorporate methodology consistent with the *Highway Safety Manual* (HSM). It should be noted that the City typically requests a 3-year crash study. However, given the lack of crash history along S Race St and E Easter Ave, the crash study was expanded to reflect a 5-year history.

An assessment of the safety problems at the intersections of interest was refined using the Safety Performance Function (SPF) methodology when data were available. Development of the SPF allows for the determination of the Level of Service of Safety (LOSS). The concept of LOSS uses qualitative measures that characterize safety of a roadway segment in reference to its expected performance and severity. If the LOSS predicted by the SPF represents a normal or an expected number of crashes at a specific level of average daily traffic (ADT), then the degree of deviation from the norm can be stratified to represent specific levels of safety.

The range of LOSS values and their qualitative descriptions are as follows:

- **LOSS-I** – Indicates low potential for crash reduction
- **LOSS-II** – Indicates better than expected safety performance
- **LOSS-III** – Indicates less than expected safety performance
- **LOSS-IV** – Indicates high potential for crash reduction

Gradual change in the degree of deviation of the LOSS boundary line from the fitted model mean reflects the observed increase of variability in crashes as ADT increases. LOSS reflects how the intersection is performing considering its expected crash frequency at a specific level of daily traffic. It only provides a crash frequency comparison with the expected norm. It does not, however, provide any information related to the nature of the safety problem itself. If a safety problem is present, LOSS will describe its magnitude only from a frequency standpoint.

The first step in the process was to evaluate the overall number of collisions in the study area. **Table 1** summarizes crash frequency for each intersection within the study area during the 5-year study period. As shown, most of intersection-related crashes occurred at the signalized intersection of S University Blvd and E Arapahoe Rd. Of the 273 total crashes that occurred in the study area, zero crashes resulted in fatalities (FAT), 38 crashes resulted in injury (INJ), and 235 crashes were property damage only (PDO).

Table 1. Reported Study Area Crashes

Intersection	Number of Legs	Reported Crashes January 2013 – December 2017			
		Total	PDO	Injury	Fatality
S University Blvd and E Easter Pl	4	32	29	3	0
S University Blvd and E Davies Ave	3	10	8	2	0
S University Blvd and E Commons Ave	4	33	26	7	0
S University Blvd and E Arapahoe Pl	4	16	15	1	0
S University Blvd and E Arapahoe Rd	4	137	123	14	0
E Arapahoe Rd and S York St	4	4	3	1	0
E Arapahoe Rd and S Vine St	4	26	21	5	0
E Arapahoe Rd and S Race St	3	9	5	4	0
S Race St and E Briarwood Ave	3	1	1	0	0
S Race St and E Davies Pl	4	1	1	0	0
S Race St and E Davies Ave	3	1	1	0	0
S Race St and E Easter Ave	3	1	0	1	0
Easter Ave and Vine St	4	1	1	0	0
Easter Ave and Gaylord St	3	1	1	0	0
Easter Ave and S York St (Mall Driveway)	3	0	0	0	0
		273	**235**	**38**	**0**

Note: PDO = Property Damage Only

Vision Zero Suite was used to calculate LOSS results for each study area intersection (**Table 2**). For intersections with small sample sizes, the LOSS is considered variable; therefore, only intersections that experienced five or more crashes within the 5-year study period were analyzed further.

Table 2. Safety Results for Project Site Intersections

Intersection	LOSS	LOSS (Inj + Fatal)
S University Blvd and E Easter Pl	II	I
S University Blvd and E Davies Ave	III	II
S University Blvd and E Commons Ave	II	II
S University Blvd and E Arapahoe Pl	II	II
S University Blvd and E Arapahoe Rd	IV	II
E Arapahoe Rd and S York St	I	II
E Arapahoe Rd and S Vine St	I	II
E Arapahoe Rd and S Race St	I	II
S Race St and E Briarwood Ave	III	II
S Race St and E Davies Pl	III	II
S Race St and E Davies Ave	III	II

Intersection	LOSS	LOSS (Inj + Fatal)
S Race St and E Easter Ave	III	III
Easter Ave and Vine St	III	II
Easter Ave and Gaylord St	II	II
Easter Ave and S York St (Mall Driveway)	II	II

As **Table 2** shows, most intersections perform acceptably (LOSS I & LOSS II), with a few exceptions:

- University Blvd at Davies Ave exhibits an overall LOSS III and an Injury + Fatal LOSS II.
- University Blvd at Arapahoe Rd exhibits an overall LOSS IV and an Injury + Fatal LOSS II.
- All intersections along Race St and the Easter Ave at Vine St intersection exhibit LOSS III with an Injury + Fatal LOSS II or LOSS III. As noted above, these intersections have limited sample sizes and the resulting LOSS results are not necessarily representative.

Specific evaluations of the locations experiencing five or more crashes in the study period and LOSS III or LOSS IV were also conducted and are included in **Appendix F**. The specific evaluations are summarized as follows:

- **University Blvd at Davies Ave –** This intersection experienced 10 crashes in the 5-year study period and exhibited LOSS III results for overall safety. A diagnostic was performed using Vision Zero Suite, and Approach-Turn crashes are statistically overrepresented (half of represented crashes). Eighty percent of the approach turn collisions involved northbound left turning vehicles from University Blvd entering Davies Ave.
- **University Blvd at Arapahoe Rd –** This intersection experienced 127 crashes in the 5-year study period and exhibited LOSS IV for overall safety. A diagnostic was preformed using Vision Zero Suite, and Rear-End collisions were most common (over 55 percent of crashes). This is typical of congested urban intersections. Sideswipe (same direction) was over-represented in the dataset. Almost half of the sideswipe collisions occurred on the SB approach, which could reflect the curve on the SB approach to the intersection. No mitigation was identified. It was noted by the City's planned reconstruction of the narrow Arapahoe Rd bridge over Big Dry Creek may reduce the number of sideswipe collisions at this intersection.
- The intersections along Race St and E Easter Ave that exhibit LOSS III experienced one collision in the 5-year study period. Given the low number of crashes, no pattern analysis was possible, and no further analyses were performed.

IV. BACKGROUND TRAFFIC CONDITIONS

Background traffic has been estimated for the short-term and long-term timeframes and accounts for existing traffic already using the transportation system, plus a general upward factoring of current traffic levels to capture the effects of anticipated future growth in the area. It does not include traffic generated from the redevelopment of Macy's and Sears. To reach future traffic levels, an annual factor of 0.50 percent per year was applied. This factor is based on the current version of the DRCOG travel demand model and has been accepted by the City of Centennial.

IV.A. Short Term Background Projections and Operations

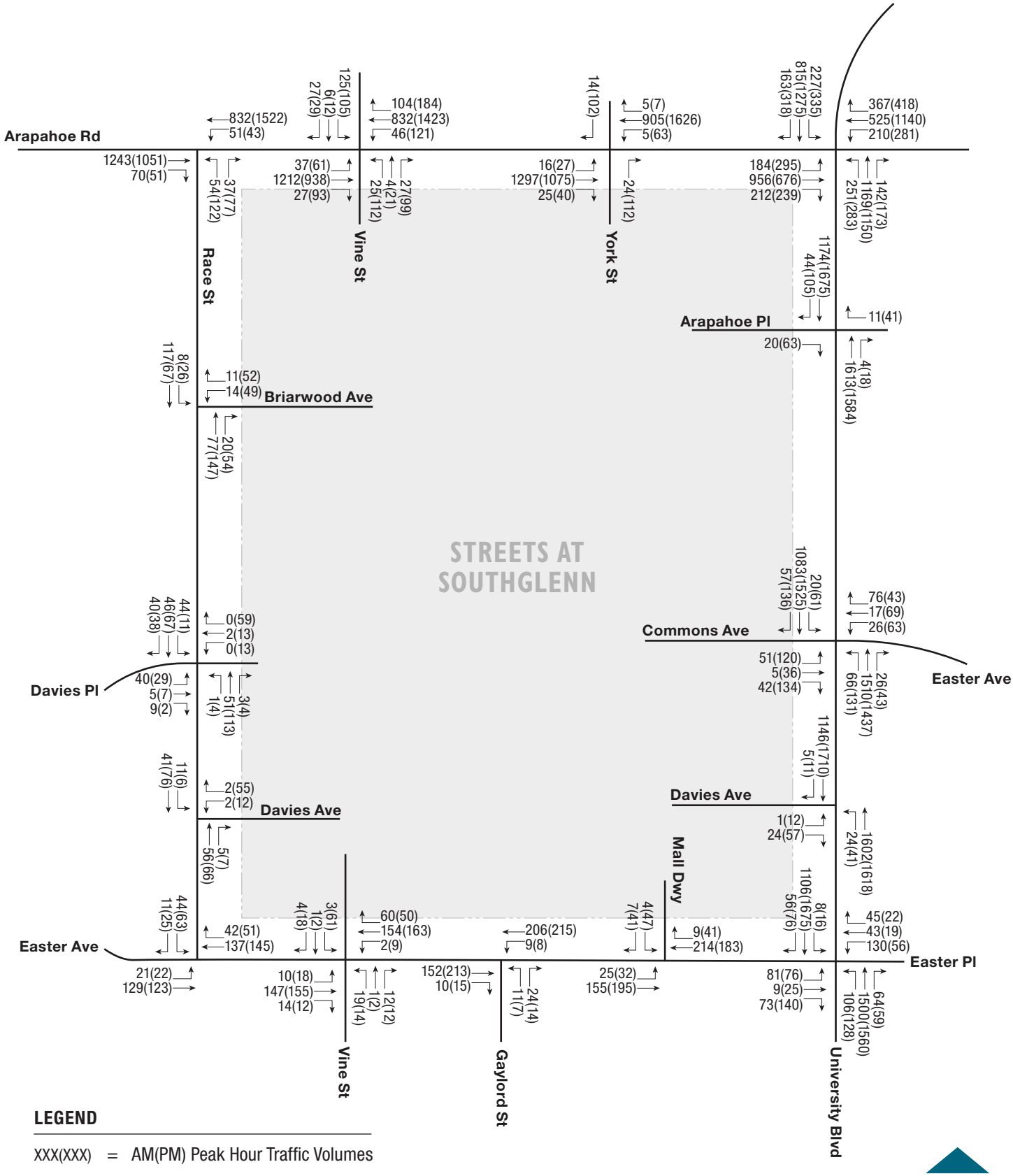
The short-term background traffic reflects traffic growth to the year 2022, which is the year that the Streets at Southglenn redevelopment is anticipated to reach full occupancy. These volumes are shown on **Figure 5**. In general, traffic volumes are estimated to increase by approximately 2 percent over existing conditions.

The City of Centennial converted the Arapahoe Rd/York St intersection from a full movement intersection to a ¾ movement intersection in September 2019, after project traffic counts were conducted. Due to the City's project, the NB and SB left turn lanes and thru movements were removed from this intersection. NB movements were relocated to the Arapahoe Rd/Vine St intersection. SB movements were converted to right turns and distributed as lefts or U-turns at the Arapahoe Rd/Vine St intersection.

Figure 6 presents the intersection operational results for short-term background traffic projections. Traffic signal timings for the short-term background traffic analysis were adjusted relative to current signal timings to optimize operation. Intersections shown under existing conditions as being problematic also present operational challenges in the short term without the influence of traffic from the Streets of Southglenn, assuming only signal timing optimization and the signal phasing mitigation improvement were completed. **Section IV.C** of this report discusses the signal phasing change. It is important to note the current construction to change the geometry at Arapahoe Rd and York St is included in the background and the total traffic conditions, as this improvement will be fully in place by the short-term (2022) horizon. The LOS remains constant between existing and short-term background conditions. All of the signalized intersections evaluated in this study operate at or above City LOS standards. The following intersection(s) experience a movement LOS below the City of Centennial's standards, but the overall LOS is still acceptable by the City of Centennial's standards:

- **Arapahoe Rd/Vine St** – The NB and SB approaches operate at LOS E in both the AM and PM peak hours.
- **Arapahoe Rd/University Blvd** – The WB approach operates at LOS E in the PM peak hour.
- **University Blvd/Commons Ave** – The WB approach operates at LOS F in the AM peak hour and LOS E and PM peak hour.
- **University Blvd/Easter Pl** – The EB approach operates at LOS E in the PM peak hour.

The unsignalized intersection of University Blvd and Davies Ave remains below the City standards for LOS from the existing condition to the short-term background condition. The eastbound left-turn operates at LOS F in the PM for existing and short-term conditions. All other unsignalized intersections identified within the scope of this study operate at or above City standards for the short-term background conditions.



LEGEND

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

XXXX = Average Daily Traffic

NORTH
(NOT TO SCALE)

FELSBURG HOLT & ULLEVIG

2022 Short Term Background Traffic Volumes

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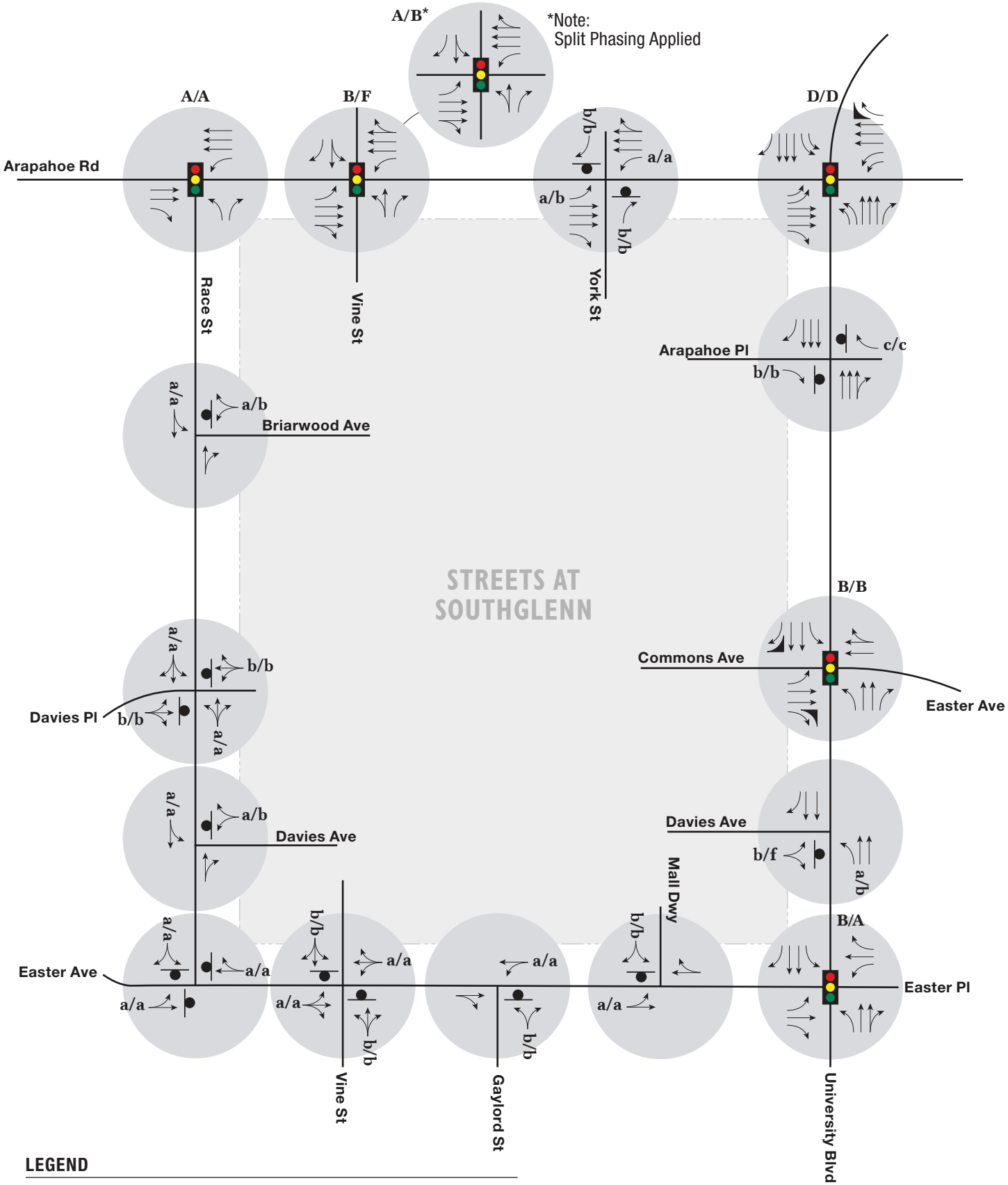
FIGURE 5



LEGEND

X/X = AM/PM Peak Hour Signalized Intersection Level of Service

x/x = AM/PM Peak Hour Unsignalized Intersection Level of Service

NORTH
(NOT TO SCALE)

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2022 Short Term Background Levels of Service

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FIGURE 6

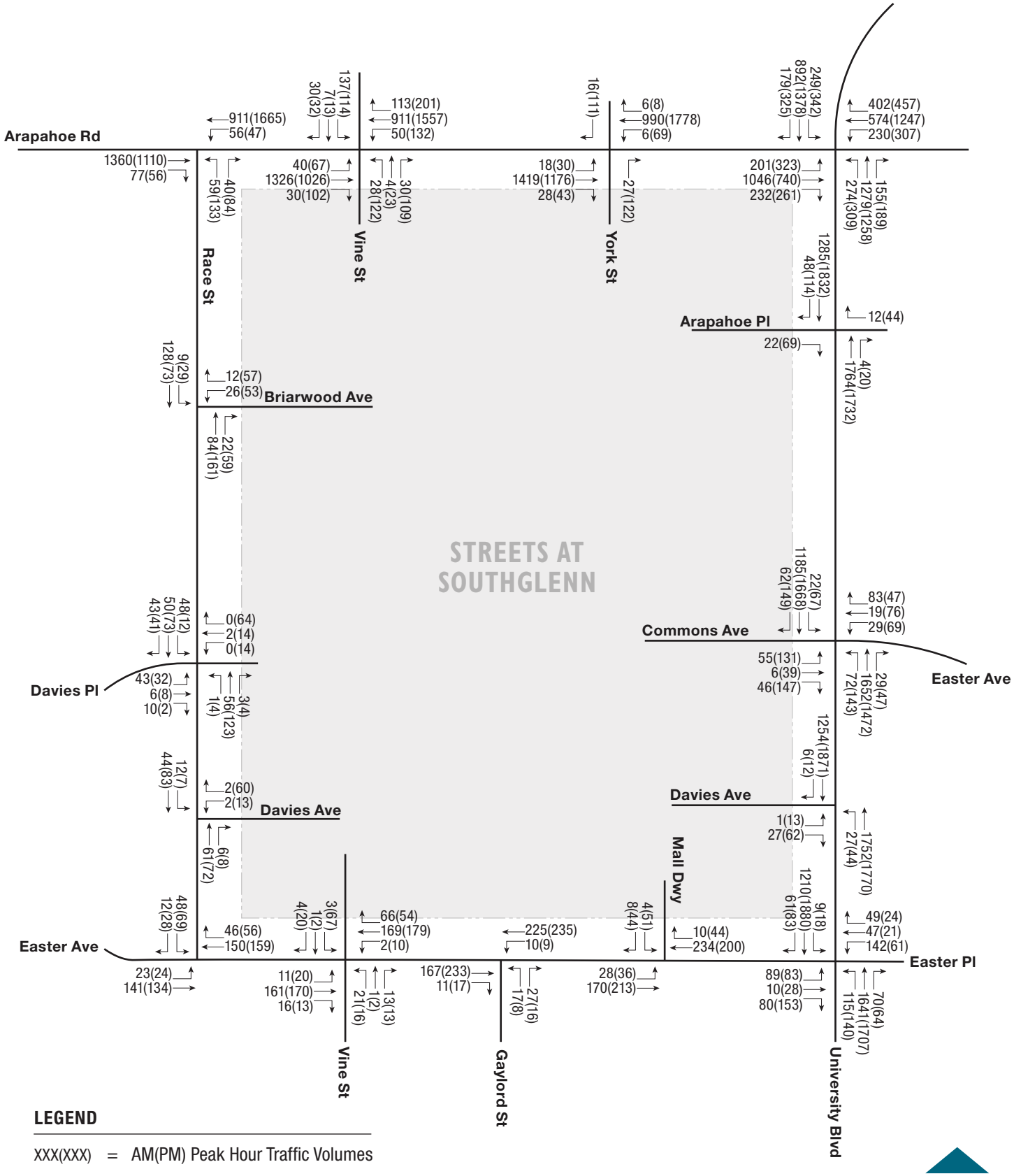
IV.B. Long-Term Background Projections and Operations

The long-term background traffic (year 2040) was estimated by further applying the growth factor of 0.5 percent per year, as previously described, to account for future growth. Again, it does not include traffic from the Streets at Southglenn redevelopment project. **Figure 7** shows the long-term peak hour turning movement projections for the study area intersections. The 2040 background traffic generally increases about 11 percent over existing traffic levels. The City's modification at Arapahoe Rd/York St is also included.

Figure 8 presents the intersection operational results for the long-term background traffic projections. Like the short-term background traffic analyses, traffic signal timings for the long-term background traffic analyses were adjusted relative to current signal timings to optimize operation. Intersections that were shown under existing conditions as being problematic do not present operational challenges in the long-term scenario without the influence of traffic from the Streets of Southglenn, assuming the mitigation improvements mentioned in **Section IV.C** have occurred. All of the signalized intersections evaluated in this study operate at or above City LOS standards after mitigation is applied. The following intersection(s) experience a movement LOS below the City of Centennial's standards, but the overall LOS is still acceptable by the City of Centennial's standards:

- **Arapahoe Rd/Vine St** – The NB and SB approaches operate at LOS E in the AM peak hour and at LOS F and LOS E respectively in the PM peak hour.
- **Arapahoe Rd/University Blvd** – The EB and WB approaches operate at LOS E in the PM peak hour.
- **University Blvd/Commons Ave** – The WB approach operates at LOS F in the AM peak hour and LOS E in the PM peak hour.
- **University Blvd/Easter Pl** – The EB approach operates at LOS E in the PM peak hour.

The unsignalized intersections within the study area meet the City of Centennial's standards after background mitigation measures are applied.



LEGEND

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

XXXX = Average Daily Traffic

NORTH
(NOT TO SCALE)

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2040 Long Term Background Traffic Volumes

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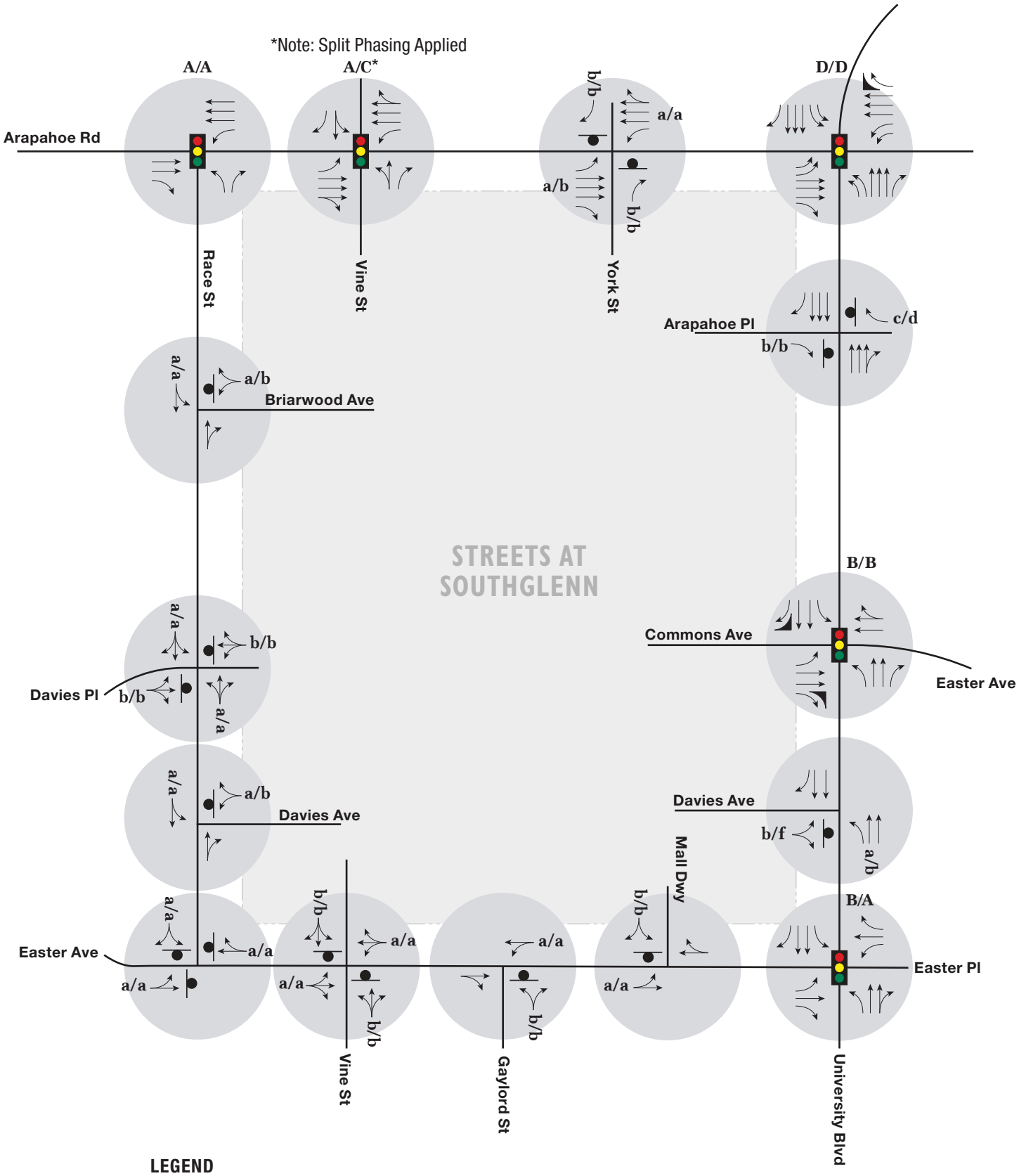
FIGURE 7



LEGEND

X/X = AM/PM Peak Hour Signalized Intersection Level of Service

x/x = AM/PM Peak Hour Unsignalized Intersection Level of Service

NORTH
(NOT TO SCALE)

FELSBURG HOLT & ULLEVIG

2040 Long Term Background Levels of Service

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FIGURE 8

IV.C. Potential Background Mitigations

Operational concerns were identified in the background traffic scenarios. This section of the report evaluates each concern and briefly identifies potential improvements to address them. It is important to note that these are shortfalls projected to occur without the Streets at Southglenn project; therefore, they are not the responsibility of the project.

- **Arapahoe Rd/Vine St Intersection –** The intersection operates as LOS D in the existing AM and PM peak hours with approaches operating at LOS F. This operation degrades in the short-term and long-term background scenarios. Because several approaches at this intersection operate below City standards, mitigation is recommended. Two mitigation options were considered:
  - Change from a thru/left lane and a designated right-turn lane to a thru/right and a designated left-turn lane for both NB and SB approaches. This change would improve operations to acceptable levels of service but would create lane alignment issues across the intersection.
  - Implement split phasing at the signal to allow protected left turns from the NB and SB Vine St approaches. The implementation of split phasing would improve the LOS for both the short-term and long-term background conditions to acceptable levels.

  Both potential solutions were reviewed with City staff. Concerns regarding pedestrian phasing and corridor-wide signal timing were expressed with the split phasing option. Concerns were also expressed with geometric improvements on the north side of the intersection, where the developer cannot provide right-of-way for roadway modifications. For the purposes of this study, the split phasing option has been assumed, and the City will monitor this location for operational issues. If these issues develop, the City will work with landowners on both sides of Arapahoe Rd to develop an appropriate geometric solution.
- **University Blvd/Davies Ave Intersection –** In the PM existing, short-term background, and long-term background conditions, the NB left-turn movement operates at LOS B and the EB left-turn movement operates at LOS F. The EB left-turn movement does not comply with the City LOS standards of LOS D for turning movements, and mitigation is recommended. Crash issues associated with northbound left turns have also been observed at this location, as described previously. Given both the operational and safety concerns, it is recommended that this intersection be converted to a RIRO intersection through the use of raised median and related signing and striping changes. This would improve LOS to acceptable levels and is anticipated to address the identified approach turn crash pattern.

Related Elements

In addition to traffic operations and safety, other transportation elements have been considered. These non-project-related elements are described below:

- The team noted that the bicycle lane/parking lane striping along the south side of E Easter Pl between S University Blvd and S Knolls Way is inconsistent and does not provide a continuous bicycle lane for cyclists leaving the Streets at Southglenn area. The City should review this striping and update it to reduce confusion.
- The study team noted that there are no east-west pedestrian crossings on Race St between E Arapahoe Rd and E Easter Ave. The City should review this corridor and determine if such a crossing is appropriate, particularly with the existing RTD bus facility along Race St at Davies Pl.

V. PROPOSED PROJECT

The proposed Streets at Southglenn redevelopment will expand on the existing mix of entertainment, retail, residential, and office spaces. The following sections describe the proposed redevelopment and how it is anticipated to interact with the adjacent street network.

V.A. Land Use and Access

The existing site consists of the two anchor stores, Macy's and Sears, and an office building located on the southwest corner of the Streets at Southglenn. These three structures combine for a total of 315.7 ksf. Parking currently surrounds both the Macy's to the north side and to the south of the Sears and east of the office building. The Streets at Southglenn redevelopment plan includes the following land uses.

Existing Development Plan

As noted earlier, there are 202 existing residential dwelling units within the Streets at Southglenn. The currently approved MDP allows for an additional 148 dwelling that have not yet been built. This includes a conversion of existing retail space into twelve dwelling units. Traffic from these units has been assumed as part of the Macy's redevelopment.

Macy's Redevelopment

The Macy's redevelopment will consist of demolition of the existing 174,693 sf of retail space and is expected to be replaced with five new buildings. It is also anticipated that the existing Macy's Home Store (20,280 sf) will close, but that this space will remain and be leased by a new retail tenant. The proposed new buildings are described below.

- The core of the Macy's redevelopment is expected to include three new five-story mixed-use buildings.
  - The southeast and southwest buildings are proposed to consist of first floor commercial open space and four levels of residential above. Each residential floor is estimated to consist of 30 to 31 units or up to 120 total DUs per building. The commercial space in the southwest building is estimated to consist of 19,945 sf of retail space and a 30,000 sf entertainment space. The commercial space in the southeast building is estimated to consist of a 54,245 sf discount store.
  - The northerly five-story building is expected to consist of 116,842 sf of office space over five floors.
- The remaining two buildings are expected to be 6,000 sf pad sites for stand-alone retail.

Sears Redevelopment

The Sears redevelopment will consist of demolition of the existing 132,584 sf Sears building and a nearby 7,828 sf office building and is expected to be replaced by a smaller retail building and three new five-story residential buildings.

- A total of 542,549 sf of residential is estimated to be split between the three five-story residential buildings at the southernmost end of the Streets at Southglenn site, with a total of 698 DUs.
- About 34,770 sf of retail space is expected to be constructed in the location of the existing Sears. This construction is proposed to create two retail buildings adjacent to each other and north of the three residential buildings.

Summary

The sizes for each proposed land use identified above represent the highest use that could be accommodated within the zoning for the site. Further refinements to this development plan may occur that could reduce the development intensity, but these are the highest anticipated densities. The redevelopment is expected to retain the existing shopping center access points.

V.B. Trip Generation

Vehicle trips generated by the proposed redevelopment were estimated using trip generation rates documented in *Trip Generation Manual, Institute of Transportation Engineers* (ITE), *Tenth Edition,* 2017. Data in the manual were applied to each use planned for the redevelopment; and total daily, AM peak hour, and PM peak hour trip estimates were developed. The trip generation was separated between the redevelopment of Macy's and Sears. Descriptions of the process used to obtain appropriate rates and related trip generation for each land use type are presented below.

Macy's

Office

FHU used ITE Land Use Code (LUC) 710 – General Office for the proposed office portion of the Macy's redevelopment, reflecting a total of 116,842 sf of office space.

Retail

FHU used two ITE Land Use Codes for the planned retail developments on the north side of the project site. ITE Land Use Code (LUC) 820 – Shopping Center was used for the general retail portions of the Macy's redevelopment, reflecting 19,950 sf of retail space in one five-story building plus 12,000 sf in two pad sites, or a total of 31,950 sf. The ITE data for this land use code present difficulties due to the small quantity of retail space when compared to the overall ITE Shopping Center dataset. For example, the average shopping center size in the weekday ITE dataset is 453,000 sf. Therefore, when the equations and rates are applied to a 31,950 sf facility, the results vary by orders of magnitude. They also do not reflect common trends, such as higher retail trip generation in the evening peak hour of adjacent street traffic than in the morning peak hour of adjacent street traffic.

To address these issues, FHU used a feature of the ITETripGen Web-based App to filter the ITE LUC 820 trip generation dataset to include only sites where the size is less than or equal to 100,000 sf. After applying this filter, the app supplies average rates based on at least 25 study sites for AM, PM, and weekday scenarios. A comparison between site-specific trip generation using the filtered rates and trip generation using the overall rates was performed. The filtered results lie roughly in the middle between the unfiltered rates and the results from the unfiltered equations, and the PM peak hour results are slightly higher than the AM peak hour results. Given these comparisons, FHU applied the filtered rates for this LUC. **Appendix D** includes the filtered dataset information from the ITETripGen Web-based App.

The second retail space required the use of ITE Land Use Code (LUC) 815 – Free Standing Discount Store, reflecting a total of 54,245 sf of proposed retail space on the first floor of the easternmost building of the Macy's redevelopment.

Residential

FHU used ITE Land Use Code (LUC) 221 – Multifamily Housing (Mid-Rise) for the residential portion of the Macy's redevelopment. Current plans reflect a total of 225 DUs of residential space split evenly between the two buildings. Trips from the additional 148 dwelling units available within the existing development plan were also calculated using this land use code.

Entertainment

The proposed entertainment land use is not reflected in any ITE land use code in the ITE *Trip Generation Manual*. Therefore, a study completed by Traffic Analysis & Design, Inc. entitled *Dave & Buster's Trip Rate and Parking Rate Calculations* was used to determine the expected trip generation for the entertainment venue within the Streets at Southglenn project site. The referenced study conducted an analysis to determine the average parking demand and trip generation rates per 1,000 sf of floor area for multiple Dave & Buster's entertainment venue / restaurant sites. The calculated rates were based on actual traffic volumes and parking demand counts collected at sites in the Atlanta, Cleveland, San Diego, and St. Louis areas. Trip rates were calculated using a weighted average trip rate for all four study sites. The weighted average trip rate methodology follows the procedures outlined in the ITE *Trip Generation Manual*. The weighted average trip rates were calculated by summing up all trips entering and exiting the four sites, and then dividing them by the sum of the gross floor area for all four sites. A copy of the study is included in **Appendix D**. The resulting trip rates were applied to the 30,000 sf entertainment space planned for the Streets at Southglenn.

Sears

Office

FHU used ITE Land Use Code (LUC) 710 – General Office when removing the existing office space southwest of Sears.

Retail

FHU used ITE Land Use Code (LUC) 820 – Shopping Center for the retail portion of the Sears redevelopment, reflecting a proposed total of 35,000 sf of retail space.

Residential

FHU used ITE Land Use Code (LUC) 221 – Multifamily Housing (Mid-Rise) for the residential portion of the Sears redevelopment. Current plans reflect a planned total of 698 DUs of residential space split between the three buildings.

Total Trips

Based on the previous assumptions, the total number of trips for each land use in the Streets at Southglenn redevelopment was calculated. They are summarized in **Table 3** and **Table 4**. As can be seen, the redevelopment is anticipated to generate about 6,100 new daily external trips, and between 670 AM peak hour and 475 PM peak hour trips.

V.C. Internal Capture and Pass-by Trips

Internal capture occurs when people travel between different land uses within a project site, without using the off-site roadway to get between these facilities. The Streets at Southglenn project is intended to take advantage of this phenomenon, allowing both office and residential users to shop at the on-site retail or enjoy the on-site entertainment. These facilities will provide additional internal capture within the Streets at Southglenn. Hence, internal capture is an important consideration for this site.

Internal trip capture between the office, residential, retail, and entertainment land uses has been calculated based on methodologies referenced in ITE's *Trip Generation Manual*. This document refers users to NCHRP Report 684, which provides methodologies for calculating the interactions between various land uses. FHU used a spreadsheet tool to compute the internal capture for the site, and the internal capture worksheets are included in **Appendix D**. Based on this process, the daily internal trip reduction is approximately 6 percent in the AM and 23 percent in the PM for the Macy's site. For the Sears site, internal capture trip reduction is approximately 1 percent in the AM and 17 percent in the PM. The AM and PM peaks have higher reductions than the projected daily trip reduction. This is reasonable as office workers and residents of the site stop for food/beverages or shopping either immediately before or after work. The results of this process are reflected in **Table 3** and **Table 4**.

Pass-by trips occur when a motorist already traveling along a roadway stops at a location that is not his or her primary destination. These trips are already on the roadway network regardless of the purpose of the secondary stop. The ITE *Trip Generation Manual* provides tools and data for estimating pass-by trips for retail land uses. Pass-by trips were not considered in this project analysis because the mixed-use facilities within the project site are not generally generators of pass-by trips.

Table 3. Streets at Southglenn Macy's/North Redevelopment Area Site Trip Generation Estimates

Description	Land Use	ITE Code	Quantity	Units	Daily Trips	AM Peak Hour Trip			PM Peak Hour Trips		
						In	Out	Total	In	Out	Total
Remove Existing Development											
Retail	Department Store	875	174.70	ksf	3,997	65	36	101	170	171	341
				Existing Macy's Reduction	**-3,997**	**-65**	**-36**	**-101**	**-170**	**-171**	**-341**
Previously Approved Development											
Residential	Multifamily Housing (Mid-Rise)	221	148	DU	805	34	19	53	33	33	66
				Approved Development	**805**	**34**	**19**	**53**	**33**	**33**	**66**
Add New Development (per allowable zoning)											
Residential	Multifamily Housing (Mid-Rise)	221	225	DU	1224	21	60	81	60	39	99
Entertainment	*(see text)*	*(see text)*	30.00	ksf	600	0	0	0	37	17	54
Retail	Shopping Center	820	31.95	ksf	2767	104	64	168	112	122	234
Retail	Free Standing Discount Store	815	54.25	ksf	2881	43	20	63	131	131	262
Office	General Office Building	710	128.35	ksf	1352	126	21	147	23	121	144
				Macy's New Development	**8,824**	**294**	**165**	**459**	**363**	**430**	**793**
Total Macy's Site Trips					***9,629***	***328***	***184***	***512***	***396***	***463***	***858***
Macy's Site Internal Trips (see text)					*-2,220*	*-15*	*-15*	*-30*	*-111*	*-111*	*-222*
Macy's Removal (from above)					*-3,997*	*-65*	*-36*	*-101*	*-170*	*-171*	*-341*
Macy's Site New External Trips					**3,412**	**248**	**133**	**381**	**114**	**181**	**295**

Table 4. Streets at Southglenn Sears/South Redevelopment Area Trip Generation Estimates

Description	Land Use	ITE Code	Quantity	Units	Daily Trips	AM Peak Hour Trip			PM Peak Hour Trips		
						In	Out	Total	In	Out	Total
Remove Existing Development											
Retail	Department Store	875	133.00	ksf	3,043	49	28	77	130	130	260
Office	Office	715	8.00	ksf	76	8	1	9	1	8	9
Existing Sears Reduction					**-3,119**	**-57**	**-29**	**-86**	**-268**	**-131**	**-138**
Add New Development (per allowable zoning)											
Residential	Multifamily Housing (Mid-Rise)	221	698[1]	DU	3,797	65	186	251	187	120	307
Retail	Shopping Center	820	35.00[2]	ksf	2,931	105	64	169	120	129	249
Sears New Development					**6,728**	**170**	**250**	**420**	**307**	**249**	**556**
Total Sears Site Trips					***6,728***	***170***	***250***	***420***	***307***	***249***	***556***
Sears Site Internal Trips (see text)					*-920*	*-3*	*-3*	*-6*	*-46*	*-46*	*-92*
Sears Removal (from above)					*-3,119*	*-57*	*-29*	*-86*	*-131*	*-138*	*-268*
Sears Site New External Trips					**2,689**	**110**	**218**	**328**	**130**	**65**	**196**

[1] This value reflects the highest land use that could be accommodated within the zoning. Current site plans reflect refinements to the development plan resulting in 550 DUs, so 698 DUs is a conservative assumption.
[2] This value reflects the highest land use that could be accommodated within the zoning. Current site plans do not include retail space, so 35.00 ksf is a conservative assumption.

Trip Distribution

The external trips generated by the site were assigned to the study area roadway network using percentages of trips expected to travel in different directions to travel to/from the site. Trip distribution percentages for the Streets at Southglenn external trips were based on existing traffic patterns in the area, the development's location relative to the major surrounding roadways, and data from the DRCOG regional travel demand model. In comparison to the previously referenced 2005 Southglenn study, the trip distribution is very similar with the only significant difference the north-south distribution on University Blvd. The 2005 Southglenn study distributed traffic evenly with 25 percent NB and 25 percent SB. The distribution used for this study favored SB traffic with 34 percent SB and 12 percent NB per information obtained from the DRCOG model. This study's distribution also reduces the percent of traffic to and from residential neighborhoods at the west and south, in accordance with DRCOG data. They are shown on **Figure 9** and are described below.

- 20 percent to/from the west on E Arapahoe Rd (west of Race)
- 1 percent to/from the north on Vine St (north of Arapahoe)
- 12 percent to/from the north on S University Blvd (north of Arapahoe)
- 22 percent to/from the east on E Arapahoe Rd (east of University)
- 2 percent to/from the east on E Easter Ave (east of University)
- 3 percent to/from the east on E Easter Pl (east of University)
- 34 percent to/from the south on S University Blvd (south of Easter)
- 1 percent to/from the south on Gaylord St (south of Easter)
- 1 percent to/from the north on S Vine St (south of Easter)
- 3 percent to/from the west on E Easter Ave (west of Race)
- 1 percent to/from the west on Davies Pl (west of Race)

The peak hour site generated traffic volumes were assigned to the roadway network and site access based on these trip distribution percentages. **Figure 9** shows the trip distribution and the estimated site generated traffic (external trips) for the proposed development. It should be noted that the revised configurations at Arapahoe and York and at University and Davies were accounted for in the distribution.

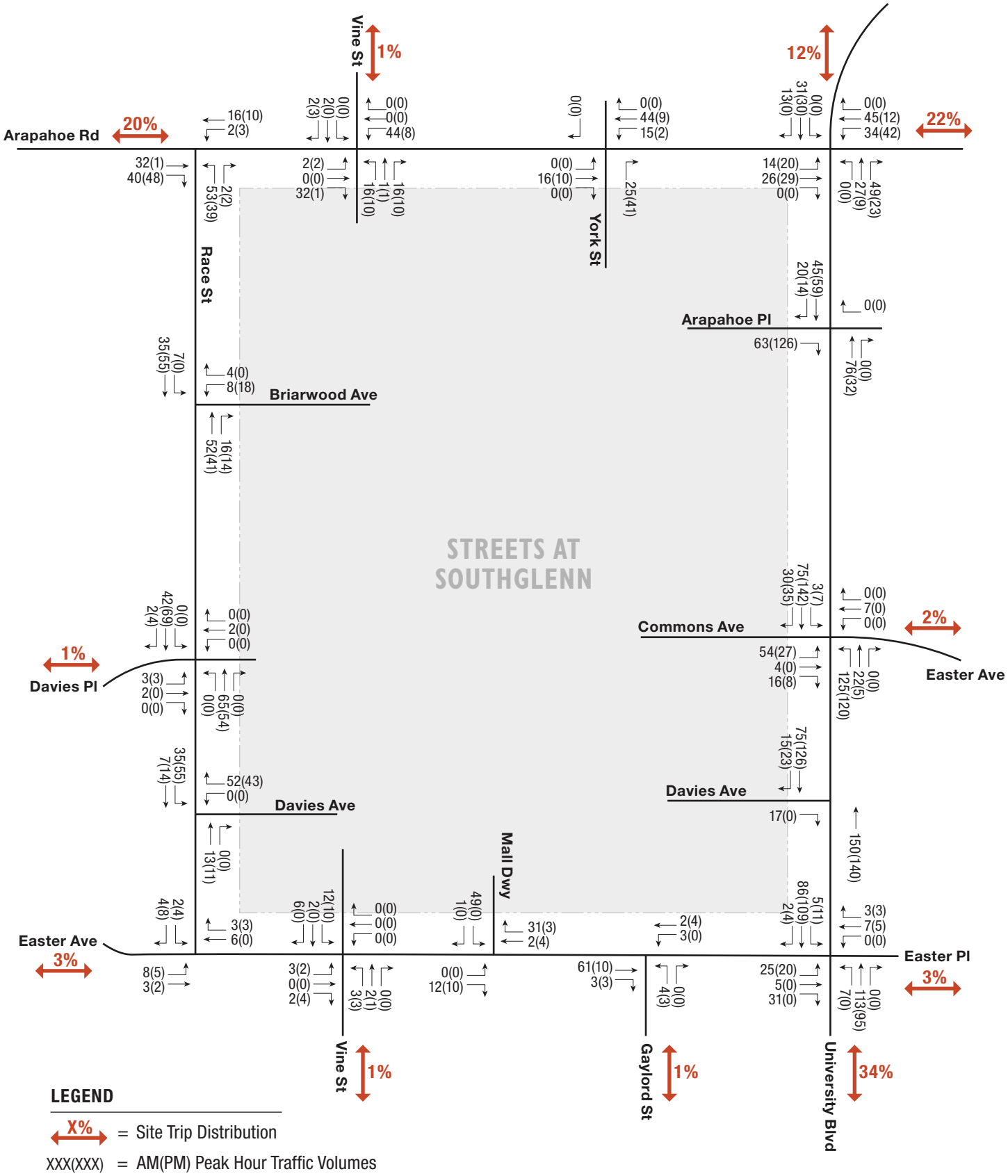
Neighborhood Traffic

The residential communities surrounding the Streets at Southglenn have expressed concerns regarding Streets at Southglenn traffic using neighborhood streets to avoid congestion along adjacent arterial roadways (sometimes referred to as cut-through traffic). FHU reviewed the local roadway network and site traffic distributions to provide further information regarding this topic. Our assessments are summarized below.

- E Easter Ave between S Broadway and S University Blvd is classified as a minor collector[3] and is, therefore, intended to move traffic into and out of the neighborhood. Race Street is a local street that is not continuous either north or south of the Streets at Southglenn.
- A review of existing traffic counts indicates that less than 5 percent of the trips from the Streets at Southglenn currently travel between the development and each of the neighborhoods surrounding the project site. These data were used to inform the trip distribution for the site.
- Trip distributions are based in part on the DRCOG model. A review of these data indicated that less than 3 percent of the trips from the Streets at Southglenn are anticipated to travel between the development and each of the neighborhoods surrounding the project site. This is a significant reduction when compared to the 7 percent to the west and 5 percent to the east considered in the October 2005 study.
- The new land uses proposed in the redevelopment shift the land uses away from retail and toward residential and office space. Blending these land uses allows internal capture within the Streets at Southglenn, reducing pressure on the surrounding roadway network.

Based on these assessments, we believe that the potential for traffic from the new development to travel through the adjacent neighborhoods to avoid congestion is low.

[3] *2017 Centennial Neighborhood Traffic Management Program*, City of Centennial, Revised December 11, 2017, Appendix A.



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Distribution and Site Generated Traffic

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FIGURE 9

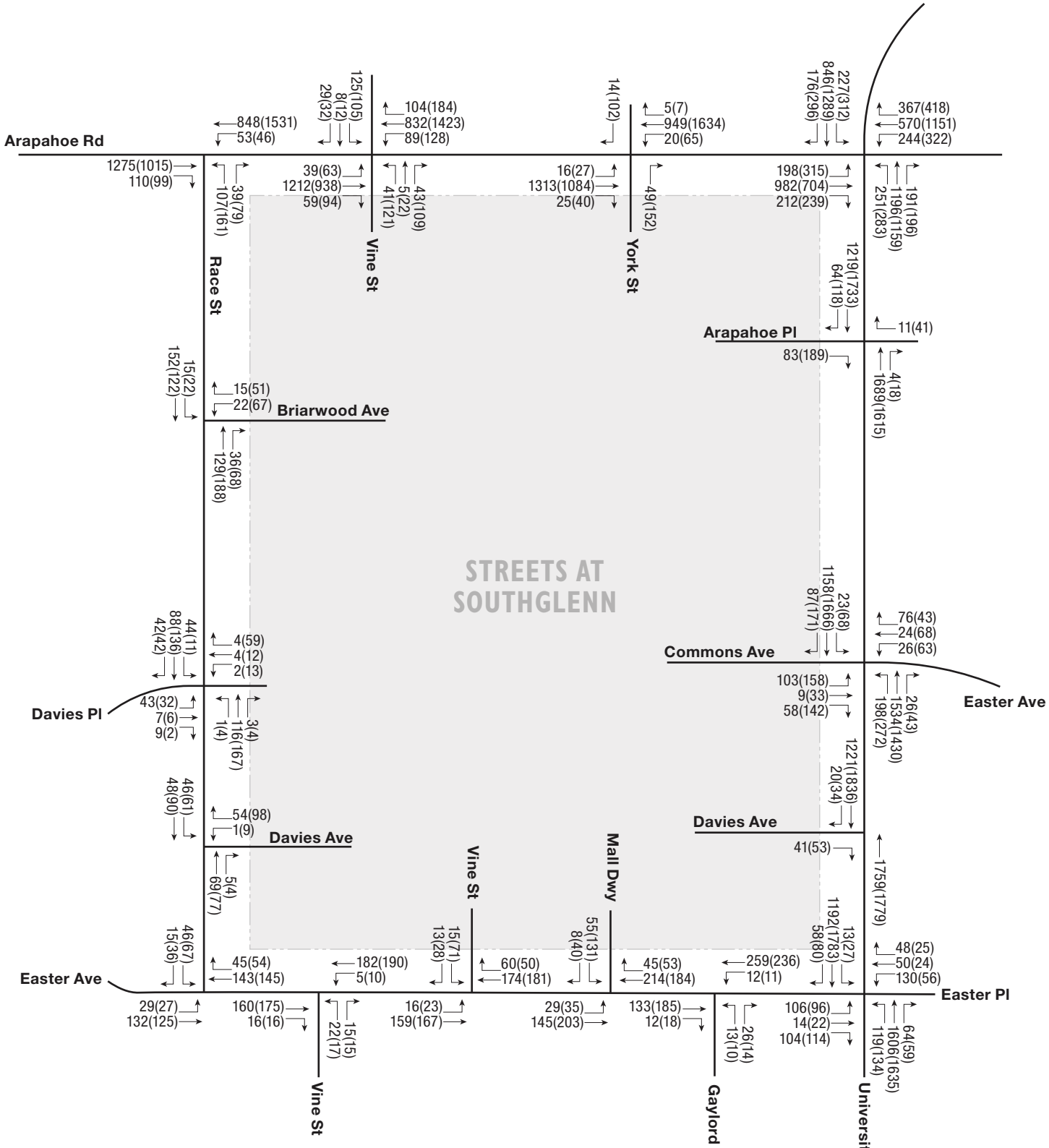
VI. TOTAL TRAFFIC PROJECTIONS AND OPERATIONS

The external site generated traffic was added to the short-term (2022) and long-term background (2040) volumes to develop total traffic volumes. Background mitigation identified in **Section IV.C**. were also included. These total traffic scenarios were then evaluated to determine LOS and project-related operational affects. LOS worksheets are shown in **Appendix E**. Where concerns were identified, mitigation measures have been proposed.

VI.A. Short-Term Total Projections and Operations

Figure 10 shows total traffic estimates for the short-term timeframe (year 2022), including short-term background traffic, trips from the Streets at Southglenn, and adjustments related to internal capture and pass-by traffic. The Streets at Southglenn traffic effects are projected to be greatest along E Arapahoe Rd and University Blvd. LOS results are presented on **Figure 11**. The resulting total traffic operations are acceptable (LOS D or better) at all of the study area intersections, assuming the identified improvements are in place. The following intersection(s) experience a movement LOS below the City of Centennial's standards, but the overall LOS is still acceptable by the City of Centennial's standards:

- **Arapahoe Rd/Vine St** – The NB and SB approaches operate at LOS E in both the AM and PM peak hours.
- **Arapahoe Rd/University Blvd** – The WB approach operates at LOS E in the PM peak hour.
- **University Blvd/Commons Ave** – The WB approach operates at LOS F in the AM peak hour and LOS E in the PM peak hour.
- **University Blvd/Easter Pl** – The EB approach operates at LOS E in the PM peak hour.



LEGEND

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

XXXX = Average Daily Traffic

NORTH
(NOT TO SCALE)

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2022 Short Term Total Traffic Volumes

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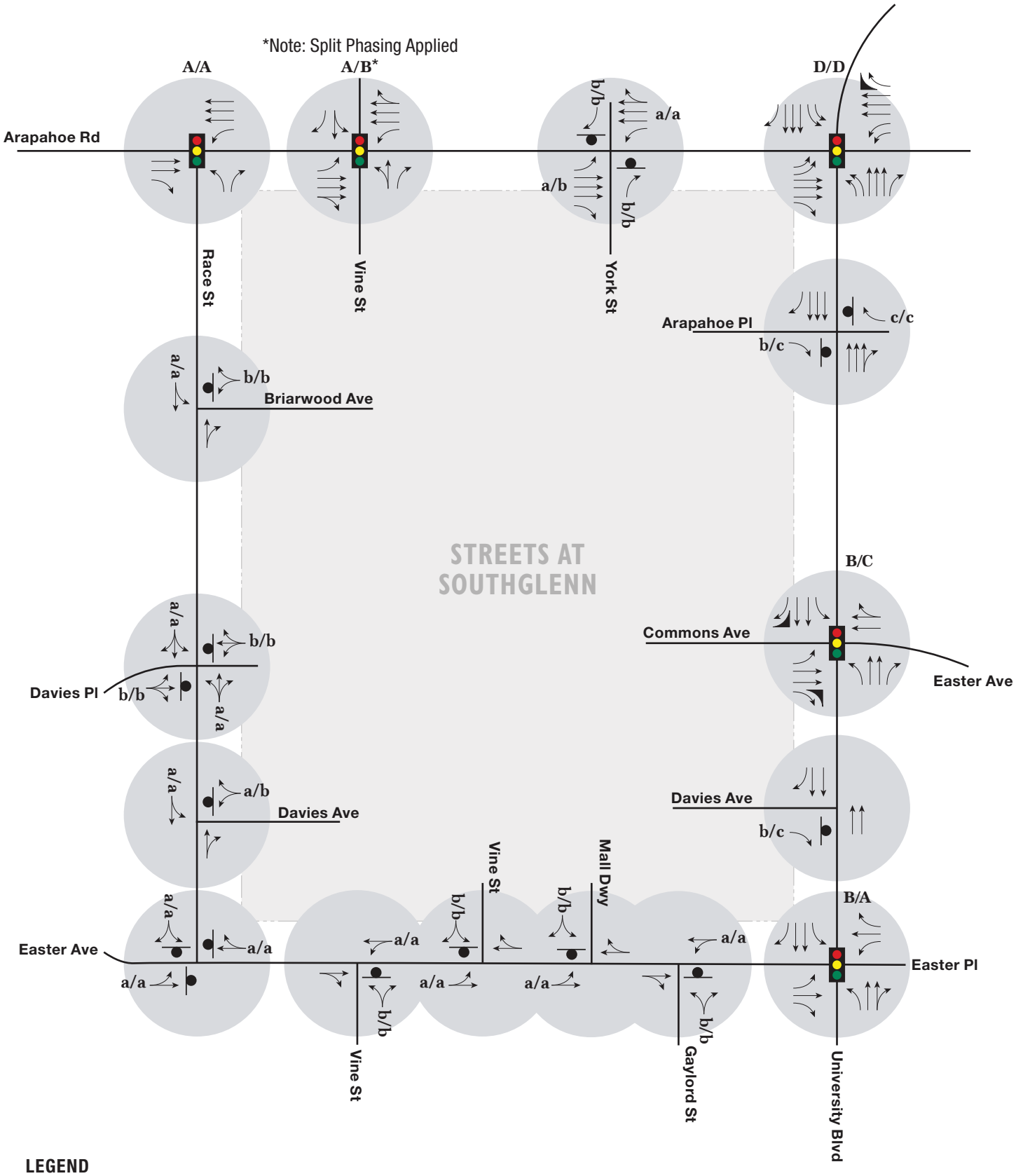
FIGURE 10



LEGEND

X/X = AM/PM Peak Hour Signalized Intersection Level of Service

x/x = AM/PM Peak Hour Unsignalized Intersection Level of Service

NORTH

(NOT TO SCALE)

FELSBURG HOLT & ULLEVIG

2022 Short Term Total Levels of Service

FIGURE 11

Streets at Southglenn Redevelopment - REPORT UPDATE 119380-02 10/13/21

VI.B. Long-Term Total Projections and Operations

Total traffic estimates for the long-term timeframe (year 2040) are shown on **Figure 12**. The figure reflects long-term background traffic, trips from the Streets at Southglenn, and adjustments related to internal capture and pass-by traffic. The Streets at Southglenn traffic effects are projected to be greatest along E Arapahoe Rd and University Blvd. **Figure 13** presents LOS. The resulting total traffic operations are acceptable (LOS D or better) at the study area intersections, assuming the identified improvements are in place. The following intersection(s) experience a movement LOS below the City of Centennial's standards, but the overall LOS is still acceptable by the City of Centennial's standards:

- **Arapahoe Rd/Vine St** – The NB and SB approaches operate at LOS E in both the AM and PM peak hours.
- **Arapahoe Rd/University Blvd** – The WB approach operates at LOS E in the PM peak hour.
- **University Blvd/Commons Ave** – The WB approach operates at LOS F in the AM peak hour and LOS E in the PM peak hour.
- **University Blvd/Easter Pl** – The EB approach operates at LOS E in the PM peak hour.

VI.C. Findings

Th Streets at Southglenn project was evaluated to understand how additional traffic may affect the roadway network and for potential mitigations required by the new development. These efforts are summarized here.

Overall Volume Changes

The removal of the existing Macy's and Sears, coupled with the addition of new office, retail, and residential space, will affect traffic along the roadways surrounding the Streets at Southglenn. **Table 5** summarizes volume changes along Arapahoe Rd, Race St, University Blvd, and Easter Ave. These values were calculated by comparing the background volumes to the total volumes for each corridor in the study area to illustrate the direct impact of the redevelopment. As shown, most of the changes are less than 10 percent and, therefore, do not represent significant changes to traffic flow. However, the volume change along Race Street is significant. This reflects the fact that Race Street has the lowest levels of background traffic of the surrounding roadways, so volume changes are more pronounced.

Table 5. Roadway Volume Summary

Short Term						
	AM			PM		
	Background	Total	Change	Background	Total	Change
Arapahoe	2,268	2,366	4%	2,906	2,964	2%
Race	226	338	49%	317	445	40%
Easter	350	364	4%	382	390	2%
University	2,797	3,022	8%	3,426	3,648	6%
Long Term						
	AM			PM		
	Background	Total	Change	Background	Total	Change
Arapahoe	2,481	2,575	4%	3,179	3,224	1%
Race	248	360	45%	346	474	37%
Easter	383	397	4%	418	425	2%
University	3,059	3,281	7%	3,748	3,959	6%

Traffic Operations

No operational concerns were identified in the total traffic scenarios, assuming the identified background improvements are in place. Hence, no traffic mitigations have been identified. **Table 6** presents a summary of the operational results.

Table 6. Operational Results Summary

Intersection	AM / PM Level of Service				
	Existing	Short-Term Background	Long-Term Background	Short-Term Total	Long-Term Total
Arapahoe Rd / Race St	A/A	A/A	A/A	A/A	A/A
Arapahoe Rd / Vine St	D/D	A/B[1]	A/C[1]	A/B[1]	A/C[1]
Arapahoe Rd / York St[2]	b/b	b/b[1]	b/b[1]	b/b[1]	b/b[1]
Arapahoe Rd / University Blvd	D/D	D/D	D/D	D/D	D/D
University Blvd / Arapahoe Pl[2]	c/c	c/c	c/d	c/c	c/d
University Blvd / Commons Ave	B/B	B/B	B/B	B/C	B/D
University Blvd / Davies Ave[2]	b/f	b/f	b/f	b/c[1]	b/c[1]
University Blvd / Easter Ave	B/A	B/A	B/A	B/A	B/A
Easter Ave / Mall Dwy[2]	b/b	b/b	b/b	b/c	b/c
Easter Ave / Gaylord St[2]	b/b	b/b	b/b	b/b	b/b
Easter Ave / Vine St[2]	b/b	b/b	b/b	b/b	b/b
Easter Ave / Race St[2]	a/a	a/a	a/a	a/a	a/a
Race St / Davies Ave[2]	a/a	a/b	a/b	a/b	a/b
Race St / Davies Pl (Garage)[2]	b/a	b/b	b/b	b/c	b/c
Race St / Briarwood Ave[2]	a/b	a/b	a/b	b/b	b/b

1- With improvements

2- Unsignalized intersection – worst approach

Intersection Sight Distances

The traffic study is based on conceptual plans for two portions of the Streets at Southglenn site (the Macy's area and the Sears area). In the Macy's area, no changes to intersections along the study area roadways are planned, and no new construction is planned adjacent to existing intersections. Hence, no changes to existing sight distances in this area are anticipated. In the Sears area, S Vine St is proposed to be relocated, and new residential building may be constructed along the southerly edge of the site. It is recommended that the site plans for these new buildings be reviewed for sight distances during the City's site plan review process.

Bicycle and Pedestrian Connectivity

As noted earlier, a study of roadway network changes along E Easter Ave due to the relocation of Vine St was performed in 2018. The 2018 evaluation is attached to this report as **Appendix G**. In addition to evaluating the existing offset intersections along this segment of E Easter Avenue, the report made recommendations for bicycle and pedestrian access updates along Easter Ave to accommodate the Vine St relocation.

The background signal phasing mitigation identified at the Arapahoe Rd and Vine St intersection may affect north-south pedestrian crossings of Arapahoe Rd. The City will monitor this intersection for changes. The restriction of the University Blvd and Davies Ave intersection to right-in / right-out will improve bicycle and pedestrian mobility slightly by removing potential left turn conflicts for north-south pedestrians along University Blvd.

Pedestrian volumes in the study area may increase with the increase in residential and commercial space within the Streets at Southglenn. Hence, additional pedestrian accommodations at traffic signals along University Boulevard and Arapahoe Road may be necessary. The operational analyses in this TIS assumed vehicular splits that do not cover pedestrian clearance times. Pedestrian calls are served by using inhibit-max and floating force-off functions within the signal timing programming. These functions allow side street max times to be violated in the event of a pedestrian call without forcing the signal into transition. This allows more consistent traffic signal operations and is preferred over having long gap-out times for uncoordinated phases. This has been a long-standing practice at the Colorado Department of Transportation (CDOT) and various Denver area jurisdictions. It is currently in use at signals within the project study area.

As the proposed redevelopment occurs, additional measures may be required to provide further pedestrian accommodations. Common measures used in the Denver metropolitan area that could be applied at the signals along University Boulevard and Arapahoe Road are described below.

- **Leading Pedestrian Intervals (LPIs)**[4] - Leading pedestrian intervals allow pedestrians to begin crossing the street several seconds before conflicting vehicles are allowed to proceed. With this early start, pedestrians can better establish their presence in the crosswalk before vehicles begin to turn. However, this measure may increase motorist delay at the intersection as motorists cannot start moving during the LPI.
- **Conversion from Permissive Lefts to Protected Lefts** – Several intersections in the study operate with permissive lefts, where left turning vehicles can turn on green ball traffic signal indications. In this scenario, motorists are focused on evaluating opposing traffic to determine when it is safe to turn left, and pedestrians already in the crosswalk may be overlooked. If these left turns are converted to protected movements, the left turns occur with a green arrow and the conflicting pedestrian movements are not permitted to go until the left turn phase is

[4] Refer to https://safety.fhwa.dot.gov/provencountermeasures/lead_ped_int/; accessed on October 11, 2021.

completed. While this measure can improve pedestrian safety, it can also increase delay as the separate left turn phase is introduced into the overall signal phasing at the intersection.

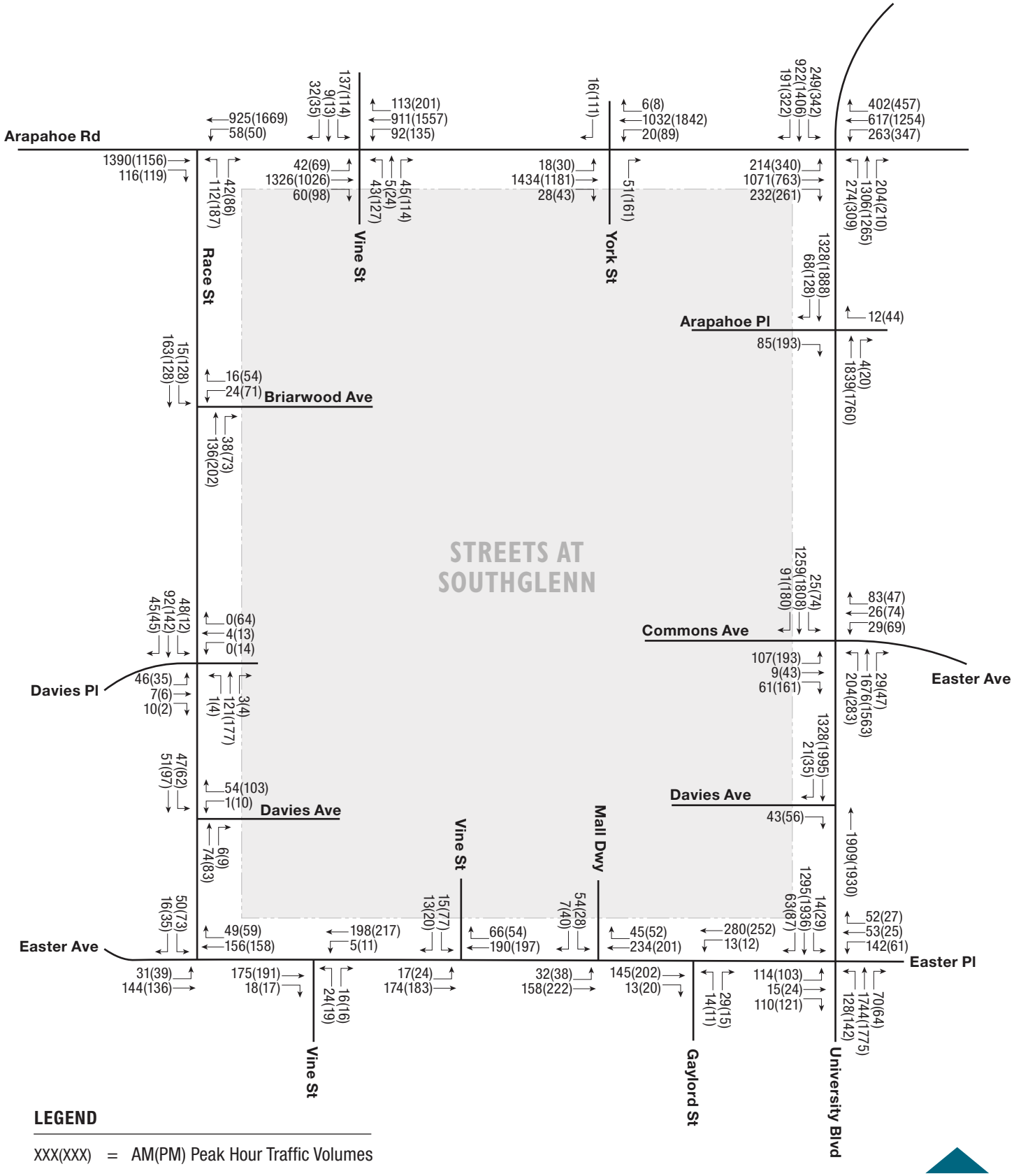
- **Right Turn on Red Prohibitions** – If right turn conflicts become a particular issue, it may be possible to prohibit right turns on red. With the prohibition, right turning vehicles would be held at the stop bar and would not conflict with pedestrian crossings. However, right turn on red prohibitions are not common in the project area, so compliance may be a concern. Further, prohibition of right turns on red increases delays for right turning movements.

It will be up to the City and CDOT to select appropriate measures from this list as pedestrian volumes increase, and related pedestrian demands become apparent.

Travel Demand Management

The existing Streets at Southglenn site provides a mix of related land uses, including residential, retail, office, and public facilities. The core area (centered around E Commons Avenue) is highly walkable, with amenities such as cast-in-place concrete crosswalks, bulb-outs, urban plazas, and mid-block crossings. In accordance with the project's design guidelines, similar design elements are anticipated to be included in the redevelopment areas, fostering walkable and bikeable connections between the planned land uses and the site's existing core area.

As noted above, pedestrian and bicycle connectivity along the boundaries of the site have been considered as part of this traffic study. Regionally, the City has recently completed various pedestrian improvements along Arapahoe Road west of Vine Street, and is planning to replace the existing Arapahoe Road structure over Big Dry Creek to the east of the site which will enhance pedestrian and bicycle connections between Arapahoe Road and the Big Dry Creek Trail. These off-site improvements serve to enhance multimodal access to the Streets at Southglenn.



LEGEND

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

XXXX = Average Daily Traffic

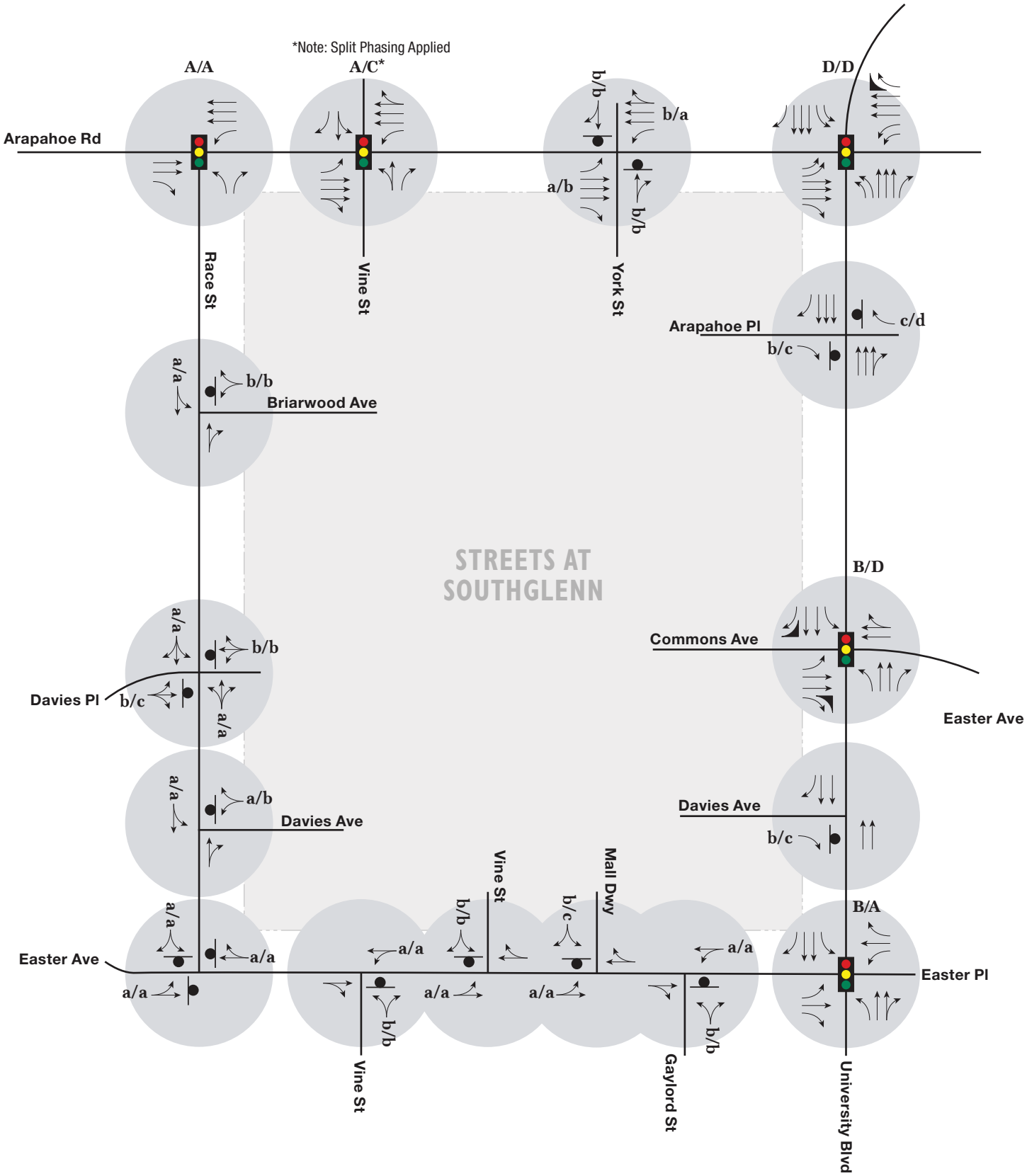
NORTH
(NOT TO SCALE)

FELSBURG HOLT & ULLEVIG

2040 Long Term Total Traffic Volumes

Streets at Southglenn Redevelopment - REPORT UPDATE 119380-02 10/13/21

FIGURE 12



LEGEND

X/X = AM/PM Peak Hour Signalized Intersection Level of Service

x/x = AM/PM Peak Hour Unsignalized Intersection Level of Service

NORTH
(NOT TO SCALE)

FELSBURG HOLT & ULLEVIG

2040 Long Term Total Levels of Service

Streets at Southglenn Redevelopment - REPORT UPDATE 119380-02 10/13/21

FIGURE 13

VII. SUMMARY AND RECOMMENDATIONS

The proposed Streets at Southglenn redevelopment will create entertainment, office, retail, and residential space within the existing Streets at Southglenn site, at the southwest corner of the Arapahoe Rd and University Blvd intersection. Existing conditions have been evaluated based on the current site configuration, and deficiencies were identified at several locations. Background traffic projections have been completed based on regional growth, and these deficiencies remained. Hence, background improvements have been identified along both Arapahoe Rd and University Blvd during the study analyses, including the Arapahoe Rd/York St, Arapahoe Rd/Vine St, and University Blvd/Davies Ave intersections. These are listed below.

- The Arapahoe Rd/Vine St intersection operates below the accepted level of service in the PM under existing and background conditions. To improve the LOS, the implementation of split phasing signal timing to allow protected left turns from the NB and SB approaches on Vine St is proposed. The implementation of split phasing would improve the operations to comply with City LOS standards.
- The Arapahoe Rd/York St intersection is currently being modified to a ¾ movement intersection. With this change, acceptable operations will be achieved.
- Due to safety and operational concerns, it is recommended that the University Blvd/Davies Ave intersection be converted to a right-in/right-out intersection. This is expected to reduce the above average number of approach turn crashes at the intersection and will improve LOS to an acceptable LOS.

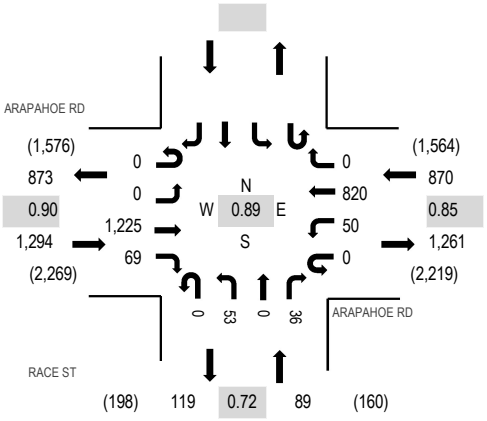
The proposed redevelopment of the Sears and Macy's has been assumed to include approximately 275,000 sf of office, retail, and entertainment space and 923 residential dwelling units. When combined with the 202 existing units within the Streets at Southglenn and 148 approved but not yet constructed units, the overall residential development on the site could result in 1,273 units. The proposed redevelopment is expected to generate a total of approximately 6,100 external vehicle trips per day, 670 vehicles per hour during the AM peak hour and 475 vehicles per hour during the PM peak hour. Total traffic operations were evaluated based on the addition of these trips to the study area roadway network. No additional mitigation needs were identified. With the background improvements in place, acceptable LOS can be maintained at study area intersections in accordance with current City of Centennial standards.

APPENDIX A. EXISTING TRAFFIC COUNTS

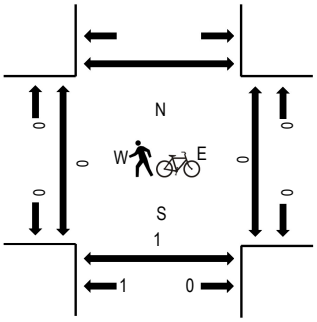
All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

Location: 1 RACE ST & ARAPAHOE RD AM
Date: Thursday, February 27, 2020
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

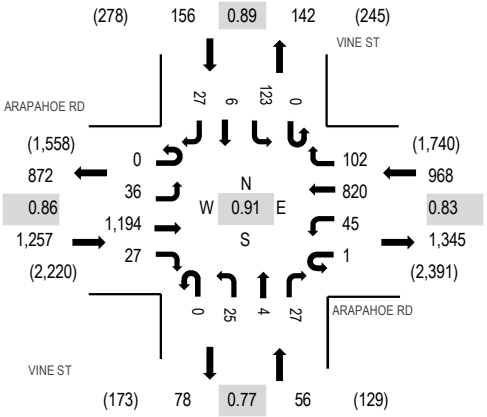
Traffic Counts

Interval Start Time	ARAPAHOE RD Eastbound				ARAPAHOE RD Westbound				RACE ST Northbound				Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	0	206	9	0	5	116	0	0	10	0	10					356	2,040	0	0	0	
7:15 AM	0	0	249	12	0	5	185	0	0	9	0	5					465	2,215	0	0	0	
7:30 AM	0	0	283	19	0	4	251	0	0	22	0	10					589	2,253	0	0	0	
7:45 AM	0	0	346	15	0	8	235	0	0	16	0	10					630	2,118	0	0	0	
8:00 AM	0	0	319	19	0	17	161	0	0	7	0	8					531	1,953	0	0	0	
8:15 AM	0	0	277	16	0	21	173	0	0	8	0	8					503		0	0	1	
8:30 AM	0	0	243	13	0	5	177	0	0	9	0	7					454		0	0	0	
8:45 AM	0	0	225	18	0	12	189	0	0	8	0	13					465		0	0	0	
Count Total	0	0	2,148	121	0	77	1,487	0	0	89	0	71					3,993		0	0	1	
Peak Hour	0	0	1,225	69	0	50	820	0	0	53	0	36					2,253		0	0	1	

All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

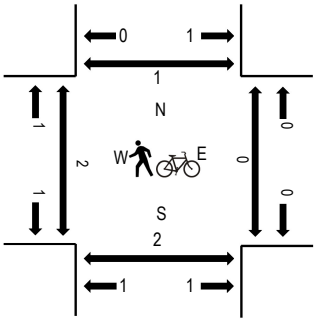
Location: 2 VINE ST & ARAPAHOE RD AM
Date: Thursday, February 27, 2020
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

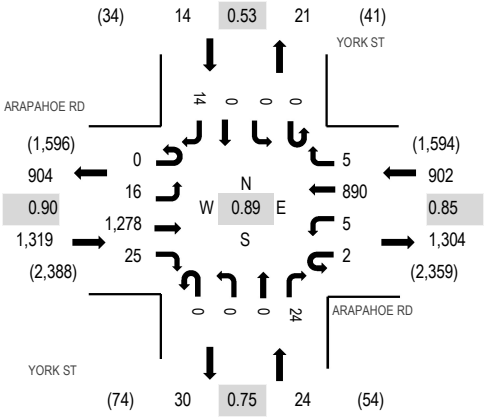
Interval Start Time	ARAPAHOE RD Eastbound				ARAPAHOE RD Westbound				VINE ST Northbound				VINE ST Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	5	203	5	0	8	127	9	0	4	0	10	0	24	0	4	399	2,215	1	1	0	0
7:15 AM	0	3	243	3	0	12	161	19	0	10	1	13	0	33	0	6	504	2,402	0	0	0	0
7:30 AM	0	6	282	2	0	13	251	27	0	10	2	7	0	36	2	7	645	2,437	0	0	0	0
7:45 AM	0	15	342	10	0	9	204	32	0	4	1	8	0	36	1	5	667	2,308	1	0	0	1
8:00 AM	0	8	297	8	0	12	185	24	0	8	1	9	0	22	3	9	586	2,152	0	0	0	0
8:15 AM	0	7	273	7	1	11	180	19	0	3	0	3	0	29	0	6	539		1	0	2	0
8:30 AM	0	4	239	11	0	14	177	22	0	6	1	9	0	26	1	6	516		0	1	0	0
8:45 AM	0	6	221	20	0	21	171	31	0	7	2	10	0	15	0	7	511		0	1	0	0
Count Total	0	54	2,100	66	1	100	1,456	183	0	52	8	69	0	221	7	50	4,367		3	3	2	1
Peak Hour	0	36	1,194	27	1	45	820	102	0	25	4	27	0	123	6	27	2,437		2	0	2	1

All Traffic Data Services Inc.

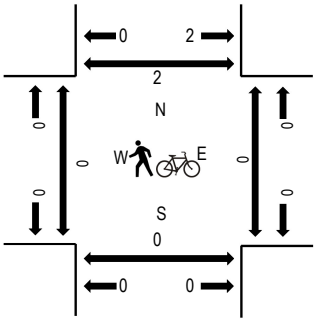
(303) 216-2439
www.alltrafficdata.net

Location: 3 YORK ST & ARAPAHOE RD AM
Date: Thursday, February 27, 2020
Peak Hour: 07:15 AM - 08:15 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

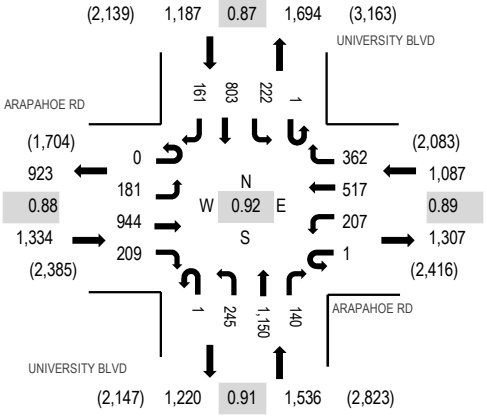
Interval Start Time	ARAPAHOE RD Eastbound				ARAPAHOE RD Westbound				YORK ST Northbound				YORK ST Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	0	226	0	0	3	125	0	0	1	0	1	0	0	0	2	358	2,089	0	0	0	0
7:15 AM	0	3	291	5	0	1	199	0	0	0	0	9	0	0	0	3	511	2,259	0	0	0	0
7:30 AM	0	4	300	4	0	2	263	1	0	0	0	5	0	0	0	5	584	2,249	0	0	0	0
7:45 AM	0	6	356	7	2	2	250	3	0	0	0	5	0	0	0	5	636	2,139	0	0	0	2
8:00 AM	0	3	331	9	0	0	178	1	0	0	0	5	0	0	0	1	528	1,981	0	0	0	0
8:15 AM	0	4	298	10	0	8	169	0	0	0	0	7	0	0	0	5	501		0	0	1	0
8:30 AM	0	7	262	10	0	3	177	0	0	0	0	11	0	0	0	4	474		0	0	1	0
8:45 AM	0	7	240	5	0	5	200	2	0	0	0	10	0	0	0	9	478		0	0	0	0
Count Total	0	34	2,304	50	2	24	1,561	7	0	1	0	53	0	0	0	34	4,070		0	0	2	2
Peak Hour	0	16	1,278	25	2	5	890	5	0	0	0	24	0	0	0	14	2,259		0	0	0	2

All Traffic Data Services Inc.

