

TRAFFIC ANALYSIS & DESIGN, INC.



Intersection Control Evaluation STH 97 Corridor Marshfield, WI



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December 7, 2011*

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INTERSECTION CONTROL EVALUATION AND CORRIDOR STUDY FOR:

STH 97 CORRIDOR

CITY OF MARSHFIELD, WISCONSIN

DATE SUBMITTED: December 7, 2011

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EXECUTIVE SUMMARY

The Wisconsin Department of Transportation (WisDOT) is currently investigating the need to make improvements to the State Trunk Highway (STH) 97 corridor located within the limits of the City of Marshfield, Wood County, Wisconsin. The corridor limits from south to north include the STH 97 intersection with Arnold Street through the STH 97 intersection with Harrison Street. This report provides an evaluation of the main signalized intersections within the corridor; specifically, the STH 97 intersections with Arnold Street and Doege Street. In addition to analyzing these main intersections, the STH 97 corridor was also evaluated to determine if changes to the existing cross section should be implemented. The study includes both operational and crash evaluations, which were used to determine the expected weekday morning and weekday evening peak hour operating conditions and recommendations for the intersections with STH 97. The traffic signal controlled intersections at Arnold Street and Doege Street were evaluated for possible enhanced traffic signal control or roundabout control under the construction year 2017 and design year 2037 traffic scenarios.

This report documents the procedures, findings, and conclusions of the intersection control evaluation. This analysis identifies recommended improvements based on existing intersection geometrics and additional background traffic expected to be generated within the City of Marshfield and by the surrounding communities.

STUDY AREA INTERSECTIONS

The ½-mile section of STH 97 from Arnold Street to Harrison Street shown in Exhibit 1 is the last remaining section of the STH 97 corridor to undergo reconstruction as the areas north and south of the project limits have recently been reconstructed. Eight intersections fall within the project limits.

An intersection operational and safety analysis was conducted for the following intersections to determine potential improvements (i.e. addition of exclusive left-turn lanes) that could be made to improve traffic operations and safety at these signalized intersections:

- STH 97 and Arnold Street
- STH 97 and Doege Street

These two intersections are currently operating under traffic signal control. The existing lane configuration of each intersection is shown in Exhibit 2.

In order to aid in the analysis of the STH 97 corridor, an operational and safety analysis was also conducted at the following two-way stop sign controlled intersections that fall within the project limits:

- STH 97 and Blodgett Street
- STH 97 and Cleveland Street
- STH 97 and Edison Street
- STH 97 and Franklin Street
- STH 97 and Grant Street
- STH 97 and Harrison Street

These six intersections are currently operating under two-way stop sign control with free-flow conditions along STH 97. The existing lane configuration of each intersection is shown in Exhibit 2.

SAFETY ISSUES

WisDOT conducted a review of five years of crash data (2005 through 2009) along the STH 97 project corridor. The STH 97 project corridor had a crash rate of 904 crashes per 100 million vehicle miles (100 MVM), which is significantly higher than the Year 2008 statewide average for urban streets of 257 crashes per 100 MVM. The injury crash rate along STH 97 was 368 injury crashes per 100 MVM, which is also significantly higher than the statewide average for urban streets of 75 injury crashes per 100 MVM. Overall, 47 percent of crashes along the project corridor were rear-end crashes and 32 percent were angle crashes.

In addition to evaluating the crash rate along the corridor, WisDOT also evaluated the crash rate at the two signalized intersections and determined the crash rates at Arnold Street and Doege Street to be 0.79 and 1.06 crashes per million entering vehicles (MEV), respectively. The crash rate of 0.79 crashes per MEV at Arnold Street is lower than the statewide average crash rate of 0.96 crashes per MEV for similar urban signalized intersections that experienced five or more crashes in one year (*Intersection Crash Summary Statistics for Wisconsin 2005*, Knapp and Campbell). The crash rate of 1.06 crashes per MEV at Doege Street is higher than the statewide average crash rate of 0.96 crashes per MEV for similar urban signalized intersections that experienced five or more crashes in one year.

STH 97 CORRIDOR CROSS SECTION ALTERNATIVES

The cross section along STH 97 between Arnold Street and Harrison Street currently provides for a four-lane undivided section with parking lanes along both sides of the road; however, it is noted that the section of STH 97 between Arnold Street and Blodgett Street does not provide for parking on the west side of the road due to the presence of a southbound left-turn lane at the signalized Arnold Street intersection. The recently reconstructed cross section of STH 97 to the north consists of two lanes in each direction separated by a center median (the corridor widens to include dedicated left- and/or right-turn lanes at major intersections and significant access points to maximize roadway capacity). The existing cross section to the south, which was also recently reconstructed in 2010, is a wider section consisting of a five lanes—one of which is a shared two-way-left-turn-lane (TWLTL)—with parking lanes on both sides of the road. The Year 2011 Annual Average Daily Traffic (AADT) on STH 97 immediately south of Doege Street was 12,800 vehicles per day (vpd), a value that is expected to increase to approximately 18,000 vpd by design year 2037.

In addition to the high traffic volumes expected along the STH 97 corridor between Arnold Street and Harrison Street, the crash rate and injury crash rate along this same stretch of highway are both higher than the statewide averages, with a high percentage of rear-end and angle crashes. Therefore, in addition to looking at geometric improvements at the signalized intersections, several cross section alternatives were also evaluated to potentially provide improved operations and safety, while also establishing continuity between the “finished” sections of STH 97 to the north and to the south. The following cross section alternatives were evaluated as part of this study:

1. *Existing four-lane cross section with optimized signal timings;*
2. *Four-lane cross section with a raised median;*
3. *Five-lane TWLTL cross section.*

The existing and alternative cross sections can be found in Exhibit 8. All traffic control is assumed to remain the same for both the existing and alternative corridor cross sections, though the signal timings and offsets at the signalized intersections may vary with each cross section alternative.

The overall corridor and the study area intersections were analyzed based on the procedures set forth in the 2000 *Highway Capacity Manual* (HCM) under the projected year 2017 and 2037 traffic volume scenarios.

Existing Four-Lane Cross Section – No Improvements

The existing four-lane cross section currently provides LOS C or better traffic operations for nearly all movements along the STH 97 project corridor. The exceptions are the westbound through and right-turn movements at Arnold Street during the morning peak hour, which operate at LOS D; although, it is noted that the expected delay for these movements of 35.1 seconds per vehicle is only 0.1 seconds more than the LOS C/D threshold for signalized intersections.

Intersections within the STH 97 project corridor are expected to continue to operate at acceptable levels with the projected year 2017 traffic volumes during the typical weekday morning and evening peak hours as all movements are expected to operate at LOS C or better except for the following:

- The westbound through and right-turn movements at Arnold Street are expected to operate at LOS D during the morning peak hour;
- All westbound movements at Blodgett Street are expected to operate at LOS D during the morning peak hour;
- All eastbound movements at Harrison Street are expected to operate at LOS D during the evening peak hour.

Traffic operations are expected to deteriorate along the project corridor with the projected year 2037 traffic volumes as each intersection is expected to include movements with LOS D or worse operations. The following movements are expected to operate unacceptably:

- At *Arnold Street*, the westbound through and right-turn movements are expected to operate at LOS D during the morning and evening peak hours and the eastbound left-turn movement is expected to operate at LOS D during the evening peak hour;
- At *Blodgett Street*, all westbound movements are expected to operate at LOS F during the morning peak hour and all eastbound movements are expected to operate at LOS F during the morning peak hour;
- At *Cleveland Street*, all westbound movements are expected to operate at LOS D during the morning peak hour;
- At *Doege Street*, the westbound through and right-turn movements are expected to operate at LOS D during the morning peak hour;
- At *Edison Street*, all westbound movements are expected to operate at LOS D during the evening peak hour and all eastbound movements are expected to operate at LOS D during the evening peak hour;
- At *Franklin Street*, all westbound movements are expected to operate at LOS D during the evening peak hour and all eastbound movements are expected to operate at LOS D during the evening peak hour;
- At *Grant Street*, all westbound movements are expected to operate at LOS E during the evening peak hour and all eastbound movements are expected to operate at LOS D during the evening peak hour;

- At *Harrison Street*, all westbound movements are expected to operate at LOS D during the evening peak hour and all eastbound movements are expected to operate at LOS E during the evening peak hour.

Due to the operational issues listed above and the extensive crash history along the corridor, a number of improvements are recommended along the corridor.

Year 2017 Projected Traffic Improvements

Based on the analysis of each intersection and of the corridor as a whole, the following improvements are recommended for this project under the projected year 2017 traffic volumes.

STH 97 at Arnold Street

- Update signal timings and offsets at the intersection

STH 97 at Doege Street

- Update signal timings and offsets at the intersection
- Provide for dedicated left-turn lanes along the northbound and southbound approaches to accompany a through lane and shared through-right lane in each direction

STH 97 Corridor

- Implement a five-lane TWLTL cross section to match STH 97 corridor to the south
- Consider constructing raised pedestrian refuge areas within the TWLTL at each intersection to match the STH 97 corridor to the south
- Eliminate on-street parking throughout the corridor

Due to the projected increase in traffic volumes in the 2017 traffic scenario, the two signalized intersections will require retiming to provide for efficient operations along the STH 97 corridor. Moreover, adding dedicated left-turn lanes to both the northbound and southbound approaches of the STH 97 intersection with Doege Street is expected to result in improved safety at the intersection; specifically, separating the left-turning vehicles from the through traffic lanes is expected to reduce the number of rear-end collisions at the Doege Street intersection.

A five-lane TWLTL cross section is currently provided south of the STH 97 project corridor. Continuing this cross section through the project limits is expected to improve safety by providing a shared dedicated left-turn lane throughout the corridor. Separating all left-turning vehicles from the through traffic lanes is expected to reduce the number of rear-end collisions along the corridor. A five-lane TWLTL is also expected to improve traffic operations throughout the corridor with all movements operating at LOS C or better under projected year 2017 traffic volumes except for the westbound through and right-turn movements at Arnold Street which are expected to operate at LOS D during the morning peak hour; however, the expected delay for these movements of 35.3 seconds per vehicle is only 0.3 seconds more than the LOS C/D threshold for signalized intersections. Although on-street parking on both the east and west sides of STH 97 would be eliminated with this cross section, most local businesses would be able to retain full access to their driveways. The exceptions would be the driveways located within the limits of the proposed pedestrian refuge areas at each of the intersections along the corridor.

Per WisDOT requirements, the intersections of STH 97 with Arnold Street and Doege Street were also evaluated with possible roundabout control as part of this study. Under roundabout control, all traffic movements would be expected to operate at LOS A with the projected year 2017 traffic volumes at both the Arnold Street and Doege Street intersections; however, due to the urban location, which limits the amount of available right-of-way, and the presence of

existing traffic signals along the corridor to the north and south, roundabout control is not recommended at these intersections.

Year 2037 Projected Traffic Improvements

Based on the analysis of each intersection and of the corridor as a whole, no additional improvements above and beyond the recommended year 2017 projected traffic improvements are recommended to accommodate the projected year 2037 traffic volumes.

Due to the projected increase in traffic volumes in the 2037 traffic scenario, the two signalized intersections will require retiming to provide for efficient operations along the STH 97 corridor. Moreover, adding dedicated left-turn lanes to both the northbound and southbound approaches of the STH 97 intersection with Doege Street is expected to result in improved safety at the intersection; specifically, separating the left-turning vehicles from the through traffic lanes is expected to reduce the number of rear-end collisions at the Doege Street intersection.