(303) 216-2439
www.alltrafficdata.net

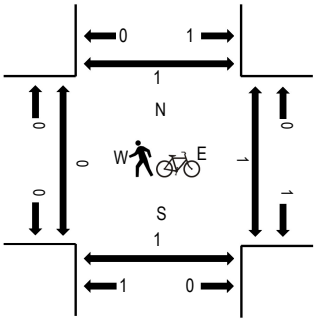
Location: 4 UNIVERSITY BLVD & ARAPAHOE RD AM
Date: Thursday, February 27, 2020
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



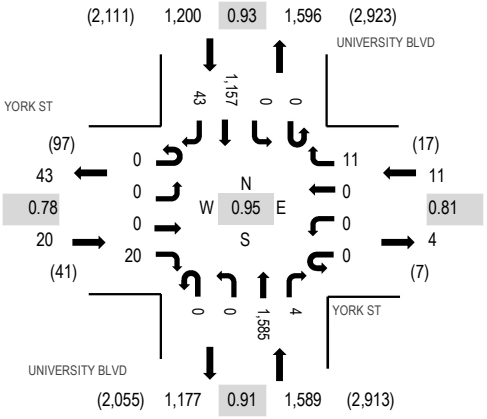
Traffic Counts

Interval Start Time	ARAPAHOE RD Eastbound				ARAPAHOE RD Westbound				UNIVERSITY BLVD Northbound				UNIVERSITY BLVD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	39	170	24	1	37	77	101	0	35	235	31	0	37	113	24	924	4,707	0	0	0	0
7:15 AM	0	38	219	33	0	33	128	87	0	40	266	48	0	47	181	35	1,155	5,031	0	0	0	0
7:30 AM	0	34	230	49	0	42	142	64	0	82	301	42	0	44	168	37	1,235	5,144	0	0	1	0
7:45 AM	0	46	264	70	1	54	160	97	1	63	305	30	0	50	205	47	1,393	5,017	0	0	0	0
8:00 AM	0	56	219	45	0	58	99	98	0	55	291	31	1	62	199	34	1,248	4,723	0	1	0	1
8:15 AM	0	45	231	45	0	53	116	103	0	45	253	37	0	66	231	43	1,268		0	0	0	0
8:30 AM	0	36	190	38	2	35	125	104	0	53	271	40	0	43	141	30	1,108		0	0	1	0
8:45 AM	0	33	192	39	0	44	147	75	0	43	183	42	1	47	209	44	1,099		0	0	1	0
Count Total	0	327	1,715	343	4	356	994	729	1	416	2,105	301	2	396	1,447	294	9,430		0	1	3	1
Peak Hour	0	181	944	209	1	207	517	362	1	245	1,150	140	1	222	803	161	5,144		0	1	1	1

All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

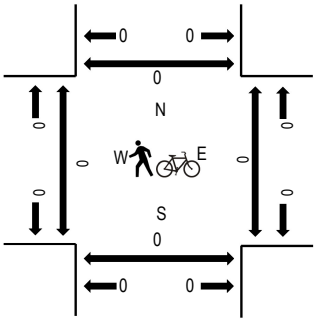
Location: 5 UNIVERSITY BLVD & YORK ST AM
Date: Thursday, February 27, 2020
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	YORK ST Eastbound				YORK ST Westbound				UNIVERSITY BLVD Northbound				UNIVERSITY BLVD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	0	0	4	0	0	0	0	0	0	320	2	0	0	169	8	503	2,557	0	0	0	0
7:15 AM	0	0	0	3	0	0	0	0	0	0	371	0	0	0	222	8	604	2,738	0	0	0	0
7:30 AM	0	0	0	3	0	0	0	1	0	0	441	1	0	0	254	7	707	2,820	0	0	0	0
7:45 AM	0	0	0	6	0	0	0	3	0	0	420	1	0	0	305	8	743	2,701	0	0	0	0
8:00 AM	0	0	0	6	0	0	0	3	0	0	371	2	0	0	289	13	684	2,525	0	0	0	0
8:15 AM	0	0	0	5	0	0	0	4	0	0	353	0	0	0	309	15	686		0	0	0	0
8:30 AM	0	0	0	6	0	0	0	2	0	0	361	1	0	0	203	15	588		0	0	0	0
8:45 AM	0	0	0	8	0	0	0	4	0	0	269	0	0	0	263	23	567		0	0	0	0
Count Total	0	0	0	41	0	0	0	17	0	0	2,906	7	0	0	2,014	97	5,082		0	0	0	0
Peak Hour	0	0	0	20	0	0	0	11	0	0	1,585	4	0	0	1,157	43	2,820		0	0	0	0

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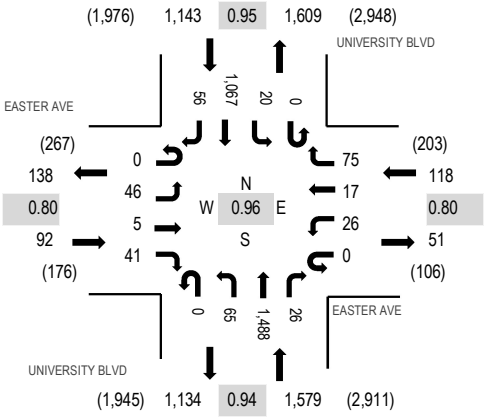
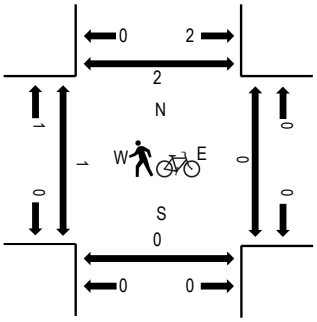
Location: 6 UNIVERSITY BLVD & EASTER AVE AM
Date: Thursday, February 27, 2020
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	EASTER AVE Eastbound				EASTER AVE Westbound				UNIVERSITY BLVD Northbound				UNIVERSITY BLVD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	5	1	5	0	3	2	15	0	13	294	3	0	1	154	12	508	2,607	0	0	0	1
7:15 AM	0	9	2	4	0	9	5	9	0	11	356	1	0	4	208	9	627	2,825	0	0	1	0
7:30 AM	0	8	0	10	0	7	0	19	0	11	404	3	0	2	240	7	711	2,932	0	0	0	0
7:45 AM	0	12	1	10	0	4	6	24	0	16	385	10	0	8	268	17	761	2,840	0	0	0	0
8:00 AM	0	15	2	11	0	9	5	24	0	16	340	5	0	6	276	17	726	2,659	1	0	0	1
8:15 AM	0	11	2	10	0	6	6	8	0	22	359	8	0	4	283	15	734		0	0	0	1
8:30 AM	0	17	4	13	0	1	4	15	0	10	330	12	0	6	191	16	619		0	0	0	0
8:45 AM	0	7	3	14	0	6	6	10	0	22	272	8	0	10	203	19	580		0	0	0	1
Count Total	0	84	15	77	0	45	34	124	0	121	2,740	50	0	41	1,823	112	5,266		1	0	1	4
Peak Hour	0	46	5	41	0	26	17	75	0	65	1,488	26	0	20	1,067	56	2,932		1	0	0	2

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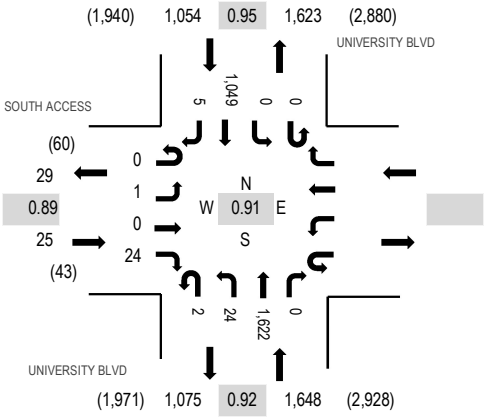
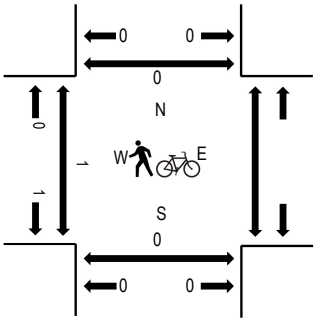
Location: 7 UNIVERSITY BLVD & SOUTH ACCESS AM
Date: Thursday, February 27, 2020
Peak Hour: 07:15 AM - 08:15 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	SOUTH ACCESS Eastbound U-Turn	Left	Thru	Right	Westbound U-Turn	Left	Thru	Right	UNIVERSITY BLVD Northbound U-Turn	Left	Thru	Right	UNIVERSITY BLVD Southbound U-Turn	Left	Thru	Right	Total	Rolling Hour	Pedestrian Crossings West	East	South	North
7:00 AM	0	0	0	3					0	5	313	0	0	0	189	1	511	2,601	0		0	0
7:15 AM	0	1	0	5					1	2	420	0	0	0	216	0	645	2,727	0		0	0
7:30 AM	0	0	0	6					1	7	420	0	0	0	264	1	699	2,719	1		0	0
7:45 AM	0	0	0	6					0	9	438	0	0	0	291	2	746	2,576	0		0	0
8:00 AM	0	0	0	7					0	6	344	0	0	0	278	2	637	2,310	0		0	0
8:15 AM	0	0	0	6					0	6	348	0	0	0	276	1	637		0		0	0
8:30 AM	0	0	0	4					0	8	332	0	0	0	210	2	556		0		0	0
8:45 AM	0	1	0	4					0	5	263	0	0	0	204	3	480		0		0	0
Count Total	0	2	0	41					2	48	2,878	0	0	0	1,928	12	4,911		1		0	0
Peak Hour	0	1	0	24					2	24	1,622	0	0	0	1,049	5	2,727		1		0	0

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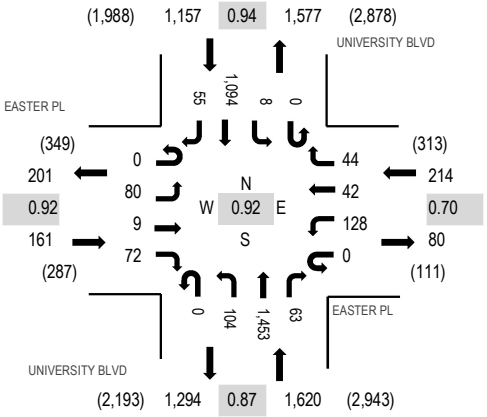
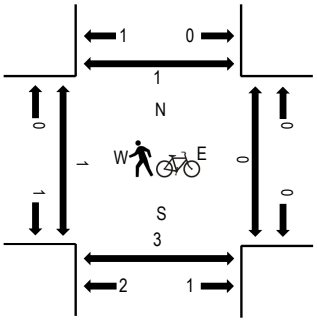
Location: 8 UNIVERSITY BLVD & EASTER PL AM
Date: Thursday, February 27, 2020
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	EASTER PL Eastbound				EASTER PL Westbound				UNIVERSITY BLVD Northbound				UNIVERSITY BLVD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	16	1	13	0	11	1	8	0	22	281	2	0	1	166	7	529	2,825	0	0	0	0
7:15 AM	0	21	2	14	0	18	3	8	0	22	362	7	0	3	220	7	687	3,071	0	1	1	2
7:30 AM	0	23	3	7	0	16	2	12	0	30	378	15	0	1	250	13	750	3,152	0	0	0	0
7:45 AM	0	18	2	23	0	34	9	12	0	24	418	32	0	4	273	10	859	2,991	1	0	1	0
8:00 AM	0	20	2	23	0	46	21	9	0	24	324	9	0	3	280	14	775	2,706	0	0	1	1
8:15 AM	0	19	2	19	0	32	10	11	0	26	333	7	0	0	291	18	768		0	0	0	0
8:30 AM	0	23	3	11	0	13	2	7	0	24	297	5	0	2	199	3	589		0	1	0	1
8:45 AM	0	10	0	12	0	15	2	11	0	41	257	3	0	2	207	14	574		0	0	0	1
Count Total	0	150	15	122	0	185	50	78	0	213	2,650	80	0	16	1,886	86	5,531		1	2	3	5
Peak Hour	0	80	9	72	0	128	42	44	0	104	1,453	63	0	8	1,094	55	3,152		1	0	2	1

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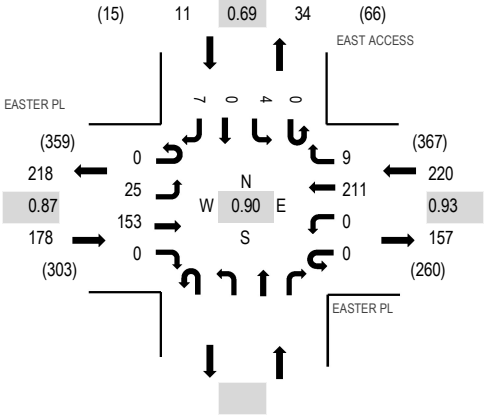
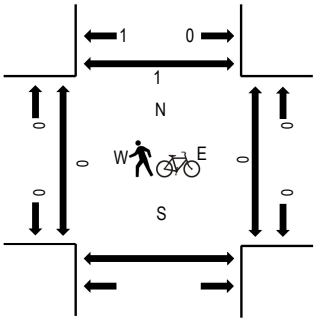
Location: 9 EAST ACCESS & EASTER PL AM
Date: Thursday, February 27, 2020
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 08:00 AM - 08:15 AM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	EASTER PL Eastbound				EASTER PL Westbound				Northbound				EAST ACCESS Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	4	25	0	0	0	28	1					0	0	0	1	59	319	1	0		0
7:15 AM	0	6	28	0	0	0	30	2					0	1	0	1	68	373	0	0		0
7:30 AM	0	5	32	0	0	0	46	2					0	0	0	3	88	409	0	0		1
7:45 AM	0	5	42	0	0	0	52	3					0	1	0	1	104	392	0	0		0
8:00 AM	0	8	44	0	0	0	56	3					0	0	0	2	113	366	0	0		0
8:15 AM	0	7	35	0	0	0	57	1					0	3	0	1	104		0	0		0
8:30 AM	0	7	33	0	0	0	28	3					0	0	0	0	71		0	0		0
8:45 AM	0	6	16	0	0	0	52	3					0	0	0	1	78		1	0		2
Count Total	0	48	255	0	0	0	349	18					0	5	0	10	685		2	0		3
Peak Hour	0	25	153	0	0	0	211	9					0	4	0	7	409		0	0		1

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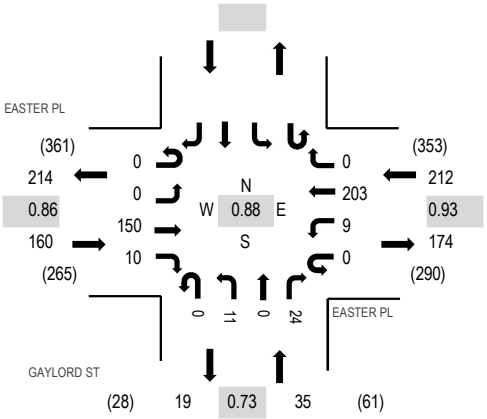
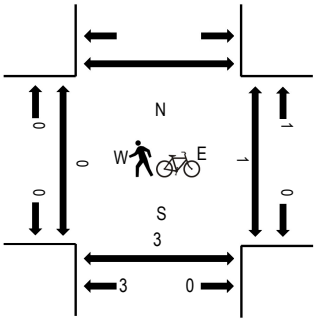
Location: 10 GAYLORD ST & EASTER PL AM
Date: Thursday, February 27, 2020
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 08:00 AM - 08:15 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	EASTER PL Eastbound				EASTER PL Westbound				GAYLORD ST Northbound				Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	0	23	0	0	1	28	0	0	3	0	5					60	321	1	2	1	
7:15 AM	0	0	27	2	0	0	31	0	0	1	0	6					67	376	1	1	0	
7:30 AM	0	0	28	1	0	1	45	0	0	5	0	8					88	407	0	0	0	
7:45 AM	0	0	40	5	0	2	50	0	0	3	0	6					106	392	0	1	1	
8:00 AM	0	0	47	2	0	4	53	0	0	3	0	6					115	358	0	0	1	
8:15 AM	0	0	35	2	0	2	55	0	0	0	0	4					98		0	0	0	
8:30 AM	0	0	34	3	0	0	29	0	0	4	0	3					73		0	0	0	
8:45 AM	0	0	15	1	0	2	50	0	0	1	0	3					72		0	1	1	
Count Total	0	0	249	16	0	12	341	0	0	20	0	41					679		2	5	4	
Peak Hour	0	0	150	10	0	9	203	0	0	11	0	24					407		0	1	2	

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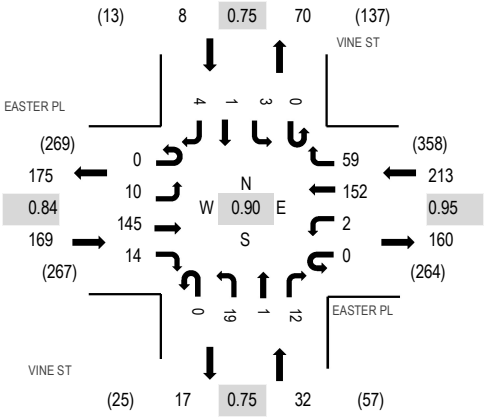
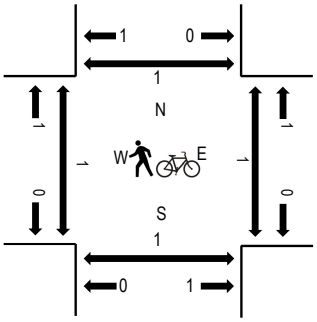
Location: 11 VINE ST & EASTER PL AM
Date: Thursday, February 27, 2020
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 08:00 AM - 08:15 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	EASTER PL Eastbound				EASTER PL Westbound				VINE ST Northbound				VINE ST Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	0	19	0	0	3	23	5	0	1	1	4	0	0	0	0	56	325	0	0	0	0
7:15 AM	0	0	23	1	0	0	18	14	0	4	0	4	0	1	0	1	66	386	0	0	1	1
7:30 AM	0	0	24	3	0	1	34	15	0	7	0	5	0	0	0	1	90	422	0	0	0	1
7:45 AM	0	1	42	7	0	0	36	16	0	7	1	2	0	1	0	0	113	410	0	0	0	0
8:00 AM	0	5	45	3	0	1	43	12	0	3	0	2	0	2	0	1	117	370	0	1	0	0
8:15 AM	0	4	34	1	0	0	39	16	0	2	0	3	0	0	1	2	102		1	0	1	0
8:30 AM	0	0	35	1	0	1	14	17	0	6	0	2	0	0	0	2	78		2	1	0	0
8:45 AM	0	3	15	1	0	1	22	27	0	2	0	1	0	0	0	1	73		1	0	0	1
Count Total	0	13	237	17	0	7	229	122	0	32	2	23	0	4	1	8	695		4	2	2	3
Peak Hour	0	10	145	14	0	2	152	59	0	19	1	12	0	3	1	4	422		1	1	1	1

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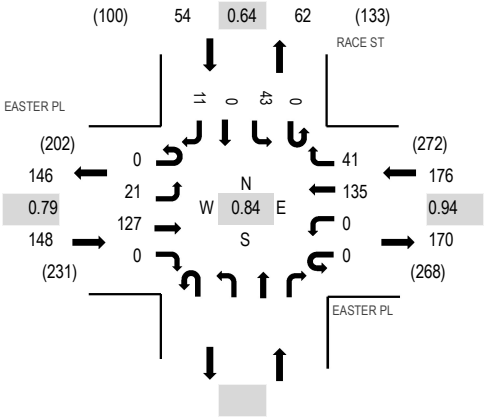
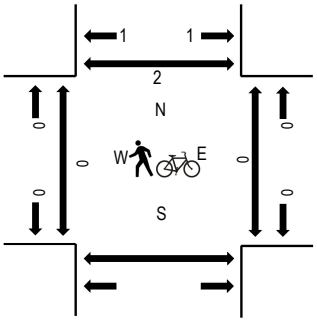
Location: 12 RACE ST & EASTER PL AM
Date: Thursday, February 27, 2020
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 08:00 AM - 08:15 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	EASTER PL Eastbound				EASTER PL Westbound				Northbound				RACE ST Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	5	13	0	0	0	8	17					0	6	0	3	52	279	0	0		0
7:15 AM	0	1	14	0	0	0	13	10					0	11	0	1	50	340	0	0		0
7:30 AM	0	4	20	0	0	0	23	20					0	7	0	0	74	378	0	0		2
7:45 AM	0	8	41	0	0	0	33	10					0	9	0	2	103	367	0	0		0
8:00 AM	0	6	36	0	0	0	39	8					0	16	0	8	113	324	0	0		0
8:15 AM	0	3	30	0	0	0	40	3					0	11	0	1	88		0	0		0
8:30 AM	0	4	26	0	0	0	12	11					0	8	0	2	63		0	0		0
8:45 AM	0	9	11	0	0	0	11	14					0	9	0	6	60		0	0		0
Count Total	0	40	191	0	0	0	179	93					0	77	0	23	603		0	0		2
Peak Hour	0	21	127	0	0	0	135	41					0	43	0	11	378		0	0		2

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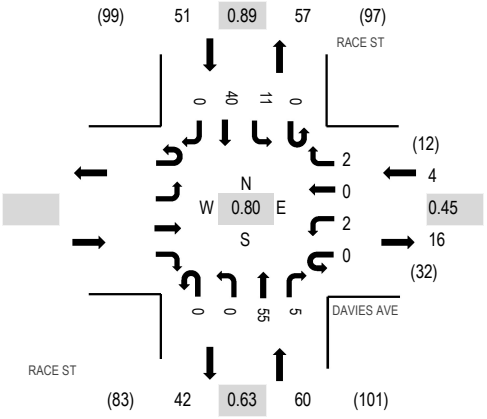
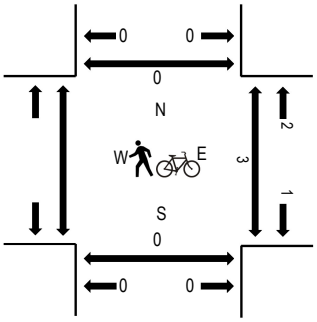
Location: 13 RACE ST & DAVIES AVE AM
Date: Thursday, February 27, 2020
Peak Hour: 07:15 AM - 08:15 AM
Peak 15-Minutes: 07:30 AM - 07:45 AM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	DAVIES AVE Eastbound				DAVIES AVE Westbound				RACE ST Northbound				RACE ST Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM					0	1	0	0	0	0	6	3	0	2	5	0	17	103	0	0	0	0
7:15 AM					0	1	0	1	0	0	8	0	0	1	10	0	21	115	1	0	0	0
7:30 AM					0	0	0	0	0	0	24	0	0	4	8	0	36	114	2	0	0	0
7:45 AM					0	0	0	0	0	0	12	5	0	2	10	0	29	105	0	0	0	0
8:00 AM					0	1	0	1	0	0	11	0	0	4	12	0	29	109	0	0	0	0
8:15 AM					0	0	0	0	0	0	5	1	0	2	12	0	20		0	0	0	0
8:30 AM					0	0	0	2	0	0	11	2	0	2	10	0	27		0	0	0	0
8:45 AM					0	1	0	4	0	0	12	1	0	3	12	0	33		0	0	1	0
Count Total					0	4	0	8	0	0	89	12	0	20	79	0	212		3	1	0	
Peak Hour					0	2	0	2	0	0	55	5	0	11	40	0	115		3	0	0	

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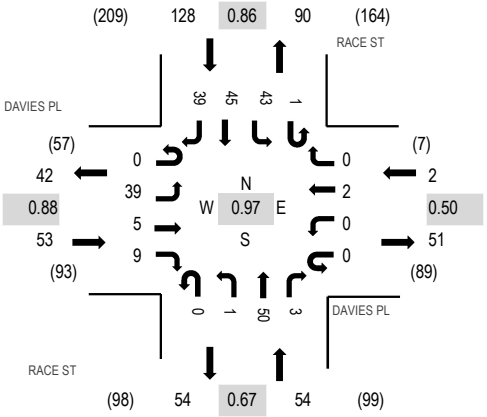
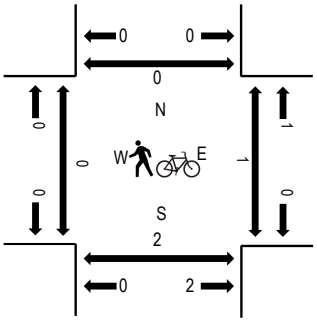
Location: 14 RACE ST & DAVIES PL AM
Date: Thursday, February 27, 2020
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 08:15 AM - 08:30 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	DAVIES PL Eastbound				DAVIES PL Westbound				RACE ST Northbound				RACE ST Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	10	2	0	0	0	0	1	0	0	10	0	0	2	7	2	34	182	0	0	0	1
7:15 AM	0	7	1	0	0	1	1	0	0	0	9	0	0	4	7	2	32	208	0	3	0	0
7:30 AM	0	13	1	1	0	0	0	0	0	0	21	0	1	10	10	0	57	237	0	1	0	0
7:45 AM	0	12	1	1	0	0	1	0	0	0	12	2	0	10	13	7	59	226	0	0	0	0
8:00 AM	0	6	2	2	0	0	0	0	0	1	11	0	0	13	13	12	60	226	0	0	0	0
8:15 AM	0	8	1	5	0	0	1	0	0	0	6	1	0	10	9	20	61		0	0	1	0
8:30 AM	0	5	3	0	0	0	1	0	0	0	13	0	0	8	11	5	46		0	0	0	0
8:45 AM	0	10	2	0	0	0	1	0	0	1	9	3	0	13	18	2	59		0	0	1	2
Count Total	0	71	13	9	0	1	5	1	0	2	91	6	1	70	88	50	408		0	4	2	3
Peak Hour	0	39	5	9	0	0	2	0	0	1	50	3	1	43	45	39	237		0	1	1	0

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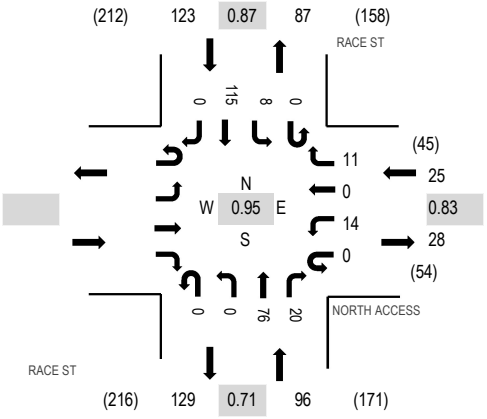
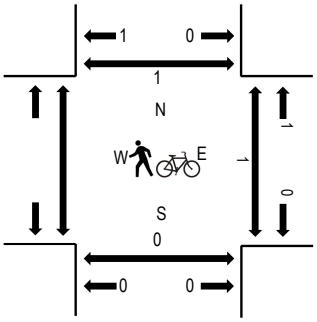
Location: 15 RACE ST & NORTH ACCESS AM
Date: Thursday, February 27, 2020
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:30 AM - 07:45 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	Eastbound				NORTH ACCESS Westbound				RACE ST Northbound				RACE ST Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM					0	0	0	1	0	0	17	5	0	2	12	0	37	197	0	0	0	0
7:15 AM					0	1	0	1	0	0	12	5	0	2	17	0	38	222	0	0	0	0
7:30 AM					0	0	0	5	0	0	30	6	0	2	21	0	64	244	1	0	0	0
7:45 AM					0	5	0	2	0	0	22	5	0	0	24	0	58	228	0	0	0	0
8:00 AM					0	3	0	2	0	0	13	6	0	1	37	0	62	231	0	0	0	0
8:15 AM					0	6	0	2	0	0	11	3	0	5	33	0	60		0	0	0	1
8:30 AM					0	3	0	5	0	0	15	3	0	1	21	0	48		0	0	0	0
8:45 AM					0	6	0	3	0	0	17	1	0	7	27	0	61		0	0	0	0
Count Total					0	24	0	21	0	0	137	34	0	20	192	0	428		1	0	1	
Peak Hour					0	14	0	11	0	0	76	20	0	8	115	0	244		1	0	1	

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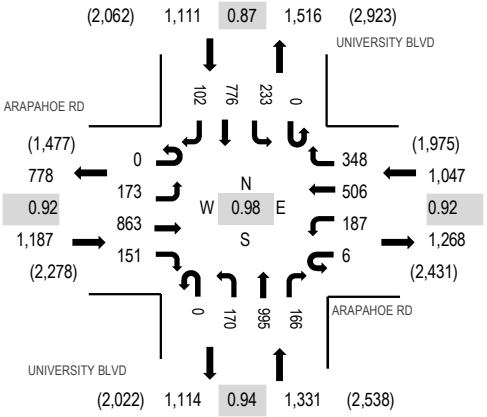
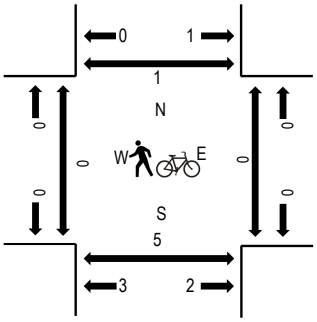
Location: 1 UNIVERSITY BLVD & ARAPAHOE RD AM
Date: Tuesday, July 30, 2019
Peak Hour: 07:45 AM - 08:45 AM
Peak 15-Minutes: 08:00 AM - 08:15 AM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	ARAPAHOE RD Eastbound				ARAPAHOE RD Westbound				UNIVERSITY BLVD Northbound				UNIVERSITY BLVD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	29	178	19	0	25	90	75	1	24	202	31	0	39	120	24	857	4,204	0	1	1	1
7:15 AM	0	37	224	26	0	27	102	84	0	25	252	35	0	50	145	28	1,035	4,540	0	0	0	0
7:30 AM	0	42	243	41	0	38	127	98	0	53	257	40	0	46	147	24	1,156	4,668	0	0	0	0
7:45 AM	0	34	227	45	1	40	126	69	0	45	228	47	0	58	211	25	1,156	4,676	0	0	3	0
8:00 AM	0	49	211	26	3	47	128	101	0	45	262	43	0	63	190	25	1,193	4,649	0	0	1	0
8:15 AM	0	38	199	44	2	47	104	87	0	45	283	40	0	59	191	24	1,163		0	0	1	1
8:30 AM	0	52	226	36	0	53	148	91	0	35	222	36	0	53	184	28	1,164		0	0	0	0
8:45 AM	0	35	178	39	0	54	119	89	0	41	207	39	0	60	226	42	1,129		0	1	0	0
Count Total	0	316	1,686	276	6	331	944	694	1	313	1,913	311	0	428	1,414	220	8,853		0	2	6	2
Peak Hour	0	173	863	151	6	187	506	348	0	170	995	166	0	233	776	102	4,676		0	0	5	1

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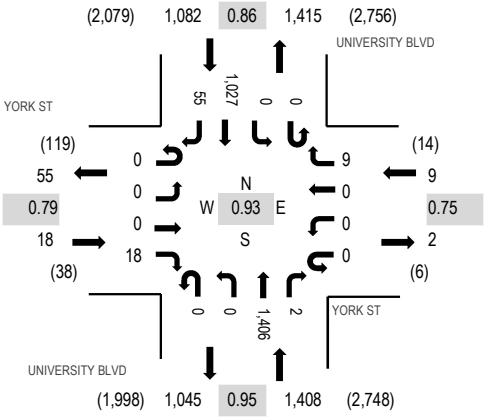
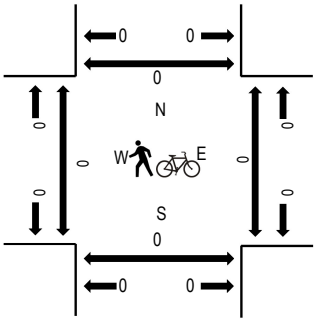
Location: 2 UNIVERSITY BLVD & YORK ST AM
Date: Tuesday, July 30, 2019
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	YORK ST Eastbound				YORK ST Westbound				UNIVERSITY BLVD Northbound				UNIVERSITY BLVD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	0	0	6	0	0	0	1	0	0	336	0	0	0	161	9	513	2,396	0	0	0	0
7:15 AM	0	0	0	4	0	0	0	0	0	0	336	1	0	0	204	11	556	2,462	0	0	0	0
7:30 AM	0	0	0	5	0	0	0	2	0	0	372	0	0	0	259	15	653	2,517	0	0	0	0
7:45 AM	0	0	0	4	0	0	0	2	0	0	357	0	0	0	291	20	674	2,501	0	0	0	0
8:00 AM	0	0	0	3	0	0	0	3	0	0	328	1	0	0	238	6	579	2,483	0	0	0	0
8:15 AM	0	0	0	6	0	0	0	2	0	0	349	1	0	0	239	14	611		0	0	0	0
8:30 AM	0	0	0	6	0	0	0	1	0	0	339	1	0	0	273	17	637		0	2	0	0
8:45 AM	0	0	0	4	0	0	0	3	0	0	325	2	0	0	295	27	656		0	0	0	0
Count Total	0	0	0	38	0	0	0	14	0	0	2,742	6	0	0	1,960	119	4,879		0	2	0	0
Peak Hour	0	0	0	18	0	0	0	9	0	0	1,406	2	0	0	1,027	55	2,517		0	0	0	0

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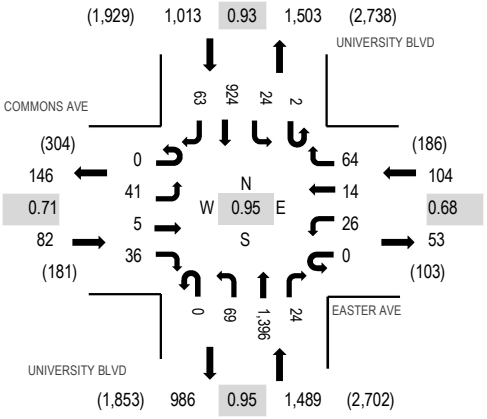
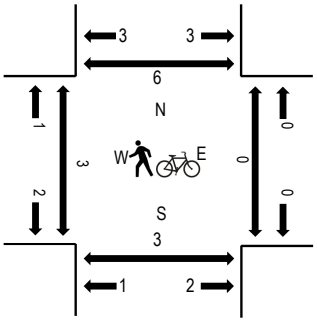
Location: 3 UNIVERSITY BLVD & EASTER AVE AM
Date: Tuesday, July 30, 2019
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	COMMONS AVE Eastbound				EASTER AVE Westbound				UNIVERSITY BLVD Northbound				UNIVERSITY BLVD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	11	0	6	0	0	6	12	0	8	265	0	0	5	131	11	455	2,365	0	0	0	1
7:15 AM	0	12	0	4	0	6	3	10	0	10	313	0	0	3	184	14	559	2,545	0	0	0	3
7:30 AM	0	9	1	4	0	12	7	19	0	12	370	2	0	3	192	16	647	2,688	1	0	0	1
7:45 AM	0	9	1	8	0	3	3	12	0	15	369	9	0	2	254	19	704	2,685	2	0	0	1
8:00 AM	0	14	2	10	0	5	2	18	0	17	312	3	2	7	227	16	635	2,633	0	0	0	2
8:15 AM	0	9	1	14	0	6	2	15	0	25	345	10	0	12	251	12	702		0	0	2	2
8:30 AM	0	14	4	7	0	3	6	15	0	19	296	7	1	9	242	21	644		0	0	1	0
8:45 AM	0	23	5	13	0	6	8	7	0	27	256	12	0	5	265	25	652		0	0	0	1
Count Total	0	101	14	66	0	41	37	108	0	133	2,526	43	3	46	1,746	134	4,998		3	0	3	11
Peak Hour	0	41	5	36	0	26	14	64	0	69	1,396	24	2	24	924	63	2,688		3	0	2	6

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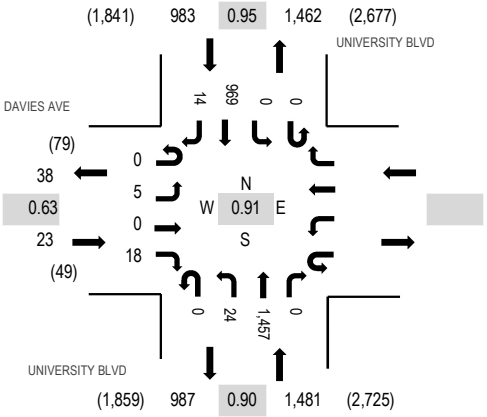
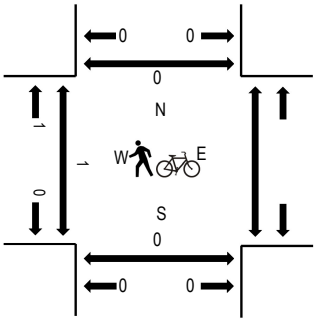
Location: 4 UNIVERSITY BLVD & DAVIES AVE AM
Date: Tuesday, July 30, 2019
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	DAVIES AVE Eastbound				Westbound				UNIVERSITY BLVD Northbound				UNIVERSITY BLVD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	0	0	4					0	2	270	0	0	0	142	4	422	2,235	1		0	0
7:15 AM	0	0	0	5					0	6	318	0	0	0	197	0	526	2,368	0		0	0
7:30 AM	0	0	0	8					0	2	384	0	0	0	202	7	603	2,487	1		0	0
7:45 AM	0	2	0	5					0	9	401	0	0	0	267	0	684	2,463	0		0	0
8:00 AM	0	1	0	4					0	6	296	0	0	0	246	2	555	2,380	0		0	0
8:15 AM	0	2	0	1					0	7	376	0	0	0	254	5	645		0		0	0
8:30 AM	0	2	0	5					0	9	316	0	0	0	244	3	579		0		0	0
8:45 AM	0	1	0	9					0	15	308	0	0	0	266	2	601		0		0	0
Count Total	0	8	0	41					0	56	2,669	0	0	0	1,818	23	4,615		2		0	0
Peak Hour	0	5	0	18					0	24	1,457	0	0	0	969	14	2,487		1		0	0

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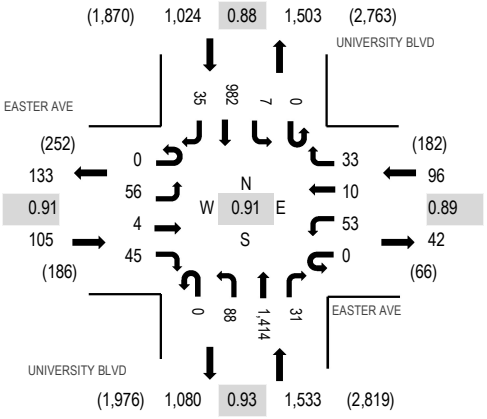
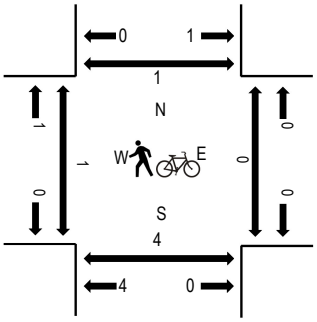
Location: 5 UNIVERSITY BLVD & EASTER AVE AM
Date: Tuesday, July 30, 2019
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	EASTER AVE Eastbound				EASTER AVE Westbound				UNIVERSITY BLVD Northbound				UNIVERSITY BLVD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	14	0	8	0	7	1	11	0	15	252	0	0	3	132	3	446	2,423	0	0	1	0
7:15 AM	0	6	1	7	0	9	0	8	0	17	318	2	0	0	187	8	563	2,616	0	0	0	0
7:30 AM	0	14	0	13	0	13	3	9	0	15	358	4	0	0	219	8	656	2,758	1	0	0	1
7:45 AM	0	10	0	13	0	15	1	11	0	24	379	9	0	2	287	7	758	2,722	0	0	3	0
8:00 AM	0	19	4	6	0	12	2	6	0	22	309	8	0	4	238	9	639	2,634	0	0	1	0
8:15 AM	0	13	0	13	0	13	4	7	0	27	368	10	0	1	238	11	705		0	0	0	0
8:30 AM	0	12	1	12	0	12	2	5	0	14	310	7	0	3	232	10	620		0	0	0	2
8:45 AM	0	10	0	10	0	20	6	5	0	36	309	6	0	1	260	7	670		0	0	1	1
Count Total	0	98	6	82	0	101	19	62	0	170	2,603	46	0	14	1,793	63	5,057		1	0	6	4
Peak Hour	0	56	4	45	0	53	10	33	0	88	1,414	31	0	7	982	35	2,758		1	0	4	1

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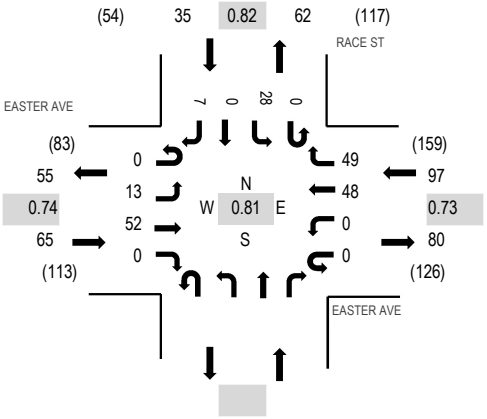
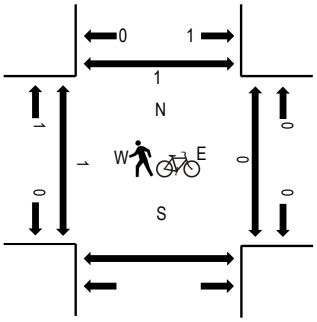
Location: 6 RACE ST & EASTER AVE AM
Date: Tuesday, July 30, 2019
Peak Hour: 08:00 AM - 09:00 AM
Peak 15-Minutes: 08:00 AM - 08:15 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	EASTER AVE Eastbound				EASTER AVE Westbound				Northbound				RACE ST Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	7	9	0	0	0	6	9					0	2	0	0	33	129	0	0		1
7:15 AM	0	2	6	0	0	0	6	7					0	1	0	1	23	157	0	0		0
7:30 AM	0	1	8	0	0	0	7	9					0	6	0	2	33	179	0	0		0
7:45 AM	0	6	9	0	0	0	4	14					0	5	0	2	40	186	0	0		0
8:00 AM	0	5	18	0	0	0	19	8					0	8	0	3	61	197	0	0		0
8:15 AM	0	1	15	0	0	0	14	7					0	7	0	1	45		0	0		0
8:30 AM	0	3	11	0	0	0	5	11					0	8	0	2	40		1	0		0
8:45 AM	0	4	8	0	0	0	10	23					0	5	0	1	51		0	0		1
Count Total	0	29	84	0	0	0	71	88					0	42	0	12	326		1	0		2
Peak Hour	0	13	52	0	0	0	48	49					0	28	0	7	197		1	0		1

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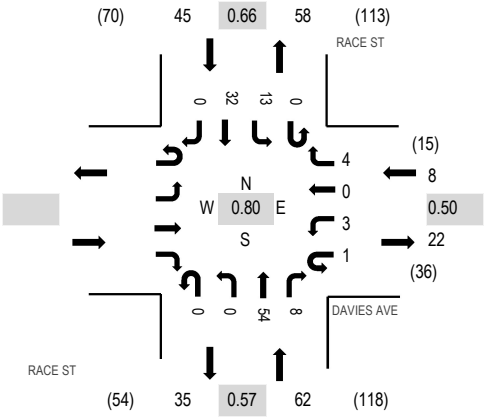
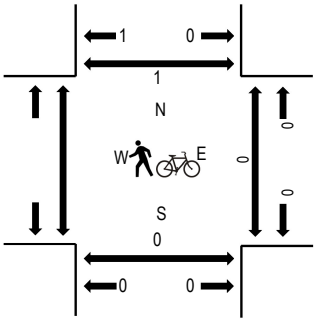
Location: 7 RACE ST & DAVIES AVE AM
Date: Tuesday, July 30, 2019
Peak Hour: 08:00 AM - 09:00 AM
Peak 15-Minutes: 08:45 AM - 09:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	Eastbound				DAVIES AVE Westbound				RACE ST Northbound				RACE ST Southbound					Rolling Hour	Pedestrian Crossings		
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM					0	0	0	0	0	0	13	3	0	0	2	0	18	88		1	0	1
7:15 AM					0	1	0	1	0	0	9	1	0	2	1	0	15	103		1	0	0
7:30 AM					0	1	0	2	0	0	10	0	0	3	7	0	23	104		0	0	0
7:45 AM					0	0	0	2	0	0	18	2	0	3	7	0	32	111		0	0	1
8:00 AM					0	1	0	0	0	0	9	4	0	8	11	0	33	115		0	0	0
8:15 AM					0	0	0	0	0	0	7	0	0	2	7	0	16			0	0	0
8:30 AM					0	1	0	2	0	0	13	2	0	3	9	0	30			0	0	1
8:45 AM					1	1	0	2	0	0	25	2	0	0	5	0	36			0	0	0
Count Total					1	5	0	9	0	0	104	14	0	21	49	0	203			2	0	3
Peak Hour					1	3	0	4	0	0	54	8	0	13	32	0	115			0	0	1

All Traffic Data Services Inc.

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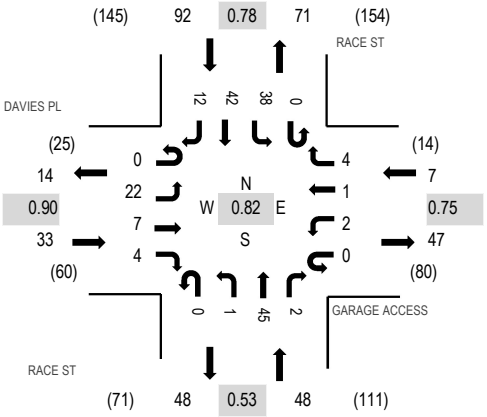
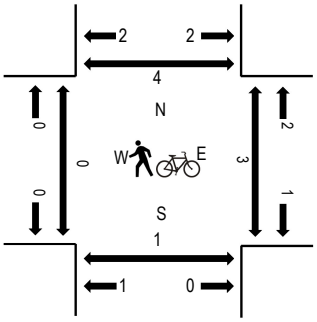
Location: 8 RACE ST & GARAGE ACCESS AM
Date: Tuesday, July 30, 2019
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	DAVIES PL Eastbound				GARAGE ACCESS Westbound				RACE ST Northbound				RACE ST Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	3	0	0	0	0	0	1	0	1	10	1	0	4	3	1	24	151	1	0	0	2
7:15 AM	0	5	1	0	0	0	0	3	0	1	10	0	0	5	2	4	31	172	0	0	0	2
7:30 AM	0	8	1	2	0	0	1	1	0	0	10	1	0	8	8	1	41	180	0	1	0	3
7:45 AM	0	4	0	0	0	0	0	1	0	0	19	1	0	12	10	8	55	179	0	0	0	1
8:00 AM	0	3	4	1	0	2	0	1	0	1	8	0	0	10	15	0	45	179	0	0	1	0
8:15 AM	0	7	2	1	0	0	0	1	0	0	8	0	0	8	9	3	39		0	2	0	0
8:30 AM	0	6	2	1	0	0	0	0	0	0	11	2	0	7	11	0	40		1	2	0	2
8:45 AM	0	6	2	1	0	0	1	2	0	0	26	1	0	8	5	3	55		0	0	0	0
Count Total	0	42	12	6	0	2	2	10	0	3	102	6	0	62	63	20	330		2	5	1	10
Peak Hour	0	22	7	4	0	2	1	4	0	1	45	2	0	38	42	12	180		0	3	1	4

All Traffic Data Services Inc.
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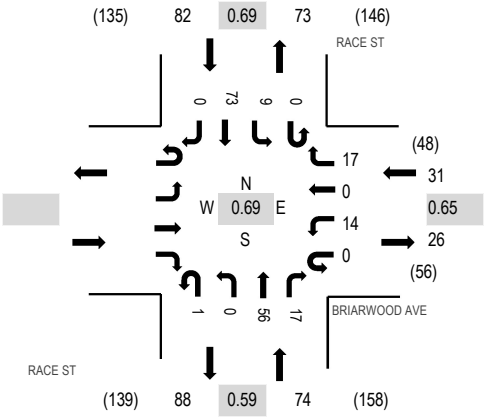
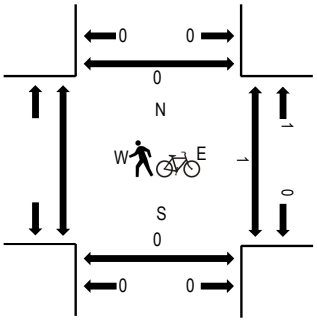
Location: 9 RACE ST & BRIARWOOD AVE AM
Date: Tuesday, July 30, 2019
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	Eastbound				BRIARWOOD AVE Westbound				RACE ST Northbound				RACE ST Southbound					Rolling Hour	Pedestrian Crossings		
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM					0	0	0	3	0	0	11	5	0	1	6	0	26	170	0	0	0	0
7:15 AM					0	1	0	3	0	0	12	4	0	5	11	0	36	183	0	0	0	0
7:30 AM					0	1	0	1	0	0	16	5	0	1	16	0	40	187	0	0	0	0
7:45 AM					0	5	0	8	0	0	21	4	0	3	27	0	68	185	0	0	0	0
8:00 AM					0	2	0	5	0	0	7	5	0	1	19	0	39	171	1	0	0	0
8:15 AM					0	6	0	3	1	0	12	3	0	4	11	0	40		0	0	0	0
8:30 AM					0	1	0	4	0	0	16	2	0	0	15	0	38		0	0	0	0
8:45 AM					0	2	0	3	0	0	21	13	0	0	15	0	54		0	0	0	0
Count Total					0	18	0	30	1	0	116	41	0	15	120	0	341		1	0	0	0
Peak Hour					0	14	0	17	1	0	56	17	0	9	73	0	187		1	0	0	0

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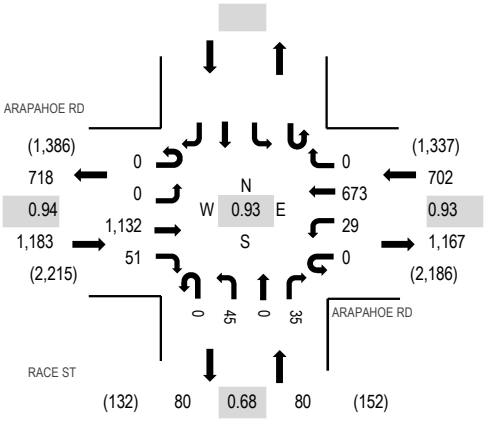
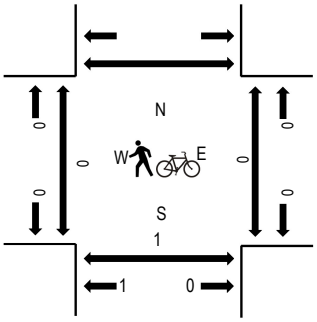
Location: 10 RACE ST & ARAPAHOE RD AM
Date: Tuesday, July 30, 2019
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	ARAPAHOE RD Eastbound				ARAPAHOE RD Westbound				RACE ST Northbound				Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	0	222	4	0	2	113	0	0	7	0	5					353	1,856	0	0	0	
7:15 AM	0	0	273	11	0	3	156	0	0	11	0	4					458	1,951	0	1	0	
7:30 AM	0	0	304	9	0	7	181	0	0	8	0	10					519	1,965	0	0	0	
7:45 AM	0	0	292	19	0	9	176	0	0	18	0	12					526	1,935	0	0	0	
8:00 AM	0	0	254	12	0	6	160	0	0	10	0	6					448	1,848	0	0	0	
8:15 AM	0	0	282	11	0	7	156	0	0	9	0	7					472		0	0	1	
8:30 AM	0	0	273	10	0	7	179	0	0	13	0	7					489		0	0	1	
8:45 AM	0	0	227	12	0	3	172	0	0	17	0	8					439		0	0	0	
Count Total	0	0	2,127	88	0	44	1,293	0	0	93	0	59					3,704		0	1	2	
Peak Hour	0	0	1,132	51	0	29	673	0	0	45	0	35					1,965		0	0	1	

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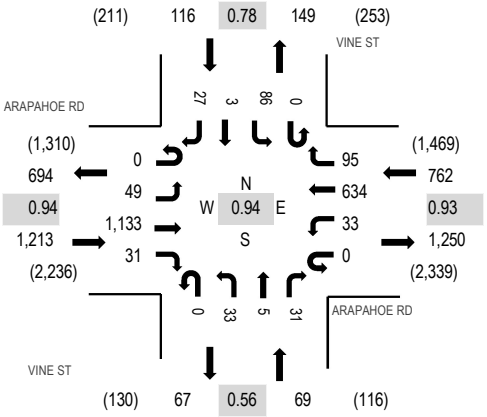
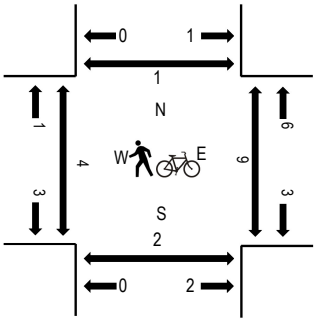
Location: 11 VINE ST & ARAPAHOE RD AM
Date: Tuesday, July 30, 2019
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	ARAPAHOE RD Eastbound				ARAPAHOE RD Westbound				VINE ST Northbound				VINE ST Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	5	213	0	1	8	107	9	0	1	0	6	0	16	1	2	369	1,984	0	0	0	0
7:15 AM	1	3	271	4	0	10	144	20	0	3	1	9	0	16	1	5	488	2,097	0	0	0	0
7:30 AM	0	11	289	4	0	4	157	22	0	17	3	11	0	24	2	7	551	2,160	1	0	1	0
7:45 AM	0	18	287	11	0	11	172	27	0	5	0	7	0	29	1	8	576	2,133	0	2	0	0
8:00 AM	0	8	254	8	0	7	148	20	0	5	2	5	0	19	0	6	482	2,048	2	3	0	1
8:15 AM	0	12	303	8	0	11	157	26	0	6	0	8	0	14	0	6	551		0	1	0	0
8:30 AM	0	10	258	4	2	9	169	24	0	5	0	8	0	27	3	5	524		3	0	0	0
8:45 AM	0	10	238	6	0	17	166	21	0	3	1	10	0	14	0	5	491		1	2	0	0
Count Total	1	77	2,113	45	3	77	1,220	169	0	45	7	64	0	159	8	44	4,032		7	8	1	1
Peak Hour	0	49	1,133	31	0	33	634	95	0	33	5	31	0	86	3	27	2,160		3	6	1	1

All Traffic Data Services Inc.

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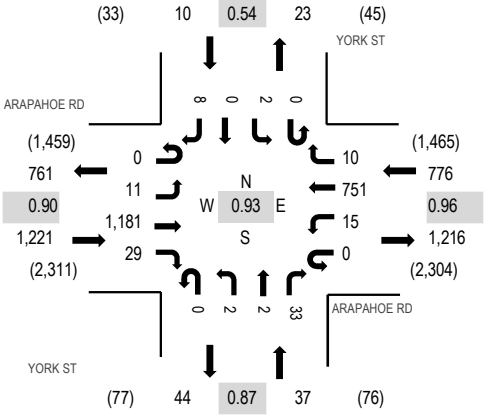
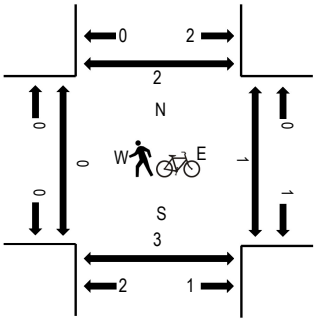
Location: 12 YORK ST & ARAPAHOE RD AM
Date: Tuesday, July 30, 2019
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	ARAPAHOE RD Eastbound				ARAPAHOE RD Westbound				YORK ST Northbound				YORK ST Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	1	219	5	0	2	124	0	0	1	0	6	0	1	0	5	364	1,925	0	0	1	0
7:15 AM	0	4	311	3	0	2	166	0	0	0	0	4	0	0	0	0	490	2,018	0	0	0	0
7:30 AM	0	0	316	3	0	1	192	3	0	0	0	4	0	0	0	1	520	2,044	0	0	1	0
7:45 AM	0	5	330	5	0	4	195	3	0	0	0	9	0	0	0	0	551	2,033	0	0	0	0
8:00 AM	0	4	240	5	0	4	188	3	0	0	2	9	0	1	0	1	457	1,960	0	0	0	1
8:15 AM	0	2	295	16	0	6	176	1	0	2	0	11	0	1	0	6	516		0	1	0	1
8:30 AM	0	6	266	8	1	3	199	1	0	1	0	12	0	2	0	10	509		0	0	0	0
8:45 AM	0	9	254	4	1	6	183	1	0	5	0	10	0	1	0	4	478		0	0	0	1
Count Total	0	31	2,231	49	2	28	1,423	12	0	9	2	65	0	6	0	27	3,885		0	1	2	3
Peak Hour	0	11	1,181	29	0	15	751	10	0	2	2	33	0	2	0	8	2,044		0	1	1	2

All Traffic Data Services Inc.
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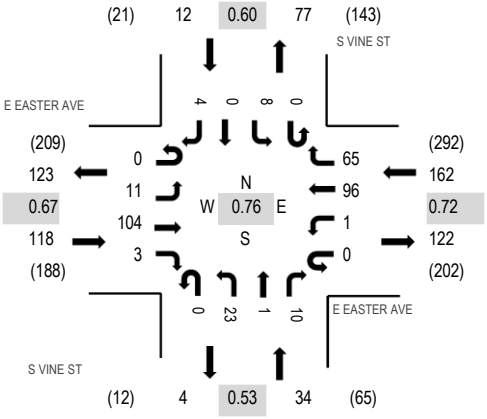
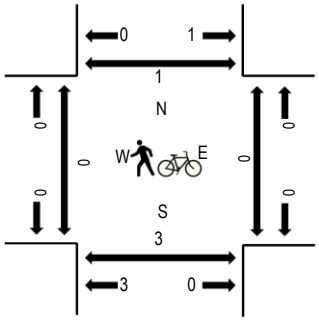
Location: 1 S VINE ST & E EASTER AVE AM
Date and Start Time: Wednesday, December 5, 2018
Peak Hour: 08:00 AM - 09:00 AM
Peak 15-Minutes: 08:45 AM - 09:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	E EASTER AVE Eastbound				E EASTER AVE Westbound				S VINE ST Northbound				S VINE ST Southbound					Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	0	11	1	0	0	12	10	0	4	5	4	0	3	0	1	51	240	0	0	0	0
7:15 AM	0	1	15	3	0	0	19	9	0	2	0	2	0	0	0	1	52	258	0	0	1	0
7:30 AM	0	0	19	0	0	1	14	21	0	3	0	6	0	3	0	0	67	277	0	0	0	0
7:45 AM	0	1	16	3	0	0	25	19	0	4	0	1	0	0	0	1	70	289	0	0	5	0
8:00 AM	0	3	28	0	0	0	20	12	0	2	0	1	0	2	0	1	69	326	0	0	0	0
8:15 AM	0	2	15	0	0	0	25	15	0	5	0	4	0	4	0	1	71		0	0	0	0
8:30 AM	0	2	23	1	0	1	16	17	0	10	1	5	0	2	0	1	79		0	0	0	0
8:45 AM	0	4	38	2	0	0	35	21	0	6	0	0	0	0	0	1	107		0	0	3	1
Count Total	0	13	165	10	0	2	166	124	0	36	6	23	0	14	0	7	566		0	0	9	1
Peak Hour	0	11	104	3	0	1	96	65	0	23	1	10	0	8	0	4	326		0	0	3	1

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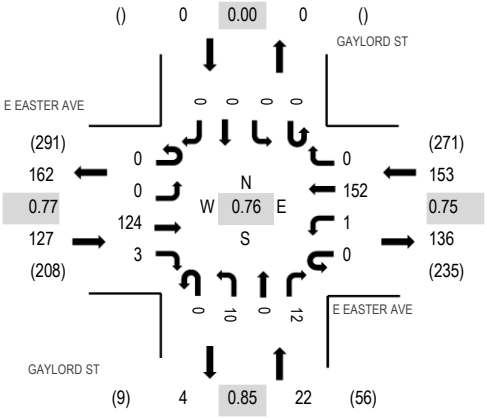
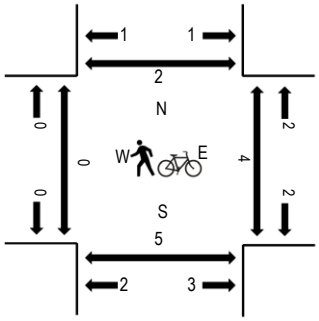
Location: 2 GAYLORD ST & E EASTER AVE AM
Date and Start Time: Wednesday, December 5, 2018
Peak Hour: 08:00 AM - 09:00 AM
Peak 15-Minutes: 08:45 AM - 09:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	E EASTER AVE Eastbound				E EASTER AVE Westbound				GAYLORD ST Northbound				GAYLORD ST Southbound					Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	0	19	1	0	1	20	0	0	3	0	3	0	0	0	0	47	233	0	1	0	0
7:15 AM	0	0	15	1	0	0	22	0	0	4	0	6	0	0	0	0	48	253	0	0	1	0
7:30 AM	0	0	26	0	0	1	36	0	0	2	0	8	0	0	0	0	73	273	0	0	0	0
7:45 AM	0	0	18	1	0	0	38	0	0	4	0	4	0	0	0	0	65	267	1	0	1	0
8:00 AM	0	0	30	1	0	0	31	0	0	2	0	3	0	0	0	0	67	302	0	1	0	0
8:15 AM	0	0	24	0	0	0	38	0	0	1	0	5	0	0	0	0	68		0	1	0	0
8:30 AM	0	0	30	1	0	1	32	0	0	2	0	1	0	0	0	0	67		0	1	5	0
8:45 AM	0	0	40	1	0	0	51	0	0	5	0	3	0	0	0	0	100		0	1	0	2
Count Total	0	0	202	6	0	3	268	0	0	23	0	33	0	0	0	0	535		1	5	7	2
Peak Hour	0	0	124	3	0	1	152	0	0	10	0	12	0	0	0	0	302		0	4	5	2

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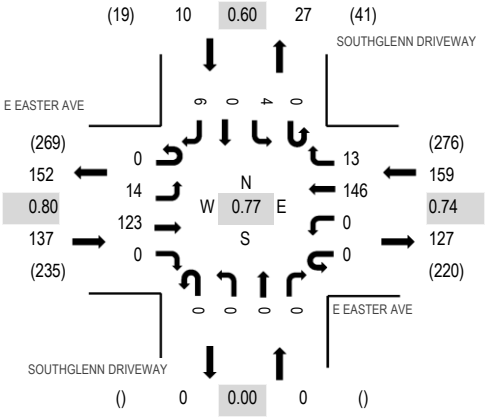
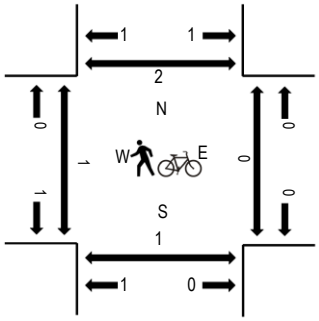
Location: 3 SOUTHGLENN DRIVEWAY & E EASTER AVE AM
Date and Start Time: Wednesday, December 5, 2018
Peak Hour: 08:00 AM - 09:00 AM
Peak 15-Minutes: 08:45 AM - 09:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	E EASTER AVE Eastbound				E EASTER AVE Westbound				SOUTHGLENN DRIVEWAY Northbound				SOUTHGLENN DRIVEWAY Southbound					Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	2	19	0	0	0	19	0	0	0	0	0	0	0	0	2	42	224	1	0	0	0
7:15 AM	0	1	20	0	0	0	22	3	0	0	0	0	0	0	0	0	46	249	0	0	0	0
7:30 AM	0	3	31	0	0	0	35	1	0	0	0	0	0	1	0	1	72	275	0	0	0	1
7:45 AM	0	2	20	0	0	0	35	2	0	0	0	0	0	2	0	3	64	270	0	0	1	0
8:00 AM	0	3	30	0	0	0	28	4	0	0	0	0	0	0	0	2	67	306	0	0	0	0
8:15 AM	0	3	27	0	0	0	38	2	0	0	0	0	0	2	0	0	72		0	0	0	0
8:30 AM	0	4	27	0	0	0	32	1	0	0	0	0	0	2	0	1	67		0	0	1	0
8:45 AM	0	4	39	0	0	0	48	6	0	0	0	0	0	0	0	3	100		1	0	0	2
Count Total	0	22	213	0	0	0	257	19	0	0	0	0	0	7	0	12	530		2	0	2	3
Peak Hour	0	14	123	0	0	0	146	13	0	0	0	0	0	4	0	6	306		1	0	1	2

All Traffic Data Services Inc.

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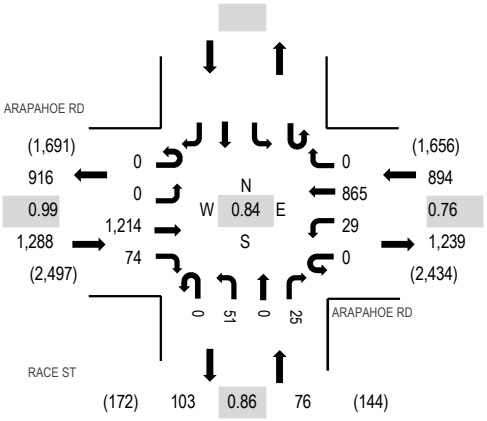
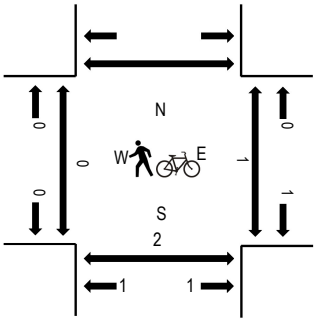
Location: 1 RACE ST & ARAPAHOE RD AM
Date: Wednesday, August 21, 2019
Peak Hour: 08:00 AM - 09:00 AM
Peak 15-Minutes: 08:45 AM - 09:00 AM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	ARAPAHOE RD Eastbound				ARAPAHOE RD Westbound				RACE ST Northbound				Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	0	239	7	0	4	151	0	0	4	0	5					410	2,039	0	0	0	
7:15 AM	0	0	308	9	0	9	169	0	0	10	0	7					512	2,118	0	0	0	
7:30 AM	0	0	311	13	0	7	211	0	0	12	0	8					562	2,142	0	0	0	
7:45 AM	0	0	309	13	0	7	204	0	0	14	0	8					555	2,142	0	0	0	
8:00 AM	0	0	298	21	0	8	148	0	0	9	0	5					489	2,258	0	0	0	
8:15 AM	0	0	312	13	0	9	182	0	0	12	0	8					536		0	0	0	
8:30 AM	0	0	270	16	0	7	246	0	0	16	0	7					562		0	0	1	
8:45 AM	0	0	334	24	0	5	289	0	0	14	0	5					671		0	0	0	
Count Total	0	0	2,381	116	0	56	1,600	0	0	91	0	53					4,297		0	0	1	
Peak Hour	0	0	1,214	74	0	29	865	0	0	51	0	25					2,258		0	0	1	

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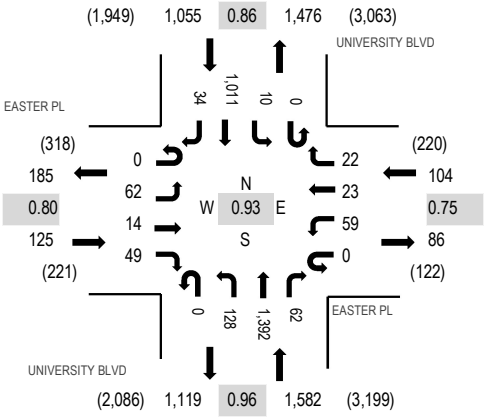
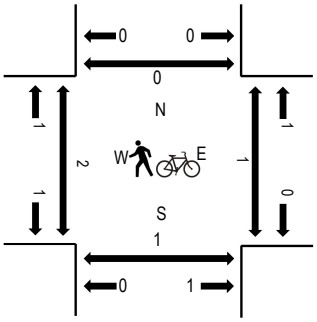
Location: 2 UNIVERSITY BLVD & EASTER PL AM
Date: Wednesday, August 21, 2019
Peak Hour: 08:00 AM - 09:00 AM
Peak 15-Minutes: 08:45 AM - 09:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	EASTER PL Eastbound				EASTER PL Westbound				UNIVERSITY BLVD Northbound				UNIVERSITY BLVD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	10	0	8	0	13	1	11	0	18	373	6	0	2	167	8	617	2,723	0	0	0	0
7:15 AM	0	16	0	9	0	17	0	11	0	16	361	8	0	0	210	6	654	2,810	0	0	1	0
7:30 AM	0	10	0	13	0	13	3	8	0	25	397	5	0	2	211	9	696	2,843	0	0	1	1
7:45 AM	0	14	2	14	0	26	2	11	0	32	365	11	0	0	266	13	756	2,853	0	0	2	0
8:00 AM	0	20	2	16	0	17	4	5	0	29	381	4	0	3	213	10	704	2,866	1	0	0	0
8:15 AM	0	14	5	9	0	11	4	4	0	24	330	7	0	2	267	10	687		0	1	1	0
8:30 AM	0	12	2	6	0	15	6	8	0	35	344	33	0	3	237	5	706		0	0	0	0
8:45 AM	0	16	5	18	0	16	9	5	0	40	337	18	0	2	294	9	769		0	0	0	0
Count Total	0	112	16	93	0	128	29	63	0	219	2,888	92	0	14	1,865	70	5,589		1	1	5	1
Peak Hour	0	62	14	49	0	59	23	22	0	128	1,392	62	0	10	1,011	34	2,866		1	1	1	0

All Traffic Data Services Inc.
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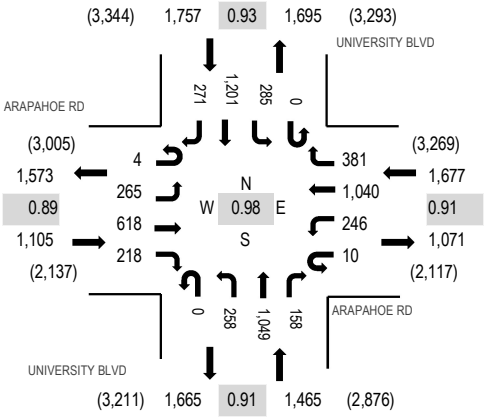
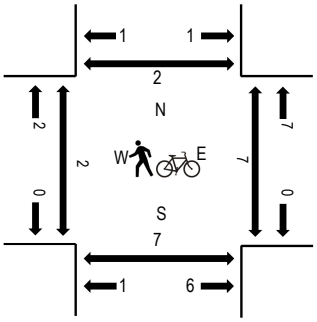
Location: 1 UNIVERSITY BLVD & ARAPAHOE RD PM
Date: Tuesday, July 30, 2019
Peak Hour: 04:45 PM - 05:45 PM
Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	ARAPAHOE RD Eastbound				ARAPAHOE RD Westbound				UNIVERSITY BLVD Northbound				UNIVERSITY BLVD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	0	53	133	45	1	52	188	82	0	76	236	43	0	81	263	54	1,307	5,679	0	0	0	0
4:15 PM	0	90	146	50	1	85	257	124	0	71	248	44	0	72	256	65	1,509	5,838	0	0	0	0
4:30 PM	0	53	149	48	1	60	234	101	0	66	233	38	0	64	278	56	1,381	5,865	0	0	0	2
4:45 PM	0	47	153	53	5	52	262	93	0	71	234	42	0	67	321	82	1,482	6,004	0	0	0	1
5:00 PM	2	77	157	62	0	71	252	97	0	48	255	36	0	63	286	60	1,466	5,947	0	3	2	0
5:15 PM	1	78	183	53	2	62	263	85	0	60	268	45	0	87	284	65	1,536		0	4	5	0
5:30 PM	1	63	125	50	3	61	263	106	0	79	292	35	0	68	310	64	1,520		2	0	0	1
5:45 PM	0	56	155	54	2	61	254	89	0	73	233	50	0	66	294	38	1,425		0	0	0	1
Count Total	4	517	1,201	415	15	504	1,973	777	0	544	1,999	333	0	568	2,292	484	11,626		2	7	7	5
Peak Hour	4	265	618	218	10	246	1,040	381	0	258	1,049	158	0	285	1,201	271	6,004		2	7	7	2

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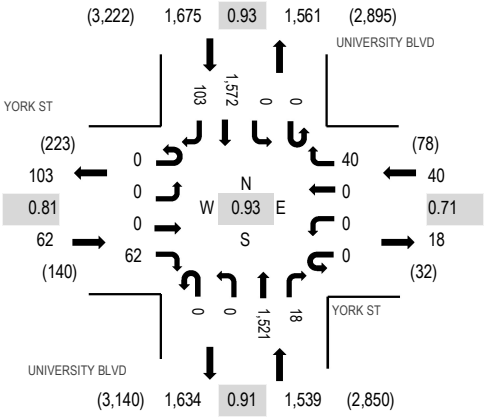
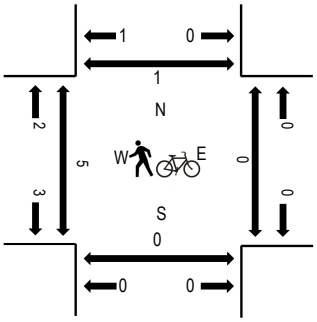
Location: 2 UNIVERSITY BLVD & YORK ST PM
Date: Tuesday, July 30, 2019
Peak Hour: 05:00 PM - 06:00 PM
Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	YORK ST Eastbound				YORK ST Westbound				UNIVERSITY BLVD Northbound				UNIVERSITY BLVD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	0	0	0	24	0	0	0	11	0	0	317	4	0	0	332	22	710	2,974	1	0	0	0
4:15 PM	0	0	0	22	0	0	0	7	0	0	304	4	0	0	398	35	770	3,074	0	0	0	0
4:30 PM	0	0	0	19	0	0	1	8	0	0	356	3	0	0	329	33	749	3,200	1	0	0	0
4:45 PM	0	0	0	13	0	0	0	11	0	0	320	3	0	0	369	29	745	3,250	0	1	0	0
5:00 PM	0	0	0	18	0	0	0	11	0	0	391	4	0	0	360	26	810	3,316	2	0	0	1
5:15 PM	0	0	0	14	0	0	0	6	0	0	423	2	0	0	423	28	896		0	0	0	0
5:30 PM	0	0	0	17	0	0	0	9	0	0	373	3	0	0	371	26	799		0	0	0	0
5:45 PM	0	0	0	13	0	0	0	14	0	0	334	9	0	0	418	23	811		1	0	0	0
Count Total	0	0	0	140	0	0	1	77	0	0	2,818	32	0	0	3,000	222	6,290		5	1	0	1
Peak Hour	0	0	0	62	0	0	0	40	0	0	1,521	18	0	0	1,572	103	3,316		3	0	0	1

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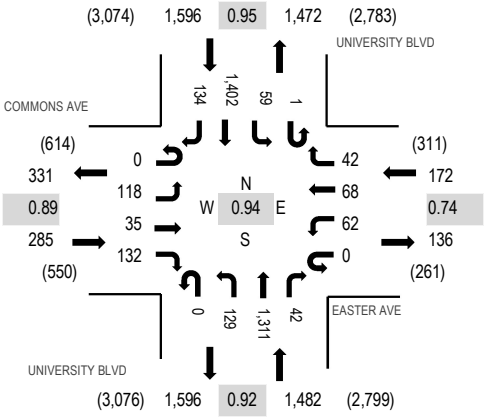
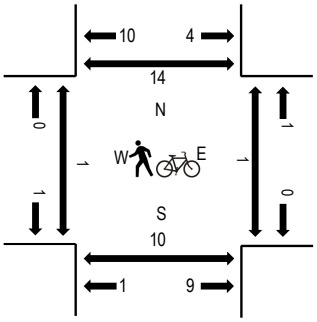
Location: 3 UNIVERSITY BLVD & EASTER AVE PM
Date: Tuesday, July 30, 2019
Peak Hour: 04:45 PM - 05:45 PM
Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	COMMONS AVE Eastbound				EASTER AVE Westbound				UNIVERSITY BLVD Northbound				UNIVERSITY BLVD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	0	34	5	33	0	24	9	15	0	30	323	13	0	15	292	30	823	3,291	0	0	0	1
4:15 PM	0	22	7	25	0	13	8	10	0	32	300	12	0	15	311	36	791	3,349	0	1	1	4
4:30 PM	0	29	9	31	0	14	8	9	0	35	275	7	0	16	339	26	798	3,501	0	0	0	2
4:45 PM	0	27	11	32	0	9	16	11	0	32	338	10	0	14	346	33	879	3,535	0	0	0	6
5:00 PM	0	29	6	45	0	12	14	7	0	39	320	9	1	12	356	31	881	3,443	0	0	4	4
5:15 PM	0	35	10	17	0	20	22	16	0	36	357	9	0	18	374	29	943		1	0	1	2
5:30 PM	0	27	8	38	0	21	16	8	0	22	296	14	0	15	326	41	832		0	1	2	1
5:45 PM	0	33	11	26	0	9	12	8	0	28	253	9	0	6	363	29	787		0	0	0	0
Count Total	0	236	67	247	0	122	105	84	0	254	2,462	83	1	111	2,707	255	6,734		1	2	8	20
Peak Hour	0	118	35	132	0	62	68	42	0	129	1,311	42	1	59	1,402	134	3,535		1	1	7	13

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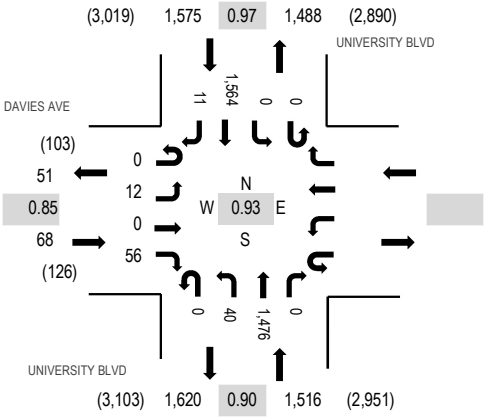
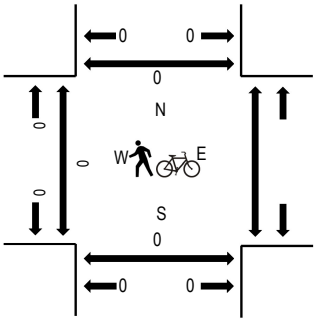
Location: 4 UNIVERSITY BLVD & DAVIES AVE PM
Date: Tuesday, July 30, 2019
Peak Hour: 05:00 PM - 06:00 PM
Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	DAVIES AVE Eastbound				Westbound				UNIVERSITY BLVD Northbound				UNIVERSITY BLVD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	0	2	0	13					0	7	354	0	0	0	341	5	722	2,937	1		0	0
4:15 PM	0	5	0	13					0	11	349	0	0	0	330	2	710	2,979	0		0	0
4:30 PM	0	0	0	11					0	14	323	0	0	0	384	1	733	3,115	0		0	0
4:45 PM	0	0	0	14					0	8	369	0	0	0	377	4	772	3,155	0		0	0
5:00 PM	0	4	0	9					0	10	348	0	0	0	392	1	764	3,159	0		0	0
5:15 PM	0	1	0	16					0	10	413	0	0	0	402	4	846		0		0	0
5:30 PM	0	4	0	14					0	11	358	0	0	0	383	3	773		0		0	0
5:45 PM	0	3	0	17					0	9	357	0	0	0	387	3	776		0		0	0
Count Total	0	19	0	107					0	80	2,871	0	0	0	2,996	23	6,096		1		0	0
Peak Hour	0	12	0	56					0	40	1,476	0	0	0	1,564	11	3,159		0		0	0

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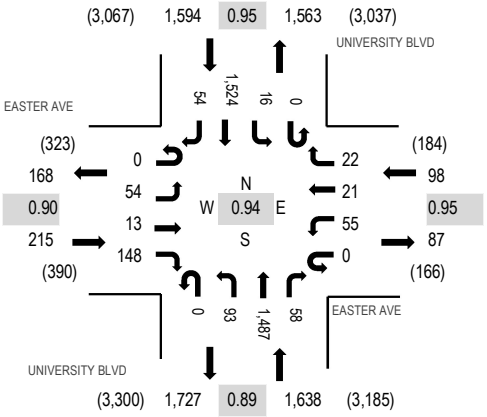
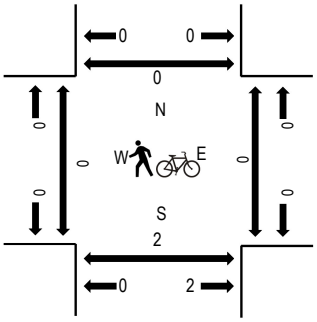
Location: 5 UNIVERSITY BLVD & EASTER AVE PM
Date: Tuesday, July 30, 2019
Peak Hour: 04:45 PM - 05:45 PM
Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	EASTER AVE Eastbound				EASTER AVE Westbound				UNIVERSITY BLVD Northbound				UNIVERSITY BLVD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	0	14	2	34	0	8	1	5	0	23	339	15	0	6	335	10	792	3,290	2	0	1	0
4:15 PM	0	9	3	27	0	14	6	6	0	22	372	10	0	7	318	15	809	3,366	0	1	0	0
4:30 PM	0	8	5	31	0	17	3	6	0	15	334	10	0	3	374	16	822	3,503	1	0	0	0
4:45 PM	0	17	1	38	0	14	3	6	0	21	375	12	0	5	359	16	867	3,545	0	0	1	0
5:00 PM	0	11	5	44	0	12	6	6	0	22	350	11	0	5	384	12	868	3,536	0	0	0	0
5:15 PM	0	9	3	29	0	17	3	3	0	26	415	19	0	2	410	10	946		0	0	1	0
5:30 PM	0	17	4	37	0	12	9	7	0	24	347	16	0	4	371	16	864		0	0	0	0
5:45 PM	0	8	2	32	0	10	4	6	0	29	367	11	0	5	373	11	858		1	0	1	1
Count Total	0	93	25	272	0	104	35	45	0	182	2,899	104	0	37	2,924	106	6,826		4	1	4	1
Peak Hour	0	54	13	148	0	55	21	22	0	93	1,487	58	0	16	1,524	54	3,545		0	0	2	0

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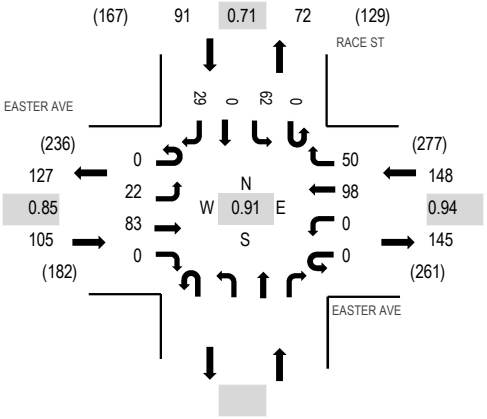
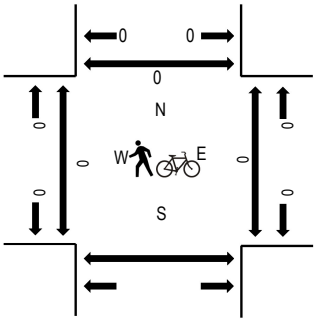
Location: 6 RACE ST & EASTER AVE PM
Date: Tuesday, July 30, 2019
Peak Hour: 05:00 PM - 06:00 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	EASTER AVE Eastbound				EASTER AVE Westbound				Northbound				RACE ST Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	4	10	0	0	0	23	8					0	14	0	7	66	282	0	0		0
4:15 PM	0	4	16	0	0	0	23	11					0	17	0	4	75	310	0	0		1
4:30 PM	0	6	18	0	0	0	15	13					0	8	0	4	64	322	0	0		0
4:45 PM	0	3	16	0	1	0	27	8					0	16	0	6	77	341	0	0		0
5:00 PM	0	5	16	0	0	0	30	11					0	20	0	12	94	344	0	0		0
5:15 PM	0	5	23	0	0	0	27	11					0	13	0	8	87		0	0		0
5:30 PM	0	2	29	0	0	0	24	15					0	9	0	4	83		0	0		0
5:45 PM	0	10	15	0	0	0	17	13					0	20	0	5	80		0	0		0
Count Total	0	39	143	0	1	0	186	90					0	117	0	50	626		0	0		1
Peak Hour	0	22	83	0	0	0	98	50					0	62	0	29	344		0	0		0

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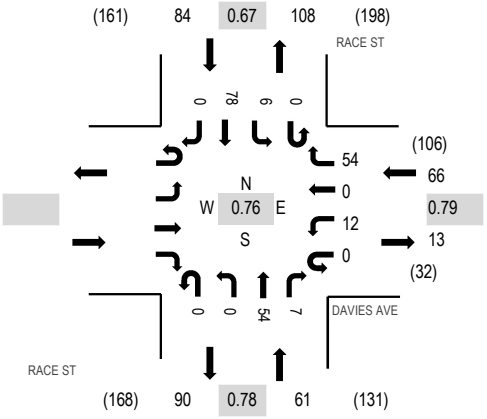
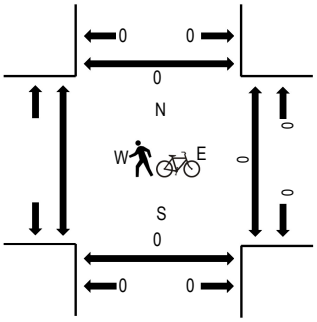
Location: 7 RACE ST & DAVIES AVE PM
Date: Tuesday, July 30, 2019
Peak Hour: 04:15 PM - 05:15 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	Eastbound				DAVIES AVE Westbound				RACE ST Northbound				RACE ST Southbound					Rolling Hour	Pedestrian Crossings		
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM					0	3	0	10	0	0	9	4	0	4	18	0	48	190	0	0	0	0
4:15 PM					0	3	0	13	0	0	14	1	0	2	18	0	51	211	0	0	0	0
4:30 PM					0	2	0	10	0	0	17	3	0	3	11	0	46	208	0	0	0	0
4:45 PM					0	5	0	12	0	0	10	1	0	0	17	0	45	200	0	0	0	0
5:00 PM					0	2	0	19	0	0	13	2	0	1	32	0	69	208	0	0	0	0
5:15 PM					0	4	0	10	0	0	14	3	0	1	16	0	48		0	0	0	0
5:30 PM					0	0	0	7	0	0	15	2	0	1	13	0	38		0	0	0	0
5:45 PM					0	1	0	5	0	0	20	3	0	1	23	0	53		0	0	0	0
Count Total					0	20	0	86	0	0	112	19	0	13	148	0	398		0	0	0	0
Peak Hour					0	12	0	54	0	0	54	7	0	6	78	0	211		0	0	0	0

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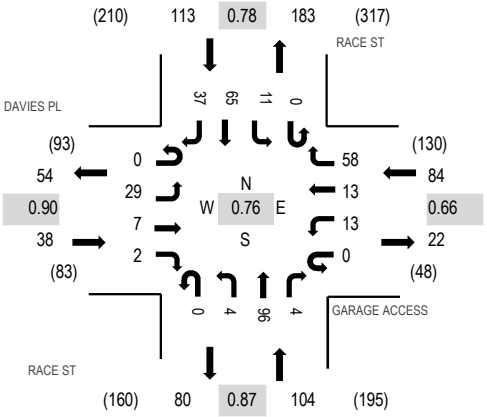
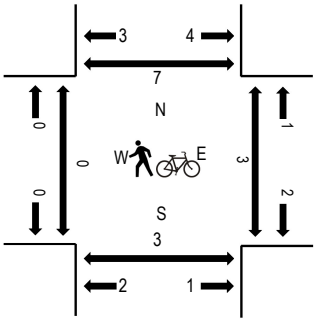
Location: 8 RACE ST & GARAGE ACCESS PM
Date: Tuesday, July 30, 2019
Peak Hour: 04:30 PM - 05:30 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	DAVIES PL Eastbound				GARAGE ACCESS Westbound				RACE ST Northbound				RACE ST Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	0	5	3	3	0	4	2	8	0	2	15	0	0	2	15	6	65	281	0	1	0	1
4:15 PM	0	4	2	2	0	3	1	9	0	2	27	0	0	3	15	6	74	328	0	1	0	0
4:30 PM	0	9	2	1	0	1	0	14	0	0	24	2	0	3	12	11	79	339	0	0	0	0
4:45 PM	0	3	1	1	0	2	3	5	0	2	18	2	0	4	15	7	63	323	0	0	0	4
5:00 PM	0	11	2	0	0	7	4	21	0	2	29	0	0	3	24	9	112	337	0	2	1	2
5:15 PM	0	6	2	0	0	3	6	18	0	0	25	0	0	1	14	10	85		0	1	2	1
5:30 PM	0	7	5	1	0	2	0	4	0	1	20	0	0	1	11	11	63		0	0	0	0
5:45 PM	1	8	4	0	0	3	3	7	0	1	20	3	0	3	21	3	77		0	2	0	0
Count Total	1	53	21	8	0	25	19	86	0	10	178	7	0	20	127	63	618		0	7	3	8
Peak Hour	0	29	7	2	0	13	13	58	0	4	96	4	0	11	65	37	339		0	3	3	7

All Traffic Data Services Inc.
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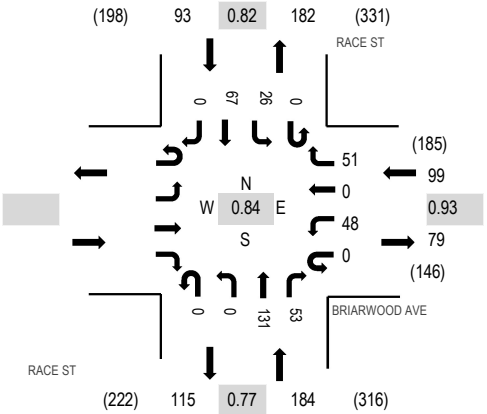
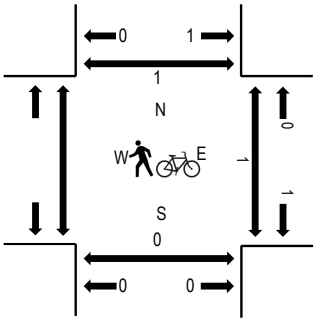
Location: 9 RACE ST & BRIARWOOD AVE PM
Date: Tuesday, July 30, 2019
Peak Hour: 04:30 PM - 05:30 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	Eastbound				BRIARWOOD AVE Westbound				RACE ST Northbound				RACE ST Southbound					Rolling Hour	Pedestrian Crossings		
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM					0	7	0	9	0	0	25	6	0	4	17	0	68	331	0	0	0	0
4:15 PM					0	5	0	14	0	0	31	8	0	11	22	0	91	375	1	0	0	0
4:30 PM					0	9	0	13	0	0	32	15	0	12	17	0	98	376	0	0	0	0
4:45 PM					0	11	0	13	0	0	20	8	0	5	17	0	74	355	1	0	1	0
5:00 PM					0	16	0	12	0	0	43	17	0	4	20	0	112	368	0	0	0	0
5:15 PM					0	12	0	13	0	0	36	13	0	5	13	0	92		0	0	0	0
5:30 PM					0	11	0	13	0	0	22	7	0	9	15	0	77		0	0	0	0
5:45 PM					0	12	0	15	0	0	20	13	0	9	18	0	87		0	0	0	0
Count Total					0	83	0	102	0	0	229	87	0	59	139	0	699		2	0	1	
Peak Hour					0	48	0	51	0	0	131	53	0	26	67	0	376		1	0	1	

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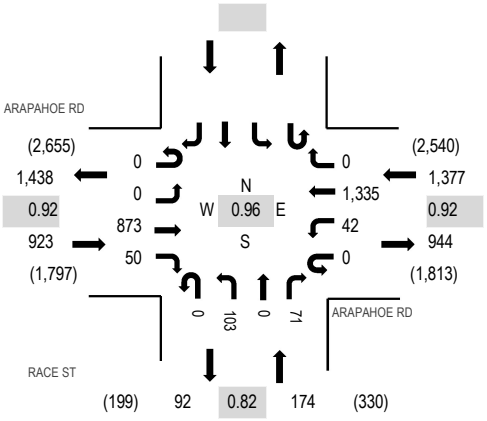
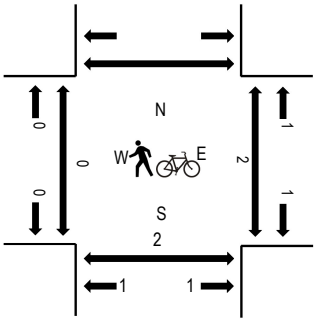
Location: 10 RACE ST & ARAPAHOE RD PM
Date: Tuesday, July 30, 2019
Peak Hour: 04:45 PM - 05:45 PM
Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	ARAPAHOE RD Eastbound				ARAPAHOE RD Westbound				RACE ST Northbound				Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	0	179	12	0	7	253	0	0	17	0	17					485	2,256	0	0	0	
4:15 PM	0	0	210	23	0	13	296	0	0	29	0	16					587	2,384	0	0	1	
4:30 PM	0	0	208	20	0	7	274	0	0	26	0	20					555	2,440	2	0	2	
4:45 PM	0	0	211	12	0	13	360	0	0	24	0	9					629	2,474	0	0	0	
5:00 PM	0	0	226	12	0	11	310	0	0	32	0	22					613	2,411	0	1	1	
5:15 PM	0	0	248	11	0	8	333	0	0	21	0	22					643		0	0	0	
5:30 PM	0	0	188	15	0	10	332	0	0	26	0	18					589		0	0	1	
5:45 PM	0	0	203	19	0	6	307	0	0	15	0	16					566		1	0	0	
Count Total	0	0	1,673	124	0	75	2,465	0	0	190	0	140					4,667		3	1	5	
Peak Hour	0	0	873	50	0	42	1,335	0	0	103	0	71					2,474		0	1	2	

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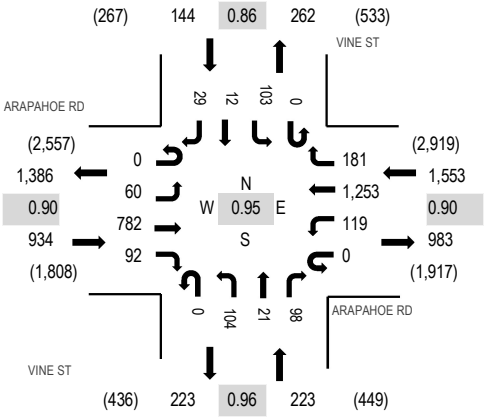
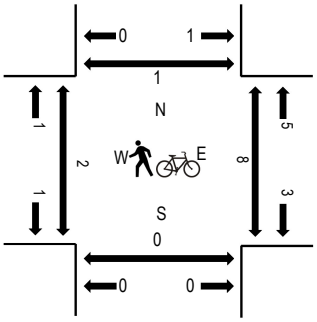
Location: 11 VINE ST & ARAPAHOE RD PM
Date: Tuesday, July 30, 2019
Peak Hour: 04:45 PM - 05:45 PM
Peak 15-Minutes: 04:45 PM - 05:00 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	ARAPAHOE RD Eastbound				ARAPAHOE RD Westbound				VINE ST Northbound				VINE ST Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	0	7	180	15	0	40	232	44	0	29	9	24	0	24	4	6	614	2,679	0	0	0	0
4:15 PM	0	17	189	24	2	30	280	52	0	20	6	36	0	22	6	7	691	2,752	1	0	1	0
4:30 PM	0	20	180	19	2	23	241	45	0	32	8	16	0	23	3	7	619	2,790	2	1	2	1
4:45 PM	0	18	197	18	0	41	327	64	0	26	5	27	0	23	2	7	755	2,854	0	0	0	0
5:00 PM	0	11	204	22	0	33	289	35	0	25	6	24	0	25	3	10	687	2,764	0	0	0	0
5:15 PM	0	14	224	29	0	19	320	43	0	24	5	19	0	25	4	3	729		1	6	0	1
5:30 PM	0	17	157	23	0	26	317	39	0	29	5	28	0	30	3	9	683		0	1	0	0
5:45 PM	0	11	197	15	0	29	299	47	0	13	5	28	0	11	5	5	665		0	2	0	2
Count Total	0	115	1,528	165	4	241	2,305	369	0	198	49	202	0	183	30	54	5,443		4	10	3	4
Peak Hour	0	60	782	92	0	119	1,253	181	0	104	21	98	0	103	12	29	2,854		1	7	0	1

All Traffic Data Services Inc.

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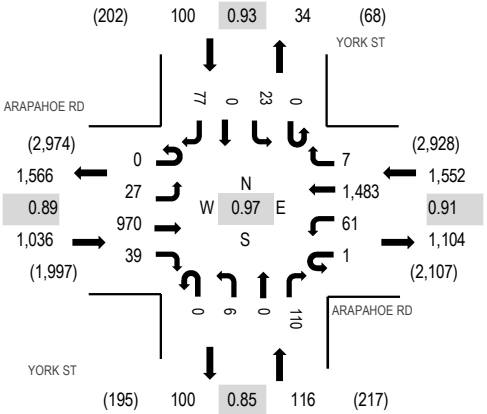
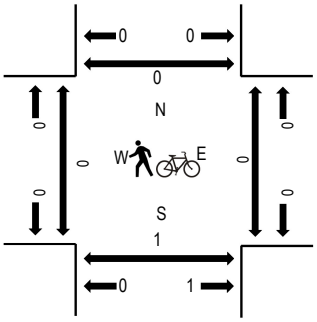
Location: 12 YORK ST & ARAPAHOE RD PM
Date: Tuesday, July 30, 2019
Peak Hour: 04:45 PM - 05:45 PM
Peak 15-Minutes: 04:45 PM - 05:00 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	ARAPAHOE RD Eastbound				ARAPAHOE RD Westbound				YORK ST Northbound				YORK ST Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	12	199	12	2	15	295	0	0	0	0	26	0	3	2	21	587	2,627	0	0	1	0
4:15 PM	0	7	249	13	0	9	360	2	0	0	0	22	0	4	0	24	690	2,723	0	0	1	0
4:30 PM	0	5	204	14	1	13	331	1	0	2	1	27	0	6	0	20	625	2,742	0	0	0	1
4:45 PM	0	4	242	7	0	17	408	0	0	2	0	22	0	6	0	17	725	2,804	0	0	0	0
5:00 PM	0	6	253	8	0	3	351	4	0	1	0	30	0	7	0	20	683	2,717	0	0	0	0
5:15 PM	0	10	266	15	1	16	352	0	0	1	0	26	0	5	0	17	709		0	0	1	0
5:30 PM	0	7	209	9	0	25	372	3	0	2	0	32	0	5	0	23	687		0	0	0	0
5:45 PM	0	5	234	7	1	9	336	1	0	2	0	21	0	4	1	17	638		0	0	0	3
Count Total	0	56	1,856	85	5	107	2,805	11	0	10	1	206	0	40	3	159	5,344		0	0	3	4
Peak Hour	0	27	970	39	1	61	1,483	7	0	6	0	110	0	23	0	77	2,804		0	0	1	0

All Traffic Data Services Inc.
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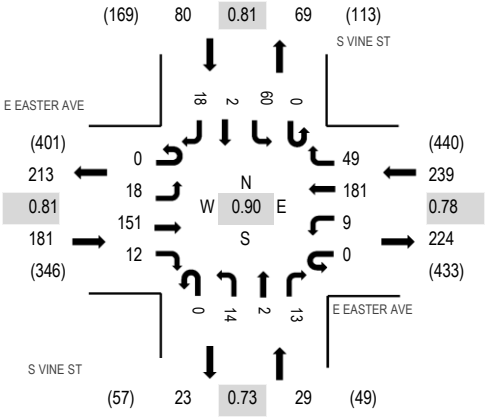
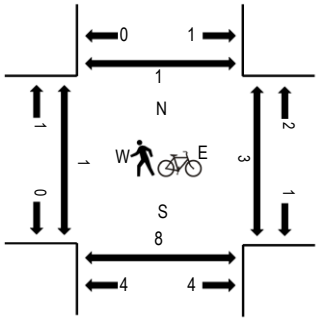
Location: 1 S VINE ST & E EASTER AVE PM
Date and Start Time: Wednesday, December 5, 2018
Peak Hour: 04:00 PM - 05:00 PM
Peak 15-Minutes: 04:00 PM - 04:15 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	E EASTER AVE Eastbound				E EASTER AVE Westbound				S VINE ST Northbound				S VINE ST Southbound					Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	0	8	44	4	0	3	39	12	0	4	1	5	0	22	2	3	147	529	1	0	4	1
4:15 PM	0	2	37	2	0	3	31	8	0	3	1	3	0	10	0	6	106	516	0	2	0	0
4:30 PM	0	5	42	2	0	2	52	12	0	4	0	3	0	15	0	3	140	520	0	0	1	0
4:45 PM	0	3	28	4	0	1	59	17	0	3	0	2	0	13	0	6	136	489	0	0	1	0
5:00 PM	0	5	39	6	0	3	39	7	0	4	1	2	0	22	1	5	134	475	0	0	0	0
5:15 PM	0	1	34	5	0	3	32	5	0	2	2	1	0	19	1	5	110		0	1	1	0
5:30 PM	0	0	29	6	0	2	48	5	0	0	0	0	0	15	1	3	109		0	1	0	0
5:45 PM	0	3	33	4	0	2	42	13	0	5	2	1	0	14	0	3	122		0	0	0	0
Count Total	0	27	286	33	0	19	342	79	0	25	7	17	0	130	5	34	1,004		1	4	7	1
Peak Hour	0	18	151	12	0	9	181	49	0	14	2	13	0	60	2	18	529		1	2	6	1

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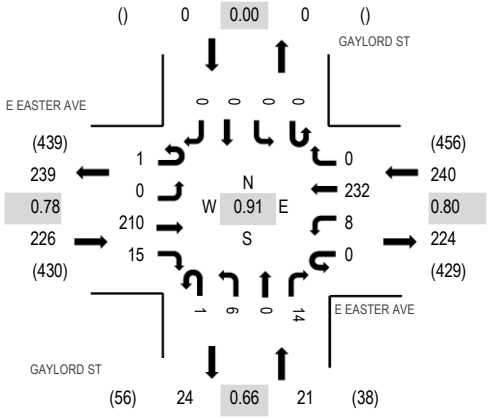
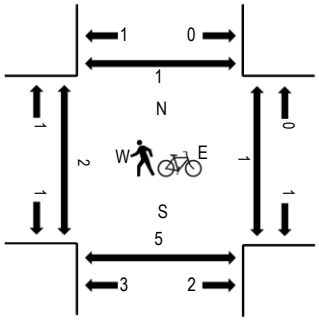
Location: 2 GAYLORD ST & E EASTER AVE PM
Date and Start Time: Wednesday, December 5, 2018
Peak Hour: 04:00 PM - 05:00 PM
Peak 15-Minutes: 04:30 PM - 04:45 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



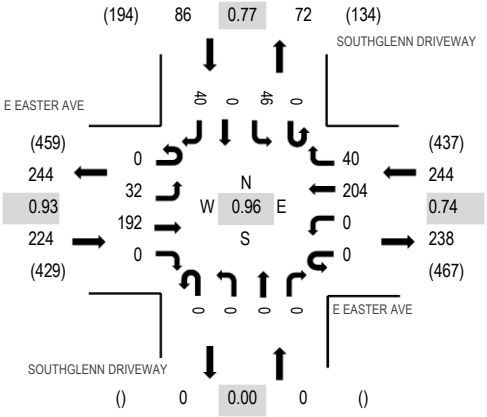
Traffic Counts

Interval Start Time	E EASTER AVE Eastbound				E EASTER AVE Westbound				GAYLORD ST Northbound				GAYLORD ST Southbound					Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	1	0	65	6	0	3	52	0	0	0	0	2	0	0	0	0	129	487	1	0	0	1
4:15 PM	0	0	46	4	0	3	39	0	1	3	0	2	0	0	0	0	98	475	0	1	3	0
4:30 PM	0	0	55	4	0	2	65	0	0	3	0	5	0	0	0	0	134	483	0	0	0	0
4:45 PM	0	0	44	1	0	0	76	0	0	0	0	5	0	0	0	0	126	456	1	0	0	0
5:00 PM	0	0	59	3	0	6	47	0	0	1	0	1	0	0	0	0	117	437	1	0	0	0
5:15 PM	0	0	52	4	0	4	42	0	0	0	0	4	0	0	0	0	106		0	0	0	0
5:30 PM	0	0	41	2	0	8	52	0	0	1	0	3	0	0	0	0	107		0	0	0	0
5:45 PM	0	0	39	4	0	1	56	0	0	1	0	6	0	0	0	0	107		0	0	1	1
Count Total	1	0	401	28	0	27	429	0	1	9	0	28	0	0	0	0	924		3	1	4	2
Peak Hour	1	0	210	15	0	8	232	0	1	6	0	14	0	0	0	0	487		2	1	3	1

All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

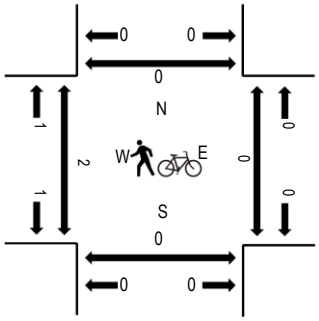
Location: 3 SOUTHGLENN DRIVEWAY & E EASTER AVE PM
Date and Start Time: Wednesday, December 5, 2018
Peak Hour: 04:30 PM - 05:30 PM
Peak 15-Minutes: 04:45 PM - 05:00 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	E EASTER AVE Eastbound				E EASTER AVE Westbound				SOUTHGLENN DRIVEWAY Northbound				SOUTHGLENN DRIVEWAY Southbound					Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	0	7	60	0	0	0	43	9	0	0	0	0	0	15	0	12	146	547	1	0	0	1
4:15 PM	0	8	40	0	0	0	30	9	0	0	0	0	0	16	0	12	115	538	0	0	2	0
4:30 PM	0	9	51	0	0	0	51	7	0	0	0	0	0	7	0	16	141	554	0	0	0	0
4:45 PM	0	10	38	0	0	0	70	12	0	0	0	0	0	8	0	7	145	538	1	0	0	0
5:00 PM	0	5	55	0	0	0	44	8	0	0	0	0	0	15	0	10	137	513	1	0	0	0
5:15 PM	0	8	48	0	0	0	39	13	0	0	0	0	0	16	0	7	131		0	0	0	0
5:30 PM	0	12	33	0	0	0	40	7	0	0	0	0	0	13	0	20	125		0	0	0	0
5:45 PM	0	4	41	0	0	0	49	6	0	0	0	0	0	11	0	9	120		0	0	0	0
Count Total	0	63	366	0	0	0	366	71	0	0	0	0	0	101	0	93	1,060		3	0	2	1
Peak Hour	0	32	192	0	0	0	204	40	0	0	0	0	0	46	0	40	554		2	0	0	0

All Traffic Data Services Inc.