A five-lane TWLTL cross section is currently provided south of the STH 97 project corridor. Continuing this cross section through the project limits is expected to improve safety by providing a shared dedicated left-turn lane throughout the corridor. Separating all left-turning vehicles from the through traffic lanes is expected to reduce the number of rear-end collisions along the corridor. A five-lane TWLTL is also expected to improve traffic operations throughout the corridor with all movements operating at LOS C or better under projected year 2037 traffic volumes except for the following movements:

- The westbound through and right-turn movements at Arnold Street are expected to operate at LOS D during the morning peak hour; however, the expected delay for these movements of 35.7 seconds per vehicle is only 0.7 seconds more than the LOS C/D threshold for signalized intersections.
- The eastbound left-turn movement at Arnold Street is expected to operate at LOS D during the evening peak hour; however, the expected delay for this movement of 35.8 seconds per vehicle is only 0.8 seconds more than the LOS C/D threshold for signalized intersections.

Although on-street parking on both the east and west sides of STH 97 would be eliminated with this cross section, most local businesses would be able to retain full access to their driveways. The exceptions would be the driveways located within the limits of the proposed pedestrian refuge areas at each of the intersections along the corridor.

Per WisDOT requirements, the intersections of STH 97 with Arnold Street and Doege Street were also evaluated with possible roundabout control as part of this study. Under roundabout control, all traffic movements would be expected to operate at LOS A with the projected year 2037 traffic volumes at both the Arnold Street and Doege Street intersections; however, due to the urban location, which limits the amount of available right-of-way, and the presence of existing traffic signals along the corridor to the north and south, roundabout control is not recommended at these intersections.

CONCLUSIONS

Geometric and cross section improvements are expected to be required along the STH 97 corridor and at the STH 97 intersection with Doege Street to provide safe operations both today and in the future. The implementation of a five-lane TWLTL cross section together with traffic signal control improvements is expected to improve operations and safety along the corridor through the year 2037.

CHAPTER I – ANALYSIS OF EXISTING CONDITIONS

PART A – PHYSICAL CHARACTERISTICS

Exhibit 2 shows the existing configuration of the study area intersections and adjacent roadways. More specifically, Exhibit 2 graphically illustrates existing intersection geometrics, existing traffic control, posted speed limits, approximate distances between intersections and the number of travel lanes and median types along roadways within the study area. The study area roadways are discussed below.

STH 97 (Central Avenue) is a north/south four-lane urban highway with a posted speed limit of 25 miles per hour (mph) throughout the project corridor. It is a predominantly undivided highway except for small divider islands along the northbound and southbound approaches at the Arnold Street and Doege Street intersections. Parking lanes are present on both sides of STH 97 throughout the project corridor except for the section of STH 97 south of Blodgett Street on the west side of the highway due to the presence of a southbound left-turn lane at the signalized Arnold Street intersection. The 2011 AADT collected by WisDOT along STH 97 was 12,800-vpd immediately south of Doege Street. Sidewalks are also located on both the east and west sides of STH 97 throughout the entire project corridor.

Arnold Street is an east/west two-lane undivided roadway with a posted speed limit of 25 mph. The roadway geometry on the eastbound approach to STH 97 consists of a dedicated left-turn lane, a through lane, and a small channelized right-turn lane (yield controlled). The roadway geometry on the westbound approach consists of a dedicated left-turn lane and a shared through-right lane. The 2011 AADT collected by WisDOT along Arnold Street was 1,600-vpd immediately east of STH 97. Sidewalks are provided on both the north and south sides of the road. There is some parking allowed on Arnold Street outside the limits of the intersection.

Doege Street is an east/west two-lane undivided roadway with a posted speed limit of 25 mph. The roadway geometry on both the eastbound and westbound approaches to STH 97 consists of a dedicated left-turn lane and a shared through-right lane. The 2011 AADT collected by WisDOT along Doege Street was 2,800-vpd immediately west of STH 97. Sidewalks are provided on both the north and south sides of the road. There is some parking allowed on Doege Street outside the limits of the intersection.

The following east/west local streets currently intersect STH 97 through the corridor. All streets have a 25-mph speed limit and parking is provided along these side streets outside the limits of their respective intersections. From south to north, the streets include Arnold Street, Blodgett Street, Cleveland Street, Doege Street, Edison Street, Franklin Street, Grant Street, and Harrison Street. Exhibits 6a-h provide photos at the approaches of each of the study area intersections along STH 97.

Alternative Modes of Transportation

Sidewalks currently exist along both sides of the main STH 97 corridor and along each of the eight side roads that intersect the highway. Bike accommodations are provided on STH 97 north of the project corridor via a two foot wide bike lane on both sides of STH 97.

PART B – TRAFFIC VOLUMES

Traffic Analysis & Design, Inc. conducted weekday morning and evening turning movement counts (6:30 am to 9:30 am and 3:00 pm to 6:00 pm) at the STH 97 intersections with Blodgett Street and Doege Street in late September 2011 in order to determine the weekday morning and evening peak hours. Additional morning and evening peak hour counts (7:00 am to 8:00 am and

4:15 pm to 5:15 pm, respectively) were then conducted at the STH 97 intersections with Cleveland Street, Edison Street, Franklin Street, Grant Street, and Harrison Street in early October 2011 (turning movement counts could not be conducted at Arnold Street due to road construction at the time). It is noted that all counts were conducted when school was in session to allow for accurate pedestrian counts at the corridor intersections. The year 2011 existing traffic volumes for the study area intersections are shown in Exhibit 3.

Turning movement counts from the STH 97 intersections with Blodgett Street and Doege Street were submitted to WisDOT for its use in providing future year traffic forecasts for the years 2017 and 2037. Based on the forecasts received from WisDOT, the expected growth rates were determined for each intersection. These rates were then applied to the turning movement counts at Cleveland Street, Edison Street, Franklin Street, Grant Street, and Harrison Street to determine the projected year 2017 and 2037 traffic volumes at these locations. Adjusted growth rates were also applied to turning movement counts at Arnold Street from 2006 to determine approximate volumes at that intersection for the years 2011, 2017, and 2037. The projected year 2017 and 2037 traffic volumes for all of the study area intersections are shown in Exhibits 7a-b. All traffic count and forecast data are included in Appendix A of this report.

PART C – CAPACITY LEVEL OF SERVICE

The study area intersections were analyzed based on the procedures set forth in the 2000 *Highway Capacity Manual* (HCM). Intersection operation is defined by “level of service”. Level of Service (LOS) is a quantitative measure that refers to the overall quality of flow at an intersection ranging from very good, represented by LOS ‘A’, to very poor, represented by LOS ‘F’. For the purpose of this study, LOS C was used to define acceptable peak hour operating conditions for the study area intersections. Descriptions of the various levels of service are as follows:

LOS A is the highest level of service that can be achieved. Under this condition, intersection approaches appear quite open, turning movements are easily made, and nearly all drivers find freedom of operation. At signalized and unsignalized intersections, average delays are less than 10 seconds.

LOS B represents stable operation. At signalized intersections, average vehicle delays are 10 to 20 seconds. At unsignalized intersections, average delays are 10 to 15 seconds.

LOS C still represents stable operation, but periodic backups of a few vehicles may develop behind turning vehicles. Most drivers begin to feel restricted, but not objectionably so. At signalized intersections, average vehicle delays are 20 to 35 seconds. At unsignalized intersections, average delays are 15 to 25 seconds.

LOS D represents increasing traffic restrictions as the intersection approaches instability. Delays to approaching vehicles may be substantial during short peaks within the peak period, but periodic clearance of long lines occurs, thus preventing excessive backups. At signalized intersections, average vehicle delays are 35 to 55 seconds. At unsignalized intersections, average delays are 25 to 35 seconds.

LOS E represents the capacity of the intersection. At signalized intersections, average vehicle delays are 55 to 80 seconds. At unsignalized intersections, average delays are 35 to 50 seconds.

LOS F represents jammed conditions where the intersection is over capacity and acceptable gaps for unsignalized intersections in the mainline traffic flow are minimal.

At signalized intersections, average vehicle delays exceed 80 seconds. At unsignalized intersections, average delays exceed 50 seconds.

Year 2011 Existing Traffic Operating Conditions

Exhibit 4 shows the year 2011 existing traffic peak hour operating conditions at each of the study area intersections. The existing intersection geometrics, shown in Exhibit 2, were used in the analysis.

As shown in Exhibit 4, all movements at the study area intersections currently operate at LOS C or better conditions during the weekday morning and weekday evening peak hours with the year 2011 existing traffic volumes. The only exception occurs at the intersection of STH 97 and Arnold Street, where the westbound through and right-turn movements operate at LOS D during the morning peak hour; however, it is noted that the expected delay for this movement of 35.1 seconds per vehicle is only 0.1 seconds more than the LOS C/D threshold.

CHAPTER II – FUTURE YEAR TRAFFIC ANALYSIS WITH NO IMPROVEMENTS

PART A – BACKGROUND TRAFFIC FORECASTING

Turning movement counts from the STH 97 intersections with Blodgett Street and Doege Street were submitted to WisDOT for its use in providing future year traffic forecasts for the years 2017 and 2037. Based on the forecasts received from WisDOT, the expected growth rates were determined for each intersection. These rates were then applied to the turning movement counts at Cleveland Street, Edison Street, Franklin Street, Grant Street, and Harrison Street to determine the projected year 2017 and 2037 traffic volumes at these locations. Adjusted growth rates were also applied to turning movement counts at Arnold Street from 2006 to determine approximate volumes at that intersection for the years 2011, 2017, and 2037. The projected year 2017 and 2037 traffic volumes for all of the study area intersections are shown in Exhibits 7a-b. All traffic count and forecast data are included in Appendix A of this report.

PART B – CAPACITY / LEVEL OF SERVICE ANALYSIS – NO IMPROVEMENTS

The projected year 2017 and 2037 traffic peak hour operating conditions are shown in Exhibits 8a and 8c, respectively. The STH 97 project corridor was evaluated with these projected traffic volumes using the existing geometrics and traffic control as shown in Exhibit 2.

Year 2017 Projected Traffic – No Improvements

With the projected year 2017 traffic volumes, all traffic movements at the study area intersections are expected to operate at LOS C or better conditions during the typical weekday morning and evening peak hours, as shown in Exhibit 9a, except for the following:

- The westbound through and right-turn movements at Arnold Street are expected to operate at LOS D during the morning peak hour;
- All westbound movements at Blodgett Street are expected to operate at LOS D during the morning peak hour;
- All eastbound movements at Harrison Street are expected to operate at LOS D during the evening peak hour.

Year 2037 Projected Traffic – No Improvements

With the projected year 2037 traffic volumes, traffic operations throughout the STH 97 project corridor are expected deteriorate with movements experiencing LOS D or worse conditions at each of the eight project intersections as shown in Exhibit 9c. The following movements are expected to operate unacceptably:

- At *Arnold Street*, the westbound through and right-turn movements are expected to operate at LOS D during the morning and evening peak hours and the eastbound left-turn movement is expected to operate at LOS D during the evening peak hour;
- At *Blodgett Street*, all westbound movements are expected to operate at LOS F during the morning peak hour and all eastbound movements are expected to operate at LOS F during the morning peak hour;
- At *Cleveland Street*, all westbound movements are expected to operate at LOS D during the morning peak hour;

- At *Doege Street*, the westbound through and right-turn movements are expected to operate at LOS D during the morning peak hour;
- At *Edison Street*, all westbound movements are expected to operate at LOS D during the evening peak hour and all eastbound movements are expected to operate at LOS D during the evening peak hour;
- At *Franklin Street*, all westbound movements are expected to operate at LOS D during the evening peak hour and all eastbound movements are expected to operate at LOS D during the evening peak hour;
- At *Grant Street*, all westbound movements are expected to operate at LOS E during the evening peak hour and all eastbound movements are expected to operate at LOS D during the evening peak hour;
- At *Harrison Street*, all westbound movements are expected to operate at LOS D during the evening peak hour and all eastbound movements are expected to operate at LOS E during the evening peak hour.

PART C – CRASH ANALYSIS

Crash Frequency/Severity

WisDOT conducted a review of five years of crash data (2005 through 2009) along the STH 97 project corridor and found that 96 non-deer crashes occurred between Arnold Street and Harrison Street over that time span. Forty-one percent of these crashes resulted in an injury to at least one person. Collision diagrams showing the location and details of crashes along the corridor are shown in Exhibits 5a-c. It should be noted that the aforementioned collision diagrams do not include *all* 96 crashes, as some of the crash reports could not be located; however, the statistical summaries of crashes shown in Exhibits 5d-f do provide a comprehensive summary of all crashes that occurred along the project corridor and at the two signalized intersections.

Crash Patterns Observed

Overall, 47 percent of crashes along the project corridor were rear-end crashes and 32 percent were angle crashes. Twenty crashes occurred within the functional area of the STH 97 intersection with Arnold Street, eight of which were rear-end crashes. Thirty-five crashes occurred within the functional area of the STH 97 intersection with Doege Street, sixteen of which were rear-end crashes. In addition, sixteen angle crashes occurred at the Doege Street intersection, many of which involved vehicles attempting to make northbound/southbound left-turn movements.

Crash Rate

The STH 97 project corridor had a crash rate of 904 crashes per 100 million vehicle miles (100 MVM), which is significantly higher than the Year 2008 statewide average for urban streets of 257 crashes per 100 MVM. The injury crash rate along STH 97 was 368 injury crashes per 100 MVM, which is also significantly higher than the statewide average for urban streets of 75 injury crashes per 100 MVM.

In addition to evaluating the crash rate along the corridor, WisDOT also evaluated the crash rate at the two signalized intersections and determined the crash rates at Arnold Street and Doege Street, to be 0.79 and 1.06 crashes per million entering vehicles (MEV), respectively. The crash rate of 0.79 crashes per MEV at Arnold Street is lower than the statewide average crash rate of 0.96 crashes per MEV for similar urban signalized intersections that experienced five or more crashes in one year (*Intersection Crash Summary Statistics for Wisconsin 2005*, Knapp and

Campbell). The crash rate of 1.06 crashes per MEV at Doege Street is higher than the statewide average crash rate of 0.96 crashes per MEV for similar urban signalized intersections that experienced five or more crashes in one year.

Crash Rate Countermeasures

A four-lane cross section with a raised median is expected to improve safety along the STH 97 corridor by separating *all* left-turning vehicles from the through traffic lanes, which is expected to reduce the number of rear-end crashes that occur each year; however, access to driveways along the corridor would be restricted to right-in/right-out only and parking would be eliminated along the corridor.

A five-lane TWLTL cross section is also expected to improve safety along the STH 97 corridor by separating *all* left-turning vehicles from the through traffic lanes, which is expected to reduce the number of rear-end collisions that occur each year and while parking would be eliminated along the entire project corridor, most local businesses would be able to retain full access to their driveways. The exceptions would be the driveways located within the limits of the proposed pedestrian refuge areas at each of the intersections along the corridor.

CHAPTER III – FUTURE YEAR TRAFFIC ANALYSIS WITH IMPROVEMENTS

PART A – FUTURE YEAR CAPACITY / LEVEL OF SERVICE ANALYSIS – WITH IMPROVEMENTS

The STH 97 project corridor and its associated intersections were analyzed based on the procedures set forth in the 2000 *Highway Capacity Manual* (HCM) with the projected year 2017 and 2037 traffic volumes in order to determine if any changes need to be made to the existing intersection geometry or to the corridor cross section to provide improved operations and safety for this highway. It is noted that LOS C or better conditions were used to define acceptable peak hour operating conditions at the intersections. The following cross section alternatives were evaluated as part of this study:

1. *Existing four-lane cross section with optimized signal timings;*
2. *Four-lane cross section with a raised median;*
3. *Five-lane TWLTL cross section.*

The existing and alternative cross sections are described below and are shown in Exhibit 8. All traffic control is assumed to remain the same for both the existing and alternative corridor cross sections, though the signal timings and offsets at the signalized intersections may vary with each cross section alternative.

Four-Lane Cross Section with Raised Median

A four-lane cross section with a raised median is currently provided north of the STH 97 project corridor. Implementing this design throughout the project corridor is expected to improve safety and operations by providing dedicated left-turn bays at critical intersections thereby separating the left-turning vehicles from the through traffic lanes which is expected to reduce the number of rear-end collisions. However, this cross section would restrict access to many of the local businesses along the corridor to right-in/right-out only in addition to eliminating all on-street parking between Arnold Street and Harrison Street.

Five-Lane TWLTL Cross Section

A five-lane TWLTL cross section is currently provided south of the STH 97 project corridor. Implementing this design throughout the project corridor is expected to improve safety and operations by providing a shared dedicated left-turn lane throughout the corridor. Separating all left-turning vehicles from the through traffic lanes has been shown to reduce the number of rear-end collisions that occur. Although on-street parking on both the east and west sides of STH 97 would be eliminated, most local businesses would be able to retain full access to their driveways. The exception is the driveways located within the limits of the proposed pedestrian refuge areas at each of the intersections along the corridor.

STH 97 Corridor Operations

To evaluate the different cross section options, a measure of effectiveness (MOE) analysis was conducted.

Table 1 shows the system MOEs reported by the Synchro traffic operations model for the weekday morning and evening peak hour operating conditions under each alternative. The system operations take into account the operations of all traffic movements along STH 97 and at the side road intersections. This allows an accurate comparison to be made between all the alternatives. The three MOEs used to assess the operation of each alternative were total vehicle delay, average speed and performance index. The MOEs are described follows.

Total Delay is determined in this model by dividing the total delay on the link by the total number of vehicles on the link. Total delay is defined as the travel time minus the time it would take the vehicle with no other vehicles or traffic control devices. It also includes the time spent by denied entry vehicles while they wait to enter the network.

Average Speed is determined by dividing the total travel distance by the total travel time. Total travel is determined by multiplying the link traffic volume by the link length. The total travel time includes both the time spent moving and the time spent delayed for all vehicles on each link.

Performance Index serves as an overall average value which totals all the Synchro MOEs into one number to compare alternatives. The lower the performance index, the better the alternative operates.

Table 1
Corridor Alternatives
Peak Hour Traffic Operations
System Measures of Effectiveness

Traffic Scenario*	Time Period	Delay (sec/veh)	Speed (mph)	Performance Index
Year 2011 Existing (4-lane with parking, existing conditions)	AM	2	21	7.1
	PM	2	21	9.7
Year 2037 Total (4-lane with parking, no improvements)	AM	3	20	12.2
	PM	3	20	16.8
1: Year 2037 Total (4-lane with parking, optimized signals)	AM	3	20	11.4
	PM	3	20	17.8
2: Year 2037 Total (4-lane with raised median, no parking, optimized signals)	AM	3	20	10.4
	PM	3	20	16.4
3: Year 2037 Total (5-lane with TWLTL, no parking, optimized signals)	AM	3	20	10.4
	PM	3	20	16.4

* Total includes background traffic plus forecasted increases in traffic volumes along the corridor

As shown in Table 1, all alternatives are expected to provide comparable delay, corridor speeds, and performance index values; however, cross section Alternatives 2 and 3 are expected to provide lower performance index values than the base year 2037 condition during both the morning and evening peak hours, while Alternative 1 is only expected to provide a lower performance index value than the base condition during the morning peak hour.

Because Alternatives 2 and 3 are identical in terms of MOEs (due to the limitations of the Synchro modeling software which is constrained from modeling closely spaced driveways within the project corridor), additional factors should be considered. Both alternatives would improve continuity along the STH 97 corridor by matching the existing cross sections along the adjacent sections of STH 97. In addition, both alternatives are expected to result in improved safety along the corridor as they provide for separation between left-turning vehicles and the through traffic lanes; however, the raised median design in Alternative 2 would restrict access to driveways along the corridor to right-in/right-out access only, while the TWLTL design in Alternative 3 would allow most local businesses to retain full access to their driveways. Therefore, it is recommended that Alternative 3 be considered for implementation along the project corridor.

Year 2017 Projected Traffic Improvements

The STH 97 project corridor was analyzed with the projected year 2017 traffic volumes. Based on the analysis of each intersection and of the corridor as a whole, the following improvements are recommended for this project under the year 2017 traffic volume scenario.

STH 97 at Arnold Street

- Update signal timings and offsets at the intersection

STH 97 at Doege Street

- Update signal timings and offsets at the intersection
- Provide for dedicated left-turn lanes along the northbound and southbound approaches to accompany a through lane and shared through-right lane in each direction

STH 97 Corridor

- Implement five-lane TWLTL cross section to match STH 97 corridor to the south
- Consider constructing raised pedestrian refuge areas within the TWLTL at each intersection to match the STH 97 corridor to the south
- Eliminate on-street parking throughout the corridor

The improvements listed above are shown in Exhibit 10.

Due to the projected increase in traffic volumes in the 2017 traffic scenario, the two signalized intersections will require retiming to provide for efficient operations along the STH 97 corridor. Moreover, adding dedicated left-turn lanes to both the northbound and southbound approaches of the STH 97 intersection with Doege Street is expected to result in improved traffic operations at the intersection; specifically, all northbound traffic movements are expected to operate at LOS A during the morning peak hour rather than LOS B (all southbound movements are expected to continue to operate at LOS A). However, the most significant advantage of adding left-turn lanes to the northbound and southbound approaches is the safety benefit they are expected to provide. Sixteen rear-end crashes occurred at the intersection over the past five years and adding left-turn lanes is expected to reduce these numbers by separating left-turning vehicles from the through vehicles at the intersection. Adding left-turn lanes is also expected to reduce the number of angle crashes in the future by clearly defining drivers' intentions (i.e. left-turning vehicles know if opposing vehicles are turning left or are continuing through the intersection).

While a four-lane cross section with a raised median currently operates effectively along STH 97 north of the project corridor, there would be impacts to existing access driveways along the corridor with the implementation of this type of cross section between Arnold Street and Harrison Street as it would restrict access to the large number of businesses and residences on both sides of the highway.

However, a five-lane TWLTL cross section would allow most local businesses and homes to retain full access to their driveways (the exception being driveways located within the limits of the proposed pedestrian refuge areas at each of the intersections along the corridor) while also improving traffic safety and operations throughout the entire corridor. Similar to adding left-turn lanes at the Doege Street intersection, adding the TWLTL to the center of the corridor cross section allows *all* left-turning vehicles to be separated from the through traffic lanes, thereby reducing the chances of rear-end and angle crashes occurring. With this recommended cross section, all traffic movements throughout the corridor are expected to operate at LOS C or better under projected year 2017 volumes, as shown in Exhibit 9b, except for the westbound through and right-turn movements at Arnold Street which are expected to operate at LOS D during the morning peak hour; however, the expected delay for these movements of 35.3 seconds per vehicle is only 0.3 seconds more than the LOS C/D threshold for signalized intersections.