(303) 216-2439
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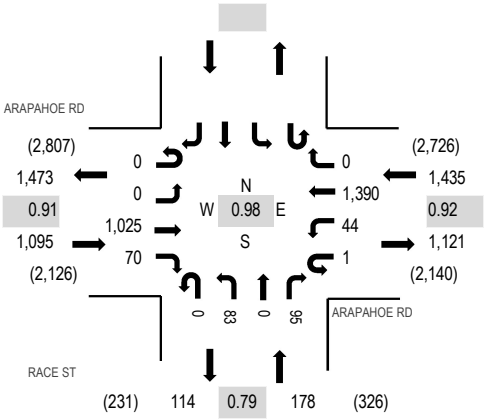
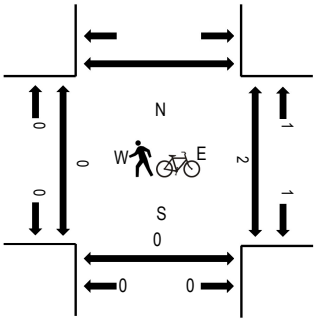
Location: 1 RACE ST & ARAPAHOE RD PM
Date: Wednesday, August 21, 2019
Peak Hour: 04:45 PM - 05:45 PM
Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	ARAPAHOE RD Eastbound				ARAPAHOE RD Westbound				RACE ST Northbound				Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	0	234	20	0	11	274	0	0	16	0	22					577	2,517	0	0	1	
4:15 PM	0	0	238	20	0	9	343	0	0	17	0	18					645	2,611	0	2	2	
4:30 PM	0	0	251	23	0	4	312	0	0	19	0	11					620	2,659	1	1	1	
4:45 PM	0	0	241	14	1	15	370	0	0	17	0	17					675	2,708	0	0	0	
5:00 PM	0	0	258	13	0	9	341	0	0	25	0	25					671	2,661	0	1	0	
5:15 PM	0	0	244	23	0	12	380	0	0	14	0	20					693		0	0	0	
5:30 PM	0	0	282	20	0	8	299	0	0	27	0	33					669		0	1	0	
5:45 PM	0	0	226	19	0	11	327	0	0	26	0	19					628		0	2	3	
Count Total	0	0	1,974	152	1	79	2,646	0	0	161	0	165					5,178		1	7	7	
Peak Hour	0	0	1,025	70	1	44	1,390	0	0	83	0	95					2,708		0	2	0	

All Traffic Data Services Inc.
(303) 216-2439
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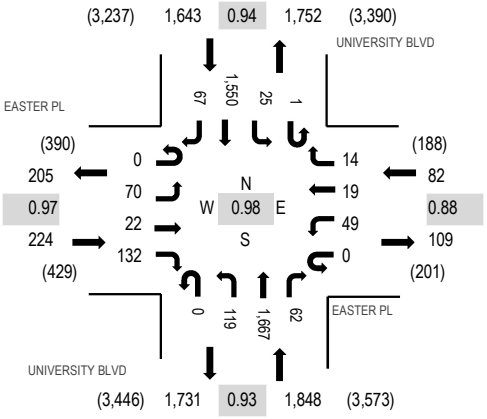
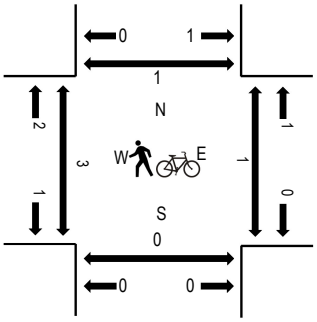
Location: 2 UNIVERSITY BLVD & EASTER PL PM
Date: Wednesday, August 21, 2019
Peak Hour: 05:00 PM - 06:00 PM
Peak 15-Minutes: 05:30 PM - 05:45 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

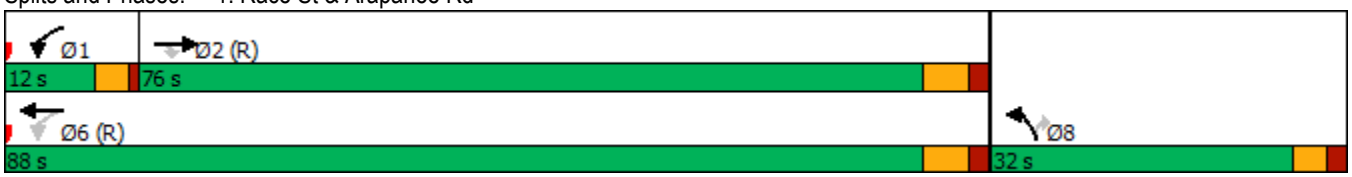
Interval Start Time	EASTER PL Eastbound				EASTER PL Westbound				UNIVERSITY BLVD Northbound				UNIVERSITY BLVD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	0	16	6	33	0	11	6	4	0	23	374	18	1	6	378	9	885	3,630	1	0	1	0
4:15 PM	0	14	7	31	0	13	6	7	0	22	383	14	0	5	346	18	866	3,690	2	0	0	0
4:30 PM	0	2	6	33	0	17	7	5	0	26	430	14	0	4	411	13	968	3,786	0	0	0	0
4:45 PM	0	13	2	42	0	16	10	4	0	33	385	3	0	7	384	12	911	3,783	1	1	0	0
5:00 PM	0	14	7	35	0	8	6	4	0	23	461	11	0	2	356	18	945	3,797	1	0	0	0
5:15 PM	0	18	6	33	0	11	3	2	0	28	405	17	1	9	412	17	962		0	0	0	1
5:30 PM	0	14	6	39	0	15	6	6	0	34	433	18	0	8	369	17	965		1	0	0	0
5:45 PM	0	24	3	25	0	15	4	2	0	34	368	16	0	6	413	15	925		0	0	0	0
Count Total	0	115	43	271	0	106	48	34	0	223	3,239	111	2	47	3,069	119	7,427		6	1	1	1
Peak Hour	0	70	22	132	0	49	19	14	0	119	1,667	62	1	25	1,550	67	3,797		2	0	0	1

APPENDIX B. EXISTING CONDITION OPERATIONAL ANALYSIS WORKSHEETS

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1225	69	50	820	53	36
Future Volume (vph)	1225	69	50	820	53	36
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	17.0	17.0	3.0	17.0	5.0	5.0
Minimum Split (s)	23.0	23.0	7.0	23.0	30.0	30.0
Total Split (s)	76.0	76.0	12.0	88.0	32.0	32.0
Total Split (%)	63.3%	63.3%	10.0%	73.3%	26.7%	26.7%
Yellow Time (s)	4.0	4.0	3.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effct Green (s)	93.9	93.9	102.1	101.3	10.9	10.9
Actuated g/C Ratio	0.78	0.78	0.85	0.84	0.09	0.09
v/c Ratio	0.45	0.06	0.14	0.19	0.34	0.21
Control Delay	7.4	3.6	6.0	5.3	53.9	16.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.4	3.6	6.0	5.3	53.9	16.1
LOS	A	A	A	A	D	B
Approach Delay	7.2			5.3	38.5	
Approach LOS	A			A	D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 111 (93%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.45	
Intersection Signal Delay: 7.7	Intersection LOS: A
Intersection Capacity Utilization 56.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: Race St & Arapahoe Rd



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1225	69	50	820	53	36
Future Volume (veh/h)	1225	69	50	820	53	36
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1250	70	51	837	54	37
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2876	1277	390	4408	80	72
Arrive On Green	0.81	0.81	0.01	0.58	0.05	0.05
Sat Flow, veh/h	3647	1578	1781	5274	1781	1585
Grp Volume(v), veh/h	1250	70	51	837	54	37
Grp Sat Flow(s),veh/h/ln	1777	1578	1781	1702	1781	1585
Q Serve(g_s), s	12.4	1.1	0.5	9.3	3.6	2.7
Cycle Q Clear(g_c), s	12.4	1.1	0.5	9.3	3.6	2.7
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2876	1277	390	4408	80	72
V/C Ratio(X)	0.43	0.05	0.13	0.19	0.67	0.52
Avail Cap(c_a), veh/h	2876	1277	472	4408	401	357
HCM Platoon Ratio	1.00	1.00	0.67	0.67	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.97	0.97	1.00	1.00
Uniform Delay (d), s/veh	3.4	2.3	2.5	5.4	56.4	56.0
Incr Delay (d2), s/veh	0.5	0.1	0.1	0.1	3.6	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	0.3	0.1	2.6	1.7	1.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	3.8	2.4	2.5	5.5	60.0	58.2
LnGrp LOS	A	A	A	A	E	E
Approach Vol, veh/h	1320			888	91	
Approach Delay, s/veh	3.8			5.3	59.3	
Approach LOS	A			A	E	

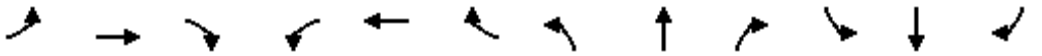
Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	6.5	103.1				109.6	10.4
Change Period (Y+Rc), s	4.0	6.0				6.0	5.0
Max Green Setting (Gmax), s	8.0	70.0				82.0	27.0
Max Q Clear Time (g_c+I1), s	2.5	14.4				11.3	5.6
Green Ext Time (p_c), s	0.0	7.1				4.3	0.1

Intersection Summary		
HCM 6th Ctrl Delay		6.6
HCM 6th LOS		A

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	36	1194	45	820	25	4	27	123	6	27
Future Volume (vph)	36	1194	45	820	25	4	27	123	6	27
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2	1	6		8			4	
Permitted Phases	2		6		8		8	4		4
Detector Phase	5	2	1	6	8	8	8	4	4	4
Switch Phase										
Minimum Initial (s)	3.0	17.0	3.0	17.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	7.0	26.0	7.0	23.0	35.0	35.0	35.0	34.0	34.0	34.0
Total Split (s)	12.0	73.0	12.0	73.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	10.0%	60.8%	10.0%	60.8%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0		5.0	5.0		5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	None	C-Max	None	None	None	None	None	None
Act Effct Green (s)	90.6	84.3	91.7	86.2		16.2	16.2		17.1	17.1
Actuated g/C Ratio	0.76	0.70	0.76	0.72		0.14	0.14		0.14	0.14
v/c Ratio	0.09	0.36	0.15	0.27		0.17	0.11		0.72	0.10
Control Delay	7.7	13.7	2.5	1.9		44.4	1.1		69.4	1.0
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	7.7	13.7	2.5	1.9		44.4	1.1		69.4	1.0
LOS	A	B	A	A		D	A		E	A
Approach Delay		13.5		1.9		23.5			57.7	
Approach LOS		B		A		C			E	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 63 (53%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 11.9	Intersection LOS: B
Intersection Capacity Utilization 55.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Vine St & Arapahoe Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	1194	27	45	820	102	25	4	27	123	6	27
Future Volume (veh/h)	36	1194	27	45	820	102	25	4	27	123	6	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	1257	28	47	863	107	26	4	28	129	6	28
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	441	3102	69	357	2793	345	56	5	392	59	1	392
Arrive On Green	0.04	1.00	1.00	0.04	1.00	1.00	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	1781	5139	114	1781	4601	568	0	19	1568	0	6	1568
Grp Volume(v), veh/h	38	833	452	47	637	333	30	0	28	135	0	28
Grp Sat Flow(s),veh/h/ln	1781	1702	1849	1781	1702	1764	19	0	1568	6	0	1568
Q Serve(g_s), s	1.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	1.6	0.0	0.0	1.6
Cycle Q Clear(g_c), s	1.0	0.0	0.0	1.2	0.0	0.0	30.0	0.0	1.6	30.0	0.0	1.6
Prop In Lane	1.00		0.06	1.00		0.32	0.87		1.00	0.96		1.00
Lane Grp Cap(c), veh/h	441	2055	1116	357	2066	1071	61	0	392	60	0	392
V/C Ratio(X)	0.09	0.41	0.41	0.13	0.31	0.31	0.49	0.00	0.07	2.25	0.00	0.07
Avail Cap(c_a), veh/h	528	2055	1116	438	2066	1071	61	0	392	60	0	392
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.90	0.90	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.6	0.0	0.0	8.5	0.0	0.0	55.2	0.0	34.4	59.3	0.0	34.4
Incr Delay (d2), s/veh	0.0	0.5	1.0	0.1	0.4	0.8	2.3	0.0	0.0	610.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.2	0.3	0.4	0.1	0.2	1.0	0.0	0.6	12.0	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.6	0.5	1.0	8.5	0.4	0.8	57.5	0.0	34.4	669.4	0.0	34.4
LnGrp LOS	A	A	A	A	A	A	E	A	C	F	A	C
Approach Vol, veh/h		1323			1017			58			163	
Approach Delay, s/veh		0.9			0.9			46.4			560.3	
Approach LOS		A			A			D			F	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.6	78.4		35.0	6.2	78.8		35.0				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	8.0	67.0		30.0	8.0	67.0		30.0				
Max Q Clear Time (g_c+I1), s	3.2	2.0		32.0	3.0	2.0		32.0				
Green Ext Time (p_c), s	0.0	6.7		0.0	0.0	4.7		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			37.5									
HCM 6th LOS			D									

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	1278	25	5	890	5	0	0	24	0	0	14
Future Vol, veh/h	16	1278	25	5	890	5	0	0	24	0	0	14
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	150	-	0	100	-	-	-	-	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	17	1389	27	5	967	5	0	0	26	0	0	15

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	972	0	0	1416	0	0	-	-	695	-	-	486
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	5.34	-	-	5.34	-	-	-	-	7.14	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	-	-	3.92	-	-	3.92
Pot Cap-1 Maneuver	*900	-	-	786	-	-	0	0	*629	0	0	*716
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %	1	-	-	1	-	-			1			1
Mov Cap-1 Maneuver	*900	-	-	786	-	-	-	-	*629	-	-	*716
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	11	10.1
HCM LOS			B	B

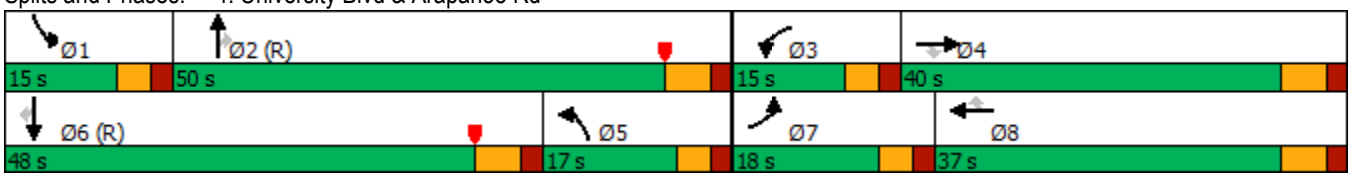
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	629	* 900	-	-	786	-	-	716
HCM Lane V/C Ratio	0.041	0.019	-	-	0.007	-	-	0.021
HCM Control Delay (s)	11	9.1	-	-	9.6	-	-	10.1
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.1

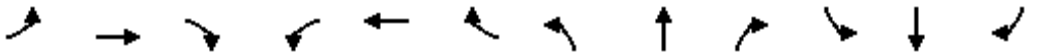
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	181	944	209	207	517	362	245	1150	140	222	803	161
Future Volume (vph)	181	944	209	207	517	362	245	1150	140	222	803	161
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	10.0	10.0	3.0	10.0	10.0
Minimum Split (s)	8.0	39.0	39.0	8.0	37.0	37.0	8.0	35.0	35.0	8.0	40.0	40.0
Total Split (s)	18.0	40.0	40.0	15.0	37.0	37.0	17.0	50.0	50.0	15.0	48.0	48.0
Total Split (%)	15.0%	33.3%	33.3%	12.5%	30.8%	30.8%	14.2%	41.7%	41.7%	12.5%	40.0%	40.0%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	10.3	29.6	29.6	9.6	28.9	28.9	12.0	49.1	49.1	9.7	46.8	46.8
Actuated g/C Ratio	0.09	0.25	0.25	0.08	0.24	0.24	0.10	0.41	0.41	0.08	0.39	0.39
v/c Ratio	0.64	0.78	0.40	0.79	0.44	0.69	0.74	0.58	0.20	0.83	0.42	0.24
Control Delay	75.0	34.0	6.0	74.2	39.7	24.5	53.4	19.4	1.9	78.5	28.2	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.0	34.0	6.0	74.2	39.7	24.5	53.4	19.4	1.9	78.5	28.2	4.8
LOS	E	C	A	E	D	C	D	B	A	E	C	A
Approach Delay		35.2			41.2			23.2			34.4	
Approach LOS		D			D			C			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 38 (32%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 95	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 32.7	Intersection LOS: C
Intersection Capacity Utilization 75.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: University Blvd & Arapahoe Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	181	944	209	207	517	362	245	1150	140	222	803	161
Future Volume (veh/h)	181	944	209	207	517	362	245	1150	140	222	803	161
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	189	983	218	216	539	0	255	1198	146	231	836	168
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	242	1154	356	270	1196		532	2196	679	285	1787	552
Arrive On Green	0.14	0.45	0.45	0.08	0.23	0.00	0.15	0.43	0.43	0.08	0.35	0.35
Sat Flow, veh/h	3456	5106	1575	3456	5106	1585	3456	5106	1580	3456	5106	1578
Grp Volume(v), veh/h	189	983	218	216	539	0	255	1198	146	231	836	168
Grp Sat Flow(s),veh/h/ln	1728	1702	1575	1728	1702	1585	1728	1702	1580	1728	1702	1578
Q Serve(g_s), s	6.3	20.6	8.5	7.4	10.8	0.0	8.1	21.0	7.0	7.9	15.3	7.0
Cycle Q Clear(g_c), s	6.3	20.6	8.5	7.4	10.8	0.0	8.1	21.0	7.0	7.9	15.3	7.0
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	242	1154	356	270	1196		532	2196	679	285	1787	552
V/C Ratio(X)	0.78	0.85	0.61	0.80	0.45		0.48	0.55	0.21	0.81	0.47	0.30
Avail Cap(c_a), veh/h	374	1447	446	288	1319		532	2196	679	288	1787	552
HCM Platoon Ratio	2.00	2.00	2.00	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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.7	31.1	13.0	54.4	39.3	0.0	46.4	25.5	21.5	54.1	30.3	16.0
Incr Delay (d2), s/veh	2.3	3.5	0.6	12.6	0.1	0.0	0.2	1.0	0.7	14.7	0.9	1.4
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	2.6	6.8	3.8	3.7	4.5	0.0	3.4	8.4	2.7	4.0	6.3	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.0	34.6	13.7	66.9	39.4	0.0	46.6	26.4	22.2	68.9	31.2	17.4
LnGrp LOS	D	C	B	E	D		D	C	C	E	C	B
Approach Vol, veh/h		1390			755	A		1599			1235	
Approach Delay, s/veh		33.8			47.3			29.3			36.4	
Approach LOS		C			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.9	57.6	14.4	33.1	24.5	48.0	13.4	34.1
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0	6.0	* 6	5.0	6.0
Max Green Setting (Gmax), s	10.0	44.0	10.0	34.0	12.0	* 42	13.0	31.0
Max Q Clear Time (g_c+I1), s	9.9	23.0	9.4	22.6	10.1	17.3	8.3	12.8
Green Ext Time (p_c), s	0.0	14.2	0.0	4.0	0.1	11.7	0.1	2.3

Intersection Summary	
HCM 6th Ctrl Delay	35.0
HCM 6th LOS	D

Notes

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

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

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	20	0	0	11	0	1585	4	0	1157	43
Future Vol, veh/h	0	0	20	0	0	11	0	1585	4	0	1157	43
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	-	-	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	100	100	92	92	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	22	0	0	12	0	1585	4	0	1157	43

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	579	-	-	795	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	*653	0	0	284	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %			1					-	-		-	-
Mov Cap-1 Maneuver	-	-	*653	-	-	284	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.7	18.2	0	0
HCM LOS	B	C		

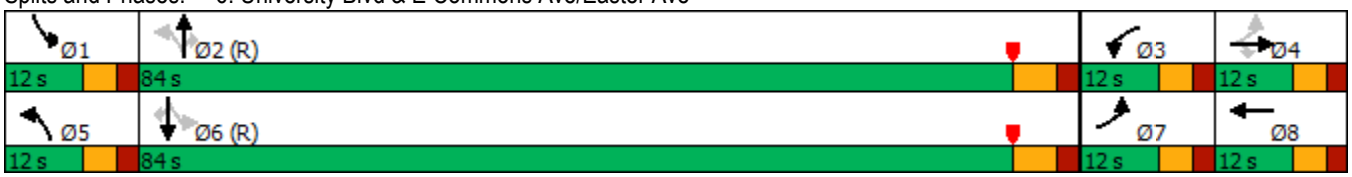
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	653	284	-	-
HCM Lane V/C Ratio	-	-	0.033	0.042	-	-
HCM Control Delay (s)	-	-	10.7	18.2	-	-
HCM Lane LOS	-	-	B	C	-	-
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-	-

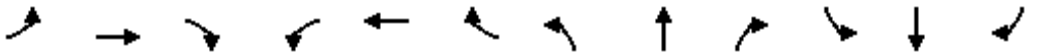
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	46	5	41	26	17	65	1488	26	20	1067	56
Future Volume (vph)	46	5	41	26	17	65	1488	26	20	1067	56
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases	4		4			2		2	6		6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	3.0	3.0	3.0	4.0	3.0	3.0	5.0	5.0	3.0	5.0	5.0
Minimum Split (s)	8.0	35.0	35.0	9.0	32.0	8.0	24.0	24.0	8.0	29.0	29.0
Total Split (s)	12.0	12.0	12.0	12.0	12.0	12.0	84.0	84.0	12.0	84.0	84.0
Total Split (%)	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	70.0%	70.0%	10.0%	70.0%	70.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	11.6	7.7	7.7	6.6	5.8	92.8	88.1	88.1	90.3	85.3	85.3
Actuated g/C Ratio	0.10	0.06	0.06	0.06	0.05	0.77	0.73	0.73	0.75	0.71	0.71
v/c Ratio	0.21	0.05	0.22	0.31	0.67	0.23	0.66	0.03	0.12	0.49	0.06
Control Delay	46.3	54.8	2.4	62.9	37.1	4.6	8.1	0.0	3.8	6.5	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.3	54.8	2.4	62.9	37.1	4.6	8.2	0.0	3.8	6.5	0.2
LOS	D	D	A	E	D	A	A	A	A	A	A
Approach Delay		27.3			42.8		7.9			6.1	
Approach LOS		C			D		A			A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 50 (42%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 105	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 9.2	Intersection LOS: A
Intersection Capacity Utilization 69.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 6: University Blvd & E Commons Ave/Easter Ave





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	5	41	26	17	75	65	1488	26	20	1067	56
Future Volume (veh/h)	46	5	41	26	17	75	65	1488	26	20	1067	56
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		0.94	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	53	6	0	30	20	86	75	1710	30	23	1226	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	209	118		38	17	74	363	2585	1149	282	2540	
Arrive On Green	0.03	0.06	0.00	0.02	0.06	0.06	0.05	1.00	1.00	0.01	0.71	0.00
Sat Flow, veh/h	3456	1870	1585	1781	293	1261	1781	3554	1580	1781	3554	1585
Grp Volume(v), veh/h	53	6	0	30	0	106	75	1710	30	23	1226	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1781	0	1554	1781	1777	1580	1781	1777	1585
Q Serve(g_s), s	1.7	0.4	0.0	2.0	0.0	7.0	1.4	0.0	0.0	0.4	18.0	0.0
Cycle Q Clear(g_c), s	1.7	0.4	0.0	2.0	0.0	7.0	1.4	0.0	0.0	0.4	18.0	0.0
Prop In Lane	1.00		1.00	1.00		0.81	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	209	118		38	0	91	363	2585	1149	282	2540	
V/C Ratio(X)	0.25	0.05		0.80	0.00	1.17	0.21	0.66	0.03	0.08	0.48	
Avail Cap(c_a), veh/h	322	118		104	0	91	421	2585	1149	362	2540	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	51.3	52.9	0.0	58.5	0.0	56.5	5.7	0.0	0.0	4.5	7.4	0.0
Incr Delay (d2), s/veh	0.2	0.1	0.0	30.2	0.0	147.1	0.1	1.3	0.0	0.0	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.2	0.0	1.2	0.0	6.5	0.4	0.5	0.0	0.1	6.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.6	52.9	0.0	88.7	0.0	203.6	5.8	1.3	0.0	4.5	8.1	0.0
LnGrp LOS	D	D		F	A	F	A	A	A	A	A	
Approach Vol, veh/h		59	A		136			1815			1249	A
Approach Delay, s/veh		51.7			178.3			1.5			8.0	
Approach LOS		D			F			A			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.6	93.3	7.5	12.5	8.1	91.8	8.1	12.0
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	78.0	7.0	7.0	7.0	78.0	7.0	7.0
Max Q Clear Time (g_c+I1), s	2.4	2.0	4.0	2.4	3.4	20.0	3.7	9.0
Green Ext Time (p_c), s	0.0	49.1	0.0	0.0	0.0	25.3	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	12.3
HCM 6th LOS	B

Notes

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

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	24	24	1578	1129	5
Future Vol, veh/h	1	24	24	1578	1129	5
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	-	120	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	26	24	1578	1129	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1966	565	1134	0	-	0
Stage 1	1129	-	-	-	-	-
Stage 2	837	-	-	-	-	-
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	*283	*618	*925	-	-	-
Stage 1	*584	-	-	-	-	-
Stage 2	*415	-	-	-	-	-
Platoon blocked, %	1	1	1	-	-	-
Mov Cap-1 Maneuver	*276	*618	*925	-	-	-
Mov Cap-2 Maneuver	*276	-	-	-	-	-
Stage 1	*568	-	-	-	-	-
Stage 2	*415	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.4	0.1	0
HCM LOS	B		

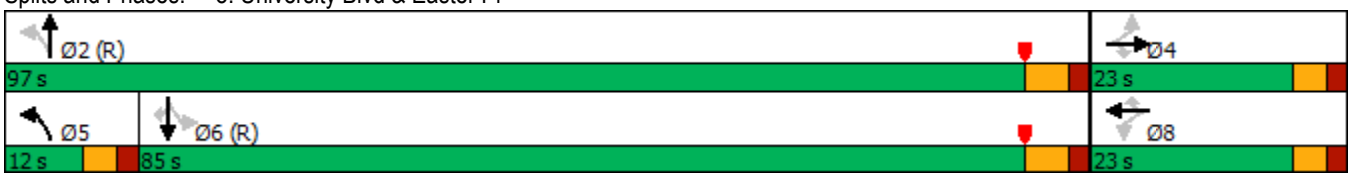
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	* 925	-	589	-	-
HCM Lane V/C Ratio	0.026	-	0.046	-	-
HCM Control Delay (s)	9	-	11.4	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

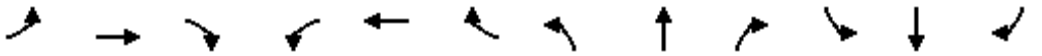
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	80	9	72	128	42	44	104	1478	8	1090	55
Future Volume (vph)	80	9	72	128	42	44	104	1478	8	1090	55
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm
Protected Phases		4			8		5	2		6	
Permitted Phases	4		4	8		8	2		6		6
Detector Phase	4	4	4	8	8	8	5	2	6	6	6
Switch Phase											
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	5.0
Minimum Split (s)	36.0	36.0	36.0	40.0	40.0	40.0	8.0	29.0	32.0	32.0	32.0
Total Split (s)	23.0	23.0	23.0	23.0	23.0	23.0	12.0	97.0	85.0	85.0	85.0
Total Split (%)	19.2%	19.2%	19.2%	19.2%	19.2%	19.2%	10.0%	80.8%	70.8%	70.8%	70.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.0	6.0	6.0	6.0
Lead/Lag							Lead		Lag	Lag	Lag
Lead-Lag Optimize?							Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Max	C-Max	C-Max
Act Effct Green (s)	15.5	15.5	15.5	15.5	15.5	15.5	94.5	93.5	82.7	82.7	82.7
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13	0.13	0.79	0.78	0.69	0.69	0.69
v/c Ratio	0.52	0.04	0.30	0.81	0.20	0.19	0.36	0.63	0.06	0.50	0.06
Control Delay	59.4	44.4	12.7	81.7	47.4	6.1	6.2	7.3	2.5	3.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.4	44.4	12.7	81.7	47.4	6.1	6.2	7.3	2.5	3.3	0.1
LOS	E	D	B	F	D	A	A	A	A	A	A
Approach Delay		37.7			59.6			7.2		3.1	
Approach LOS		D			E			A		A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 66 (55%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 10.8	Intersection LOS: B
Intersection Capacity Utilization 77.5%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 8: University Blvd & Easter Pl





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	9	72	128	42	44	104	1478	63	8	1090	55
Future Volume (veh/h)	80	9	72	128	42	44	104	1478	63	8	1090	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.98		0.98	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	90	10	81	144	47	49	117	1661	71	9	1225	62
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	206	256	212	230	256	212	419	2679	114	217	2473	1098
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.03	0.77	0.77	1.00	1.00	1.00
Sat Flow, veh/h	1279	1870	1554	1283	1870	1554	1781	3472	148	280	3554	1577
Grp Volume(v), veh/h	90	10	81	144	47	49	117	846	886	9	1225	62
Grp Sat Flow(s),veh/h/ln	1279	1870	1554	1283	1870	1554	1781	1777	1843	280	1777	1577
Q Serve(g_s), s	8.0	0.6	5.7	13.2	2.7	3.4	2.1	24.9	25.4	0.8	0.0	0.0
Cycle Q Clear(g_c), s	10.7	0.6	5.7	13.7	2.7	3.4	2.1	24.9	25.4	17.1	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.08	1.00		1.00
Lane Grp Cap(c), veh/h	206	256	212	230	256	212	419	1371	1422	217	2473	1098
V/C Ratio(X)	0.44	0.04	0.38	0.63	0.18	0.23	0.28	0.62	0.62	0.04	0.50	0.06
Avail Cap(c_a), veh/h	223	281	233	247	281	233	462	1371	1422	217	2473	1098
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.6	45.0	47.2	50.9	45.9	46.2	4.1	6.0	6.0	1.7	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.4	3.0	0.1	0.2	0.1	2.1	2.1	0.4	0.7	0.1
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	2.6	0.3	2.3	4.5	1.3	1.3	0.6	7.4	7.8	0.0	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.1	45.0	47.6	54.0	46.0	46.4	4.3	8.1	8.1	2.0	0.7	0.1
LnGrp LOS	D	D	D	D	D	D	A	A	A	A	A	A
Approach Vol, veh/h		181			240			1849			1296	
Approach Delay, s/veh		49.2			50.8			7.8			0.7	
Approach LOS		D			D			A			A	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		98.6		21.4	9.1	89.5		21.4				
Change Period (Y+Rc), s		6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s		91.0		18.0	7.0	79.0		18.0				
Max Q Clear Time (g_c+I1), s		27.4		12.7	4.1	19.1		15.7				
Green Ext Time (p_c), s		43.1		0.1	0.0	27.3		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			10.2									
HCM 6th LOS			B									

Notes

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

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	25	153	211	9	4	7
Future Vol, veh/h	25	153	211	9	4	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	166	229	10	4	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	239	0	-	0	454	234
Stage 1	-	-	-	-	234	-
Stage 2	-	-	-	-	220	-
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	1328	-	-	-	564	805
Stage 1	-	-	-	-	805	-
Stage 2	-	-	-	-	817	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1328	-	-	-	552	805
Mov Cap-2 Maneuver	-	-	-	-	552	-
Stage 1	-	-	-	-	787	-
Stage 2	-	-	-	-	817	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	10.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1328	-	-	-	690
HCM Lane V/C Ratio	0.02	-	-	-	0.017
HCM Control Delay (s)	7.8	0	-	-	10.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	150	10	9	203	11	24
Future Vol, veh/h	150	10	9	203	11	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	163	11	10	221	12	26

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	174	0	410	169
Stage 1	-	-	-	-	169	-
Stage 2	-	-	-	-	241	-
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	-	-	1403	-	598	875
Stage 1	-	-	-	-	861	-
Stage 2	-	-	-	-	799	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1403	-	593	875
Mov Cap-2 Maneuver	-	-	-	-	593	-
Stage 1	-	-	-	-	861	-
Stage 2	-	-	-	-	793	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	10
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	761	-	-	1403	-
HCM Lane V/C Ratio	0.05	-	-	0.007	-
HCM Control Delay (s)	10	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	145	14	2	152	59	19	1	12	3	1	4
Future Vol, veh/h	10	145	14	2	152	59	19	1	12	3	1	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	158	15	2	165	64	21	1	13	3	1	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	229	0	0	173	0	0	392	421	166	396	396	197
Stage 1	-	-	-	-	-	-	188	188	-	201	201	-
Stage 2	-	-	-	-	-	-	204	233	-	195	195	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1339	-	-	1404	-	-	567	524	878	564	541	844
Stage 1	-	-	-	-	-	-	814	745	-	801	735	-
Stage 2	-	-	-	-	-	-	798	712	-	807	739	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1339	-	-	1404	-	-	558	518	878	550	535	844
Mov Cap-2 Maneuver	-	-	-	-	-	-	558	518	-	550	535	-
Stage 1	-	-	-	-	-	-	807	738	-	794	734	-
Stage 2	-	-	-	-	-	-	791	711	-	787	732	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.1	10.9	10.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	645	1339	-	-	1404	-	-	663
HCM Lane V/C Ratio	0.054	0.008	-	-	0.002	-	-	0.013
HCM Control Delay (s)	10.9	7.7	0	-	7.6	0	-	10.5
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	21	127	135	41	43	11
Future Vol, veh/h	21	127	135	41	43	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	138	147	45	47	12
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8.3	8.2	8.1
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	14%	0%	80%
Vol Thru, %	86%	77%	0%
Vol Right, %	0%	23%	20%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	148	176	54
LT Vol	21	0	43
Through Vol	127	135	0
RT Vol	0	41	11
Lane Flow Rate	161	191	59
Geometry Grp	1	1	1
Degree of Util (X)	0.188	0.214	0.077
Departure Headway (Hd)	4.21	4.019	4.729
Convergence, Y/N	Yes	Yes	Yes
Cap	840	880	762
Service Time	2.3	2.108	2.729
HCM Lane V/C Ratio	0.192	0.217	0.077
HCM Control Delay	8.3	8.2	8.1
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.7	0.8	0.2

Intersection	
Int Delay, s/veh	1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	2	55	5	11	40
Future Vol, veh/h	2	2	55	5	11	40
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	2	60	5	12	43

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	130	63	0	0	65	0
Stage 1	63	-	-	-	-	-
Stage 2	67	-	-	-	-	-
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	864	1002	-	-	1537	-
Stage 1	960	-	-	-	-	-
Stage 2	956	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	857	1002	-	-	1537	-
Mov Cap-2 Maneuver	857	-	-	-	-	-
Stage 1	960	-	-	-	-	-
Stage 2	948	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	1.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	924	1537	-
HCM Lane V/C Ratio	-	-	0.005	0.008	-
HCM Control Delay (s)	-	-	8.9	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	39	5	9	0	2	0	1	50	3	43	45	39
Future Vol, veh/h	39	5	9	0	2	0	1	50	3	43	45	39
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	-	-	-	-	-	-	-	-	-	-	-	-
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	42	5	10	0	2	0	1	54	3	47	49	42

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	223	223	70	230	243	56	91	0	0	57	0	0
Stage 1	164	164	-	58	58	-	-	-	-	-	-	-
Stage 2	59	59	-	172	185	-	-	-	-	-	-	-
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	733	676	993	725	659	1011	1504	-	-	1547	-	-
Stage 1	838	762	-	954	847	-	-	-	-	-	-	-
Stage 2	953	846	-	830	747	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	712	654	993	695	637	1011	1504	-	-	1547	-	-
Mov Cap-2 Maneuver	712	654	-	695	637	-	-	-	-	-	-	-
Stage 1	837	738	-	953	846	-	-	-	-	-	-	-
Stage 2	950	845	-	790	723	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.3	10.7	0.1	2.5
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1504	-	-	741	637	1547	-	-
HCM Lane V/C Ratio	0.001	-	-	0.078	0.003	0.03	-	-
HCM Control Delay (s)	7.4	0	-	10.3	10.7	7.4	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0	0.1	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	11	76	20	8	115
Future Vol, veh/h	14	11	76	20	8	115
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	12	83	22	9	125

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	237	94	0	0	105	0
Stage 1	94	-	-	-	-	-
Stage 2	143	-	-	-	-	-
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	751	963	-	-	1486	-
Stage 1	930	-	-	-	-	-
Stage 2	884	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	746	963	-	-	1486	-
Mov Cap-2 Maneuver	746	-	-	-	-	-
Stage 1	930	-	-	-	-	-
Stage 2	878	-	-	-	-	-

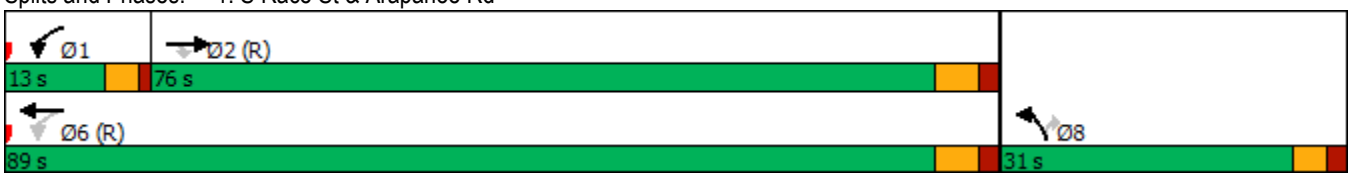
Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	0.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	828	1486	-
HCM Lane V/C Ratio	-	-	0.033	0.006	-
HCM Control Delay (s)	-	-	9.5	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1000	50	42	1499	120	76
Future Volume (vph)	1000	50	42	1499	120	76
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	17.0	17.0	3.0	17.0	5.0	5.0
Minimum Split (s)	23.0	23.0	7.0	23.0	30.0	30.0
Total Split (s)	76.0	76.0	13.0	89.0	31.0	31.0
Total Split (%)	63.3%	63.3%	10.8%	74.2%	25.8%	25.8%
Yellow Time (s)	4.0	4.0	3.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effct Green (s)	87.3	87.3	96.8	94.8	14.2	14.2
Actuated g/C Ratio	0.73	0.73	0.81	0.79	0.12	0.12
v/c Ratio	0.40	0.05	0.11	0.39	0.60	0.31
Control Delay	8.1	3.8	1.5	1.3	60.6	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.1	3.8	1.5	1.3	60.6	12.4
LOS	A	A	A	A	E	B
Approach Delay	7.8			1.3	41.9	
Approach LOS	A			A	D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 31 (26%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 6.6	Intersection LOS: A
Intersection Capacity Utilization 52.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: S Race St & Arapahoe Rd



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1000	50	42	1499	120	76
Future Volume (veh/h)	1000	50	42	1499	120	76
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1042	52	44	1561	125	79
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2730	1212	441	4191	156	139
Arrive On Green	0.77	0.77	0.04	1.00	0.09	0.09
Sat Flow, veh/h	3647	1578	1781	5274	1781	1585
Grp Volume(v), veh/h	1042	52	44	1561	125	79
Grp Sat Flow(s),veh/h/ln	1777	1578	1781	1702	1781	1585
Q Serve(g_s), s	11.5	0.9	0.6	0.0	8.3	5.7
Cycle Q Clear(g_c), s	11.5	0.9	0.6	0.0	8.3	5.7
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2730	1212	441	4191	156	139
V/C Ratio(X)	0.38	0.04	0.10	0.37	0.80	0.57
Avail Cap(c_a), veh/h	2730	1212	540	4191	386	343
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.88	0.88	1.00	1.00
Uniform Delay (d), s/veh	4.6	3.3	3.1	0.0	53.7	52.6
Incr Delay (d2), s/veh	0.4	0.1	0.0	0.2	3.6	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	0.3	0.2	0.1	3.9	2.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	5.0	3.4	3.2	0.2	57.3	53.9
LnGrp LOS	A	A	A	A	E	D
Approach Vol, veh/h	1094			1605	204	
Approach Delay, s/veh	4.9			0.3	56.0	
Approach LOS	A			A	E	

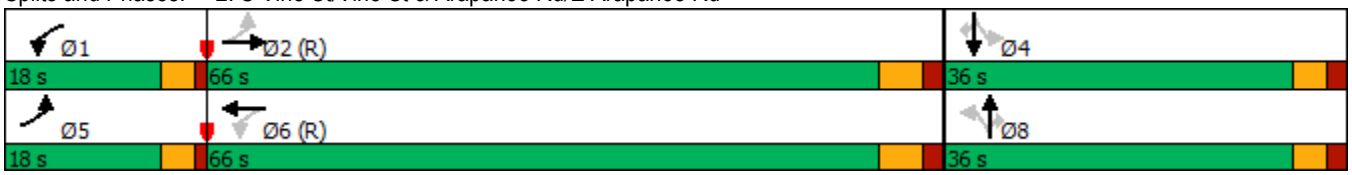
Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	6.3	98.2				104.5	15.5
Change Period (Y+Rc), s	4.0	6.0				6.0	5.0
Max Green Setting (Gmax), s	9.0	70.0				83.0	26.0
Max Q Clear Time (g_c+I1), s	2.6	13.5				2.0	10.3
Green Ext Time (p_c), s	0.0	5.4				10.5	0.3

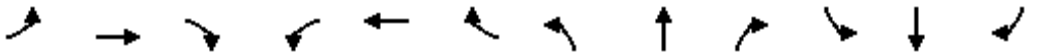
Intersection Summary	
HCM 6th Ctrl Delay	5.9
HCM 6th LOS	A

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	60	924	119	1402	110	21	98	103	12	29
Future Volume (vph)	60	924	119	1402	110	21	98	103	12	29
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2	1	6		8			4	
Permitted Phases	2		6		8		8	4		4
Detector Phase	5	2	1	6	8	8	8	4	4	4
Switch Phase										
Minimum Initial (s)	3.0	17.0	3.0	17.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	7.0	26.0	7.0	23.0	35.0	35.0	35.0	34.0	34.0	34.0
Total Split (s)	18.0	66.0	18.0	66.0	36.0	36.0	36.0	36.0	36.0	36.0
Total Split (%)	15.0%	55.0%	15.0%	55.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0		5.0	5.0		5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	None	C-Max	None	None	None	None	None	None
Act Effct Green (s)	87.7	80.1	90.7	82.9		18.2	18.2		18.2	18.2
Actuated g/C Ratio	0.73	0.67	0.76	0.69		0.15	0.15		0.15	0.15
v/c Ratio	0.27	0.32	0.31	0.48		0.83	0.32		0.82	0.11
Control Delay	8.3	6.4	3.7	2.6		84.7	10.3		85.9	2.1
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	8.3	6.4	3.7	2.6		84.7	10.3		85.9	2.1
LOS	A	A	A	A		F	B		F	A
Approach Delay		6.5		2.7		52.9			68.8	
Approach LOS		A		A		D			E	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 43 (36%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 10.7	Intersection LOS: B
Intersection Capacity Utilization 62.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: S Vine St/Vine St & Arapahoe Rd/E Arapahoe Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	924	92	119	1402	181	110	21	98	103	12	29
Future Volume (veh/h)	60	924	92	119	1402	181	110	21	98	103	12	29
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	63	973	97	125	1476	191	116	22	103	108	13	31
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	280	2691	268	443	2692	348	55	6	405	57	4	405
Arrive On Green	0.06	1.00	1.00	0.09	1.00	1.00	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	1781	4717	469	1781	4573	591	0	23	1568	0	15	1568
Grp Volume(v), veh/h	63	701	369	125	1098	569	138	0	103	121	0	31
Grp Sat Flow(s),veh/h/ln	1781	1702	1782	1781	1702	1760	23	0	1568	15	0	1568
Q Serve(g_s), s	1.8	0.0	0.0	3.6	0.0	0.0	0.0	0.0	6.3	0.0	0.0	1.8
Cycle Q Clear(g_c), s	1.8	0.0	0.0	3.6	0.0	0.0	31.0	0.0	6.3	31.0	0.0	1.8
Prop In Lane	1.00		0.26	1.00		0.34	0.84		1.00	0.89		1.00
Lane Grp Cap(c), veh/h	280	1941	1017	443	2004	1036	61	0	405	61	0	405
V/C Ratio(X)	0.23	0.36	0.36	0.28	0.55	0.55	2.26	0.00	0.25	2.00	0.00	0.08
Avail Cap(c_a), veh/h	438	1941	1017	568	2004	1036	61	0	405	61	0	405
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.92	0.92	0.92	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.8	0.0	0.0	9.0	0.0	0.0	57.0	0.0	35.3	58.1	0.0	33.7
Incr Delay (d2), s/veh	0.1	0.5	0.9	0.1	1.1	2.1	614.5	0.0	0.1	502.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.1	0.3	1.2	0.3	0.6	12.3	0.0	2.4	10.3	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.9	0.5	0.9	9.1	1.1	2.1	671.6	0.0	35.4	560.9	0.0	33.7
LnGrp LOS	A	A	A	A	A	A	F	A	D	F	A	C
Approach Vol, veh/h		1133			1792			241			152	
Approach Delay, s/veh		1.1			2.0			399.7			453.3	
Approach LOS		A			A			F			F	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.6	74.4		36.0	7.4	76.6		36.0				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	14.0	60.0		31.0	14.0	60.0		31.0				
Max Q Clear Time (g_c+I1), s	5.6	2.0		33.0	3.8	2.0		33.0				
Green Ext Time (p_c), s	0.1	5.3		0.0	0.0	10.5		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			51.3									
HCM 6th LOS			D									

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	27	1059	39	62	1602	7	0	0	110	0	0	100
Future Vol, veh/h	27	1059	39	62	1602	7	0	0	110	0	0	100
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	150	-	0	100	-	-	-	-	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	29	1151	42	67	1741	8	0	0	120	0	0	109

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1749	0	0	1193	0	0	-	-	576	-	-	875
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	5.34	-	-	5.34	-	-	-	-	7.14	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	-	-	3.92	-	-	3.92
Pot Cap-1 Maneuver	*682	-	-	*846	-	-	0	0	*673	0	0	*542
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %	1	-	-	1	-	-			1			1
Mov Cap-1 Maneuver	*682	-	-	*846	-	-	-	-	*673	-	-	*542
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.4	11.5	13.3
HCM LOS			B	B

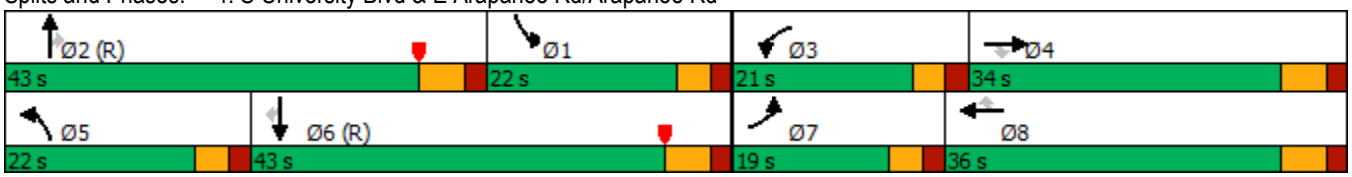
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	673	* 682	-	-	* 846	-	-	542
HCM Lane V/C Ratio	0.178	0.043	-	-	0.08	-	-	0.201
HCM Control Delay (s)	11.5	10.5	-	-	9.6	-	-	13.3
HCM Lane LOS	B	B	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0.3	-	-	0.7

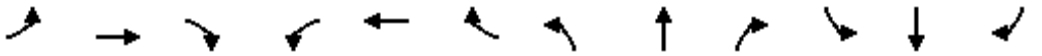
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	291	666	235	276	1123	411	279	1133	171	309	1241	293
Future Volume (vph)	291	666	235	276	1123	411	279	1133	171	309	1241	293
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	10.0	10.0	3.0	10.0	10.0
Minimum Split (s)	8.0	39.0	39.0	8.0	37.0	37.0	8.0	35.0	35.0	8.0	40.0	40.0
Total Split (s)	19.0	34.0	34.0	21.0	36.0	36.0	22.0	43.0	43.0	22.0	43.0	43.0
Total Split (%)	15.8%	28.3%	28.3%	17.5%	30.0%	30.0%	18.3%	35.8%	35.8%	18.3%	35.8%	35.8%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	13.1	29.5	29.5	13.5	29.9	29.9	14.2	38.0	38.0	17.0	40.9	40.9
Actuated g/C Ratio	0.11	0.25	0.25	0.11	0.25	0.25	0.12	0.32	0.32	0.14	0.34	0.34
v/c Ratio	0.81	0.56	0.43	0.75	0.92	0.70	0.72	0.73	0.29	0.66	0.75	0.43
Control Delay	71.5	47.8	15.2	63.7	56.7	19.4	47.9	33.0	6.8	56.1	38.9	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.5	47.8	15.2	63.7	56.7	19.4	47.9	33.0	6.8	56.1	38.9	7.3
LOS	E	D	B	E	E	B	D	C	A	E	D	A
Approach Delay		47.1			49.3			32.8			36.8	
Approach LOS		D			D			C			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 103 (86%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 105	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 41.2	Intersection LOS: D
Intersection Capacity Utilization 81.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: S University Blvd & E Arapahoe Rd/Arapahoe Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	291	666	235	276	1123	411	279	1133	171	309	1241	293
Future Volume (veh/h)	291	666	235	276	1123	411	279	1133	171	309	1241	293
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	303	694	245	288	1170	0	291	1180	178	322	1293	305
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	361	1283	396	345	1259		351	1574	486	515	1859	575
Arrive On Green	0.03	0.08	0.08	0.10	0.25	0.00	0.10	0.31	0.31	0.15	0.36	0.36
Sat Flow, veh/h	3456	5106	1576	3456	5106	1585	3456	5106	1577	3456	5106	1579
Grp Volume(v), veh/h	303	694	245	288	1170	0	291	1180	178	322	1293	305
Grp Sat Flow(s),veh/h/ln	1728	1702	1576	1728	1702	1585	1728	1702	1577	1728	1702	1579
Q Serve(g_s), s	10.5	15.7	18.0	9.8	26.9	0.0	9.9	24.9	7.6	10.5	25.9	18.3
Cycle Q Clear(g_c), s	10.5	15.7	18.0	9.8	26.9	0.0	9.9	24.9	7.6	10.5	25.9	18.3
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	361	1283	396	345	1259		351	1574	486	515	1859	575
V/C Ratio(X)	0.84	0.54	0.62	0.83	0.93		0.83	0.75	0.37	0.63	0.70	0.53
Avail Cap(c_a), veh/h	403	1283	396	461	1277		490	1574	486	515	1859	575
HCM Platoon Ratio	0.33	0.33	0.33	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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.9	48.4	49.5	53.0	44.2	0.0	52.9	37.3	16.9	47.9	32.5	30.1
Incr Delay (d2), s/veh	12.1	0.3	2.2	7.4	11.6	0.0	5.9	3.3	2.1	1.8	2.2	3.5
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	5.4	7.2	7.9	4.6	12.5	0.0	4.5	10.6	3.0	4.6	10.7	7.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.0	48.6	51.7	60.5	55.8	0.0	58.8	40.7	19.0	49.7	34.7	33.6
LnGrp LOS	E	D	D	E	E		E	D	B	D	C	C
Approach Vol, veh/h		1242			1458	A		1649			1920	
Approach Delay, s/veh		54.2			56.7			41.5			37.0	
Approach LOS		D			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.9	43.0	17.0	36.2	17.2	49.7	17.5	35.6
Change Period (Y+Rc), s	6.0	* 6	5.0	6.0	5.0	6.0	5.0	6.0
Max Green Setting (Gmax), s	17.0	* 37	16.0	28.0	17.0	37.0	14.0	30.0
Max Q Clear Time (g_c+I1), s	12.5	26.9	11.8	20.0	11.9	27.9	12.5	28.9
Green Ext Time (p_c), s	0.2	7.8	0.2	2.4	0.3	7.8	0.1	0.7

Intersection Summary	
HCM 6th Ctrl Delay	46.2
HCM 6th LOS	D

Notes

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

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

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	62	0	0	40	0	1560	18	0	1650	103
Future Vol, veh/h	0	0	62	0	0	40	0	1560	18	0	1650	103
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	-	-	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	100	100	92	92	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	67	0	0	43	0	1560	20	0	1650	103

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	825	-	-	790	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	*545	0	0	286	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %			1					-	-		-	-
Mov Cap-1 Maneuver	-	-	*545	-	-	286	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.5	19.8	0	0
HCM LOS	B	C		

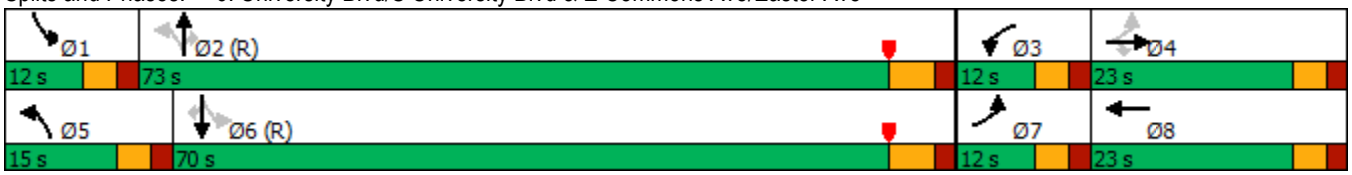
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	545	286	-	-
HCM Lane V/C Ratio	-	-	0.124	0.152	-	-
HCM Control Delay (s)	-	-	12.5	19.8	-	-
HCM Lane LOS	-	-	B	C	-	-
HCM 95th %tile Q(veh)	-	-	0.4	0.5	-	-

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

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	118	35	132	53	58	129	1416	42	60	1502	134
Future Volume (vph)	118	35	132	53	58	129	1416	42	60	1502	134
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases	4		4			2		2	6		6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	3.0	3.0	3.0	4.0	3.0	3.0	5.0	5.0	3.0	5.0	5.0
Minimum Split (s)	8.0	35.0	35.0	9.0	32.0	8.0	24.0	24.0	8.0	29.0	29.0
Total Split (s)	12.0	23.0	23.0	12.0	23.0	15.0	73.0	73.0	12.0	70.0	70.0
Total Split (%)	10.0%	19.2%	19.2%	10.0%	19.2%	12.5%	60.8%	60.8%	10.0%	58.3%	58.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	20.0	14.4	14.4	6.8	12.2	84.5	76.0	76.0	78.2	71.4	71.4
Actuated g/C Ratio	0.17	0.12	0.12	0.06	0.10	0.70	0.63	0.63	0.65	0.60	0.60
v/c Ratio	0.35	0.18	0.49	0.61	0.59	0.78	0.73	0.05	0.38	0.82	0.16
Control Delay	41.1	48.8	16.4	80.4	50.9	58.4	16.0	0.1	17.2	24.1	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay	41.1	48.8	16.4	80.4	50.9	58.4	16.1	0.1	17.2	24.1	2.6
LOS	D	D	B	F	D	E	B	A	B	C	A
Approach Delay		30.6			61.1		19.1			22.2	
Approach LOS		C			E		B			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 74 (62%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 115	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 23.1	Intersection LOS: C
Intersection Capacity Utilization 74.5%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 6: University Blvd/S University Blvd & E Commons Ave/Easter Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	118	35	132	53	58	42	129	1416	42	60	1502	134
Future Volume (veh/h)	118	35	132	53	58	42	129	1416	42	60	1502	134
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		1.00	1.00		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	136	40	0	61	67	48	148	1628	48	69	1726	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	390	207		78	104	74	220	2283	1014	293	2211	
Arrive On Green	0.05	0.11	0.00	0.04	0.10	0.10	0.10	1.00	1.00	0.03	0.62	0.00
Sat Flow, veh/h	3456	1870	1585	1781	999	715	1781	3554	1579	1781	3554	1585
Grp Volume(v), veh/h	136	40	0	61	0	115	148	1628	48	69	1726	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1781	0	1714	1781	1777	1579	1781	1777	1585
Q Serve(g_s), s	4.2	2.3	0.0	4.1	0.0	7.7	3.7	0.0	0.0	1.7	42.8	0.0
Cycle Q Clear(g_c), s	4.2	2.3	0.0	4.1	0.0	7.7	3.7	0.0	0.0	1.7	42.8	0.0
Prop In Lane	1.00		1.00	1.00		0.42	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	390	207		78	0	178	220	2283	1014	293	2211	
V/C Ratio(X)	0.35	0.19		0.78	0.00	0.65	0.67	0.71	0.05	0.24	0.78	
Avail Cap(c_a), veh/h	416	281		104	0	257	283	2283	1014	348	2211	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	44.9	48.5	0.0	56.8	0.0	51.7	20.8	0.0	0.0	7.6	16.7	0.0
Incr Delay (d2), s/veh	0.2	0.2	0.0	23.1	0.0	1.5	2.0	1.9	0.1	0.2	2.8	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	1.8	1.1	0.0	2.3	0.0	3.4	2.5	0.6	0.0	0.6	16.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.1	48.7	0.0	79.8	0.0	53.1	22.8	1.9	0.1	7.8	19.5	0.0
LnGrp LOS	D	D		E	A	D	C	A	A	A	B	
Approach Vol, veh/h		176	A		176			1824			1795	A
Approach Delay, s/veh		45.9			62.4			3.6			19.0	
Approach LOS		D			E			A			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.3	83.1	10.3	18.3	10.8	80.7	11.1	17.5
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	67.0	7.0	18.0	10.0	64.0	7.0	18.0
Max Q Clear Time (g_c+I1), s	3.7	2.0	6.1	4.3	5.7	44.8	6.2	9.7
Green Ext Time (p_c), s	0.0	41.9	0.0	0.1	0.1	16.6	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	15.0
HCM 6th LOS	B

Notes

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

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	56	40	1594	1685	11
Future Vol, veh/h	12	56	40	1594	1685	11
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	-	120	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	61	40	1594	1685	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2562	843	1696	0	-	0
Stage 1	1685	-	-	-	-	-
Stage 2	877	-	-	-	-	-
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	*29	*389	*582	-	-	-
Stage 1	*367	-	-	-	-	-
Stage 2	*391	-	-	-	-	-
Platoon blocked, %	1	1	1	-	-	-
Mov Cap-1 Maneuver	*27	*389	*582	-	-	-
Mov Cap-2 Maneuver	*27	-	-	-	-	-
Stage 1	*342	-	-	-	-	-
Stage 2	*391	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	79.2	0.3	0
HCM LOS	F		

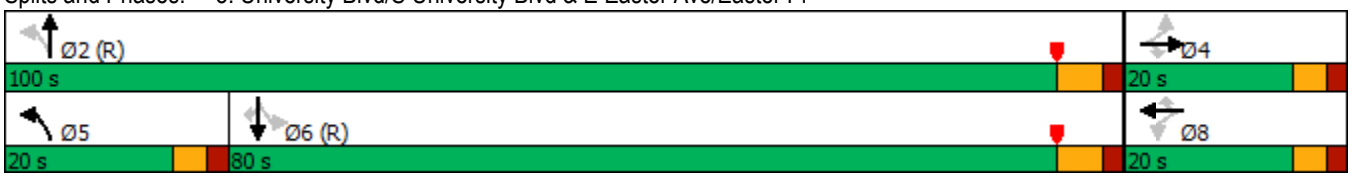
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	* 582	-	116	-	-
HCM Lane V/C Ratio	0.069	-	0.637	-	-
HCM Control Delay (s)	11.6	-	79.2	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.2	-	3.3	-	-

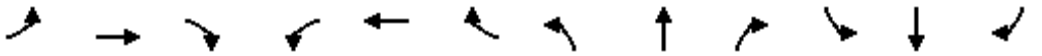
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	75	25	138	55	19	22	126	1537	16	1650	75
Future Volume (vph)	75	25	138	55	19	22	126	1537	16	1650	75
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm
Protected Phases		4			8		5	2		6	
Permitted Phases	4		4	8		8	2		6		6
Detector Phase	4	4	4	8	8	8	5	2	6	6	6
Switch Phase											
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	5.0
Minimum Split (s)	36.0	36.0	36.0	40.0	40.0	40.0	8.0	29.0	32.0	32.0	32.0
Total Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	100.0	80.0	80.0	80.0
Total Split (%)	16.7%	16.7%	16.7%	16.7%	16.7%	16.7%	16.7%	83.3%	66.7%	66.7%	66.7%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.0	6.0	6.0	6.0
Lead/Lag							Lead		Lag	Lag	Lag
Lead-Lag Optimize?							Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	11.3	11.3	11.3	11.3	11.3	11.3	98.7	97.7	83.8	83.8	83.8
Actuated g/C Ratio	0.09	0.09	0.09	0.09	0.09	0.09	0.82	0.81	0.70	0.70	0.70
v/c Ratio	0.66	0.16	0.54	0.48	0.12	0.12	0.64	0.63	0.11	0.75	0.08
Control Delay	75.2	50.4	15.0	63.3	49.5	1.1	28.9	5.7	6.5	6.0	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.2	50.4	15.0	63.3	49.5	1.1	28.9	5.7	6.5	6.0	1.0
LOS	E	D	B	E	D	A	C	A	A	A	A
Approach Delay		37.6			46.2			7.4		5.8	
Approach LOS		D			D			A		A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 82 (68%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 110	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 9.5	Intersection LOS: A
Intersection Capacity Utilization 79.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 8: University Blvd/S University Blvd & E Easter Ave/Easter Pl





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	25	138	55	19	22	126	1537	58	16	1650	75
Future Volume (veh/h)	75	25	138	55	19	22	126	1537	58	16	1650	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.98		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	84	28	155	62	21	25	142	1727	65	18	1854	84
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	204	221	183	183	221	183	289	2760	103	214	2528	1122
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.04	0.79	0.79	1.00	1.00	1.00
Sat Flow, veh/h	1332	1870	1549	1181	1870	1549	1781	3492	131	264	3554	1577
Grp Volume(v), veh/h	84	28	155	62	21	25	142	875	917	18	1854	84
Grp Sat Flow(s),veh/h/ln	1332	1870	1549	1181	1870	1549	1781	1777	1846	264	1777	1577
Q Serve(g_s), s	7.2	1.6	11.8	6.0	1.2	1.7	2.4	24.4	24.8	1.6	0.0	0.0
Cycle Q Clear(g_c), s	8.4	1.6	11.8	7.6	1.2	1.7	2.4	24.4	24.8	17.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	204	221	183	183	221	183	289	1404	1459	214	2528	1122
V/C Ratio(X)	0.41	0.13	0.85	0.34	0.10	0.14	0.49	0.62	0.63	0.08	0.73	0.07
Avail Cap(c_a), veh/h	213	234	194	192	234	194	445	1404	1459	214	2528	1122
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.0	47.4	51.9	50.8	47.2	47.4	3.6	5.2	5.2	1.5	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.1	25.5	0.4	0.1	0.1	0.5	2.1	2.1	0.8	1.9	0.1
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	0.8	5.9	1.8	0.6	0.7	0.7	6.7	7.1	0.1	0.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.5	47.5	77.3	51.2	47.3	47.6	4.1	7.3	7.3	2.3	1.9	0.1
LnGrp LOS	D	D	E	D	D	D	A	A	A	A	A	A
Approach Vol, veh/h		267			108			1934			1956	
Approach Delay, s/veh		66.1			49.6			7.1			1.9	
Approach LOS		E			D			A			A	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		100.8		19.2	9.5	91.4		19.2				
Change Period (Y+Rc), s		6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s		94.0		15.0	15.0	74.0		15.0				
Max Q Clear Time (g_c+I1), s		26.8		13.8	4.4	19.0		9.6				
Green Ext Time (p_c), s		47.0		0.1	0.1	44.3		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			9.4									
HCM 6th LOS			A									

Notes

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

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	32	192	180	40	46	40
Future Vol, veh/h	32	192	180	40	46	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	35	209	196	43	50	43

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	239	0	-	0	497	218
Stage 1	-	-	-	-	218	-
Stage 2	-	-	-	-	279	-
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	1328	-	-	-	532	822
Stage 1	-	-	-	-	818	-
Stage 2	-	-	-	-	768	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1328	-	-	-	516	822
Mov Cap-2 Maneuver	-	-	-	-	516	-
Stage 1	-	-	-	-	793	-
Stage 2	-	-	-	-	768	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	11.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1328	-	-	-	624
HCM Lane V/C Ratio	0.026	-	-	-	0.15
HCM Control Delay (s)	7.8	0	-	-	11.8
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.5

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	210	15	8	212	7	14
Future Vol, veh/h	210	15	8	212	7	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	228	16	9	230	8	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	244	0	484	236
Stage 1	-	-	-	-	236	-
Stage 2	-	-	-	-	248	-
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	-	-	1322	-	542	803
Stage 1	-	-	-	-	803	-
Stage 2	-	-	-	-	793	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1322	-	538	803
Mov Cap-2 Maneuver	-	-	-	-	538	-
Stage 1	-	-	-	-	803	-
Stage 2	-	-	-	-	787	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	10.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	690	-	-	1322	-
HCM Lane V/C Ratio	0.033	-	-	0.007	-
HCM Control Delay (s)	10.4	-	-	7.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	18	153	12	9	161	49	14	2	12	60	2	18
Future Vol, veh/h	18	153	12	9	161	49	14	2	12	60	2	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	166	13	10	175	53	15	2	13	65	2	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	228	0	0	179	0	0	446	461	173	442	441	202
Stage 1	-	-	-	-	-	-	213	213	-	222	222	-
Stage 2	-	-	-	-	-	-	233	248	-	220	219	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1340	-	-	1397	-	-	523	497	871	526	510	839
Stage 1	-	-	-	-	-	-	789	726	-	780	720	-
Stage 2	-	-	-	-	-	-	770	701	-	782	722	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1340	-	-	1397	-	-	499	485	871	507	497	839
Mov Cap-2 Maneuver	-	-	-	-	-	-	499	485	-	507	497	-
Stage 1	-	-	-	-	-	-	776	714	-	767	714	-
Stage 2	-	-	-	-	-	-	744	695	-	755	710	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	0.3	11.2	12.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	609	1340	-	-	1397	-	-	556
HCM Lane V/C Ratio	0.05	0.015	-	-	0.007	-	-	0.156
HCM Control Delay (s)	11.2	7.7	0	-	7.6	0	-	12.7
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.6

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	22	121	143	50	62	25
Future Vol, veh/h	22	121	143	50	62	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	132	155	54	67	27
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8.5	8.5	8.4
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	15%	0%	71%
Vol Thru, %	85%	74%	0%
Vol Right, %	0%	26%	29%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	143	193	87
LT Vol	22	0	62
Through Vol	121	143	0
RT Vol	0	50	25
Lane Flow Rate	155	210	95
Geometry Grp	1	1	1
Degree of Util (X)	0.19	0.243	0.123
Departure Headway (Hd)	4.409	4.176	4.698
Convergence, Y/N	Yes	Yes	Yes
Cap	816	862	764
Service Time	2.423	2.189	2.718
HCM Lane V/C Ratio	0.19	0.244	0.124
HCM Control Delay	8.5	8.5	8.4
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.7	1	0.4

Intersection	
Int Delay, s/veh	2.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	12	54	65	7	6	75
Future Vol, veh/h	12	54	65	7	6	75
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	59	71	8	7	82

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	171	75	0	0	79	0
Stage 1	75	-	-	-	-	-
Stage 2	96	-	-	-	-	-
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	819	986	-	-	1519	-
Stage 1	948	-	-	-	-	-
Stage 2	928	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	815	986	-	-	1519	-
Mov Cap-2 Maneuver	815	-	-	-	-	-
Stage 1	948	-	-	-	-	-
Stage 2	923	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.1	0	0.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	950	1519	-
HCM Lane V/C Ratio	-	-	0.076	0.004	-
HCM Control Delay (s)	-	-	9.1	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	29	7	2	13	13	58	4	111	4	11	66	37
Future Vol, veh/h	29	7	2	13	13	58	4	111	4	11	66	37
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	-	-	-	-	-	-	-	-	-	-	-	-
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	32	8	2	14	14	63	4	121	4	12	72	40

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	286	249	92	252	267	123	112	0	0	125	0	0
Stage 1	116	116	-	131	131	-	-	-	-	-	-	-
Stage 2	170	133	-	121	136	-	-	-	-	-	-	-
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	666	654	965	701	639	928	1478	-	-	1462	-	-
Stage 1	889	800	-	873	788	-	-	-	-	-	-	-
Stage 2	832	786	-	883	784	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	605	646	965	687	631	928	1478	-	-	1462	-	-
Mov Cap-2 Maneuver	605	646	-	687	631	-	-	-	-	-	-	-
Stage 1	886	793	-	870	786	-	-	-	-	-	-	-
Stage 2	759	784	-	865	777	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.2	9.9	0.3	0.7
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1478	-	-	625	823	1462	-	-
HCM Lane V/C Ratio	0.003	-	-	0.066	0.111	0.008	-	-
HCM Control Delay (s)	7.4	0	-	11.2	9.9	7.5	0	-
HCM Lane LOS	A	A	-	B	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.4	0	-	-

Intersection	
Int Delay, s/veh	3.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	48	51	145	53	26	66
Future Vol, veh/h	48	51	145	53	26	66
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	52	55	158	58	28	72

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	315	187	0	0	216	0
Stage 1	187	-	-	-	-	-
Stage 2	128	-	-	-	-	-
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	678	855	-	-	1354	-
Stage 1	845	-	-	-	-	-
Stage 2	898	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	663	855	-	-	1354	-
Mov Cap-2 Maneuver	663	-	-	-	-	-
Stage 1	845	-	-	-	-	-
Stage 2	878	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.6	0	2.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	750	1354	-
HCM Lane V/C Ratio	-	-	0.143	0.021	-
HCM Control Delay (s)	-	-	10.6	7.7	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-

APPENDIX C. SAFETY ANALYSIS

Streets at Southglenn Safety Analysis

A safety review was completed for the fifteen study area intersections to address City of Centennial TIS requirements. The safety review focused on understanding the magnitude and nature of safety problems within the project limits and related crash causality to roadway geometrics, roadside features, traffic control devices, traffic operations, driver behavior, and vehicle type. To uniformly evaluate across all data sources, the crash history of each facility was prepared using five years of data from January 1, 2013 through December 31, 2017. DiExSys™ Vision Zero Suite software was used in performing the safety review for each intersection. The software is a sophisticated and comprehensive suite of analytical tools designed to provide decision support analysis and to incorporate methodology consistent with the Highway Safety Manual (HSM). An assessment of the safety problems at the intersections of interest was refined using the Safety Performance Function (SPF) methodology when data was available. Development of the SPF allows for the determination of the Levels of Service of Safety (LOSS). The concept of LOSS uses qualitative measures that characterize safety of a roadway segment in reference to its expected performance and severity. If the LOSS predicted by the SPF represents a normal or expected number of crashes at a specific level of average daily traffic (ADT), then the degree of deviation from the norm can be stratified to represent specific levels of safety.

The range of LOSS values and their qualitative descriptions are as follows:

- LOSS-I – indicates low potential for crash reduction
- LOSS-II – indicates better than expected safety performance
- LOSS-III – indicates less than expected safety performance
- LOSS-IV – indicates high potential for crash reduction

Gradual change in the degree of deviation of the LOSS boundary line from the fitted model mean reflects the observed increase of variability in crashes as ADT increases. LOSS reflects how the intersection is performing considering its expected crash frequency at a specific level of daily traffic. It only provides a crash frequency comparison with the expected norm. It does not, however, provide any information related to the nature of the safety problem itself. If a safety problem is present, LOSS will only describe its magnitude from a frequency standpoint.

The first step in the process was to evaluate the overall number of collisions in the study area. **Table 3** summarizes crash frequency for each intersection within the study area during the five-year study period. As shown, most of intersection-related crashes occurred at the signalized intersection of S University Boulevard and E Arapahoe Road. Of the 273 total crashes that occurred in the study area, zero crashes resulted in fatalities (FAT), 38 crashes resulted in injury (INJ), and 235 crashes were property damage only (PDO). IT should be noted that the City typically requests a three-year crash study. However, given the zero volumes along S Race St and E Easter Ave, the crash study was expanded to reflect a five-year history.

The intersections within the project area that had greater than five crashes reported within the study timeframe was tested for the presence of patterns related to crash type, severity, direction of travel, road conditions, spatial distribution of crashes, time of day, and behavior attributes. These diagnostic norms were developed using the same data points as the SPF analysis. Locations with five or fewer crashes within the timeframe are noted to not have a crash pattern and do not need additional diagnostics.

The decision to analyze intersections over five crashes is due to the crash distribution within the project site. The seven intersections with five or more crashes experienced the majority of the traffic and therefore are the intersections that pose the greatest danger to public safety. The following report will elaborate on each intersections geometry and include safety analysis for the intersections of concern.

Table 3. Crash Results for Project Site Intersections

Intersection	Signalized	Number of Legs	Reported Crashes January 2013 – December 2017			
			Total	PDO	Injury	Fatality
S University Boulevard and E Easter Pl	Yes	4	32	29	3	0
S University Boulevard and E Davies Ave	No	3	10	8	2	0
S University Boulevard and E Commons Ave	Yes	4	33	26	7	0
S University Boulevard and S York St	No	4	16	15	1	0
S University Boulevard and E Arapahoe Road	Yes	4	137	123	14	0
E Arapahoe Road and S York St	No	4	4	3	1	0
E Arapahoe Road and S Vine St	Yes	4	26	21	5	0
E Arapahoe Road and S Race St	Yes	3	9	5	4	0
S Race St and E Briarwood Ave	No	3	1	1	0	0
S Race St and E Davies Pl	No	4	1	1	0	0
S Race St and E Davies Ave	No	3	1	1	0	0
S Race St and E Easter Ave	No	3	1	0	1	0
Easter Ave and Vine Street	No	4	1	1	0	0
Easter Ave and Gaylord Street	No	3	1	1	0	0
Easter Ave and S York Street (Mall Dwy)	No	3	0	0	0	0
Total Study Area Reported Crashes			**273**	**235**	**38**	**0**

Note: PDO = Property Damage Only

Table 4. Safety Results for Project Site Intersections

Intersection	LOSS	LOSS (Inj + Fatal)
S University Boulevard and E Easter Pl	II	I
S University Boulevard and E Davies Ave	III	II
S University Boulevard and E Commons Ave	II	II
S University Boulevard and S York St	II	II
S University Boulevard and E Arapahoe Road	IV	II
E Arapahoe Road and S York St	I	II
E Arapahoe Road and S Vine St	I	II
E Arapahoe Road and S Race St	I	II
S Race St and E Briarwood Ave	III	II
S Race St and E Davies Pl	III	II
S Race St and E Davies Ave	III	II
S Race St and E Easter Ave	III	III
Easter Ave and Vine Street	III	II
Easter Ave and Gaylord Street	II	II
Easter Ave and S York Street (Mall Dwy)	II	II

S University Boulevard and E Easter Pl

The intersection of S University Boulevard and E Easter Ave is a four-leg, signalized intersection. 32 crashes were observed at the intersection during the study period. Therefore, the intersection was analyzed for crash patterns.

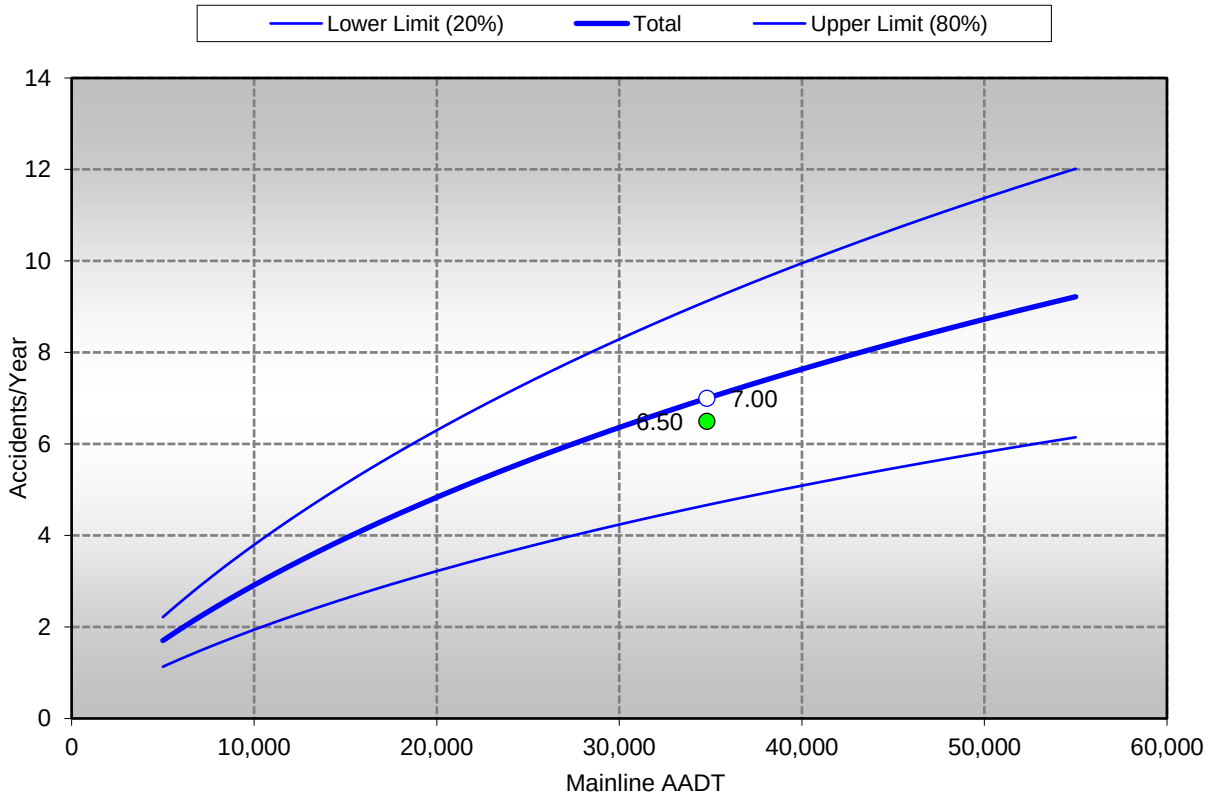
Safety Performance Function Analysis

For this intersection, an average of nearly seven crashes was observed per year during the study period (uncorrected). Figure 1 shows that the observed crash frequency is below the expected value for an urban four-lane divided signalized four-leg intersection. This indicates that the intersection operates with better than expected safety performance (LOSS II).

Crash History

During the five-year study period, there were 32 reported crashes at the intersection of S University Boulevard and Easter Pl. Figure 2 displays a graphical representation of the crash type distribution for this location. Based on the information from the CDOT DiExSys™ Roadway Safety Systems, the frequency of all crash types is expected, and no single type exceeds a statistical norm expected for the four-leg signalized intersection.

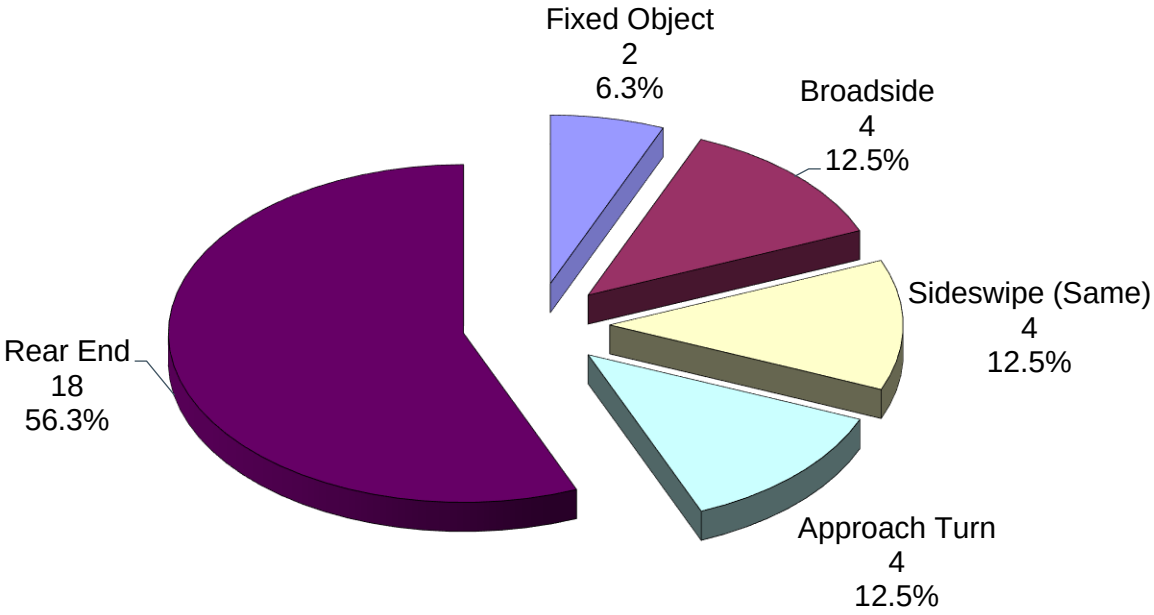
Figure 1. SPF for S University Boulevard & E Easter Pl



Observations and Recommendations

The frequency of all crash types is expected for a four-leg signalized intersection with an AADT greater than 35,000. The crash types for the intersection of S University Boulevard and Easter Pl is illustrated below in Figure 2.

Figure 2. Crash Distribution by Type for S University Boulevard & E Easter Pl



S University Boulevard and E Davies Ave

The intersection of S University Boulevard and E Davies Ave is a three-leg, unsignalized intersection. During the study period, 10 crashes were recorded. Therefore, the intersection was analyzed for crash patterns.

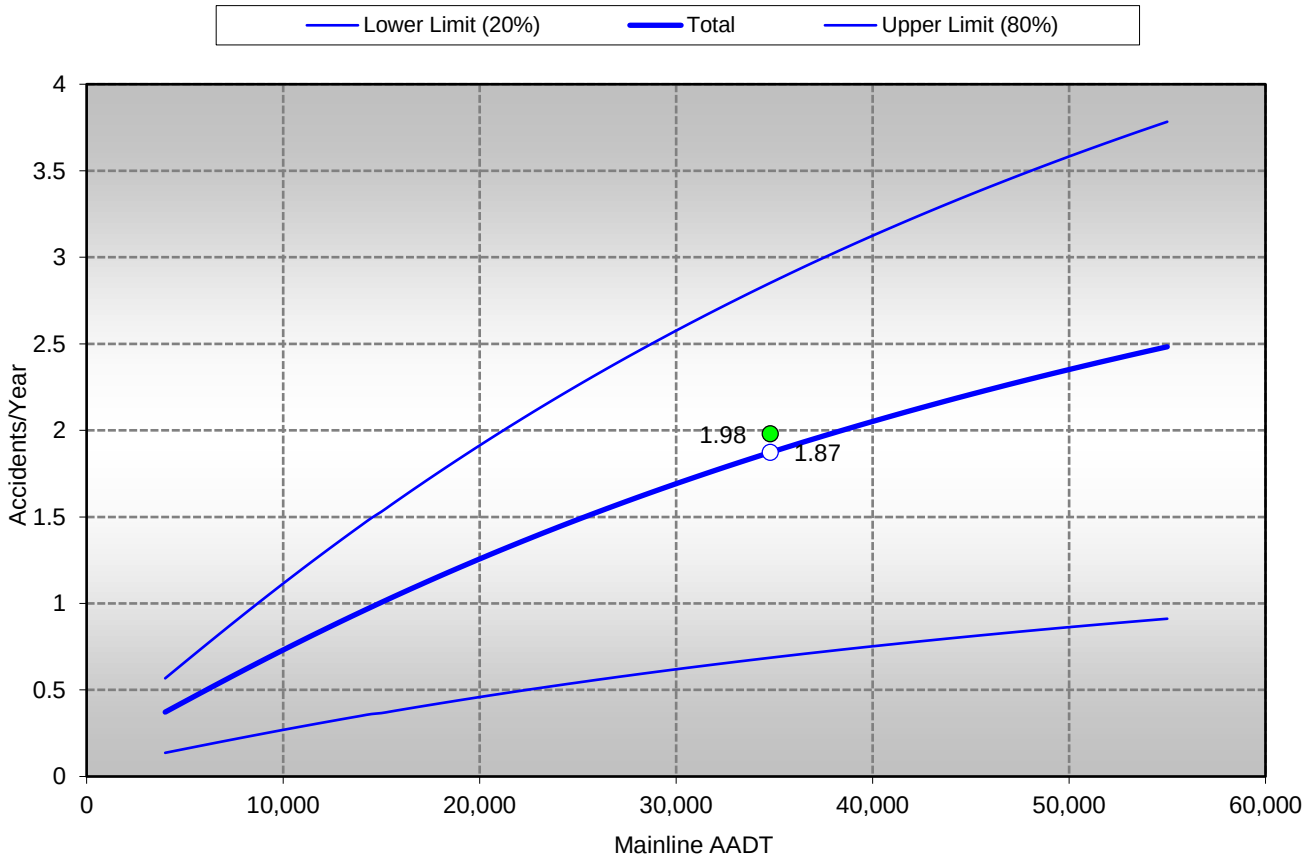
Safety Performance Function Analysis

For this intersection, an average of less than 2 crashes were observed per year during the study period (uncorrected). Figure 3 displays that the observed crash frequency is above the expected value for an urban four-lane divided unsignalized three-leg intersection. This indicates less than expected safety performance (LOSS III).

Crash History

During the five-year study period, there were 10 reported crashes at the intersection of S University Boulevard and E Davies Ave. Figure 4 displays a graphical representation of the crash type distribution for this location. Based on the information from the CDOT DiExSys™ Roadway Safety Systems the frequency of approach turn crashes is higher than expected for this intersection.

Figure 3. SPF for S University Boulevard & E Davies Ave

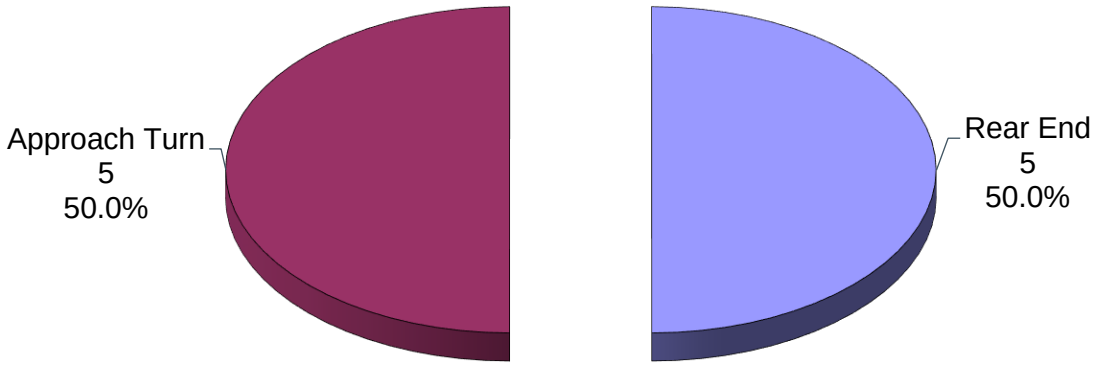


Observations and Recommendations

The frequency of approach turn crashes is higher than expected for this intersection. Approach Turn crashes occurred during dry conditions and involved two vehicles. The crashes occurred mostly during daytime with dry road conditions. Two injuries occurred at the intersection due to approach turn crashes. Based on the information from CDOT DiExSys™ Roadway Safety Systems the expected percentage of approach turn crashes at this specific intersection geometry is 12%. The percentage of approach turn crashes observed at this intersection was 50%, this indicates an issue regarding the movement of vehicles turning left across the mainline from both the northbound and eastbound approach. Based on the information from the CDOT DiExSys™ Roadway Safety Systems Direct Diagnostics, the frequency of approach crashes at this intersection is in the 99.96th percentile. See Appendix G for the direct diagnostics output.

Approach Turn crashes can be reduced by restricting the S University Blvd and E Davies Ave intersection to Right In-Right Out (RiRo) movements. Left turns across the mainline from the northbound and eastbound approach would be restricted and therefore the above average approach-turn crash frequency and the related injuries would be reduced.

Figure 4. Crash Distribution by Type for S University Boulevard & E Davies Ave



S University Boulevard and E Commons Ave

The intersection of S University Boulevard and E Commons Ave is a divided four-leg signalized intersection. During the study period, 33 crashes were recorded. Therefore, the intersection was analyzed for crash patterns.

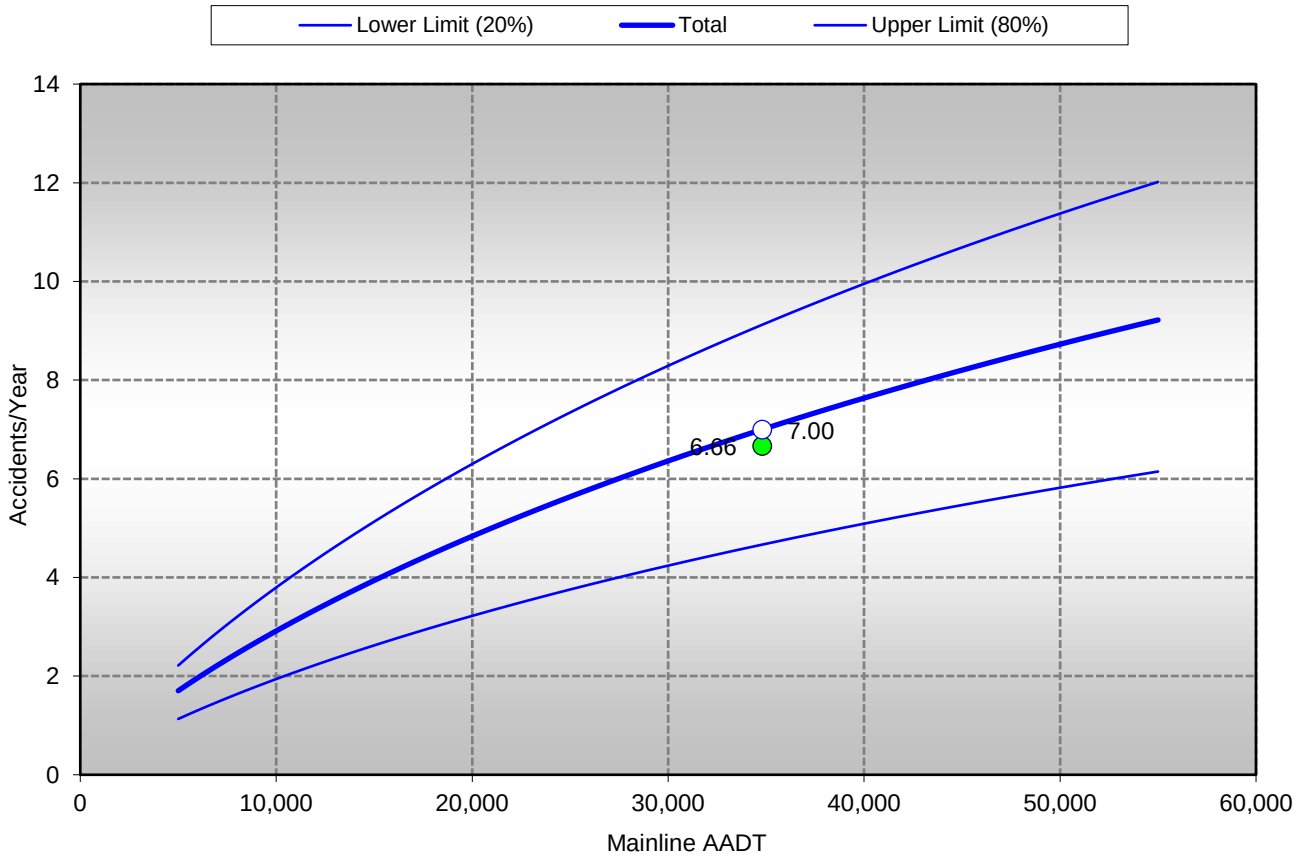
Safety Performance Function Analysis

For this intersection, an average of nearly seven crashes was observed per year during the study period (uncorrected). Figure 5 shows that the observed crash frequency is above the expected value for an urban four-lane divided signalized four-leg intersection. This indicates that the intersection operates with better than expected safety performance (LOSS II).