While all parking lanes along STH 97 within the project limits would need to be removed as part of the recommended five-lane TWLTL cross section design, the benefits this cross section is expected to provide in terms of both safety and operations makes it a worthwhile option to consider. In addition, on-street parking currently exists along the side roads adjacent to STH 97 for the patrons of the businesses located along the corridor.

Year 2037 Projected Traffic Improvements

Based on the analysis of each intersection and of the corridor as a whole, no additional improvements above and beyond the year 2017 projected traffic improvements are recommended to accommodate the projected year 2037 traffic volumes. These improvements are shown in Exhibit 10.

Due to the projected increase in traffic volumes in the 2037 traffic scenario, the two signalized intersections will require retiming to ensure that traffic continues to provide for efficient operations along the STH 97 corridor. Adding dedicated left-turn lanes to both the northbound and southbound approaches of the STH 97 intersection with Doege Street is expected to result in improved traffic operations at the intersection; specifically, all northbound traffic movements are expected to operate at LOS A during the morning peak hour rather than LOS B (all southbound movements are expected to continue to operate at LOS A). However, the most significant advantage of adding left-turn lanes to the northbound and southbound approaches is the safety benefit they are expected to provide. Sixteen rear-end crashes occurred at the intersection over the past five years and adding left-turn lanes is expected to reduce these numbers by separating left-turning vehicles from the through vehicles at the intersection. Adding left-turn lanes is also expected to reduce the number of angle crashes in the future by clearly defining drivers' intentions (i.e. left-turning vehicles know if opposing vehicles are turning left or continuing through the intersection).

While a four-lane cross section with a raised median currently operates effectively along STH 97 north of the project corridor, it would be impractical to implement this type of cross section between Arnold Street and Harrison Street as it would restrict access to the large number of businesses and residences on both sides of the road.

However, a five-lane TWLTL cross section would allow most local businesses and homes to retain full access to their driveways (the exception being driveways located within the limits of the proposed pedestrian refuge areas at each of the intersections along the corridor) while also improving traffic safety and operations throughout the entire corridor. Similar to adding left-turn lanes at the Doege Street intersection, adding the TWLTL to the center of the corridor cross section allows *all* left-turning vehicles to be separated from the through traffic lanes, thereby reducing the chances of rear-end and angle crashes occurring. With this recommended cross

section, all traffic movements throughout the corridor are expected to operate at LOS C or better under projected year 2037 volumes, as shown in Exhibit 9d, except for the following movements:

- The westbound through and right-turn movements at Arnold Street are expected to operate at LOS D during the morning peak hour; however, the expected delay for these movements of 35.7 seconds per vehicle is only 0.7 seconds more than the LOS C/D threshold for signalized intersections.
- The eastbound left-turn movement at Arnold Street is expected to operate at LOS D during the evening peak hour; however, the expected delay for this movement of 35.8 seconds per vehicle is only 0.8 seconds more than the LOS C/D threshold for signalized intersections.

While all parking lanes along STH 97 within the project limits would need to be removed as part of the recommended five-lane TWLTL cross section design, the benefits this cross section is expected to provide in terms of both safety and operations makes it a worthwhile option to consider. In addition, on-street parking currently exists along the side roads adjacent to STH 97 for the patrons of the businesses located along the corridor.

PART B – TRAFFIC CONTROL ANALYSIS

The decision to choose a specific traffic control alternative for an intersection is best left to WisDOT and the local community. To aid WisDOT and the local community in their decision, Traffic Analysis & Design, Inc. has completed an alternatives analysis to objectively compare traffic signal control and roundabout control for the study area intersections along the STH 97 corridor. A recommended alternative is presented after considering right-of-way impacts, operations, safety and practical feasibility.

Roundabout Control

Per WisDOT requirements, the intersections of STH 97 with Arnold Street and Doege Street were evaluated with possible roundabout control as part of this study. Each intersection was modeled as a two-lane roundabout with two-lane northbound/southbound approaches and one-lane eastbound/westbound approaches. Based on the analysis conducted using RODEL software, all traffic movements are expected to operate at LOS A under roundabout control with the projected year 2017 and 2037 traffic volumes at both the Arnold Street and Doege Street intersections; however, due to the urban location, which limits the amount of available right-of-way, and the presence of existing traffic signals along the corridor to the north and south, roundabout control is not recommended at these intersections.

Traffic Signal Control

The intersections of STH 97 with Arnold Street and Doege Street are currently operating acceptably under the existing traffic signal control. Although traffic volumes are expected to increase with the projected year 2017 and 2037 traffic scenarios, updating the existing signal timings and offsets and implementing the recommended geometric improvements is expected to result in acceptable operations in the future. Traffic signal control is expected to be a lower cost alternative that also requires less right-of-way; therefore, it is recommended to consider retaining traffic signal control at the Arnold Street and Doege Street intersections.

An intersection control evaluation matrix has been included in the Appendix of this report to summarize the alternatives evaluated.

CHAPTER IV – RECOMMENDATIONS

SUMMARY/RECOMMENDATIONS

An intersection operational and safety analysis was conducted for the two signalized intersections along the STH 97 project corridor to determine potential geometric improvements that could be made to improve traffic operations and safety at these locations. The traffic signal controlled intersections at Arnold Street and Doege Street were also evaluated for possible enhanced traffic signal control or roundabout control under the construction year 2017 and design year 2037 traffic scenarios.

The intersection crash rate of 1.06 crashes per MEV at the STH 97 intersection with Doege Street is greater than the statewide average rate of 0.96 crashes per MEV for similar urban intersections with at least five crashes in one year. A high percentage of these crashes are rear-end and angle crashes. Therefore, it is recommended to implement dedicated left-turn lanes to the northbound and southbound approaches at Doege Street to accompany a through lane and shared through-right lane in each direction.

In addition, due to the projected increase in traffic volumes in the year 2017 and 2037 traffic scenarios, the signalized intersections at Arnold Street and Doege Street will require retiming to ensure that traffic continues to operate efficiently throughout the STH 97 corridor in the future. While roundabout control is expected to provide LOS A conditions for all traffic movements at the Arnold Street and Doege Street intersections through the project year 2037 traffic scenario, due to the urban location, which limits the amount of available right-of-way, and the presence of existing traffic signals along the corridor to the north and south, roundabout control is not recommended at these intersections.

In addition to analyzing these main intersections, the STH 97 corridor was also evaluated to determine if changes to the existing cross section should be implemented. Due to the expected increase in traffic volumes in the future and a crash rate along the corridor that exceeds the statewide average, several cross section alternatives were examined; specifically, (1) the existing four-lane cross section with optimized signal timings, (2) a four-lane cross section with a raised median, and (3) a five-lane TWLTL cross section were evaluated in order to determine which alternative provides the greatest overall improvement to operations and safety through the year 2037.

The existing four-lane cross section with optimized signal timings is expected to result in slightly improved traffic operations; however, several of the intersections along the project corridor are expected to continue to have one or more movements with LOS D, E, and/or F conditions during the weekday morning and evening peak hours under the projected year 2037 traffic scenario. While the existing four-lane cross section does provide for parking on both sides of STH 97, it does not fully address the safety issues that exist along the highway. Therefore, this cross section alternative is not recommended for the STH 97 project corridor.

The four-lane cross section with a raised center median, which currently exists along STH 97 north of the project corridor, is expected to result in similar operations to the existing four lane cross section at each of the stop sign controlled intersections along the project corridor under the projected year 2037 traffic scenario. In addition, at the signalized intersection with Arnold Street, the westbound through and right-turn movements during the morning peak hour and the eastbound left-turn movement during the evening peak hour are expected to operate at LOS D; however, the expected delays for these movements are expected to be 35.7 seconds per vehicle and 35.8 seconds per vehicle, respectively. These values are less than one second more than the LOS C/D threshold for signalized intersections. The four-lane cross section with a raised median

is also expected to improve safety along the STH 97 corridor by separating *all* left-turning vehicles from the through traffic lanes, which is expected to reduce the number of rear-end crashes that occur each year; however, access to driveways along the corridor would be restricted to right-in/right-out only and parking would be eliminated along the corridor between Arnold Street and Harrison Street. Therefore, this cross section alternative is not recommended for the STH 97 project corridor.

The five-lane TWLTL cross section, which currently exists along STH 97 south of the project corridor, is expected to result in acceptable intersection operations (LOS C) for nearly all traffic movements along the project corridor under the projected year 2037 traffic scenario. The only exceptions are the westbound through and right-turn movements at Arnold Street during the morning peak hour and the eastbound left-turn movement at Arnold Street during the evening peak hour which are expected to operate at LOS D; however, the expected delays for these movements are expected to be 35.7 seconds per vehicle and 35.8 seconds per vehicle, respectively. These values are less than one second more than the LOS C/D threshold for signalized intersections. The five-lane TWLTL cross section is also expected to improve safety along the STH 97 corridor by separating *all* left-turning vehicles from the through traffic lanes, which is expected to reduce the number of rear-end collisions that occur each year and while parking would be eliminated along the entire project corridor, most local businesses would be able to retain full access to their driveways. The exceptions would be the driveways located within the limits of the proposed pedestrian refuge areas at each of the intersections along the corridor.

Therefore, the following improvements are recommended for this project under the projected year 2017 and 2037 traffic volumes.

STH 97 at Arnold Street

- Update signal timings and offsets at the intersection

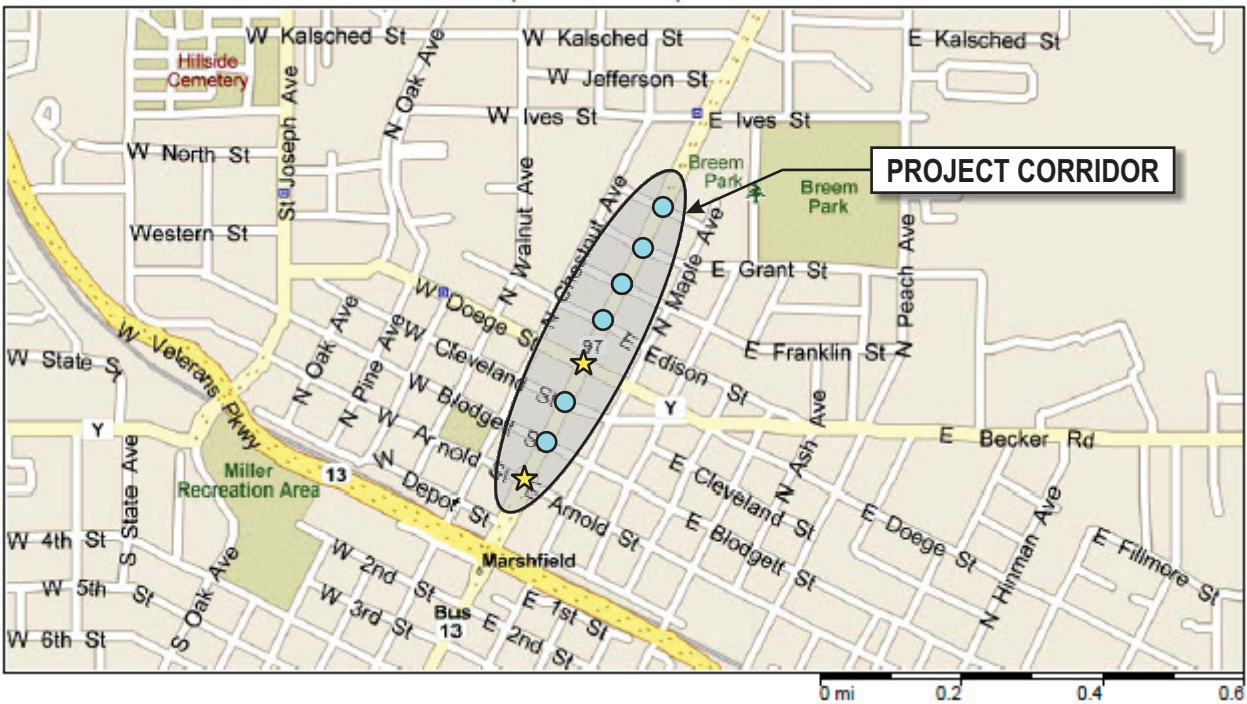
STH 97 at Doege Street

- Update signal timings and offsets at the intersection
- Provide for dedicated left-turn lanes along the northbound and southbound approaches to accompany a through lane and shared through-right lane in each direction

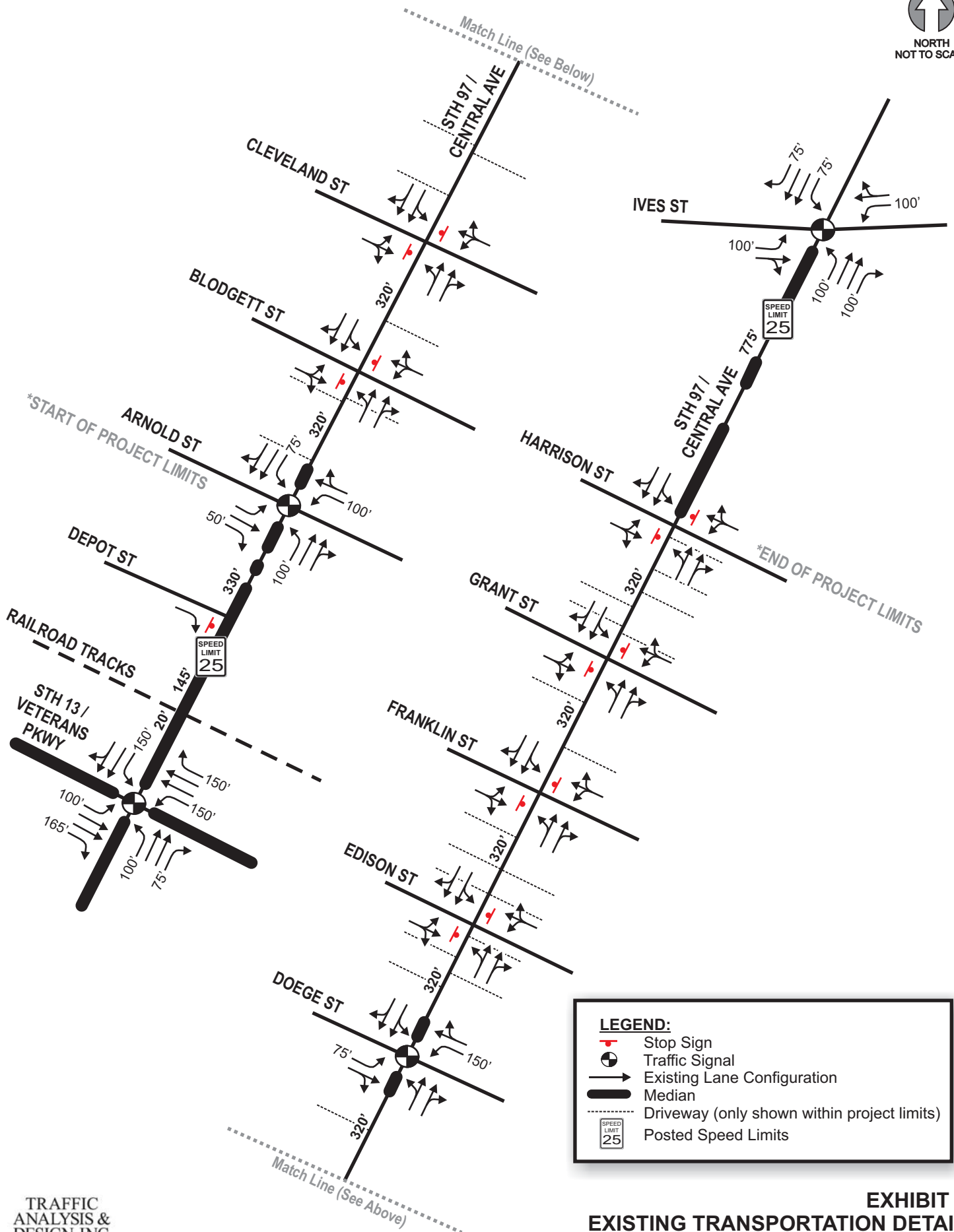
STH 97 Corridor

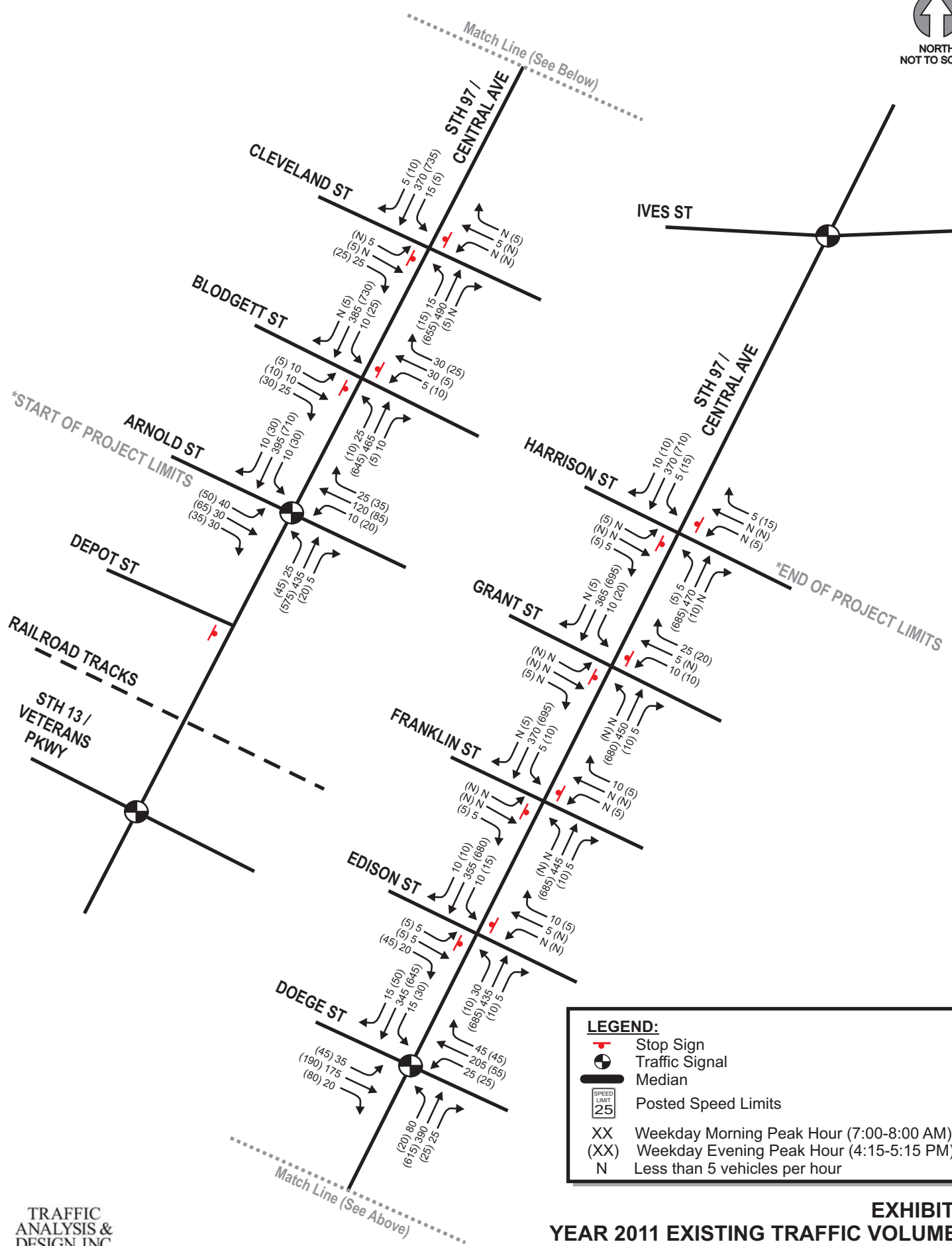
- Implement a five-lane TWLTL cross section to match STH 97 corridor to the south
- Consider constructing raised pedestrian refuge areas within the TWLTL at each intersection to match the STH 97 corridor to the south
- Eliminate on-street parking throughout the corridor

With the implementation of the recommended improvements along the project corridor, all movements at the study area intersection are expected to operate safely and efficiently through the year 2037.



- = STUDY AREA INTERSECTIONS
- ★ = MAIN STUDY INTERSECTIONS
(EXISTING TRAFFIC SIGNALS)