Crash History

During the five-year study period, there were 33 reported crashes at the intersection of S University Boulevard and E Commons Ave. Figure 6 displays a graphical representation of the crash type distribution for this location. Based on the information from the CDOT DiExSys™ Roadway Safety Systems the frequency of approach turn crashes and crashes involving pedestrians is higher than expected.

Figure 5. SPF for S University Boulevard & E Commons Ave



Observations and Recommendations

The frequency of approach turn crashes is higher than expected for this intersection. Approach Turn crashes occurred during dry conditions and involved two vehicles. The crashes occurred mostly during daytime with dry road conditions. Two injuries occurred at the intersection due to approach turn crashes.

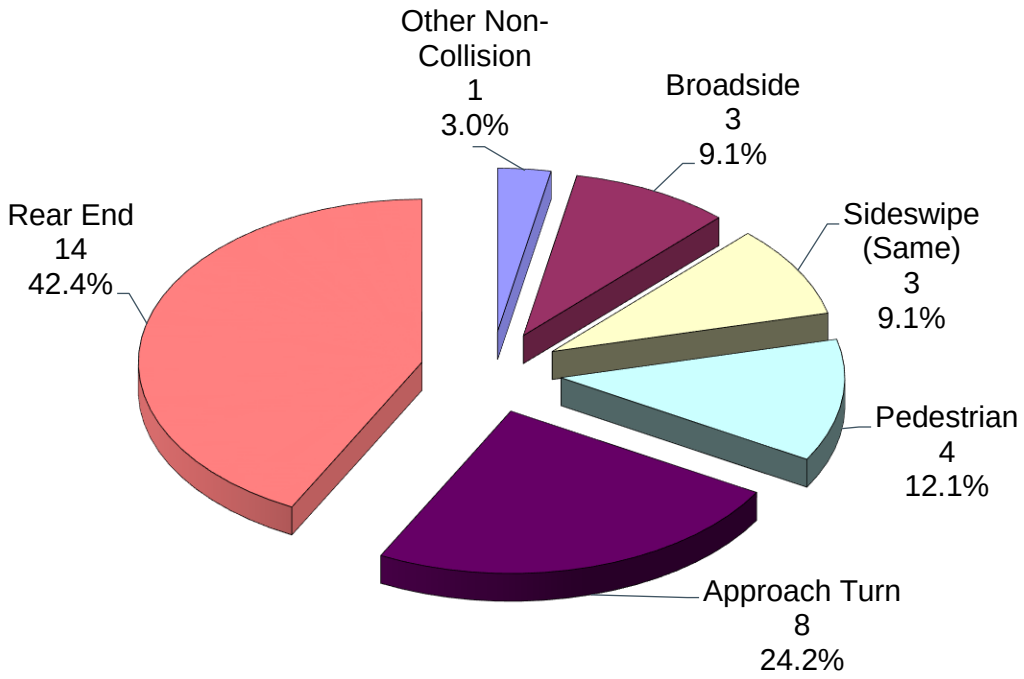
Based on the information from CDOT DiExSys™ Roadway Safety Systems the expected percentage of approach turn crashes at this specific intersection geometry is 15.8%. The percentage of approach turn crashes observed at this intersection was 24.2%. Based on the information from the CDOT DiExSys™ Roadway Safety Systems Direct Diagnostics, the frequency of approach turn crashes does not exceed the 95th percentile. See Appendix G for the direct diagnostics output.

Approach Turn crashes at the University Blvd and Commons Ave intersection have all been identified as left turn movements on the northbound approach and all occurred between the years of 2013 to 2017. The City of Centennial in the year 2018 introduced flashing yellow arrows to the 5-section signal heads on the northbound and southbound approaches and changed the permitted left turn lanes on the east and west bound approaches to protected left turns. According to the Crash Modification Factors Clearinghouse a flashing yellow arrow with supplemental traffic signals installation decreases accident probability by 14.3%. Since the flashing yellow left turn arrow implementation, no crashes have been recorded.

The frequency of crashes including pedestrians is higher than expected for this intersection. Thee crashes within the three-year study period included pedestrians. A typical two lane three-leg divided unsignalized intersection predicts a norm of 1.2% for pedestrians crashes out of all crash types. An estimated 12% of all crashes at this intersection are pedestrian related accidents. Based on the information from the CDOT DiExSys™ Roadway Safety Systems Direct Diagnostics, the frequency of pedestrians related crashes is in the 99.97th percentile. See Appendix G for the direct diagnostics output.

Pedestrian related crashes at the University Blvd and Commons Ave intersection have all been identified as vehicles making right turns. The current site has signage installed mandating vehicle drivers to yield to pedestrians crossing from the sidewalk onto the pedestrian islands. To further protect pedestrians and lower the frequency of pedestrian related accidents at this intersection raised walkways between the sidewalk and the pedestrian islands. The raised walkways would reduce vehicle speed and increase vehicle driver's ability to identify crossing pedestrians.

Figure 6. Crash Distribution by Type for S University Boulevard & E Davies Ave



S University Boulevard and S York Street

The intersection of S University Boulevard and S York St is a divided three-leg unsignalized intersection with a Right In-Right Out (RiRo) restriction on the southbound approach. During the study period, 16 crashes were recorded. Therefore, the intersection was analyzed for crash patterns.

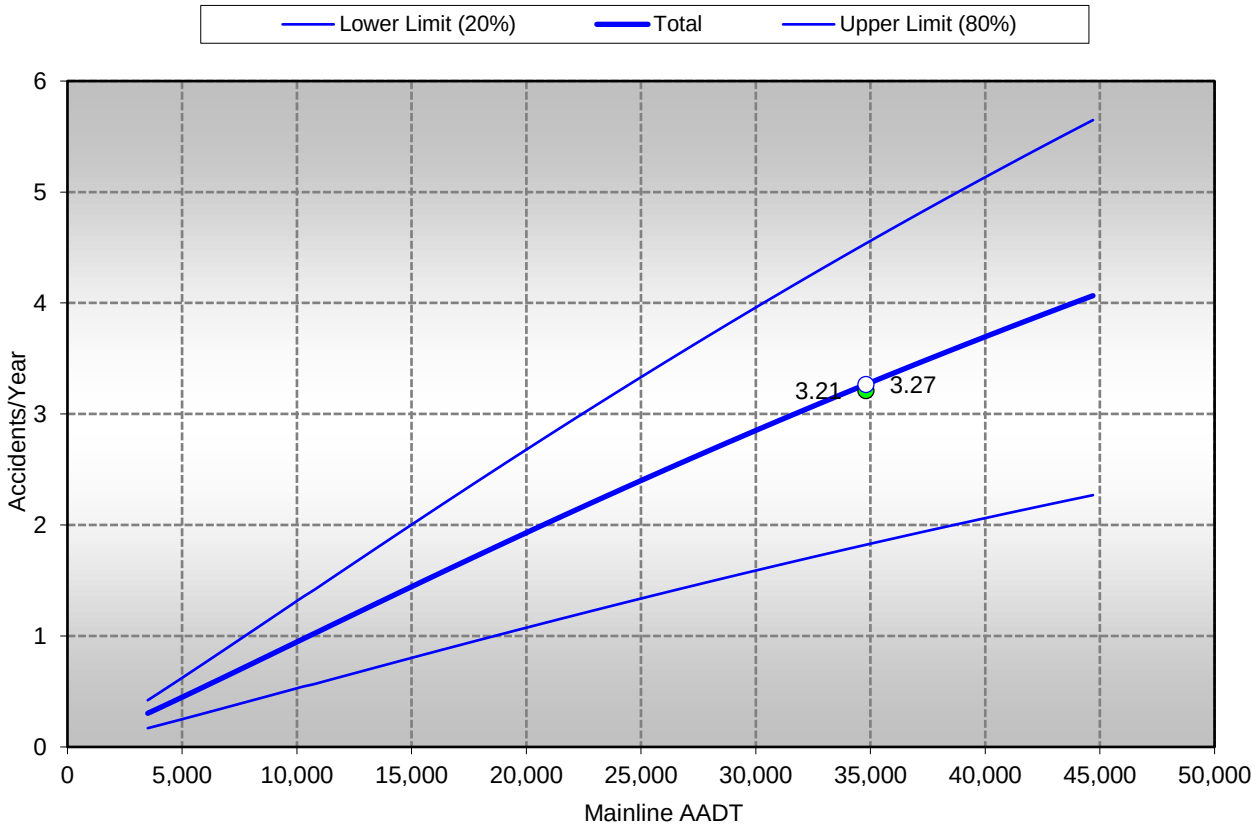
Safety Performance Function Analysis

For this intersection, an average of nearly three crashes was observed per year during the study period (uncorrected). Figure 7 shows that the observed crash frequency is below the expected value for an urban four-lane divided three-leg unsignalized intersection. This indicates that the intersection operates with better than expected safety performance (LOSS II).

Crash History

During the five-year study period, there were 16 reported crashes at the intersection of S University Boulevard and S York St. Figure 8 displays a graphical representation of the crash type distribution for this location. Based on the information from the CDOT DiExSys™ Roadway Safety Systems the frequency of rear end crashes is higher than expected.

Figure 7. SPF for S University Boulevard & S York St

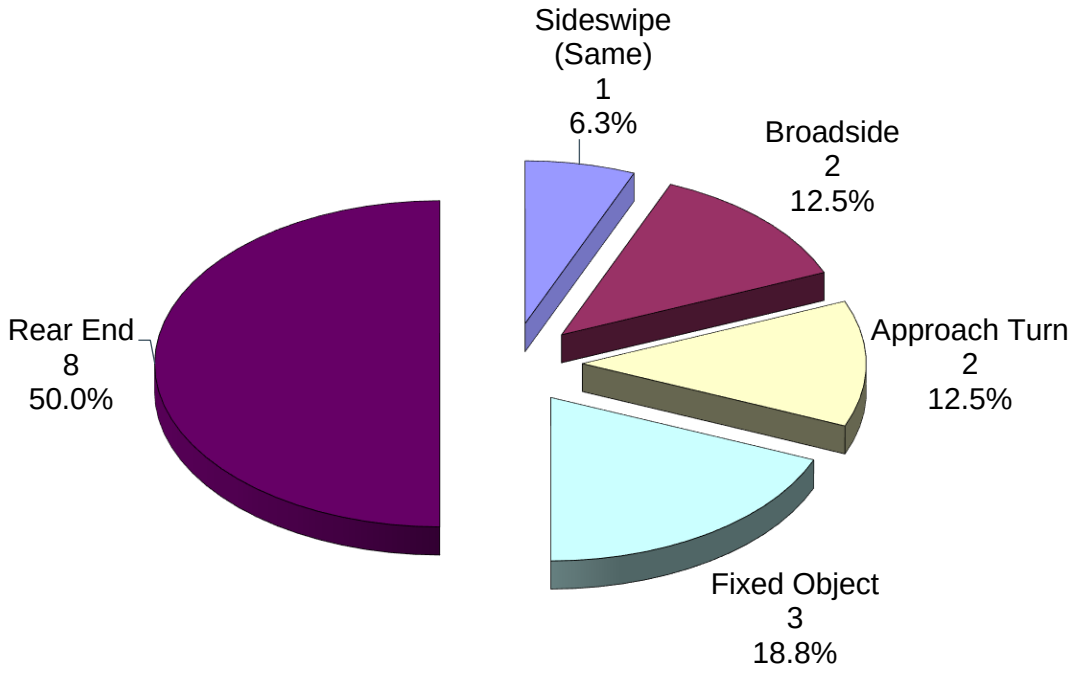


Observations and Recommendations

The frequency of rear-end crashes is higher than expected for this intersection. The majority of Rear-end crashes occurred during dry conditions, with one crash occurring during icy conditions and one during snowy conditions. The crashes occurred mostly during peak traffic hours. No injuries occurred at the intersection due to rear-end crashes. Based on the information from CDOT DiExSys™ Roadway Safety Systems the expected percentage of approach turn crashes at this specific intersection geometry is 32.2%. The percentage of approach turn crashes observed at this intersection was 50%. Based on the information from the CDOT DiExSys™ Roadway Safety Systems Direct Diagnostics, the frequency of approach crashes is in the 95.93th percentile. See Appendix G for the direct diagnostics output.

The rear-end crashes are not likely due to the intersection geometry. The majority of the crashes occurred during congestion in peak commute hours and/or with varying weather conditions. Crashes occurring at this intersection could be from potential queuing during peak hour traffic congestion on the northbound approach of the S University Blvd and E Arapahoe Rd intersection.

Figure 8. Crash Distribution by Type for S University Boulevard & S York St



S University Boulevard and E Arapahoe Road

The intersection of S University Boulevard and E Arapahoe Road is four-leg signalized intersection. During the study period, 137 crashes were recorded. Therefore, the intersection was analyzed for crash patterns.

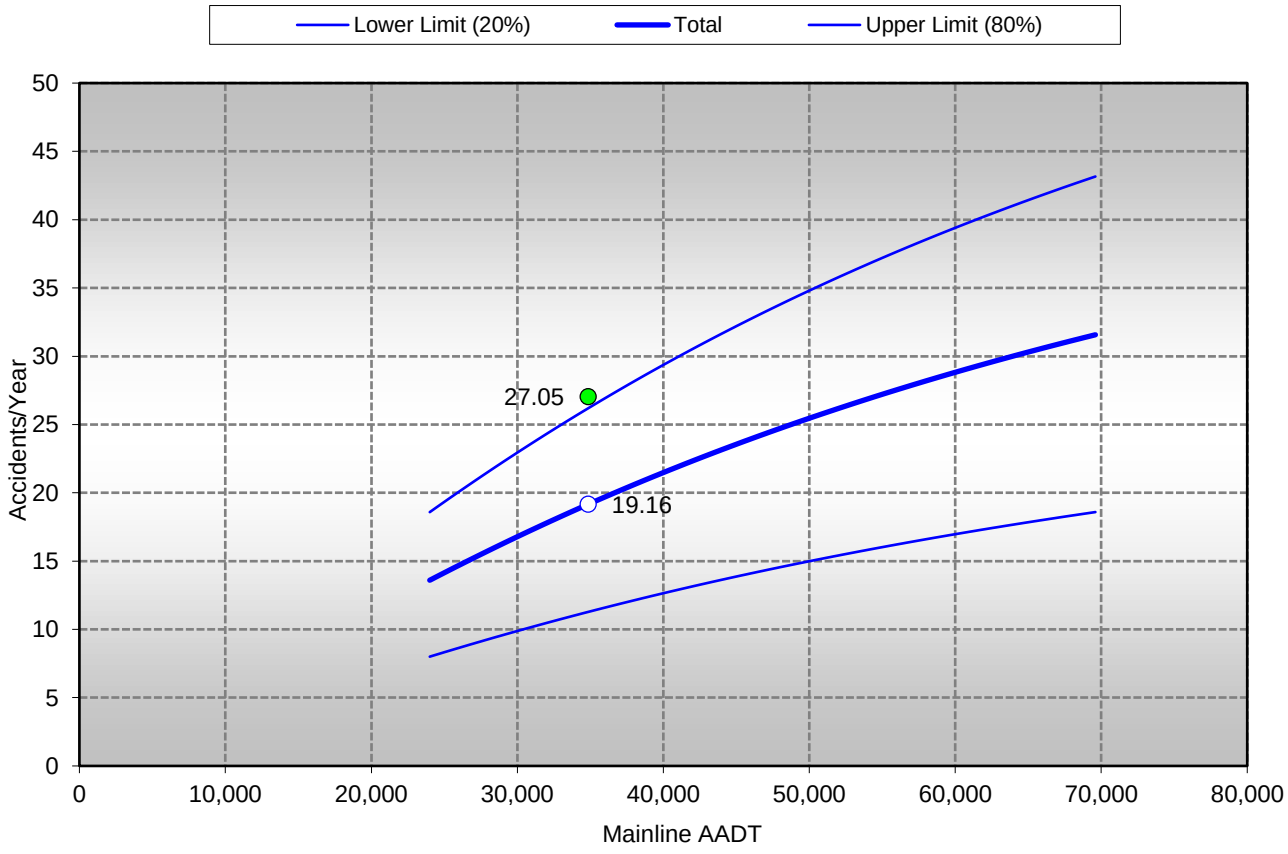
Safety Performance Function Analysis

For this intersection, an average of nearly 28 crashes was observed per year during the study period (uncorrected). Figure 9 shows that the observed crash frequency is above the expected value for an urban six-lane divided signalized four-leg intersection. This indicates that the intersection operates with high potential for crash reduction (LOSS IV).

Crash History

During the five-year study period, there were 137 reported crashes at the intersection of S University Boulevard and E Arapahoe Rd. Figure 10 displays a graphical representation of the crash type distribution for this location. Based on the information from the CDOT DiExSys™ Roadway Safety Systems the frequency of sideswipe (same direction) crashes is higher than expected.

Figure 9. SPF for S University Boulevard & E Arapahoe Road

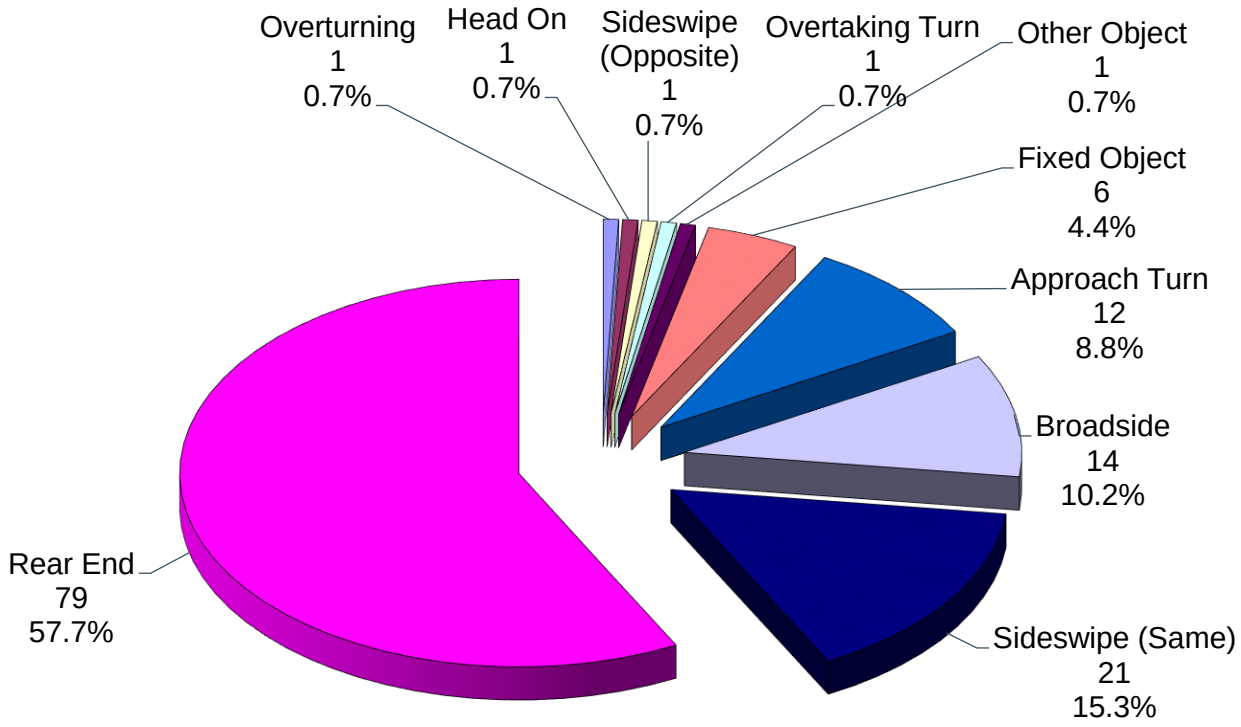


Observations and Recommendations

The frequency of sideswipe (same direction) crashes is higher than expected for this intersection. The recorded sideswipe crashes occurred most commonly during dry weather and during daytime. Only one of the twenty-two sideswipe crashes resulted in injury, with the rest being a property damage only. Based on the information from the CDOT DiExSys™ Roadway Safety Systems the expected percentage for sideswipe crashes at this intersection sideswipe crashes should represent 10.6% of all crashes. At the intersection of Arapahoe Rd and University Blvd the sideswipe crashes represent 15.3% within the five-year time period. The twenty-two sideswipe crashes were distributed by direction and are as follows: ten crashes involved SB vehicles, six crashes involved NB vehicles, four crashes involved WB vehicles, and one crashes involved an EB vehicles. The majority of the sideswipe crashes involved vehicles going straight. Based on the information from the CDOT DiExSys™ Roadway Safety Systems Direct Diagnostics, the frequency of sideswipe (same direction) crashes is in the 96.95 percentile. See Appendix G for the direct diagnostics output.

This array of roadway conditions, travel directions, and vehicle maneuvers shows that although the frequency of sideswipe crashes is high, there is no definitive pattern related to a feature of the intersection and can be attributed to the reduction of lanes of lanes and/or congestion.

Figure 10. Crash Distribution by Type for S University Boulevard & E Arapahoe Road



E Arapahoe Road and S Vine St

The intersection of E Arapahoe Road and S Vine St is four-leg signalized intersection. During the study period, 26 crashes were recorded. Therefore, the intersection was analyzed for crash patterns.

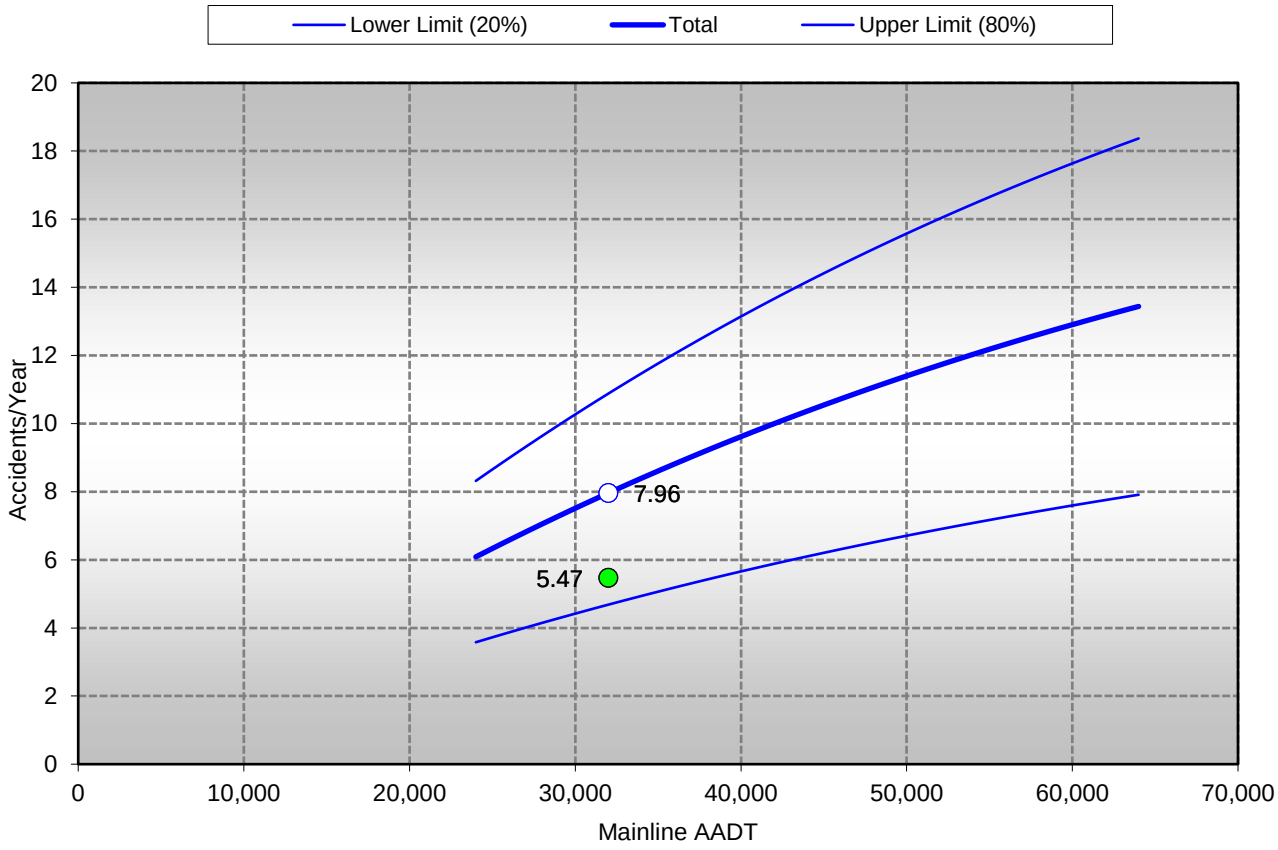
Safety Performance Function Analysis

For this intersection, an average of nearly 5 crashes was observed per year during the study period (uncorrected). Figure 11 shows that this observed crash frequency is below the expected value for an urban four-lane divided signalized four-leg intersection. This indicates that the intersection operates with better than expected level of safety (LOSS II).

Crash History

During the five-year study period, there were 26 reported crashes at the intersection of E Arapahoe Rd and S Vine St. Figure 12 displays a graphical representation of the crash type distribution for this location. Based on the information from the CDOT DiExSys™ Roadway Safety Systems the frequency of approach turn crashes and sideswipe (same direction) crashes is higher than expected.

Figure 11. SPF for E Arapahoe Road & S Vine St



Observations and Recommendations

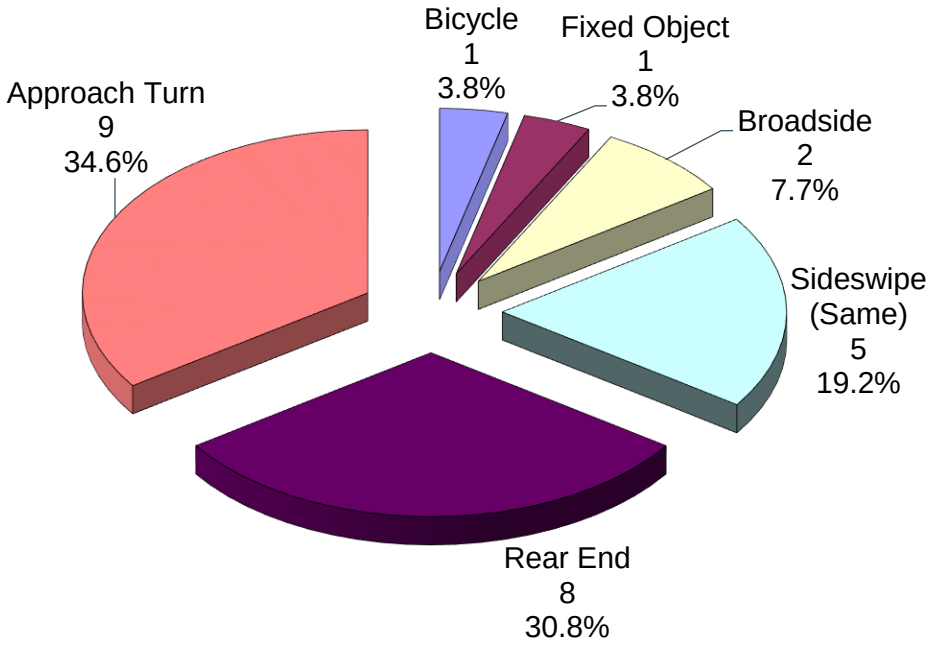
The frequency of approach turn crashes is higher than expected for this intersection. The majority of the approach turn crashes occurred during dry weather conditions and involved two vehicles. The crashes occurred during daytime with dry road conditions with the exception of one wet road accident. Two injuries occurred at the intersection due to approach turn crashes. Based on the information from CDOT DiExSys™ Roadway Safety Systems the expected percentage of approach turn crashes at this specific intersection geometry is 17.2%. The percentage of approach turn crashes observed at this intersection was 34.6%. According to the information acquired from the CDOT DiExSys™ Roadway Safety Systems Direct Diagnostics, the frequency of approach turn crashes is in the 99.19th percentile. See Appendix J for the direct diagnostics output.

Approach Turn crashes at the Arapahoe Rd and Vine St intersection have been identified as left turn movements. The majority of the approach turn crashes occur as vehicles turn onto the mainline. For both the northbound and southbound approach of Vine St the left turns are permitted but not protected. The vehicles leaving Vine St and turning onto Arapahoe Road are crossing the majority of the vehicle traffic. Introducing a protected left turn for the NB and SB approaches on Vine St would reduce approach turn crashes at this intersection.

The frequency of sideswipe (same direction) crashes is higher than expected for this intersection. The majority of the sideswipe crashes at this intersection are due to vehicles changing lanes. Based on the information from CDOT DiExSys™ Roadway Safety Systems the expected percentage of approach turn crashes at this specific intersection geometry is 10.6%. The percentage of approach turn crashes observed at this intersection was 19.2%. According to the information acquired from the CDOT DiExSys™ Roadway Safety Systems Direct Diagnostics, the frequency of approach turn crashes is in the 95th percentile. See Appendix G for the direct diagnostics output.

Sideswipe (same direction) crashes at the Arapahoe Rd and Vine St intersection have been identified as vehicle changing lanes. This can most likely be attributed to the addition of a thru lane as vehicles travel eastbound through the intersection.

Figure 12. Crash Distribution by Type E Arapahoe Road & S Vine St



E Arapahoe Road and S Race St

The intersection of E Arapahoe Road and S Race St is three-leg signalized intersection. During the study period, nine crashes were recorded. Therefore, the intersection was analyzed for crash patterns.

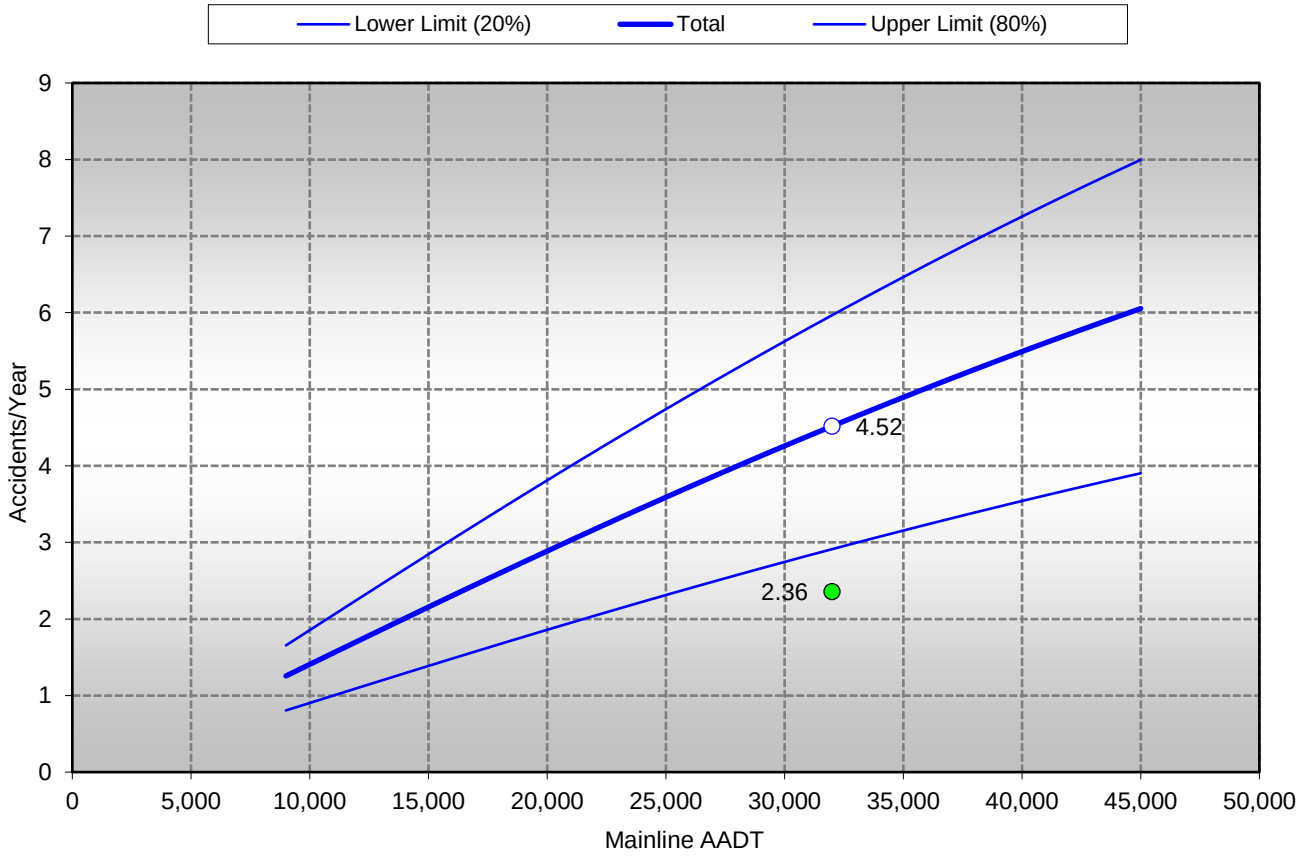
Safety Performance Function Analysis

For this intersection, an average of nearly two crashes was observed per year during the study period (uncorrected). Figure 13 shows that this observed crash frequency is below the expected value for an urban four-lane divided signalized three-leg intersection. This indicates that the intersection operates with better than expected level of safety (LOSS I).

Crash History

During the three-year study period, there were nine reported crashes at the intersection of E Arapahoe Rd and S Race St. Figure 14 displays a graphical representation of the crash type distribution for this location. Based on the information from the CDOT DiExSys™ Roadway Safety Systems the frequency of all crash types is expected, and no single type exceeds a statistical norm expected for the three-leg signalized intersection.

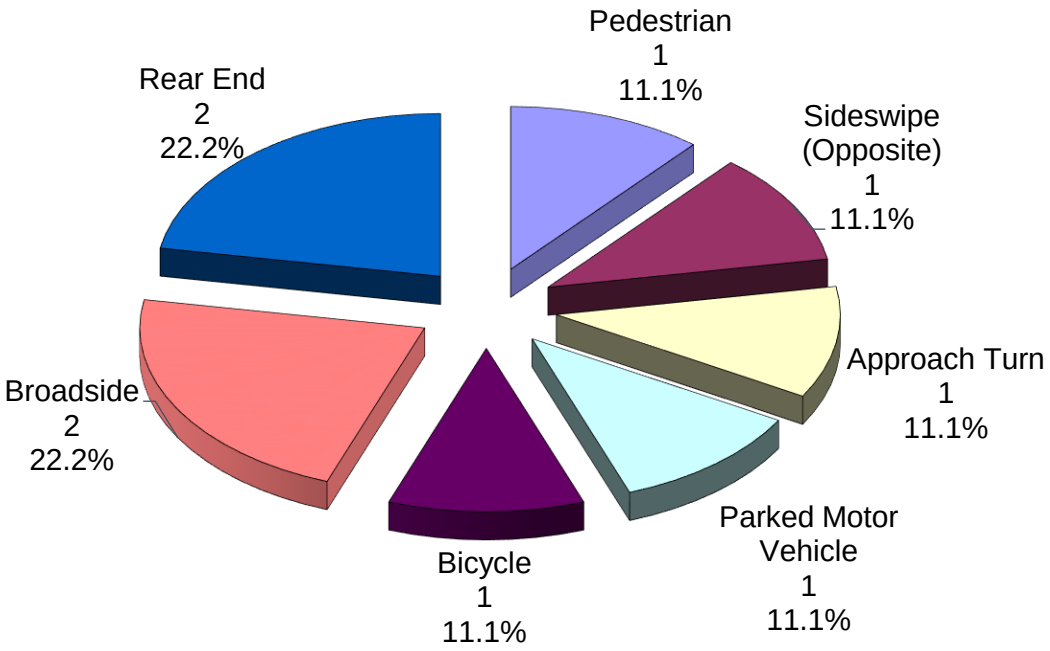
Figure 13. SPF for E Arapahoe Road & S Vine St



Observations and Recommendations

The frequency of all crash types for this three-leg signalized intersection with an AADT less than 35,000 is expected. The crash types for the intersection of E Arapahoe Road and S Race St are illustrated below in Figure 14.

Figure 14. Crash Distribution by Type E Arapahoe Road & S Vine St



The following intersections experienced less than five crashes during the three-year study period.

E Arapahoe Road and S York St

The intersection of E Arapahoe Road and S York St is four-leg unsignalized intersection.
During the study period, four crashes were recorded. Two of the crashes reported at this intersection were approach turn crashes between two vehicles. The result of both crashes was property damage. The other two crashes observed at this intersection were a broadside crash and a rear-end crash.

S Race St and E Briarwood Ave

The intersection of S Race St and E Briarwood Ave is three-leg unsignalized intersection. During the study period, one crash was recorded. The single crash reported at this intersection was a parked car crash between two vehicles. The result of the crash was property damage.

S Race St and E Davies Ave

The intersection of S Race St and E Davies Ave is three-leg unsignalized intersection. During the study period, one crash was recorded. The single crash reported at this intersection was a parked car crash between two vehicles. The result of the crash was property damage.

S Race St and E Easter Ave

The intersection of S Race St and E Easter Ave is three-leg unsignalized intersection. During the study period, one crash was recorded. The single crash reported at this intersection was a broadside crash between two vehicles. The result of the crash was injury.

Easter Ave and S Vine St

The intersection of E Easter Ave and S Vine St is three-leg unsignalized intersection. During the study period, one crash was recorded. The single crash reported at this intersection was a broadside crash between two vehicles. The result of the crash was property damage.

S Race St and E Davies Pl (Garage Access)

The intersection of S Race St and E Briarwood Ave is four-leg unsignalized intersection. During the study period, one crash was recorded. The single crash reported was a broadside crash. The result of the crash was property damage.

Easter Ave and Gaylord St

The intersection of E Easter Ave and Gaylord St is three-leg unsignalized intersection. During the study period, one crash was recorded. The single crash reported was an overtaking turn. The result of the crash was property damage.

Easter Ave and S York St

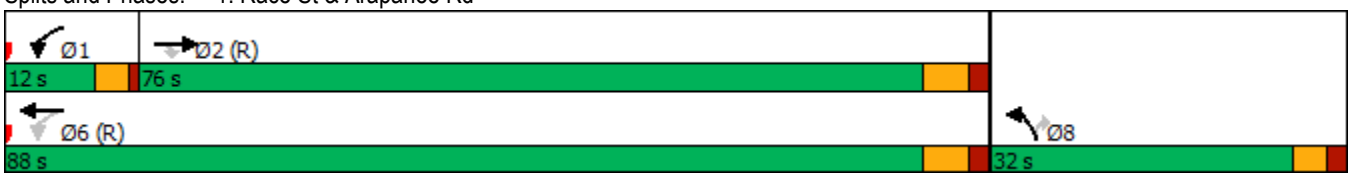
The intersection of E Easter Ave and S York St is three-leg unsignalized intersection. During the study period, no crashes were recorded.

APPENDIX D. BACKGROUND TRAFFIC OPERATIONAL ANALYSIS WORKSHEETS

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1243	70	51	832	54	37
Future Volume (vph)	1243	70	51	832	54	37
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	17.0	17.0	3.0	17.0	5.0	5.0
Minimum Split (s)	23.0	23.0	7.0	23.0	30.0	30.0
Total Split (s)	76.0	76.0	12.0	88.0	32.0	32.0
Total Split (%)	63.3%	63.3%	10.0%	73.3%	26.7%	26.7%
Yellow Time (s)	4.0	4.0	3.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effct Green (s)	93.8	93.8	102.1	101.3	10.9	10.9
Actuated g/C Ratio	0.78	0.78	0.85	0.84	0.09	0.09
v/c Ratio	0.46	0.06	0.15	0.20	0.34	0.22
Control Delay	7.5	3.7	1.9	0.5	54.1	16.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.5	3.7	1.9	0.5	54.1	16.1
LOS	A	A	A	A	D	B
Approach Delay	7.3			0.6	38.6	
Approach LOS	A			A	D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 111 (93%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.46	
Intersection Signal Delay: 5.9	Intersection LOS: A
Intersection Capacity Utilization 56.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: Race St & Arapahoe Rd



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1243	70	51	832	54	37
Future Volume (veh/h)	1243	70	51	832	54	37
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1268	71	52	849	55	38
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2873	1276	383	4404	82	73
Arrive On Green	0.81	0.81	0.02	0.86	0.05	0.05
Sat Flow, veh/h	3647	1578	1781	5274	1781	1585
Grp Volume(v), veh/h	1268	71	52	849	55	38
Grp Sat Flow(s),veh/h/ln	1777	1578	1781	1702	1781	1585
Q Serve(g_s), s	12.7	1.1	0.6	3.3	3.6	2.8
Cycle Q Clear(g_c), s	12.7	1.1	0.6	3.3	3.6	2.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2873	1276	383	4404	82	73
V/C Ratio(X)	0.44	0.06	0.14	0.19	0.67	0.52
Avail Cap(c_a), veh/h	2873	1276	466	4404	401	357
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.97	0.97	1.00	1.00
Uniform Delay (d), s/veh	3.4	2.3	2.5	1.4	56.4	56.0
Incr Delay (d2), s/veh	0.5	0.1	0.1	0.1	3.6	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.3	0.1	0.5	1.7	1.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	3.9	2.4	2.6	1.5	59.9	58.1
LnGrp LOS	A	A	A	A	E	E
Approach Vol, veh/h	1339			901	93	
Approach Delay, s/veh	3.8			1.5	59.2	
Approach LOS	A			A	E	

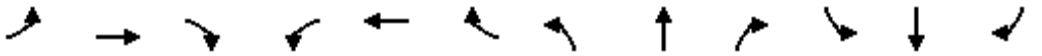
Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	6.5	103.0				109.5	10.5
Change Period (Y+Rc), s	4.0	6.0				6.0	5.0
Max Green Setting (Gmax), s	8.0	70.0				82.0	27.0
Max Q Clear Time (g_c+I1), s	2.6	14.7				5.3	5.6
Green Ext Time (p_c), s	0.0	7.3				4.3	0.1

Intersection Summary			
HCM 6th Ctrl Delay		5.1	
HCM 6th LOS		A	

Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	37	1212	46	832	4	27	6	27
Future Volume (vph)	37	1212	46	832	4	27	6	27
Turn Type	pm+pt	NA	pm+pt	NA	NA	Perm	NA	Perm
Protected Phases	5	2	1	6	8		4	
Permitted Phases	2		6			8		4
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	3.0	17.0	3.0	17.0	5.0	5.0	5.0	5.0
Minimum Split (s)	7.0	26.0	7.0	23.0	35.0	35.0	34.0	34.0
Total Split (s)	12.0	72.0	12.0	72.0	18.0	18.0	18.0	18.0
Total Split (%)	10.0%	60.0%	10.0%	60.0%	15.0%	15.0%	15.0%	15.0%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	85.3	78.9	86.4	80.8	7.5	7.5	11.9	11.9
Actuated g/C Ratio	0.71	0.66	0.72	0.67	0.06	0.06	0.10	0.10
v/c Ratio	0.10	0.39	0.16	0.29	0.27	0.14	0.79	0.11
Control Delay	6.1	9.3	7.7	10.5	58.3	1.5	82.0	0.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.1	9.3	7.7	10.5	58.3	1.5	82.0	0.9
LOS	A	A	A	B	E	A	F	A
Approach Delay		9.2		10.4	30.9		68.3	
Approach LOS		A		B	C		E	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 102 (85%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	
Natural Cycle: 105	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 13.9	Intersection LOS: B
Intersection Capacity Utilization 55.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Vine St & Arapahoe Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	1212	27	46	832	104	25	4	27	125	6	27
Future Volume (veh/h)	37	1212	27	46	832	104	25	4	27	125	6	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.94	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	39	1276	28	48	876	109	26	4	28	132	6	28
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	476	3455	76	380	3100	384	71	11	69	162	7	146
Arrive On Green	0.04	1.00	1.00	0.04	1.00	1.00	0.05	0.05	0.05	0.10	0.10	0.10
Sat Flow, veh/h	1781	5141	113	1781	4599	570	1554	239	1492	1707	78	1540
Grp Volume(v), veh/h	39	845	459	48	647	338	30	0	28	138	0	28
Grp Sat Flow(s),veh/h/ln	1781	1702	1849	1781	1702	1764	1793	0	1492	1785	0	1540
Q Serve(g_s), s	0.8	0.0	0.0	1.0	0.0	0.0	1.9	0.0	2.2	9.1	0.0	2.0
Cycle Q Clear(g_c), s	0.8	0.0	0.0	1.0	0.0	0.0	1.9	0.0	2.2	9.1	0.0	2.0
Prop In Lane	1.00		0.06	1.00		0.32	0.87		1.00	0.96		1.00
Lane Grp Cap(c), veh/h	476	2288	1243	380	2295	1189	82	0	69	170	0	146
V/C Ratio(X)	0.08	0.37	0.37	0.13	0.28	0.28	0.36	0.00	0.41	0.81	0.00	0.19
Avail Cap(c_a), veh/h	562	2288	1243	462	2295	1189	194	0	162	193	0	167
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.89	0.89	0.89	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.8	0.0	0.0	5.7	0.0	0.0	55.5	0.0	55.7	53.3	0.0	50.0
Incr Delay (d2), s/veh	0.0	0.4	0.8	0.1	0.3	0.6	1.0	0.0	1.4	18.0	0.0	0.2
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	0.3	0.1	0.3	0.3	0.1	0.2	0.9	0.0	0.9	4.9	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.8	0.4	0.8	5.8	0.3	0.6	56.5	0.0	57.1	71.3	0.0	50.3
LnGrp LOS	A	A	A	A	A	A	E	A	E	E	A	D
Approach Vol, veh/h		1343			1033			58			166	
Approach Delay, s/veh		0.7			0.7			56.8			67.7	
Approach LOS		A			A			E			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.4	86.6		16.4	6.2	86.9		10.5				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	8.0	66.0		13.0	8.0	66.0		13.0				
Max Q Clear Time (g_c+I1), s	3.0	2.0		11.1	2.8	2.0		4.2				
Green Ext Time (p_c), s	0.0	6.9		0.1	0.0	4.7		0.1				

Intersection Summary			
HCM 6th Ctrl Delay		6.2	
HCM 6th LOS		A	

Notes

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

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	1297	25	5	905	5	0	0	24	0	0	14
Future Vol, veh/h	16	1297	25	5	905	5	0	0	24	0	0	14
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	150	-	0	100	-	-	-	-	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	17	1410	27	5	984	5	0	0	26	0	0	15

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	989	0	0	1437	0	0	-	-	705	-	-	495
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	5.34	-	-	5.34	-	-	-	-	7.14	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	-	-	3.92	-	-	3.92
Pot Cap-1 Maneuver	897	-	-	762	-	-	0	0	*629	0	0	*716
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %	1	-	-	1	-	-			1			1
Mov Cap-1 Maneuver	897	-	-	762	-	-	-	-	*629	-	-	*716
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	11	10.1
HCM LOS			B	B

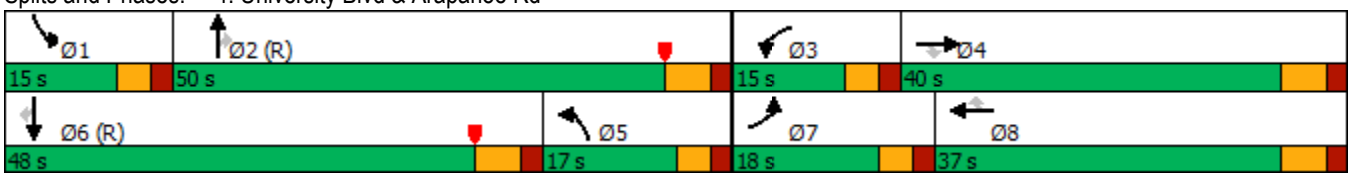
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	629	897	-	-	762	-	-	716
HCM Lane V/C Ratio	0.041	0.019	-	-	0.007	-	-	0.021
HCM Control Delay (s)	11	9.1	-	-	9.8	-	-	10.1
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.1

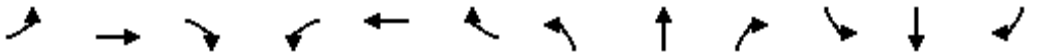
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	184	956	212	210	525	367	251	1169	142	227	815	163
Future Volume (vph)	184	956	212	210	525	367	251	1169	142	227	815	163
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	10.0	10.0	3.0	10.0	10.0
Minimum Split (s)	8.0	39.0	39.0	8.0	37.0	37.0	8.0	35.0	35.0	8.0	40.0	40.0
Total Split (s)	18.0	40.0	40.0	15.0	37.0	37.0	17.0	50.0	50.0	15.0	48.0	48.0
Total Split (%)	15.0%	33.3%	33.3%	12.5%	30.8%	30.8%	14.2%	41.7%	41.7%	12.5%	40.0%	40.0%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	10.4	29.9	29.9	9.6	29.2	29.2	12.0	48.6	48.6	9.8	46.4	46.4
Actuated g/C Ratio	0.09	0.25	0.25	0.08	0.24	0.24	0.10	0.40	0.40	0.08	0.39	0.39
v/c Ratio	0.65	0.79	0.40	0.79	0.44	0.70	0.76	0.59	0.21	0.84	0.43	0.24
Control Delay	56.7	59.4	20.7	75.0	39.5	25.1	54.3	20.0	1.9	79.9	28.6	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.7	59.4	20.7	75.0	39.5	25.1	54.3	20.0	1.9	79.9	28.6	4.8
LOS	E	E	C	E	D	C	D	B	A	E	C	A
Approach Delay		53.0			41.5			23.8			35.0	
Approach LOS		D			D			C			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 38 (32%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 95	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 37.7	Intersection LOS: D
Intersection Capacity Utilization 76.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: University Blvd & Arapahoe Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	184	956	212	210	525	367	251	1169	142	227	815	163
Future Volume (veh/h)	184	956	212	210	525	367	251	1169	142	227	815	163
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	192	996	221	219	547	0	261	1218	148	236	849	170
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	251	1232	380	273	1265		477	2109	652	288	1787	552
Arrive On Green	0.02	0.08	0.08	0.08	0.25	0.00	0.14	0.41	0.41	0.08	0.35	0.35
Sat Flow, veh/h	3456	5106	1575	3456	5106	1585	3456	5106	1579	3456	5106	1578
Grp Volume(v), veh/h	192	996	221	219	547	0	261	1218	148	236	849	170
Grp Sat Flow(s),veh/h/ln	1728	1702	1575	1728	1702	1585	1728	1702	1579	1728	1702	1578
Q Serve(g_s), s	6.6	23.0	11.2	7.5	10.8	0.0	8.5	22.1	7.3	8.1	15.6	7.0
Cycle Q Clear(g_c), s	6.6	23.0	11.2	7.5	10.8	0.0	8.5	22.1	7.3	8.1	15.6	7.0
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	251	1232	380	273	1265		477	2109	652	288	1787	552
V/C Ratio(X)	0.77	0.81	0.58	0.80	0.43		0.55	0.58	0.23	0.82	0.48	0.31
Avail Cap(c_a), veh/h	374	1447	446	288	1319		477	2109	652	288	1787	552
HCM Platoon Ratio	0.33	0.33	0.33	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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.5	52.5	23.3	54.3	38.0	0.0	48.2	27.2	22.8	54.1	30.4	15.9
Incr Delay (d2), s/veh	2.4	2.6	0.5	13.0	0.1	0.0	0.8	1.2	0.8	15.9	0.9	1.4
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	3.1	10.8	4.7	3.7	4.5	0.0	3.6	8.9	2.8	4.1	6.4	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.9	55.1	23.8	67.3	38.1	0.0	49.0	28.3	23.6	70.0	31.3	17.3
LnGrp LOS	E	E	C	E	D		D	C	C	E	C	B
Approach Vol, veh/h		1409			766	A		1627			1255	
Approach Delay, s/veh		50.8			46.5			31.2			36.7	
Approach LOS		D			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	55.6	14.5	35.0	22.6	48.0	13.7	35.7
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0	6.0	* 6	5.0	6.0
Max Green Setting (Gmax), s	10.0	44.0	10.0	34.0	12.0	* 42	13.0	31.0
Max Q Clear Time (g_c+I1), s	10.1	24.1	9.5	25.0	10.5	17.6	8.6	12.8
Green Ext Time (p_c), s	0.0	13.8	0.0	3.6	0.1	11.8	0.1	2.3

Intersection Summary	
HCM 6th Ctrl Delay	40.3
HCM 6th LOS	D

Notes

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

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

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	20	0	0	11	0	1613	4	0	1174	44
Future Vol, veh/h	0	0	20	0	0	11	0	1613	4	0	1174	44
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	-	-	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	100	100	92	92	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	22	0	0	12	0	1613	4	0	1174	44

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	587	-	-	809	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	*653	0	0	278	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %			1					-	-		-	-
Mov Cap-1 Maneuver	-	-	*653	-	-	278	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.7	18.5	0	0
HCM LOS	B	C		

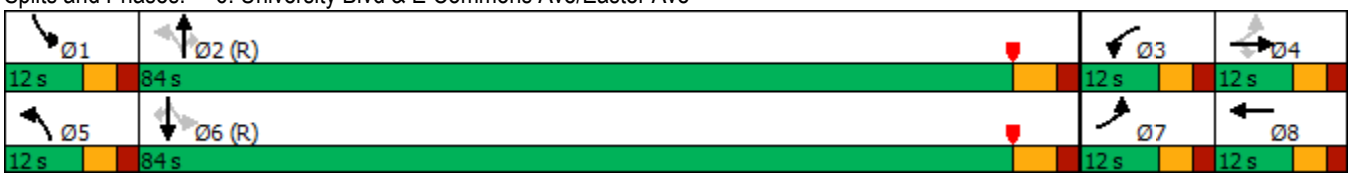
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	653	278	-	-
HCM Lane V/C Ratio	-	-	0.033	0.043	-	-
HCM Control Delay (s)	-	-	10.7	18.5	-	-
HCM Lane LOS	-	-	B	C	-	-
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-	-

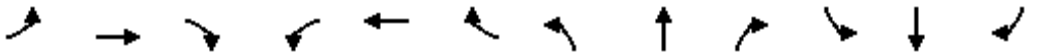
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	51	5	42	26	17	66	1510	26	20	1083	57
Future Volume (vph)	51	5	42	26	17	66	1510	26	20	1083	57
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases	4		4			2		2	6		6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	3.0	3.0	3.0	4.0	3.0	3.0	5.0	5.0	3.0	5.0	5.0
Minimum Split (s)	8.0	35.0	35.0	9.0	32.0	8.0	24.0	24.0	8.0	29.0	29.0
Total Split (s)	12.0	12.0	12.0	12.0	12.0	12.0	84.0	84.0	12.0	84.0	84.0
Total Split (%)	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	70.0%	70.0%	10.0%	70.0%	70.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	11.9	7.8	7.8	6.6	5.8	92.7	87.9	87.9	90.2	85.2	85.2
Actuated g/C Ratio	0.10	0.06	0.06	0.06	0.05	0.77	0.73	0.73	0.75	0.71	0.71
v/c Ratio	0.23	0.05	0.23	0.31	0.67	0.23	0.67	0.03	0.12	0.50	0.06
Control Delay	46.6	54.8	2.5	62.9	37.1	4.7	8.3	0.0	4.1	7.1	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.6	54.8	2.5	62.9	37.1	4.7	8.3	0.0	4.1	7.1	0.3
LOS	D	D	A	E	D	A	A	A	A	A	A
Approach Delay		28.3			42.8		8.0			6.7	
Approach LOS		C			D		A			A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 50 (42%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 105	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 9.6	Intersection LOS: A
Intersection Capacity Utilization 69.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 6: University Blvd & E Commons Ave/Easter Ave





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	5	42	26	17	76	66	1510	26	20	1083	57
Future Volume (veh/h)	51	5	42	26	17	76	66	1510	26	20	1083	57
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		0.94	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	59	6	0	30	20	87	76	1736	30	23	1245	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	217	122		38	17	74	356	2577	1145	276	2531	
Arrive On Green	0.03	0.07	0.00	0.02	0.06	0.06	0.05	1.00	1.00	0.01	0.71	0.00
Sat Flow, veh/h	3456	1870	1585	1781	290	1263	1781	3554	1580	1781	3554	1585
Grp Volume(v), veh/h	59	6	0	30	0	107	76	1736	30	23	1245	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1781	0	1554	1781	1777	1580	1781	1777	1585
Q Serve(g_s), s	1.9	0.4	0.0	2.0	0.0	7.0	1.4	0.0	0.0	0.4	18.6	0.0
Cycle Q Clear(g_c), s	1.9	0.4	0.0	2.0	0.0	7.0	1.4	0.0	0.0	0.4	18.6	0.0
Prop In Lane	1.00		1.00	1.00		0.81	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	217	122		38	0	91	356	2577	1145	276	2531	
V/C Ratio(X)	0.27	0.05		0.80	0.00	1.18	0.21	0.67	0.03	0.08	0.49	
Avail Cap(c_a), veh/h	322	122		104	0	91	413	2577	1145	357	2531	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	51.2	52.6	0.0	58.5	0.0	56.5	5.9	0.0	0.0	4.6	7.7	0.0
Incr Delay (d2), s/veh	0.2	0.1	0.0	30.2	0.0	151.1	0.1	1.4	0.0	0.0	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.2	0.0	1.2	0.0	6.6	0.4	0.5	0.0	0.1	6.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.4	52.7	0.0	88.7	0.0	207.6	6.0	1.4	0.0	4.6	8.3	0.0
LnGrp LOS	D	D		F	A	F	A	A	A	A	A	
Approach Vol, veh/h		65	A		137			1842			1268	A
Approach Delay, s/veh		51.5			181.6			1.6			8.3	
Approach LOS		D			F			A			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.6	93.0	7.5	12.8	8.2	91.5	8.4	12.0
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	78.0	7.0	7.0	7.0	78.0	7.0	7.0
Max Q Clear Time (g_c+I1), s	2.4	2.0	4.0	2.4	3.4	20.6	3.9	9.0
Green Ext Time (p_c), s	0.0	50.2	0.0	0.0	0.0	25.8	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	12.6
HCM 6th LOS	B

Notes

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

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	24	24	1602	1146	5
Future Vol, veh/h	1	24	24	1602	1146	5
Conflicting Peds, #/hr	24	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	120	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	26	24	1602	1146	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2019	573	1151	0	-	0
Stage 1	1146	-	-	-	-	-
Stage 2	873	-	-	-	-	-
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	*259	*618	*925	-	-	-
Stage 1	*584	-	-	-	-	-
Stage 2	*391	-	-	-	-	-
Platoon blocked, %	1	1	1	-	-	-
Mov Cap-1 Maneuver	*252	*618	*925	-	-	-
Mov Cap-2 Maneuver	*252	-	-	-	-	-
Stage 1	*568	-	-	-	-	-
Stage 2	*391	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.5	0.1	0
HCM LOS	B		

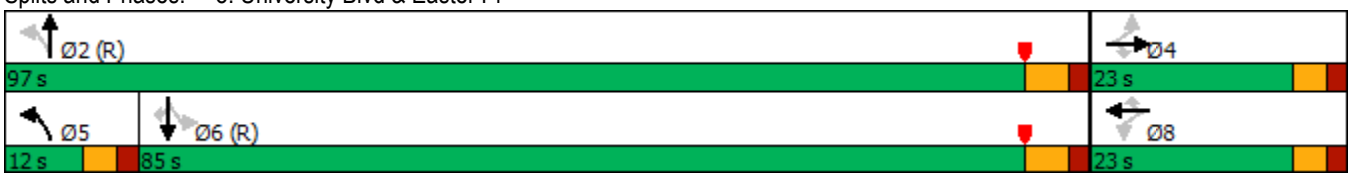
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	* 925	-	584	-	-
HCM Lane V/C Ratio	0.026	-	0.047	-	-
HCM Control Delay (s)	9	-	11.5	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

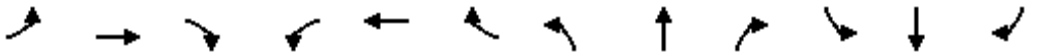
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	81	9	73	130	43	45	106	1500	8	1106	56
Future Volume (vph)	81	9	73	130	43	45	106	1500	8	1106	56
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm
Protected Phases		4			8		5	2		6	
Permitted Phases	4		4	8		8	2		6		6
Detector Phase	4	4	4	8	8	8	5	2	6	6	6
Switch Phase											
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	5.0
Minimum Split (s)	36.0	36.0	36.0	40.0	40.0	40.0	8.0	29.0	32.0	32.0	32.0
Total Split (s)	23.0	23.0	23.0	23.0	23.0	23.0	12.0	97.0	85.0	85.0	85.0
Total Split (%)	19.2%	19.2%	19.2%	19.2%	19.2%	19.2%	10.0%	80.8%	70.8%	70.8%	70.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.0	6.0	6.0	6.0
Lead/Lag							Lead		Lag	Lag	Lag
Lead-Lag Optimize?							Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	15.6	15.6	15.6	15.6	15.6	15.6	94.4	93.4	82.6	82.6	82.6
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13	0.13	0.79	0.78	0.69	0.69	0.69
v/c Ratio	0.53	0.04	0.30	0.81	0.20	0.19	0.37	0.64	0.06	0.51	0.06
Control Delay	59.3	44.3	12.7	82.1	47.4	6.5	6.5	7.5	2.6	3.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.3	44.3	12.7	82.1	47.4	6.5	6.5	7.5	2.6	3.3	0.1
LOS	E	D	B	F	D	A	A	A	A	A	A
Approach Delay		37.6			59.6			7.4		3.2	
Approach LOS		D			E			A		A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 66 (55%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 10.9	Intersection LOS: B
Intersection Capacity Utilization 78.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 8: University Blvd & Easter Pl





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	9	73	130	43	45	106	1500	64	8	1106	56
Future Volume (veh/h)	81	9	73	130	43	45	106	1500	64	8	1106	56
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.98		0.98	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	91	10	82	146	48	51	119	1685	72	9	1243	63
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	207	258	214	231	258	214	414	2675	114	211	2467	1095
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.03	0.77	0.77	1.00	1.00	1.00
Sat Flow, veh/h	1276	1870	1554	1282	1870	1554	1781	3472	148	273	3554	1577
Grp Volume(v), veh/h	91	10	82	146	48	51	119	858	899	9	1243	63
Grp Sat Flow(s),veh/h/ln	1276	1870	1554	1282	1870	1554	1781	1777	1843	273	1777	1577
Q Serve(g_s), s	8.2	0.6	5.8	13.4	2.7	3.5	2.2	25.7	26.2	0.9	0.0	0.0
Cycle Q Clear(g_c), s	10.9	0.6	5.8	13.9	2.7	3.5	2.2	25.7	26.2	17.9	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.08	1.00		1.00
Lane Grp Cap(c), veh/h	207	258	214	231	258	214	414	1369	1420	211	2467	1095
V/C Ratio(X)	0.44	0.04	0.38	0.63	0.19	0.24	0.29	0.63	0.63	0.04	0.50	0.06
Avail Cap(c_a), veh/h	222	281	233	246	281	233	456	1369	1420	211	2467	1095
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.6	44.8	47.1	50.9	45.8	46.1	4.2	6.1	6.2	1.8	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.4	3.3	0.1	0.2	0.1	2.2	2.2	0.4	0.7	0.1
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	2.7	0.3	2.3	4.5	1.3	1.4	0.6	7.6	8.0	0.0	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.1	44.9	47.5	54.2	45.9	46.3	4.3	8.3	8.3	2.2	0.7	0.1
LnGrp LOS	D	D	D	D	D	D	A	A	A	A	A	A
Approach Vol, veh/h		183			245			1876			1315	
Approach Delay, s/veh		49.2			50.9			8.1			0.7	
Approach LOS		D			D			A			A	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		98.4		21.6	9.1	89.3		21.6				
Change Period (Y+Rc), s		6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s		91.0		18.0	7.0	79.0		18.0				
Max Q Clear Time (g_c+I1), s		28.2		12.9	4.2	19.9		15.9				
Green Ext Time (p_c), s		43.6		0.1	0.0	27.7		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			10.4									
HCM 6th LOS			B									

Notes

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

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	25	155	214	9	4	7
Future Vol, veh/h	25	155	214	9	4	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	168	233	10	4	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	243	0	-	0	460	238
Stage 1	-	-	-	-	238	-
Stage 2	-	-	-	-	222	-
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	1323	-	-	-	559	801
Stage 1	-	-	-	-	802	-
Stage 2	-	-	-	-	815	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1323	-	-	-	546	801
Mov Cap-2 Maneuver	-	-	-	-	546	-
Stage 1	-	-	-	-	784	-
Stage 2	-	-	-	-	815	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	10.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1323	-	-	-	685
HCM Lane V/C Ratio	0.021	-	-	-	0.017
HCM Control Delay (s)	7.8	0	-	-	10.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	152	10	9	206	11	24
Future Vol, veh/h	152	10	9	206	11	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	165	11	10	224	12	26

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	176	0	415	171
Stage 1	-	-	-	-	171	-
Stage 2	-	-	-	-	244	-
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	-	-	1400	-	594	873
Stage 1	-	-	-	-	859	-
Stage 2	-	-	-	-	797	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1400	-	589	873
Mov Cap-2 Maneuver	-	-	-	-	589	-
Stage 1	-	-	-	-	859	-
Stage 2	-	-	-	-	791	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	10
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	758	-	-	1400	-
HCM Lane V/C Ratio	0.05	-	-	0.007	-
HCM Control Delay (s)	10	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	147	14	2	154	60	19	1	12	3	1	4
Future Vol, veh/h	10	147	14	2	154	60	19	1	12	3	1	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	160	15	2	167	65	21	1	13	3	1	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	232	0	0	175	0	0	396	426	168	401	401	200
Stage 1	-	-	-	-	-	-	190	190	-	204	204	-
Stage 2	-	-	-	-	-	-	206	236	-	197	197	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1336	-	-	1401	-	-	564	520	876	560	538	841
Stage 1	-	-	-	-	-	-	812	743	-	798	733	-
Stage 2	-	-	-	-	-	-	796	710	-	805	738	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1336	-	-	1401	-	-	556	514	876	546	532	841
Mov Cap-2 Maneuver	-	-	-	-	-	-	556	514	-	546	532	-
Stage 1	-	-	-	-	-	-	805	736	-	791	732	-
Stage 2	-	-	-	-	-	-	789	709	-	785	731	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.1	10.9	10.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	642	1336	-	-	1401	-	-	659
HCM Lane V/C Ratio	0.054	0.008	-	-	0.002	-	-	0.013
HCM Control Delay (s)	10.9	7.7	0	-	7.6	0	-	10.5
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0

Intersection	
Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	21	129	137	42	44	11
Future Vol, veh/h	21	129	137	42	44	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	140	149	46	48	12
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8.3	8.3	8.1
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	14%	0%	80%
Vol Thru, %	86%	77%	0%
Vol Right, %	0%	23%	20%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	150	179	55
LT Vol	21	0	44
Through Vol	129	137	0
RT Vol	0	42	11
Lane Flow Rate	163	195	60
Geometry Grp	1	1	1
Degree of Util (X)	0.191	0.217	0.079
Departure Headway (Hd)	4.215	4.021	4.743
Convergence, Y/N	Yes	Yes	Yes
Cap	838	877	760
Service Time	2.306	2.114	2.743
HCM Lane V/C Ratio	0.195	0.222	0.079
HCM Control Delay	8.3	8.3	8.1
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.7	0.8	0.3

Intersection	
Int Delay, s/veh	1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	2	56	5	11	41
Future Vol, veh/h	2	2	56	5	11	41
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	2	61	5	12	45

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	133	64	0	0	66	0
Stage 1	64	-	-	-	-	-
Stage 2	69	-	-	-	-	-
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	861	1000	-	-	1536	-
Stage 1	959	-	-	-	-	-
Stage 2	954	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	854	1000	-	-	1536	-
Mov Cap-2 Maneuver	854	-	-	-	-	-
Stage 1	959	-	-	-	-	-
Stage 2	946	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	1.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	921	1536	-
HCM Lane V/C Ratio	-	-	0.005	0.008	-
HCM Control Delay (s)	-	-	8.9	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	40	5	9	0	2	0	1	51	3	44	46	40
Future Vol, veh/h	40	5	9	0	2	0	1	51	3	44	46	40
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	-	-	-	-	-	-	-	-	-	-	-	-
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	43	5	10	0	2	0	1	55	3	48	50	43

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	228	228	72	234	248	57	93	0	0	58	0	0
Stage 1	168	168	-	59	59	-	-	-	-	-	-	-
Stage 2	60	60	-	175	189	-	-	-	-	-	-	-
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	727	671	990	721	655	1009	1501	-	-	1546	-	-
Stage 1	834	759	-	953	846	-	-	-	-	-	-	-
Stage 2	951	845	-	827	744	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	707	648	990	691	633	1009	1501	-	-	1546	-	-
Mov Cap-2 Maneuver	707	648	-	691	633	-	-	-	-	-	-	-
Stage 1	833	734	-	952	845	-	-	-	-	-	-	-
Stage 2	948	844	-	786	719	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.3	10.7	0.1	2.5
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1501	-	-	736	633	1546	-	-
HCM Lane V/C Ratio	0.001	-	-	0.08	0.003	0.031	-	-
HCM Control Delay (s)	7.4	0	-	10.3	10.7	7.4	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0	0.1	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	11	77	20	8	117
Future Vol, veh/h	14	11	77	20	8	117
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	12	84	22	9	127

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	240	95	0	0	106	0
Stage 1	95	-	-	-	-	-
Stage 2	145	-	-	-	-	-
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	748	962	-	-	1485	-
Stage 1	929	-	-	-	-	-
Stage 2	882	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	743	962	-	-	1485	-
Mov Cap-2 Maneuver	743	-	-	-	-	-
Stage 1	929	-	-	-	-	-
Stage 2	876	-	-	-	-	-

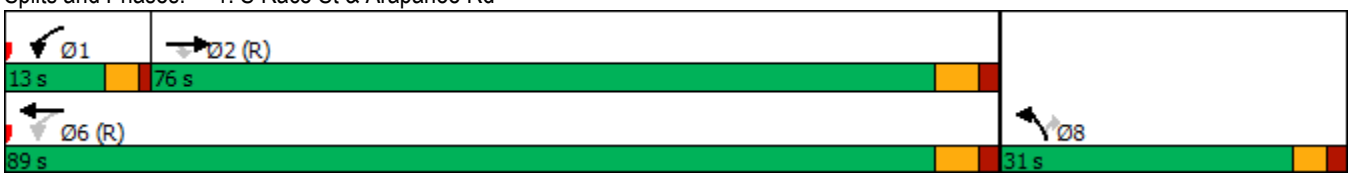
Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	0.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	826	1485	-
HCM Lane V/C Ratio	-	-	0.033	0.006	-
HCM Control Delay (s)	-	-	9.5	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1051	51	43	1522	122	77
Future Volume (vph)	1051	51	43	1522	122	77
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	17.0	17.0	3.0	17.0	5.0	5.0
Minimum Split (s)	23.0	23.0	7.0	23.0	30.0	30.0
Total Split (s)	76.0	76.0	13.0	89.0	31.0	31.0
Total Split (%)	63.3%	63.3%	10.8%	74.2%	25.8%	25.8%
Yellow Time (s)	4.0	4.0	3.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effct Green (s)	87.2	87.2	96.7	94.7	14.3	14.3
Actuated g/C Ratio	0.73	0.73	0.81	0.79	0.12	0.12
v/c Ratio	0.43	0.05	0.12	0.40	0.60	0.31
Control Delay	8.3	3.8	4.0	4.8	60.7	12.4
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0
Total Delay	8.3	3.8	4.0	5.0	60.7	12.4
LOS	A	A	A	A	E	B
Approach Delay	8.1			5.0	42.0	
Approach LOS	A			A	D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 31 (26%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 8.7	Intersection LOS: A
Intersection Capacity Utilization 53.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: S Race St & Arapahoe Rd



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1051	51	43	1522	122	77
Future Volume (veh/h)	1051	51	43	1522	122	77
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1095	53	45	1585	127	80
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2725	1210	419	4185	158	141
Arrive On Green	0.77	0.77	0.02	0.82	0.09	0.09
Sat Flow, veh/h	3647	1578	1781	5274	1781	1585
Grp Volume(v), veh/h	1095	53	45	1585	127	80
Grp Sat Flow(s),veh/h/ln	1777	1578	1781	1702	1781	1585
Q Serve(g_s), s	12.5	1.0	0.6	9.7	8.4	5.8
Cycle Q Clear(g_c), s	12.5	1.0	0.6	9.7	8.4	5.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2725	1210	419	4185	158	141
V/C Ratio(X)	0.40	0.04	0.11	0.38	0.80	0.57
Avail Cap(c_a), veh/h	2725	1210	518	4185	386	343
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.80	0.80	1.00	1.00
Uniform Delay (d), s/veh	4.7	3.4	3.4	2.8	53.6	52.5
Incr Delay (d2), s/veh	0.4	0.1	0.0	0.2	3.6	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.3	0.2	2.3	3.9	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	5.2	3.4	3.4	3.0	57.2	53.8
LnGrp LOS	A	A	A	A	E	D
Approach Vol, veh/h	1148			1630	207	
Approach Delay, s/veh	5.1			3.1	55.9	
Approach LOS	A			A	E	

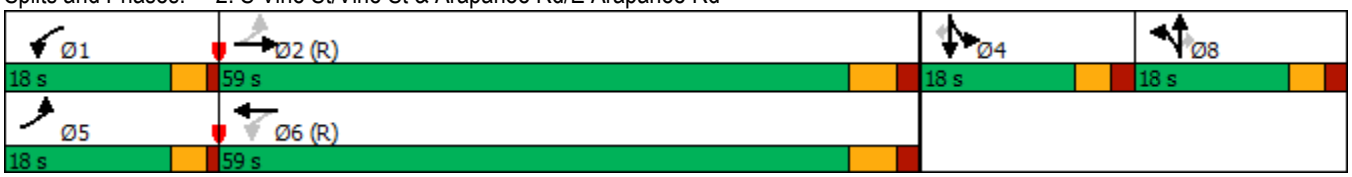
Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	6.3	98.0				104.4	15.6
Change Period (Y+Rc), s	4.0	6.0				6.0	5.0
Max Green Setting (Gmax), s	9.0	70.0				83.0	26.0
Max Q Clear Time (g_c+I1), s	2.6	14.5				11.7	10.4
Green Ext Time (p_c), s	0.0	5.8				10.7	0.3

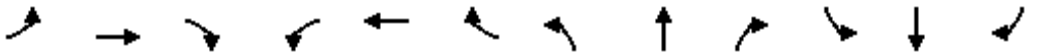
Intersection Summary	
HCM 6th Ctrl Delay	7.5
HCM 6th LOS	A

Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	61	938	121	1423	21	99	12	29
Future Volume (vph)	61	938	121	1423	21	99	12	29
Turn Type	pm+pt	NA	pm+pt	NA	NA	Perm	NA	Perm
Protected Phases	5	2	1	6	8		4	
Permitted Phases	2		6			8		4
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	3.0	17.0	3.0	17.0	5.0	5.0	5.0	5.0
Minimum Split (s)	7.0	26.0	7.0	23.0	35.0	35.0	34.0	34.0
Total Split (s)	18.0	59.0	18.0	59.0	18.0	18.0	18.0	18.0
Total Split (%)	15.9%	52.2%	15.9%	52.2%	15.9%	15.9%	15.9%	15.9%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	70.7	62.8	74.4	66.0	11.7	11.7	11.1	11.1
Actuated g/C Ratio	0.63	0.56	0.66	0.58	0.10	0.10	0.10	0.10
v/c Ratio	0.33	0.39	0.36	0.58	0.76	0.40	0.71	0.12
Control Delay	11.9	15.2	10.2	16.7	74.5	11.5	70.9	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.9	15.2	10.2	16.7	74.5	11.5	70.9	1.0
LOS	B	B	B	B	E	B	E	A
Approach Delay		15.0		16.2	47.7		56.9	
Approach LOS		B		B	D		E	

Intersection Summary		
Cycle Length: 113		
Actuated Cycle Length: 113		
Offset: 28 (25%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green		
Natural Cycle: 115		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.76		
Intersection Signal Delay: 19.9	Intersection LOS: B	
Intersection Capacity Utilization 63.5%	ICU Level of Service B	
Analysis Period (min) 15		

Splits and Phases: 2: S Vine St/Vine St & Arapahoe Rd/E Arapahoe Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	61	938	93	121	1423	184	112	21	99	105	12	29
Future Volume (veh/h)	61	938	93	121	1423	184	112	21	99	105	12	29
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	64	987	98	127	1498	194	118	22	104	111	13	31
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	234	2781	276	395	2776	359	148	28	151	144	17	138
Arrive On Green	0.03	0.59	0.59	0.05	0.61	0.61	0.10	0.10	0.10	0.09	0.09	0.09
Sat Flow, veh/h	1781	4719	468	1781	4572	591	1513	282	1541	1603	188	1537
Grp Volume(v), veh/h	64	711	374	127	1115	577	140	0	104	124	0	31
Grp Sat Flow(s),veh/h/ln	1781	1702	1783	1781	1702	1760	1795	0	1541	1790	0	1537
Q Serve(g_s), s	1.6	12.3	12.3	3.2	21.6	21.7	8.6	0.0	7.4	7.7	0.0	2.1
Cycle Q Clear(g_c), s	1.6	12.3	12.3	3.2	21.6	21.7	8.6	0.0	7.4	7.7	0.0	2.1
Prop In Lane	1.00		0.26	1.00		0.34	0.84		1.00	0.90		1.00
Lane Grp Cap(c), veh/h	234	2006	1051	395	2067	1068	176	0	151	161	0	138
V/C Ratio(X)	0.27	0.35	0.36	0.32	0.54	0.54	0.79	0.00	0.69	0.77	0.00	0.22
Avail Cap(c_a), veh/h	405	2006	1051	534	2067	1068	206	0	177	206	0	177
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)	0.91	0.91	0.91	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.8	12.0	12.1	9.0	13.0	13.0	49.8	0.0	49.3	50.3	0.0	47.8
Incr Delay (d2), s/veh	0.2	0.4	0.9	0.2	1.0	2.0	14.0	0.0	6.0	9.3	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	4.5	4.9	1.2	8.0	8.5	4.6	0.0	3.1	3.8	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.0	12.5	12.9	9.2	14.0	14.9	63.9	0.0	55.3	59.5	0.0	48.1
LnGrp LOS	B	B	B	A	B	B	E	A	E	E	A	D
Approach Vol, veh/h		1149			1819			244			155	
Approach Delay, s/veh		12.5			14.0			60.2			57.3	
Approach LOS		B			B			E			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.2	72.6		15.2	7.2	74.6		16.1				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	14.0	53.0		13.0	14.0	53.0		13.0				
Max Q Clear Time (g_c+I1), s	5.2	14.3		9.7	3.6	23.7		10.6				
Green Ext Time (p_c), s	0.1	5.3		0.1	0.0	9.6		0.2				

Intersection Summary			
HCM 6th Ctrl Delay		18.8	
HCM 6th LOS		B	

Notes

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

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	27	1075	40	63	1626	7	0	0	112	0	0	102
Future Vol, veh/h	27	1075	40	63	1626	7	0	0	112	0	0	102
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	150	-	0	100	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	1108	41	65	1676	7	0	0	115	0	0	105

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1683	0	0	1149	0	0	-	-	554	-	-	842
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	5.34	-	-	5.34	-	-	-	-	7.14	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	-	-	3.92	-	-	3.92
Pot Cap-1 Maneuver	*682	-	-	*856	-	-	0	0	*681	0	0	*542
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %	1	-	-	1	-	-			1			1
Mov Cap-1 Maneuver	*682	-	-	*856	-	-	-	-	*681	-	-	*542
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.4	11.4	13.2
HCM LOS			B	B

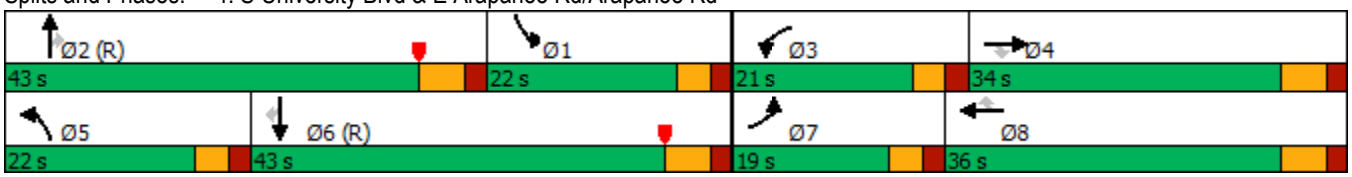
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	681	* 682	-	-	* 856	-	-	542
HCM Lane V/C Ratio	0.17	0.041	-	-	0.076	-	-	0.194
HCM Control Delay (s)	11.4	10.5	-	-	9.6	-	-	13.2
HCM Lane LOS	B	B	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0.2	-	-	0.7

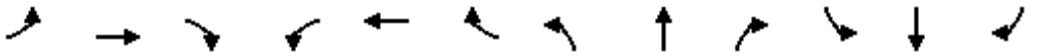
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	295	676	239	281	1140	418	283	1150	173	312	1260	297
Future Volume (vph)	295	676	239	281	1140	418	283	1150	173	312	1260	297
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	10.0	10.0	3.0	10.0	10.0
Minimum Split (s)	8.0	39.0	39.0	8.0	37.0	37.0	8.0	35.0	35.0	8.0	40.0	40.0
Total Split (s)	19.0	34.0	34.0	21.0	36.0	36.0	22.0	43.0	43.0	22.0	43.0	43.0
Total Split (%)	15.8%	28.3%	28.3%	17.5%	30.0%	30.0%	18.3%	35.8%	35.8%	18.3%	35.8%	35.8%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	13.0	29.4	29.4	13.5	29.9	29.9	14.1	38.1	38.1	17.0	41.0	41.0
Actuated g/C Ratio	0.11	0.24	0.24	0.11	0.25	0.25	0.12	0.32	0.32	0.14	0.34	0.34
v/c Ratio	0.81	0.55	0.43	0.74	0.92	0.70	0.72	0.73	0.29	0.65	0.74	0.43
Control Delay	69.4	41.7	7.2	63.6	56.3	19.4	47.2	33.6	7.5	55.8	38.6	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.4	41.7	7.2	63.6	56.3	19.4	47.2	33.6	7.5	55.8	38.6	7.3
LOS	E	D	A	E	E	B	D	C	A	E	D	A
Approach Delay		41.7			49.0			33.2			36.5	
Approach LOS		D			D			C			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 103 (86%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 95	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 40.2	Intersection LOS: D
Intersection Capacity Utilization 81.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: S University Blvd & E Arapahoe Rd/Arapahoe Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	295	676	239	281	1140	418	283	1150	173	312	1260	297
Future Volume (veh/h)	295	676	239	281	1140	418	283	1150	173	312	1260	297
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	301	690	244	287	1163	0	289	1173	177	318	1286	303
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	356	1273	393	344	1256		349	1574	486	522	1873	579
Arrive On Green	0.10	0.25	0.25	0.10	0.25	0.00	0.10	0.31	0.31	0.15	0.37	0.37
Sat Flow, veh/h	3456	5106	1576	3456	5106	1585	3456	5106	1577	3456	5106	1579
Grp Volume(v), veh/h	301	690	244	287	1163	0	289	1173	177	318	1286	303
Grp Sat Flow(s),veh/h/ln	1728	1702	1576	1728	1702	1585	1728	1702	1577	1728	1702	1579
Q Serve(g_s), s	10.3	14.1	16.5	9.8	26.7	0.0	9.8	24.8	7.6	10.3	25.6	18.0
Cycle Q Clear(g_c), s	10.3	14.1	16.5	9.8	26.7	0.0	9.8	24.8	7.6	10.3	25.6	18.0
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	356	1273	393	344	1256		349	1574	486	522	1873	579
V/C Ratio(X)	0.85	0.54	0.62	0.83	0.93		0.83	0.75	0.36	0.61	0.69	0.52
Avail Cap(c_a), veh/h	403	1273	393	461	1277		490	1574	486	522	1873	579
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.9	39.1	40.0	53.1	44.2	0.0	52.9	37.3	16.9	47.6	32.1	29.8
Incr Delay (d2), s/veh	12.6	0.3	2.2	7.3	11.2	0.0	5.7	3.2	2.1	1.5	2.1	3.4
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	5.0	5.9	6.6	4.6	12.4	0.0	4.5	10.5	3.0	4.5	10.5	7.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.5	39.4	42.2	60.4	55.4	0.0	58.7	40.5	19.0	49.1	34.2	33.1
LnGrp LOS	E	D	D	E	E		E	D	B	D	C	C
Approach Vol, veh/h		1235			1450	A		1639			1907	
Approach Delay, s/veh		46.3			56.4			41.4			36.5	
Approach LOS		D			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	24.1	43.0	16.9	35.9	17.1	50.0	17.4	35.5
Change Period (Y+Rc), s	6.0	* 6	5.0	6.0	5.0	6.0	5.0	6.0
Max Green Setting (Gmax), s	17.0	* 37	16.0	28.0	17.0	37.0	14.0	30.0
Max Q Clear Time (g_c+I1), s	12.3	26.8	11.8	18.5	11.8	27.6	12.3	28.7
Green Ext Time (p_c), s	0.2	7.9	0.2	2.6	0.3	8.0	0.1	0.8

Intersection Summary	
HCM 6th Ctrl Delay	44.4
HCM 6th LOS	D

Notes

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

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

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	63	0	0	41	0	1584	18	0	1675	105
Future Vol, veh/h	0	0	63	0	0	41	0	1584	18	0	1675	105
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	-	-	0	-	-	0	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	68	0	0	44	0	1703	19	0	1801	113

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	901	-	-	861	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	*524	0	0	257	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %			1					-	-		-	-
Mov Cap-1 Maneuver	-	-	*524	-	-	257	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.9	21.9	0	0
HCM LOS	B	C		

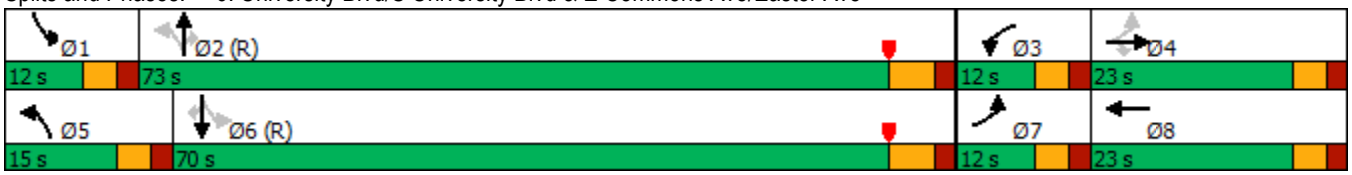
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	524	257	-	-
HCM Lane V/C Ratio	-	-	0.129	0.172	-	-
HCM Control Delay (s)	-	-	12.9	21.9	-	-
HCM Lane LOS	-	-	B	C	-	-
HCM 95th %tile Q(veh)	-	-	0.4	0.6	-	-

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

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	120	36	134	63	69	131	1437	43	61	1525	136
Future Volume (vph)	120	36	134	63	69	131	1437	43	61	1525	136
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases	4		4			2		2	6		6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	3.0	3.0	3.0	4.0	3.0	3.0	5.0	5.0	3.0	5.0	5.0
Minimum Split (s)	8.0	35.0	35.0	9.0	32.0	8.0	24.0	24.0	8.0	29.0	29.0
Total Split (s)	12.0	23.0	23.0	12.0	23.0	15.0	73.0	73.0	12.0	70.0	70.0
Total Split (%)	10.0%	19.2%	19.2%	10.0%	19.2%	12.5%	60.8%	60.8%	10.0%	58.3%	58.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	20.2	14.6	14.6	6.9	12.4	84.0	75.9	75.9	78.3	71.5	71.5
Actuated g/C Ratio	0.17	0.12	0.12	0.06	0.10	0.70	0.63	0.63	0.65	0.60	0.60
v/c Ratio	0.32	0.17	0.46	0.66	0.60	0.70	0.68	0.04	0.33	0.77	0.15
Control Delay	40.6	48.4	14.2	85.1	53.2	45.3	14.6	0.1	11.0	21.4	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.6	48.4	14.2	85.1	53.2	45.3	14.6	0.1	11.0	21.4	2.7
LOS	D	D	B	F	D	D	B	A	B	C	A
Approach Delay		29.3			64.7		16.7			19.6	
Approach LOS		C			E		B			B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 74 (62%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 105	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 21.2	Intersection LOS: C
Intersection Capacity Utilization 75.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 6: University Blvd/S University Blvd & E Commons Ave/Easter Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	36	134	63	69	43	131	1437	43	61	1525	136
Future Volume (veh/h)	120	36	134	63	69	43	131	1437	43	61	1525	136
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		1.00	1.00		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	128	38	0	67	73	46	139	1529	46	65	1622	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	381	198		86	111	70	238	2291	1018	311	2223	
Arrive On Green	0.05	0.11	0.00	0.05	0.11	0.11	0.09	1.00	1.00	0.03	0.63	0.00
Sat Flow, veh/h	3456	1870	1585	1781	1058	667	1781	3554	1579	1781	3554	1585
Grp Volume(v), veh/h	128	38	0	67	0	119	139	1529	46	65	1622	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1781	0	1725	1781	1777	1579	1781	1777	1585
Q Serve(g_s), s	3.9	2.2	0.0	4.5	0.0	8.0	3.5	0.0	0.0	1.6	37.7	0.0
Cycle Q Clear(g_c), s	3.9	2.2	0.0	4.5	0.0	8.0	3.5	0.0	0.0	1.6	37.7	0.0
Prop In Lane	1.00		1.00	1.00		0.39	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	381	198		86	0	181	238	2291	1018	311	2223	
V/C Ratio(X)	0.34	0.19		0.78	0.00	0.66	0.58	0.67	0.05	0.21	0.73	
Avail Cap(c_a), veh/h	415	281		104	0	259	305	2291	1018	367	2223	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	44.9	49.0	0.0	56.5	0.0	51.6	16.6	0.0	0.0	7.5	15.5	0.0
Incr Delay (d2), s/veh	0.2	0.2	0.0	26.2	0.0	1.5	0.8	1.6	0.1	0.1	2.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	1.1	0.0	2.6	0.0	3.5	1.7	0.5	0.0	0.6	14.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.1	49.2	0.0	82.7	0.0	53.1	17.4	1.6	0.1	7.7	17.6	0.0
LnGrp LOS	D	D		F	A	D	B	A	A	A	B	
Approach Vol, veh/h		166	A		186			1714			1687	A
Approach Delay, s/veh		46.0			63.8			2.8			17.3	
Approach LOS		D			E			A			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.2	83.4	10.8	17.7	10.5	81.1	10.8	17.6
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	67.0	7.0	18.0	10.0	64.0	7.0	18.0
Max Q Clear Time (g_c+I1), s	3.6	2.0	6.5	4.2	5.5	39.7	5.9	10.0
Green Ext Time (p_c), s	0.0	38.3	0.0	0.1	0.1	19.7	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	14.2
HCM 6th LOS	B

Notes

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

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	10.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	57	41	1618	1710	11
Future Vol, veh/h	12	57	41	1618	1710	11
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	-	120	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	61	44	1740	1839	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2797	920	1851	0	-	0
Stage 1	1839	-	-	-	-	-
Stage 2	958	-	-	-	-	-
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	*~ 9	*363	*544	-	-	-
Stage 1	*343	-	-	-	-	-
Stage 2	*391	-	-	-	-	-
Platoon blocked, %	1	1	1	-	-	-
Mov Cap-1 Maneuver	*~ 9	*363	*544	-	-	-
Mov Cap-2 Maneuver	*~ 9	-	-	-	-	-
Stage 1	*315	-	-	-	-	-
Stage 2	*391	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 496.5	0.3	0
HCM LOS	F		

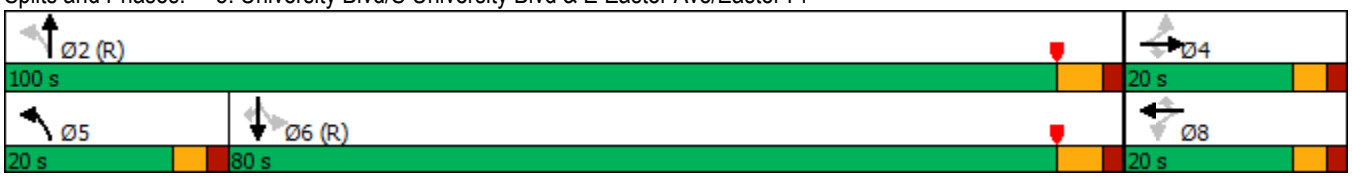
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	* 544	-	46	-	-
HCM Lane V/C Ratio	0.081	-	1.613	-	-
HCM Control Delay (s)	12.2	-	$ 496.5	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.3	-	7.3	-	-

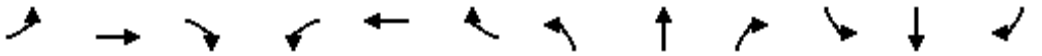
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	76	25	140	56	19	22	128	1560	16	1675	76
Future Volume (vph)	76	25	140	56	19	22	128	1560	16	1675	76
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm
Protected Phases		4			8		5	2		6	
Permitted Phases	4		4	8		8	2		6		6
Detector Phase	4	4	4	8	8	8	5	2	6	6	6
Switch Phase											
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	5.0
Minimum Split (s)	36.0	36.0	36.0	40.0	40.0	40.0	8.0	29.0	32.0	32.0	32.0
Total Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	100.0	80.0	80.0	80.0
Total Split (%)	16.7%	16.7%	16.7%	16.7%	16.7%	16.7%	16.7%	83.3%	66.7%	66.7%	66.7%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.0	6.0	6.0	6.0
Lead/Lag							Lead		Lag	Lag	Lag
Lead-Lag Optimize?							Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	11.1	11.1	11.1	11.1	11.1	11.1	98.9	97.9	84.4	84.4	84.4
Actuated g/C Ratio	0.09	0.09	0.09	0.09	0.09	0.09	0.82	0.82	0.70	0.70	0.70
v/c Ratio	0.64	0.16	0.54	0.48	0.12	0.11	0.59	0.60	0.10	0.72	0.07
Control Delay	74.4	50.4	15.1	63.1	49.5	1.1	20.5	5.3	5.2	4.6	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.4	50.4	15.1	63.1	49.5	1.1	20.5	5.3	5.2	4.6	0.8
LOS	E	D	B	E	D	A	C	A	A	A	A
Approach Delay		37.5			46.6			6.4		4.4	
Approach LOS		D			D			A		A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 82 (68%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 110	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 8.5	Intersection LOS: A
Intersection Capacity Utilization 80.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 8: University Blvd/S University Blvd & E Easter Ave/Easter Pl





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	76	25	140	56	19	22	128	1560	59	16	1675	76
Future Volume (veh/h)	76	25	140	56	19	22	128	1560	59	16	1675	76
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.98		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	81	27	149	60	20	23	136	1660	63	17	1782	81
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	201	215	178	181	215	178	300	2769	105	230	2542	1128
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.04	0.79	0.79	1.00	1.00	1.00
Sat Flow, veh/h	1335	1870	1548	1188	1870	1548	1781	3491	132	282	3554	1577
Grp Volume(v), veh/h	81	27	149	60	20	23	136	842	881	17	1782	81
Grp Sat Flow(s),veh/h/ln	1335	1870	1548	1188	1870	1548	1781	1777	1846	282	1777	1577
Q Serve(g_s), s	6.9	1.6	11.3	5.7	1.1	1.6	2.3	22.3	22.7	1.2	0.0	0.0
Cycle Q Clear(g_c), s	8.1	1.6	11.3	7.3	1.1	1.6	2.3	22.3	22.7	14.6	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	201	215	178	181	215	178	300	1409	1464	230	2542	1128
V/C Ratio(X)	0.40	0.13	0.84	0.33	0.09	0.13	0.45	0.60	0.60	0.07	0.70	0.07
Avail Cap(c_a), veh/h	214	234	193	193	234	193	459	1409	1464	230	2542	1128
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.1	47.7	52.0	50.9	47.5	47.7	3.5	4.9	4.9	1.1	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.1	22.6	0.4	0.1	0.1	0.4	1.9	1.8	0.6	1.6	0.1
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	2.4	0.7	5.5	1.7	0.5	0.6	0.6	6.1	6.4	0.0	0.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.6	47.8	74.6	51.3	47.5	47.8	3.9	6.8	6.8	1.8	1.6	0.1
LnGrp LOS	D	D	E	D	D	D	A	A	A	A	A	A
Approach Vol, veh/h		257			103			1859			1880	
Approach Delay, s/veh		64.5			49.8			6.5			1.6	
Approach LOS		E			D			A			A	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		101.2		18.8	9.3	91.9		18.8				
Change Period (Y+Rc), s		6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s		94.0		15.0	15.0	74.0		15.0				
Max Q Clear Time (g_c+I1), s		24.7		13.3	4.3	16.6		9.3				
Green Ext Time (p_c), s		45.2		0.1	0.1	44.0		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			9.0									
HCM 6th LOS			A									

Notes

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

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	32	195	183	41	47	41
Future Vol, veh/h	32	195	183	41	47	41
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	33	203	191	43	49	43

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	234	0	-	0	482	213
Stage 1	-	-	-	-	213	-
Stage 2	-	-	-	-	269	-
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	1333	-	-	-	543	827
Stage 1	-	-	-	-	823	-
Stage 2	-	-	-	-	776	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1333	-	-	-	528	827
Mov Cap-2 Maneuver	-	-	-	-	528	-
Stage 1	-	-	-	-	800	-
Stage 2	-	-	-	-	776	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	11.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1333	-	-	-	635
HCM Lane V/C Ratio	0.025	-	-	-	0.144
HCM Control Delay (s)	7.8	0	-	-	11.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.5

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	213	15	8	215	7	14
Future Vol, veh/h	213	15	8	215	7	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	234	16	9	236	8	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	250	0	496	242
Stage 1	-	-	-	-	242	-
Stage 2	-	-	-	-	254	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1316	-	533	797
Stage 1	-	-	-	-	798	-
Stage 2	-	-	-	-	788	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1316	-	529	797
Mov Cap-2 Maneuver	-	-	-	-	529	-
Stage 1	-	-	-	-	798	-
Stage 2	-	-	-	-	782	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	10.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	682	-	-	1316	-
HCM Lane V/C Ratio	0.034	-	-	0.007	-
HCM Control Delay (s)	10.5	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	18	155	12	9	163	50	14	2	12	61	2	18
Future Vol, veh/h	18	155	12	9	163	50	14	2	12	61	2	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	172	13	10	181	56	16	2	13	68	2	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	237	0	0	185	0	0	459	476	179	455	454	209
Stage 1	-	-	-	-	-	-	219	219	-	229	229	-
Stage 2	-	-	-	-	-	-	240	257	-	226	225	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1330	-	-	1390	-	-	512	488	864	515	502	831
Stage 1	-	-	-	-	-	-	783	722	-	774	715	-
Stage 2	-	-	-	-	-	-	763	695	-	777	718	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1330	-	-	1390	-	-	488	476	864	495	489	831
Mov Cap-2 Maneuver	-	-	-	-	-	-	488	476	-	495	489	-
Stage 1	-	-	-	-	-	-	770	710	-	761	709	-
Stage 2	-	-	-	-	-	-	736	689	-	750	706	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	0.3	11.3	12.9
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	599	1330	-	-	1390	-	-	544
HCM Lane V/C Ratio	0.052	0.015	-	-	0.007	-	-	0.165
HCM Control Delay (s)	11.3	7.7	0	-	7.6	0	-	12.9
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.6

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	22	123	145	51	63	25
Future Vol, veh/h	22	123	145	51	63	25
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	135	159	56	69	27
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8.5	8.6	8.4
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	15%	0%	72%
Vol Thru, %	85%	74%	0%
Vol Right, %	0%	26%	28%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	145	196	88
LT Vol	22	0	63
Through Vol	123	145	0
RT Vol	0	51	25
Lane Flow Rate	159	215	97
Geometry Grp	1	1	1
Degree of Util (X)	0.196	0.25	0.127
Departure Headway (Hd)	4.421	4.186	4.723
Convergence, Y/N	Yes	Yes	Yes
Cap	814	859	760
Service Time	2.437	2.202	2.744
HCM Lane V/C Ratio	0.195	0.25	0.128
HCM Control Delay	8.5	8.6	8.4
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.7	1	0.4

Intersection	
Int Delay, s/veh	5.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	12	55	66	7	6	76
Future Vol, veh/h	12	55	66	7	6	76
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	76	25	76	76	76	76
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	220	87	9	8	100

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	208	92	0	0	96	0
Stage 1	92	-	-	-	-	-
Stage 2	116	-	-	-	-	-
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	780	965	-	-	1498	-
Stage 1	932	-	-	-	-	-
Stage 2	909	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	775	965	-	-	1498	-
Mov Cap-2 Maneuver	775	-	-	-	-	-
Stage 1	932	-	-	-	-	-
Stage 2	904	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10	0	0.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	949	1498	-
HCM Lane V/C Ratio	-	-	0.248	0.005	-
HCM Control Delay (s)	-	-	10	7.4	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1	0	-

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	29	7	2	13	13	59	4	113	4	11	67	38
Future Vol, veh/h	29	7	2	13	13	59	4	113	4	11	67	38
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	76	76	76	76	76	76	76	76	76	76	76	76
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	38	9	3	17	17	78	5	149	5	14	88	50

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	350	305	113	309	328	152	138	0	0	154	0	0
Stage 1	141	141	-	162	162	-	-	-	-	-	-	-
Stage 2	209	164	-	147	166	-	-	-	-	-	-	-
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	605	608	940	643	591	894	1446	-	-	1426	-	-
Stage 1	862	780	-	840	764	-	-	-	-	-	-	-
Stage 2	793	762	-	856	761	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	534	599	940	626	582	894	1446	-	-	1426	-	-
Mov Cap-2 Maneuver	534	599	-	626	582	-	-	-	-	-	-	-
Stage 1	859	771	-	837	761	-	-	-	-	-	-	-
Stage 2	705	759	-	834	753	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.1	10.4	0.2	0.7
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1446	-	-	558	779	1426	-	-
HCM Lane V/C Ratio	0.004	-	-	0.09	0.144	0.01	-	-
HCM Control Delay (s)	7.5	0	-	12.1	10.4	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.5	0	-	-

Intersection	
Int Delay, s/veh	3.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	49	52	147	54	26	67
Future Vol, veh/h	49	52	147	54	26	67
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	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	58	62	175	64	31	80

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	349	207	0	0	239	0
Stage 1	207	-	-	-	-	-
Stage 2	142	-	-	-	-	-
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	648	833	-	-	1328	-
Stage 1	828	-	-	-	-	-
Stage 2	885	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	632	833	-	-	1328	-
Mov Cap-2 Maneuver	632	-	-	-	-	-
Stage 1	828	-	-	-	-	-
Stage 2	864	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11	0	2.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	722	1328	-
HCM Lane V/C Ratio	-	-	0.167	0.023	-
HCM Control Delay (s)	-	-	11	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0.1	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1360	77	56	911	59	40
Future Volume (vph)	1360	77	56	911	59	40
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	17.0	17.0	3.0	17.0	5.0	5.0
Minimum Split (s)	23.0	23.0	7.0	23.0	30.0	30.0
Total Split (s)	76.0	76.0	12.0	88.0	32.0	32.0
Total Split (%)	63.3%	63.3%	10.0%	73.3%	26.7%	26.7%
Yellow Time (s)	4.0	4.0	3.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effct Green (s)	93.5	93.5	101.9	101.1	11.1	11.1
Actuated g/C Ratio	0.78	0.78	0.85	0.84	0.09	0.09
v/c Ratio	0.50	0.07	0.18	0.22	0.37	0.23
Control Delay	8.1	3.9	3.2	0.5	54.7	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.1	3.9	3.2	0.5	54.7	15.6
LOS	A	A	A	A	D	B
Approach Delay	7.9			0.7	38.8	
Approach LOS	A			A	D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 111 (93%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.50	
Intersection Signal Delay: 6.3	Intersection LOS: A
Intersection Capacity Utilization 60.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: Race St & Arapahoe Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1360	77	56	911	59	40
Future Volume (veh/h)	1360	77	56	911	59	40
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1388	79	57	930	60	41
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2860	1270	343	4387	87	78
Arrive On Green	0.80	0.80	0.02	0.86	0.05	0.05
Sat Flow, veh/h	3647	1578	1781	5274	1781	1585
Grp Volume(v), veh/h	1388	79	57	930	60	41
Grp Sat Flow(s),veh/h/ln	1777	1578	1781	1702	1781	1585
Q Serve(g_s), s	15.0	1.2	0.6	3.8	4.0	3.0
Cycle Q Clear(g_c), s	15.0	1.2	0.6	3.8	4.0	3.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2860	1270	343	4387	87	78
V/C Ratio(X)	0.49	0.06	0.17	0.21	0.69	0.53
Avail Cap(c_a), veh/h	2860	1270	424	4387	401	357
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.96	0.96	1.00	1.00
Uniform Delay (d), s/veh	3.8	2.4	3.0	1.5	56.1	55.7
Incr Delay (d2), s/veh	0.6	0.1	0.1	0.1	3.5	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	0.3	0.1	0.6	1.9	1.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	4.3	2.5	3.0	1.6	59.7	57.7
LnGrp LOS	A	A	A	A	E	E
Approach Vol, veh/h	1467			987	101	
Approach Delay, s/veh	4.2			1.6	58.9	
Approach LOS	A			A	E	

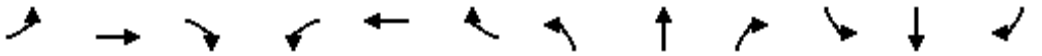
Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	6.6	102.6				109.1	10.9
Change Period (Y+Rc), s	4.0	6.0				6.0	5.0
Max Green Setting (Gmax), s	8.0	70.0				82.0	27.0
Max Q Clear Time (g_c+I1), s	2.6	17.0				5.8	6.0
Green Ext Time (p_c), s	0.0	8.5				4.9	0.1

Intersection Summary			
HCM 6th Ctrl Delay		5.4	
HCM 6th LOS		A	

Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	40	1326	50	911	4	30	7	30
Future Volume (vph)	40	1326	50	911	4	30	7	30
Turn Type	pm+pt	NA	pm+pt	NA	NA	Perm	NA	Perm
Protected Phases	5	2	1	6	8		4	
Permitted Phases	2		6			8		4
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	3.0	17.0	3.0	17.0	5.0	5.0	5.0	5.0
Minimum Split (s)	7.0	26.0	7.0	23.0	35.0	35.0	34.0	34.0
Total Split (s)	12.0	72.0	12.0	72.0	18.0	18.0	18.0	18.0
Total Split (%)	10.0%	60.0%	10.0%	60.0%	15.0%	15.0%	15.0%	15.0%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	84.7	78.2	85.1	78.4	7.6	7.6	12.3	12.3
Actuated g/C Ratio	0.71	0.65	0.71	0.65	0.06	0.06	0.10	0.10
v/c Ratio	0.12	0.43	0.20	0.33	0.29	0.16	0.83	0.12
Control Delay	6.6	10.2	8.5	11.7	58.9	1.7	86.4	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.6	10.2	8.5	11.7	58.9	1.7	86.4	1.0
LOS	A	B	A	B	E	A	F	A
Approach Delay		10.1		11.6	30.8		71.5	
Approach LOS		B		B	C		E	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 102 (85%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	
Natural Cycle: 105	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 15.1	Intersection LOS: B
Intersection Capacity Utilization 58.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Vine St & Arapahoe Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	1326	30	50	911	113	28	4	30	137	7	30
Future Volume (veh/h)	40	1326	30	50	911	113	28	4	30	137	7	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.94	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	42	1396	32	53	959	119	29	4	32	144	7	32
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	440	3405	78	348	3065	379	74	10	70	172	8	156
Arrive On Green	0.04	1.00	1.00	0.04	1.00	1.00	0.05	0.05	0.05	0.10	0.10	0.10
Sat Flow, veh/h	1781	5135	118	1781	4599	569	1574	217	1494	1702	83	1543
Grp Volume(v), veh/h	42	925	503	53	709	369	33	0	32	151	0	32
Grp Sat Flow(s),veh/h/ln	1781	1702	1848	1781	1702	1764	1792	0	1494	1785	0	1543
Q Serve(g_s), s	0.9	0.0	0.0	1.2	0.0	0.0	2.1	0.0	2.5	10.0	0.0	2.3
Cycle Q Clear(g_c), s	0.9	0.0	0.0	1.2	0.0	0.0	2.1	0.0	2.5	10.0	0.0	2.3
Prop In Lane	1.00		0.06	1.00		0.32	0.88		1.00	0.95		1.00
Lane Grp Cap(c), veh/h	440	2257	1226	348	2268	1176	84	0	70	181	0	156
V/C Ratio(X)	0.10	0.41	0.41	0.15	0.31	0.31	0.39	0.00	0.46	0.84	0.00	0.21
Avail Cap(c_a), veh/h	525	2257	1226	427	2268	1176	194	0	162	193	0	167
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.86	0.86	0.86	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.1	0.0	0.0	6.0	0.0	0.0	55.5	0.0	55.7	53.0	0.0	49.5
Incr Delay (d2), s/veh	0.0	0.5	0.9	0.1	0.4	0.7	1.1	0.0	1.7	23.1	0.0	0.2
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	0.3	0.1	0.3	0.4	0.1	0.2	1.0	0.0	1.0	5.6	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.1	0.5	0.9	6.1	0.4	0.7	56.6	0.0	57.4	76.1	0.0	49.7
LnGrp LOS	A	A	A	A	A	A	E	A	E	E	A	D
Approach Vol, veh/h		1470			1131			65			183	
Approach Delay, s/veh		0.8			0.7			57.0			71.4	
Approach LOS		A			A			E			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.6	85.6		17.1	6.3	86.0		10.6				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	8.0	66.0		13.0	8.0	66.0		13.0				
Max Q Clear Time (g_c+I1), s	3.2	2.0		12.0	2.9	2.0		4.5				
Green Ext Time (p_c), s	0.0	7.9		0.1	0.0	5.4		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			6.6									
HCM 6th LOS			A									

Notes

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

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	1419	28	6	990	6	0	0	27	0	0	16
Future Vol, veh/h	18	1419	28	6	990	6	0	0	27	0	0	16
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	150	-	0	100	-	-	-	-	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	20	1542	30	7	1076	7	0	0	29	0	0	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1083	0	0	1572	0	0	-	-	771	-	-	542
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	5.34	-	-	5.34	-	-	-	-	7.14	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	-	-	3.92	-	-	3.92
Pot Cap-1 Maneuver	*873	-	-	*737	-	-	0	0	*586	0	0	*694
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %	1	-	-	1	-	-			1			1
Mov Cap-1 Maneuver	*873	-	-	*737	-	-	-	-	*586	-	-	*694
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	11.5	10.3
HCM LOS			B	B

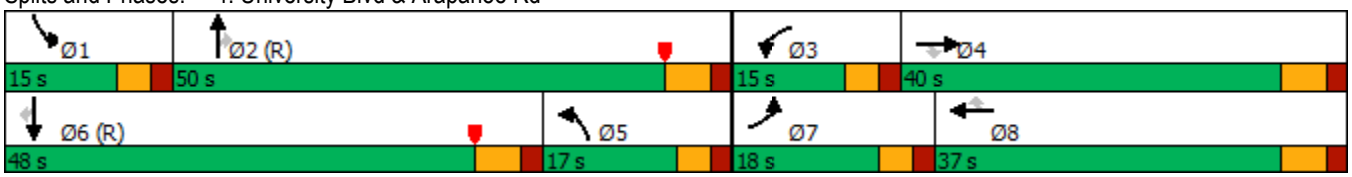
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	586	* 873	-	-	* 737	-	-	694
HCM Lane V/C Ratio	0.05	0.022	-	-	0.009	-	-	0.025
HCM Control Delay (s)	11.5	9.2	-	-	9.9	-	-	10.3
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.1

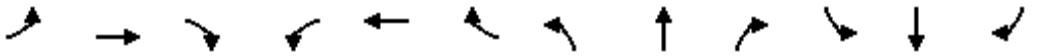
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	201	1046	232	230	574	402	274	1279	155	249	892	179
Future Volume (vph)	201	1046	232	230	574	402	274	1279	155	249	892	179
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	10.0	10.0	3.0	10.0	10.0
Minimum Split (s)	8.0	39.0	39.0	8.0	37.0	37.0	8.0	35.0	35.0	8.0	40.0	40.0
Total Split (s)	18.0	40.0	40.0	15.0	37.0	37.0	17.0	50.0	50.0	15.0	48.0	48.0
Total Split (%)	15.0%	33.3%	33.3%	12.5%	30.8%	30.8%	14.2%	41.7%	41.7%	12.5%	40.0%	40.0%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	10.8	31.5	31.5	9.8	30.5	30.5	12.0	46.6	46.6	10.0	44.6	44.6
Actuated g/C Ratio	0.09	0.26	0.26	0.08	0.25	0.25	0.10	0.39	0.39	0.08	0.37	0.37
v/c Ratio	0.68	0.82	0.42	0.85	0.46	0.75	0.83	0.67	0.23	0.91	0.49	0.27
Control Delay	57.2	60.0	22.1	81.1	39.0	29.7	58.1	22.4	2.2	88.5	30.5	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.2	60.0	22.1	81.1	39.0	29.7	58.1	22.4	2.2	88.5	30.5	4.8
LOS	E	E	C	F	D	C	E	C	A	F	C	A
Approach Delay		53.7			44.0			26.3			38.0	
Approach LOS		D			D			C			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 38 (32%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 95	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 39.8	Intersection LOS: D
Intersection Capacity Utilization 79.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: University Blvd & Arapahoe Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	201	1046	232	230	574	402	274	1279	155	249	892	179
Future Volume (veh/h)	201	1046	232	230	574	402	274	1279	155	249	892	179
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	209	1090	242	240	598	0	285	1332	161	259	929	186
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	268	1306	403	288	1335		412	2013	623	288	1787	552
Arrive On Green	0.03	0.08	0.08	0.08	0.26	0.00	0.12	0.39	0.39	0.08	0.35	0.35
Sat Flow, veh/h	3456	5106	1576	3456	5106	1585	3456	5106	1579	3456	5106	1578
Grp Volume(v), veh/h	209	1090	242	240	598	0	285	1332	161	259	929	186
Grp Sat Flow(s),veh/h/ln	1728	1702	1576	1728	1702	1585	1728	1702	1579	1728	1702	1578
Q Serve(g_s), s	7.2	25.2	12.5	8.2	11.8	0.0	9.5	25.7	8.3	8.9	17.3	7.7
Cycle Q Clear(g_c), s	7.2	25.2	12.5	8.2	11.8	0.0	9.5	25.7	8.3	8.9	17.3	7.7
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	268	1306	403	288	1335		412	2013	623	288	1787	552
V/C Ratio(X)	0.78	0.83	0.60	0.83	0.45		0.69	0.66	0.26	0.90	0.52	0.34
Avail Cap(c_a), veh/h	374	1447	446	288	1335		412	2013	623	288	1787	552
HCM Platoon Ratio	0.33	0.33	0.33	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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.5	52.4	24.4	54.2	37.1	0.0	50.7	29.8	24.5	54.5	31.0	15.7
Incr Delay (d2), s/veh	4.3	3.6	1.1	17.6	0.1	0.0	4.1	1.7	1.0	28.1	1.1	1.6
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	3.4	12.0	5.3	4.2	4.9	0.0	4.3	10.4	3.2	4.9	7.1	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.7	56.1	25.4	71.7	37.1	0.0	54.8	31.5	25.5	82.6	32.1	17.4
LnGrp LOS	E	E	C	E	D		D	C	C	F	C	B
Approach Vol, veh/h		1541			838	A		1778			1374	
Approach Delay, s/veh		52.0			47.1			34.7			39.6	
Approach LOS		D			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	53.3	15.0	36.7	20.3	48.0	14.3	37.4
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0	6.0	* 6	5.0	6.0
Max Green Setting (Gmax), s	10.0	44.0	10.0	34.0	12.0	* 42	13.0	31.0
Max Q Clear Time (g_c+I1), s	10.9	27.7	10.2	27.2	11.5	19.3	9.2	13.8
Green Ext Time (p_c), s	0.0	12.6	0.0	3.2	0.0	12.4	0.1	2.5

Intersection Summary	
HCM 6th Ctrl Delay	42.6
HCM 6th LOS	D

Notes

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

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

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	22	0	0	12	0	1764	4	0	1285	48
Future Vol, veh/h	0	0	22	0	0	12	0	1764	4	0	1285	48
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	-	-	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	100	100	92	92	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	24	0	0	13	0	1764	4	0	1285	48

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	643	-	-	884	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	*632	0	0	248	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %			1					-	-		-	-
Mov Cap-1 Maneuver	-	-	*632	-	-	248	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.9	20.3	0	0
HCM LOS	B	C		

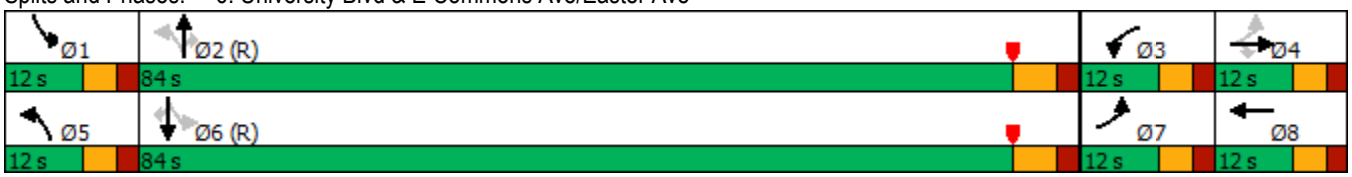
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	632	248	-	-
HCM Lane V/C Ratio	-	-	0.038	0.053	-	-
HCM Control Delay (s)	-	-	10.9	20.3	-	-
HCM Lane LOS	-	-	B	C	-	-
HCM 95th %tile Q(veh)	-	-	0.1	0.2	-	-

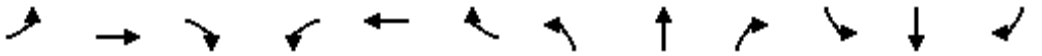
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	55	6	46	29	19	72	1652	29	22	1185	62
Future Volume (vph)	55	6	46	29	19	72	1652	29	22	1185	62
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases	4		4			2		2	6		6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	3.0	3.0	3.0	4.0	3.0	3.0	5.0	5.0	3.0	5.0	5.0
Minimum Split (s)	8.0	35.0	35.0	9.0	32.0	8.0	24.0	24.0	8.0	29.0	29.0
Total Split (s)	12.0	12.0	12.0	12.0	12.0	12.0	84.0	84.0	12.0	84.0	84.0
Total Split (%)	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	70.0%	70.0%	10.0%	70.0%	70.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	12.1	8.0	8.0	6.6	6.0	92.6	87.7	87.7	89.9	84.9	84.9
Actuated g/C Ratio	0.10	0.07	0.07	0.06	0.05	0.77	0.73	0.73	0.75	0.71	0.71
v/c Ratio	0.24	0.06	0.25	0.34	0.69	0.29	0.73	0.03	0.16	0.54	0.06
Control Delay	46.7	54.8	2.7	64.2	37.4	5.4	9.2	0.0	7.6	8.1	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay	46.7	54.8	2.7	64.2	37.4	5.4	9.3	0.0	7.6	8.1	0.2
LOS	D	D	A	E	D	A	A	A	A	A	A
Approach Delay		28.2			43.3		9.0			7.7	
Approach LOS		C			D		A			A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 50 (42%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 115	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 10.5	Intersection LOS: B
Intersection Capacity Utilization 73.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 6: University Blvd & E Commons Ave/Easter Ave





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	6	46	29	19	83	72	1652	29	22	1185	62
Future Volume (veh/h)	55	6	46	29	19	83	72	1652	29	22	1185	62
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		0.94	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	63	7	0	33	22	95	83	1899	33	25	1362	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	222	121		42	17	74	321	2569	1142	248	2519	
Arrive On Green	0.03	0.06	0.00	0.02	0.06	0.06	0.06	1.00	1.00	0.01	0.71	0.00
Sat Flow, veh/h	3456	1870	1585	1781	292	1262	1781	3554	1580	1781	3554	1585
Grp Volume(v), veh/h	63	7	0	33	0	117	83	1899	33	25	1362	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1781	0	1554	1781	1777	1580	1781	1777	1585
Q Serve(g_s), s	2.0	0.4	0.0	2.2	0.0	7.0	1.6	0.0	0.0	0.5	21.7	0.0
Cycle Q Clear(g_c), s	2.0	0.4	0.0	2.2	0.0	7.0	1.6	0.0	0.0	0.5	21.7	0.0
Prop In Lane	1.00		1.00	1.00		0.81	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	222	121		42	0	91	321	2569	1142	248	2519	
V/C Ratio(X)	0.28	0.06		0.79	0.00	1.29	0.26	0.74	0.03	0.10	0.54	
Avail Cap(c_a), veh/h	322	121		104	0	91	375	2569	1142	327	2519	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	51.0	52.7	0.0	58.3	0.0	56.5	6.6	0.0	0.0	4.7	8.2	0.0
Incr Delay (d2), s/veh	0.3	0.1	0.0	27.1	0.0	191.2	0.2	2.0	0.0	0.1	0.8	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	0.9	0.2	0.0	1.3	0.0	7.6	0.5	0.7	0.0	0.2	7.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.3	52.8	0.0	85.4	0.0	247.7	6.8	2.0	0.0	4.7	9.1	0.0
LnGrp LOS	D	D		F	A	F	A	A	A	A	A	
Approach Vol, veh/h		70	A		150			2015			1387	A
Approach Delay, s/veh		51.4			212.0			2.1			9.0	
Approach LOS		D			F			A			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.7	92.7	7.8	12.7	8.4	91.1	8.6	12.0
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	78.0	7.0	7.0	7.0	78.0	7.0	7.0
Max Q Clear Time (g_c+I1), s	2.5	2.0	4.2	2.4	3.6	23.7	4.0	9.0
Green Ext Time (p_c), s	0.0	56.5	0.0	0.0	0.0	28.7	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	14.4
HCM 6th LOS	B

Notes

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

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	27	27	1752	1254	6
Future Vol, veh/h	1	27	27	1752	1254	6
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	-	120	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	29	27	1752	1254	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2184	627	1260	0	-	0
Stage 1	1254	-	-	-	-	-
Stage 2	930	-	-	-	-	-
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	*211	*567	*849	-	-	-
Stage 1	*535	-	-	-	-	-
Stage 2	*343	-	-	-	-	-
Platoon blocked, %	1	1	1	-	-	-
Mov Cap-1 Maneuver	*204	*567	*849	-	-	-
Mov Cap-2 Maneuver	*204	-	-	-	-	-
Stage 1	*518	-	-	-	-	-
Stage 2	*343	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.2	0.1	0
HCM LOS	B		

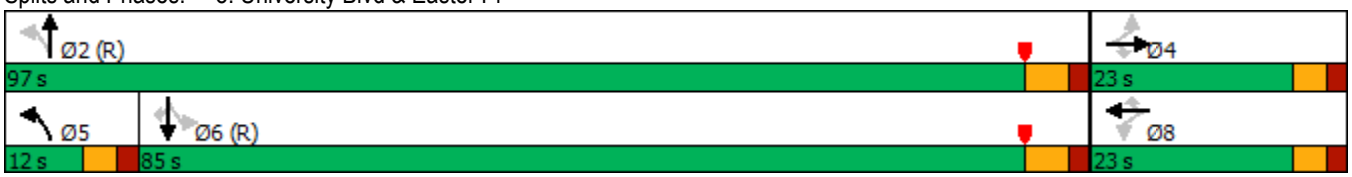
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	* 849	-	533	-	-
HCM Lane V/C Ratio	0.032	-	0.057	-	-
HCM Control Delay (s)	9.4	-	12.2	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

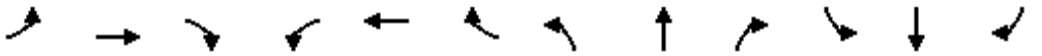
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	89	10	80	142	47	49	115	1641	9	1210	61
Future Volume (vph)	89	10	80	142	47	49	115	1641	9	1210	61
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm
Protected Phases		4			8		5	2		6	
Permitted Phases	4		4	8		8	2		6		6
Detector Phase	4	4	4	8	8	8	5	2	6	6	6
Switch Phase											
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	5.0
Minimum Split (s)	36.0	36.0	36.0	40.0	40.0	40.0	8.0	29.0	32.0	32.0	32.0
Total Split (s)	23.0	23.0	23.0	23.0	23.0	23.0	12.0	97.0	85.0	85.0	85.0
Total Split (%)	19.2%	19.2%	19.2%	19.2%	19.2%	19.2%	10.0%	80.8%	70.8%	70.8%	70.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.0	6.0	6.0	6.0
Lead/Lag							Lead		Lag	Lag	Lag
Lead-Lag Optimize?							Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	16.3	16.3	16.3	16.3	16.3	16.3	93.7	92.7	81.7	81.7	81.7
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.14	0.14	0.78	0.77	0.68	0.68	0.68
v/c Ratio	0.56	0.04	0.31	0.85	0.21	0.20	0.45	0.71	0.09	0.56	0.07
Control Delay	60.3	44.3	12.2	86.8	47.3	7.6	8.6	8.9	3.3	3.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.3	44.3	12.2	86.8	47.3	7.6	8.6	8.9	3.3	3.8	0.1
LOS	E	D	B	F	D	A	A	A	A	A	A
Approach Delay		37.9			62.7			8.9		3.7	
Approach LOS		D			E			A		A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 66 (55%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 12.1	Intersection LOS: B
Intersection Capacity Utilization 82.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 8: University Blvd & Easter Pl





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	10	80	142	47	49	115	1641	70	9	1210	61
Future Volume (veh/h)	89	10	80	142	47	49	115	1641	70	9	1210	61
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.98		0.98	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	100	11	90	160	53	55	129	1844	79	10	1360	69
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	214	274	228	240	274	228	381	2645	112	173	2428	1077
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.04	0.76	0.76	1.00	1.00	1.00
Sat Flow, veh/h	1267	1870	1556	1273	1870	1556	1781	3472	148	232	3554	1577
Grp Volume(v), veh/h	100	11	90	160	53	55	129	937	986	10	1360	69
Grp Sat Flow(s),veh/h/ln	1267	1870	1556	1273	1870	1556	1781	1777	1843	232	1777	1577
Q Serve(g_s), s	9.0	0.6	6.3	14.8	3.0	3.8	2.5	31.9	32.9	1.6	0.0	0.0
Cycle Q Clear(g_c), s	12.0	0.6	6.3	15.4	3.0	3.8	2.5	31.9	32.9	25.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.08	1.00		1.00
Lane Grp Cap(c), veh/h	214	274	228	240	274	228	381	1353	1404	173	2428	1077
V/C Ratio(X)	0.47	0.04	0.39	0.67	0.19	0.24	0.34	0.69	0.70	0.06	0.56	0.06
Avail Cap(c_a), veh/h	219	281	233	245	281	233	420	1353	1404	173	2428	1077
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.2	44.0	46.4	50.6	45.0	45.3	4.5	7.2	7.3	3.6	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.4	5.2	0.1	0.2	0.2	2.9	3.0	0.6	0.9	0.1
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	2.9	0.3	2.5	5.1	1.4	1.5	0.7	9.8	10.4	0.1	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.8	44.0	46.8	55.8	45.1	45.5	4.7	10.1	10.3	4.2	0.9	0.1
LnGrp LOS	D	D	D	E	D	D	A	B	B	A	A	A
Approach Vol, veh/h		201			268			2052			1439	
Approach Delay, s/veh		48.6			51.6			9.9			0.9	
Approach LOS		D			D			A			A	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		97.4		22.6	9.4	88.0		22.6				
Change Period (Y+Rc), s		6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s		91.0		18.0	7.0	79.0		18.0				
Max Q Clear Time (g_c+I1), s		34.9		14.0	4.5	27.0		17.4				
Green Ext Time (p_c), s		44.9		0.1	0.0	29.7		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			11.4									
HCM 6th LOS			B									

Notes

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

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	28	170	234	10	4	8
Future Vol, veh/h	28	170	234	10	4	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	185	254	11	4	9

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	265	0	-	0	505	260
Stage 1	-	-	-	-	260	-
Stage 2	-	-	-	-	245	-
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	1299	-	-	-	527	779
Stage 1	-	-	-	-	783	-
Stage 2	-	-	-	-	796	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1299	-	-	-	513	779
Mov Cap-2 Maneuver	-	-	-	-	513	-
Stage 1	-	-	-	-	763	-
Stage 2	-	-	-	-	796	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1299	-	-	-	664
HCM Lane V/C Ratio	0.023	-	-	-	0.02
HCM Control Delay (s)	7.8	0	-	-	10.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	167	11	10	225	12	27
Future Vol, veh/h	167	11	10	225	12	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	182	12	11	245	13	29

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	194	0	455	188
Stage 1	-	-	-	-	188	-
Stage 2	-	-	-	-	267	-
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	-	-	1379	-	563	854
Stage 1	-	-	-	-	844	-
Stage 2	-	-	-	-	778	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1379	-	558	854
Mov Cap-2 Maneuver	-	-	-	-	558	-
Stage 1	-	-	-	-	844	-
Stage 2	-	-	-	-	771	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	10.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	734	-	-	1379	-
HCM Lane V/C Ratio	0.058	-	-	0.008	-
HCM Control Delay (s)	10.2	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	161	16	2	169	66	21	1	13	3	1	4
Future Vol, veh/h	11	161	16	2	169	66	21	1	13	3	1	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	175	17	2	184	72	23	1	14	3	1	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	256	0	0	192	0	0	435	468	184	439	440	220
Stage 1	-	-	-	-	-	-	208	208	-	224	224	-
Stage 2	-	-	-	-	-	-	227	260	-	215	216	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1309	-	-	1381	-	-	531	493	858	528	511	820
Stage 1	-	-	-	-	-	-	794	730	-	779	718	-
Stage 2	-	-	-	-	-	-	776	693	-	787	724	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1309	-	-	1381	-	-	523	487	858	514	505	820
Mov Cap-2 Maneuver	-	-	-	-	-	-	523	487	-	514	505	-
Stage 1	-	-	-	-	-	-	786	723	-	771	717	-
Stage 2	-	-	-	-	-	-	769	692	-	765	717	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.1	11.3	10.8
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	610	1309	-	-	1381	-	-	630
HCM Lane V/C Ratio	0.062	0.009	-	-	0.002	-	-	0.014
HCM Control Delay (s)	11.3	7.8	0	-	7.6	-	-	10.8
HCM Lane LOS	B	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	23	141	150	46	48	12
Future Vol, veh/h	23	141	150	46	48	12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	153	163	50	52	13
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8.5	8.5	8.3
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	14%	0%	80%
Vol Thru, %	86%	77%	0%
Vol Right, %	0%	23%	20%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	164	196	60
LT Vol	23	0	48
Through Vol	141	150	0
RT Vol	0	46	12
Lane Flow Rate	178	213	65
Geometry Grp	1	1	1
Degree of Util (X)	0.215	0.245	0.087
Departure Headway (Hd)	4.342	4.147	4.817
Convergence, Y/N	Yes	Yes	Yes
Cap	831	871	745
Service Time	2.347	2.151	2.837
HCM Lane V/C Ratio	0.214	0.245	0.087
HCM Control Delay	8.5	8.5	8.3
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.8	1	0.3

Intersection	
Int Delay, s/veh	1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	2	61	6	12	44
Future Vol, veh/h	2	2	61	6	12	44
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	2	66	7	13	48

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	144	70	0	0	73	0
Stage 1	70	-	-	-	-	-
Stage 2	74	-	-	-	-	-
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	849	993	-	-	1527	-
Stage 1	953	-	-	-	-	-
Stage 2	949	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	841	993	-	-	1527	-
Mov Cap-2 Maneuver	841	-	-	-	-	-
Stage 1	953	-	-	-	-	-
Stage 2	940	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	1.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	911	1527	-
HCM Lane V/C Ratio	-	-	0.005	0.009	-
HCM Control Delay (s)	-	-	9	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	43	6	10	0	2	0	1	56	3	48	50	43
Future Vol, veh/h	43	6	10	0	2	0	1	56	3	48	50	43
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	-	-	-	-	-	-	-	-	-	-	-	-
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	47	7	11	0	2	0	1	61	3	52	54	47

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	248	248	78	256	270	63	101	0	0	64	0	0
Stage 1	182	182	-	65	65	-	-	-	-	-	-	-
Stage 2	66	66	-	191	205	-	-	-	-	-	-	-
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	706	655	983	697	636	1002	1491	-	-	1538	-	-
Stage 1	820	749	-	946	841	-	-	-	-	-	-	-
Stage 2	945	840	-	811	732	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	684	631	983	664	612	1002	1491	-	-	1538	-	-
Mov Cap-2 Maneuver	684	631	-	664	612	-	-	-	-	-	-	-
Stage 1	819	722	-	945	840	-	-	-	-	-	-	-
Stage 2	942	839	-	766	706	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.5	10.9	0.1	2.5
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1491	-	-	715	612	1538	-	-
HCM Lane V/C Ratio	0.001	-	-	0.09	0.004	0.034	-	-
HCM Control Delay (s)	7.4	0	-	10.5	10.9	7.4	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0	0.1	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	12	84	22	9	128
Future Vol, veh/h	16	12	84	22	9	128
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	13	91	24	10	139

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	262	103	0	0	115	0
Stage 1	103	-	-	-	-	-
Stage 2	159	-	-	-	-	-
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	727	952	-	-	1474	-
Stage 1	921	-	-	-	-	-
Stage 2	870	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	722	952	-	-	1474	-
Mov Cap-2 Maneuver	722	-	-	-	-	-
Stage 1	921	-	-	-	-	-
Stage 2	864	-	-	-	-	-

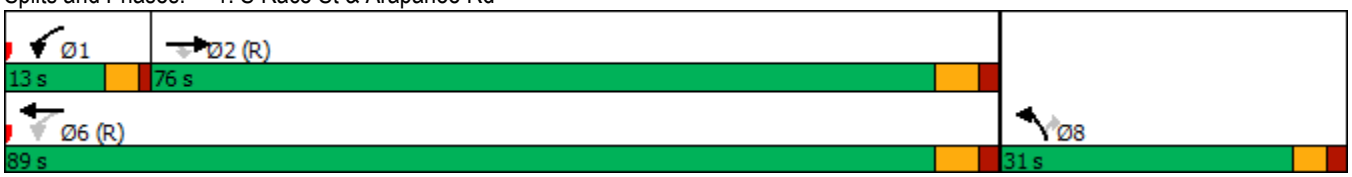
Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	0.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	805	1474	-
HCM Lane V/C Ratio	-	-	0.038	0.007	-
HCM Control Delay (s)	-	-	9.6	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1110	56	47	1665	133	84
Future Volume (vph)	1110	56	47	1665	133	84
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	17.0	17.0	3.0	17.0	5.0	5.0
Minimum Split (s)	23.0	23.0	7.0	23.0	30.0	30.0
Total Split (s)	76.0	76.0	13.0	89.0	31.0	31.0
Total Split (%)	63.3%	63.3%	10.8%	74.2%	25.8%	25.8%
Yellow Time (s)	4.0	4.0	3.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effct Green (s)	86.5	86.5	96.1	94.1	14.9	14.9
Actuated g/C Ratio	0.72	0.72	0.80	0.78	0.12	0.12
v/c Ratio	0.45	0.05	0.13	0.44	0.63	0.33
Control Delay	8.8	4.0	4.2	5.2	61.7	11.9
Queue Delay	0.0	0.0	0.0	0.3	0.0	0.0
Total Delay	8.8	4.0	4.2	5.5	61.7	11.9
LOS	A	A	A	A	E	B
Approach Delay	8.6			5.4	42.4	
Approach LOS	A			A	D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 31 (26%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.63	
Intersection Signal Delay: 9.2	Intersection LOS: A
Intersection Capacity Utilization 56.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: S Race St & Arapahoe Rd



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1110	56	47	1665	133	84
Future Volume (veh/h)	1110	56	47	1665	133	84
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1156	58	49	1734	139	88
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2698	1198	392	4150	170	152
Arrive On Green	0.76	0.76	0.02	0.81	0.10	0.10
Sat Flow, veh/h	3647	1578	1781	5274	1781	1585
Grp Volume(v), veh/h	1156	58	49	1734	139	88
Grp Sat Flow(s),veh/h/ln	1777	1578	1781	1702	1781	1585
Q Serve(g_s), s	13.9	1.1	0.7	11.6	9.2	6.4
Cycle Q Clear(g_c), s	13.9	1.1	0.7	11.6	9.2	6.4
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2698	1198	392	4150	170	152
V/C Ratio(X)	0.43	0.05	0.13	0.42	0.82	0.58
Avail Cap(c_a), veh/h	2698	1198	489	4150	386	343
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.73	0.73	1.00	1.00
Uniform Delay (d), s/veh	5.2	3.6	3.7	3.2	53.2	52.0
Incr Delay (d2), s/veh	0.5	0.1	0.0	0.2	3.6	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	0.3	0.2	2.8	4.3	2.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	5.7	3.7	3.8	3.4	56.8	53.3
LnGrp LOS	A	A	A	A	E	D
Approach Vol, veh/h	1214			1783	227	
Approach Delay, s/veh	5.6			3.4	55.5	
Approach LOS	A			A	E	

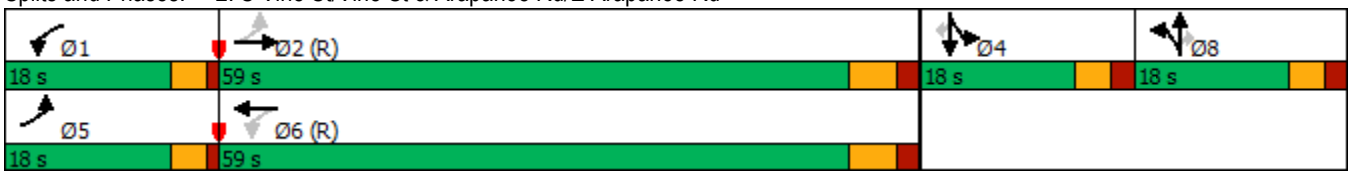
Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	6.4	97.1				103.5	16.5
Change Period (Y+Rc), s	4.0	6.0				6.0	5.0
Max Green Setting (Gmax), s	9.0	70.0				83.0	26.0
Max Q Clear Time (g_c+I1), s	2.7	15.9				13.6	11.2
Green Ext Time (p_c), s	0.0	6.3				12.6	0.3

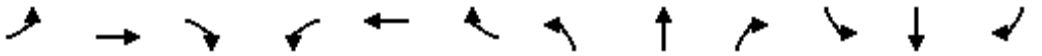
Intersection Summary			
HCM 6th Ctrl Delay		7.9	
HCM 6th LOS		A	

Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	67	1026	132	1557	23	109	13	32
Future Volume (vph)	67	1026	132	1557	23	109	13	32
Turn Type	pm+pt	NA	pm+pt	NA	NA	Perm	NA	Perm
Protected Phases	5	2	1	6	8		4	
Permitted Phases	2		6			8		4
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	3.0	17.0	3.0	17.0	5.0	5.0	5.0	5.0
Minimum Split (s)	7.0	26.0	7.0	23.0	35.0	35.0	34.0	34.0
Total Split (s)	18.0	59.0	18.0	59.0	18.0	18.0	18.0	18.0
Total Split (%)	15.9%	52.2%	15.9%	52.2%	15.9%	15.9%	15.9%	15.9%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	69.8	61.6	73.7	65.0	12.0	12.0	11.5	11.5
Actuated g/C Ratio	0.62	0.55	0.65	0.58	0.11	0.11	0.10	0.10
v/c Ratio	0.41	0.43	0.44	0.64	0.80	0.43	0.74	0.13
Control Delay	16.3	16.3	11.8	18.4	78.6	13.7	72.5	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.3	16.3	11.8	18.4	78.6	13.7	72.5	1.0
LOS	B	B	B	B	E	B	E	A
Approach Delay		16.3		17.9	50.7		58.1	
Approach LOS		B		B	D		E	

Intersection Summary	
Cycle Length: 113	
Actuated Cycle Length: 113	
Offset: 28 (25%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	
Natural Cycle: 125	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 21.6	Intersection LOS: C
Intersection Capacity Utilization 67.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: S Vine St/Vine St & Arapahoe Rd/E Arapahoe Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	1026	102	132	1557	201	122	23	109	114	13	32
Future Volume (veh/h)	67	1026	102	132	1557	201	122	23	109	114	13	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	71	1080	107	139	1639	212	128	24	115	120	14	34
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	210	2714	269	364	2717	350	157	29	160	152	18	146
Arrive On Green	0.03	0.58	0.58	0.05	0.59	0.59	0.10	0.10	0.10	0.09	0.09	0.09
Sat Flow, veh/h	1781	4720	467	1781	4574	590	1511	283	1544	1603	187	1540
Grp Volume(v), veh/h	71	779	408	139	1218	633	152	0	115	134	0	34
Grp Sat Flow(s),veh/h/ln	1781	1702	1783	1781	1702	1760	1795	0	1544	1790	0	1540
Q Serve(g_s), s	1.8	14.2	14.3	3.6	25.6	25.7	9.4	0.0	8.2	8.3	0.0	2.3
Cycle Q Clear(g_c), s	1.8	14.2	14.3	3.6	25.6	25.7	9.4	0.0	8.2	8.3	0.0	2.3
Prop In Lane	1.00		0.26	1.00		0.34	0.84		1.00	0.90		1.00
Lane Grp Cap(c), veh/h	210	1957	1025	364	2022	1045	186	0	160	170	0	146
V/C Ratio(X)	0.34	0.40	0.40	0.38	0.60	0.61	0.82	0.00	0.72	0.79	0.00	0.23
Avail Cap(c_a), veh/h	376	1957	1025	496	2022	1045	206	0	178	206	0	177
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)	0.90	0.90	0.90	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.6	13.2	13.2	9.9	14.5	14.5	49.6	0.0	49.1	50.0	0.0	47.3
Incr Delay (d2), s/veh	0.3	0.5	1.0	0.2	1.3	2.6	18.2	0.0	9.4	12.6	0.0	0.3
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	5.3	5.7	1.3	9.5	10.3	5.2	0.0	3.6	4.3	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.9	13.8	14.3	10.1	15.9	17.1	67.8	0.0	58.5	62.7	0.0	47.6
LnGrp LOS	B	B	B	B	B	B	E	A	E	E	A	D
Approach Vol, veh/h		1258			1990			267			168	
Approach Delay, s/veh		13.9			15.9			63.8			59.6	
Approach LOS		B			B			E			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.6	71.0		15.7	7.5	73.1		16.7				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	14.0	53.0		13.0	14.0	53.0		13.0				
Max Q Clear Time (g_c+I1), s	5.6	16.3		10.3	3.8	27.7		11.4				
Green Ext Time (p_c), s	0.1	6.0		0.1	0.0	10.4		0.1				

Intersection Summary		
HCM 6th Ctrl Delay		20.7
HCM 6th LOS		C

Notes

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

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	1176	43	69	1778	8	0	0	122	0	0	111
Future Vol, veh/h	30	1176	43	69	1778	8	0	0	122	0	0	111
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	150	-	0	100	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	31	1212	44	71	1833	8	0	0	126	0	0	114

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1841	0	0	1256	0	0	-	-	606	-	-	921
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	5.34	-	-	5.34	-	-	-	-	7.14	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	-	-	3.92	-	-	3.92
Pot Cap-1 Maneuver	*627	-	-	*827	-	-	0	0	*658	0	0	*499
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %	1	-	-	1	-	-			1			1
Mov Cap-1 Maneuver	*627	-	-	*827	-	-	-	-	*658	-	-	*499
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.4	11.8	14.3
HCM LOS			B	B

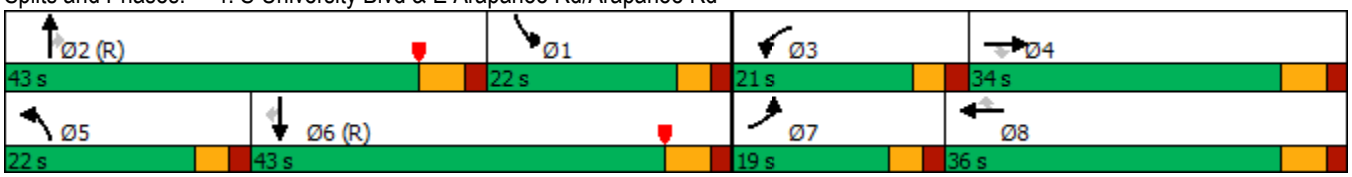
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	658	* 627	-	-	* 827	-	-	499
HCM Lane V/C Ratio	0.191	0.049	-	-	0.086	-	-	0.229
HCM Control Delay (s)	11.8	11	-	-	9.8	-	-	14.3
HCM Lane LOS	B	B	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.7	0.2	-	-	0.3	-	-	0.9

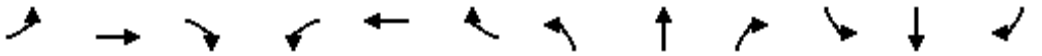
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	323	740	261	307	1247	457	309	1258	189	342	1378	325
Future Volume (vph)	323	740	261	307	1247	457	309	1258	189	342	1378	325
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	10.0	10.0	3.0	10.0	10.0
Minimum Split (s)	8.0	39.0	39.0	8.0	37.0	37.0	8.0	35.0	35.0	8.0	40.0	40.0
Total Split (s)	19.0	34.0	34.0	21.0	36.0	36.0	22.0	43.0	43.0	22.0	43.0	43.0
Total Split (%)	15.8%	28.3%	28.3%	17.5%	30.0%	30.0%	18.3%	35.8%	35.8%	18.3%	35.8%	35.8%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	13.5	29.4	29.4	14.1	30.0	30.0	14.8	37.5	37.5	17.0	39.7	39.7
Actuated g/C Ratio	0.11	0.24	0.24	0.12	0.25	0.25	0.12	0.31	0.31	0.14	0.33	0.33
v/c Ratio	0.86	0.61	0.46	0.78	1.00	0.76	0.75	0.81	0.31	0.72	0.84	0.48
Control Delay	73.5	42.8	7.2	65.2	70.5	24.6	48.1	34.8	6.6	58.4	43.0	9.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.5	42.8	7.2	65.2	70.5	24.6	48.1	34.8	6.6	58.4	43.0	9.3
LOS	E	D	A	E	E	C	D	C	A	E	D	A
Approach Delay		43.3			59.3			34.1			40.2	
Approach LOS		D			E			C			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 103 (86%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 105	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 44.6	Intersection LOS: D
Intersection Capacity Utilization 87.1%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 4: S University Blvd & E Arapahoe Rd/Arapahoe Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	323	740	261	307	1247	457	309	1258	189	342	1378	325
Future Volume (veh/h)	323	740	261	307	1247	457	309	1258	189	342	1378	325
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	330	755	266	313	1272	0	315	1284	193	349	1406	332
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	383	1297	400	369	1277		374	1574	486	481	1775	548
Arrive On Green	0.11	0.25	0.25	0.11	0.25	0.00	0.11	0.31	0.31	0.14	0.35	0.35
Sat Flow, veh/h	3456	5106	1576	3456	5106	1585	3456	5106	1577	3456	5106	1578
Grp Volume(v), veh/h	330	755	266	313	1272	0	315	1284	193	349	1406	332
Grp Sat Flow(s),veh/h/ln	1728	1702	1576	1728	1702	1585	1728	1702	1577	1728	1702	1578
Q Serve(g_s), s	11.3	15.5	18.2	10.7	29.9	0.0	10.7	27.9	8.3	11.6	29.8	20.9
Cycle Q Clear(g_c), s	11.3	15.5	18.2	10.7	29.9	0.0	10.7	27.9	8.3	11.6	29.8	20.9
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	383	1297	400	369	1277		374	1574	486	481	1775	548
V/C Ratio(X)	0.86	0.58	0.66	0.85	1.00		0.84	0.82	0.40	0.73	0.79	0.61
Avail Cap(c_a), veh/h	403	1297	400	461	1277		490	1574	486	490	1775	548
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.4	39.2	40.2	52.6	44.9	0.0	52.5	38.3	16.6	49.5	35.2	32.3
Incr Delay (d2), s/veh	15.5	0.4	3.3	9.7	24.3	0.0	7.9	4.8	2.4	4.5	3.7	4.9
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	5.7	6.5	7.3	5.1	15.2	0.0	5.0	12.0	3.3	5.2	12.5	8.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.0	39.6	43.5	62.4	69.2	0.0	60.4	43.1	19.0	54.0	39.0	37.2
LnGrp LOS	E	D	D	E	E		E	D	B	D	D	D
Approach Vol, veh/h		1351			1585	A		1792			2087	
Approach Delay, s/veh		47.3			67.9			43.6			41.2	
Approach LOS		D			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.7	43.0	17.8	36.5	18.0	47.7	18.3	36.0
Change Period (Y+Rc), s	6.0	* 6	5.0	6.0	5.0	6.0	5.0	6.0
Max Green Setting (Gmax), s	17.0	* 37	16.0	28.0	17.0	37.0	14.0	30.0
Max Q Clear Time (g_c+I1), s	13.6	29.9	12.7	20.2	12.7	31.8	13.3	31.9
Green Ext Time (p_c), s	0.2	6.0	0.2	2.6	0.3	4.8	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	49.2
HCM 6th LOS	D

Notes

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

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

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	69	0	0	44	0	1732	20	0	1832	114
Future Vol, veh/h	0	0	69	0	0	44	0	1732	20	0	1832	114
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	-	-	0	-	-	0	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	74	0	0	47	0	1862	22	0	1970	123

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	985	-	-	942	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	*502	0	0	227	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %			1					-	-		-	-
Mov Cap-1 Maneuver	-	-	*502	-	-	227	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.4	25	0	0
HCM LOS	B	D		

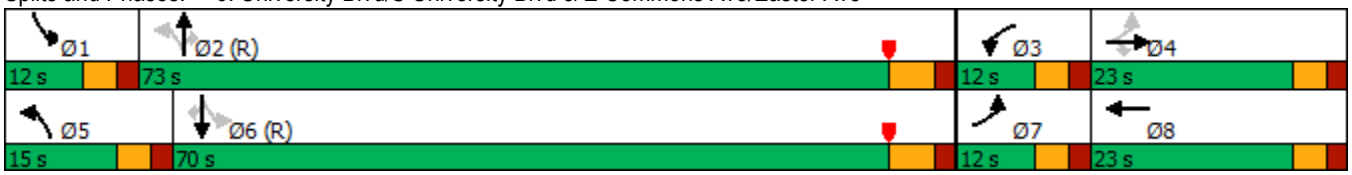
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	502	227	-	-
HCM Lane V/C Ratio	-	-	0.148	0.208	-	-
HCM Control Delay (s)	-	-	13.4	25	-	-
HCM Lane LOS	-	-	B	D	-	-
HCM 95th %tile Q(veh)	-	-	0.5	0.8	-	-

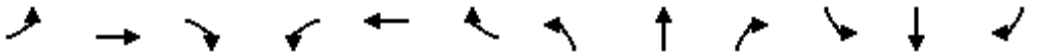
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	131	39	147	69	76	143	1572	47	67	1668	149
Future Volume (vph)	131	39	147	69	76	143	1572	47	67	1668	149
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases	4		4			2		2	6		6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	3.0	3.0	3.0	4.0	3.0	3.0	5.0	5.0	3.0	5.0	5.0
Minimum Split (s)	8.0	35.0	35.0	9.0	32.0	8.0	24.0	24.0	8.0	29.0	29.0
Total Split (s)	12.0	23.0	23.0	12.0	23.0	15.0	73.0	73.0	12.0	70.0	70.0
Total Split (%)	10.0%	19.2%	19.2%	10.0%	19.2%	12.5%	60.8%	60.8%	10.0%	58.3%	58.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	20.7	15.1	15.1	7.0	12.8	83.9	75.3	75.3	77.4	70.5	70.5
Actuated g/C Ratio	0.17	0.13	0.13	0.06	0.11	0.70	0.63	0.63	0.64	0.59	0.59
v/c Ratio	0.36	0.18	0.50	0.71	0.64	0.79	0.75	0.05	0.43	0.85	0.16
Control Delay	40.9	48.3	18.7	90.4	55.8	59.4	15.7	0.1	23.2	24.6	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.0
Total Delay	40.9	48.3	18.7	90.4	55.8	59.4	15.7	0.1	23.2	24.8	2.6
LOS	D	D	B	F	E	E	B	A	C	C	A
Approach Delay		31.5			68.2		18.8			23.0	
Approach LOS		C			E		B			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 74 (62%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 115	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 24.0	Intersection LOS: C
Intersection Capacity Utilization 86.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 6: University Blvd/S University Blvd & E Commons Ave/Easter Ave





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	131	39	147	69	76	47	143	1572	47	67	1668	149
Future Volume (veh/h)	131	39	147	69	76	47	143	1572	47	67	1668	149
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		1.00	1.00		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	139	41	0	73	81	50	152	1672	50	71	1774	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	385	204		93	117	72	210	2256	1002	284	2182	
Arrive On Green	0.05	0.11	0.00	0.05	0.11	0.11	0.10	1.00	1.00	0.03	0.61	0.00
Sat Flow, veh/h	3456	1870	1585	1781	1068	659	1781	3554	1579	1781	3554	1585
Grp Volume(v), veh/h	139	41	0	73	0	131	152	1672	50	71	1774	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1781	0	1728	1781	1777	1579	1781	1777	1585
Q Serve(g_s), s	4.2	2.4	0.0	4.9	0.0	8.8	3.9	0.0	0.0	1.8	46.2	0.0
Cycle Q Clear(g_c), s	4.2	2.4	0.0	4.9	0.0	8.8	3.9	0.0	0.0	1.8	46.2	0.0
Prop In Lane	1.00		1.00	1.00		0.38	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	385	204		93	0	190	210	2256	1002	284	2182	
V/C Ratio(X)	0.36	0.20		0.79	0.00	0.69	0.72	0.74	0.05	0.25	0.81	
Avail Cap(c_a), veh/h	409	281		104	0	259	270	2256	1002	337	2182	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	44.4	48.7	0.0	56.2	0.0	51.4	22.9	0.0	0.0	8.0	17.9	0.0
Incr Delay (d2), s/veh	0.2	0.2	0.0	29.1	0.0	1.9	4.3	2.2	0.1	0.2	3.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	1.1	0.0	3.0	0.0	3.9	2.7	0.7	0.0	0.6	17.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.6	48.9	0.0	85.3	0.0	53.3	27.2	2.2	0.1	8.2	21.3	0.0
LnGrp LOS	D	D		F	A	D	C	A	A	A	C	
Approach Vol, veh/h		180	A		204			1874			1845	A
Approach Delay, s/veh		45.6			64.8			4.2			20.8	
Approach LOS		D			E			A			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.4	82.2	11.3	18.1	11.0	79.7	11.2	18.2
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	67.0	7.0	18.0	10.0	64.0	7.0	18.0
Max Q Clear Time (g_c+I1), s	3.8	2.0	6.9	4.4	5.9	48.2	6.2	10.8
Green Ext Time (p_c), s	0.0	43.4	0.0	0.1	0.1	14.2	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	16.5
HCM 6th LOS	B

Notes

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

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	70.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	62	44	1770	1871	12
Future Vol, veh/h	13	62	44	1770	1871	12
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	-	120	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	67	47	1903	2012	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	3058	1006	2025	0	-	0
Stage 1	2012	-	-	-	-	-
Stage 2	1046	-	-	-	-	-
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	*~ 2	*312	*467	-	-	-
Stage 1	*295	-	-	-	-	-
Stage 2	*319	-	-	-	-	-
Platoon blocked, %	1	1	1	-	-	-
Mov Cap-1 Maneuver	*~ 2	*312	*467	-	-	-
Mov Cap-2 Maneuver	*~ 2	-	-	-	-	-
Stage 1	*265	-	-	-	-	-
Stage 2	*319	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, $	3520.1	0.3	0
HCM LOS	F		

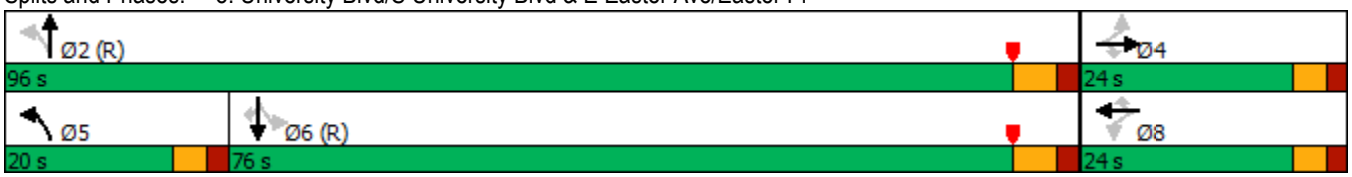
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	* 467	-	11	-	-
HCM Lane V/C Ratio	0.101	-	7.331	-	-
HCM Control Delay (s)	13.6	-	$ 3520.1	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.3	-	11.4	-	-

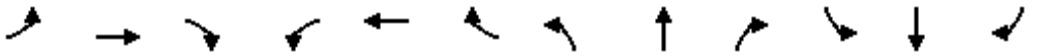
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	83	28	153	61	21	24	140	1707	18	1832	83
Future Volume (vph)	83	28	153	61	21	24	140	1707	18	1832	83
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm
Protected Phases		4			8		5	2		6	
Permitted Phases	4		4	8		8	2		6		6
Detector Phase	4	4	4	8	8	8	5	2	6	6	6
Switch Phase											
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	5.0
Minimum Split (s)	36.0	36.0	36.0	40.0	40.0	40.0	8.0	29.0	32.0	32.0	32.0
Total Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	20.0	96.0	76.0	76.0	76.0
Total Split (%)	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	16.7%	80.0%	63.3%	63.3%	63.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.0	6.0	6.0	6.0
Lead/Lag							Lead		Lag	Lag	Lag
Lead-Lag Optimize?							Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	12.3	12.3	12.3	12.3	12.3	12.3	97.7	96.7	82.5	82.5	82.5
Actuated g/C Ratio	0.10	0.10	0.10	0.10	0.10	0.10	0.81	0.81	0.69	0.69	0.69
v/c Ratio	0.63	0.16	0.53	0.46	0.12	0.12	0.74	0.66	0.14	0.80	0.08
Control Delay	70.0	48.5	13.7	60.0	47.5	1.0	45.1	6.9	7.3	7.3	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.0	48.5	13.7	60.0	47.5	1.0	45.1	6.9	7.3	7.3	1.3
LOS	E	D	B	E	D	A	D	A	A	A	A
Approach Delay		35.1			44.0			9.7		7.0	
Approach LOS		D			D			A		A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 82 (68%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 10.9	Intersection LOS: B
Intersection Capacity Utilization 85.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 8: University Blvd/S University Blvd & E Easter Ave/Easter Pl





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	83	28	153	61	21	24	140	1707	64	18	1832	83
Future Volume (veh/h)	83	28	153	61	21	24	140	1707	64	18	1832	83
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	88	30	163	65	22	26	149	1816	68	19	1949	88
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	220	244	203	197	244	203	275	2716	101	189	2475	1098
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.04	0.78	0.78	1.00	1.00	1.00
Sat Flow, veh/h	1332	1870	1552	1172	1870	1552	1781	3493	130	241	3554	1577
Grp Volume(v), veh/h	88	30	163	65	22	26	149	919	965	19	1949	88
Grp Sat Flow(s),veh/h/ln	1332	1870	1552	1172	1870	1552	1781	1777	1846	241	1777	1577
Q Serve(g_s), s	7.5	1.7	12.2	6.2	1.2	1.8	2.7	28.6	29.2	2.5	0.0	0.0
Cycle Q Clear(g_c), s	8.7	1.7	12.2	7.9	1.2	1.8	2.7	28.6	29.2	22.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	220	244	203	197	244	203	275	1382	1436	189	2475	1098
V/C Ratio(X)	0.40	0.12	0.80	0.33	0.09	0.13	0.54	0.66	0.67	0.10	0.79	0.08
Avail Cap(c_a), veh/h	257	296	246	229	296	246	427	1382	1436	189	2475	1098
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.7	46.1	50.7	49.6	45.9	46.1	4.1	6.1	6.2	2.6	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.1	12.1	0.4	0.1	0.1	0.6	2.5	2.5	1.1	2.6	0.1
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	0.8	5.5	1.9	0.6	0.7	0.8	8.3	8.8	0.1	0.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.1	46.2	62.8	49.9	45.9	46.2	4.7	8.7	8.7	3.6	2.6	0.1
LnGrp LOS	D	D	E	D	D	D	A	A	A	A	A	A
Approach Vol, veh/h		281			113			2033			2056	
Approach Delay, s/veh		57.1			48.3			8.4			2.5	
Approach LOS		E			D			A			A	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		99.3		20.7	9.8	89.6		20.7				
Change Period (Y+Rc), s		6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s		90.0		19.0	15.0	70.0		19.0				
Max Q Clear Time (g_c+I1), s		31.2		14.2	4.7	24.0		9.9				
Green Ext Time (p_c), s		45.5		0.3	0.1	39.7		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			9.8									
HCM 6th LOS			A									

Notes

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

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	36	213	200	44	51	44
Future Vol, veh/h	36	213	200	44	51	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	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	38	222	208	46	53	46

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	254	0	-	0	529	231
Stage 1	-	-	-	-	231	-
Stage 2	-	-	-	-	298	-
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	1311	-	-	-	510	808
Stage 1	-	-	-	-	807	-
Stage 2	-	-	-	-	753	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1311	-	-	-	493	808
Mov Cap-2 Maneuver	-	-	-	-	493	-
Stage 1	-	-	-	-	780	-
Stage 2	-	-	-	-	753	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	12.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1311	-	-	-	602
HCM Lane V/C Ratio	0.029	-	-	-	0.164
HCM Control Delay (s)	7.8	0	-	-	12.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.6

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	233	17	9	235	8	16
Future Vol, veh/h	233	17	9	235	8	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	256	19	10	258	9	18

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	275	0	544	266
Stage 1	-	-	-	-	266	-
Stage 2	-	-	-	-	278	-
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	-	-	1288	-	500	773
Stage 1	-	-	-	-	779	-
Stage 2	-	-	-	-	769	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1288	-	496	773
Mov Cap-2 Maneuver	-	-	-	-	496	-
Stage 1	-	-	-	-	779	-
Stage 2	-	-	-	-	762	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	10.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	652	-	-	1288	-
HCM Lane V/C Ratio	0.04	-	-	0.008	-
HCM Control Delay (s)	10.8	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	20	170	13	10	179	54	16	2	13	67	2	20
Future Vol, veh/h	20	170	13	10	179	54	16	2	13	67	2	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	189	14	11	199	60	18	2	14	74	2	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	259	0	0	203	0	0	503	521	196	499	498	229
Stage 1	-	-	-	-	-	-	240	240	-	251	251	-
Stage 2	-	-	-	-	-	-	263	281	-	248	247	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1306	-	-	1369	-	-	479	460	845	482	474	810
Stage 1	-	-	-	-	-	-	763	707	-	753	699	-
Stage 2	-	-	-	-	-	-	742	678	-	756	702	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1306	-	-	1369	-	-	454	447	845	462	461	810
Mov Cap-2 Maneuver	-	-	-	-	-	-	454	447	-	462	461	-
Stage 1	-	-	-	-	-	-	749	694	-	739	693	-
Stage 2	-	-	-	-	-	-	713	672	-	727	689	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	0.3	11.8	13.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	563	1306	-	-	1369	-	-	511
HCM Lane V/C Ratio	0.061	0.017	-	-	0.008	-	-	0.194
HCM Control Delay (s)	11.8	7.8	0	-	7.7	0	-	13.7
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.7

Intersection	
Intersection Delay, s/veh	8.8
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	24	134	159	56	69	28
Future Vol, veh/h	24	134	159	56	69	28
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	26	147	175	62	76	31
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8.7	8.9	8.6
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	15%	0%	71%
Vol Thru, %	85%	74%	0%
Vol Right, %	0%	26%	29%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	158	215	97
LT Vol	24	0	69
Through Vol	134	159	0
RT Vol	0	56	28
Lane Flow Rate	174	236	107
Geometry Grp	1	1	1
Degree of Util (X)	0.216	0.278	0.142
Departure Headway (Hd)	4.472	4.231	4.798
Convergence, Y/N	Yes	Yes	Yes
Cap	804	851	747
Service Time	2.493	2.25	2.827
HCM Lane V/C Ratio	0.216	0.277	0.143
HCM Control Delay	8.7	8.9	8.6
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.8	1.1	0.5

Intersection	
Int Delay, s/veh	5.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	13	60	72	8	7	83
Future Vol, veh/h	13	60	72	8	7	83
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	76	25	76	76	76	76
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	240	95	11	9	109

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	228	101	0	0	106	0
Stage 1	101	-	-	-	-	-
Stage 2	127	-	-	-	-	-
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	760	954	-	-	1485	-
Stage 1	923	-	-	-	-	-
Stage 2	899	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	755	954	-	-	1485	-
Mov Cap-2 Maneuver	755	-	-	-	-	-
Stage 1	923	-	-	-	-	-
Stage 2	894	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.3	0	0.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	938	1485	-
HCM Lane V/C Ratio	-	-	0.274	0.006	-
HCM Control Delay (s)	-	-	10.3	7.4	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1.1	0	-

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	32	8	2	14	14	64	4	123	4	12	73	41
Future Vol, veh/h	32	8	2	14	14	64	4	123	4	12	73	41
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	76	76	76	76	76	76	76	76	76	76	76	76
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	42	11	3	18	18	84	5	162	5	16	96	54

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	381	332	123	337	357	165	150	0	0	167	0	0
Stage 1	155	155	-	175	175	-	-	-	-	-	-	-
Stage 2	226	177	-	162	182	-	-	-	-	-	-	-
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	577	588	928	617	569	879	1431	-	-	1411	-	-
Stage 1	847	769	-	827	754	-	-	-	-	-	-	-
Stage 2	777	753	-	840	749	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	503	579	928	599	560	879	1431	-	-	1411	-	-
Mov Cap-2 Maneuver	503	579	-	599	560	-	-	-	-	-	-	-
Stage 1	844	760	-	824	751	-	-	-	-	-	-	-
Stage 2	683	750	-	816	740	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.6	10.6	0.2	0.7
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1431	-	-	528	759	1411	-	-
HCM Lane V/C Ratio	0.004	-	-	0.105	0.159	0.011	-	-
HCM Control Delay (s)	7.5	0	-	12.6	10.6	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.6	0	-	-

Intersection	
Int Delay, s/veh	3.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	53	57	161	59	29	73
Future Vol, veh/h	53	57	161	59	29	73
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	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	63	68	192	70	35	87

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	384	227	0	0	262	0
Stage 1	227	-	-	-	-	-
Stage 2	157	-	-	-	-	-
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	619	812	-	-	1302	-
Stage 1	811	-	-	-	-	-
Stage 2	871	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	602	812	-	-	1302	-
Mov Cap-2 Maneuver	602	-	-	-	-	-
Stage 1	811	-	-	-	-	-
Stage 2	847	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.4	0	2.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	695	1302	-
HCM Lane V/C Ratio	-	-	0.188	0.027	-
HCM Control Delay (s)	-	-	11.4	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.1	-

APPENDIX E. TRIP GENERATION

Streets at Southglenn Macy's Trip Generation Estimates

Description	Land Use	ITE Code	Quantity	Units	Daily Trips	AM Peak Hour Trip			PM Peak Hour Trips		
						In	Out	Total	In	Out	Total
Remove Existing Development											
Retail	Department Store	875	174.70	ksf	3,997	101	65	36	341	170	171
				Existing Macy's Reduction	**-3,997**	**-65**	**-36**	**-101**	**-170**	**-171**	**-341**
Previously Approved Development											
Residential	Multifamily Housing (Mid-Rise)	221	148	DU	805	34	19	53	33	33	66
				Approved Development	**805**	**34**	**19**	**53**	**33**	**33**	**66**
Add New Development											
Residential	Multifamily Housing (Mid-Rise)	221	225	DU	1224	21	60	81	60	39	99
Entertainment	*(see text)*	*(see text)*	30.00	ksf	600	0	0	0	37	17	54
Retail	Shopping Center	820	31.95	ksf	2767	104	64	108	112	122	234
Retail	Free Standing Discount Store	815	54.25	ksf	2881	63	43	20	131	131	262
Office	General Office Building	710	128.35	ksf	1352	126	21	147	23	121	144
				Macy's New Development	**8,824**	**294**	**165**	**459**	**363**	**430**	**793**
Total Macy's Site Trips					***9,629***	***328***	***184***	***512***	***396***	***463***	***858***
Macy's Site Internal Trips (see text)					*-2,220*	*-15*	*-15*	*-30*	*-111*	*-111*	*-222*
Macy's Removal (from above)					*-3,997*	*-65*	*-36*	*-101*	*-170*	*-171*	*-341*
Macy's Site New External Trips					**3,412**	**248**	**133**	**381**	**114**	**181**	**295**

Streets at Southglenn Sears Trip Generation Estimates

Description	Land Use	ITE Code	Quantity	Units	Daily Trips	AM Peak Hour Trip			PM Peak Hour Trips		
						In	Out	Total	In	Out	Total
Remove Existing Development											
Retail	Department Store	875	133.00	ksf	3,043	49	28	77	130	130	260
Office	Office	715	8.00	ksf	76	8	1	9	1	8	9
				Existing Sears Reduction	**-3,119**	**-57**	**-29**	**-86**	**-268**	**-131**	**-138**
Add New Development											
Residential	Multifamily Housing (Mid-Rise)	221	698	DU	3,797	65	186	251	187	120	307
Retail	Shopping Center	820	35.00	ksf	2,931	105	64	169	120	129	249
				Sears New Development	**6,728**	**170**	**250**	**420**	**307**	**249**	**556**
Total Sears Site Trips					***6,728***	***170***	***250***	***420***	***307***	***249***	***556***
Sears Site Internal Trips (see text)					*-920*	*-3*	*-3*	*-6*	*-46*	*-46*	*-92*
Sears Removal (from above)					*-3,119*	*-57*	*-29*	*-86*	*-131*	*-138*	*-268*
Sears Site New External Trips					**2,689**	**110**	**218**	**328**	**130**	**65**	**196**

Department Store
(875)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday**

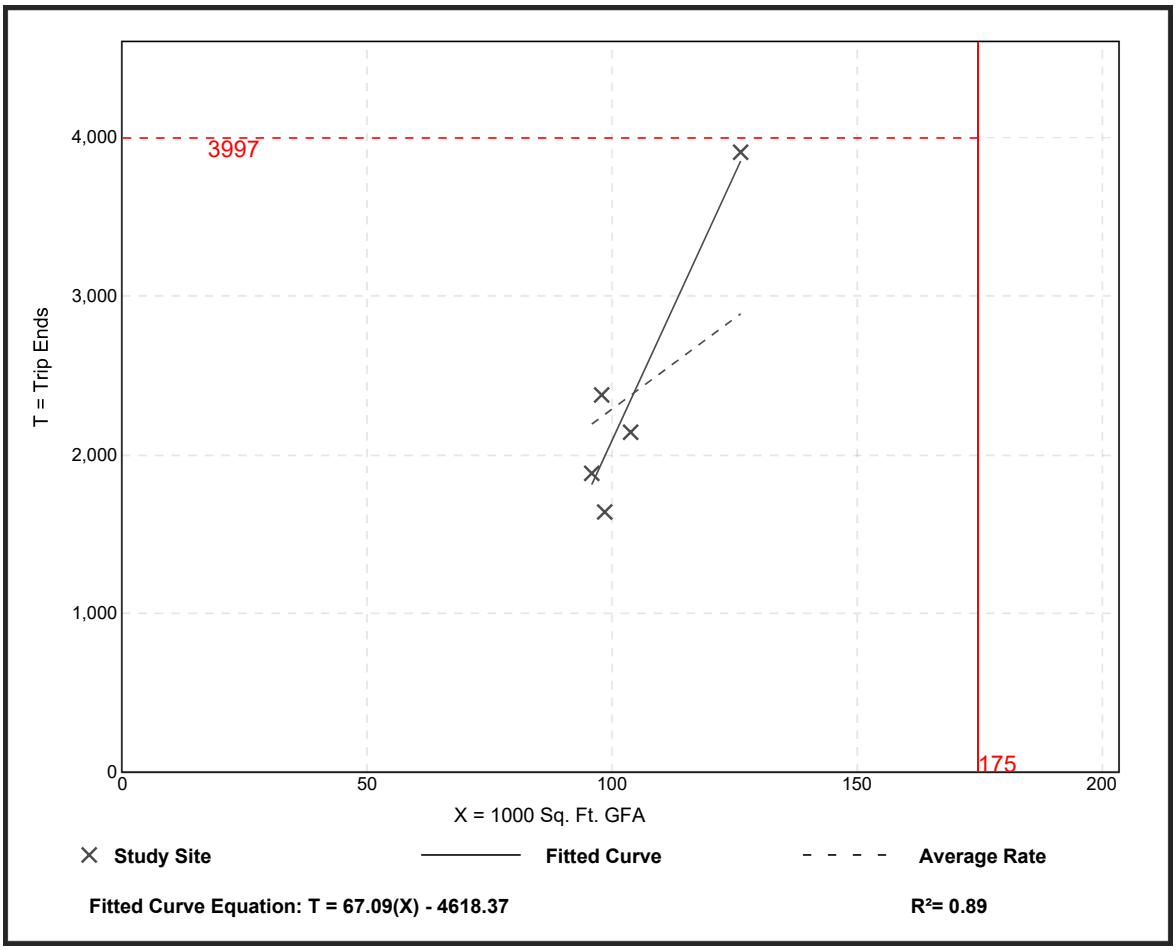
Setting/Location: **General Urban/Suburban**
Number of Studies: 5
Avg. 1000 Sq. Ft. GFA: 104
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
22.88	16.64 - 30.95	5.74

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: T = 67.09(X) - 4618.37

R^2= 0.89

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Department Store
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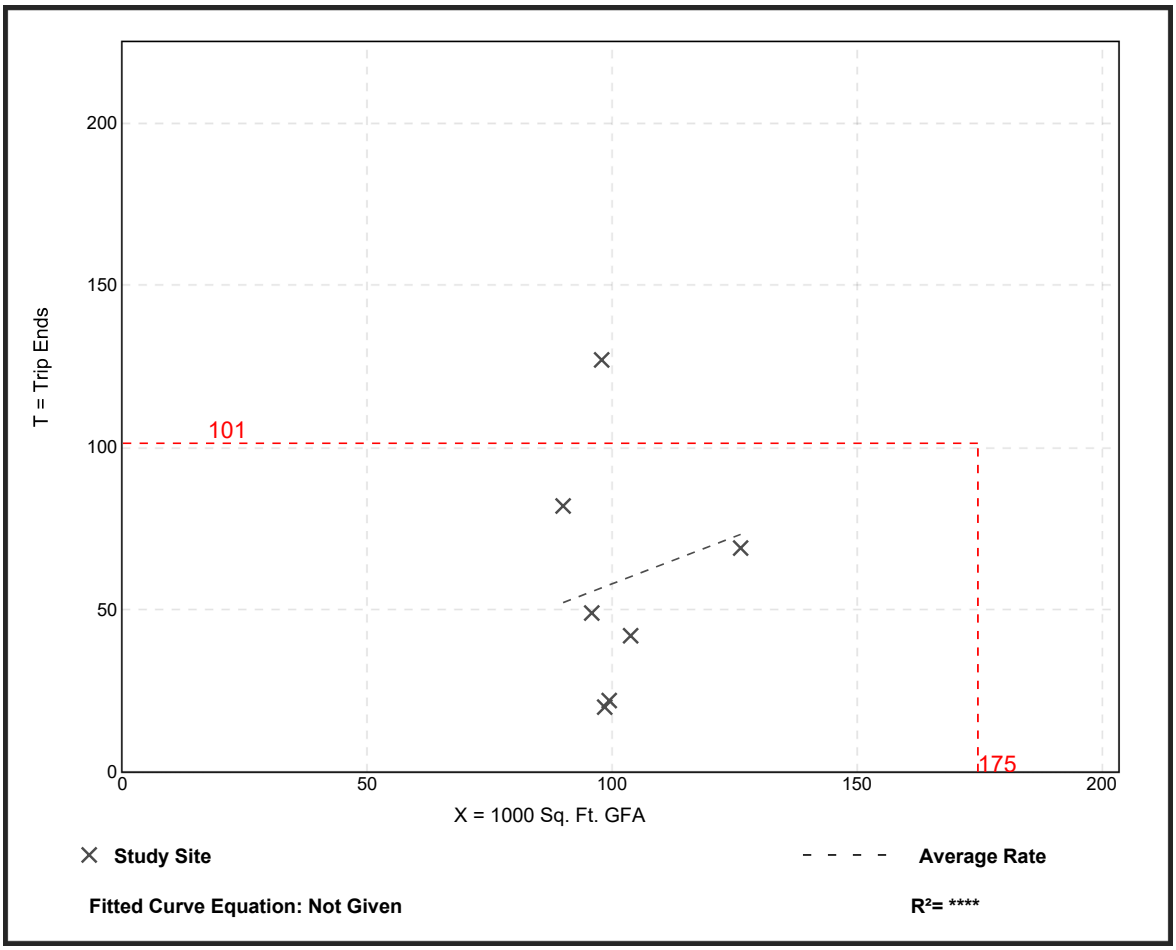
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 7
Avg. 1000 Sq. Ft. GFA: 102
Directional Distribution: 64% entering, 36% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.58	0.20 - 1.30	0.39

Data Plot and Equation



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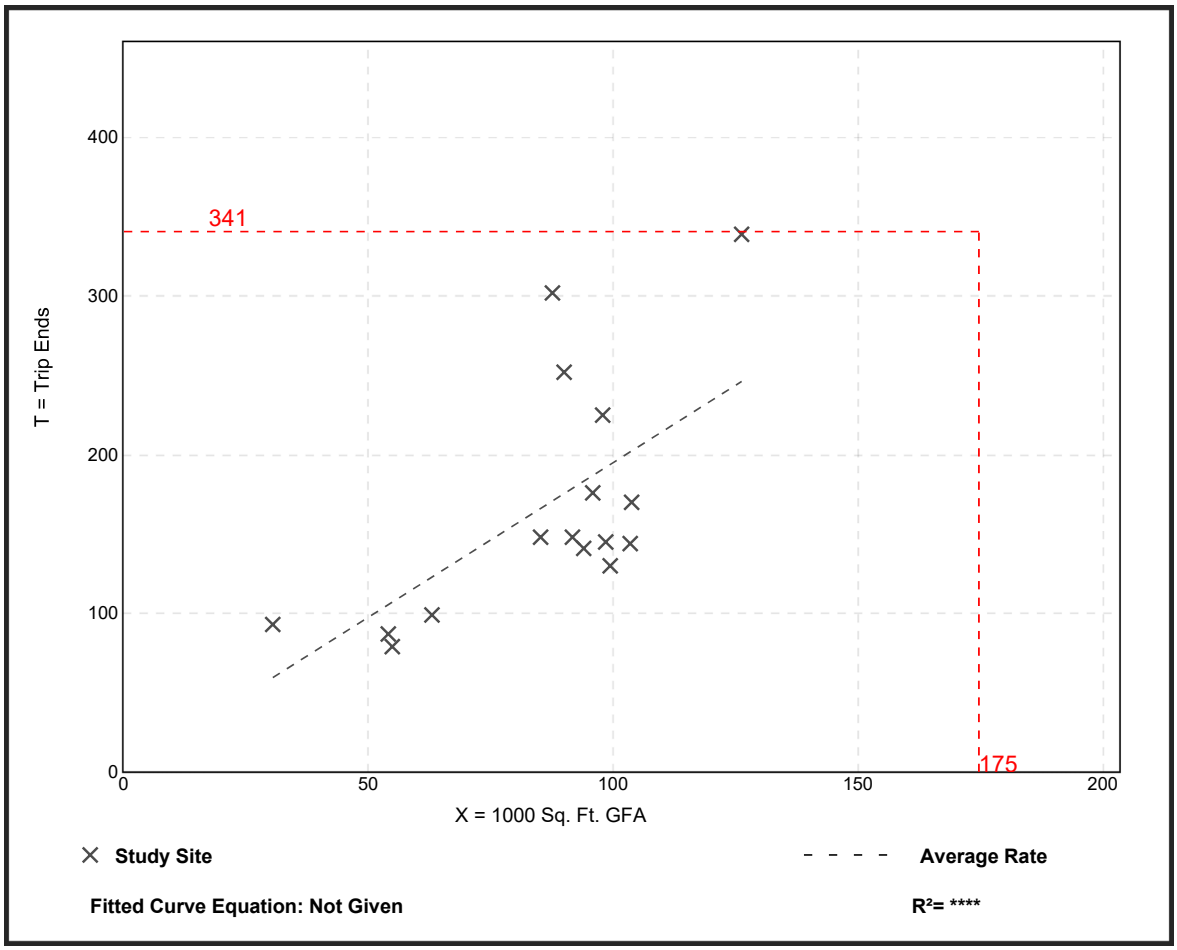
Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday,** **Peak Hour of Adjacent Street Traffic,** **One Hour Between 4 and 6 p.m.**
Setting/Location:	**General Urban/Suburban**
Number of Studies:	16
Avg. 1000 Sq. Ft. GFA:	86
Directional Distribution:	50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.95	1.31 - 3.45	0.65

Data Plot and Equation



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Multifamily Housing (Mid-Rise)
(221)

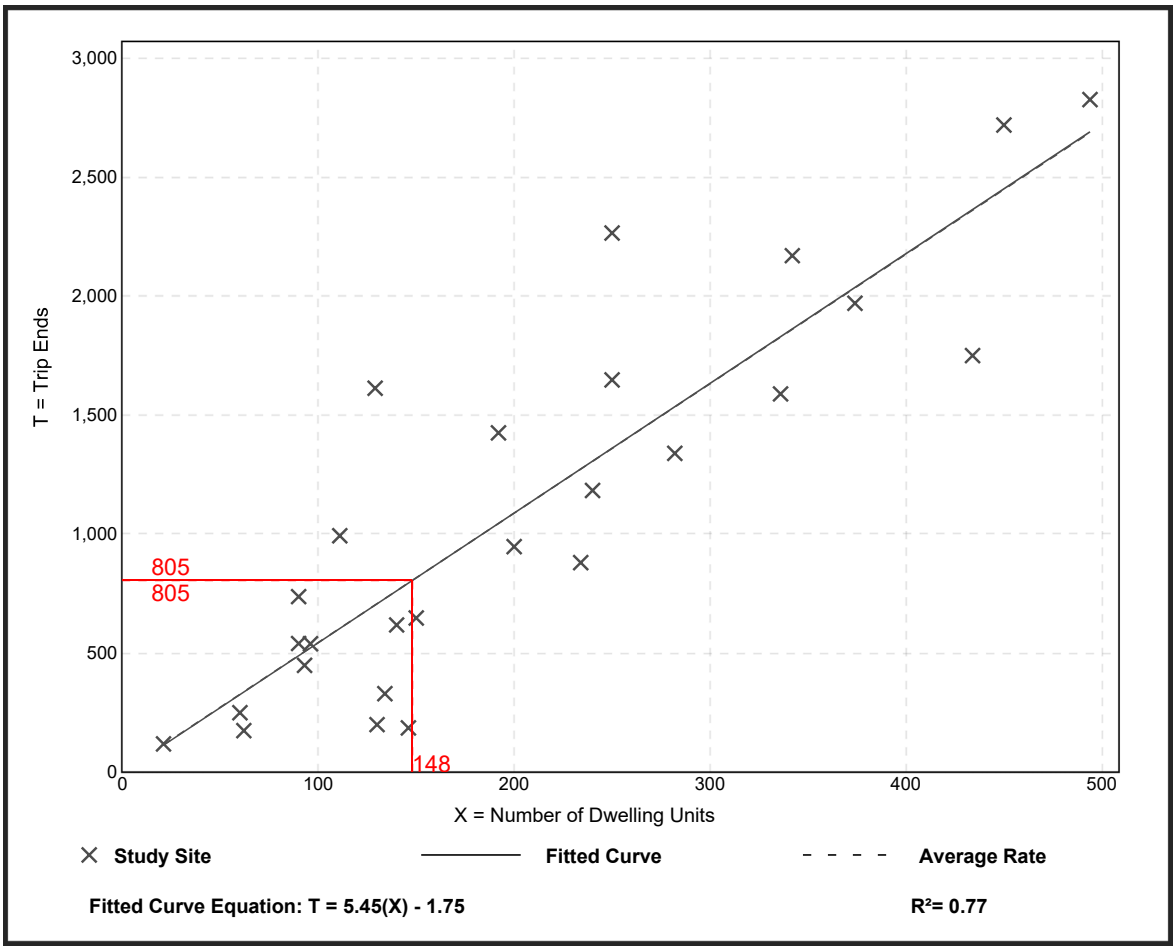
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 27
Avg. Num. of Dwelling Units: 205
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
5.44	1.27 - 12.50	2.03

Data Plot and Equation



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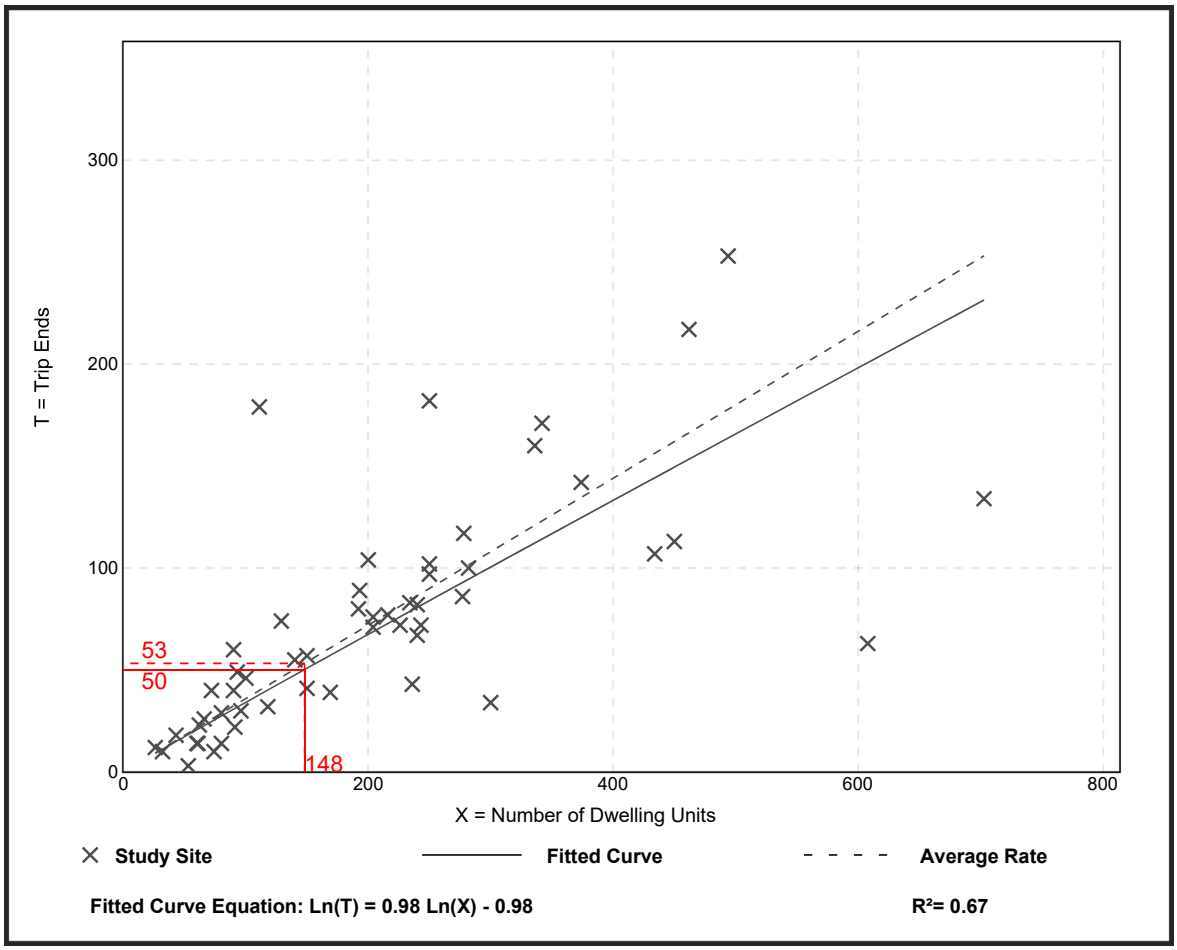
Multifamily Housing (Mid-Rise)
(221)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 53
Avg. Num. of Dwelling Units: 207
Directional Distribution: 26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.36	0.06 - 1.61	0.19