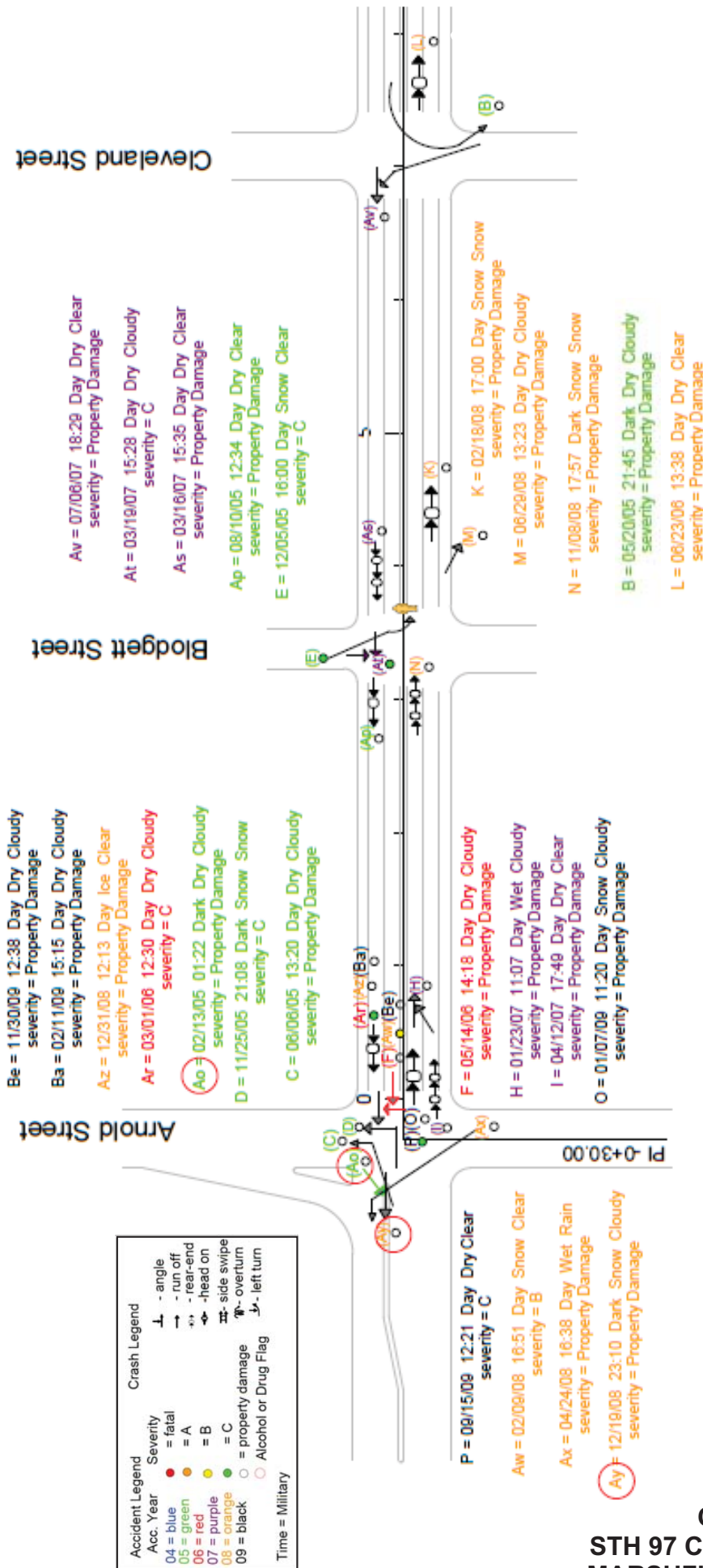


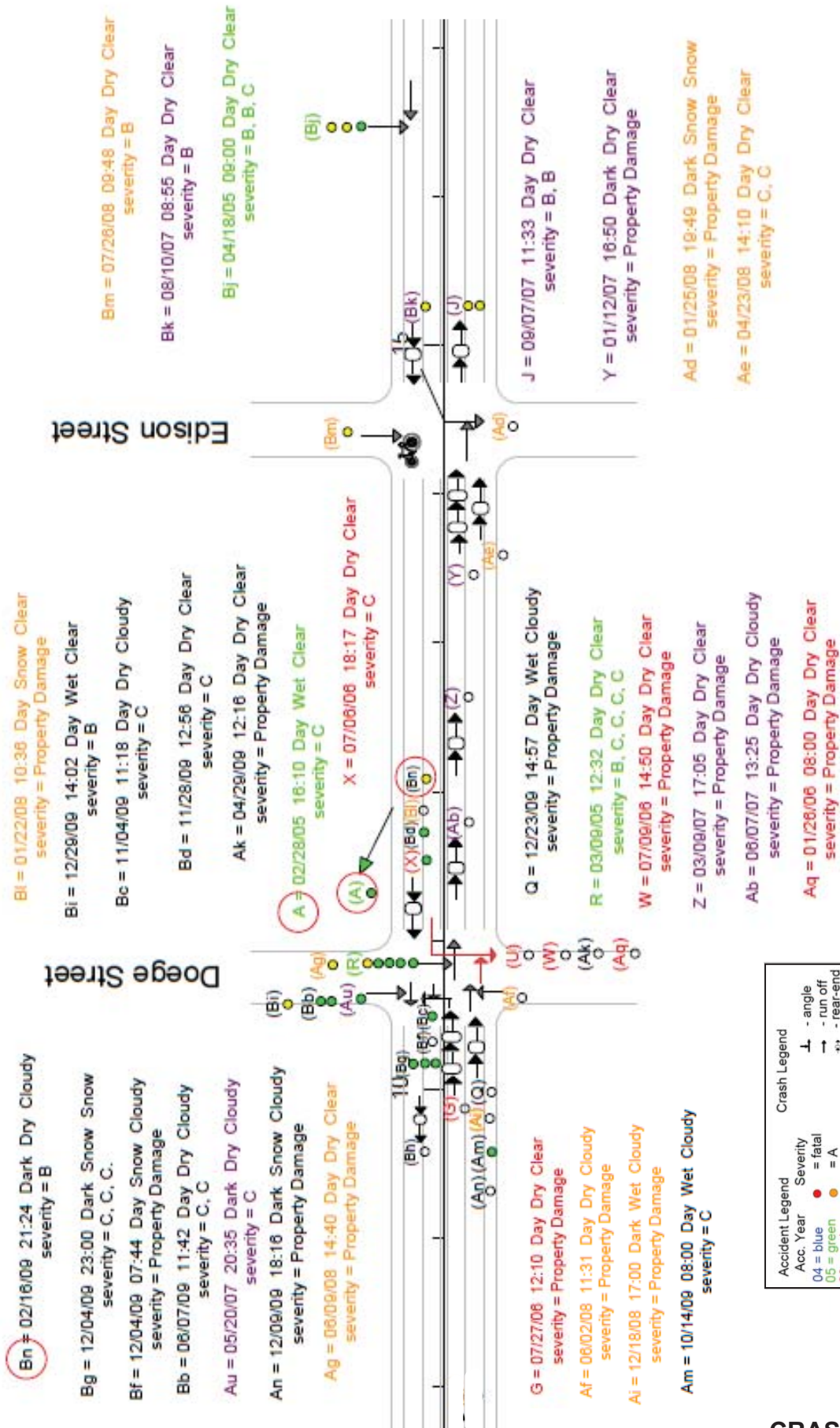


**Year 2011 Background Traffic Peak Hour Operating Conditions
Existing Geometrics and Traffic Control**

Intersection	Traffic Control	Peak Hour	Level of Service per Movement by Approach											
			Eastbound			Westbound			Northbound			Southbound		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
STH 97 & Arnold Street	Traffic Signal	AM	C	C	C	C	D ¹	D ¹	A	A	A	A	A	A
		PM	C	C	C	C	C	C	A	A	A	A	A	A
STH 97 & Blodgett Street	Two-Way Stop Sign	AM	C	C	C	C	C	C	A	A	A	A	A	A
		PM	C	C	C	C	C	C	A	A	A	A	A	A
STH 97 & Cleveland Street	Two-Way Stop Sign	AM	B	B	B	C	C	C	A	A	A	A	A	A
		PM	B	B	B	C	C	C	A	A	A	A	A	A
STH 97 & Doege Street	Traffic Signal	AM	C	C	C	C	C	C	B	B	B	A	A	A
		PM	C	C	C	C	C	C	A	A	A	B	B	B
STH 97 & Edison Street	Two-Way Stop Sign	AM	B	B	B	B	B	B	A	A	A	A	A	A
		PM	C	C	C	C	C	C	A	A	A	A	A	A
STH 97 & Franklin Street	Two-Way Stop Sign	AM	B	B	B	B	B	B	A	A	A	A	A	A
		PM	C	C	C	C	C	C	A	A	A	A	A	A
STH 97 & Grant Street	Two-Way Stop Sign	AM	C	C	C	B	B	B	A	A	A	A	A	A
		PM	C	C	C	C	C	C	A	A	A	A	A	A
STH 97 & Harrison Street	Two-Way Stop Sign	AM	B	B	B	B	B	B	A	A	A	A	A	A
		PM	C	C	C	C	C	C	A	A	A	A	A	A

¹ Movement expected to operate with 35.1 seconds of delay per vehicle (i.e., 0.1 seconds more than the LOS C/D threshold).





Accident Legend		Crash Legend	
Acc. Year	Severity	angle	
04 = blue	= fatal	- run off	
05 = green	= A	- rear end	
06 = red	= B	- head on	
07 = purple	= C	- side swipe	
08 = orange	= property damage	- overturn	
09 = black	= Alcohol or Drug Flag	- left turn	
Time = Military			

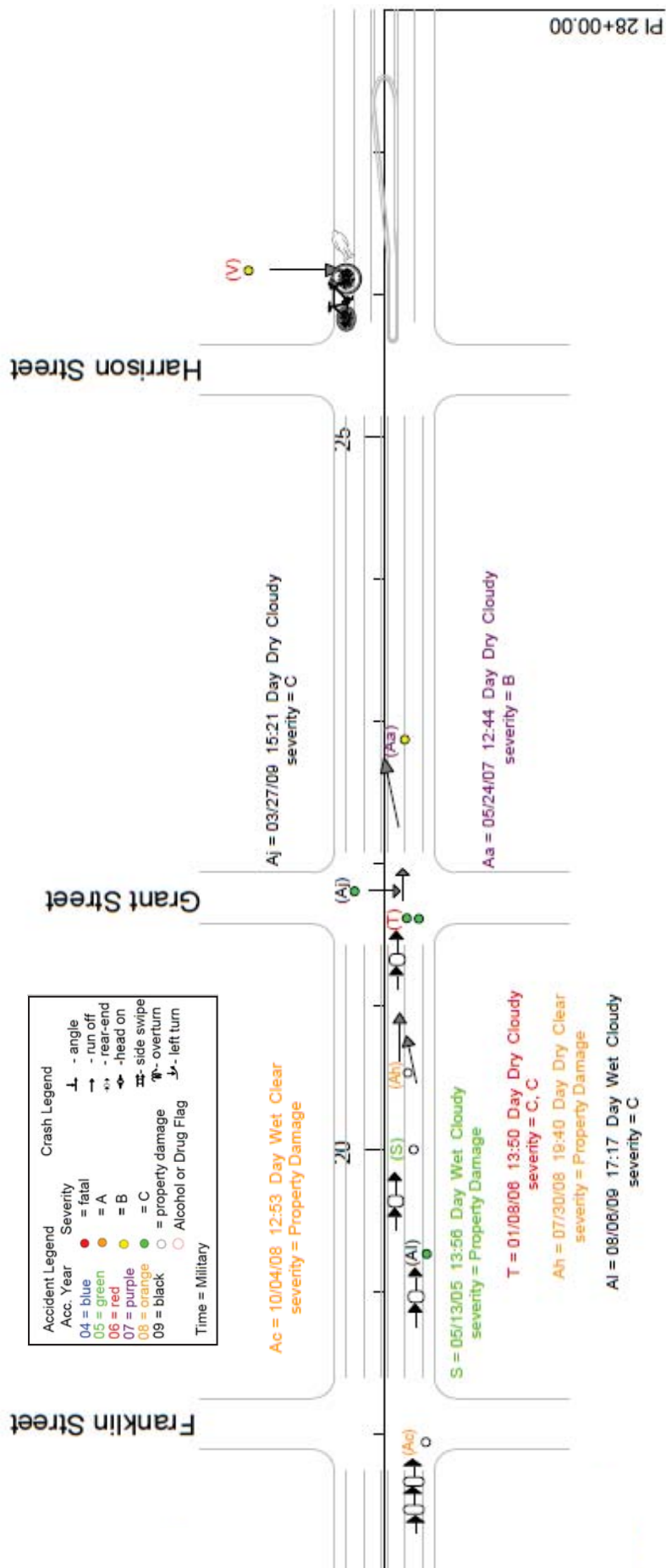


EXHIBIT 5c
CRASH DIAGRAM
STH 97 CORRIDOR STUDY
MARSHFIELD, WISCONSIN

GENERAL INFORMATION																
INTERSECTION: STH 97						DURATION										
MUNICIPALITY: MARSHFIELD						5 YEARS										
COUNTY: WOOD						0 MONTHS										
STATE: WI																
PROJECT ID: 6/5/6380						PREPARED BY: RLH		DATE: 6/30/2011								
INTERSECTION CHARACTERISTICS																
TRAFFIC CONTROL: NA						POSTED SPEED (MAJOR): 25										
INTERSECTION AADT: 5 Year Average 11867						DEER CRASHES INCLUDED: No										
NUMBER OF LEGS: NA						AREA TYPE: URBAN										
CRASH STATISTICS																
CRASH FREQUENCY & SEVERITY							ROAD CONDITIONS		PERCENT							
YEAR	PD	C-LEVEL	B-LEVEL	A-LEVEL	FATAL	TOTAL	DRY	66	68.8%							
2005	8	6	3	0	0	17	WET	10	10.4%							
2006	13	5	1	0	0	19	SNOW	15	15.6%							
2007	8	4	3	1	0	16	ICE	2	2.1%							
2008	16	1	3	0	0	20	MUD	0	0.0%							
2009	12	9	3	0	0	24	OTHER/UNK	3	3.1%							
							TOTAL	96	100.0%							
TOTAL							57		25	13	1	0	96			
PERCENT							59.4%		26.0%	13.5%	1.0%	0.0%	100.0%			
YEAR AVG.							11.4		5	2.6	0.2	0	19.2			
CRASH RATES							per MEV									
CRASH RATE							4.43									
INJURY CRASH RATE							1.80									
FATAL CRASH RATE							0.00									
LIGHT CONDITIONS							PERCENT		VEHICLE TYPES			PERCENT				
LIGHT	95	99.0%		CAR			143	77.7%								
DUSK	1	1.0%		TRUCK			32	17.4%								
TOTAL	96	100.0%		OTHER/UNK			9	4.9%								
Note: Lighted street conditions.							TOTAL			184	100.0%					
DAY AND TIME							Note: Statistics based on first and second vehicles in crashes.									
							EARLY MORNING	AM PEAK	MIDDAY	PM PEAK	EVENING	LATE EVENING				
							2:00 AM	6:00 AM	10:00 AM	2:00 PM	6:00 PM	10:00 PM				
							TO	TO	TO	TO	TO	TO				
DAY OF THE WEEK	5:59 AM	9:59 AM	1:59 PM	5:59 PM	9:59 PM	1:59 AM	UNKNOWN	TOTAL								
MONDAY	0	1	4	7	3	0	0	15	Weekday							
TUESDAY	0	0	4	3	2	0	0	9								
WEDNESDAY	0	3	8	5	2	1	0	19								
THURSDAY	0	1	5	5	2	0	0	13								
FRIDAY	0	2	4	7	7	4	0	24								
SATURDAY	0	1	1	4	1	1	0	8	Weekend							
SUNDAY	0	1	3	2	1	1	0	8								
TOTAL	0	9	29	33	18	7	0	96								
DRIVER AGES							PERCENT		VEHICLE DAMAGE		PERCENT		BY SEASON		PERCENT	
<25	59	32.1%		VERY SEVERE			19	10.3%			SPRING		26	27.1%		
25-34	31	16.8%		SEVERE			26	14.1%			SUMMER		26	27.1%		
35-44	16	8.7%		MODERATE			74	40.2%			FALL		20	20.8%		
45-54	28	15.2%		MINOR			38	20.7%			WINTER		24	25.0%		
55-64	18	9.8%		VERY MINOR			16	8.7%			TOTAL		96	100.0%		
65-74	3	1.6%		NONE			11	6.0%			Note: Wint=Jan-Mar, Spr=Apr-June, Sum=July-Sept, Fall=Oct-Dec					
75-84	7	3.8%		OTHER/UNK			0	0.0%								
85+	1	0.5%		TOTAL			184	100.0%			AVERAGE NUMBER OF					
UNKNOWN	21	11.4%		Note: Statistics based on first and second vehicles in crashes.						VEHICLES PER CRASH						
TOTAL	184	100.0%		PERCENT OF CRASHES						Note: Statistics based on all vehicles in crashes.						
Note: Statistics based on first and second vehicles in crashes							ALCOHOL RELATED		4							

GENERAL INFORMATION															
INTERSECTION: STH 97 & ARNOLD ST					DURATION										
MUNICIPALITY: MARSHFIELD					CRASHES FROM: 1/1/2005			5 YEARS							
COUNTY: WOOD					TO: 12/31/2009			0 MONTHS							
STATE: WI															
PROJECT ID: 6/5/6380					PREPARED BY: RLH			DATE: 6/30/2011							
INTERSECTION CHARACTERISTICS															
TRAFFIC CONTROL: SIGNALIZED					POSTED SPEED (MAJOR): 25										
INTERSECTION AADT: (2008) 13850					DEER CRASHES INCLUDED: No										
NUMBER OF LEGS: 4					AREA TYPE: URBAN										
CRASH STATISTICS															
CRASH FREQUENCY & SEVERITY							ROAD CONDITIONS		PERCENT						
YEAR	PD	C-LEVEL	B-LEVEL	A-LEVEL	FATAL	TOTAL	DRY	11	55.0%						
2005	3	1	0	0	0	4	WET	2	10.0%						
2006	3	1	0	0	0	4	SNOW	4	20.0%						
2007	2	1	0	0	0	3	ICE	1	5.0%						
2008	4	0	1	0	0	5	MUD	0	0.0%						
2009	3	1	0	0	0	4	OTHER/UNK	2	10.0%						
							TOTAL	20	100.0%						
							CRASH TYPE		PERCENT						
TOTAL							15	4	1	0	0	20	ANGLE	6	30.0%
PERCENT							75.0%	20.0%	5.0%	0.0%	0.0%	100.0%	REAR-END	8	40.0%
YEAR AVG.							3	0.8	0.2	0	0	4	HEAD-ON	0	0.0%
													SS-SAME	2	10.0%
CRASH RATES							per MEV						SS-OPPOSITE	0	0.0%
CRASH RATE							0.79						PEDESTRIAN	0	0.0%
INJURY CRASH RATE							0.20						BICYCLE	0	0.0%
FATAL CRASH RATE							0.00						FIXED	0	0.0%
													NOT FIXED	0	0.0%
LIGHT CONDITIONS			PERCENT		VEHICLE TYPES		PERCENT						ROR/	4	20.0%
LIGHT	20	100.0%			CAR	26	76.5%					OVERTURN	0	0.0%	
DUSK	0	0.0%			TRUCK	3	8.8%					OTHER/UNK	0	0.0%	
TOTAL	20	100.0%			OTHER/UNK	5	14.7%					TOTAL	20	100.0%	
Note: Lighted street conditions.							TOTAL			34	100.0%				
DAY AND TIME							Note: Statistics based on first and second vehicles in crashes.								
		EARLY MORNING	AM PEAK	MIDDAY	PM PEAK	EVENING	LATE EVENING								
		2:00 AM TO 5:59 AM	6:00 AM TO 9:59 AM	10:00 AM TO 1:59 PM	2:00 PM TO 5:59 PM	6:00 PM TO 9:59 PM	10:00 PM TO 1:59 AM								
DAY OF THE WEEK		5:59 AM	9:59 AM	1:59 PM	5:59 PM	9:59 PM	1:59 AM	UNKNOWN	TOTAL						
MONDAY		0	0	2	0	1	0	0	3	Weekday					
TUESDAY		0	0	3	1	0	0	0	4						
WEDNESDAY		0	0	3	1	0	0	0	4						
THURSDAY		0	0	1	2	0	0	0	3						
FRIDAY		0	0	1	0	1	0	0	2						
SATURDAY		0	0	0	1	0	0	0	1	Weekend					
SUNDAY		0	1	0	1	0	1	0	3						
TOTAL		0	1	10	6	2	1	0	20						
DRIVER AGES		PERCENT		VEHICLE DAMAGE		PERCENT		BY SEASON		PERCENT					
<25	9	26.5%		VERY SEVERE	4	11.8%		SPRING	6	30.0%					
25-34	7	20.6%		SEVERE	2	5.9%		SUMMER	2	10.0%					
35-44	7	20.6%		MODERATE	20	58.8%		FALL	6	30.0%					
45-54	6	17.6%		MINOR	5	14.7%		WINTER	6	30.0%					
55-64	3	8.8%		VERY MINOR	3	8.8%		TOTAL	20	100.0%					
65-74	1	2.9%		NONE	0	0.0%		Note: Wint=Jan-Mar, Spr=Apr-June, Sum=July-Sept, Fall=Oct-Dec							
75-84	1	2.9%		OTHER/UNK	0	0.0%									
85+	0	0.0%		TOTAL	34	100.0%									
UNKNOWN	0	0.0%		Note: Statistics based on first and second vehicles in crashes.				AVERAGE NUMBER OF VEHICLES PER CRASH						1.7	
TOTAL	34	100.0%		PERCENT OF CRASHES				Note: Statistics based on all vehicles in crashes.							
Note: Statistics based on first and second vehicles in crashes				ALCOHOL RELATED				2							

GENERAL INFORMATION									
INTERSECTION: STH 97 & DOEGE ST							DURATION		
MUNICIPALITY: MARSHFIELD							CRASHES FROM: 1/1/2005		
COUNTY: WOOD							TO: 12/31/2009		
STATE: WI							5 YEARS		
PROJECT ID: 6/5/6380							0 MONTHS		
PREPARED BY: RLH							DATE: 6/30/2011		
INTERSECTION CHARACTERISTICS									
TRAFFIC CONTROL: SIGNALIZED							POSTED SPEED (MAJOR): 25		
INTERSECTION AADT: (2008) 18100							DEER CRASHES INCLUDED: No		
NUMBER OF LEGS: 4							AREA TYPE: URBAN		
CRASH STATISTICS									
CRASH FREQUENCY & SEVERITY							ROAD CONDITIONS		
YEAR	PD	C-LEVEL	B-LEVEL	A-LEVEL	FATAL	TOTAL	DRY	25	71.4%
2005	1	2	1	0	0	4	WET	5	14.3%
2006	6	1	0	0	0	7	SNOW	5	14.3%
2007	3	2	0	0	0	5	ICE	0	0.0%
2008	3	0	1	0	0	4	MUD	0	0.0%
2009	6	6	3	0	0	15	OTHER/UNK	0	0.0%
TOTAL	19	11	5	0	0	35	TOTAL	35	100.0%
PERCENT	54.3%	31.4%	14.3%	0.0%	0.0%	100.0%			
YEAR AVG.	3.8	2.2	1	0	0	7	CRASH TYPE		
							ANGLE	16	45.7%
							REAR-END	16	45.7%
							HEAD-ON	1	2.9%
							SS-SAME	1	2.9%
							SS-OPPOSITE	0	0.0%
							PEDESTRIAN	0	0.0%
							BICYCLE	0	0.0%
							FIXED	0	0.0%
							NOT FIXED	0	0.0%
							ROR/		
							OVERTURN	1	2.9%
							OTHER/UNK	0	0.0%
							TOTAL	35	100.0%
CRASH RATES			per MEV	VEHICLE TYPES		PERCENT			
CRASH RATE			1.06	CAR	64	90.1%			
INJURY CRASH RATE			0.48	TRUCK	5	7.0%			
FATAL CRASH RATE			0.00	OTHER/UNK	2	2.8%			
				TOTAL	71	100.0%			
							Note: Statistics based on first and second vehicles in crashes.		
LIGHT CONDITIONS			PERCENT						
LIGHT	34	97.1%							
DUSK	1	2.9%							
TOTAL	35	100.0%							
Note: Lighted street conditions.									
DAY AND TIME									
	EARLY MORNING	AM PEAK	MIDDAY	PM PEAK	EVENING	LATE EVENING			
	2:00 AM TO	6:00 AM TO	10:00 AM TO	2:00 PM TO	6:00 PM TO	10:00 PM TO			
DAY OF THE WEEK	5:59 AM	9:59 AM	1:59 PM	5:59 PM	9:59 PM	1:59 AM	UNKNOWN	TOTAL	
MONDAY	0	0	1	3	2	0	0	6	Weekday
TUESDAY	0	0	1	2	0	0	0	3	
WEDNESDAY	0	3	3	2	1	1	0	10	
THURSDAY	0	1	2	1	1	0	0	5	
FRIDAY	0	1	0	3	1	1	0	6	
SATURDAY	0	0	1	1	0	0	0	2	Weekend
SUNDAY	0	0	1	1	1	0	0	3	
TOTAL	0	5	9	13	6	2	0	35	
DRIVER AGES			VEHICLE DAMAGE		PERCENT		BY SEASON		
<25	27	38.0%	VERY SEVERE	2	2.8%	SPRING	8	22.9%	
25-34	9	12.7%	SEVERE	14	19.7%	SUMMER	5	14.3%	
35-44	6	8.5%	MODERATE	29	40.8%	FALL	14	40.0%	
45-54	9	12.7%	MINOR	19	26.8%	WINTER	8	22.9%	
55-64	11	15.5%	VERY MINOR	4	5.6%	TOTAL	35	100.0%	
65-74	4	5.6%	NONE	2	2.8%	Note: Wint=Jan-Mar, Spr=Apr-June, Sum=July-Sept, Fall=Oct-Dec			
75-84	4	5.6%	OTHER/UNK	1	1.4%	AVERAGE NUMBER OF			
85+	1	1.4%	TOTAL	71	100.0%	VEHICLES PER CRASH			
UNKNOWN	0	0.0%	Note: Statistics based on first and second vehicles in crashes.						
TOTAL	71	100.0%	PERCENT OF CRASHES						
Note: Statistics based on all vehicles in crashes.									
ALCOHOL RELATED									
2									