Data Plot and Equation



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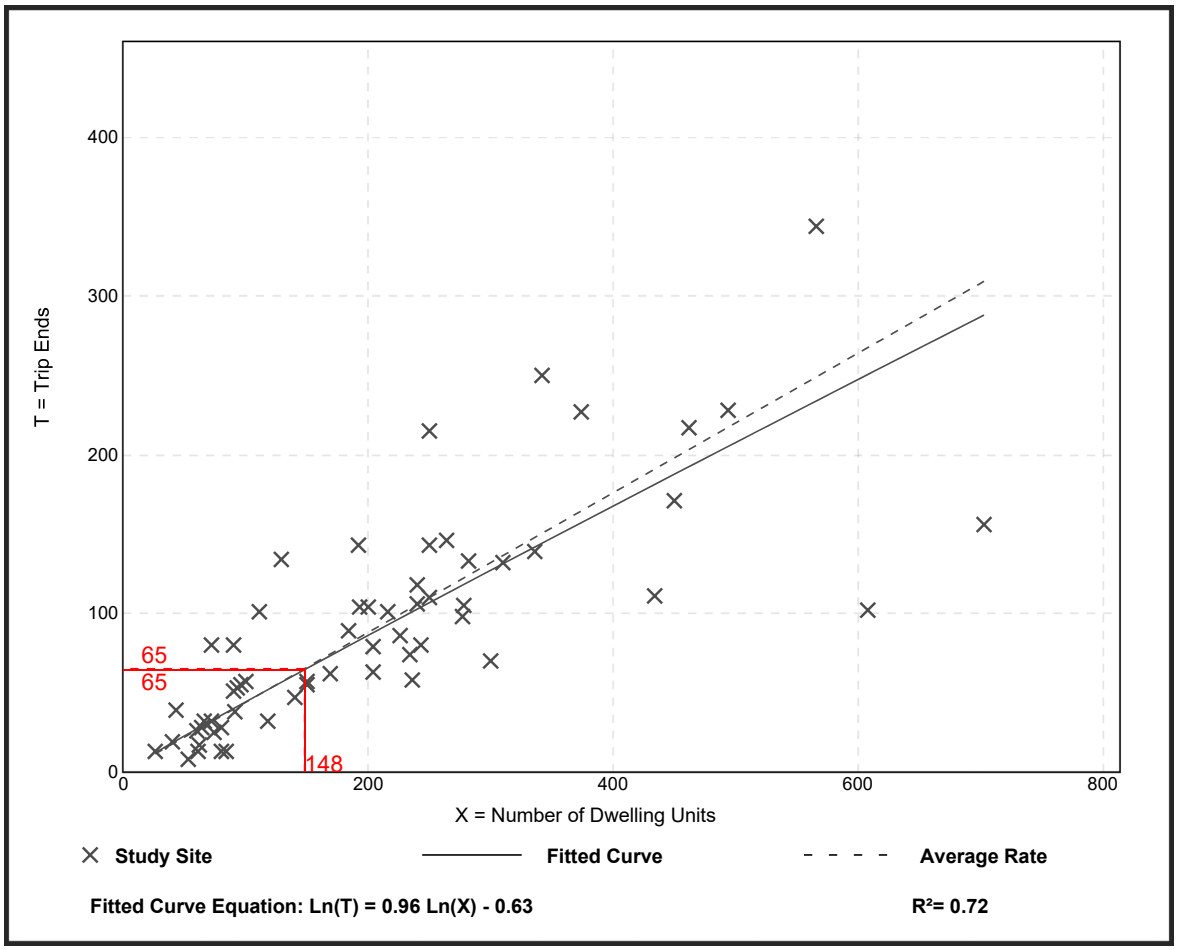
Multifamily Housing (Mid-Rise)
(221)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 60
Avg. Num. of Dwelling Units: 208
Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.44	0.15 - 1.11	0.19

Data Plot and Equation



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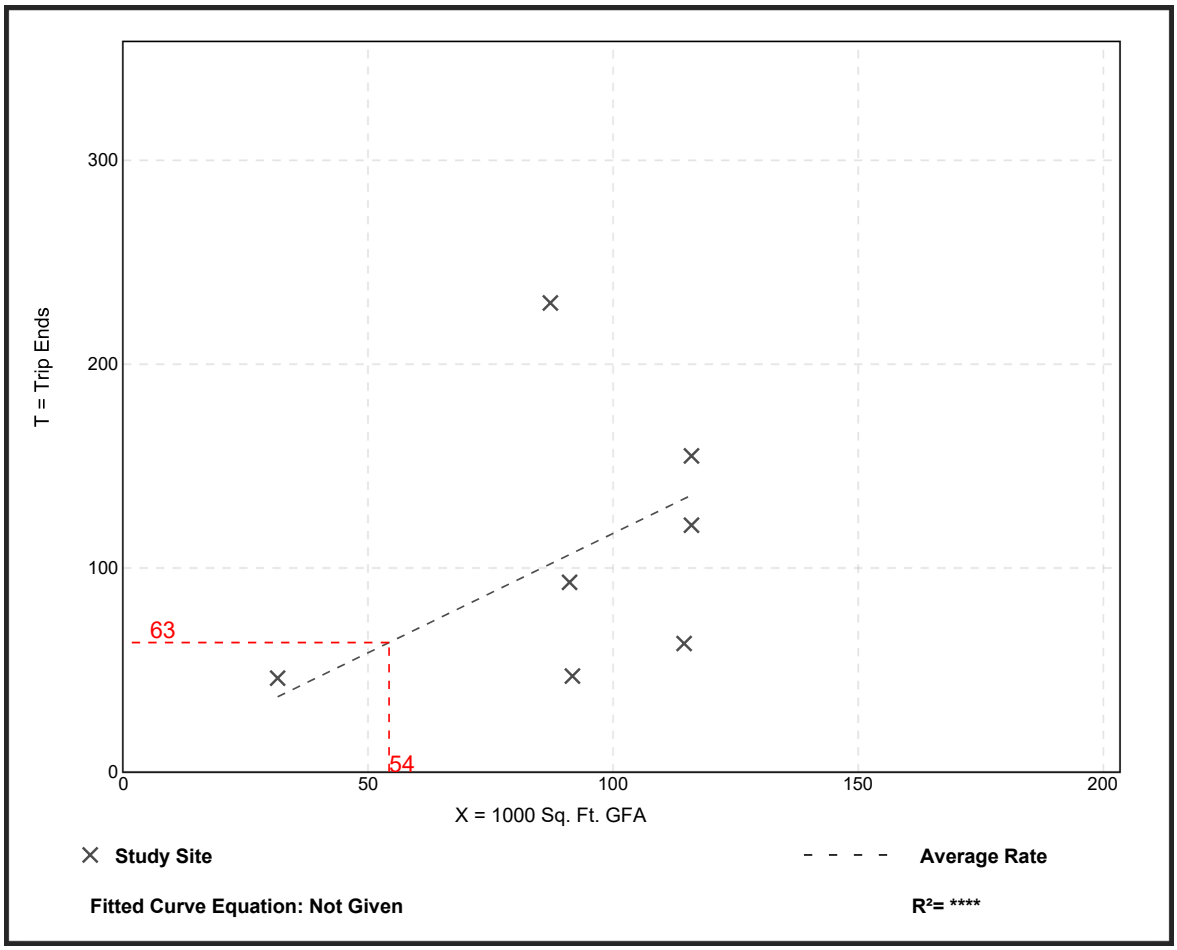
Free-Standing Discount Store
(815)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 7
Avg. 1000 Sq. Ft. GFA: 93
Directional Distribution: 69% entering, 31% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.17	0.51 - 2.64	0.71

Data Plot and Equation



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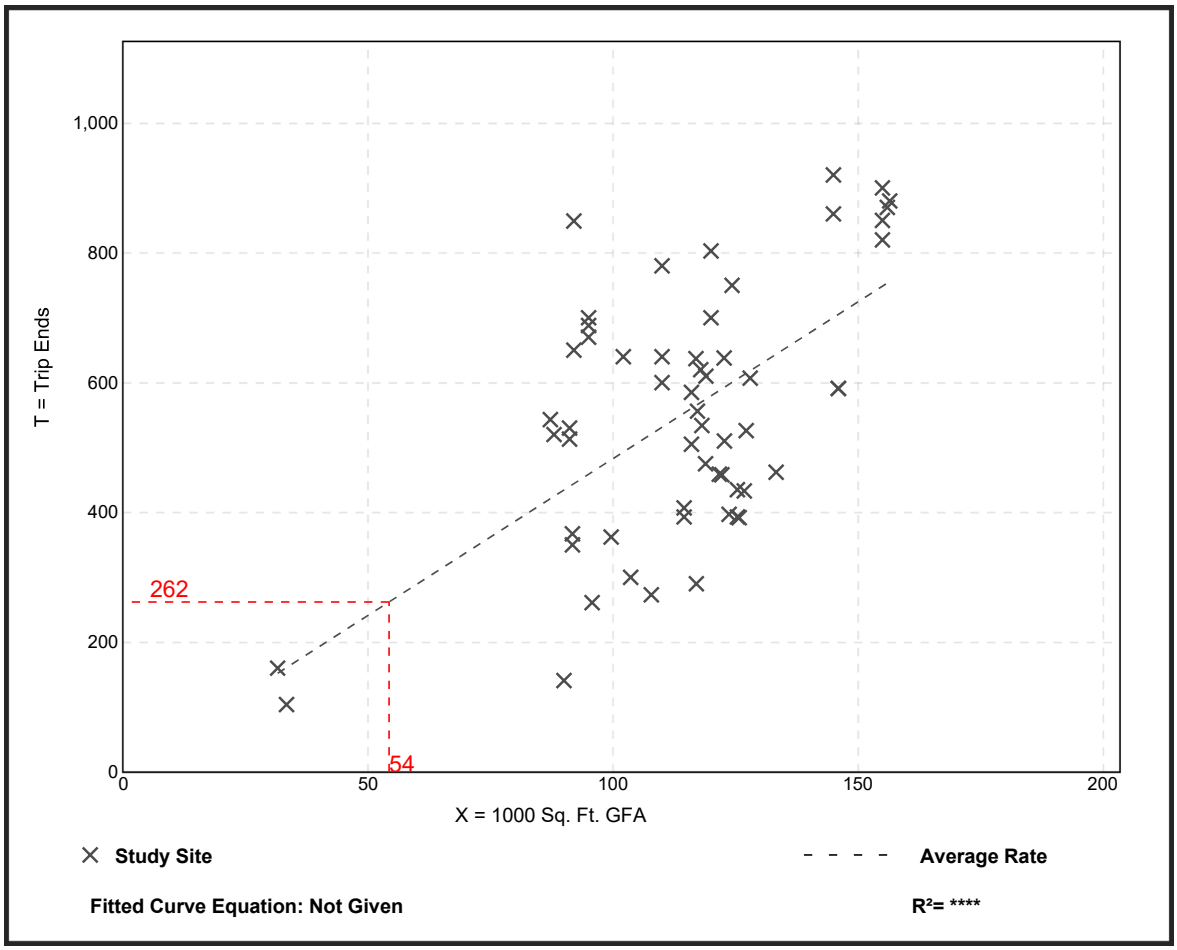
Free-Standing Discount Store
(815)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 57
Avg. 1000 Sq. Ft. GFA: 114
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
4.83	1.57 - 9.23	1.44

Data Plot and Equation



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Shopping Center
(820)

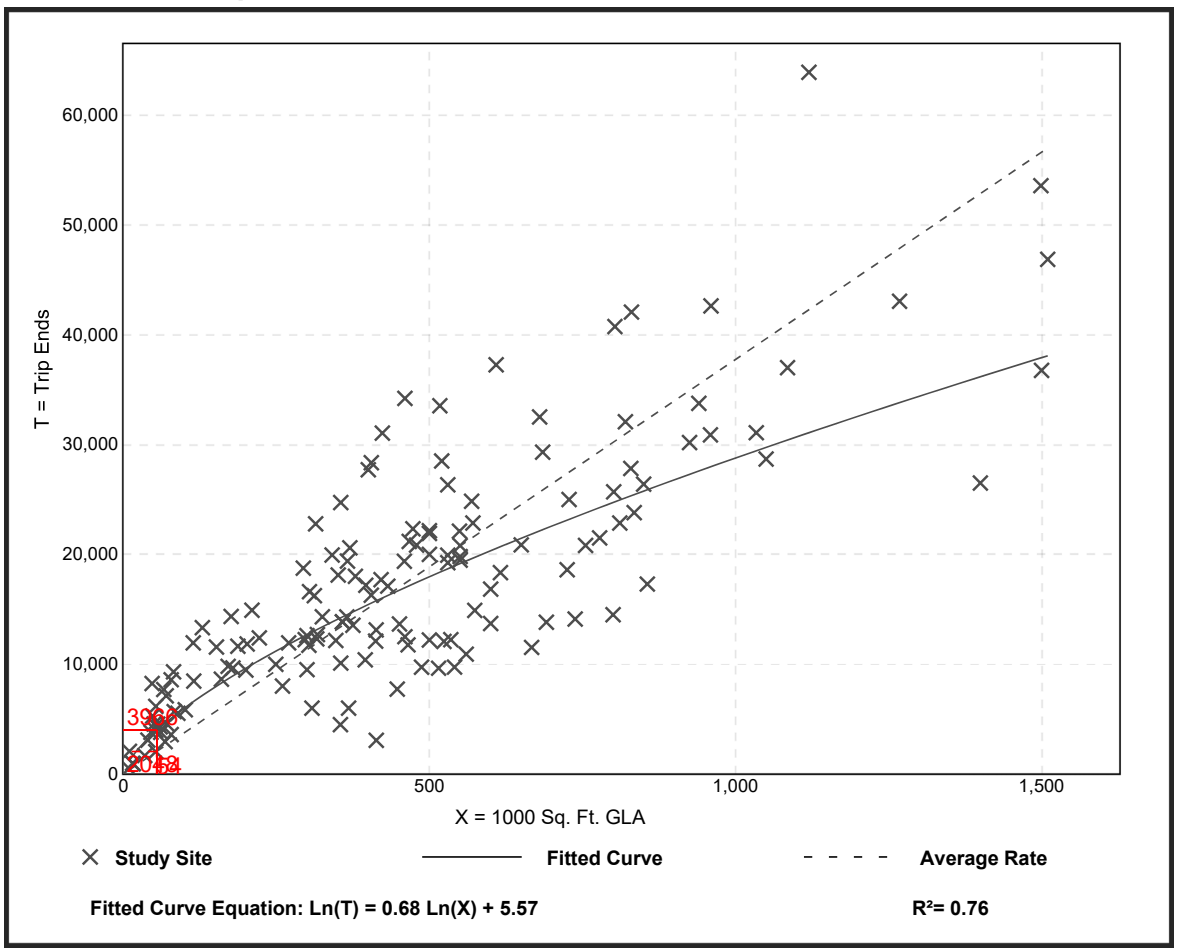
Vehicle Trip Ends vs: **1000 Sq. Ft. GLA**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 147
Avg. 1000 Sq. Ft. GLA: 453
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
37.75	7.42 - 207.98	16.41

Data Plot and Equation



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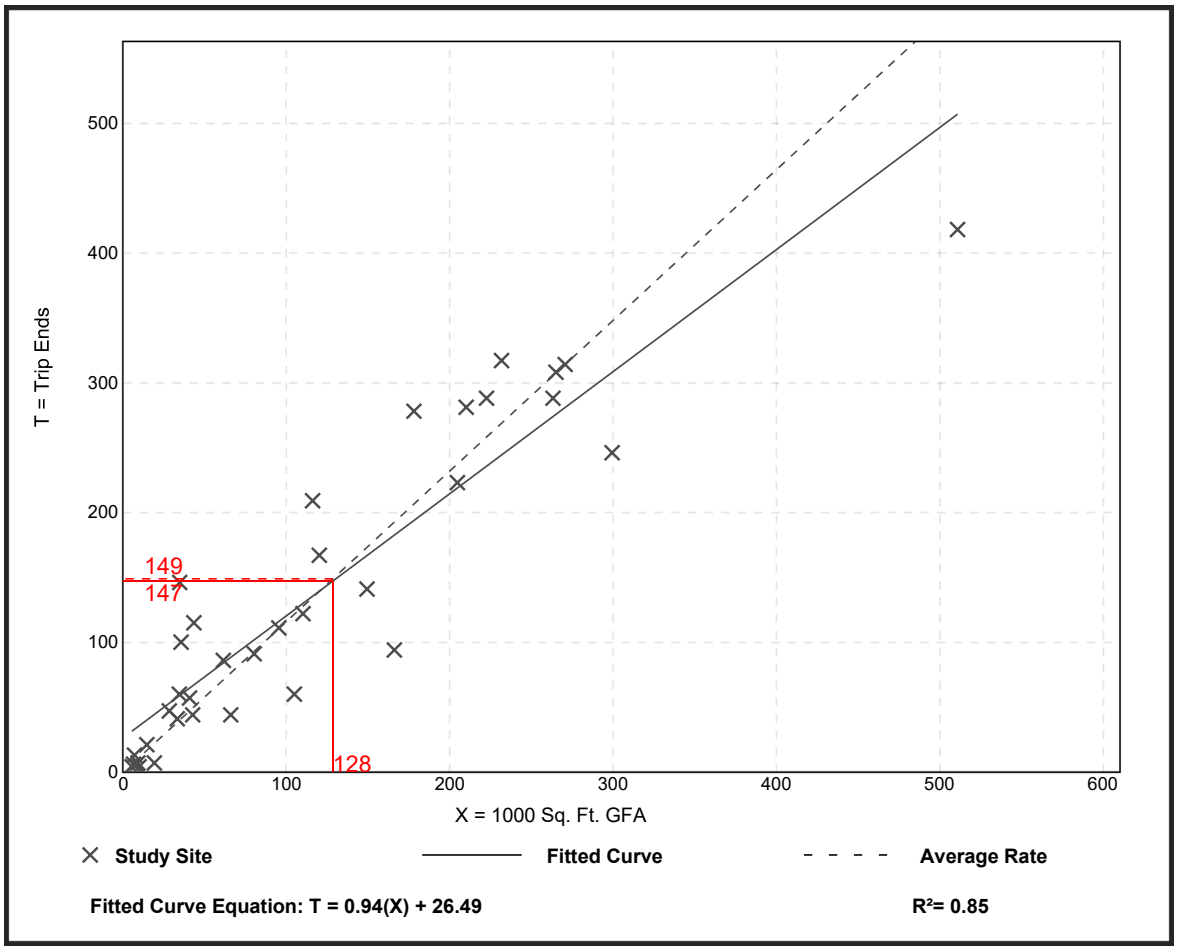
General Office Building
(710)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 35
Avg. 1000 Sq. Ft. GFA: 117
Directional Distribution: 86% entering, 14% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.16	0.37 - 4.23	0.47

Data Plot and Equation



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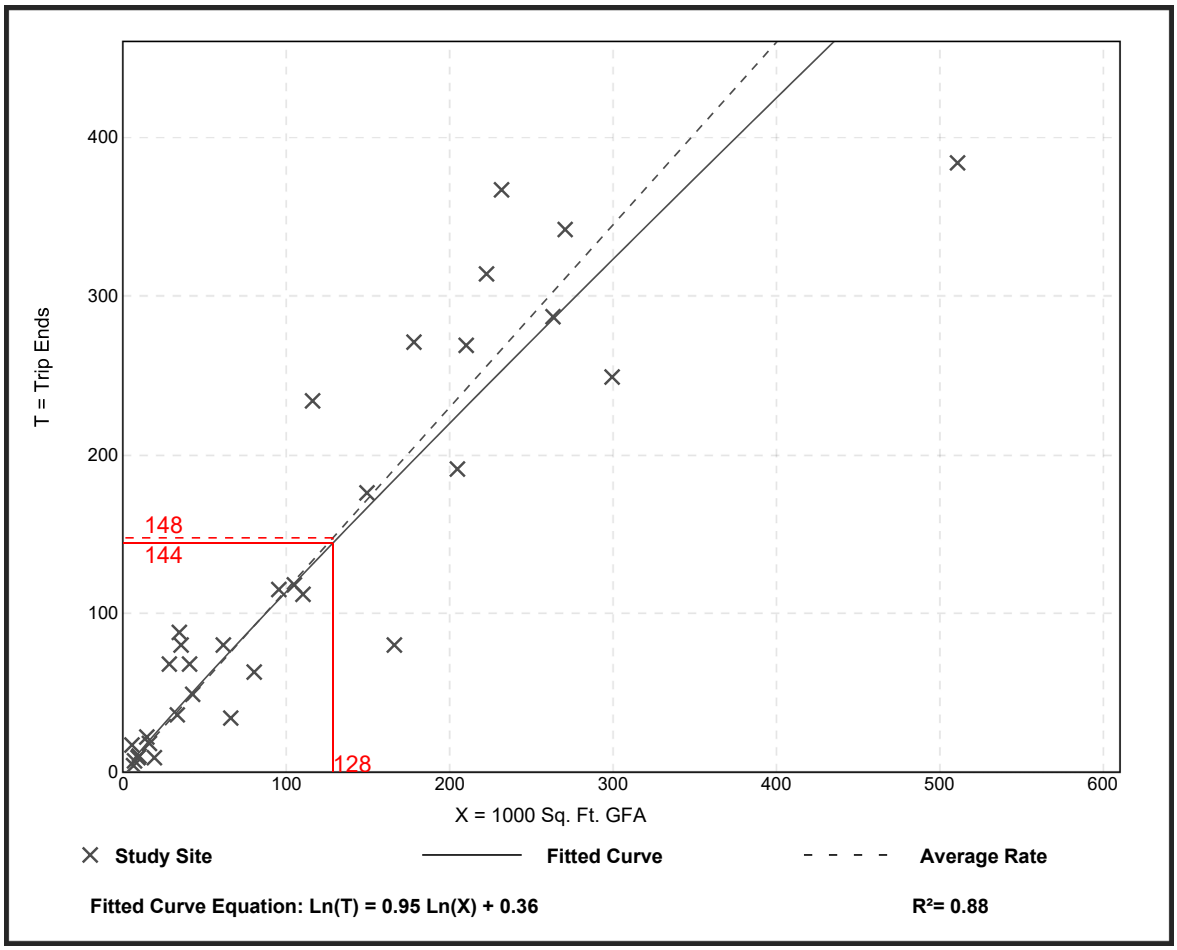
General Office Building
(710)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 32
Avg. 1000 Sq. Ft. GFA: 114
Directional Distribution: 16% entering, 84% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.15	0.47 - 3.23	0.42

Data Plot and Equation



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General Office Building
(710)

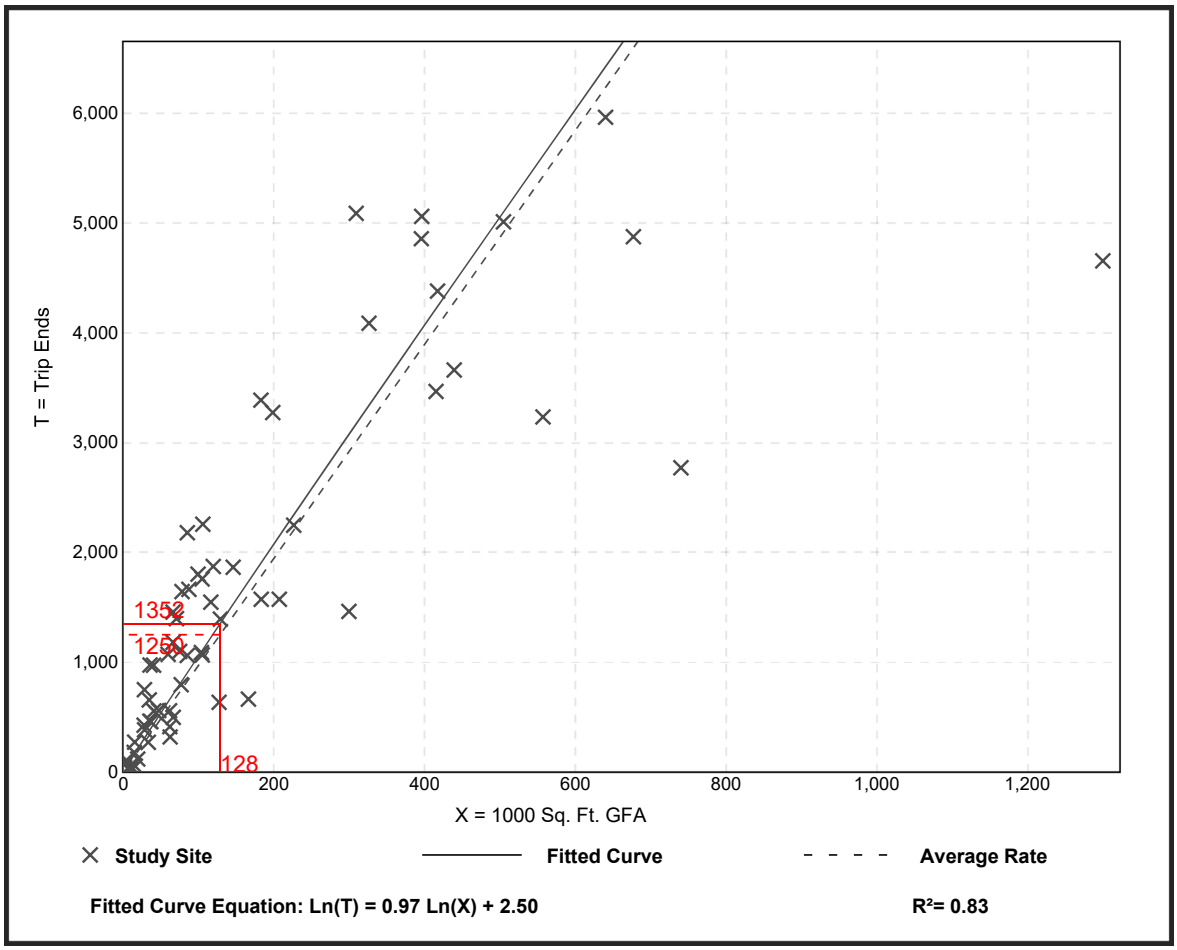
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 66
Avg. 1000 Sq. Ft. GFA: 171
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
9.74	2.71 - 27.56	5.15

Data Plot and Equation



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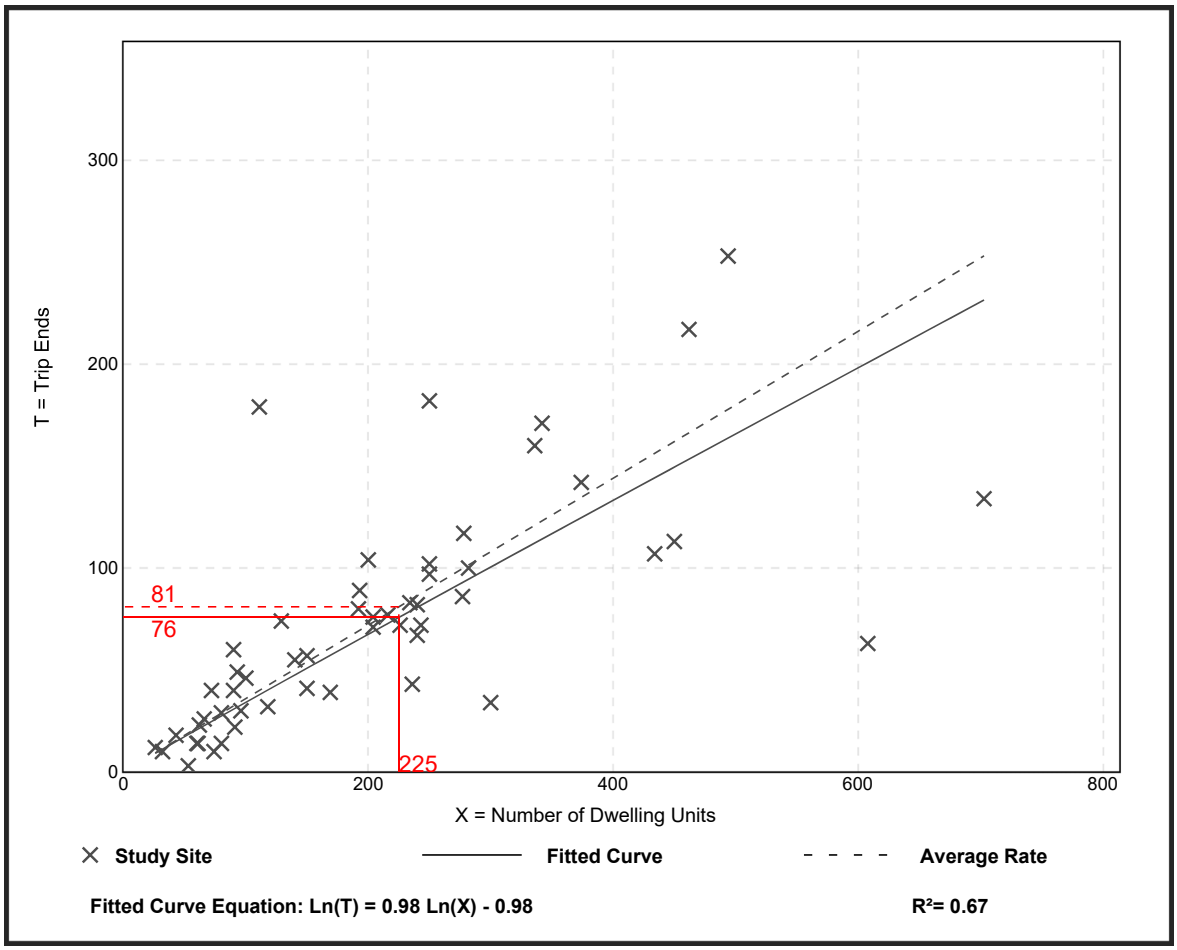
Multifamily Housing (Mid-Rise)
(221)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 53
Avg. Num. of Dwelling Units: 207
Directional Distribution: 26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.36	0.06 - 1.61	0.19

Data Plot and Equation



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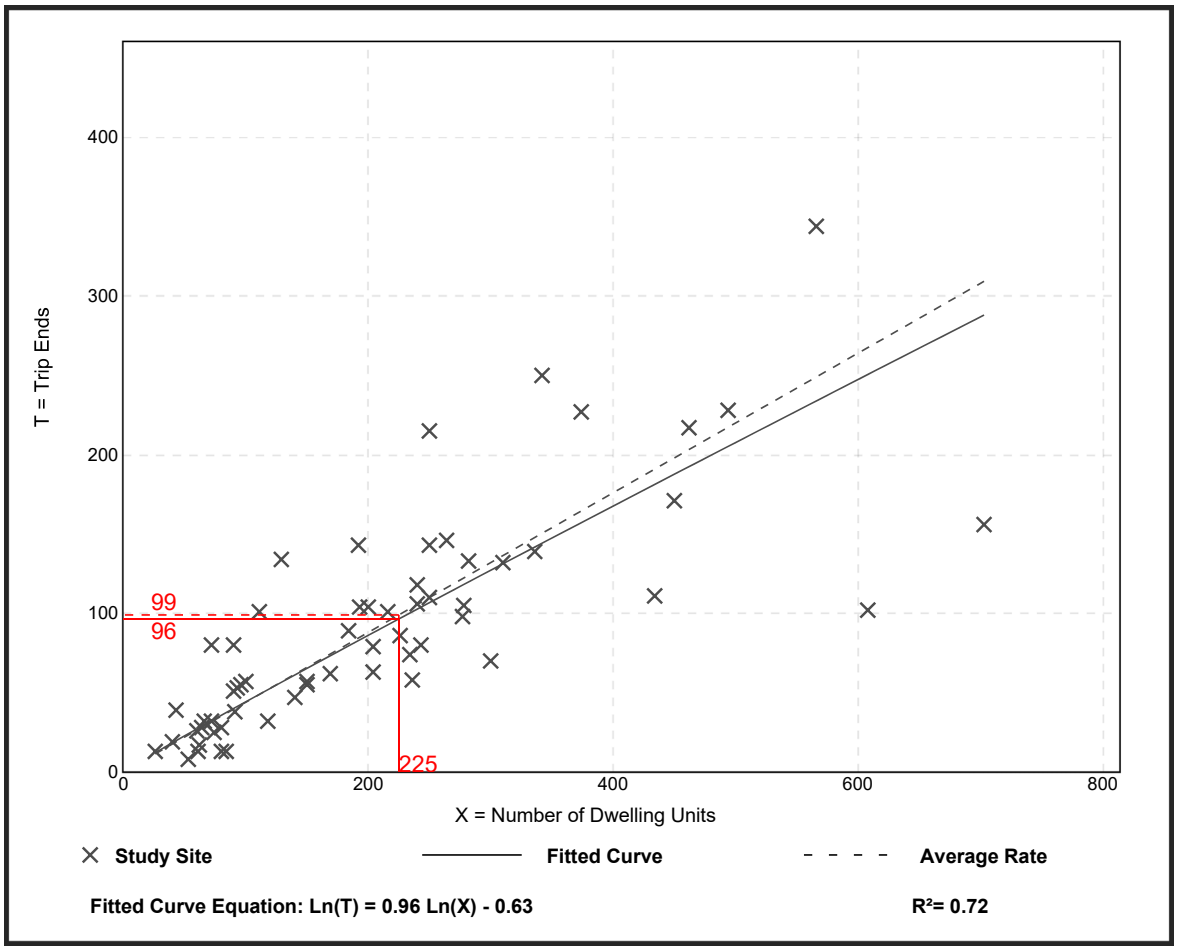
Multifamily Housing (Mid-Rise)
(221)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 60
Avg. Num. of Dwelling Units: 208
Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.44	0.15 - 1.11	0.19

Data Plot and Equation



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Multifamily Housing (Mid-Rise)
(221)

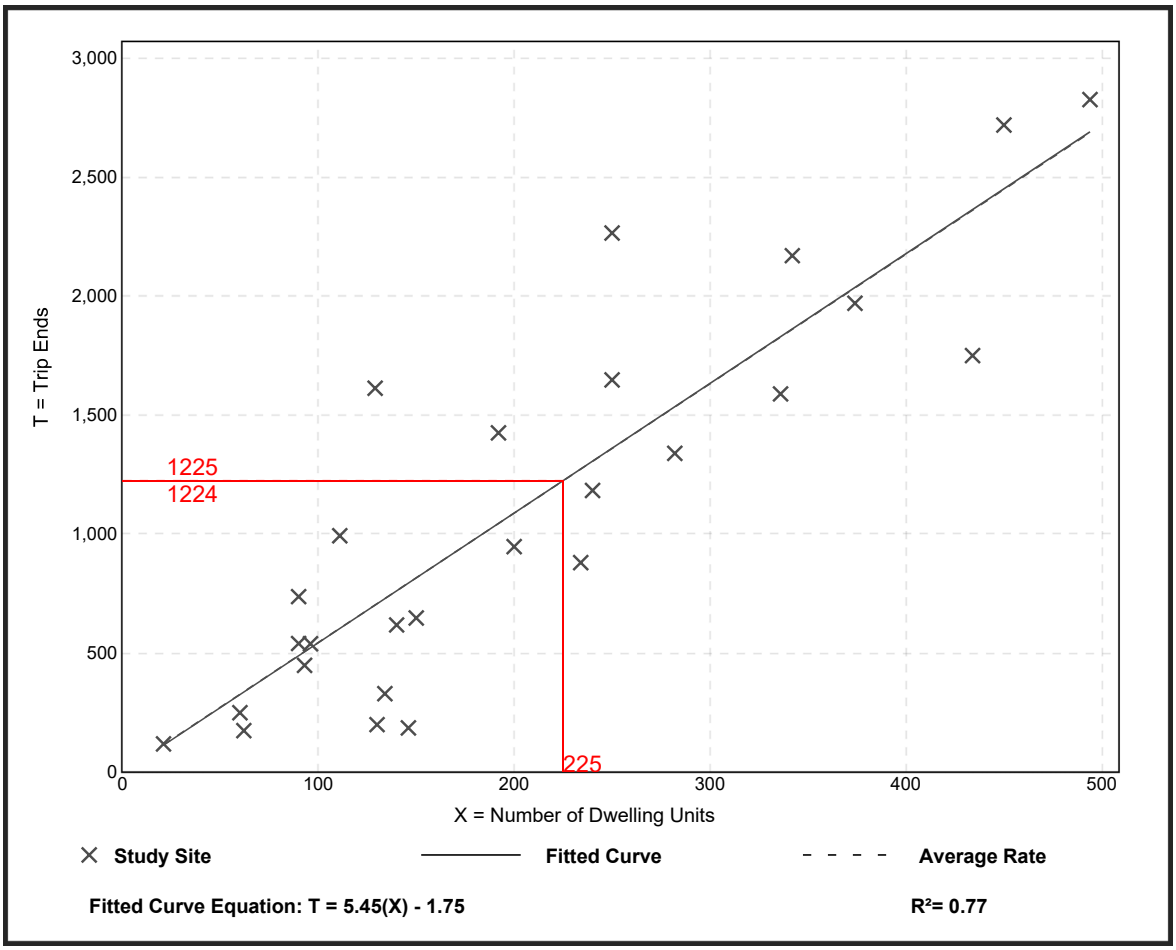
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 27
Avg. Num. of Dwelling Units: 205
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
5.44	1.27 - 12.50	2.03

Data Plot and Equation



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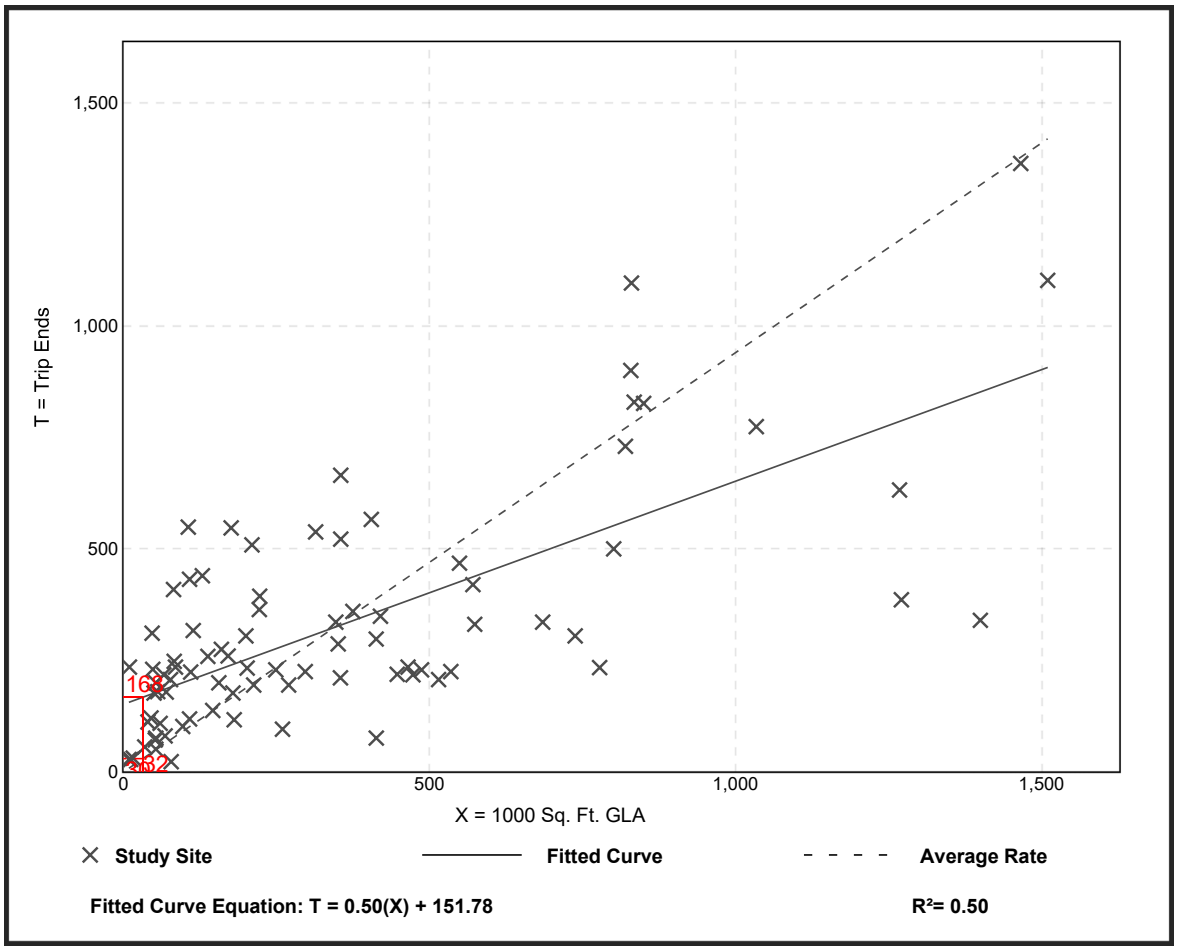
Shopping Center
(820)

Vehicle Trip Ends vs: **1000 Sq. Ft. GLA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 84
Avg. 1000 Sq. Ft. GLA: 351
Directional Distribution: 62% entering, 38% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
0.94	0.18 - 23.74	0.87

Data Plot and Equation



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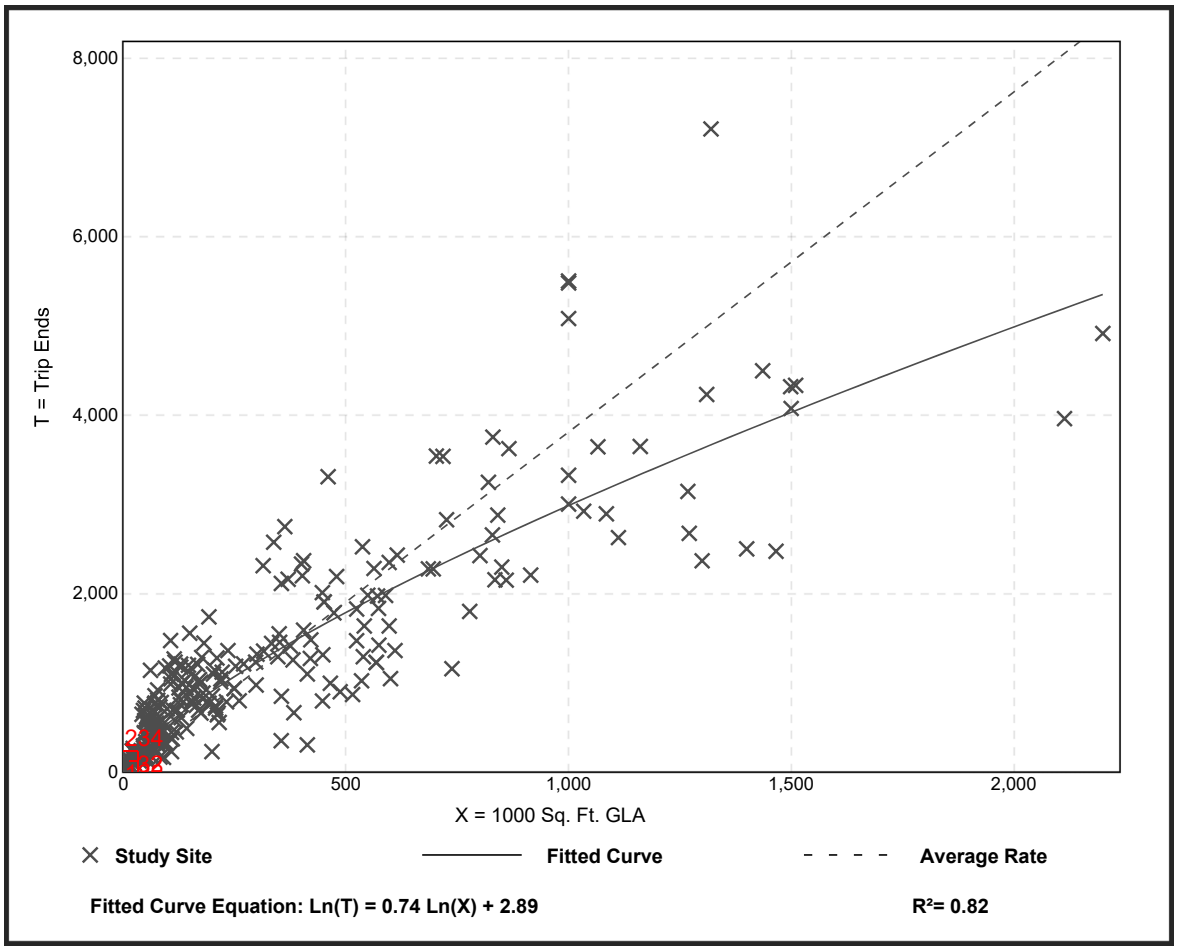
Shopping Center
(820)

Vehicle Trip Ends vs: **1000 Sq. Ft. GLA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 261
Avg. 1000 Sq. Ft. GLA: 327
Directional Distribution: 48% entering, 52% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
3.81	0.74 - 18.69	2.04

Data Plot and Equation



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Shopping Center
(820)

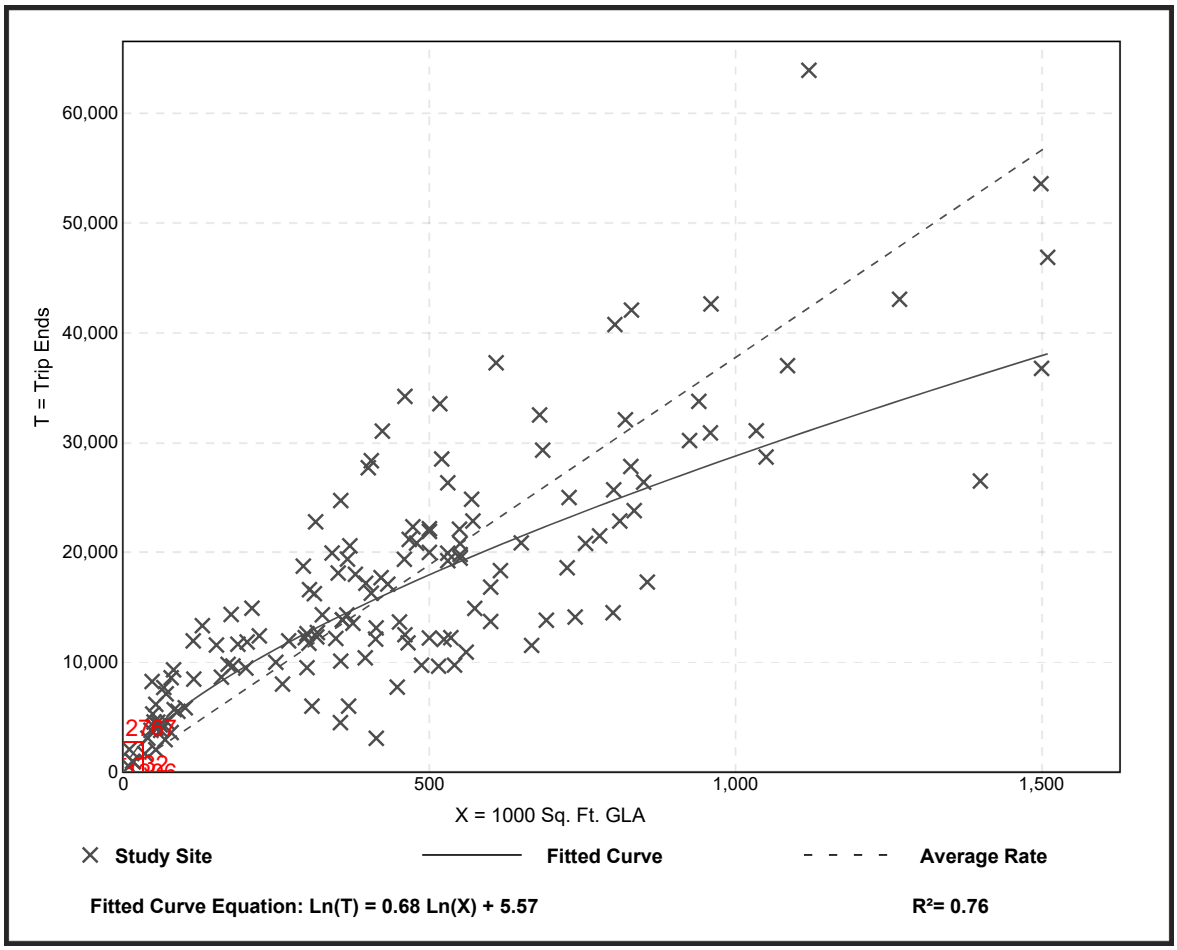
Vehicle Trip Ends vs: **1000 Sq. Ft. GLA**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 147
Avg. 1000 Sq. Ft. GLA: 453
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
37.75	7.42 - 207.98	16.41

Data Plot and Equation



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Department Store
(875)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday**

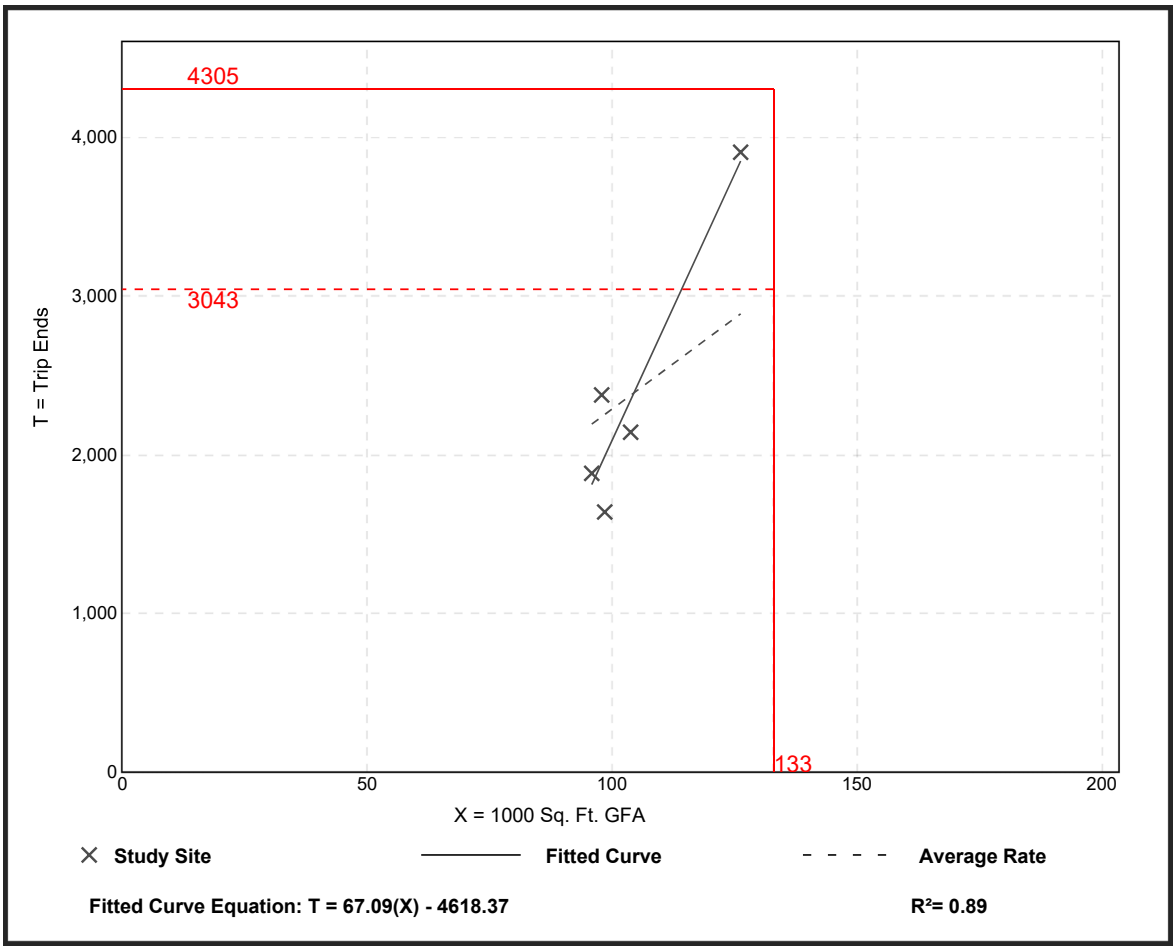
Setting/Location: **General Urban/Suburban**
Number of Studies: 5
Avg. 1000 Sq. Ft. GFA: 104
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
22.88	16.64 - 30.95	5.74

Data Plot and Equation

Caution – Small Sample Size



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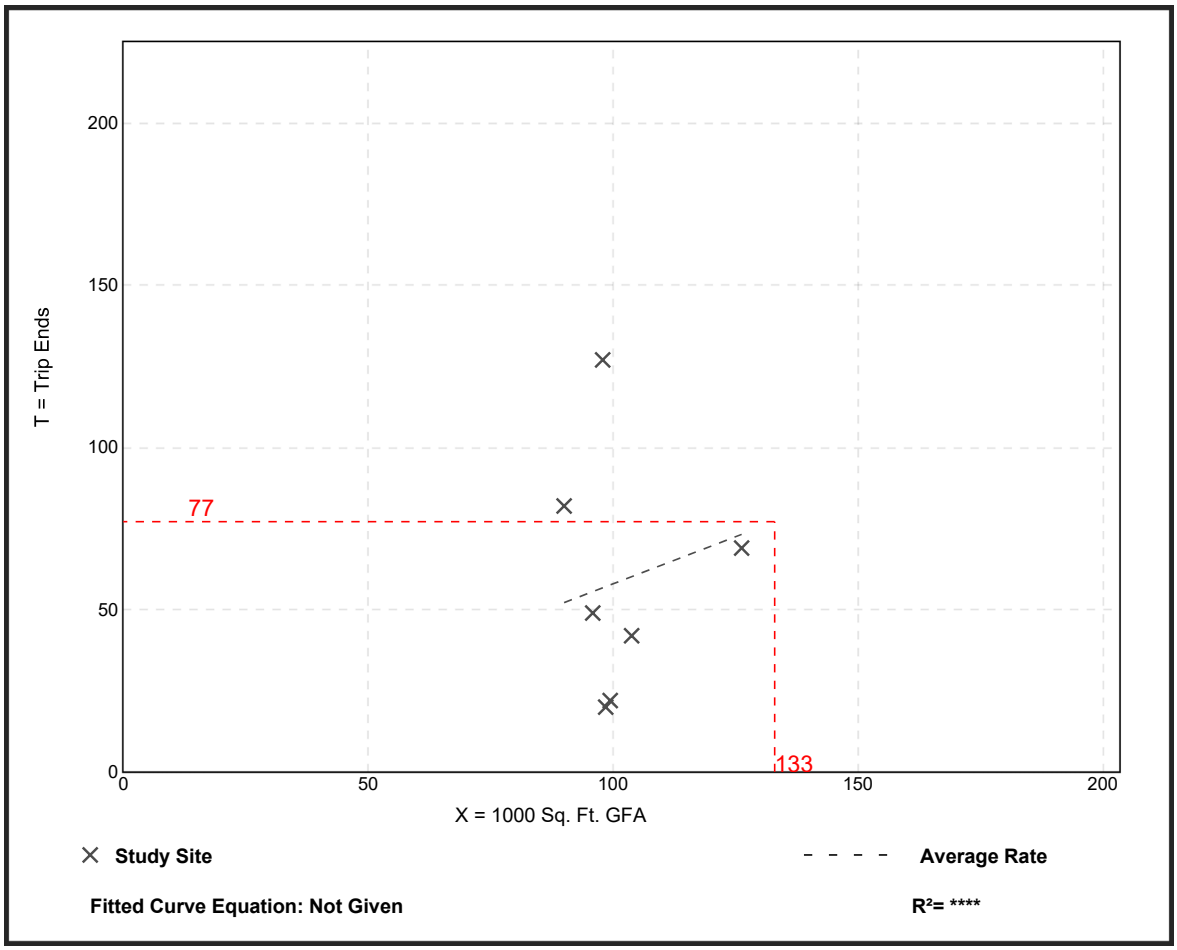
Department Store
(875)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 7
Avg. 1000 Sq. Ft. GFA: 102
Directional Distribution: 64% entering, 36% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.58	0.20 - 1.30	0.39

Data Plot and Equation



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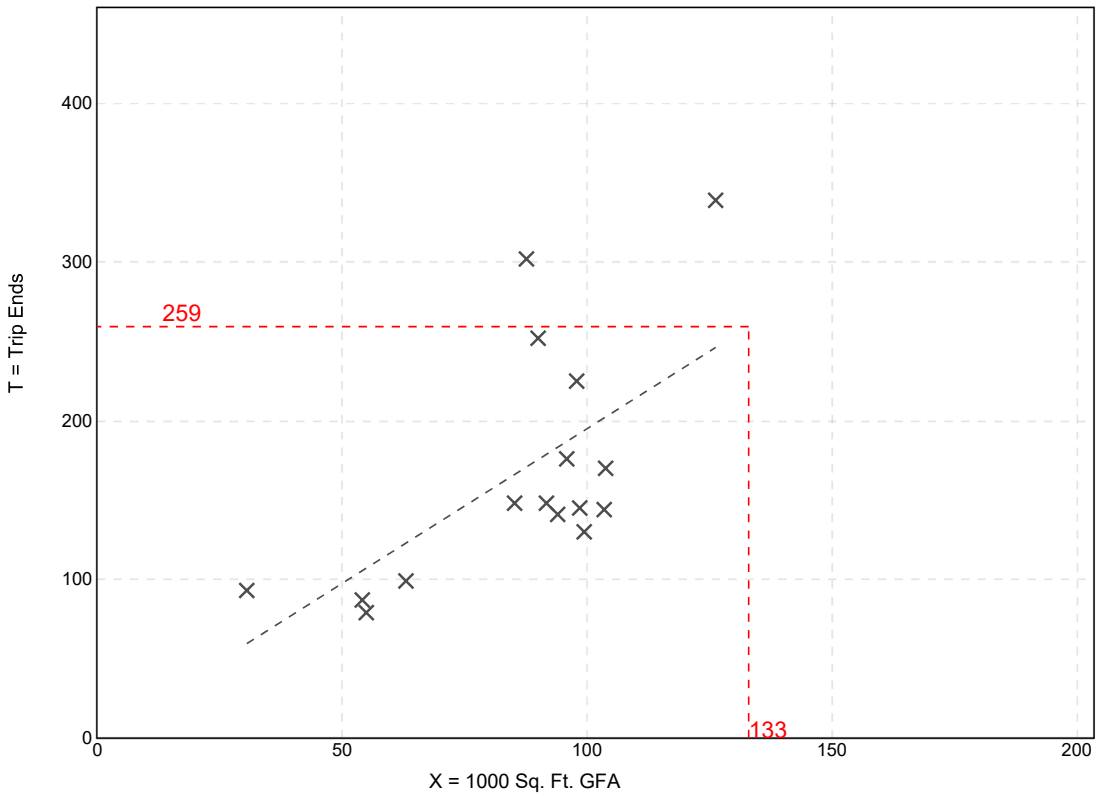
Department Store
(875)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 16
Avg. 1000 Sq. Ft. GFA: 86
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.95	1.31 - 3.45	0.65

Data Plot and Equation



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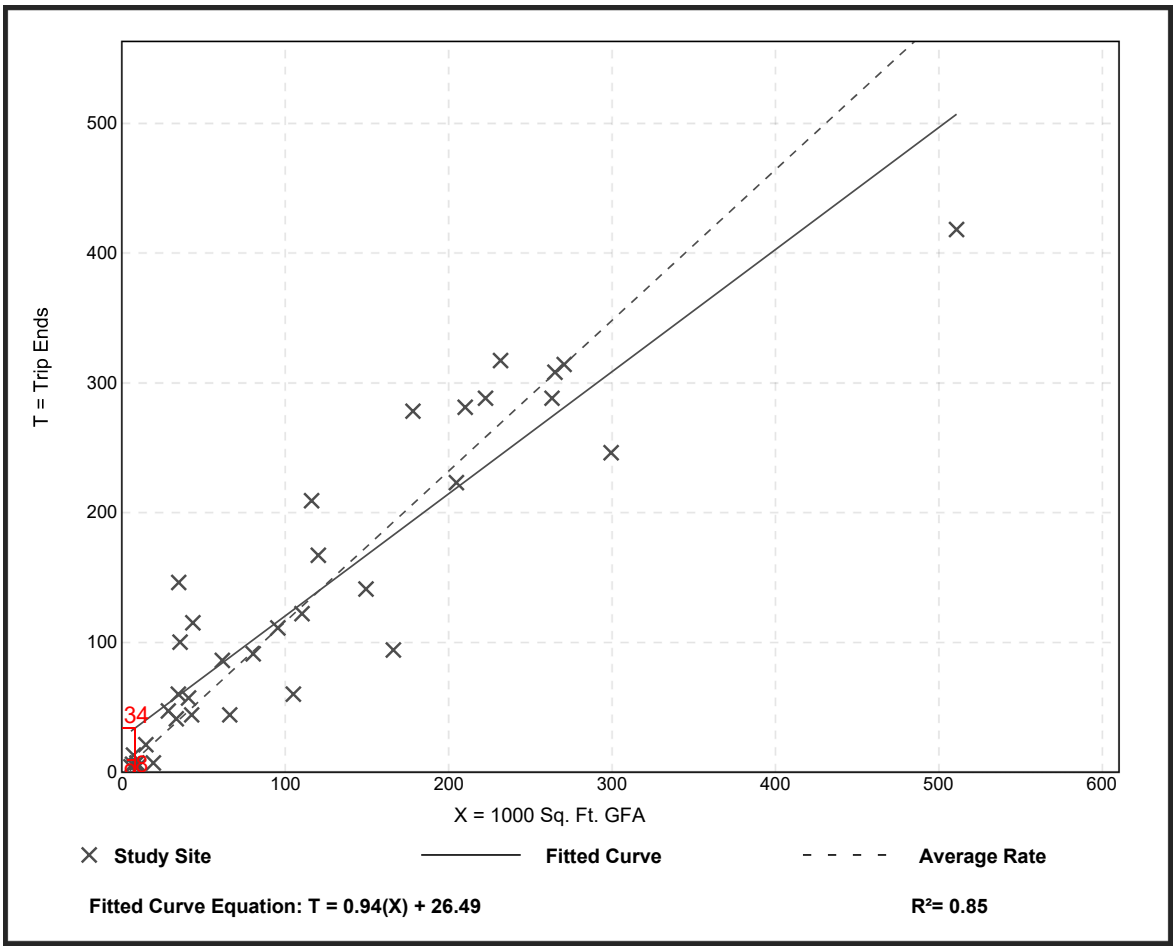
General Office Building
(710)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 35
Avg. 1000 Sq. Ft. GFA: 117
Directional Distribution: 86% entering, 14% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.16	0.37 - 4.23	0.47

Data Plot and Equation



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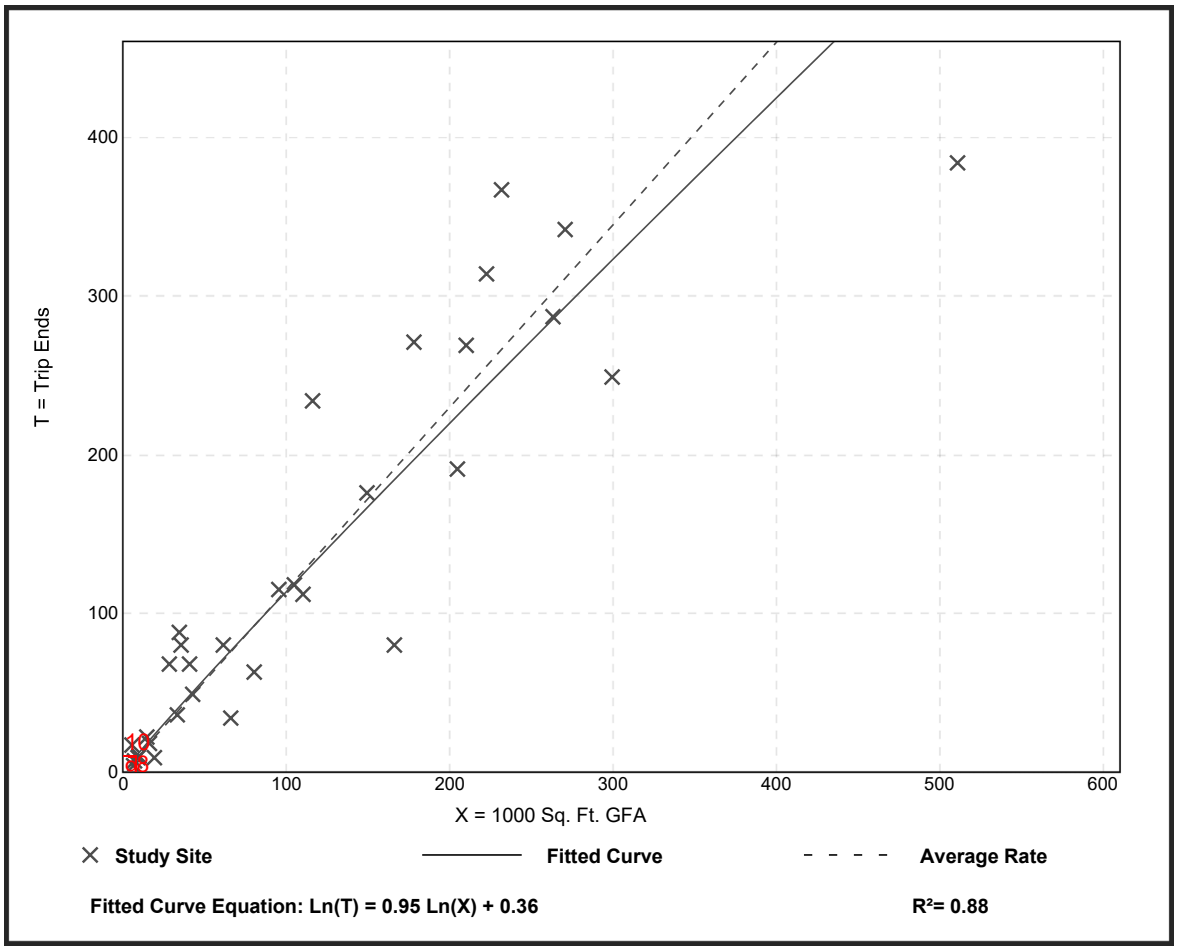
General Office Building
(710)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 32
Avg. 1000 Sq. Ft. GFA: 114
Directional Distribution: 16% entering, 84% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.15	0.47 - 3.23	0.42

Data Plot and Equation



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General Office Building
(710)

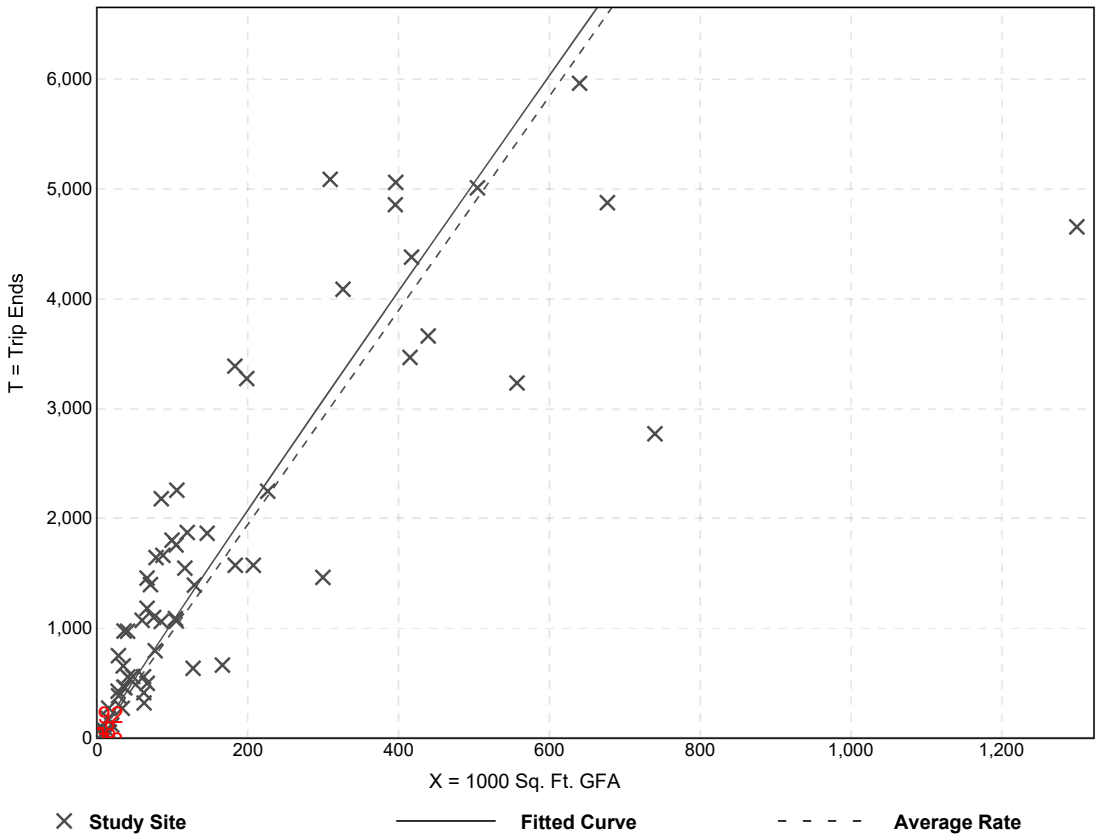
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 66
Avg. 1000 Sq. Ft. GFA: 171
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
9.74	2.71 - 27.56	5.15

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.97 Ln(X) + 2.50

R^2= 0.83

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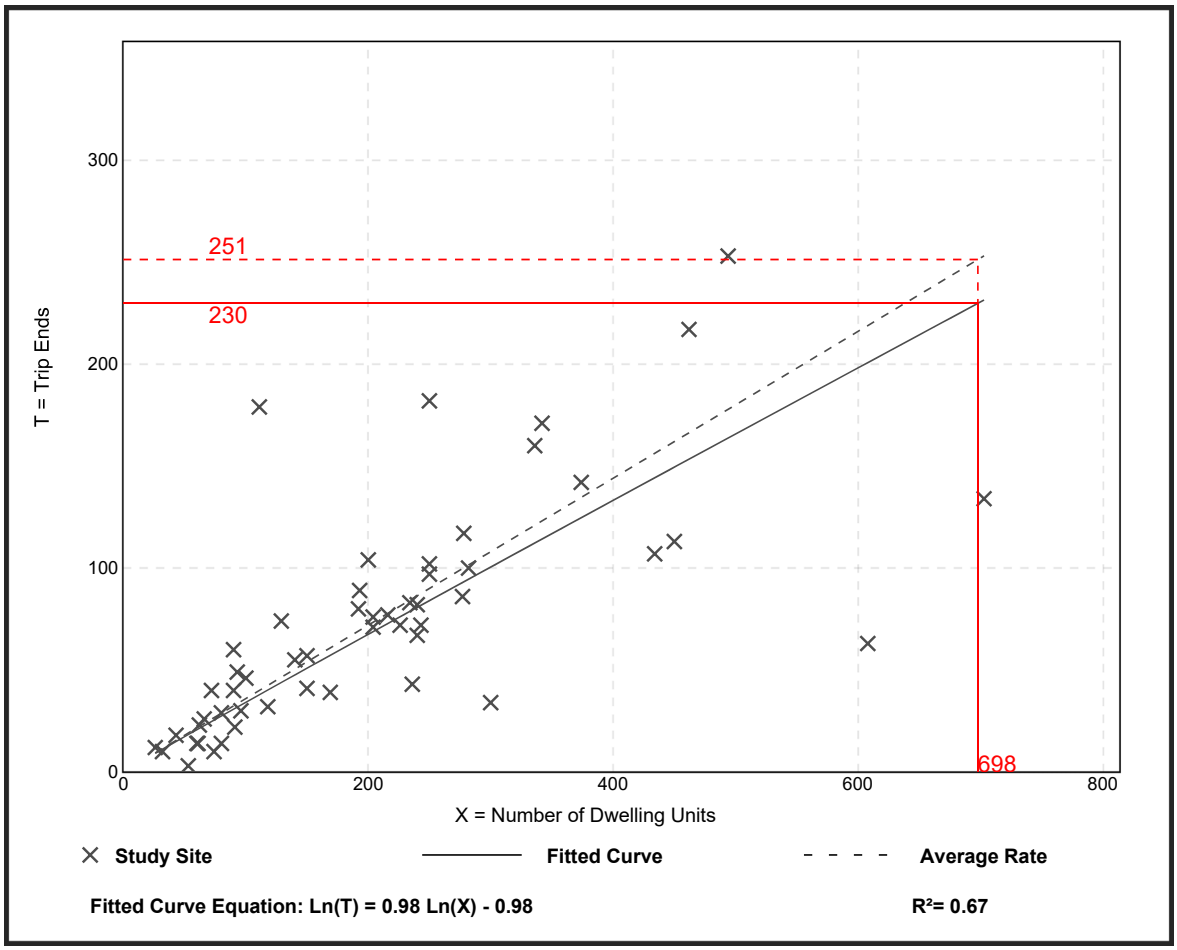
Multifamily Housing (Mid-Rise)
(221)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 53
Avg. Num. of Dwelling Units: 207
Directional Distribution: 26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.36	0.06 - 1.61	0.19

Data Plot and Equation



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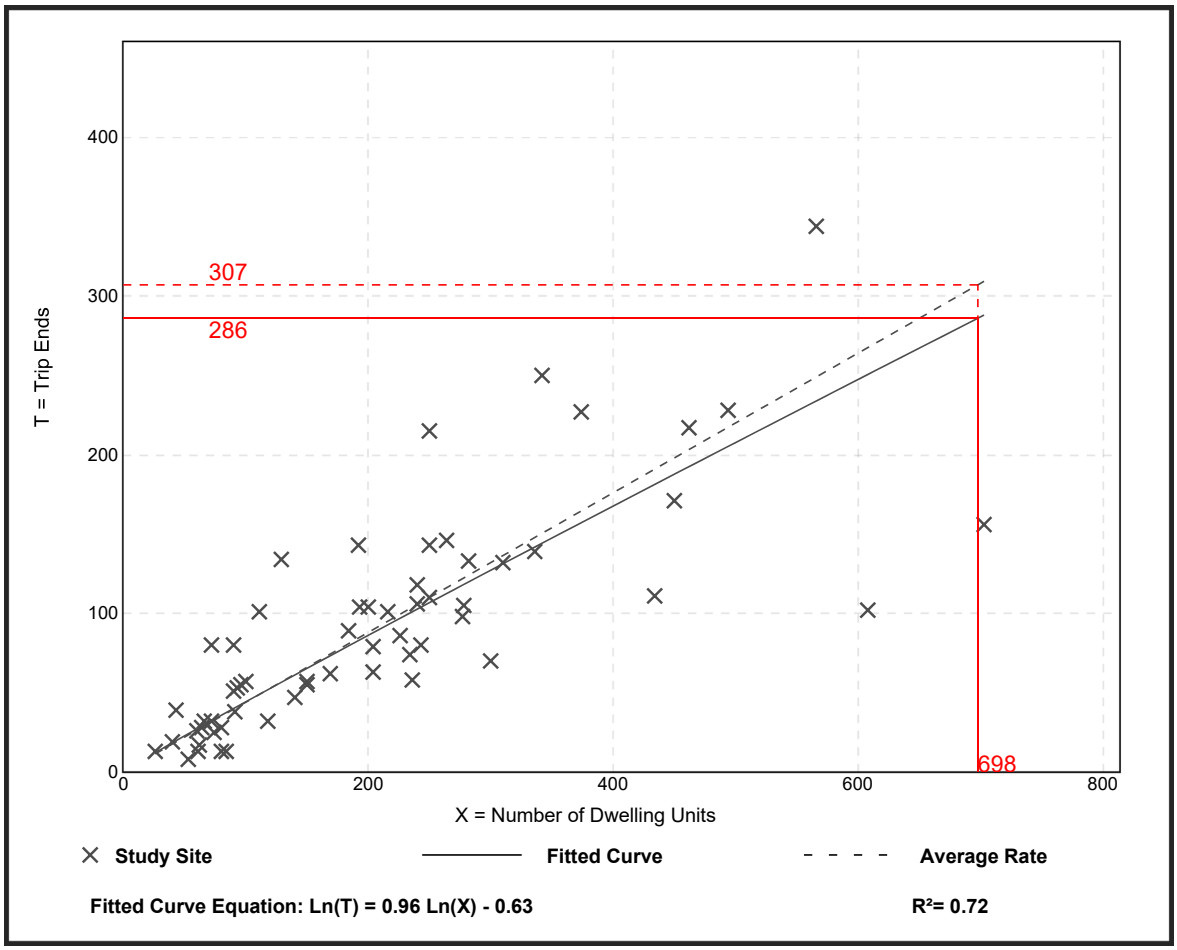
Multifamily Housing (Mid-Rise)
(221)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 60
Avg. Num. of Dwelling Units: 208
Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.44	0.15 - 1.11	0.19

Data Plot and Equation



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Multifamily Housing (Mid-Rise)
(221)

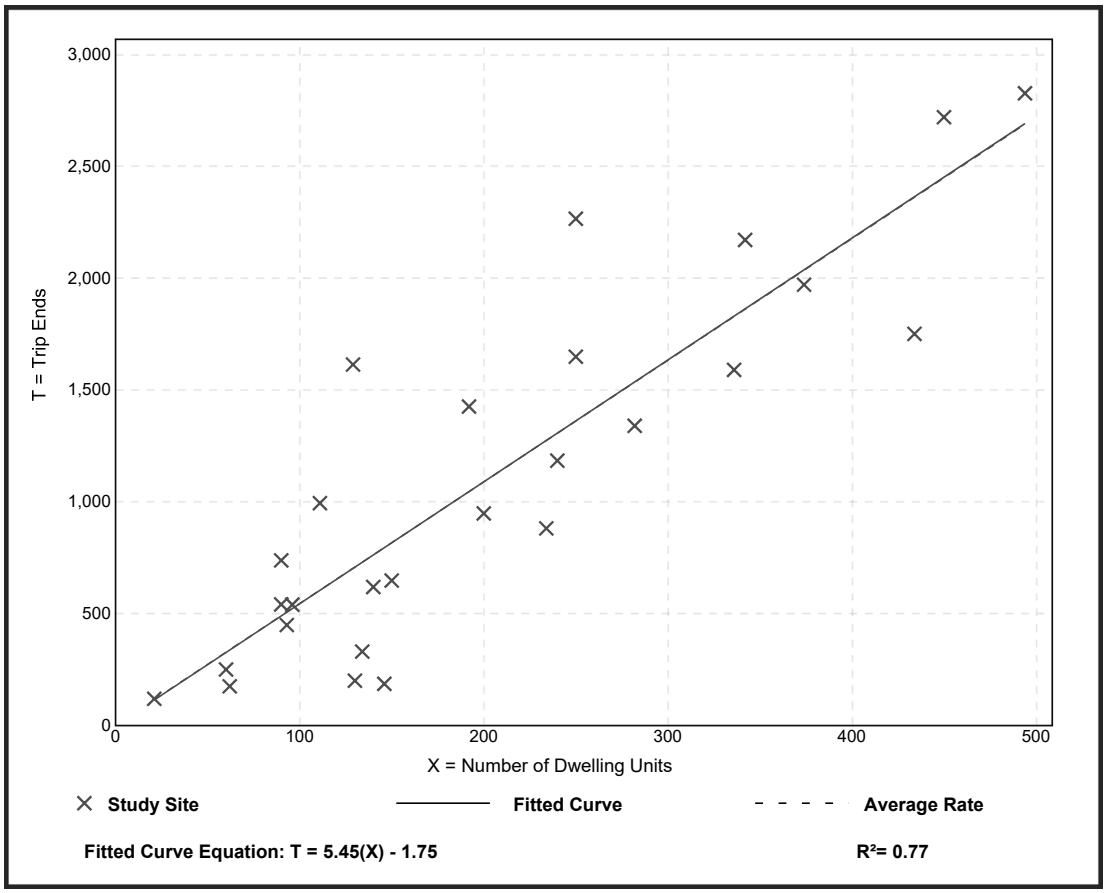
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 27
Avg. Num. of Dwelling Units: 205
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
5.44	1.27 - 12.50	2.03

Data Plot and Equation



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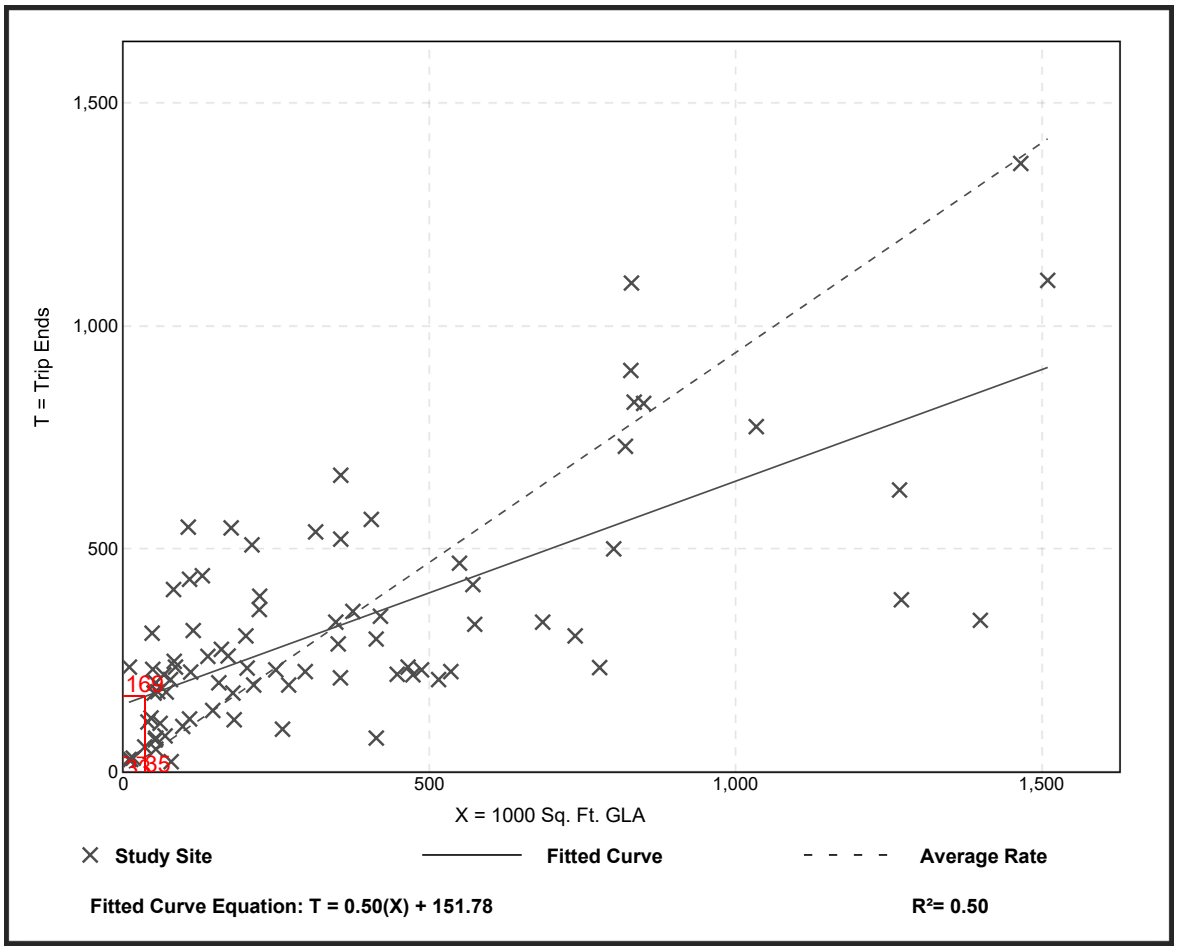
Shopping Center
(820)

Vehicle Trip Ends vs: **1000 Sq. Ft. GLA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 84
Avg. 1000 Sq. Ft. GLA: 351
Directional Distribution: 62% entering, 38% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
0.94	0.18 - 23.74	0.87

Data Plot and Equation



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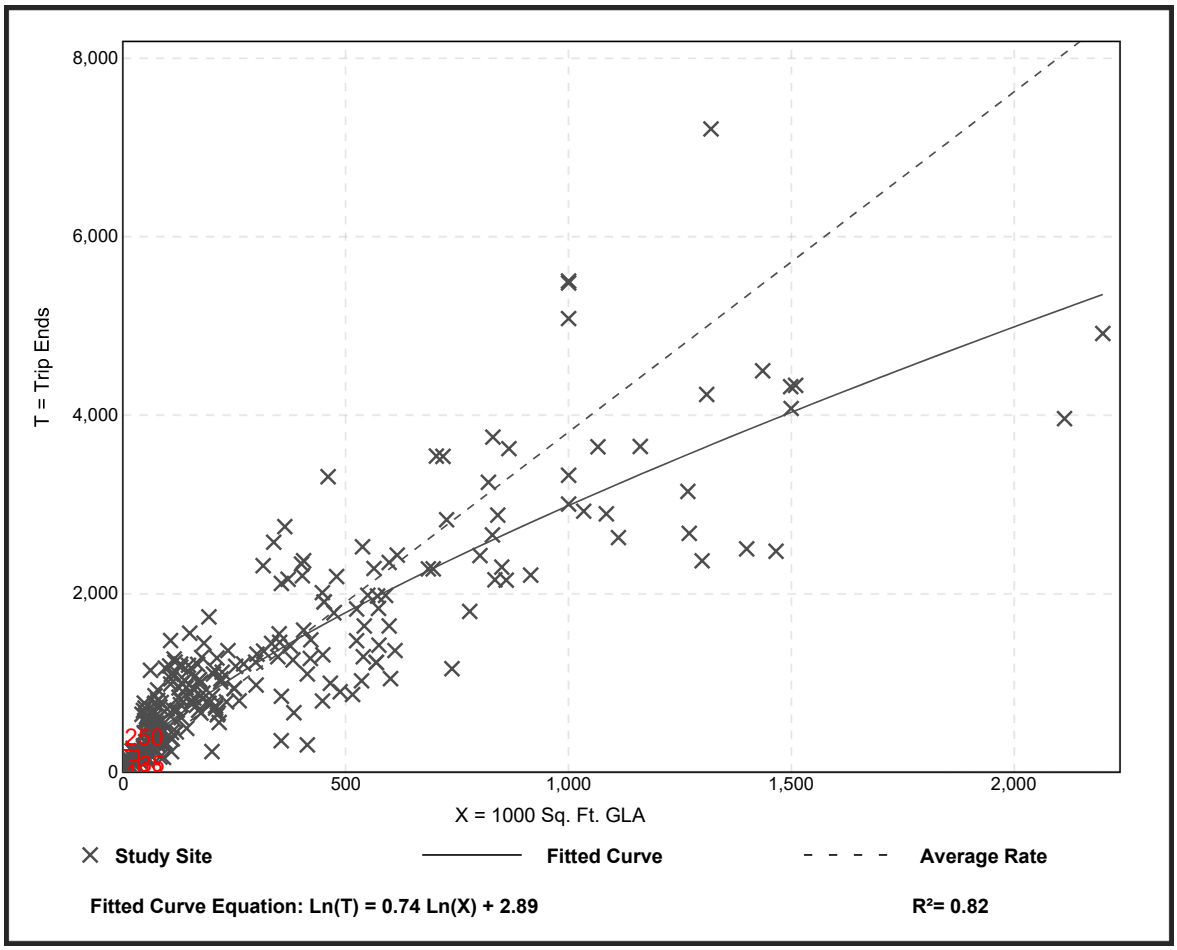
Shopping Center
(820)

Vehicle Trip Ends vs: **1000 Sq. Ft. GLA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 261
Avg. 1000 Sq. Ft. GLA: 327
Directional Distribution: 48% entering, 52% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
3.81	0.74 - 18.69	2.04

Data Plot and Equation



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Shopping Center
(820)

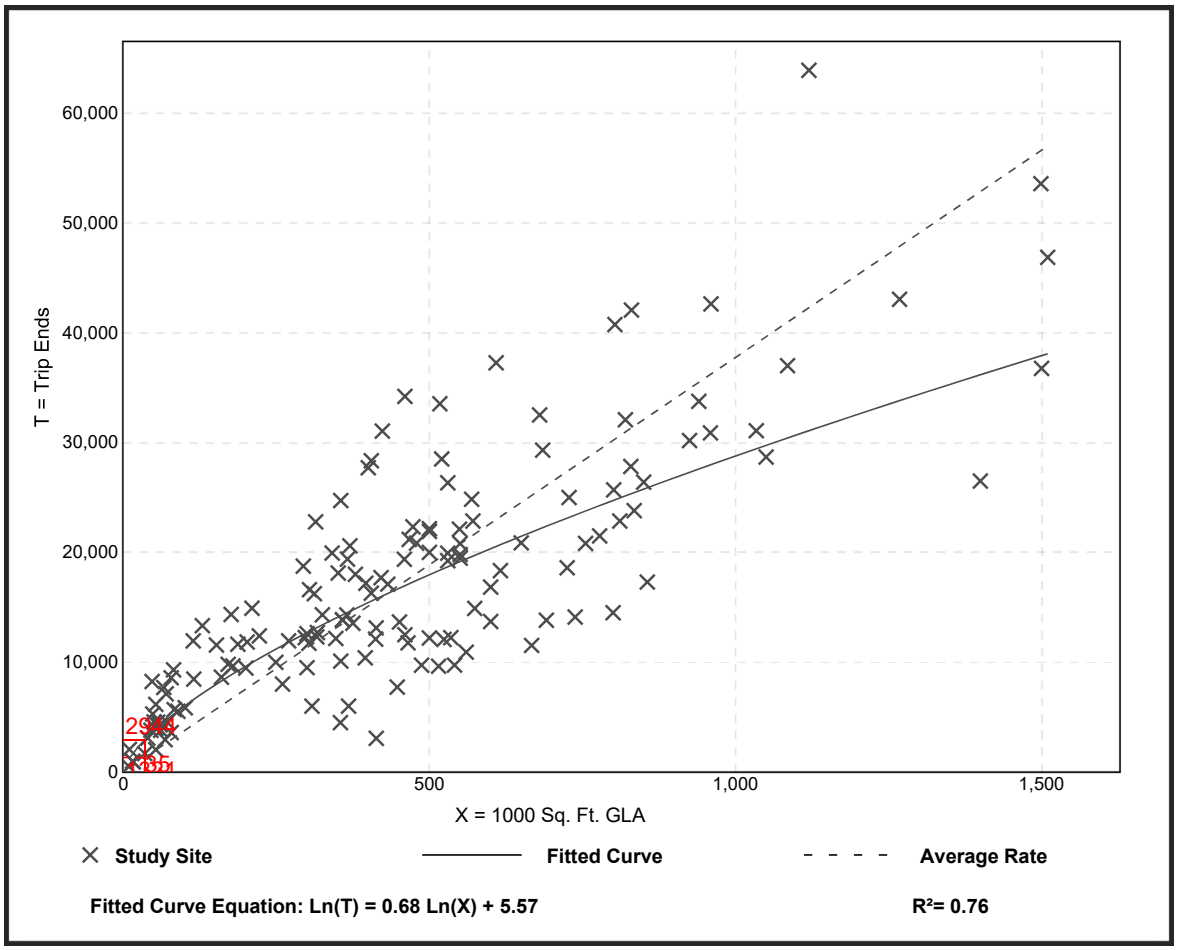
Vehicle Trip Ends vs: **1000 Sq. Ft. GLA**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 147
Avg. 1000 Sq. Ft. GLA: 453
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
37.75	7.42 - 207.98	16.41

Data Plot and Equation



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TRAFFIC ANALYSIS & DESIGN, INC.

PROVIDING TRAFFIC ENGINEERING SOLUTIONS

Date: December 20, 2010

Memorandum

To: Fred Hennighausen, Dave & Busters, Inc.

From: Tammi Czewski, Traffic Analysis & Design, Inc.

cc List::

Subject Dave & Buster's Trip Rate and Parking Rate Calculations

INTRODUCTION

Traffic Analysis & Design, Inc. conducted an analysis to determine the average parking demand and trip generation rates per 1,000 square feet of floor area for Dave & Buster's restaurants. The calculated rates were based on actual traffic volume and parking demand counts collected at Dave & Buster's sites in the San Diego, Atlanta, Cleveland, and St. Louis areas (see Exhibit 1). The specific locations of each site included in this analysis are as follows:

San Diego
2931 Camino Del Rio N.
San Diego, CA 92108

Cleveland
25735 First Street
Westlake, OH 44145

St. Louis
13857 Riverpoint Drive
Maryland Heights, MO 63043

Atlanta
2215 D&B Drive
Marietta, GA 30067

DATA COLLECTION

All field data was collected at the four Dave & Buster's sites on Wednesdays, Fridays, and Saturdays from November 12 through November 17, 2010. For calculating the trip rates, traffic volumes were counted (in 15-minute increments) for all vehicles entering and exiting the Dave & Buster's sites. These traffic volumes were counted on a Wednesday, Friday, and Saturday from 4:00 p.m. to midnight, and also on Saturday from 11:00 a.m. to 2:00 p.m. For calculating the parking demand rates, the total parked cars in each Dave & Buster's parking lots were counted every 30 minutes. These cars were counted on a Wednesday, Friday, and Saturday from 4:00 p.m. to midnight. All traffic data collected for each Dave & Buster's site is located in the appendix at the end of this technical memorandum.

The total square footage and maximum number of parking spaces for each site was obtained from Dave & Buster's staff.

TRIP GENERATION (PER SQUARE FEET)

Trip rates were calculated using a weighted average trip rate for all four Dave & Buster's study sites. The weighted average trip rate methodology follows the procedures outlined in the Institute of Transportation Engineers (ITE) *Trip Generation Handbook*. A weighted average trip rate is calculated by summing up all trips entering and exiting all sites, and then dividing them by the sum of the gross floor area for all four sites.

The weighted average trip rates were calculated for the weekday evening (Wednesday data), Friday evening, Saturday midday, and Saturday evening peak time periods. Trip rates were calculated to represent both the peak hour of adjacent street traffic and the peak hour of the generator. The peak hour of adjacent street traffic represents the time periods where traffic volumes on the nearby mainline roadways are highest. These time periods typically occur weekdays (including Friday) from 4:00 p.m. to 6:00 p.m. and Saturdays from 11:00 a.m. to 2:00 p.m. The peak hour of the generator represents the time periods where traffic volumes to and from the development site being evaluated (such as Dave & Buster's) is highest. These peak times varied considerably between the Dave & Buster's sites evaluated in this study. At some locations, the peak hour of the generator coincided with the peak hour of adjacent street traffic. At other locations, the peak hour of the generator occurred much later in the evening.

Graphs showing the total traffic flow data (sum of entering and exiting vehicles) at each site throughout the analysis time periods are shown on Exhibits 2 through 5. These exhibits also show aerial views of each Dave & Buster's restaurant and parking areas and parking demand graphs.

The weighted average trip rates for the weekday, Friday, and Saturday peak hour of adjacent street traffic and generator (as applicable) are shown in Table 1.

Table 1: Dave & Buster's Weighted Average Trip Rates

Weekday		Pk Hr. of Adjacent Street Traffic (4-6 PM)			Peak Hour of Generator		
Site	GFA (1,000 SF)	In	Out	Trips	In	Out	Trips
St. Louis	55.000	72	26	98	62	47	109
San Diego	43.701	75	49	124	56	72	128
Cleveland	57.500	60	20	80	54	39	93
Atlanta	59.551	62	24	86	60	37	97
Totals	215.752	269	119	388	232	195	427
Weighted Average Rate:		**69%**	**31%**	**1.80**	**54%**	**46%**	**1.98**
		%in	%out	Rate	%in	%out	Rate

Friday		Pk Hr. of Adjacent Street Traffic (4-6 PM)			Peak Hour of Generator		
Site	GFA (1,000 SF)	In	Out	Trips	In	Out	Trips
St. Louis	55.000	101	65	166	101	65	166
San Diego	43.701	128	49	177	138	123	261
Cleveland	57.500	108	33	141	95	82	177
Atlanta	59.551	154	36	190	131	123	254
Totals	215.752	491	183	674	465	393	858
Weighted Average Rate:		**73%**	**27%**	**3.12**	**54%**	**46%**	**3.98**
		%in	%out	Rate	%in	%out	Rate

Saturday		Pk Hr. of Adjacent Street Traffic (11 AM-2 PM)			Peak Hour of Generator		
Site	GFA (1,000 SF)	In	Out	Trips	In	Out	Trips
St. Louis	55.000	69	25	94	212	85	297
San Diego	43.701	106	23	129	168	114	282
Cleveland	57.500	63	21	84	248	101	349
Atlanta	59.551	80	30	110	148	172	320
Totals	215.752	318	99	417	776	472	1248
Weighted Average Rate:		**76%**	**24%**	**1.93**	**62%**	**38%**	**5.78**
		%in	%out	Rate	%in	%out	Rate

The weighted average trip rates can be used to estimate the total number of trips that may be generated at future Dave & Buster's restaurants. For example, a new store with about 60,000 SF of gross floor area can be expected to generate about 116 trips in one hour between 11:00 a.m. and 2:00 p.m. on a typical Saturday (60 x 1.93 = 116). During the Saturday peak however, which usually occurs later in the day, that same new store would be expected to generate about 347 trips in one hour. Of these trips, 62 percent are expected to be entering and 38 percent are expected to be exiting during the Saturday peak hour (215 entering and 132 exiting).

PARKING DEMAND (PER SQUARE FEET)

The maximum number of cars parked in the Dave & Buster's parking lot at each site is compared to the site capacity in Table 2. For all four Dave & Buster's sites, this maximum occupancy occurred during the Saturday evening time period.

Table 2: Dave & Buster's Maximum Parking Occupancy

Site Location	Lot Size		
	Parking Capacity	Max Occupancy	
		Vehicles	% Full
St. Louis	538	408	76%
San Diego	595	398	67%
Cleveland	626	559	89%
Atlanta	732	479	65%

The weighted average parking demand rates were calculated for the weekday peak hour of adjacent street traffic (highest parking demand between 4:00 p.m. and 6:00 p.m.), and for the weekday, Friday, and Saturday evening peak hours of the generator. The weighted average parking demand rates were based on methodologies from the ITE *Parking Generation* manual and are shown in Table 3.

Table 3: Dave & Buster's Parking Demand Rates

Site Location	D&B Size (1,000 SF)	Weekday PM PH of Adj		Weekday PM PH of Gen		Friday PM PH of Gen		Saturday PM PH of Gen	
		Cars	Rate	Cars	Rate	Cars	Rate	Cars	Rate
St. Louis	55.000	111	2.02	160	2.91	227	4.13	408	7.42
San Diego	43.701	114	2.61	192	4.39	359	8.21	398	9.11
Cleveland	57.500	94	1.63	130	2.26	307	5.34	559	9.72
Atlanta	59.551	94	1.58	134	2.25	340	5.71	479	8.04
Weighted Average Rate:	215.752	413	**1.91**	616	**2.86**	1233	**5.71**	1844	**8.55**

The weighted average parking rates can be used to estimate the total number of parking spaces that may be occupied at future Dave & Buster's restaurants. For example, a new store with about 60,000 SF of gross floor area can be expected to have up to 513 cars parked in its lot during the peak parking time on a Saturday (60 x 8.55 = 513). Since parking lots typically seem "full" at 85 percent occupancy, a new Dave & Buster's parking area should therefore be sized with at least 603 parking spaces to accommodate the maximum number of guests parking on site (513 / 0.85 = 603).

CONCLUSION

The trip rates and parking demand rates were calculated according to industry methods (i.e. ITE trip generation and parking generation methodology) for sample size and calculation procedures. These rates are expected to provide adequate predictions of traffic flow and parking needs for future Dave & Buster's sites across the country.

United States, North America

★ = Dave & Buster's Sites

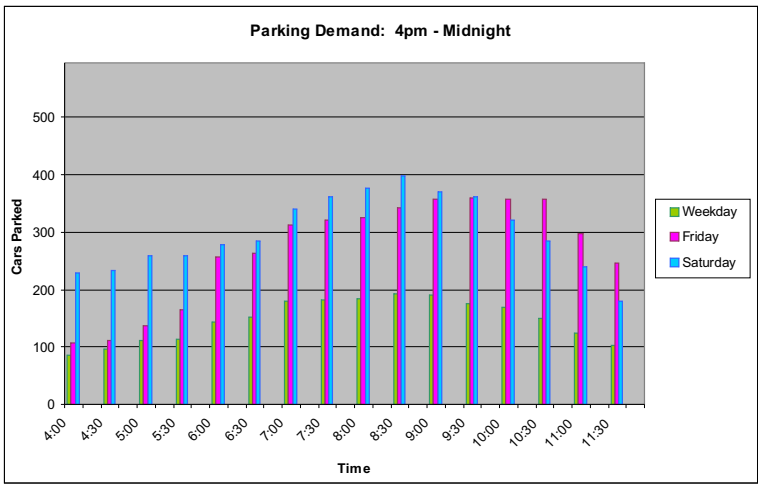
Atlanta, Georgia
Cleveland, Ohio
St. Louis, Missouri
San Diego, California

TRAFFIC ANALYSIS & DESIGN, INC.

#1203

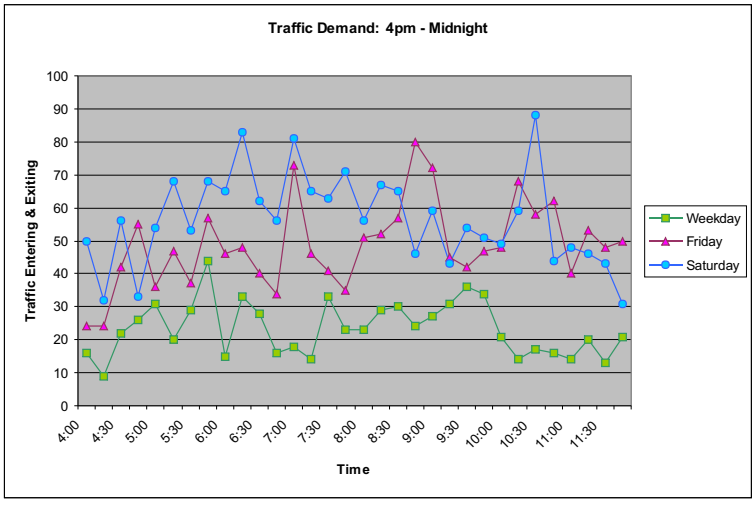
EXHIBIT 1
SITE LOCATION MAP
DAVE & BUSTER'S

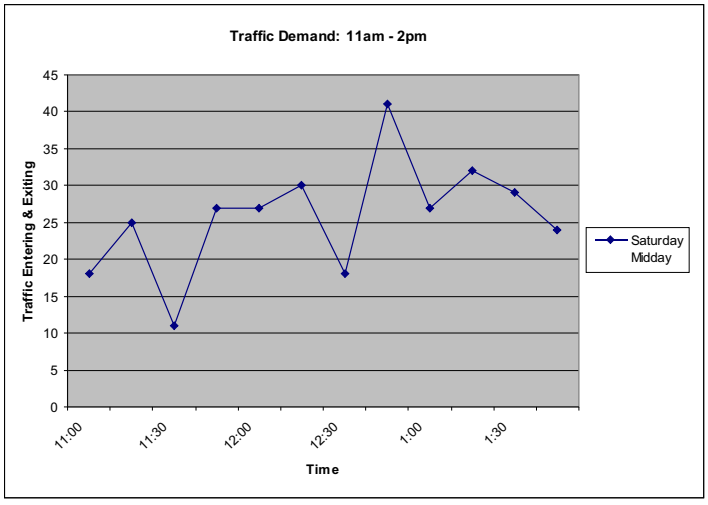
N



Dave & Buster's
2931 Camino Del Rio N.
San Diego, CA 92108

Building Size: 43,701 SF
Lot Size: 595 Parking Spaces



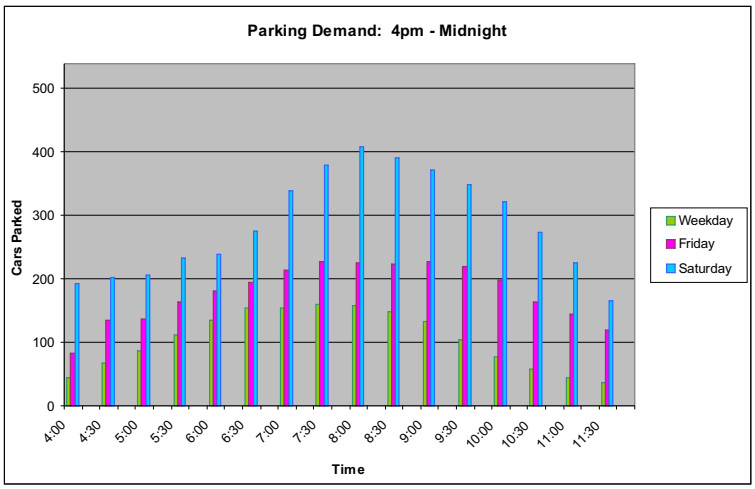


TRAFFIC ANALYSIS & DESIGN, INC.

#1203

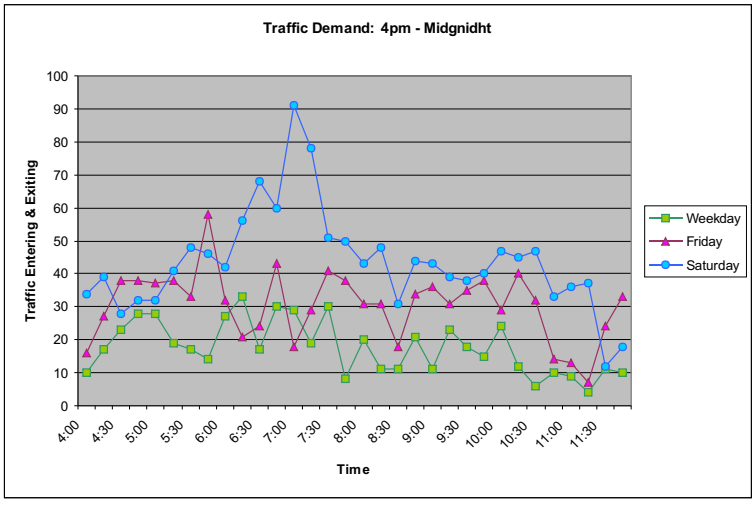
EXHIBIT 2
SAN DIEGO SITE
DAVE & BUSTER'S

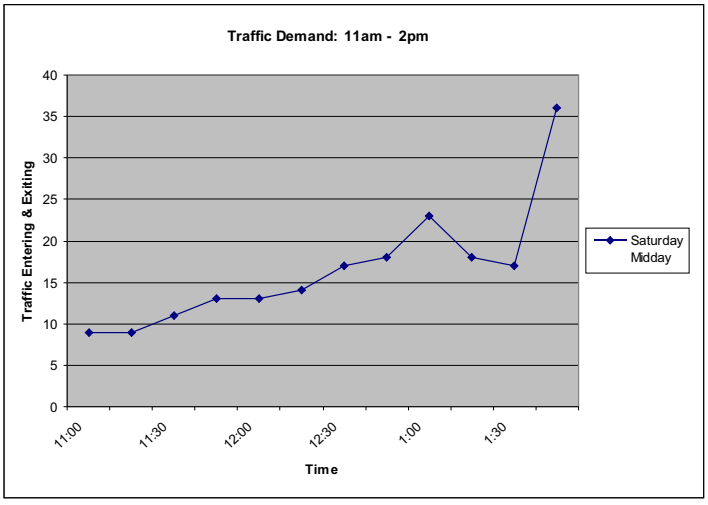
N



Dave & Buster's
13857 Riverpoint Drive
Maryland Heights, MO 63043

Building Size: 55,000 SF
Lot Size: 538 Parking Spaces





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#1203

EXHIBIT 3
ST. LOUIS SITE
DAVE & BUSTER'S

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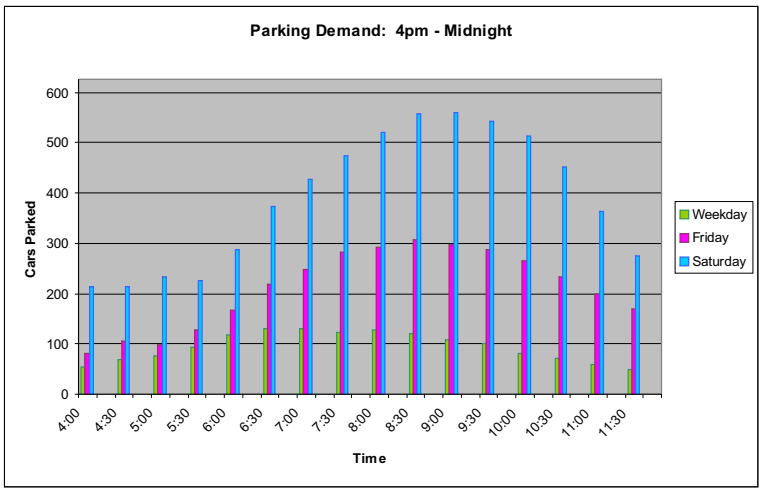
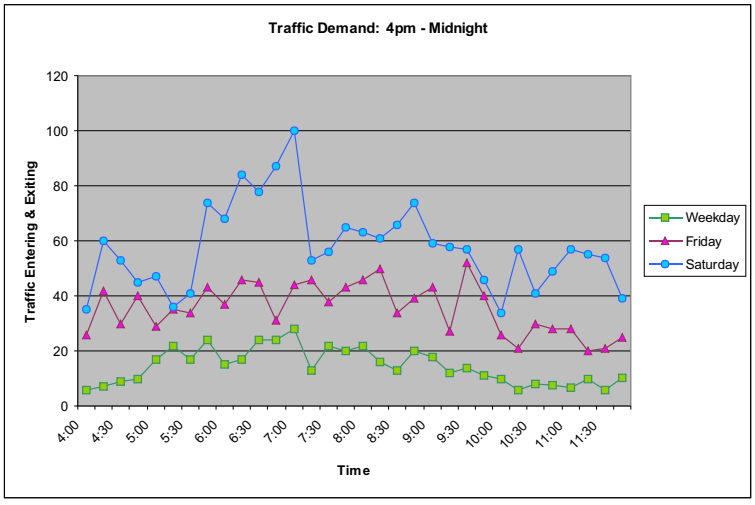
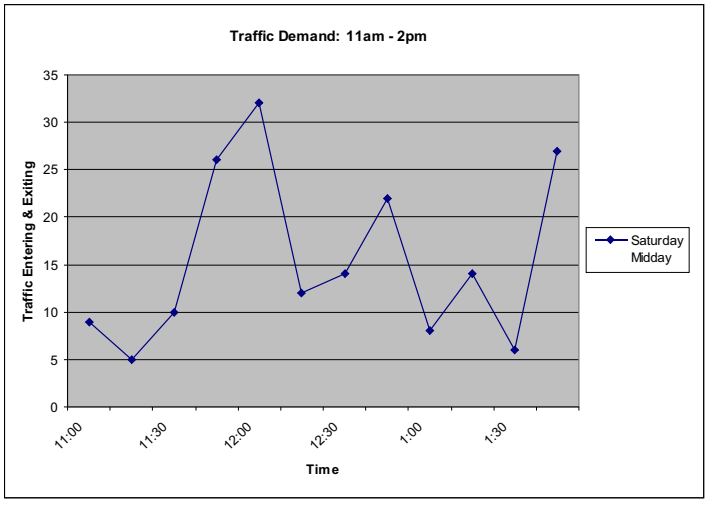


Dave & Buster's
25735 First Street
Westlake, OH 44145

Building Size: 57,500 SF
Lot Size: 626 Parking Spaces

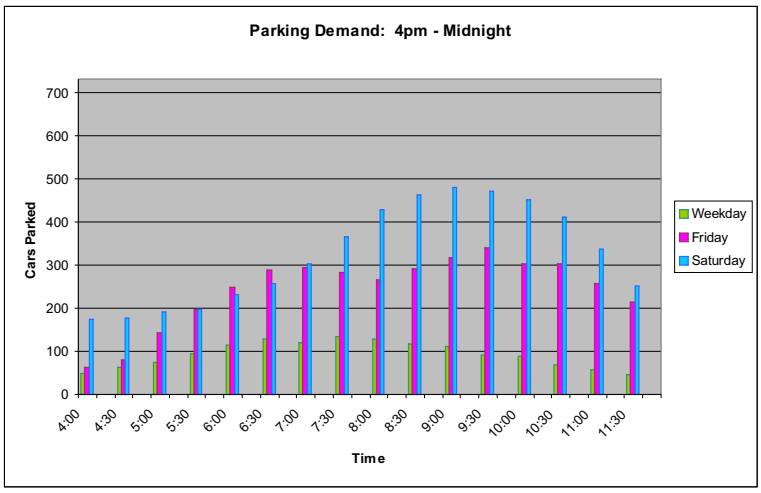




TRAFFIC ANALYSIS & DESIGN, INC.
#1203

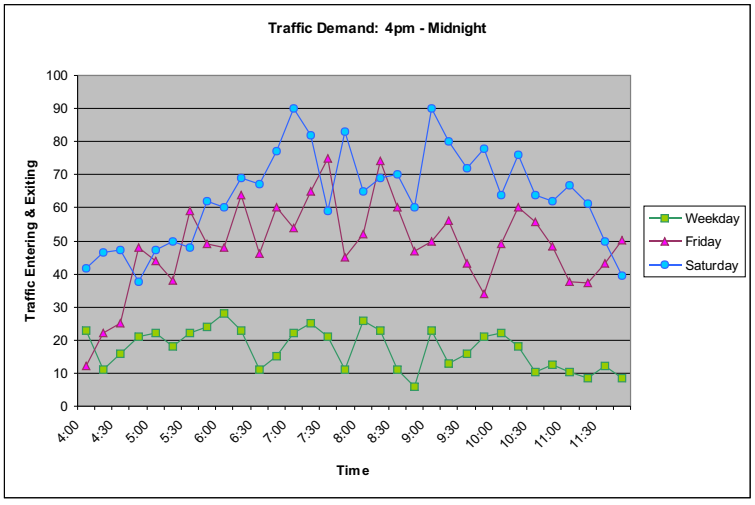
EXHIBIT 4
CLEVELAND SITE
DAVE & BUSTER'S

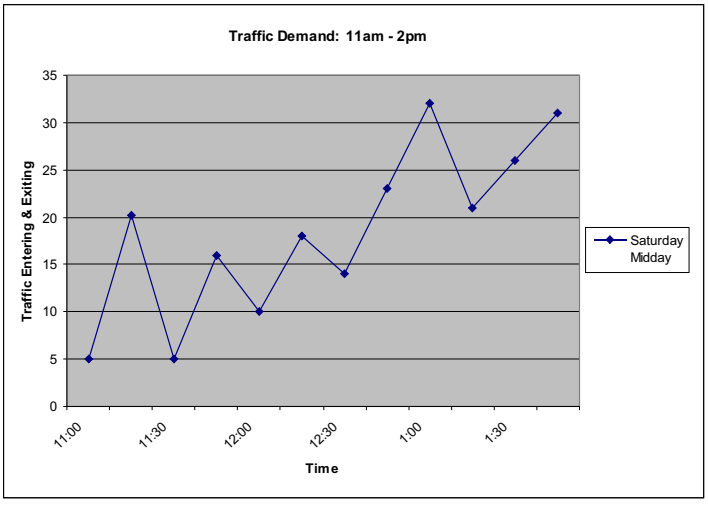
N



Dave & Buster's
2215 D&B Drive
Marietta, GA 30067

Building Size: 59,551 SF
Lot Size: 732 Parking Spaces





TRAFFIC ANALYSIS & DESIGN, INC.

#1203

EXHIBIT 5
ATLANTA SITE
DAVE & BUSTER'S

N

Dave Buster's San Diego
Traffic and Parking Counts

Friday

Time	In	Out	Parking
4:00	8	16	108
4:15	13	11	
4:30	30	12	111
4:45	33	22	
5:00	20	16	137
5:15	34	13	
5:30	27	10	165
5:45	47	10	
6:00	32	14	256
6:15	32	16	
6:30	29	11	263
6:45	24	10	
7:00	45	28	313
7:15	29	17	
7:30	17	24	320
7:45	24	11	
8:00	30	21	326
8:15	28	24	
8:30	31	26	343
8:45	43	37	
9:00	36	36	357
9:15	24	21	
9:30	20	22	**359**
9:45	24	23	
10:00	22	26	358
10:15	36	32	
10:30	14	44	358
10:45	20	42	
11:00	13	27	298
11:15	9	44	
11:30	8	40	246
11:45	9	41	

Saturday

Times	In	Out	Parking
11:00	13	5	32
11:15	22	3	
11:30	8	3	57
11:45	23	4	
12:00	22	5	93
12:15	25	5	
12:30	16	2	134
12:45	35	6	
1:00	24	3	176
1:15	24	8	
1:30	23	6	182
1:45	15	9	
4:00	25	25	230
4:15	17	15	
4:30	32	24	233
4:45	23	10	
5:00	35	19	258
5:15	28	40	
5:30	33	20	259
5:45	45	23	
6:00	31	34	279
6:15	40	43	
6:30	40	22	285
6:45	38	18	
7:00	50	31	340
7:15	42	23	
7:30	42	21	361
7:45	41	30	
8:00	30	26	376
8:15	41	26	
8:30	38	27	**398**
8:45	16	30	
9:00	22	37	371
9:15	16	27	
9:30	17	37	361
9:45	18	33	
10:00	18	31	320
10:15	21	38	
10:30	28	60	285
10:45	20	24	
11:00	10	38	239
11:15	5	41	
11:30	10	33	179
11:45	6	25	

Wednesday

Time	In	Out	Parking
4:00	9	7	85
4:15	5	4	
4:30	16	6	97
4:45	14	12	
5:00	18	13	111
5:15	12	8	
5:30	17	12	**114**
5:45	28	16	
6:00	10	5	143
6:15	24	9	
6:30	17	11	153
6:45	9	7	
7:00	9	9	179
7:15	11	3	
7:30	23	10	182
7:45	13	10	
8:00	14	9	185
8:15	18	11	
8:30	18	12	**192**
8:45	12	12	
9:00	11	16	191
9:15	12	19	
9:30	18	18	176
9:45	15	19	
10:00	7	14	170
10:15	6	8	
10:30	3	14	149
10:45	3	13	
11:00	2	12	125
11:15	2	18	
11:30	3	10	103
11:45	1	20	

595 Spaces in the lot
43,701 GFA

Peak Hours for Max In/Out Trips on Site

Wkdy PM Peak (4-6)	5:00-6:00 p.m.
Wkdy Pk Hr of Generator	9:00-10:00 p.m.
Friday PM Peak (4-6)	5:00-6:00 p.m.
Friday Pk Hr of Generator	8:15-9:15 p.m.
Sat. Midday Peak (11-2)	12:45-1:45 p.m.
Sat. PM Pk Hr of Generator	6:15-7:15 p.m.

Peak Hours for Max Occupancy in Parking Lot

Wkdy PM Peak (4-6)	5:30 p.m.
Wkdy Pk Hr of Generator	8:30 p.m.
Friday Pk Hr of Generator	9:30 p.m.
Sat. PM Pk Hr of Generator	8:30 p.m.

Dave Buster's St. Louis
Traffic and Parking Counts

Friday

Time	In	Out	Parking
4:00	13	3	83
4:15	24	3	
4:30	29	9	135
4:45	27	11	
5:00	14	23	136
5:15	26	12	
5:30	24	9	164
5:45	37	21	
6:00	18	14	181
6:15	14	7	
6:30	20	4	194
6:45	29	14	
7:00	9	9	214
7:15	16	13	
7:30	25	16	227
7:45	15	23	
8:00	21	10	224
8:15	14	17	
8:30	4	14	222
8:45	22	12	
9:00	21	15	**227**
9:15	11	20	
9:30	13	22	219
9:45	12	26	
10:00	13	16	197
10:15	9	31	
10:30	5	27	164
10:45	5	9	
11:00	1	12	144
11:15	2	5	
11:30	7	17	120
11:45	3	30	

Saturday

Times	In	Out	Parking
11:00	7	2	31
11:15	8	1	
11:30	10	1	44
11:45	11	2	
12:00	11	2	63
12:15	13	1	
12:30	16	1	90
12:45	14	4	
1:00	18	5	105
1:15	13	5	
1:30	12	5	118
1:45	26	10	
4:00	21	13	193
4:15	19	20	
4:30	17	11	202
4:45	18	14	
5:00	15	17	205
5:15	32	9	
5:30	26	22	232
5:45	28	18	
6:00	27	15	239
6:15	34	22	
6:30	48	20	275
6:45	44	16	
7:00	66	25	339
7:15	54	24	
7:30	30	21	379
7:45	34	16	
8:00	34	9	**408**
8:15	19	29	
8:30	9	22	391
8:45	15	29	
9:00	19	24	370
9:15	13	26	
9:30	13	25	348
9:45	20	20	
10:00	18	29	321
10:15	12	33	
10:30	11	36	273
10:45	3	30	
11:00	10	26	225
11:15	5	32	
11:30	0	12	165
11:45	2	16	

Wednesday

Time	In	Out	Parking
4:00	5	5	44
4:15	14	3	
4:30	16	7	67
4:45	21	7	
5:00	19	9	87
5:15	16	3	
5:30	13	4	**111**
5:45	12	2	
6:00	20	7	135
6:15	25	8	
6:30	11	6	154
6:45	11	19	
7:00	15	14	154
7:15	12	7	
7:30	17	13	**160**
7:45	2	6	
8:00	10	10	157
8:15	6	5	
8:30	3	8	148
8:45	6	15	
9:00	4	7	132
9:15	2	21	
9:30	4	14	104
9:45	3	12	
10:00	1	23	77
10:15	1	11	
10:30	0	6	58
10:45	1	9	
11:00	1	8	45
11:15	0	4	
11:30	1	10	37
11:45	0	10	

538 Spaces in the lot
55,000 GFA

Peak Hours for Max In/Out Trips on Site

Wkdy PM Peak (4-6)	4:30-5:30 p.m.
Wkdy Pk Hr of Generator	6:15-7:15 p.m.
Friday PM Peak (4-6)	5:00-6:00 p.m.
Friday Pk Hr of Generator	5:00-6:00 p.m.
Sat. Midday Peak (11-2)	1:00-2:00 p.m.
Sat. PM Pk Hr of Generator	6:30-7:30 p.m.

Peak Hours for Max Occupancy in Parking Lot

Wkdy PM Peak (4-6)	5:30 p.m.
Wkdy Pk Hr of Generator	7:30 p.m.
Friday Pk Hr of Generator	9:00 p.m.
Sat. PM Pk Hr of Generator	8:00 p.m.

Dave Buster's Cleveland
Traffic and Parking Counts

Friday

Time	In	Out	Parking
4:00	6	20	82
4:15	7	35	
4:30	19	11	105
4:45	22	18	
5:00	19	10	99
5:15	24	11	
5:30	29	5	127
5:45	36	7	
6:00	28	9	166
6:15	32	14	
6:30	31	14	218
6:45	25	6	
7:00	29	15	248
7:15	28	18	
7:30	22	16	282
7:45	25	18	
8:00	28	18	292
8:15	20	30	
8:30	17	17	**307**
8:45	19	20	
9:00	21	22	296
9:15	7	20	
9:30	19	33	288
9:45	17	23	
10:00	5	21	266
10:15	9	12	
10:30	12	18	234
10:45	7	21	
11:00	7	21	198
11:15	8	12	
11:30	3	18	169
11:45	4	21	

Saturday

Times	In	Out	Parking
11:00	7	2	
11:15	5	0	
11:30	9	1	
11:45	22	4	
12:00	20	12	
12:15	10	2	
12:30	11	3	
12:45	16	6	
1:00	6	2	
1:15	11	3	
1:30	4	2	
1:45	21	6	
4:00	19	16	214
4:15	30	30	
4:30	31	22	214
4:45	25	20	
5:00	18	29	232
5:15	26	10	
5:30	31	10	227
5:45	58	16	
6:00	52	16	288
6:15	54	30	
6:30	56	22	374
6:45	67	20	
7:00	71	29	428
7:15	43	10	
7:30	46	10	475
7:45	49	16	
8:00	47	16	521
8:15	43	18	
8:30	43	23	557
8:45	46	28	
9:00	28	31	**559**
9:15	26	32	
9:30	27	30	542
9:45	22	24	
10:00	14	20	514
10:15	14	43	
10:30	10	31	452
10:45	11	38	
11:00	9	48	363
11:15	4	51	
11:30	7	47	275
11:45	3	36	

Wednesday

Time	In	Out	Parking
4:00	6	0	53
4:15	5	2	
4:30	7	2	68
4:45	9	1	
5:00	10	7	77
5:15	19	3	
5:30	11	6	**94**
5:45	20	4	
6:00	10	5	117
6:15	12	5	
6:30	15	9	129
6:45	11	13	
7:00	16	12	**130**
7:15	5	8	
7:30	11	11	123
7:45	9	11	
8:00	11	11	128
8:15	5	11	
8:30	4	9	120
8:45	5	15	
9:00	9	9	107
9:15	3	9	
9:30	2	12	100
9:45	0	11	
10:00	1	9	80
10:15	2	4	
10:30	1	7	70
10:45	1	7	
11:00	1	6	59
11:15	1	9	
11:30	1	5	48
11:45	0	10	

626 Spaces in the lot
57,500 GFA

Peak Hours for Max In/Out Trips on Site

Wkdy PM Peak (4-6)	5:00-6:00 p.m.
Wkdy Pk Hr of Generator	6:15-7:15 p.m.
Friday PM Peak (4-6)	5:00-6:00 p.m.
Friday Pk Hr of Generator	7:30-8:30 p.m.
Sat. Midday Peak (11-2)	11:45-12:45 p.m
Sat. PM Pk Hr of Generator	6:15-7:15 p.m.

Peak Hours for Max Occupancy in Parking Lot

Wkdy PM Peak (4-6)	5:30 p.m.
Wkdy Pk Hr of Generator	7:00 p.m.
Friday Pk Hr of Generator	8:30 p.m.
Sat. PM Pk Hr of Generator	9:00 p.m.

Dave Buster's Atlanta
Traffic and Parking Counts

Friday

Time	In	Out	Parking
4:00	9	3	63
4:15	17	5	
4:30	20	5	81
4:45	44	4	
5:00	33	11	144
5:15	34	4	
5:30	51	8	198
5:45	36	13	
6:00	36	12	249
6:15	34	30	
6:30	27	19	288
6:45	38	22	
7:00	27	27	294
7:15	31	34	
7:30	35	40	284
7:45	21	24	
8:00	32	20	267
8:15	36	38	
8:30	37	23	293
8:45	26	21	
9:00	35	15	316
9:15	35	21	
9:30	13	30	**340**
9:45	13	21	
10:00	19	30	302
10:15	25	35	
10:30	14	42	304
10:45	15	34	
11:00	10	28	257
11:15	9	28	
11:30	8	35	215
11:45	7	43	

Saturday

Times	In	Out	Parking
11:00	5	0	
11:15	19	1	
11:30	5	0	
11:45	15	1	
12:00	8	2	
12:15	14	4	
12:30	11	3	
12:45	20	3	
1:00	25	7	
1:15	16	5	
1:30	19	7	
1:45	20	11	
4:00	19	23	175
4:15	19	28	
4:30	23	24	178
4:45	19	19	
5:00	20	28	191
5:15	25	25	
5:30	26	22	197
5:45	38	24	
6:00	37	23	231
6:15	37	32	
6:30	39	28	256
6:45	58	19	
7:00	54	36	304
7:15	62	20	
7:30	44	15	366
7:45	58	25	
8:00	38	27	429
8:15	42	27	
8:30	36	34	464
8:45	34	26	
9:00	48	42	**479**
9:15	44	36	
9:30	26	46	472
9:45	30	48	
10:00	34	30	451
10:15	28	48	
10:30	19	45	412
10:45	24	38	
11:00	20	46	337
11:15	10	51	
11:30	12	38	253
11:45	8	32	

Wednesday

Time	In	Out	Parking
4:00	18	5	50
4:15	11	0	
4:30	14	2	63
4:45	15	6	
5:00	20	2	73
5:15	14	4	
5:30	13	9	**94**
5:45	15	9	
6:00	17	11	114
6:15	15	8	
6:30	6	5	130
6:45	8	7	
7:00	13	9	121
7:15	11	14	
7:30	10	11	**134**
7:45	6	5	
8:00	9	17	128
8:15	3	20	
8:30	4	7	117
8:45	3	3	
9:00	18	5	111
9:15	11	2	
9:30	14	2	91
9:45	15	6	
10:00	20	2	88
10:15	14	4	
10:30	6	4	68
10:45	8	5	
11:00	6	4	56
11:15	4	5	
11:30	8	4	46
11:45	2	6	

732 Spaces in the lot
59,551 GFA

Peak Hours for Max In/Out Trips on Site

Wkdy PM Peak (4-6)	5:00-6:00 p.m.
Wkdy Pk Hr of Generator	5:30-6:30 p.m.
Friday PM Peak (4-6)	5:00-6:00 p.m.
Friday Pk Hr of Generator	6:45-7:45 p.m.
Sat. Midday Peak (11-2)	1:00-2:00 p.m.
Sat. PM Pk Hr of Generator	9:00-10:00 p.m.

Peak Hours for Max Occupancy in Parking Lot

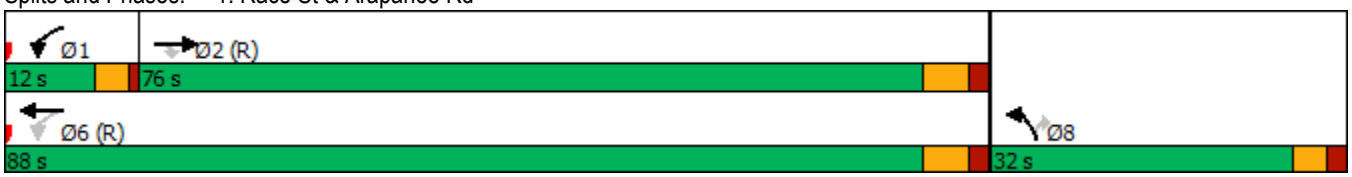
Wkdy PM Peak (4-6)	5:30 p.m.
Wkdy Pk Hr of Generator	7:30 p.m.
Friday Pk Hr of Generator	9:30 p.m.
Sat. PM Pk Hr of Generator	9:00 p.m.

APPENDIX F. TOTAL TRAFFIC OPERATIONAL ANALYSIS WORKSHEETS

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1275	110	53	848	107	39
Future Volume (vph)	1275	110	53	848	107	39
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	17.0	17.0	3.0	17.0	5.0	5.0
Minimum Split (s)	23.0	23.0	7.0	23.0	30.0	30.0
Total Split (s)	76.0	76.0	12.0	88.0	32.0	32.0
Total Split (%)	63.3%	63.3%	10.0%	73.3%	26.7%	26.7%
Yellow Time (s)	4.0	4.0	3.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effct Green (s)	87.9	87.9	97.5	95.5	13.5	13.5
Actuated g/C Ratio	0.73	0.73	0.81	0.80	0.11	0.11
v/c Ratio	0.50	0.10	0.17	0.21	0.55	0.19
Control Delay	9.0	3.9	4.0	1.9	59.2	14.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.0	3.9	4.0	1.9	59.2	14.6
LOS	A	A	A	A	E	B
Approach Delay	8.6			2.1	47.2	
Approach LOS	A			A	D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 111 (93%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.55	
Intersection Signal Delay: 8.5	Intersection LOS: A
Intersection Capacity Utilization 59.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: Race St & Arapahoe Rd



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1275	110	53	848	107	39
Future Volume (veh/h)	1275	110	53	848	107	39
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1301	112	54	865	109	40
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2759	1225	343	4241	138	123
Arrive On Green	0.78	0.78	0.04	1.00	0.08	0.08
Sat Flow, veh/h	3647	1578	1781	5274	1781	1585
Grp Volume(v), veh/h	1301	112	54	865	109	40
Grp Sat Flow(s),veh/h/ln	1777	1578	1781	1702	1781	1585
Q Serve(g_s), s	15.5	2.1	0.7	0.0	7.2	2.9
Cycle Q Clear(g_c), s	15.5	2.1	0.7	0.0	7.2	2.9
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2759	1225	343	4241	138	123
V/C Ratio(X)	0.47	0.09	0.16	0.20	0.79	0.32
Avail Cap(c_a), veh/h	2759	1225	425	4241	401	357
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.96	0.96	1.00	1.00
Uniform Delay (d), s/veh	4.7	3.2	3.5	0.0	54.4	52.4
Incr Delay (d2), s/veh	0.6	0.1	0.1	0.1	3.7	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	0.5	0.2	0.0	3.4	1.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	5.3	3.4	3.6	0.1	58.1	52.9
LnGrp LOS	A	A	A	A	E	D
Approach Vol, veh/h	1413			919	149	
Approach Delay, s/veh	5.2			0.3	56.7	
Approach LOS	A			A	E	

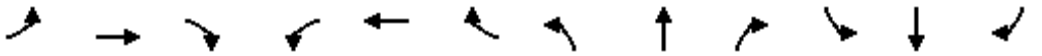
Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	6.5	99.2				105.7	14.3
Change Period (Y+Rc), s	4.0	6.0				6.0	5.0
Max Green Setting (Gmax), s	8.0	70.0				82.0	27.0
Max Q Clear Time (g_c+I1), s	2.7	17.5				2.0	9.2
Green Ext Time (p_c), s	0.0	7.7				4.5	0.2

Intersection Summary			
HCM 6th Ctrl Delay		6.5	
HCM 6th LOS		A	

Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	39	1212	89	832	5	43	8	29
Future Volume (vph)	39	1212	89	832	5	43	8	29
Turn Type	pm+pt	NA	pm+pt	NA	NA	Perm	NA	Perm
Protected Phases	5	2	1	6	8		4	
Permitted Phases	2		6			8		4
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	3.0	17.0	3.0	17.0	5.0	5.0	5.0	5.0
Minimum Split (s)	7.0	26.0	7.0	23.0	35.0	35.0	34.0	34.0
Total Split (s)	12.0	72.0	12.0	72.0	18.0	18.0	18.0	18.0
Total Split (%)	10.0%	60.0%	10.0%	60.0%	15.0%	15.0%	15.0%	15.0%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	82.9	75.5	85.6	78.2	8.2	8.2	12.0	12.0
Actuated g/C Ratio	0.69	0.63	0.71	0.65	0.07	0.07	0.10	0.10
v/c Ratio	0.10	0.42	0.32	0.30	0.40	0.22	0.79	0.12
Control Delay	4.7	6.7	10.6	18.9	61.9	2.4	82.6	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.7	6.7	10.6	18.9	61.9	2.4	82.6	1.0
LOS	A	A	B	B	E	A	F	A
Approach Delay		6.7		18.2	33.1		67.8	
Approach LOS		A		B	C		E	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	
Natural Cycle: 105	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 16.0	Intersection LOS: B
Intersection Capacity Utilization 57.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Vine St & Arapahoe Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	1212	59	89	832	104	41	5	43	125	8	29
Future Volume (veh/h)	39	1212	59	89	832	104	41	5	43	125	8	29
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.95	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	41	1276	62	94	876	109	43	5	45	132	8	31
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	464	3243	158	385	3058	379	86	10	81	162	10	148
Arrive On Green	0.04	1.00	1.00	0.07	1.00	1.00	0.05	0.05	0.05	0.10	0.10	0.10
Sat Flow, veh/h	1781	4987	242	1781	4599	570	1604	186	1505	1684	102	1540
Grp Volume(v), veh/h	41	871	467	94	647	338	48	0	45	140	0	31
Grp Sat Flow(s),veh/h/ln	1781	1702	1825	1781	1702	1764	1790	0	1505	1786	0	1540
Q Serve(g_s), s	0.9	0.0	0.0	2.2	0.0	0.0	3.1	0.0	3.5	9.2	0.0	2.2
Cycle Q Clear(g_c), s	0.9	0.0	0.0	2.2	0.0	0.0	3.1	0.0	3.5	9.2	0.0	2.2
Prop In Lane	1.00		0.13	1.00		0.32	0.90		1.00	0.94		1.00
Lane Grp Cap(c), veh/h	464	2213	1187	385	2264	1173	96	0	81	171	0	148
V/C Ratio(X)	0.09	0.39	0.39	0.24	0.29	0.29	0.50	0.00	0.56	0.82	0.00	0.21
Avail Cap(c_a), veh/h	550	2213	1187	444	2264	1173	194	0	163	194	0	167
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.86	0.86	0.86	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.6	0.0	0.0	6.1	0.0	0.0	55.2	0.0	55.4	53.2	0.0	50.0
Incr Delay (d2), s/veh	0.0	0.5	0.8	0.1	0.3	0.6	1.5	0.0	2.2	18.7	0.0	0.3
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	0.3	0.1	0.3	0.7	0.1	0.2	1.5	0.0	1.4	5.0	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.6	0.5	0.8	6.2	0.3	0.6	56.7	0.0	57.6	71.9	0.0	50.3
LnGrp LOS	A	A	A	A	A	A	E	A	E	E	A	D
Approach Vol, veh/h		1379			1079			93			171	
Approach Delay, s/veh		0.8			0.9			57.1			68.0	
Approach LOS		A			A			E			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.0	84.0		16.5	6.2	85.8		11.4				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	8.0	66.0		13.0	8.0	66.0		13.0				
Max Q Clear Time (g_c+I1), s	4.2	2.0		11.2	2.9	2.0		5.5				
Green Ext Time (p_c), s	0.0	7.2		0.1	0.0	4.7		0.1				

Intersection Summary		
HCM 6th Ctrl Delay	7.0	
HCM 6th LOS	A	

Notes

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

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	1313	25	20	949	5	0	0	49	0	0	14
Future Vol, veh/h	16	1313	25	20	949	5	0	0	49	0	0	14
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	150	-	0	100	-	-	-	-	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	17	1427	27	22	1032	5	0	0	53	0	0	15

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1037	0	0	1454	0	0	-	-	714	-	-	519
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	5.34	-	-	5.34	-	-	-	-	7.14	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	-	-	3.92	-	-	3.92
Pot Cap-1 Maneuver	*873	-	-	*764	-	-	0	0	*608	0	0	*694
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %	1	-	-	1	-	-			1			1
Mov Cap-1 Maneuver	*873	-	-	*764	-	-	-	-	*608	-	-	*694
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.2	11.5	10.3
HCM LOS			B	B

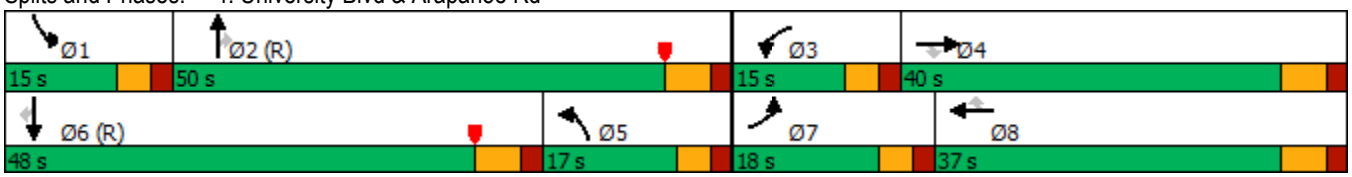
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	608	* 873	-	-	* 764	-	-	694
HCM Lane V/C Ratio	0.088	0.02	-	-	0.028	-	-	0.022
HCM Control Delay (s)	11.5	9.2	-	-	9.8	-	-	10.3
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0.1	-	-	0.1

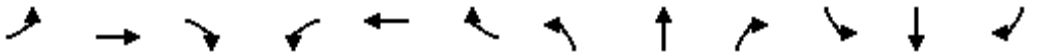
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	198	982	212	244	570	367	251	1196	191	227	846	176
Future Volume (vph)	198	982	212	244	570	367	251	1196	191	227	846	176
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	10.0	10.0	3.0	10.0	10.0
Minimum Split (s)	8.0	39.0	39.0	8.0	37.0	37.0	8.0	35.0	35.0	8.0	40.0	40.0
Total Split (s)	18.0	40.0	40.0	15.0	37.0	37.0	17.0	50.0	50.0	15.0	48.0	48.0
Total Split (%)	15.0%	33.3%	33.3%	12.5%	30.8%	30.8%	14.2%	41.7%	41.7%	12.5%	40.0%	40.0%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	10.8	30.4	30.4	10.0	29.6	29.6	12.0	47.8	47.8	9.8	45.6	45.6
Actuated g/C Ratio	0.09	0.25	0.25	0.08	0.25	0.25	0.10	0.40	0.40	0.08	0.38	0.38
v/c Ratio	0.67	0.79	0.40	0.89	0.47	0.70	0.76	0.62	0.27	0.84	0.46	0.26
Control Delay	53.4	48.0	17.7	85.7	39.8	25.4	54.8	21.6	2.2	79.9	29.4	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.4	48.0	17.7	85.7	39.8	25.4	54.8	21.6	2.2	79.9	29.4	4.8
LOS	D	D	B	F	D	C	D	C	A	E	C	A
Approach Delay		44.1			44.8			24.4			35.1	
Approach LOS		D			D			C			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 38 (32%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 95	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 36.3	Intersection LOS: D
Intersection Capacity Utilization 77.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: University Blvd & Arapahoe Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	198	982	212	244	570	367	251	1196	191	227	846	176
Future Volume (veh/h)	198	982	212	244	570	367	251	1196	191	227	846	176
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	206	1023	221	254	594	0	261	1246	199	236	881	183
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	265	1254	387	288	1288		447	2065	639	288	1787	552
Arrive On Green	0.03	0.08	0.08	0.08	0.25	0.00	0.13	0.40	0.40	0.08	0.35	0.35
Sat Flow, veh/h	3456	5106	1575	3456	5106	1585	3456	5106	1579	3456	5106	1578
Grp Volume(v), veh/h	206	1023	221	254	594	0	261	1246	199	236	881	183
Grp Sat Flow(s),veh/h/ln	1728	1702	1575	1728	1702	1585	1728	1702	1579	1728	1702	1578
Q Serve(g_s), s	7.1	23.7	11.3	8.7	11.8	0.0	8.5	23.1	10.3	8.1	16.3	7.6
Cycle Q Clear(g_c), s	7.1	23.7	11.3	8.7	11.8	0.0	8.5	23.1	10.3	8.1	16.3	7.6
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	265	1254	387	288	1288		447	2065	639	288	1787	552
V/C Ratio(X)	0.78	0.82	0.57	0.88	0.46		0.58	0.60	0.31	0.82	0.49	0.33
Avail Cap(c_a), veh/h	374	1447	446	288	1319		447	2065	639	288	1787	552
HCM Platoon Ratio	0.33	0.33	0.33	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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.5	52.5	23.8	54.4	38.0	0.0	49.2	28.2	24.4	54.1	30.6	15.7
Incr Delay (d2), s/veh	4.0	2.8	0.5	24.9	0.1	0.0	1.3	1.3	1.3	15.9	1.0	1.6
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	3.4	11.1	4.7	4.8	4.9	0.0	3.7	9.3	4.0	4.1	6.7	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.4	55.3	24.2	79.3	38.1	0.0	50.5	29.5	25.6	70.0	31.6	17.4
LnGrp LOS	E	E	C	E	D		D	C	C	E	C	B
Approach Vol, veh/h		1450			848	A		1706			1300	
Approach Delay, s/veh		51.4			50.4			32.2			36.6	
Approach LOS		D			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	54.5	15.0	35.5	21.5	48.0	14.2	36.3
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0	6.0	* 6	5.0	6.0
Max Green Setting (Gmax), s	10.0	44.0	10.0	34.0	12.0	* 42	13.0	31.0
Max Q Clear Time (g_c+I1), s	10.1	25.1	10.7	25.7	10.5	18.3	9.1	13.8
Green Ext Time (p_c), s	0.0	13.8	0.0	3.5	0.1	12.1	0.1	2.5

Intersection Summary	
HCM 6th Ctrl Delay	41.5
HCM 6th LOS	D

Notes

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

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

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	83	0	0	11	0	1689	4	0	1219	64
Future Vol, veh/h	0	0	83	0	0	11	0	1689	4	0	1219	64
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	-	-	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	100	100	92	92	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	90	0	0	12	0	1689	4	0	1219	64

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	610	-	-	847	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	*632	0	0	262	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %			1					-	-		-	-
Mov Cap-1 Maneuver	-	-	*632	-	-	262	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.6	19.4	0	0
HCM LOS	B	C		

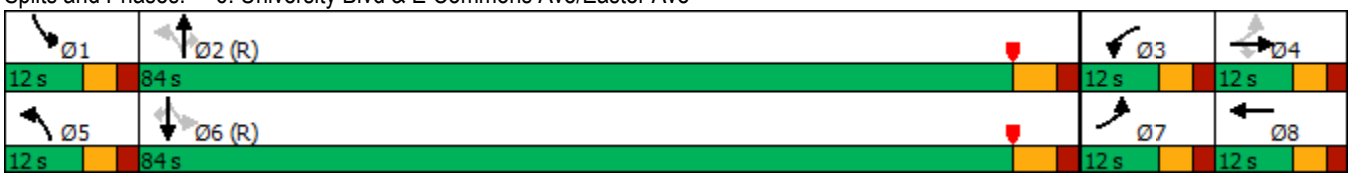
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	632	262	-	-
HCM Lane V/C Ratio	-	-	0.143	0.046	-	-
HCM Control Delay (s)	-	-	11.6	19.4	-	-
HCM Lane LOS	-	-	B	C	-	-
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-	-

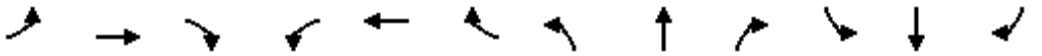
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	103	9	58	26	24	198	1534	26	23	1158	87
Future Volume (vph)	103	9	58	26	24	198	1534	26	23	1158	87
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases	4		4			2		2	6		6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	3.0	3.0	3.0	4.0	3.0	3.0	5.0	5.0	3.0	5.0	5.0
Minimum Split (s)	8.0	35.0	35.0	9.0	32.0	8.0	24.0	24.0	8.0	29.0	29.0
Total Split (s)	12.0	12.0	12.0	12.0	12.0	12.0	84.0	84.0	12.0	84.0	84.0
Total Split (%)	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	70.0%	70.0%	10.0%	70.0%	70.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	14.8	10.6	10.6	6.6	6.1	90.3	85.1	85.1	85.1	79.2	79.2
Actuated g/C Ratio	0.12	0.09	0.09	0.06	0.05	0.75	0.71	0.71	0.71	0.66	0.66
v/c Ratio	0.42	0.06	0.27	0.31	0.70	0.79	0.70	0.03	0.15	0.57	0.09
Control Delay	49.4	54.4	3.6	62.9	40.8	32.0	9.2	0.0	5.3	8.8	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay	49.4	54.4	3.6	62.9	40.8	32.0	9.3	0.0	5.3	8.8	0.5
LOS	D	D	A	E	D	C	A	A	A	A	A
Approach Delay		33.9			45.4		11.7			8.2	
Approach LOS		C			D		B			A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 50 (42%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 105	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 12.8	Intersection LOS: B
Intersection Capacity Utilization 70.6%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 6: University Blvd & E Commons Ave/Easter Ave





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	103	9	58	26	24	76	198	1534	26	23	1158	87
Future Volume (veh/h)	103	9	58	26	24	76	198	1534	26	23	1158	87
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		0.94	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	118	10	0	30	28	87	228	1763	30	26	1331	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	284	158		38	22	69	352	2504	1113	260	2349	
Arrive On Green	0.05	0.08	0.00	0.02	0.06	0.06	0.12	1.00	1.00	0.01	0.66	0.00
Sat Flow, veh/h	3456	1870	1585	1781	383	1189	1781	3554	1579	1781	3554	1585
Grp Volume(v), veh/h	118	10	0	30	0	115	228	1763	30	26	1331	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1781	0	1572	1781	1777	1579	1781	1777	1585
Q Serve(g_s), s	3.8	0.6	0.0	2.0	0.0	7.0	5.1	0.0	0.0	0.6	24.4	0.0
Cycle Q Clear(g_c), s	3.8	0.6	0.0	2.0	0.0	7.0	5.1	0.0	0.0	0.6	24.4	0.0
Prop In Lane	1.00		1.00	1.00		0.76	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	284	158		38	0	92	352	2504	1113	260	2349	
V/C Ratio(X)	0.42	0.06		0.80	0.00	1.25	0.65	0.70	0.03	0.10	0.57	
Avail Cap(c_a), veh/h	322	158		104	0	92	352	2504	1113	338	2349	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	49.7	50.5	0.0	58.5	0.0	56.5	10.2	0.0	0.0	6.4	11.0	0.0
Incr Delay (d2), s/veh	0.4	0.1	0.0	30.2	0.0	176.9	3.2	1.7	0.0	0.1	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.3	0.0	1.2	0.0	7.3	2.1	0.6	0.0	0.2	8.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.1	50.6	0.0	88.7	0.0	233.4	13.4	1.7	0.0	6.5	12.0	0.0
LnGrp LOS	D	D		F	A	F	B	A	A	A	B	
Approach Vol, veh/h		128	A		145			2021			1357	A
Approach Delay, s/veh		50.1			203.5			3.0			11.9	
Approach LOS		D			F			A			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.7	90.6	7.5	15.2	12.0	85.3	10.7	12.0
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	78.0	7.0	7.0	7.0	78.0	7.0	7.0
Max Q Clear Time (g_c+I1), s	2.6	2.0	4.0	2.6	7.1	26.4	5.8	9.0
Green Ext Time (p_c), s	0.0	51.3	0.0	0.0	0.0	27.1	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	15.9
HCM 6th LOS	B

Notes

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

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	41	0	1759	1221	20
Future Vol, veh/h	0	41	0	1759	1221	20
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	92	92	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	45	0	1759	1221	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	611	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	*593	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %		1		-	-	-
Mov Cap-1 Maneuver	-	*593	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.6	0	0
HCM LOS	B		

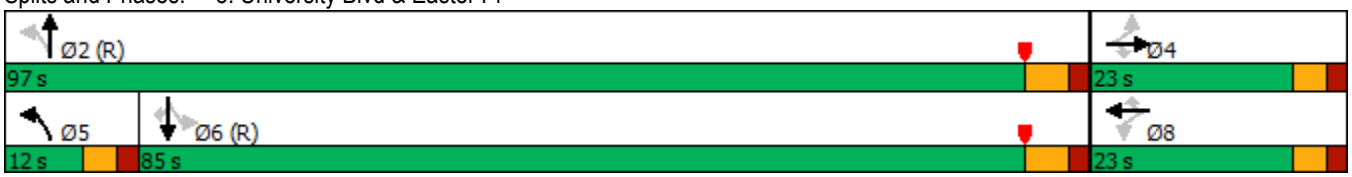
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	593	-	-
HCM Lane V/C Ratio	-	0.075	-	-
HCM Control Delay (s)	-	11.6	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

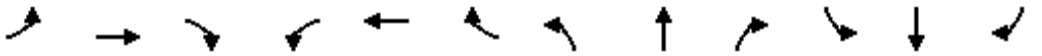
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	106	12	104	130	50	48	119	1606	13	1192	58
Future Volume (vph)	106	12	104	130	50	48	119	1606	13	1192	58
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm
Protected Phases		4			8		5	2		6	
Permitted Phases	4		4	8		8	2		6		6
Detector Phase	4	4	4	8	8	8	5	2	6	6	6
Switch Phase											
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	5.0
Minimum Split (s)	36.0	36.0	36.0	40.0	40.0	40.0	8.0	29.0	32.0	32.0	32.0
Total Split (s)	23.0	23.0	23.0	23.0	23.0	23.0	12.0	97.0	85.0	85.0	85.0
Total Split (%)	19.2%	19.2%	19.2%	19.2%	19.2%	19.2%	10.0%	80.8%	70.8%	70.8%	70.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.0	6.0	6.0	6.0
Lead/Lag							Lead		Lag	Lag	Lag
Lead-Lag Optimize?							Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	15.6	15.6	15.6	15.6	15.6	15.6	94.4	93.4	82.4	82.4	82.4
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13	0.13	0.79	0.78	0.69	0.69	0.69
v/c Ratio	0.69	0.05	0.38	0.81	0.23	0.20	0.46	0.69	0.12	0.55	0.06
Control Delay	70.0	44.6	12.0	82.3	48.0	7.5	8.3	8.3	3.9	3.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.0	44.6	12.0	82.3	48.0	7.5	8.3	8.3	3.9	3.1	0.1
LOS	E	D	B	F	D	A	A	A	A	A	A
Approach Delay		41.4			59.0			8.3		3.0	
Approach LOS		D			E			A		A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 66 (55%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 11.8	Intersection LOS: B
Intersection Capacity Utilization 81.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 8: University Blvd & Easter Pl





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	106	12	104	130	50	48	119	1606	64	13	1192	58
Future Volume (veh/h)	106	12	104	130	50	48	119	1606	64	13	1192	58
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.98		0.98	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	119	13	117	146	56	54	134	1804	72	15	1339	65
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	206	265	220	228	265	220	390	2670	106	185	2443	1084
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.04	0.77	0.77	1.00	1.00	1.00
Sat Flow, veh/h	1264	1870	1555	1241	1870	1555	1781	3483	138	243	3554	1577
Grp Volume(v), veh/h	119	13	117	146	56	54	134	915	961	15	1339	65
Grp Sat Flow(s),veh/h/ln	1264	1870	1555	1241	1870	1555	1781	1777	1845	243	1777	1577
Q Serve(g_s), s	11.0	0.7	8.4	13.8	3.2	3.7	2.5	29.7	30.5	2.1	0.0	0.0
Cycle Q Clear(g_c), s	14.2	0.7	8.4	14.6	3.2	3.7	2.5	29.7	30.5	23.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	206	265	220	228	265	220	390	1362	1414	185	2443	1084
V/C Ratio(X)	0.58	0.05	0.53	0.64	0.21	0.25	0.34	0.67	0.68	0.08	0.55	0.06
Avail Cap(c_a), veh/h	216	281	233	239	281	233	428	1362	1414	185	2443	1084
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.9	44.5	47.8	50.8	45.6	45.8	4.4	6.7	6.8	2.9	0.0	0.0
Incr Delay (d2), s/veh	2.1	0.0	0.8	3.9	0.1	0.2	0.2	2.7	2.7	0.9	0.9	0.1
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	3.6	0.3	3.3	4.6	1.5	1.5	0.7	9.0	9.6	0.1	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.9	44.5	48.6	54.7	45.7	46.0	4.5	9.4	9.5	3.8	0.9	0.1
LnGrp LOS	D	D	D	D	D	D	A	A	A	A	A	A
Approach Vol, veh/h		249			256			2010			1419	
Approach Delay, s/veh		50.9			50.9			9.1			0.9	
Approach LOS		D			D			A			A	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		98.0		22.0	9.5	88.5		22.0				
Change Period (Y+Rc), s		6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s		91.0		18.0	7.0	79.0		18.0				
Max Q Clear Time (g_c+I1), s		32.5		16.2	4.5	25.0		16.6				
Green Ext Time (p_c), s		45.1		0.1	0.0	30.0		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			11.5									
HCM 6th LOS			B									

Notes

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

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	133	12	12	259	13	26
Future Vol, veh/h	133	12	12	259	13	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	145	13	13	282	14	28

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	158	0	460	152
Stage 1	-	-	-	-	152	-
Stage 2	-	-	-	-	308	-
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	-	-	1422	-	559	894
Stage 1	-	-	-	-	876	-
Stage 2	-	-	-	-	745	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1422	-	553	894
Mov Cap-2 Maneuver	-	-	-	-	553	-
Stage 1	-	-	-	-	876	-
Stage 2	-	-	-	-	737	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	10.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	742	-	-	1422	-
HCM Lane V/C Ratio	0.057	-	-	0.009	-
HCM Control Delay (s)	10.1	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	16	159	174	60	15	13
Future Vol, veh/h	16	159	174	60	15	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	173	189	65	16	14

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	254	0	-	0	429	222
Stage 1	-	-	-	-	222	-
Stage 2	-	-	-	-	207	-
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	1311	-	-	-	583	818
Stage 1	-	-	-	-	815	-
Stage 2	-	-	-	-	828	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1311	-	-	-	575	818
Mov Cap-2 Maneuver	-	-	-	-	575	-
Stage 1	-	-	-	-	804	-
Stage 2	-	-	-	-	828	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	10.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1311	-	-	-	667
HCM Lane V/C Ratio	0.013	-	-	-	0.046
HCM Control Delay (s)	7.8	0	-	-	10.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	160	16	5	182	22	15
Future Vol, veh/h	160	16	5	182	22	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	174	17	5	198	24	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	191	0	391	183
Stage 1	-	-	-	-	183	-
Stage 2	-	-	-	-	208	-
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	-	-	1383	-	613	859
Stage 1	-	-	-	-	848	-
Stage 2	-	-	-	-	827	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1383	-	611	859
Mov Cap-2 Maneuver	-	-	-	-	611	-
Stage 1	-	-	-	-	848	-
Stage 2	-	-	-	-	824	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	10.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	692	-	-	1383	-
HCM Lane V/C Ratio	0.058	-	-	0.004	-
HCM Control Delay (s)	10.5	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	29	132	143	45	46	15
Future Vol, veh/h	29	132	143	45	46	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	143	155	49	50	16
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8.5	8.4	8.2
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	18%	0%	75%
Vol Thru, %	82%	76%	0%
Vol Right, %	0%	24%	25%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	161	188	61
LT Vol	29	0	46
Through Vol	132	143	0
RT Vol	0	45	15
Lane Flow Rate	175	204	66
Geometry Grp	1	1	1
Degree of Util (X)	0.206	0.235	0.088
Departure Headway (Hd)	4.348	4.143	4.755
Convergence, Y/N	Yes	Yes	Yes
Cap	831	873	757
Service Time	2.348	2.143	2.766
HCM Lane V/C Ratio	0.211	0.234	0.087
HCM Control Delay	8.5	8.4	8.2
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.8	0.9	0.3

Intersection	
Int Delay, s/veh	3.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	54	69	5	46	48
Future Vol, veh/h	1	54	69	5	46	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	59	75	5	50	52

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	230	78	0	0	80	0
Stage 1	78	-	-	-	-	-
Stage 2	152	-	-	-	-	-
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	758	983	-	-	1518	-
Stage 1	945	-	-	-	-	-
Stage 2	876	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	732	983	-	-	1518	-
Mov Cap-2 Maneuver	732	-	-	-	-	-
Stage 1	945	-	-	-	-	-
Stage 2	846	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	3.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	977	1518	-
HCM Lane V/C Ratio	-	-	0.061	0.033	-
HCM Control Delay (s)	-	-	8.9	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	43	7	9	2	4	4	1	116	3	44	88	42
Future Vol, veh/h	43	7	9	2	4	4	1	116	3	44	88	42
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	-	-	-	-	-	-	-	-	-	-	-	-
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	47	8	10	2	4	4	1	126	3	48	96	46

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	349	346	119	354	368	128	142	0	0	129	0	0
Stage 1	215	215	-	130	130	-	-	-	-	-	-	-
Stage 2	134	131	-	224	238	-	-	-	-	-	-	-
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	606	577	933	601	561	922	1441	-	-	1457	-	-
Stage 1	787	725	-	874	789	-	-	-	-	-	-	-
Stage 2	869	788	-	779	708	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	582	556	933	572	540	922	1441	-	-	1457	-	-
Mov Cap-2 Maneuver	582	556	-	572	540	-	-	-	-	-	-	-
Stage 1	786	699	-	873	788	-	-	-	-	-	-	-
Stage 2	859	787	-	735	683	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.5	10.6	0.1	1.9
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1441	-	-	614	656	1457	-	-
HCM Lane V/C Ratio	0.001	-	-	0.104	0.017	0.033	-	-
HCM Control Delay (s)	7.5	0	-	11.5	10.6	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	22	15	129	36	15	152
Future Vol, veh/h	22	15	129	36	15	152
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	16	140	39	16	165

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	357	160	0	0	179	0
Stage 1	160	-	-	-	-	-
Stage 2	197	-	-	-	-	-
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	641	885	-	-	1397	-
Stage 1	869	-	-	-	-	-
Stage 2	836	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	633	885	-	-	1397	-
Mov Cap-2 Maneuver	633	-	-	-	-	-
Stage 1	869	-	-	-	-	-
Stage 2	825	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.3	0	0.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	716	1397	-
HCM Lane V/C Ratio	-	-	0.056	0.012	-
HCM Control Delay (s)	-	-	10.3	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	29	145	214	45	55	6
Future Vol, veh/h	29	145	214	45	55	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	158	233	49	60	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	282	0	-	0	480	258
Stage 1	-	-	-	-	258	-
Stage 2	-	-	-	-	222	-
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	1280	-	-	-	545	781
Stage 1	-	-	-	-	785	-
Stage 2	-	-	-	-	815	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1280	-	-	-	530	781
Mov Cap-2 Maneuver	-	-	-	-	530	-
Stage 1	-	-	-	-	764	-
Stage 2	-	-	-	-	815	-

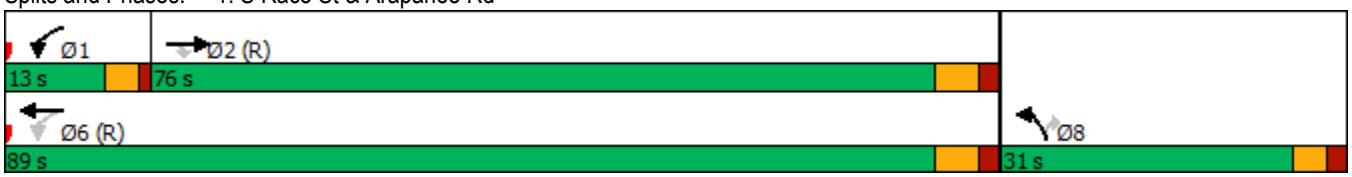
Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	12.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1280	-	-	-	547
HCM Lane V/C Ratio	0.025	-	-	-	0.121
HCM Control Delay (s)	7.9	0	-	-	12.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1015	99	46	1531	161	79
Future Volume (vph)	1015	99	46	1531	161	79
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	17.0	17.0	3.0	17.0	5.0	5.0
Minimum Split (s)	23.0	23.0	7.0	23.0	30.0	30.0
Total Split (s)	76.0	76.0	13.0	89.0	31.0	31.0
Total Split (%)	63.3%	63.3%	10.8%	74.2%	25.8%	25.8%
Yellow Time (s)	4.0	4.0	3.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effct Green (s)	85.0	85.0	94.6	92.6	16.4	16.4
Actuated g/C Ratio	0.71	0.71	0.79	0.77	0.14	0.14
v/c Ratio	0.42	0.09	0.12	0.41	0.70	0.29
Control Delay	9.0	3.6	4.3	5.4	63.7	11.5
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0
Total Delay	9.0	3.6	4.3	5.6	63.7	11.5
LOS	A	A	A	A	E	B
Approach Delay	8.5			5.6	46.5	
Approach LOS	A			A	D	

Intersection Summary			
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 31 (26%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 10.1		Intersection LOS: B	
Intersection Capacity Utilization 54.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: S Race St & Arapahoe Rd



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1015	99	46	1531	161	79
Future Volume (veh/h)	1015	99	46	1531	161	79
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1057	103	48	1595	168	82
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2642	1173	403	4068	199	177
Arrive On Green	0.74	0.74	0.02	0.80	0.11	0.11
Sat Flow, veh/h	3647	1578	1781	5274	1781	1585
Grp Volume(v), veh/h	1057	103	48	1595	168	82
Grp Sat Flow(s),veh/h/ln	1777	1578	1781	1702	1781	1585
Q Serve(g_s), s	13.0	2.2	0.7	11.1	11.1	5.8
Cycle Q Clear(g_c), s	13.0	2.2	0.7	11.1	11.1	5.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2642	1173	403	4068	199	177
V/C Ratio(X)	0.40	0.09	0.12	0.39	0.84	0.46
Avail Cap(c_a), veh/h	2642	1173	501	4068	386	343
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.79	0.79	1.00	1.00
Uniform Delay (d), s/veh	5.6	4.2	4.0	3.6	52.3	49.9
Incr Delay (d2), s/veh	0.5	0.1	0.0	0.2	3.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	0.6	0.2	2.9	5.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	6.1	4.4	4.1	3.8	56.0	50.6
LnGrp LOS	A	A	A	A	E	D
Approach Vol, veh/h	1160			1643	250	
Approach Delay, s/veh	5.9			3.8	54.2	
Approach LOS	A			A	D	

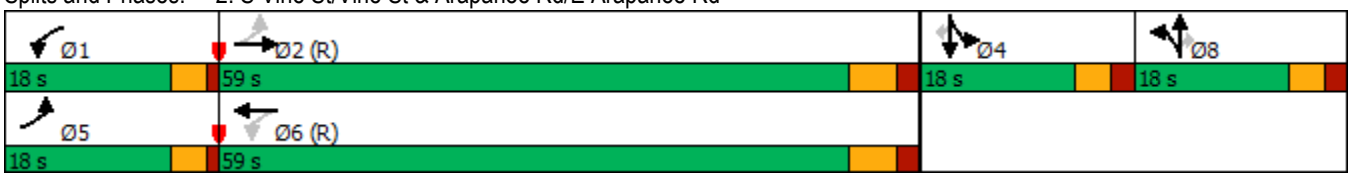
Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	6.4	95.2				101.6	18.4
Change Period (Y+Rc), s	4.0	6.0				6.0	5.0
Max Green Setting (Gmax), s	9.0	70.0				83.0	26.0
Max Q Clear Time (g_c+I1), s	2.7	15.0				13.1	13.1
Green Ext Time (p_c), s	0.0	5.6				10.8	0.3

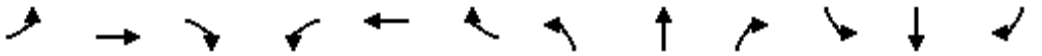
Intersection Summary	
HCM 6th Ctrl Delay	8.8
HCM 6th LOS	A

Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	63	938	128	1423	22	109	12	32
Future Volume (vph)	63	938	128	1423	22	109	12	32
Turn Type	pm+pt	NA	pm+pt	NA	NA	Perm	NA	Perm
Protected Phases	5	2	1	6	8		4	
Permitted Phases	2		6			8		4
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	3.0	17.0	3.0	17.0	5.0	5.0	5.0	5.0
Minimum Split (s)	7.0	26.0	7.0	23.0	35.0	35.0	34.0	34.0
Total Split (s)	18.0	59.0	18.0	59.0	18.0	18.0	18.0	18.0
Total Split (%)	15.9%	52.2%	15.9%	52.2%	15.9%	15.9%	15.9%	15.9%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	70.3	62.3	74.3	65.6	12.0	12.0	11.1	11.1
Actuated g/C Ratio	0.62	0.55	0.66	0.58	0.11	0.11	0.10	0.10
v/c Ratio	0.34	0.39	0.39	0.58	0.79	0.43	0.71	0.13
Control Delay	12.1	15.5	10.6	16.9	77.7	13.7	70.9	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.1	15.5	10.6	16.9	77.7	13.7	70.9	1.1
LOS	B	B	B	B	E	B	E	A
Approach Delay		15.3		16.4	49.9		55.9	
Approach LOS		B		B	D		E	

Intersection Summary	
Cycle Length: 113	
Actuated Cycle Length: 113	
Offset: 28 (25%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	
Natural Cycle: 115	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 20.5	Intersection LOS: C
Intersection Capacity Utilization 64.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: S Vine St/Vine St & Arapahoe Rd/E Arapahoe Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	63	938	94	128	1423	184	121	22	109	105	12	32
Future Volume (veh/h)	63	938	94	128	1423	184	121	22	109	105	12	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	66	987	99	135	1498	194	127	23	115	111	13	34
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	233	2745	275	394	2750	356	156	28	159	144	17	138
Arrive On Green	0.03	0.58	0.58	0.05	0.60	0.60	0.10	0.10	0.10	0.09	0.09	0.09
Sat Flow, veh/h	1781	4714	472	1781	4572	591	1519	275	1543	1603	188	1537
Grp Volume(v), veh/h	66	712	374	135	1115	577	150	0	115	124	0	34
Grp Sat Flow(s),veh/h/ln	1781	1702	1782	1781	1702	1760	1794	0	1543	1790	0	1537
Q Serve(g_s), s	1.7	12.5	12.5	3.4	21.9	22.0	9.2	0.0	8.2	7.7	0.0	2.3
Cycle Q Clear(g_c), s	1.7	12.5	12.5	3.4	21.9	22.0	9.2	0.0	8.2	7.7	0.0	2.3
Prop In Lane	1.00		0.26	1.00		0.34	0.85		1.00	0.90		1.00
Lane Grp Cap(c), veh/h	233	1982	1038	394	2048	1059	184	0	159	161	0	138
V/C Ratio(X)	0.28	0.36	0.36	0.34	0.54	0.55	0.81	0.00	0.73	0.77	0.00	0.25
Avail Cap(c_a), veh/h	403	1982	1038	529	2048	1059	206	0	178	206	0	177
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)	0.92	0.92	0.92	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.1	12.5	12.5	9.2	13.3	13.4	49.6	0.0	49.1	50.3	0.0	47.9
Incr Delay (d2), s/veh	0.2	0.5	0.9	0.2	1.0	2.0	17.5	0.0	9.8	9.2	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	4.6	5.0	1.2	8.1	8.7	5.1	0.0	3.6	3.8	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.3	12.9	13.4	9.4	14.4	15.4	67.2	0.0	58.9	59.5	0.0	48.2
LnGrp LOS	B	B	B	A	B	B	E	A	E	E	A	D
Approach Vol, veh/h		1152			1827			265			158	
Approach Delay, s/veh		13.0			14.3			63.6			57.1	
Approach LOS		B			B			E			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.4	71.8		15.2	7.3	74.0		16.6				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	14.0	53.0		13.0	14.0	53.0		13.0				
Max Q Clear Time (g_c+I1), s	5.4	14.5		9.7	3.7	24.0		11.2				
Green Ext Time (p_c), s	0.1	5.3		0.1	0.0	9.6		0.1				

Intersection Summary			
HCM 6th Ctrl Delay		19.7	
HCM 6th LOS		B	

Notes

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

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	27	1084	40	65	1634	7	0	0	152	0	0	102
Future Vol, veh/h	27	1084	40	65	1634	7	0	0	152	0	0	102
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	150	-	0	100	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	1118	41	67	1685	7	0	0	157	0	0	105

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1692	0	0	1159	0	0	-	-	559	-	-	846
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	5.34	-	-	5.34	-	-	-	-	7.14	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	-	-	3.92	-	-	3.92
Pot Cap-1 Maneuver	*682	-	-	*856	-	-	0	0	*681	0	0	*542
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %	1	-	-	1	-	-			1			1
Mov Cap-1 Maneuver	*682	-	-	*856	-	-	-	-	*681	-	-	*542
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.4	11.9	13.2
HCM LOS			B	B

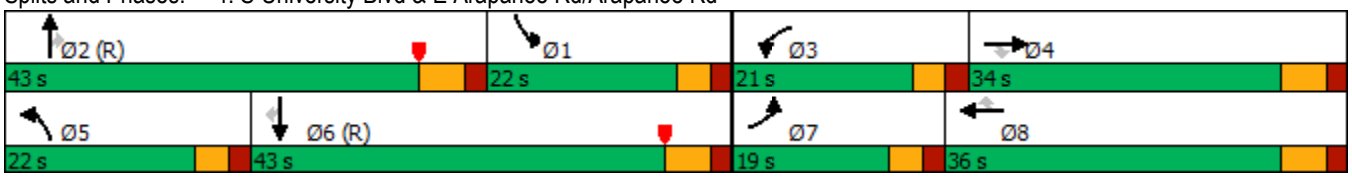
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	681	* 682	-	-	* 856	-	-	542
HCM Lane V/C Ratio	0.23	0.041	-	-	0.078	-	-	0.194
HCM Control Delay (s)	11.9	10.5	-	-	9.6	-	-	13.2
HCM Lane LOS	B	B	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.9	0.1	-	-	0.3	-	-	0.7

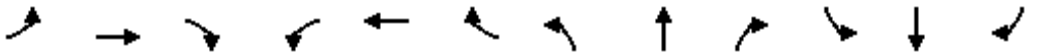
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	315	704	239	322	1151	418	283	1159	196	312	1289	296
Future Volume (vph)	315	704	239	322	1151	418	283	1159	196	312	1289	296
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	10.0	10.0	3.0	10.0	10.0
Minimum Split (s)	8.0	39.0	39.0	8.0	37.0	37.0	8.0	35.0	35.0	8.0	40.0	40.0
Total Split (s)	19.0	34.0	34.0	21.0	36.0	36.0	22.0	43.0	43.0	22.0	43.0	43.0
Total Split (%)	15.8%	28.3%	28.3%	17.5%	30.0%	30.0%	18.3%	35.8%	35.8%	18.3%	35.8%	35.8%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	13.4	29.0	29.0	14.3	29.9	29.9	14.1	37.7	37.7	17.0	40.6	40.6
Actuated g/C Ratio	0.11	0.24	0.24	0.12	0.25	0.25	0.12	0.31	0.31	0.14	0.34	0.34
v/c Ratio	0.84	0.59	0.44	0.80	0.93	0.70	0.72	0.74	0.32	0.65	0.76	0.43
Control Delay	72.0	42.6	7.3	66.6	57.0	19.5	48.0	35.5	7.6	55.8	39.6	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.0	42.6	7.3	66.6	57.0	19.5	48.0	35.5	7.6	55.8	39.6	7.7
LOS	E	D	A	E	E	B	D	D	A	E	D	A
Approach Delay		43.3			50.3			34.3			37.3	
Approach LOS		D			D			C			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 103 (86%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 105	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 41.4	Intersection LOS: D
Intersection Capacity Utilization 82.6%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 4: S University Blvd & E Arapahoe Rd/Arapahoe Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	315	704	239	322	1151	418	283	1159	196	312	1289	296
Future Volume (veh/h)	315	704	239	322	1151	418	283	1159	196	312	1289	296
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	321	718	244	329	1174	0	289	1183	200	318	1315	302
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	375	1246	384	385	1261		349	1574	486	500	1840	569
Arrive On Green	0.11	0.24	0.24	0.11	0.25	0.00	0.10	0.31	0.31	0.14	0.36	0.36
Sat Flow, veh/h	3456	5106	1575	3456	5106	1585	3456	5106	1577	3456	5106	1578
Grp Volume(v), veh/h	321	718	244	329	1174	0	289	1183	200	318	1315	302
Grp Sat Flow(s),veh/h/ln	1728	1702	1575	1728	1702	1585	1728	1702	1577	1728	1702	1578
Q Serve(g_s), s	11.0	14.8	16.6	11.2	27.0	0.0	9.8	25.0	8.5	10.4	26.6	18.2
Cycle Q Clear(g_c), s	11.0	14.8	16.6	11.2	27.0	0.0	9.8	25.0	8.5	10.4	26.6	18.2
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	375	1246	384	385	1261		349	1574	486	500	1840	569
V/C Ratio(X)	0.86	0.58	0.63	0.86	0.93		0.83	0.75	0.41	0.64	0.71	0.53
Avail Cap(c_a), veh/h	403	1246	384	461	1277		490	1574	486	500	1840	569
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.6	39.9	40.6	52.4	44.2	0.0	52.9	37.4	16.4	48.4	33.1	30.4
Incr Delay (d2), s/veh	14.6	0.4	2.6	11.2	11.9	0.0	5.7	3.4	2.6	2.1	2.4	3.5
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	5.5	6.2	6.7	5.4	12.6	0.0	4.5	10.6	3.4	4.5	11.0	7.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.2	40.3	43.2	63.5	56.1	0.0	58.7	40.7	19.0	50.4	35.5	33.9
LnGrp LOS	E	D	D	E	E		E	D	B	D	D	C
Approach Vol, veh/h		1283			1503	A		1672			1935	
Approach Delay, s/veh		47.6			57.7			41.2			37.7	
Approach LOS		D			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.4	43.0	18.4	35.3	17.1	49.2	18.0	35.6
Change Period (Y+Rc), s	6.0	* 6	5.0	6.0	5.0	6.0	5.0	6.0
Max Green Setting (Gmax), s	17.0	* 37	16.0	28.0	17.0	37.0	14.0	30.0
Max Q Clear Time (g_c+I1), s	12.4	27.0	13.2	18.6	11.8	28.6	13.0	29.0
Green Ext Time (p_c), s	0.2	7.9	0.1	2.7	0.3	7.2	0.1	0.6

Intersection Summary	
HCM 6th Ctrl Delay	45.3
HCM 6th LOS	D

Notes

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

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

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	189	0	0	41	0	1615	18	0	1733	118
Future Vol, veh/h	0	0	189	0	0	41	0	1615	18	0	1733	118
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	-	-	0	-	-	0	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	203	0	0	44	0	1737	19	0	1863	127

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	932	-	-	878	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	*524	0	0	250	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %			1					-	-		-	-
Mov Cap-1 Maneuver	-	-	*524	-	-	250	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.2	22.5	0	0
HCM LOS	C	C		

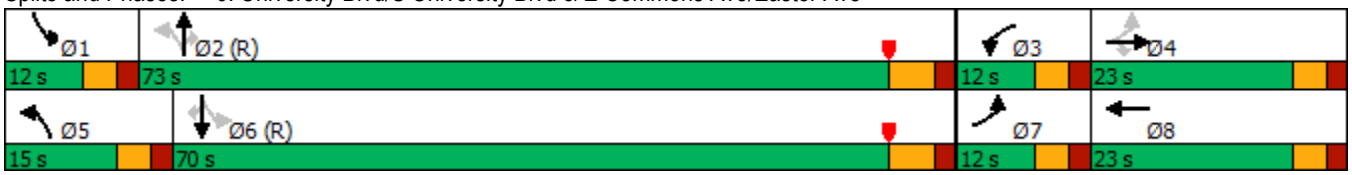
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	524	250	-	-
HCM Lane V/C Ratio	-	-	0.388	0.176	-	-
HCM Control Delay (s)	-	-	16.2	22.5	-	-
HCM Lane LOS	-	-	C	C	-	-
HCM 95th %tile Q(veh)	-	-	1.8	0.6	-	-

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

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	158	33	142	63	68	272	1430	43	68	1666	171
Future Volume (vph)	158	33	142	63	68	272	1430	43	68	1666	171
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases	4		4			2		2	6		6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	3.0	3.0	3.0	4.0	3.0	3.0	5.0	5.0	3.0	5.0	5.0
Minimum Split (s)	8.0	35.0	35.0	9.0	32.0	8.0	24.0	24.0	8.0	29.0	29.0
Total Split (s)	12.0	23.0	23.0	12.0	23.0	15.0	73.0	73.0	12.0	70.0	70.0
Total Split (%)	10.0%	19.2%	19.2%	10.0%	19.2%	12.5%	60.8%	60.8%	10.0%	58.3%	58.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	20.3	14.7	14.7	6.9	12.3	84.7	75.7	75.7	76.5	69.7	69.7
Actuated g/C Ratio	0.17	0.12	0.12	0.06	0.10	0.71	0.63	0.63	0.64	0.58	0.58
v/c Ratio	0.42	0.15	0.49	0.66	0.60	1.38	0.68	0.04	0.36	0.86	0.19
Control Delay	42.4	48.1	17.1	85.1	52.5	227.7	14.2	0.1	11.9	26.2	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.4	48.1	17.1	85.1	52.5	227.7	14.2	0.1	11.9	26.2	2.9
LOS	D	D	B	F	D	F	B	A	B	C	A
Approach Delay		32.2			64.3		47.1			23.6	
Approach LOS		C			E		D			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 74 (62%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 145	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.38	
Intersection Signal Delay: 35.9	Intersection LOS: D
Intersection Capacity Utilization 87.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 6: University Blvd/S University Blvd & E Commons Ave/Easter Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	158	33	142	63	68	43	272	1430	43	68	1666	171
Future Volume (veh/h)	158	33	142	63	68	43	272	1430	43	68	1666	171
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		1.00	1.00		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	168	35	0	67	72	46	289	1521	46	72	1772	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	415	215		86	110	70	251	2245	997	304	2056	
Arrive On Green	0.06	0.11	0.00	0.05	0.10	0.10	0.17	1.00	1.00	0.03	0.58	0.00
Sat Flow, veh/h	3456	1870	1585	1781	1052	672	1781	3554	1579	1781	3554	1585
Grp Volume(v), veh/h	168	35	0	67	0	118	289	1521	46	72	1772	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1781	0	1724	1781	1777	1579	1781	1777	1585
Q Serve(g_s), s	5.1	2.0	0.0	4.5	0.0	7.9	10.0	0.0	0.0	2.0	50.3	0.0
Cycle Q Clear(g_c), s	5.1	2.0	0.0	4.5	0.0	7.9	10.0	0.0	0.0	2.0	50.3	0.0
Prop In Lane	1.00		1.00	1.00		0.39	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	415	215		86	0	181	251	2245	997	304	2056	
V/C Ratio(X)	0.40	0.16		0.78	0.00	0.65	1.15	0.68	0.05	0.24	0.86	
Avail Cap(c_a), veh/h	415	281		104	0	259	251	2245	997	354	2056	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	44.4	47.9	0.0	56.5	0.0	51.6	30.5	0.0	0.0	9.6	21.3	0.0
Incr Delay (d2), s/veh	0.2	0.1	0.0	26.2	0.0	1.5	103.3	1.7	0.1	0.1	5.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	1.0	0.0	2.6	0.0	3.5	13.8	0.5	0.0	0.7	20.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.7	48.0	0.0	82.7	0.0	53.1	133.9	1.7	0.1	9.7	26.3	0.0
LnGrp LOS	D	D		F	A	D	F	A	A	A	C	
Approach Vol, veh/h		203	A		185			1856			1844	A
Approach Delay, s/veh		45.3			63.8			22.2			25.7	
Approach LOS		D			E			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.6	81.8	10.8	18.8	15.0	75.4	12.0	17.6
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	67.0	7.0	18.0	10.0	64.0	7.0	18.0
Max Q Clear Time (g_c+I1), s	4.0	2.0	6.5	4.0	12.0	52.3	7.1	9.9
Green Ext Time (p_c), s	0.0	38.0	0.0	0.1	0.0	10.7	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	26.8
HCM 6th LOS	C

Notes

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

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	53	0	1779	1836	34
Future Vol, veh/h	0	53	0	1779	1836	34
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	57	0	1913	1974	37

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	987	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	*312	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %		1		-	-	-
Mov Cap-1 Maneuver	-	*312	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19.1	0	0
HCM LOS	C		

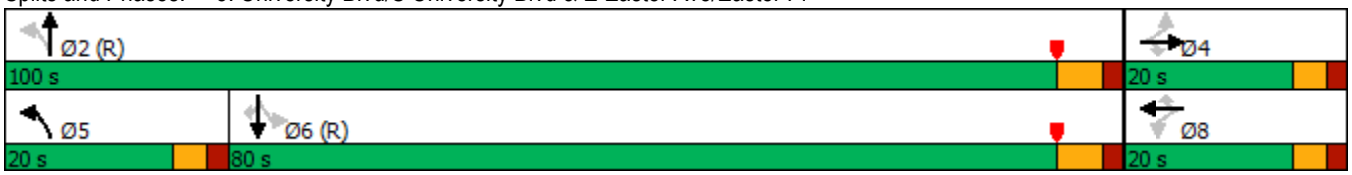
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	312	-	-
HCM Lane V/C Ratio	-	0.183	-	-
HCM Control Delay (s)	-	19.1	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.7	-	-

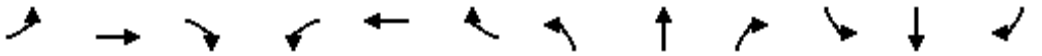
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	96	22	114	56	24	25	134	1635	27	1783	80
Future Volume (vph)	96	22	114	56	24	25	134	1635	27	1783	80
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm
Protected Phases		4			8		5	2		6	
Permitted Phases	4		4	8		8	2		6		6
Detector Phase	4	4	4	8	8	8	5	2	6	6	6
Switch Phase											
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	5.0
Minimum Split (s)	36.0	36.0	36.0	40.0	40.0	40.0	8.0	29.0	32.0	32.0	32.0
Total Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	100.0	80.0	80.0	80.0
Total Split (%)	16.7%	16.7%	16.7%	16.7%	16.7%	16.7%	16.7%	83.3%	66.7%	66.7%	66.7%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.0	6.0	6.0	6.0
Lead/Lag							Lead		Lag	Lag	Lag
Lead-Lag Optimize?							Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	12.3	12.3	12.3	12.3	12.3	12.3	97.7	96.7	82.7	82.7	82.7
Actuated g/C Ratio	0.10	0.10	0.10	0.10	0.10	0.10	0.81	0.81	0.69	0.69	0.69
v/c Ratio	0.73	0.12	0.45	0.43	0.14	0.12	0.68	0.64	0.19	0.78	0.08
Control Delay	80.6	48.8	14.1	59.1	49.1	1.1	35.7	6.1	7.0	6.4	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.6	48.8	14.1	59.1	49.1	1.1	35.7	6.1	7.0	6.4	1.0
LOS	F	D	B	E	D	A	D	A	A	A	A
Approach Delay		44.9			42.9			8.3		6.2	
Approach LOS		D			D			A		A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 82 (68%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 110	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 10.3	Intersection LOS: B
Intersection Capacity Utilization 83.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 8: University Blvd/S University Blvd & E Easter Ave/Easter Pl





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	96	22	114	56	24	25	134	1635	59	27	1783	80
Future Volume (veh/h)	96	22	114	56	24	25	134	1635	59	27	1783	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.98		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	102	23	121	60	26	27	143	1739	63	29	1897	85
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	190	207	171	182	207	171	283	2790	101	216	2556	1134
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.04	0.80	0.80	1.00	1.00	1.00
Sat Flow, veh/h	1322	1870	1546	1221	1870	1546	1781	3498	126	261	3554	1577
Grp Volume(v), veh/h	102	23	121	60	26	27	143	879	923	29	1897	85
Grp Sat Flow(s),veh/h/ln	1322	1870	1546	1221	1870	1546	1781	1777	1847	261	1777	1577
Q Serve(g_s), s	9.0	1.3	9.1	5.6	1.5	1.9	2.4	23.8	24.2	2.7	0.0	0.0
Cycle Q Clear(g_c), s	10.5	1.3	9.1	6.9	1.5	1.9	2.4	23.8	24.2	17.5	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	190	207	171	182	207	171	283	1417	1473	216	2556	1134
V/C Ratio(X)	0.54	0.11	0.71	0.33	0.13	0.16	0.51	0.62	0.63	0.13	0.74	0.07
Avail Cap(c_a), veh/h	209	234	193	199	234	193	440	1417	1473	216	2556	1134
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.9	48.0	51.5	51.2	48.1	48.3	3.4	4.9	4.9	1.5	0.0	0.0
Incr Delay (d2), s/veh	0.9	0.1	7.5	0.4	0.1	0.2	0.5	2.1	2.0	1.3	2.0	0.1
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	3.1	0.6	3.9	1.7	0.7	0.7	0.7	6.4	6.7	0.1	0.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.8	48.1	59.0	51.5	48.2	48.5	3.9	6.9	6.9	2.8	2.0	0.1
LnGrp LOS	D	D	E	D	D	D	A	A	A	A	A	A
Approach Vol, veh/h		246			113			1945			2011	
Approach Delay, s/veh		55.8			50.0			6.7			1.9	
Approach LOS		E			D			A			A	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		101.7		18.3	9.4	92.3		18.3				
Change Period (Y+Rc), s		6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s		94.0		15.0	15.0	74.0		15.0				
Max Q Clear Time (g_c+I1), s		26.2		12.5	4.4	19.5		8.9				
Green Ext Time (p_c), s		47.7		0.1	0.1	45.2		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			8.4									
HCM 6th LOS			A									

Notes

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

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	185	18	11	236	10	14
Future Vol, veh/h	185	18	11	236	10	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	203	20	12	259	11	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	223	0	496	213
Stage 1	-	-	-	-	213	-
Stage 2	-	-	-	-	283	-
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	-	-	1346	-	533	827
Stage 1	-	-	-	-	823	-
Stage 2	-	-	-	-	765	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1346	-	528	827
Mov Cap-2 Maneuver	-	-	-	-	528	-
Stage 1	-	-	-	-	823	-
Stage 2	-	-	-	-	757	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	10.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	669	-	-	1346	-
HCM Lane V/C Ratio	0.039	-	-	0.009	-
HCM Control Delay (s)	10.6	-	-	7.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	23	167	181	50	71	19
Future Vol, veh/h	23	167	181	50	71	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	182	197	54	77	21

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	251	0	-	0	456	224
Stage 1	-	-	-	-	224	-
Stage 2	-	-	-	-	232	-
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	1314	-	-	-	562	815
Stage 1	-	-	-	-	813	-
Stage 2	-	-	-	-	807	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1314	-	-	-	550	815
Mov Cap-2 Maneuver	-	-	-	-	550	-
Stage 1	-	-	-	-	796	-
Stage 2	-	-	-	-	807	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	12.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1314	-	-	-	591
HCM Lane V/C Ratio	0.019	-	-	-	0.166
HCM Control Delay (s)	7.8	0	-	-	12.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.6

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	175	16	10	190	17	15
Future Vol, veh/h	175	16	10	190	17	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	194	18	11	211	19	17

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	212	0	436	203
Stage 1	-	-	-	-	203	-
Stage 2	-	-	-	-	233	-
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	-	-	1358	-	578	838
Stage 1	-	-	-	-	831	-
Stage 2	-	-	-	-	806	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1358	-	573	838
Mov Cap-2 Maneuver	-	-	-	-	573	-
Stage 1	-	-	-	-	831	-
Stage 2	-	-	-	-	799	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	10.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	673	-	-	1358	-
HCM Lane V/C Ratio	0.053	-	-	0.008	-
HCM Control Delay (s)	10.6	-	-	7.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	27	125	145	54	67	33
Future Vol, veh/h	27	125	145	54	67	33
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	137	159	59	74	36
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8.6	8.7	8.5
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	18%	0%	67%
Vol Thru, %	82%	73%	0%
Vol Right, %	0%	27%	33%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	152	199	100
LT Vol	27	0	67
Through Vol	125	145	0
RT Vol	0	54	33
Lane Flow Rate	167	219	110
Geometry Grp	1	1	1
Degree of Util (X)	0.207	0.256	0.144
Departure Headway (Hd)	4.464	4.222	4.714
Convergence, Y/N	Yes	Yes	Yes
Cap	805	853	762
Service Time	2.483	2.24	2.738
HCM Lane V/C Ratio	0.207	0.257	0.144
HCM Control Delay	8.6	8.7	8.5
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.8	1	0.5

Intersection	
Int Delay, s/veh	7.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	9	98	77	4	61	90
Future Vol, veh/h	9	98	77	4	61	90
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	76	25	76	76	76	76
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	392	101	5	80	118

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	382	104	0	0	106	0
Stage 1	104	-	-	-	-	-
Stage 2	278	-	-	-	-	-
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	620	951	-	-	1485	-
Stage 1	920	-	-	-	-	-
Stage 2	769	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	584	951	-	-	1485	-
Mov Cap-2 Maneuver	584	-	-	-	-	-
Stage 1	920	-	-	-	-	-
Stage 2	724	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.8	0	3.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	934	1485	-
HCM Lane V/C Ratio	-	-	0.432	0.054	-
HCM Control Delay (s)	-	-	11.8	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	2.2	0.2	-

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	32	6	2	13	12	59	4	167	4	11	136	42
Future Vol, veh/h	32	6	2	13	12	59	4	167	4	11	136	42
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	76	76	76	76	76	76	76	76	76	76	76	76
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	42	8	3	17	16	78	5	220	5	14	179	55

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	515	470	207	473	495	223	234	0	0	225	0	0
Stage 1	235	235	-	233	233	-	-	-	-	-	-	-
Stage 2	280	235	-	240	262	-	-	-	-	-	-	-
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	470	492	833	501	476	817	1333	-	-	1344	-	-
Stage 1	768	710	-	770	712	-	-	-	-	-	-	-
Stage 2	727	710	-	763	691	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	409	484	833	487	468	817	1333	-	-	1344	-	-
Mov Cap-2 Maneuver	409	484	-	487	468	-	-	-	-	-	-	-
Stage 1	765	701	-	767	709	-	-	-	-	-	-	-
Stage 2	641	707	-	743	683	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.5	11.4	0.2	0.4
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1333	-	-	430	674	1344	-	-
HCM Lane V/C Ratio	0.004	-	-	0.122	0.164	0.011	-	-
HCM Control Delay (s)	7.7	0	-	14.5	11.4	7.7	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0.6	0	-	-

Intersection	
Int Delay, s/veh	3.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	67	51	188	68	22	122
Future Vol, veh/h	67	51	188	68	22	122
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	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	80	61	224	81	26	145

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	462	265	0	0	305	0
Stage 1	265	-	-	-	-	-
Stage 2	197	-	-	-	-	-
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	558	774	-	-	1256	-
Stage 1	779	-	-	-	-	-
Stage 2	836	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	545	774	-	-	1256	-
Mov Cap-2 Maneuver	545	-	-	-	-	-
Stage 1	779	-	-	-	-	-
Stage 2	817	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.4	0	1.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	625	1256	-
HCM Lane V/C Ratio	-	-	0.225	0.021	-
HCM Control Delay (s)	-	-	12.4	7.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.9	0.1	-

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	35	203	184	53	31	37
Future Vol, veh/h	35	203	184	53	31	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	38	221	200	58	34	40

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	258	0	-	0	526	229
Stage 1	-	-	-	-	229	-
Stage 2	-	-	-	-	297	-
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	1307	-	-	-	512	810
Stage 1	-	-	-	-	809	-
Stage 2	-	-	-	-	754	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1307	-	-	-	495	810
Mov Cap-2 Maneuver	-	-	-	-	495	-
Stage 1	-	-	-	-	782	-
Stage 2	-	-	-	-	754	-

Approach	EB	WB	SB
HCM Control Delay, s	1.2	0	11.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1307	-	-	-	628
HCM Lane V/C Ratio	0.029	-	-	-	0.118
HCM Control Delay (s)	7.8	0	-	-	11.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1390	116	58	925	112	42
Future Volume (vph)	1390	116	58	925	112	42
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	17.0	17.0	3.0	17.0	5.0	5.0
Minimum Split (s)	23.0	23.0	7.0	23.0	30.0	30.0
Total Split (s)	76.0	76.0	12.0	88.0	32.0	32.0
Total Split (%)	63.3%	63.3%	10.0%	73.3%	26.7%	26.7%
Yellow Time (s)	4.0	4.0	3.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effct Green (s)	87.6	87.6	97.3	95.3	13.7	13.7
Actuated g/C Ratio	0.73	0.73	0.81	0.79	0.11	0.11
v/c Ratio	0.55	0.11	0.21	0.23	0.57	0.20
Control Delay	9.7	4.1	4.8	1.3	59.7	14.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.7	4.1	4.8	1.3	59.7	14.4
LOS	A	A	A	A	E	B
Approach Delay	9.3			1.5	47.3	
Approach LOS	A			A	D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 111 (93%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.57	
Intersection Signal Delay: 8.6	Intersection LOS: A
Intersection Capacity Utilization 62.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: Race St & Arapahoe Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1390	116	58	925	112	42
Future Volume (veh/h)	1390	116	58	925	112	42
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1418	118	59	944	114	43
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2746	1219	309	4226	144	128
Arrive On Green	0.77	0.77	0.02	0.83	0.08	0.08
Sat Flow, veh/h	3647	1578	1781	5274	1781	1585
Grp Volume(v), veh/h	1418	118	59	944	114	43
Grp Sat Flow(s),veh/h/ln	1777	1578	1781	1702	1781	1585
Q Serve(g_s), s	18.1	2.2	0.8	4.7	7.5	3.1
Cycle Q Clear(g_c), s	18.1	2.2	0.8	4.7	7.5	3.1
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2746	1219	309	4226	144	128
V/C Ratio(X)	0.52	0.10	0.19	0.22	0.79	0.34
Avail Cap(c_a), veh/h	2746	1219	389	4226	401	357
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.95	0.95	1.00	1.00
Uniform Delay (d), s/veh	5.2	3.3	4.3	2.2	54.2	52.1
Incr Delay (d2), s/veh	0.7	0.2	0.1	0.1	3.7	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.3	0.6	0.2	1.1	3.5	1.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	5.9	3.5	4.4	2.3	57.9	52.7
LnGrp LOS	A	A	A	A	E	D
Approach Vol, veh/h	1536			1003	157	
Approach Delay, s/veh	5.7			2.4	56.5	
Approach LOS	A			A	E	

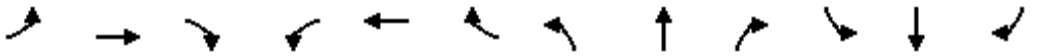
Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	6.6	98.7				105.3	14.7
Change Period (Y+Rc), s	4.0	6.0				6.0	5.0
Max Green Setting (Gmax), s	8.0	70.0				82.0	27.0
Max Q Clear Time (g_c+I1), s	2.8	20.1				6.7	9.5
Green Ext Time (p_c), s	0.0	8.9				5.0	0.2

Intersection Summary							
HCM 6th Ctrl Delay			7.4				
HCM 6th LOS			A				

Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	42	1326	92	911	5	45	9	32
Future Volume (vph)	42	1326	92	911	5	45	9	32
Turn Type	pm+pt	NA	pm+pt	NA	NA	Perm	NA	Perm
Protected Phases	5	2	1	6	8		4	
Permitted Phases	2		6			8		4
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	3.0	17.0	3.0	17.0	5.0	5.0	5.0	5.0
Minimum Split (s)	7.0	26.0	7.0	23.0	35.0	35.0	34.0	34.0
Total Split (s)	12.0	72.0	12.0	72.0	18.0	18.0	18.0	18.0
Total Split (%)	10.0%	60.0%	10.0%	60.0%	15.0%	15.0%	15.0%	15.0%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	82.3	74.9	85.2	77.7	8.3	8.3	12.4	12.4
Actuated g/C Ratio	0.69	0.62	0.71	0.65	0.07	0.07	0.10	0.10
v/c Ratio	0.12	0.46	0.37	0.33	0.41	0.23	0.84	0.13
Control Delay	7.0	11.4	14.1	11.6	62.3	2.5	87.7	1.1
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.0	11.4	14.1	11.6	62.3	2.5	87.7	1.1
LOS	A	B	B	B	E	A	F	A
Approach Delay		11.3		11.8	33.3		72.0	
Approach LOS		B		B	C		E	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 102 (85%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	
Natural Cycle: 115	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 16.0	Intersection LOS: B
Intersection Capacity Utilization 60.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Vine St & Arapahoe Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	1326	60	92	911	113	43	5	45	137	9	32
Future Volume (veh/h)	42	1326	60	92	911	113	43	5	45	137	9	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.95	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	44	1396	63	97	959	119	45	5	47	144	9	34
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	430	3213	145	355	3021	374	89	10	83	172	11	157
Arrive On Green	0.04	1.00	1.00	0.07	1.00	1.00	0.05	0.05	0.05	0.10	0.10	0.10
Sat Flow, veh/h	1781	5006	226	1781	4599	569	1611	179	1507	1681	105	1543
Grp Volume(v), veh/h	44	949	510	97	709	369	50	0	47	153	0	34
Grp Sat Flow(s),veh/h/ln	1781	1702	1828	1781	1702	1764	1790	0	1507	1786	0	1543
Q Serve(g_s), s	1.0	0.0	0.0	2.3	0.0	0.0	3.3	0.0	3.7	10.1	0.0	2.4
Cycle Q Clear(g_c), s	1.0	0.0	0.0	2.3	0.0	0.0	3.3	0.0	3.7	10.1	0.0	2.4
Prop In Lane	1.00		0.12	1.00		0.32	0.90		1.00	0.94		1.00
Lane Grp Cap(c), veh/h	430	2184	1173	355	2236	1159	98	0	83	182	0	157
V/C Ratio(X)	0.10	0.43	0.43	0.27	0.32	0.32	0.51	0.00	0.57	0.84	0.00	0.22
Avail Cap(c_a), veh/h	514	2184	1173	412	2236	1159	194	0	163	194	0	167
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.83	0.83	0.83	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.9	0.0	0.0	6.4	0.0	0.0	55.1	0.0	55.3	52.9	0.0	49.5
Incr Delay (d2), s/veh	0.0	0.5	1.0	0.2	0.4	0.7	1.5	0.0	2.3	23.8	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.2	0.3	0.8	0.1	0.2	1.5	0.0	1.5	5.7	0.0	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.0	0.5	1.0	6.6	0.4	0.7	56.6	0.0	57.6	76.7	0.0	49.7
LnGrp LOS	A	A	A	A	A	A	E	A	E	E	A	D
Approach Vol, veh/h		1503			1175			97			187	
Approach Delay, s/veh		0.9			1.0			57.1			71.8	
Approach LOS		A			A			E			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.2	83.0		17.2	6.3	84.8		11.6				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	8.0	66.0		13.0	8.0	66.0		13.0				
Max Q Clear Time (g_c+I1), s	4.3	2.0		12.1	3.0	2.0		5.7				
Green Ext Time (p_c), s	0.0	8.3		0.1	0.0	5.4		0.1				

Intersection Summary		
HCM 6th Ctrl Delay		7.2
HCM 6th LOS		A

Notes

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

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	1434	28	20	1032	6	0	0	51	0	0	16
Future Vol, veh/h	18	1434	28	20	1032	6	0	0	51	0	0	16
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	150	-	0	100	-	-	-	-	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	20	1559	30	22	1122	7	0	0	55	0	0	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1129	0	0	1589	0	0	-	-	780	-	-	565
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	5.34	-	-	5.34	-	-	-	-	7.14	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	-	-	3.92	-	-	3.92
Pot Cap-1 Maneuver	830	-	-	*737	-	-	0	0	*586	0	0	*694
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %	1	-	-	1	-	-			1			1
Mov Cap-1 Maneuver	830	-	-	*737	-	-	-	-	*586	-	-	*694
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.2	11.8	10.3
HCM LOS			B	B

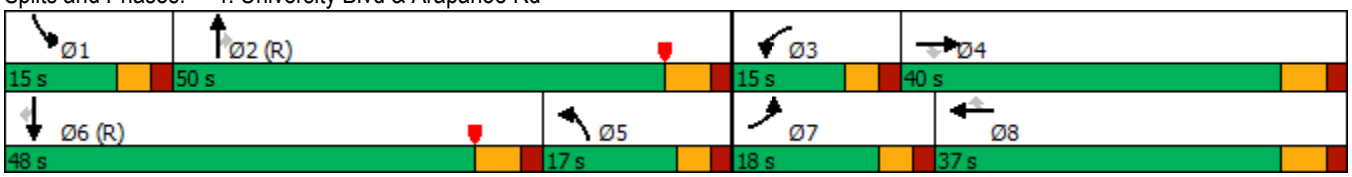
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	586	830	-	-	* 737	-	-	694
HCM Lane V/C Ratio	0.095	0.024	-	-	0.029	-	-	0.025
HCM Control Delay (s)	11.8	9.4	-	-	10	-	-	10.3
HCM Lane LOS	B	A	-	-	B	-	-	B
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0.1	-	-	0.1

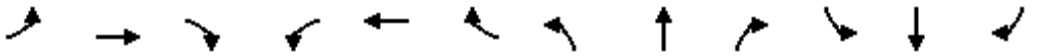
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	214	1071	232	263	617	402	274	1306	204	249	922	191
Future Volume (vph)	214	1071	232	263	617	402	274	1306	204	249	922	191
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	10.0	10.0	3.0	10.0	10.0
Minimum Split (s)	8.0	39.0	39.0	8.0	37.0	37.0	8.0	35.0	35.0	8.0	40.0	40.0
Total Split (s)	18.0	40.0	40.0	15.0	37.0	37.0	17.0	50.0	50.0	15.0	48.0	48.0
Total Split (%)	15.0%	33.3%	33.3%	12.5%	30.8%	30.8%	14.2%	41.7%	41.7%	12.5%	40.0%	40.0%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	11.2	31.8	31.8	10.0	30.6	30.6	12.0	46.2	46.2	10.0	44.2	44.2
Actuated g/C Ratio	0.09	0.26	0.26	0.08	0.26	0.26	0.10	0.38	0.38	0.08	0.37	0.37
v/c Ratio	0.70	0.83	0.42	0.96	0.50	0.75	0.83	0.70	0.29	0.91	0.51	0.29
Control Delay	56.5	59.8	21.8	98.5	39.5	30.2	58.5	24.0	2.4	88.5	31.1	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.5	59.8	21.8	98.5	39.5	30.2	58.5	24.0	2.4	88.5	31.1	4.8
LOS	E	E	C	F	D	C	E	C	A	F	C	A
Approach Delay		53.5			48.7			26.8			37.9	
Approach LOS		D			D			C			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 38 (32%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 95	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 40.9	Intersection LOS: D
Intersection Capacity Utilization 80.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: University Blvd & Arapahoe Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	214	1071	232	263	617	402	274	1306	204	249	922	191
Future Volume (veh/h)	214	1071	232	263	617	402	274	1306	204	249	922	191
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	223	1116	242	274	643	0	285	1360	212	259	960	199
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	282	1324	409	288	1333		400	1995	617	288	1787	552
Arrive On Green	0.03	0.09	0.09	0.08	0.26	0.00	0.12	0.39	0.39	0.08	0.35	0.35
Sat Flow, veh/h	3456	5106	1576	3456	5106	1585	3456	5106	1579	3456	5106	1578
Grp Volume(v), veh/h	223	1116	242	274	643	0	285	1360	212	259	960	199
Grp Sat Flow(s),veh/h/ln	1728	1702	1576	1728	1702	1585	1728	1702	1579	1728	1702	1578
Q Serve(g_s), s	7.7	25.8	12.6	9.5	12.8	0.0	9.5	26.5	11.3	8.9	18.1	8.3
Cycle Q Clear(g_c), s	7.7	25.8	12.6	9.5	12.8	0.0	9.5	26.5	11.3	8.9	18.1	8.3
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	282	1324	409	288	1333		400	1995	617	288	1787	552
V/C Ratio(X)	0.79	0.84	0.59	0.95	0.48		0.71	0.68	0.34	0.90	0.54	0.36
Avail Cap(c_a), veh/h	374	1447	446	288	1333		400	1995	617	288	1787	552
HCM Platoon Ratio	0.33	0.33	0.33	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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.4	52.5	24.5	54.8	37.5	0.0	51.1	30.4	25.7	54.5	31.2	15.6
Incr Delay (d2), s/veh	5.8	4.0	1.0	39.6	0.1	0.0	5.1	1.9	1.5	28.1	1.2	1.8
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	3.7	12.3	5.4	5.7	5.3	0.0	4.3	10.8	4.5	4.9	7.4	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.2	56.5	25.5	94.4	37.6	0.0	56.2	32.3	27.2	82.6	32.4	17.4
LnGrp LOS	E	E	C	F	D		E	C	C	F	C	B
Approach Vol, veh/h		1581			917	A		1857			1418	
Approach Delay, s/veh		52.7			54.6			35.4			39.5	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	52.9	15.0	37.1	19.9	48.0	14.8	37.3
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0	6.0	* 6	5.0	6.0
Max Green Setting (Gmax), s	10.0	44.0	10.0	34.0	12.0	* 42	13.0	31.0
Max Q Clear Time (g_c+I1), s	10.9	28.5	11.5	27.8	11.5	20.1	9.7	14.8
Green Ext Time (p_c), s	0.0	12.3	0.0	3.1	0.0	12.6	0.1	2.7

Intersection Summary	
HCM 6th Ctrl Delay	44.2
HCM 6th LOS	D

Notes

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

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

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	85	0	0	12	0	1839	4	0	1328	68
Future Vol, veh/h	0	0	85	0	0	12	0	1839	4	0	1328	68
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	-	-	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	100	100	92	92	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	92	0	0	13	0	1839	4	0	1328	68

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	664	-	-	922	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	*610	0	0	234	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %			1					-	-		-	-
Mov Cap-1 Maneuver	-	-	*610	-	-	234	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12	21.3	0	0
HCM LOS	B	C		

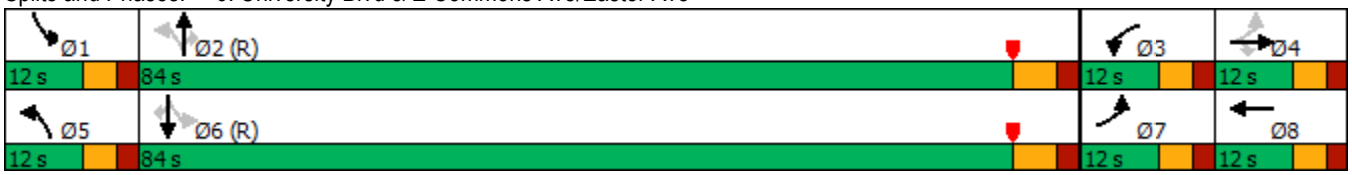
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	610	234	-	-
HCM Lane V/C Ratio	-	-	0.151	0.056	-	-
HCM Control Delay (s)	-	-	12	21.3	-	-
HCM Lane LOS	-	-	B	C	-	-
HCM 95th %tile Q(veh)	-	-	0.5	0.2	-	-

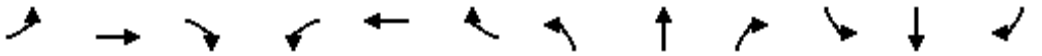
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	107	9	61	29	26	204	1676	29	25	1259	91
Future Volume (vph)	107	9	61	29	26	204	1676	29	25	1259	91
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases	4		4			2		2	6		6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	3.0	3.0	3.0	4.0	3.0	3.0	5.0	5.0	3.0	5.0	5.0
Minimum Split (s)	8.0	35.0	35.0	9.0	32.0	8.0	24.0	24.0	8.0	29.0	29.0
Total Split (s)	12.0	12.0	12.0	12.0	12.0	12.0	84.0	84.0	12.0	84.0	84.0
Total Split (%)	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	70.0%	70.0%	10.0%	70.0%	70.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	15.0	10.8	10.8	6.6	6.2	90.1	84.9	84.9	85.0	79.0	79.0
Actuated g/C Ratio	0.12	0.09	0.09	0.06	0.05	0.75	0.71	0.71	0.71	0.66	0.66
v/c Ratio	0.43	0.06	0.28	0.34	0.72	0.93	0.77	0.03	0.21	0.62	0.10
Control Delay	49.7	54.4	4.5	64.2	41.2	55.1	10.2	0.0	11.1	10.1	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay	49.7	54.4	4.5	64.2	41.2	55.1	10.4	0.0	11.1	10.1	0.5
LOS	D	D	A	E	D	E	B	A	B	B	A
Approach Delay		34.4			46.0		15.0			9.5	
Approach LOS		C			D		B			A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 50 (42%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 125	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 15.0	Intersection LOS: B
Intersection Capacity Utilization 74.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 6: University Blvd & E Commons Ave/Easter Ave





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	107	9	61	29	26	83	204	1676	29	25	1259	91
Future Volume (veh/h)	107	9	61	29	26	83	204	1676	29	25	1259	91
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		0.94	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	123	10	0	33	30	95	234	1926	33	29	1447	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	289	157		42	22	70	321	2496	1109	235	2343	
Arrive On Green	0.05	0.08	0.00	0.02	0.06	0.06	0.12	1.00	1.00	0.02	0.66	0.00
Sat Flow, veh/h	3456	1870	1585	1781	377	1194	1781	3554	1579	1781	3554	1585
Grp Volume(v), veh/h	123	10	0	33	0	125	234	1926	33	29	1447	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1781	0	1571	1781	1777	1579	1781	1777	1585
Q Serve(g_s), s	4.0	0.6	0.0	2.2	0.0	7.0	5.3	0.0	0.0	0.6	28.1	0.0
Cycle Q Clear(g_c), s	4.0	0.6	0.0	2.2	0.0	7.0	5.3	0.0	0.0	0.6	28.1	0.0
Prop In Lane	1.00		1.00	1.00		0.76	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	289	157		42	0	92	321	2496	1109	235	2343	
V/C Ratio(X)	0.43	0.06		0.79	0.00	1.36	0.73	0.77	0.03	0.12	0.62	
Avail Cap(c_a), veh/h	322	157		104	0	92	321	2496	1109	312	2343	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	49.7	50.6	0.0	58.3	0.0	56.5	13.4	0.0	0.0	6.4	11.7	0.0
Incr Delay (d2), s/veh	0.4	0.1	0.0	27.1	0.0	218.9	7.2	2.4	0.0	0.1	1.2	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	1.7	0.3	0.0	1.3	0.0	8.4	3.4	0.8	0.0	0.2	10.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.1	50.7	0.0	85.4	0.0	275.4	20.6	2.4	0.0	6.5	13.0	0.0
LnGrp LOS	D	D		F	A	F	C	A	A	A	B	
Approach Vol, veh/h		133	A		158			2193			1476	A
Approach Delay, s/veh		50.2			235.7			4.3			12.8	
Approach LOS		D			F			A			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.9	90.3	7.8	15.1	12.0	85.1	10.9	12.0
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	78.0	7.0	7.0	7.0	78.0	7.0	7.0
Max Q Clear Time (g_c+I1), s	2.6	2.0	4.2	2.6	7.3	30.1	6.0	9.0
Green Ext Time (p_c), s	0.0	57.5	0.0	0.0	0.0	29.1	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	18.3
HCM 6th LOS	B

Notes

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

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	43	0	1909	1328	21
Future Vol, veh/h	0	43	0	1909	1328	21
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	92	92	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	47	0	1909	1328	21

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	664	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	*542	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %		1		-	-	-
Mov Cap-1 Maneuver	-	*542	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.3	0	0
HCM LOS	B		

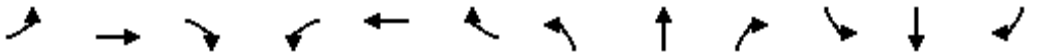
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	542	-	-
HCM Lane V/C Ratio	-	0.086	-	-
HCM Control Delay (s)	-	12.3	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.3	-	-

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

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	114	15	110	142	53	52	127	1744	14	1295	63
Future Volume (vph)	114	15	110	142	53	52	127	1744	14	1295	63
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm
Protected Phases		4			8		5	2		6	
Permitted Phases	4		4	8		8	2		6		6
Detector Phase	4	4	4	8	8	8	5	2	6	6	6
Switch Phase											
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	5.0
Minimum Split (s)	36.0	36.0	36.0	40.0	40.0	40.0	8.0	29.0	32.0	32.0	32.0
Total Split (s)	23.0	23.0	23.0	23.0	23.0	23.0	12.0	97.0	85.0	85.0	85.0
Total Split (%)	19.2%	19.2%	19.2%	19.2%	19.2%	19.2%	10.0%	80.8%	70.8%	70.8%	70.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.0	6.0	6.0	6.0
Lead/Lag							Lead		Lag	Lag	Lag
Lead-Lag Optimize?							Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	16.3	16.3	16.3	16.3	16.3	16.3	93.7	92.7	81.5	81.5	81.5
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.14	0.14	0.78	0.77	0.68	0.68	0.68
v/c Ratio	0.72	0.07	0.39	0.86	0.24	0.21	0.55	0.75	0.18	0.61	0.07
Control Delay	71.2	44.7	11.6	87.0	47.9	8.7	11.7	9.9	6.0	3.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.2	44.7	11.6	87.0	47.9	8.7	11.7	9.9	6.0	3.5	0.1
LOS	E	D	B	F	D	A	B	A	A	A	A
Approach Delay		42.1			62.2			10.0		3.4	
Approach LOS		D			E			B		A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 66 (55%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 13.1	Intersection LOS: B
Intersection Capacity Utilization 85.6%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 8: University Blvd & Easter Pl



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	114	15	110	142	53	52	127	1744	70	14	1295	63
Future Volume (veh/h)	114	15	110	142	53	52	127	1744	70	14	1295	63
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.98	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	128	17	124	160	60	58	143	1960	79	16	1455	71
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	213	281	233	235	281	233	362	2641	106	152	2405	1067
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.04	0.76	0.76	1.00	1.00	1.00
Sat Flow, veh/h	1256	1870	1557	1230	1870	1557	1781	3482	139	207	3554	1577
Grp Volume(v), veh/h	128	17	124	160	60	58	143	993	1046	16	1455	71
Grp Sat Flow(s),veh/h/ln	1256	1870	1557	1230	1870	1557	1781	1777	1845	207	1777	1577
Q Serve(g_s), s	12.0	0.9	8.8	15.4	3.4	3.9	2.8	36.8	38.0	3.6	0.0	0.0
Cycle Q Clear(g_c), s	15.3	0.9	8.8	16.3	3.4	3.9	2.8	36.8	38.0	31.8	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.08	1.00		1.00
Lane Grp Cap(c), veh/h	213	281	233	235	281	233	362	1347	1399	152	2405	1067
V/C Ratio(X)	0.60	0.06	0.53	0.68	0.21	0.25	0.40	0.74	0.75	0.11	0.60	0.07
Avail Cap(c_a), veh/h	213	281	233	235	281	233	395	1347	1399	152	2405	1067
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.5	43.7	47.1	50.8	44.8	45.0	4.7	7.9	8.1	5.5	0.0	0.0
Incr Delay (d2), s/veh	3.3	0.0	1.2	6.5	0.1	0.2	0.3	3.6	3.7	1.4	1.1	0.1
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	4.0	0.4	3.5	5.2	1.6	1.6	0.8	11.5	12.3	0.2	0.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.8	43.8	48.3	57.2	44.9	45.2	4.9	11.6	11.8	6.9	1.1	0.1
LnGrp LOS	D	D	D	E	D	D	A	B	B	A	A	A
Approach Vol, veh/h		269			278			2182			1542	
Approach Delay, s/veh		51.1			52.1			11.2			1.2	
Approach LOS		D			D			B			A	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		97.0		23.0	9.8	87.2		23.0				
Change Period (Y+Rc), s		6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s		91.0		18.0	7.0	79.0		18.0				
Max Q Clear Time (g_c+I1), s		40.0		17.3	4.8	33.8		18.3				
Green Ext Time (p_c), s		43.9		0.0	0.0	30.0		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			12.8									
HCM 6th LOS			B									

Notes

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

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	145	13	13	280	14	29
Future Vol, veh/h	145	13	13	280	14	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	158	14	14	304	15	32

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	172	0	497	165
Stage 1	-	-	-	-	165	-
Stage 2	-	-	-	-	332	-
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	-	-	1405	-	532	879
Stage 1	-	-	-	-	864	-
Stage 2	-	-	-	-	727	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1405	-	526	879
Mov Cap-2 Maneuver	-	-	-	-	526	-
Stage 1	-	-	-	-	864	-
Stage 2	-	-	-	-	718	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	10.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	721	-	-	1405	-
HCM Lane V/C Ratio	0.065	-	-	0.01	-
HCM Control Delay (s)	10.3	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	17	174	190	66	15	13
Future Vol, veh/h	17	174	190	66	15	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	18	189	207	72	16	14

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	279	0	-	0	468	243
Stage 1	-	-	-	-	243	-
Stage 2	-	-	-	-	225	-
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	1284	-	-	-	553	796
Stage 1	-	-	-	-	797	-
Stage 2	-	-	-	-	812	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1284	-	-	-	544	796
Mov Cap-2 Maneuver	-	-	-	-	544	-
Stage 1	-	-	-	-	784	-
Stage 2	-	-	-	-	812	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1284	-	-	-	638
HCM Lane V/C Ratio	0.014	-	-	-	0.048
HCM Control Delay (s)	7.8	0	-	-	10.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	175	18	5	198	24	16
Future Vol, veh/h	175	18	5	198	24	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	190	20	5	215	26	17

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	210	0	425	200
Stage 1	-	-	-	-	200	-
Stage 2	-	-	-	-	225	-
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	-	-	1361	-	586	841
Stage 1	-	-	-	-	834	-
Stage 2	-	-	-	-	812	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1361	-	584	841
Mov Cap-2 Maneuver	-	-	-	-	584	-
Stage 1	-	-	-	-	834	-
Stage 2	-	-	-	-	809	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	10.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	665	-	-	1361	-
HCM Lane V/C Ratio	0.065	-	-	0.004	-
HCM Control Delay (s)	10.8	-	-	7.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	31	144	156	49	50	16
Future Vol, veh/h	31	144	156	49	50	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	34	157	170	53	54	17
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8.7	8.6	8.4
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	18%	0%	76%
Vol Thru, %	82%	76%	0%
Vol Right, %	0%	24%	24%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	175	205	66
LT Vol	31	0	50
Through Vol	144	156	0
RT Vol	0	49	16
Lane Flow Rate	190	223	72
Geometry Grp	1	1	1
Degree of Util (X)	0.231	0.258	0.096
Departure Headway (Hd)	4.37	4.168	4.831
Convergence, Y/N	Yes	Yes	Yes
Cap	824	865	743
Service Time	2.384	2.181	2.855
HCM Lane V/C Ratio	0.231	0.258	0.097
HCM Control Delay	8.7	8.6	8.4
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.9	1	0.3

Intersection	
Int Delay, s/veh	3.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	54	74	6	47	51
Future Vol, veh/h	1	54	74	6	47	51
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	59	80	7	51	55

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	241	84	0	0	87	0
Stage 1	84	-	-	-	-	-
Stage 2	157	-	-	-	-	-
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	747	975	-	-	1509	-
Stage 1	939	-	-	-	-	-
Stage 2	871	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	721	975	-	-	1509	-
Mov Cap-2 Maneuver	721	-	-	-	-	-
Stage 1	939	-	-	-	-	-
Stage 2	841	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	3.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	969	1509	-
HCM Lane V/C Ratio	-	-	0.062	0.034	-
HCM Control Delay (s)	-	-	9	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	46	7	10	0	4	0	1	121	3	48	92	45
Future Vol, veh/h	46	7	10	0	4	0	1	121	3	48	92	45
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	-	-	-	-	-	-	-	-	-	-	-	-
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	50	8	11	0	4	0	1	132	3	52	100	49

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	367	366	125	374	389	134	149	0	0	135	0	0
Stage 1	229	229	-	136	136	-	-	-	-	-	-	-
Stage 2	138	137	-	238	253	-	-	-	-	-	-	-
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	589	562	926	583	546	915	1432	-	-	1449	-	-
Stage 1	774	715	-	867	784	-	-	-	-	-	-	-
Stage 2	865	783	-	765	698	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	567	540	926	553	524	915	1432	-	-	1449	-	-
Mov Cap-2 Maneuver	567	540	-	553	524	-	-	-	-	-	-	-
Stage 1	773	687	-	866	783	-	-	-	-	-	-	-
Stage 2	859	782	-	718	671	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.8	11.9	0.1	2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1432	-	-	601	524	1449	-	-
HCM Lane V/C Ratio	0.001	-	-	0.114	0.008	0.036	-	-
HCM Control Delay (s)	7.5	0	-	11.8	11.9	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0	0.1	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	24	16	136	38	15	163
Future Vol, veh/h	24	16	136	38	15	163
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	26	17	148	41	16	177

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	378	169	0	0	189	0
Stage 1	169	-	-	-	-	-
Stage 2	209	-	-	-	-	-
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	624	875	-	-	1385	-
Stage 1	861	-	-	-	-	-
Stage 2	826	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	616	875	-	-	1385	-
Mov Cap-2 Maneuver	616	-	-	-	-	-
Stage 1	861	-	-	-	-	-
Stage 2	815	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.5	0	0.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	699	1385	-
HCM Lane V/C Ratio	-	-	0.062	0.012	-
HCM Control Delay (s)	-	-	10.5	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	32	158	234	45	54	7
Future Vol, veh/h	32	158	234	45	54	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	35	172	254	49	59	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	303	0	-	0	521	279
Stage 1	-	-	-	-	279	-
Stage 2	-	-	-	-	242	-
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	1258	-	-	-	516	760
Stage 1	-	-	-	-	768	-
Stage 2	-	-	-	-	798	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1258	-	-	-	500	760
Mov Cap-2 Maneuver	-	-	-	-	500	-
Stage 1	-	-	-	-	744	-
Stage 2	-	-	-	-	798	-

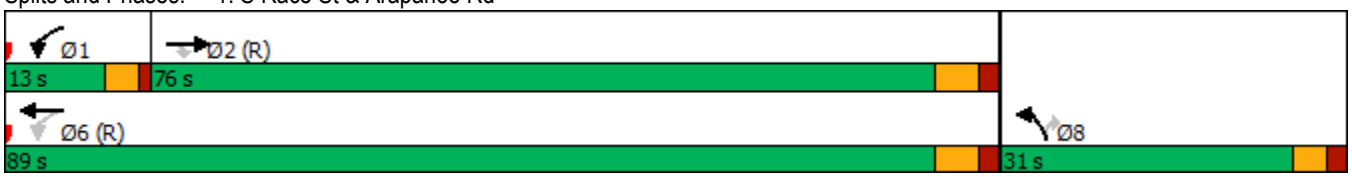
Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	12.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1258	-	-	-	520
HCM Lane V/C Ratio	0.028	-	-	-	0.128
HCM Control Delay (s)	7.9	0	-	-	12.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1106	102	50	1669	171	86
Future Volume (vph)	1106	102	50	1669	171	86
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	17.0	17.0	3.0	17.0	5.0	5.0
Minimum Split (s)	23.0	23.0	7.0	23.0	30.0	30.0
Total Split (s)	76.0	76.0	13.0	89.0	31.0	31.0
Total Split (%)	63.3%	63.3%	10.8%	74.2%	25.8%	25.8%
Yellow Time (s)	4.0	4.0	3.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effct Green (s)	84.4	84.4	94.1	92.1	16.9	16.9
Actuated g/C Ratio	0.70	0.70	0.78	0.77	0.14	0.14
v/c Ratio	0.46	0.10	0.15	0.45	0.72	0.31
Control Delay	9.7	4.0	4.7	5.8	64.5	11.1
Queue Delay	0.0	0.0	0.0	0.3	0.0	0.0
Total Delay	9.7	4.0	4.7	6.1	64.5	11.1
LOS	A	A	A	A	E	B
Approach Delay	9.2			6.1	46.6	
Approach LOS	A			A	D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 31 (26%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 10.5	Intersection LOS: B
Intersection Capacity Utilization 57.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: S Race St & Arapahoe Rd



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1106	102	50	1669	171	86
Future Volume (veh/h)	1106	102	50	1669	171	86
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1152	106	52	1739	178	90
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2619	1163	366	4039	209	186
Arrive On Green	0.74	0.74	0.02	0.79	0.12	0.12
Sat Flow, veh/h	3647	1578	1781	5274	1781	1585
Grp Volume(v), veh/h	1152	106	52	1739	178	90
Grp Sat Flow(s),veh/h/ln	1777	1578	1781	1702	1781	1585
Q Serve(g_s), s	15.1	2.3	0.8	13.0	11.8	6.4
Cycle Q Clear(g_c), s	15.1	2.3	0.8	13.0	11.8	6.4
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2619	1163	366	4039	209	186
V/C Ratio(X)	0.44	0.09	0.14	0.43	0.85	0.48
Avail Cap(c_a), veh/h	2619	1163	463	4039	386	343
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.73	0.73	1.00	1.00
Uniform Delay (d), s/veh	6.1	4.4	4.5	4.0	51.9	49.6
Incr Delay (d2), s/veh	0.5	0.2	0.0	0.2	3.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	0.7	0.2	3.5	5.5	2.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	6.7	4.6	4.6	4.2	55.7	50.3
LnGrp LOS	A	A	A	A	E	D
Approach Vol, veh/h	1258			1791	268	
Approach Delay, s/veh	6.5			4.2	53.9	
Approach LOS	A			A	D	

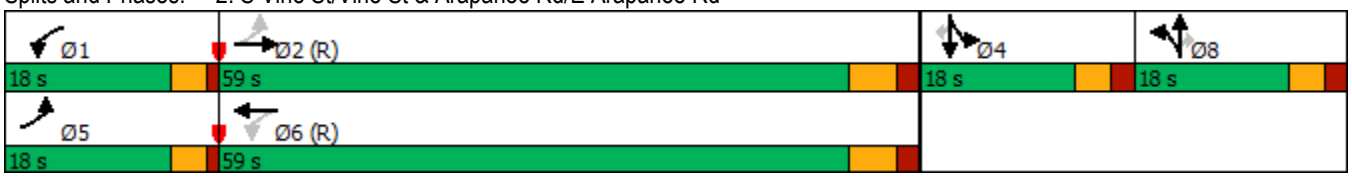
Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	6.5	94.4				100.9	19.1
Change Period (Y+Rc), s	4.0	6.0				6.0	5.0
Max Green Setting (Gmax), s	9.0	70.0				83.0	26.0
Max Q Clear Time (g_c+I1), s	2.8	17.1				15.0	13.8
Green Ext Time (p_c), s	0.0	6.4				12.7	0.3

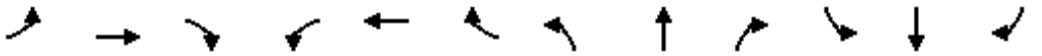
Intersection Summary			
HCM 6th Ctrl Delay		9.1	
HCM 6th LOS		A	

Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	69	1026	135	1557	24	114	13	35
Future Volume (vph)	69	1026	135	1557	24	114	13	35
Turn Type	pm+pt	NA	pm+pt	NA	NA	Perm	NA	Perm
Protected Phases	5	2	1	6	8		4	
Permitted Phases	2		6			8		4
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	3.0	17.0	3.0	17.0	5.0	5.0	5.0	5.0
Minimum Split (s)	7.0	26.0	7.0	23.0	35.0	35.0	34.0	34.0
Total Split (s)	18.0	59.0	18.0	59.0	18.0	18.0	18.0	18.0
Total Split (%)	15.9%	52.2%	15.9%	52.2%	15.9%	15.9%	15.9%	15.9%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	69.6	61.3	73.5	64.7	12.2	12.2	11.5	11.5
Actuated g/C Ratio	0.62	0.54	0.65	0.57	0.11	0.11	0.10	0.10
v/c Ratio	0.42	0.43	0.45	0.65	0.82	0.44	0.74	0.14
Control Delay	16.8	16.4	12.0	18.6	81.0	13.6	72.5	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.8	16.4	12.0	18.6	81.0	13.6	72.5	1.1
LOS	B	B	B	B	F	B	E	A
Approach Delay		16.5		18.1	52.0		57.1	
Approach LOS		B		B	D		E	

Intersection Summary		
Cycle Length: 113		
Actuated Cycle Length: 113		
Offset: 28 (25%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green		
Natural Cycle: 125		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.82		
Intersection Signal Delay: 21.9	Intersection LOS: C	
Intersection Capacity Utilization 67.6%	ICU Level of Service C	
Analysis Period (min) 15		

Splits and Phases: 2: S Vine St/Vine St & Arapahoe Rd/E Arapahoe Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	69	1026	98	135	1557	201	127	24	114	114	13	35
Future Volume (veh/h)	69	1026	98	135	1557	201	127	24	114	114	13	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	73	1080	103	142	1639	212	134	25	120	120	14	37
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	210	2704	258	364	2698	348	162	30	165	152	18	146
Arrive On Green	0.03	0.57	0.57	0.05	0.59	0.59	0.11	0.11	0.11	0.09	0.09	0.09
Sat Flow, veh/h	1781	4738	451	1781	4574	590	1513	282	1545	1603	187	1540
Grp Volume(v), veh/h	73	775	408	142	1218	633	159	0	120	134	0	37
Grp Sat Flow(s),veh/h/ln	1781	1702	1786	1781	1702	1760	1795	0	1545	1790	0	1540
Q Serve(g_s), s	1.9	14.3	14.3	3.7	25.8	26.0	9.8	0.0	8.5	8.3	0.0	2.5
Cycle Q Clear(g_c), s	1.9	14.3	14.3	3.7	25.8	26.0	9.8	0.0	8.5	8.3	0.0	2.5
Prop In Lane	1.00		0.25	1.00		0.34	0.84		1.00	0.90		1.00
Lane Grp Cap(c), veh/h	210	1943	1019	364	2008	1038	192	0	165	170	0	146
V/C Ratio(X)	0.35	0.40	0.40	0.39	0.61	0.61	0.83	0.00	0.73	0.79	0.00	0.25
Avail Cap(c_a), veh/h	374	1943	1019	495	2008	1038	206	0	178	206	0	177
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)	0.89	0.89	0.89	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.9	13.5	13.5	10.1	14.8	14.8	49.5	0.0	48.9	50.0	0.0	47.4
Incr Delay (d2), s/veh	0.3	0.5	1.0	0.3	1.4	2.7	20.8	0.0	10.8	12.6	0.0	0.3
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	5.4	5.8	1.4	9.7	10.4	5.5	0.0	3.8	4.3	0.0	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.2	14.0	14.5	10.3	16.2	17.5	70.2	0.0	59.6	62.6	0.0	47.8
LnGrp LOS	B	B	B	B	B	B	E	A	E	E	A	D
Approach Vol, veh/h		1256			1993			279			171	
Approach Delay, s/veh		14.1			16.2			65.7			59.4	
Approach LOS		B			B			E			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.7	70.5		15.7	7.6	72.7		17.1				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	14.0	53.0		13.0	14.0	53.0		13.0				
Max Q Clear Time (g_c+I1), s	5.7	16.3		10.3	3.9	28.0		11.8				
Green Ext Time (p_c), s	0.1	5.9		0.1	0.0	10.4		0.1				

Intersection Summary		
HCM 6th Ctrl Delay		21.2
HCM 6th LOS		C

Notes

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

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	1181	43	69	1782	8	0	0	161	0	0	111
Future Vol, veh/h	30	1181	43	69	1782	8	0	0	161	0	0	111
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	150	-	0	100	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	31	1218	44	71	1837	8	0	0	166	0	0	114

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1845	0	0	1262	0	0	-	-	609	-	-	923
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	5.34	-	-	5.34	-	-	-	-	7.14	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	-	-	3.92	-	-	3.92
Pot Cap-1 Maneuver	*627	-	-	*827	-	-	0	0	*658	0	0	*499
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %	1	-	-	1	-	-			1			1
Mov Cap-1 Maneuver	*627	-	-	*827	-	-	-	-	*658	-	-	*499
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.4	12.3	14.3
HCM LOS			B	B

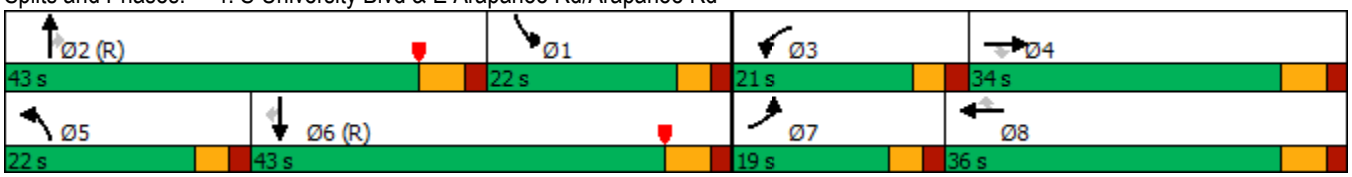
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	658	* 627	-	-	* 827	-	-	499
HCM Lane V/C Ratio	0.252	0.049	-	-	0.086	-	-	0.229
HCM Control Delay (s)	12.3	11	-	-	9.8	-	-	14.3
HCM Lane LOS	B	B	-	-	A	-	-	B
HCM 95th %tile Q(veh)	1	0.2	-	-	0.3	-	-	0.9

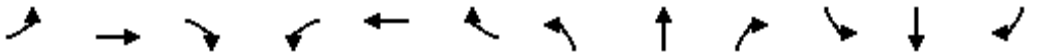
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	340	763	261	347	1254	457	309	1265	210	342	1406	322
Future Volume (vph)	340	763	261	347	1254	457	309	1265	210	342	1406	322
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	10.0	10.0	3.0	10.0	10.0
Minimum Split (s)	8.0	39.0	39.0	8.0	37.0	37.0	8.0	35.0	35.0	8.0	40.0	40.0
Total Split (s)	19.0	34.0	34.0	21.0	36.0	36.0	22.0	43.0	43.0	22.0	43.0	43.0
Total Split (%)	15.8%	28.3%	28.3%	17.5%	30.0%	30.0%	18.3%	35.8%	35.8%	18.3%	35.8%	35.8%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	13.7	28.8	28.8	14.9	30.0	30.0	14.8	37.3	37.3	17.0	39.6	39.6
Actuated g/C Ratio	0.11	0.24	0.24	0.12	0.25	0.25	0.12	0.31	0.31	0.14	0.33	0.33
v/c Ratio	0.89	0.64	0.46	0.83	1.01	0.76	0.75	0.82	0.34	0.72	0.86	0.48
Control Delay	77.4	44.0	7.3	68.4	71.9	24.7	48.2	34.8	8.2	58.4	44.2	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.4	44.0	7.3	68.4	71.9	24.7	48.2	34.8	8.2	58.4	44.2	9.7
LOS	E	D	A	E	E	C	D	C	A	E	D	A
Approach Delay		45.3			60.8			34.0			41.2	
Approach LOS		D			E			C			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 103 (86%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 105	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 45.7	Intersection LOS: D
Intersection Capacity Utilization 88.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 4: S University Blvd & E Arapahoe Rd/Arapahoe Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	340	763	261	347	1254	457	309	1265	210	342	1406	322
Future Volume (veh/h)	340	763	261	347	1254	457	309	1265	210	342	1406	322
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	347	779	266	354	1280	0	315	1291	214	349	1435	329
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	399	1262	389	409	1277		374	1574	486	465	1751	541
Arrive On Green	0.12	0.25	0.25	0.12	0.25	0.00	0.11	0.31	0.31	0.13	0.34	0.34
Sat Flow, veh/h	3456	5106	1575	3456	5106	1585	3456	5106	1577	3456	5106	1578
Grp Volume(v), veh/h	347	779	266	354	1280	0	315	1291	214	349	1435	329
Grp Sat Flow(s),veh/h/ln	1728	1702	1575	1728	1702	1585	1728	1702	1577	1728	1702	1578
Q Serve(g_s), s	11.8	16.3	18.4	12.1	30.0	0.0	10.7	28.1	9.1	11.7	30.8	20.8
Cycle Q Clear(g_c), s	11.8	16.3	18.4	12.1	30.0	0.0	10.7	28.1	9.1	11.7	30.8	20.8
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	399	1262	389	409	1277		374	1574	486	465	1751	541
V/C Ratio(X)	0.87	0.62	0.68	0.87	1.00		0.84	0.82	0.44	0.75	0.82	0.61
Avail Cap(c_a), veh/h	403	1262	389	461	1277		490	1574	486	490	1751	541
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.2	40.1	40.9	52.0	45.0	0.0	52.5	38.4	16.1	50.0	36.0	32.7
Incr Delay (d2), s/veh	17.3	0.7	4.0	13.4	25.8	0.0	7.9	4.9	2.9	5.3	4.4	5.0
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	6.0	6.8	7.5	5.9	15.5	0.0	5.0	12.1	3.6	5.3	13.1	8.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.5	40.8	44.9	65.4	70.8	0.0	60.4	43.3	19.0	55.2	40.5	37.7
LnGrp LOS	E	D	D	E	F		E	D	B	E	D	D
Approach Vol, veh/h		1392			1634	A		1820			2113	
Approach Delay, s/veh		48.7			69.7			43.4			42.5	
Approach LOS		D			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.1	43.0	19.2	35.7	18.0	47.2	18.9	36.0
Change Period (Y+Rc), s	6.0	* 6	5.0	6.0	5.0	6.0	5.0	6.0
Max Green Setting (Gmax), s	17.0	* 37	16.0	28.0	17.0	37.0	14.0	30.0
Max Q Clear Time (g_c+I1), s	13.7	30.1	14.1	20.4	12.7	32.8	13.8	32.0
Green Ext Time (p_c), s	0.2	5.9	0.1	2.7	0.3	3.9	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	50.4
HCM 6th LOS	D

Notes

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

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

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	193	0	0	44	0	1760	20	0	1888	128
Future Vol, veh/h	0	0	193	0	0	44	0	1760	20	0	1888	128
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	-	-	0	-	-	0	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	208	0	0	47	0	1892	22	0	2030	138

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	1015	-	-	957	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	*480	0	0	222	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %			1					-	-		-	-
Mov Cap-1 Maneuver	-	-	*480	-	-	222	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.1	25.6	0	0
HCM LOS	C	D		

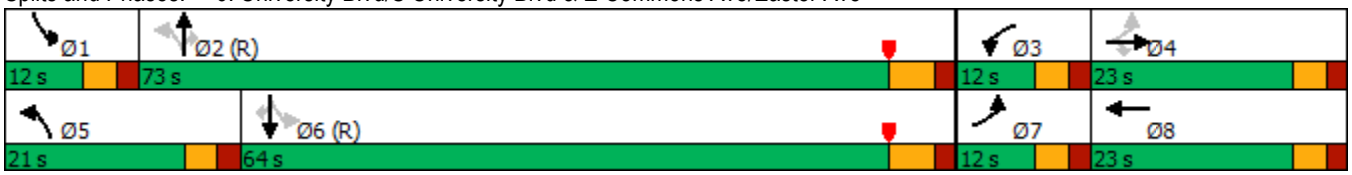
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	480	222	-	-
HCM Lane V/C Ratio	-	-	0.432	0.213	-	-
HCM Control Delay (s)	-	-	18.1	25.6	-	-
HCM Lane LOS	-	-	C	D	-	-
HCM 95th %tile Q(veh)	-	-	2.1	0.8	-	-

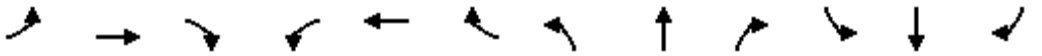
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	193	43	161	69	74	283	1563	47	74	1808	180
Future Volume (vph)	193	43	161	69	74	283	1563	47	74	1808	180
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases	4		4			2		2	6		6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	3.0	3.0	3.0	4.0	3.0	3.0	5.0	5.0	3.0	5.0	5.0
Minimum Split (s)	8.0	35.0	35.0	9.0	32.0	8.0	24.0	24.0	8.0	29.0	29.0
Total Split (s)	12.0	23.0	23.0	12.0	23.0	21.0	73.0	73.0	12.0	64.0	64.0
Total Split (%)	10.0%	19.2%	19.2%	10.0%	19.2%	17.5%	60.8%	60.8%	10.0%	53.3%	53.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	20.7	15.1	15.1	7.0	12.7	85.3	75.2	75.2	70.3	63.3	63.3
Actuated g/C Ratio	0.17	0.13	0.13	0.06	0.11	0.71	0.63	0.63	0.59	0.53	0.53
v/c Ratio	0.53	0.20	0.49	0.71	0.63	1.01	0.75	0.05	0.46	1.03	0.21
Control Delay	44.8	48.8	11.9	90.4	55.1	93.3	15.4	0.1	32.1	50.1	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay	44.8	48.8	11.9	90.4	55.1	93.3	15.5	0.1	32.1	50.1	2.3
LOS	D	D	B	F	E	F	B	A	C	D	A
Approach Delay		31.9			67.9		26.7			45.3	
Approach LOS		C			E		C			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 67 (56%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 145	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.03	
Intersection Signal Delay: 37.3	Intersection LOS: D
Intersection Capacity Utilization 95.4%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 6: University Blvd/S University Blvd & E Commons Ave/Easter Ave





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	193	43	161	69	74	47	283	1563	47	74	1808	180
Future Volume (veh/h)	193	43	161	69	74	47	283	1563	47	74	1808	180
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	205	46	0	73	79	50	301	1663	50	79	1923	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	401	207		93	111	70	298	2230	991	272	1879	
Arrive On Green	0.06	0.11	0.00	0.05	0.10	0.10	0.27	1.00	1.00	0.03	0.53	0.00
Sat Flow, veh/h	3456	1870	1585	1781	1064	673	1781	3554	1579	1781	3554	1585
Grp Volume(v), veh/h	205	46	0	73	0	129	301	1663	50	79	1923	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1781	0	1738	1781	1777	1579	1781	1777	1585
Q Serve(g_s), s	6.3	2.7	0.0	4.9	0.0	8.6	16.0	0.0	0.0	2.4	63.4	0.0
Cycle Q Clear(g_c), s	6.3	2.7	0.0	4.9	0.0	8.6	16.0	0.0	0.0	2.4	63.4	0.0
Prop In Lane	1.00		1.00	1.00		0.39	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	401	207		93	0	182	298	2230	991	272	1879	
V/C Ratio(X)	0.51	0.22		0.79	0.00	0.71	1.01	0.75	0.05	0.29	1.02	
Avail Cap(c_a), veh/h	401	281		104	0	261	298	2230	991	314	1879	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	45.0	48.6	0.0	56.2	0.0	52.0	34.6	0.0	0.0	12.0	28.3	0.0
Incr Delay (d2), s/veh	0.5	0.2	0.0	29.1	0.0	1.9	55.2	2.3	0.1	0.2	26.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	1.3	0.0	3.0	0.0	3.9	11.7	0.7	0.0	0.9	31.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.5	48.8	0.0	85.3	0.0	53.9	89.8	2.3	0.1	12.2	55.2	0.0
LnGrp LOS	D	D		F	A	D	F	A	A	B	F	
Approach Vol, veh/h		251	A		202			2014			2002	A
Approach Delay, s/veh		46.1			65.2			15.3			53.5	
Approach LOS		D			E			B			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.1	81.3	11.3	18.3	21.0	69.4	12.0	17.6
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	67.0	7.0	18.0	16.0	58.0	7.0	18.0
Max Q Clear Time (g_c+I1), s	4.4	2.0	6.9	4.7	18.0	65.4	8.3	10.6
Green Ext Time (p_c), s	0.0	43.1	0.0	0.1	0.0	0.0	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	36.4
HCM 6th LOS	D

Notes

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

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	56	0	1930	1995	35
Future Vol, veh/h	0	56	0	1930	1995	35
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	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	60	0	2075	2145	38

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	1073	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	*261	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %		1		-	-	-
Mov Cap-1 Maneuver	-	*261	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22.9	0	0
HCM LOS	C		

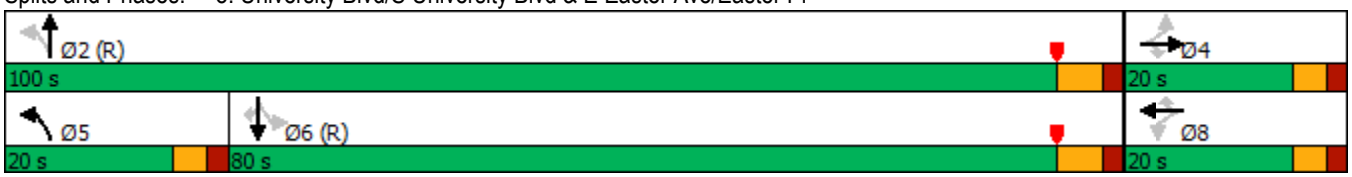
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	261	-	-
HCM Lane V/C Ratio	-	0.231	-	-
HCM Control Delay (s)	-	22.9	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.9	-	-

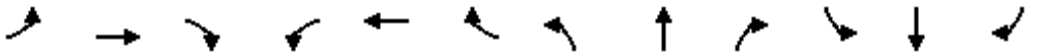
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	103	24	121	61	25	27	142	1775	29	1936	87
Future Volume (vph)	103	24	121	61	25	27	142	1775	29	1936	87
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm
Protected Phases		4			8		5	2		6	
Permitted Phases	4		4	8		8	2		6		6
Detector Phase	4	4	4	8	8	8	5	2	6	6	6
Switch Phase											
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	5.0
Minimum Split (s)	36.0	36.0	36.0	40.0	40.0	40.0	8.0	29.0	32.0	32.0	32.0
Total Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	100.0	80.0	80.0	80.0
Total Split (%)	16.7%	16.7%	16.7%	16.7%	16.7%	16.7%	16.7%	83.3%	66.7%	66.7%	66.7%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.0	6.0	6.0	6.0
Lead/Lag							Lead		Lag	Lag	Lag
Lead-Lag Optimize?							Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	12.8	12.8	12.8	12.8	12.8	12.8	97.2	96.2	81.7	81.7	81.7
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11	0.11	0.81	0.80	0.68	0.68	0.68
v/c Ratio	0.76	0.13	0.46	0.45	0.14	0.13	0.75	0.69	0.26	0.85	0.09
Control Delay	82.7	48.8	13.8	59.4	48.9	1.1	47.5	7.2	4.2	9.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.7	48.8	13.8	59.4	48.9	1.1	47.5	7.2	4.2	9.0	0.1
LOS	F	D	B	E	D	A	D	A	A	A	A
Approach Delay		45.8			43.1			10.1		8.5	
Approach LOS		D			D			B		A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 82 (68%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 130	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 12.2	Intersection LOS: B
Intersection Capacity Utilization 88.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 8: University Blvd/S University Blvd & E Easter Ave/Easter Pl





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	103	24	121	61	25	27	142	1775	64	29	1936	87
Future Volume (veh/h)	103	24	121	61	25	27	142	1775	64	29	1936	87
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.98		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	110	26	129	65	27	29	151	1888	68	31	2060	93
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	195	216	179	185	216	179	261	2774	99	183	2533	1124
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.04	0.79	0.79	1.00	1.00	1.00
Sat Flow, veh/h	1320	1870	1548	1210	1870	1548	1781	3499	125	225	3554	1577
Grp Volume(v), veh/h	110	26	129	65	27	29	151	953	1003	31	2060	93
Grp Sat Flow(s),veh/h/ln	1320	1870	1548	1210	1870	1548	1781	1777	1847	225	1777	1577
Q Serve(g_s), s	9.8	1.5	9.6	6.1	1.6	2.0	2.6	28.7	29.5	4.8	0.0	0.0
Cycle Q Clear(g_c), s	11.3	1.5	9.6	7.6	1.6	2.0	2.6	28.7	29.5	24.7	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	195	216	179	185	216	179	261	1409	1465	183	2533	1124
V/C Ratio(X)	0.56	0.12	0.72	0.35	0.13	0.16	0.58	0.68	0.68	0.17	0.81	0.08
Avail Cap(c_a), veh/h	208	234	193	196	234	193	415	1409	1465	183	2533	1124
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.7	47.6	51.2	51.0	47.6	47.8	3.6	5.6	5.6	2.9	0.0	0.0
Incr Delay (d2), s/veh	1.6	0.1	9.4	0.4	0.1	0.2	0.8	2.6	2.6	2.0	3.0	0.1
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	3.4	0.7	4.2	1.9	0.7	0.8	0.7	7.9	8.4	0.2	1.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.3	47.7	60.6	51.4	47.7	48.0	4.4	8.2	8.3	4.9	3.0	0.1
LnGrp LOS	D	D	E	D	D	D	A	A	A	A	A	A
Approach Vol, veh/h		265			121			2107			2184	
Approach Delay, s/veh		56.7			49.8			7.9			2.9	
Approach LOS		E			D			A			A	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		101.1		18.9	9.6	91.5		18.9				
Change Period (Y+Rc), s		6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s		94.0		15.0	15.0	74.0		15.0				
Max Q Clear Time (g_c+I1), s		31.5		13.3	4.6	26.7		9.6				
Green Ext Time (p_c), s		49.9		0.1	0.1	42.4		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			9.4									
HCM 6th LOS			A									

Notes

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

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	38	222	201	52	28	40
Future Vol, veh/h	38	222	201	52	28	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	241	218	57	30	43

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	275	0	-	0	570	247
Stage 1	-	-	-	-	247	-
Stage 2	-	-	-	-	323	-
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	1288	-	-	-	483	792
Stage 1	-	-	-	-	794	-
Stage 2	-	-	-	-	734	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1288	-	-	-	465	792
Mov Cap-2 Maneuver	-	-	-	-	465	-
Stage 1	-	-	-	-	765	-
Stage 2	-	-	-	-	734	-

Approach	EB	WB	SB
HCM Control Delay, s	1.2	0	11.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1288	-	-	-	614
HCM Lane V/C Ratio	0.032	-	-	-	0.12
HCM Control Delay (s)	7.9	0	-	-	11.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	202	20	12	252	11	15
Future Vol, veh/h	202	20	12	252	11	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	222	22	13	277	12	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	244	0	536	233
Stage 1	-	-	-	-	233	-
Stage 2	-	-	-	-	303	-
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	-	-	1322	-	505	806
Stage 1	-	-	-	-	806	-
Stage 2	-	-	-	-	749	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1322	-	499	806
Mov Cap-2 Maneuver	-	-	-	-	499	-
Stage 1	-	-	-	-	806	-
Stage 2	-	-	-	-	740	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	10.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	640	-	-	1322	-
HCM Lane V/C Ratio	0.045	-	-	0.01	-
HCM Control Delay (s)	10.9	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	191	17	11	207	19	16
Future Vol, veh/h	191	17	11	207	19	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	212	19	12	230	21	18

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	231	0	476	222
Stage 1	-	-	-	-	222	-
Stage 2	-	-	-	-	254	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1337	-	548	818
Stage 1	-	-	-	-	815	-
Stage 2	-	-	-	-	788	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1337	-	543	818
Mov Cap-2 Maneuver	-	-	-	-	543	-
Stage 1	-	-	-	-	815	-
Stage 2	-	-	-	-	780	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	11
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	642	-	-	1337	-
HCM Lane V/C Ratio	0.061	-	-	0.009	-
HCM Control Delay (s)	11	-	-	7.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Intersection Delay, s/veh	9
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	39	136	158	59	73	35
Future Vol, veh/h	39	136	158	59	73	35
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	43	149	174	65	80	38
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	9	9	8.8
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	22%	0%	68%
Vol Thru, %	78%	73%	0%
Vol Right, %	0%	27%	32%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	175	217	108
LT Vol	39	0	73
Through Vol	136	158	0
RT Vol	0	59	35
Lane Flow Rate	192	238	119
Geometry Grp	1	1	1
Degree of Util (X)	0.242	0.284	0.159
Departure Headway (Hd)	4.524	4.28	4.821
Convergence, Y/N	Yes	Yes	Yes
Cap	794	839	743
Service Time	2.548	2.302	2.855
HCM Lane V/C Ratio	0.242	0.284	0.16
HCM Control Delay	9	9	8.8
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.9	1.2	0.6

Intersection	
Int Delay, s/veh	7.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	103	83	4	62	97
Future Vol, veh/h	10	103	83	4	62	97
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	76	25	76	76	76	76
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	412	109	5	82	128

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	404	112	0	0	114	0
Stage 1	112	-	-	-	-	-
Stage 2	292	-	-	-	-	-
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	603	941	-	-	1475	-
Stage 1	913	-	-	-	-	-
Stage 2	758	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	567	941	-	-	1475	-
Mov Cap-2 Maneuver	567	-	-	-	-	-
Stage 1	913	-	-	-	-	-
Stage 2	713	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.2	0	3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	922	1475	-
HCM Lane V/C Ratio	-	-	0.461	0.055	-
HCM Control Delay (s)	-	-	12.2	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	2.5	0.2	-

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	35	6	2	14	13	64	4	177	4	12	142	45
Future Vol, veh/h	35	6	2	14	13	64	4	177	4	12	142	45
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	76	76	76	76	76	76	76	76	76	76	76	76
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	46	8	3	18	17	84	5	233	5	16	187	59

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	545	497	217	500	524	236	246	0	0	238	0	0
Stage 1	249	249	-	246	246	-	-	-	-	-	-	-
Stage 2	296	248	-	254	278	-	-	-	-	-	-	-
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	449	475	823	481	458	803	1320	-	-	1329	-	-
Stage 1	755	701	-	758	703	-	-	-	-	-	-	-
Stage 2	712	701	-	750	680	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	385	466	823	467	450	803	1320	-	-	1329	-	-
Mov Cap-2 Maneuver	385	466	-	467	450	-	-	-	-	-	-	-
Stage 1	752	691	-	755	700	-	-	-	-	-	-	-
Stage 2	619	698	-	729	670	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.3	11.7	0.2	0.5
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1320	-	-	405	657	1329	-	-
HCM Lane V/C Ratio	0.004	-	-	0.14	0.182	0.012	-	-
HCM Control Delay (s)	7.7	0	-	15.3	11.7	7.7	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.7	0	-	-

Intersection	
Int Delay, s/veh	3.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	71	54	202	73	23	128
Future Vol, veh/h	71	54	202	73	23	128
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	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	85	64	240	87	27	152

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	490	284	0	0	327	0
Stage 1	284	-	-	-	-	-
Stage 2	206	-	-	-	-	-
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	537	755	-	-	1233	-
Stage 1	764	-	-	-	-	-
Stage 2	829	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	524	755	-	-	1233	-
Mov Cap-2 Maneuver	524	-	-	-	-	-
Stage 1	764	-	-	-	-	-
Stage 2	809	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.9	0	1.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	604	1233	-
HCM Lane V/C Ratio	-	-	0.246	0.022	-
HCM Control Delay (s)	-	-	12.9	8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1	0.1	-

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	24	183	197	54	77	20
Future Vol, veh/h	24	183	197	54	77	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	26	199	214	59	84	22

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	273	0	-	0	495	244
Stage 1	-	-	-	-	244	-
Stage 2	-	-	-	-	251	-
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	1290	-	-	-	534	795
Stage 1	-	-	-	-	797	-
Stage 2	-	-	-	-	791	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1290	-	-	-	522	795
Mov Cap-2 Maneuver	-	-	-	-	522	-
Stage 1	-	-	-	-	779	-
Stage 2	-	-	-	-	791	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	12.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1290	-	-	-	562
HCM Lane V/C Ratio	0.02	-	-	-	0.188
HCM Control Delay (s)	7.8	0	-	-	12.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7

APPENDIX G. EAST EASTER AVENUE EVALUATION

FELSBURG HOLT & ULLEVIG
connecting & enhancing communities

December 21, 2018

Mr. Bryan McFarland
Principal – Development
Southglenn Affiliated Holdings, LLC
5750 DTC Parkway, Suite 210
Greenwood Village, Colorado 80111

RE: Southglenn Northwoods Development in Centennial, Colorado
East Easter Avenue Evaluation
Project No. 118490-01

Dear Mr. McFarland:

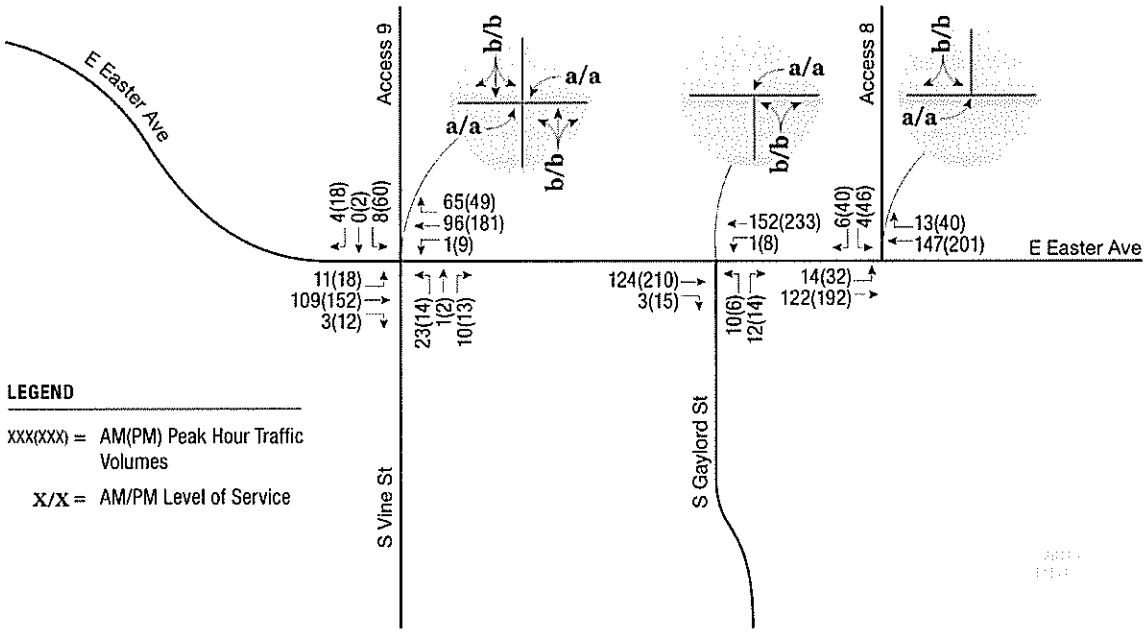
Felsburg Holt & Ullevig (FHU) has been asked to evaluate traffic and roadway network changes along East Easter Avenue associated with the redevelopment of the existing Sears department store in the Streets at Southglenn. This is a follow-up to our 2006 traffic impact analysis for the overall mall redevelopment. We have assessed the changes in site trip generation related to the redevelopment. FHU has also examined traffic operations along East Easter Avenue based on the updated on-site roadway network, specifically addressing access to the roadway. We have found that traffic operations along East Easter Avenue are not adversely affected by the redevelopment. This letter report presents our findings.

Existing Conditions

The Streets at Southglenn is a regional mixed-use development that includes several large anchor stores, a wide variety of smaller retail shops, a movie theater, and residential land uses. The existing Sears (the southerly anchor store) is closing, and a redevelopment of the Sears site and surrounding area has been proposed. The project is expected to consist of both retail and residential uses across the south end of the shopping center, along East Easter Avenue. As part of the redevelopment, South Vine Street will be connected through the Streets at Southglenn, and the existing shopping center access just east of South Gaylord Street (referred to as Access 8) will be realigned. Refer to **Figure 1**. These on-site roadway changes may affect traffic operations along East Easter Avenue, as the alignments of both the South Vine Street / East Easter Avenue and South Gaylord Street / Access 8 / East Easter Avenue intersections will be modified from existing conditions.

The existing Sears building is located between South Vine Street and Access 8. Both north-south streets provide one lane in each direction and are stop-controlled approaching East Easter Avenue. They provide access to Sears parking areas and connections between East Easter Avenue and additional shopping areas to the north. South Vine Street also provides access to the mall's main parking garage, located between South Vine Street and South Race Street, slightly north of Sears. East Easter Avenue is also one lane per direction, with a striped bicycle lane on each side of the street. At East Easter Avenue, South Vine Street is aligned with South Vine Street in Glenn Oaks Townhomes, an established residential neighborhood. Access 8 is currently offset about 100 feet (centerline to centerline) east of South Gaylord Street along East Easter Avenue. Due to the flared South Gaylord Street approach to East Easter Avenue, the distance between the east curbline of South Gaylord Street to the west curbline of Access 8 is approximately 40 feet. South Gaylord Street provides access to the existing Glenn Oaks Condominiums.

Figure 1. Existing Volumes and Levels of Service



Peak period traffic counts were collected at the South Vine Street / East Easter Avenue and South Gaylord Street / Access 8 / East Easter Avenue intersections on Wednesday, December 5, 2018. The AM peak hour was identified as 8:00 AM to 9:00 AM, and the PM peak hour was identified as 4:00 PM to 5:00 PM. Refer to **Figure 1**. The counted through volumes along East Easter Avenue were higher than those reported in the 2006 study, as would be expected with 12 years of traffic growth since the 2006 study. South Vine Street, South Gaylord Street, and Access 8 volumes were estimated in 2006. The 2018 side street counts were similar to the 2006 estimates in most locations. The largest observed difference was eastbound right turns into the Streets at Southglenn from East Easter Avenue. In the 2006 study, most of these trips turned right at Access 8, while the 2018 counts show more trips turning right at South Vine Street. This could be attributed to the location of the parking structure along South Vine Street within the shopping center and the limited number of trips destined to Sears as the store approaches closure.

Peak hour factors (PHFs), which are used to account for the variation of traffic arrivals within a peak hour, were calculated for each intersection approach. These data were summarized, and project-wide peak hours were determined for the AM and PM peak hours. The AM peak hour factor was 0.76, and the PM peak hour factor was 0.91.

Study area traffic operations were evaluated according to techniques documented in the *Highway Capacity Manual, Sixth Edition* (HCM) using the existing traffic volumes and intersection geometry. Synchro software (version 10.3) from Trafficware was used for the HCM evaluations. Level of Service (LOS), a qualitative measure of traffic operational conditions based on roadway capacity and vehicle delay, was determined for all movements that must yield right-of-way to other traffic movements. LOS is described by a letter designation ranging from LOS A to LOS F, with LOS A representing nearly free-flow travel and LOS F representing congested conditions. For unsignalized intersections, LOS is reported for side street approaches and for the main street left turns.

The existing geometry and volumes were evaluated using Synchro, and the results are presented on **Figure 1**. As shown, the side street approaches generally operate at LOS B, and the East Easter Avenue left turns typically operate at LOS A. Detailed Synchro printouts are attached to this letter. A key consideration in this study is the intersection spacing between the East Easter Avenue / South Gaylord Street intersection and the East Easter Avenue / Access 8 intersection. The Synchro results show negligible queuing westbound approaching South Gaylord Street. Short queues (less than 1 vehicle) are predicted eastbound approaching Access 8 in both AM and PM peak hours. Assuming each vehicle is 25 feet long and a one vehicle queue, the existing 40-foot separation provides adequate spacing between South Gaylord Street and Access 8 to accommodate existing queues.

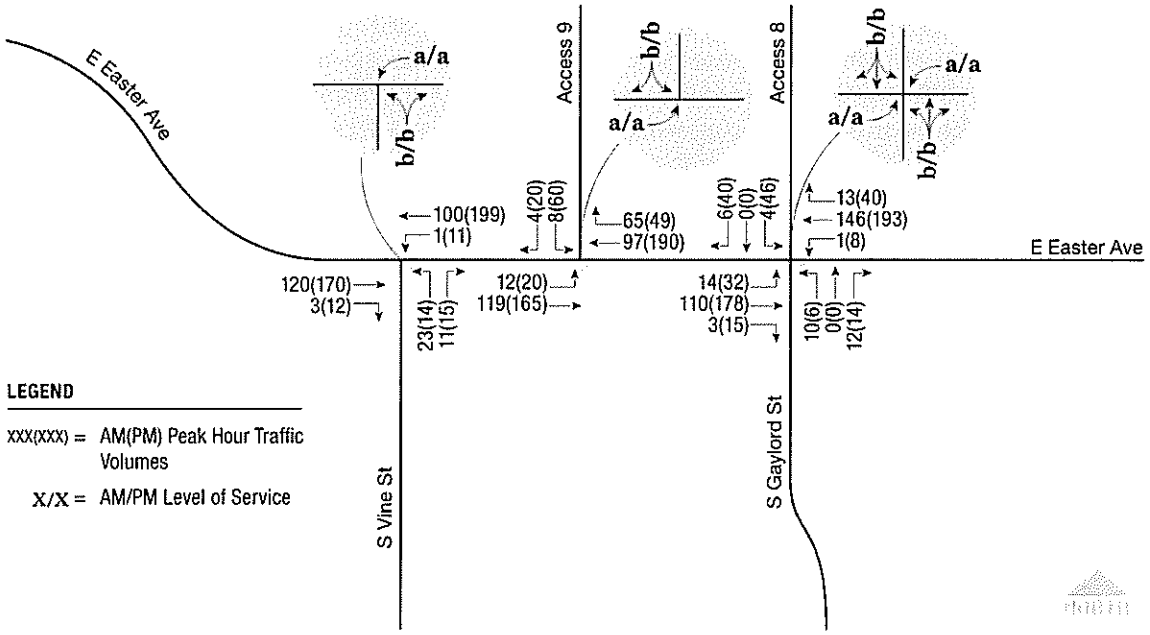
Roadway Realignment

As part of the proposed redevelopment, both South Vine Street and Access 8 are planned to be relocated.

- South Vine Street will be shifted east (away from the Glenn Oaks Townhomes access) to provide better through connectivity between East Easter Avenue and commercial development north of Sears. This will create a new offset intersection along East Easter Avenue. For clarity, the relocated South Vine Street approach is referred to as Access 9 in this letter. The proposed alignment results in a 150-foot centerline offset, or 100 feet from the east curb of (existing) South Vine Street and the proposed west curb of Access 9.
- Access 8 will be shifted west to align with South Gaylord Street, eliminating the existing offset.

The existing traffic volumes were redistributed within these intersections to reflect the change in offsets, and Synchro analyses were performed to document the operational effects of the realignments. No changes to peak hour factors or other inputs were made. Refer to **Figure 2**. As shown, the side street approaches generally operate at LOS B, and the East Easter Avenue left turns typically operate at LOS A, which is unchanged from the existing conditions.

Figure 2. Redistributed Volumes and Level of Service



The Synchro results show negligible queuing along East Easter Avenue approaching the new South Gaylord Street / Access 8 intersection. Negligible westbound queues are predicted approaching South Vine Street. Short queues (less than 1 vehicle) are predicted eastbound approaching Access 9 in the PM peak hour, and negligible eastbound queues are predicted in the AM peak hour. Assuming each vehicle is 25 feet long and a one vehicle queue, the proposed 100-foot separation provides adequate spacing between South Vine Street and Access 9 to accommodate existing queues.

Redevelopment

The proposed redevelopment will consist of several components:

- Closure and demolition of the existing Sears store, which includes 132,584 square feet of retail space.
- Closure and demolition of 2001 East Easter Avenue, a 3-story office-style building with 7,828 square feet of space dedicated to medical / dental offices, retail facilities, and office space.
- Construction of 34,770 square feet of new retail space adjacent to the existing retail in the Streets at Southglenn.
- Construction of three 5-story residential buildings on three blocks along East Easter Avenue, providing a total of 683 multi-family units.

Data from *Trip Generation*, Institute of Transportation Engineers (ITE), 10th Edition (2017) were used to determine vehicle-trips anticipated to be generated by the proposed redevelopment. Reductions in trip generation were taken to reflect the elimination of Sears and the office building. Although Sears is part of the Streets at Southglenn and would normally be evaluated using ITE Land Use 820 (Shopping Center), FHU applied ITE Land Use 875 (Department Store). This land use reflects lower trip generation than Land Use 820, which is believed to be more reflective of the current declining retail operations at Sears. This results in a smaller overall trip reduction and is therefore conservative. **Table 1** presents the typical weekday trip generation information (including reductions), including daily, AM peak hour, and PM peak hour volumes. The AM and PM peak hour trips were calculated using ITE's peak hour of adjacent street traffic rates.

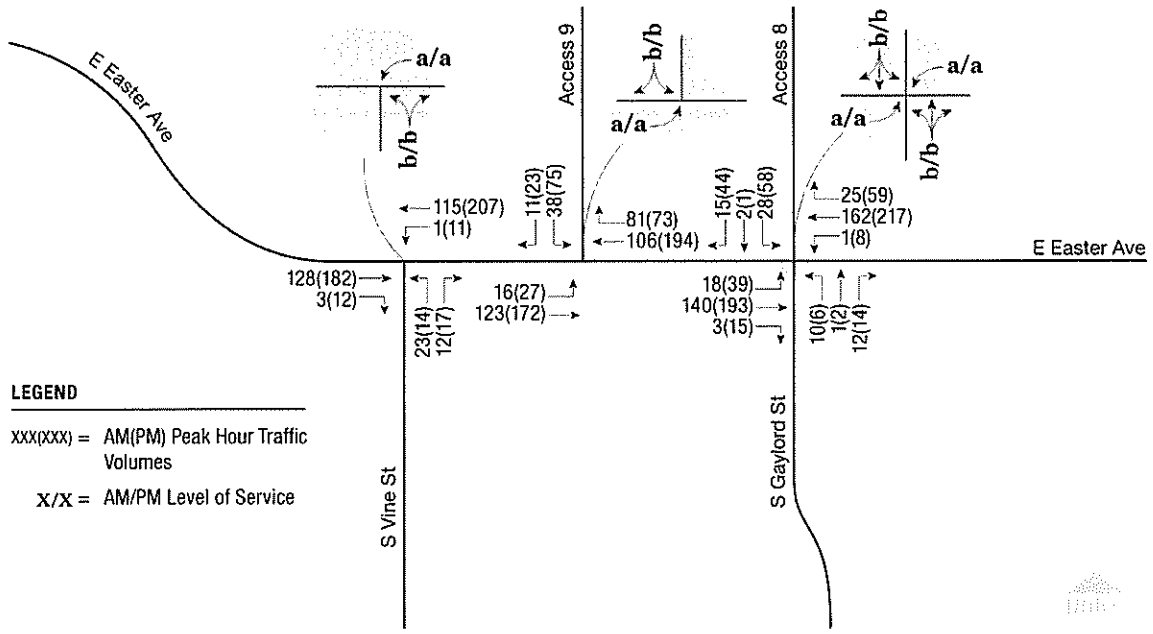
As **Table 1** indicates, there is a net increase of approximately 2,300 daily trips, with 327 new trips in the AM peak and 282 trips in the PM peak. These trips were distributed to the street network based on the trip distribution in the 2006 study. That study indicated that 7% of trips from the Streets at Southglenn would travel to/from the west on East Easter Avenue, 1% of trips would travel to/from the south on South Vine Street, 1% of trips would travel to/from the south on South Gaylord Street, and 25% of trips would travel to/from the south of University Boulevard. The remaining 66% of trips were shown to use other streets surrounding the Streets at Southglenn, including Arapahoe Road and University Boulevard to the north. These trips would not use East Easter Avenue and have not been evaluated as part of this redevelopment traffic study.

Table 1. Weekday Trip Generation

Description	ITE LU Code	Quantity	Unit	Daily		AM Peak				PM Peak			
				Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
Remove Existing Development													
- Remove Existing Sears								64%	36%			50%	50%
	875 - Department Store	132.584	1000 sq. ft.	eqn	4277	0.58	77	49	28	1.95	259	130	130
- Remove Existing Office								86%	14%			16%	84%
	710 – Office	7.828	1000 sq. ft.	9.74	76	1.16	9	8	1	1.15	9	1	8
			Net Reduction		*-4353*		-86	-57	-29		-268	-131	-138
Add New Development													
- Add New Residential								26%	74%			61%	39%
	221 - Multifamily Housing (Mid-Rise)	683	dwelling units	5.44	3716	0.36	246	64	182	0.44	301	184	117
- Add New Retail								62%	38%			48%	52%
	820 - Shopping Center	34.77	1000 sq. ft.	Eqn	2931	Eqn	160	105	64	Eqn	249	120	129
			Net Addition		6647		415	169	246		550	304	246
Totals					**2294**		**327**	**113**	**214**		**282**	**170**	**111**

The distribution along East Easter Avenue was applied to the trip generation shown above, and the volumes were added to traffic on the realigned roadway network. Synchro analyses were performed to document the operational effects of the redevelopment. No changes to peak hour factors or other inputs were made. Refer to **Figure 3**. As shown, the side street approaches generally operate at LOS B, and the East Easter Avenue left turns typically operate at LOS A, which is unchanged from the existing conditions.

Figure 3. Total Volumes and Level of Service



The Synchro results show negligible queuing along East Easter Avenue approaching the new South Gaylord Street / Access 8 intersection. Negligible westbound queues are predicted approaching South Vine Street. Short queues (less than 1 vehicle) are predicted eastbound approaching Access 9 in the PM peak hour. Assuming each vehicle is 25 feet long and a one vehicle queue, the proposed 100-foot separation provides adequate spacing between South Vine Street and Access 9 to accommodate existing queues.

A review of ITE guidance regarding offset intersections was undertaken using ITE's *Transportation and Land Development, 2nd Edition* (2002). ITE recommends that queue lengths between offset intersections be evaluated, and that various minimums also be observed. As discussed above, our evaluation of queue lengths indicates that there is a low probability of overlap issues with the proposed relocation of Access 9. The ITE minimums vary based on site conditions, intersection control, and traffic volumes. The working minimum for spacing is 120 feet (from curbline to curbline), per Figure 6-23. The existing 40-foot offset at Access 8 / South Gaylord Street offset is only 33% of the recommended value. The proposed 100-foot offset at Access 9 / South Vine Street, while not ideal, is 83% of the recommended value.

A similar review of Transportation Research Board (TRB) guidance regarding offset intersections was undertaken using TRB's *Access Management Manual, 2nd Edition* (2014). TRB also recommends that various minimums be observed between offset intersections, and they specify a 175-foot minimum from centerline to centerline in Exhibit 14-23. The existing 100-foot offset at Access 8 / South Gaylord Street offset is 57% of TRB's recommended value. The proposed 150-foot offset at Access 9 / South Vine Street, while not ideal, is 86% of TRB's recommended value.

Not fully meeting these offset recommendations is not problematic due to the relatively low peak hour traffic volumes they serve and the fact that minimal queuing is anticipated between the offset legs.

Related Elements

In addition to traffic operations and queuing, several other transportation elements have been considered at a conceptual level. These are presented below.

Bus Stops

The Regional Transportation District (RTD), the Denver area's transit provider, operates three routes that use East Easter Avenue to reach their transfer / end-of-line bus station at South Race Street / East Davies Place (on the west side of the shopping center parking garage). There are far-side bus stops eastbound and westbound at South Vine Street, plus a near-side stop approaching Gaylord Street and approaching Access 8. The bus stops along eastbound East Easter Avenue serve all three routes as they circulate clockwise around the Streets at Southglenn. The westbound stops only serve Route 66 as part of its local service pattern.

- Near-side bus stops are often discouraged as stopped buses conflict with traffic flow approaching intersections. It is assumed that the near-side stops at the Access 8 / South Gaylord Street intersection are in place to prevent buses from stopping within the offset area. With the realignment of Access 8 across from South Gaylord Street, it is recommended that a discussion be held with RTD to relocate these two stops to far-side stops surrounding the reconfigured South Gaylord Street / Access 8 intersection.
- The eastbound far-side stop at South Vine Street will be within the offset intersection created when Access 9 is constructed, and the stop should be relocated further east. It is recommended that a discussion be held with RTD to relocate this stop east of Access 9.

If bus stops are relocated, existing bus stop amenities (benches, signs, etc.) will need to be moved during the process. RTD is currently evaluating their entire system for bus stop consolidation. A conversation with RTD staff about consolidating stops along East Easter Avenue may also be beneficial.

Bicycles and Pedestrians

Given the existing bicycle lanes and marked crosswalk on East Easter Avenue, a review of bicycle and pedestrian amenities has also been conducted.

- The existing bicycle lanes connect to bicycle lanes east of the project along East Easter Place and continue west of the project along East Easter Avenue. The proposed realignments should be designed to maintain continuity of these facilities along East Easter Avenue. The total number of bicycle lane interruptions for intersections will not change, although the interruption at Access 8 will be related west to Access 9. If bus stops are relocated, the related dashed bicycle lane striping will need to be adjusted.
- The existing marked pedestrian crosswalk at Access 8 should be removed when Access 8 is relocated. If the bus stops at Access 8 and South Gaylord Street are relocated as described above, it would make sense to relocate the existing crosswalk at the new Access 8 / South Gaylord Street intersection, where access to both the Glenn Oaks Condominiums and the eastbound bus stop can be provided. The current concept plans for the relocated Access 8 show pedestrian amenities along both sides of the new access. These will connect pedestrians from East Easter Avenue to the existing pedestrian plaza north of the Sears building.

Conclusions

Based on the evaluations above, FHU believes that the proposed offset intersection at South Vine Street represents an improvement from existing conditions for the following reasons:

- The proposed offset intersection location is further from University Boulevard than the existing offset intersection, implying that motorists will be more acclimated to lower volume, lower speed conditions.
- The through volumes on East Easter Avenue at the proposed location are lower than at the existing offset intersection, implying fewer conflicts at the offset intersection.
- The analyses performed indicate that left turn queues between the north and south legs of the proposed offset intersection are not anticipated to overlap.
- The proposed offset intersection provides more than twice the interior spacing between the north and south legs of the offset intersections than at the existing offset intersection.

The proposed plan reflects an improvement with respect to East Easter Avenue access. If you have any questions regarding this letter report, please call me at 303.721.1440.

Sincerely,

FELSBURG HOLT & ULLEVIG

Paul Brown, PE, PTOE
Associate

Attachments