STH 97 LOOKING NORTH



STH 97 LOOKING SOUTH



ARNOLD STREET LOOKING WEST



ARNOLD STREET LOOKING EAST
(UNDER CONSTRUCTION AT TIME OF PHOTO)



STH 97 LOOKING NORTH



STH 97 LOOKING SOUTH



BLODGETT STREET LOOKING WEST



BLODGETT STREET LOOKING EAST



STH 97 LOOKING NORTH



STH 97 LOOKING SOUTH



CLEVELAND STREET LOOKING WEST



CLEVELAND STREET LOOKING EAST



STH 97 LOOKING NORTH



STH 97 LOOKING SOUTH



DOEGE STREET LOOKING WEST



DOEGE STREET LOOKING EAST



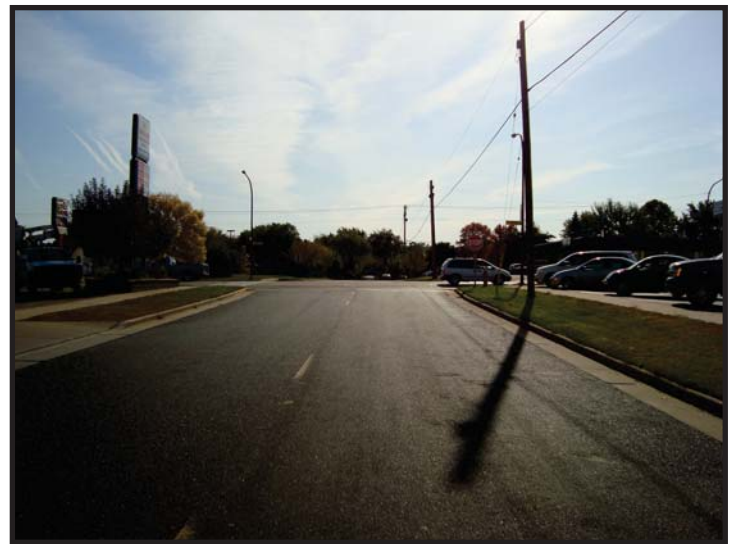
STH 97 LOOKING NORTH



STH 97 LOOKING SOUTH



EDISON STREET LOOKING WEST



EDISON STREET LOOKING EAST



STH 97 LOOKING NORTH



STH 97 LOOKING SOUTH



FRANKLIN STREET LOOKING WEST



FRANKLIN STREET LOOKING EAST



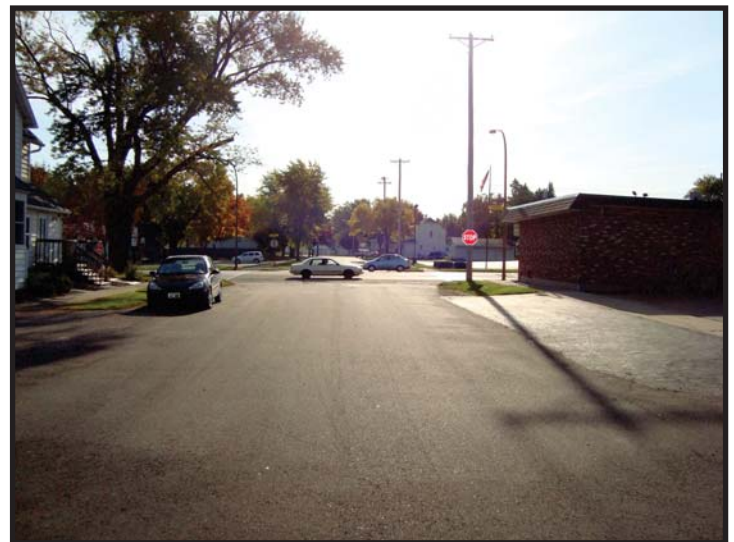
STH 97 LOOKING NORTH



STH 97 LOOKING SOUTH



GRANT STREET LOOKING WEST



GRANT STREET LOOKING EAST



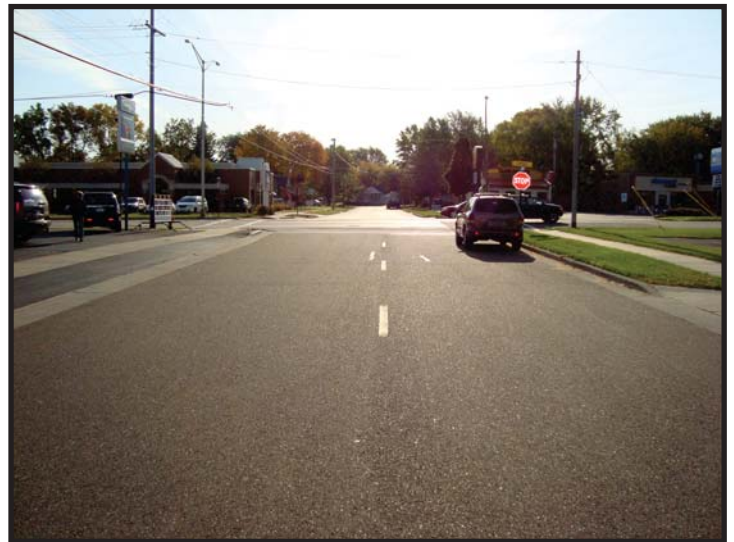
STH 97 LOOKING NORTH



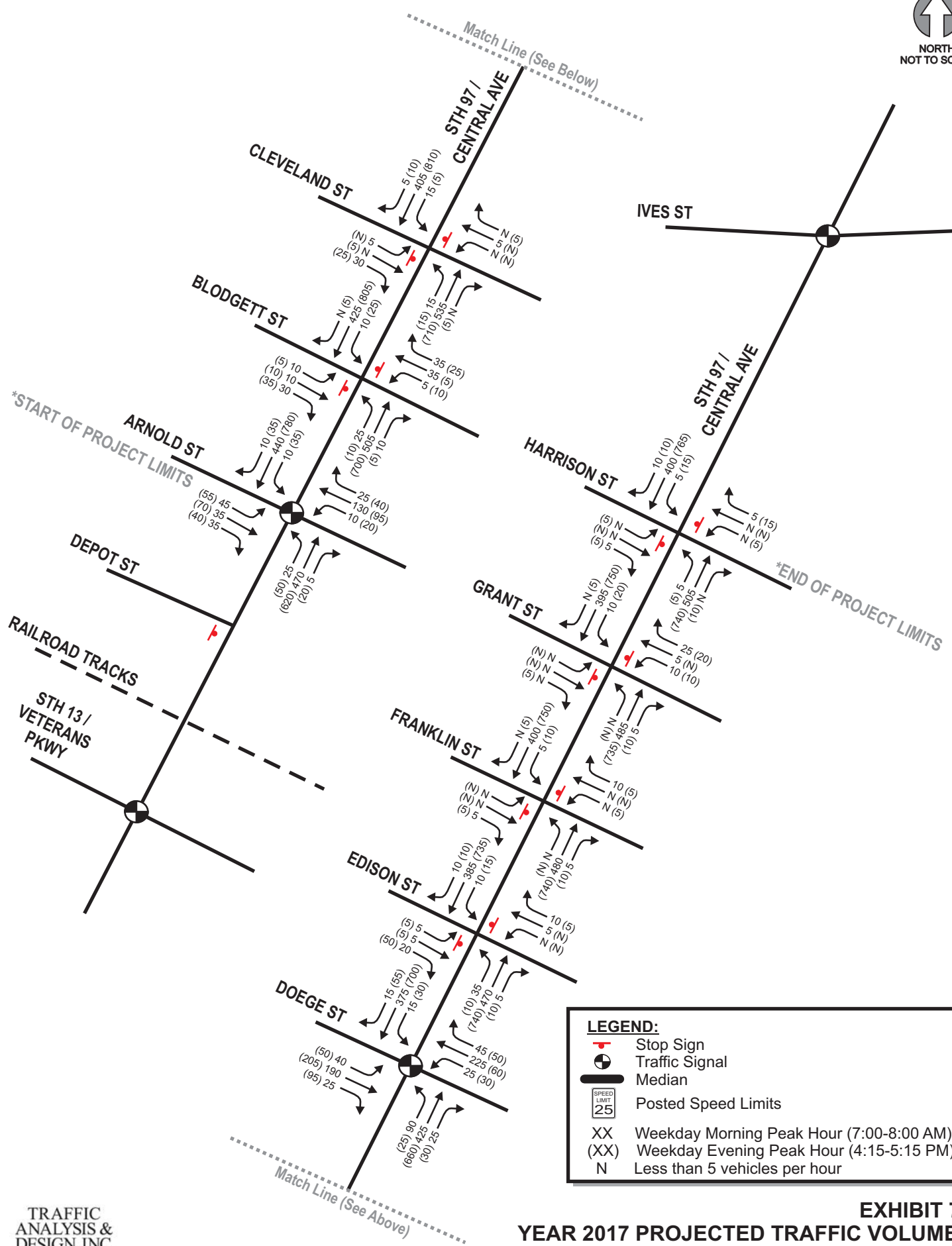
STH 97 LOOKING SOUTH



HARRISON STREET LOOKING WEST



HARRISON STREET LOOKING EAST



LEGEND:

- Stop Sign
- Traffic Signal
- Median
- Posted Speed Limits
- XX Weekday Morning Peak Hour (7:00-8:00 AM)
- (XX) Weekday Evening Peak Hour (4:15-5:15 PM)
- N Less than 5 vehicles per hour

EXHIBIT 7a
YEAR 2017 PROJECTED TRAFFIC VOLUMES
STH 97 CORRIDOR STUDY
MARSHFIELD, WISCONSIN

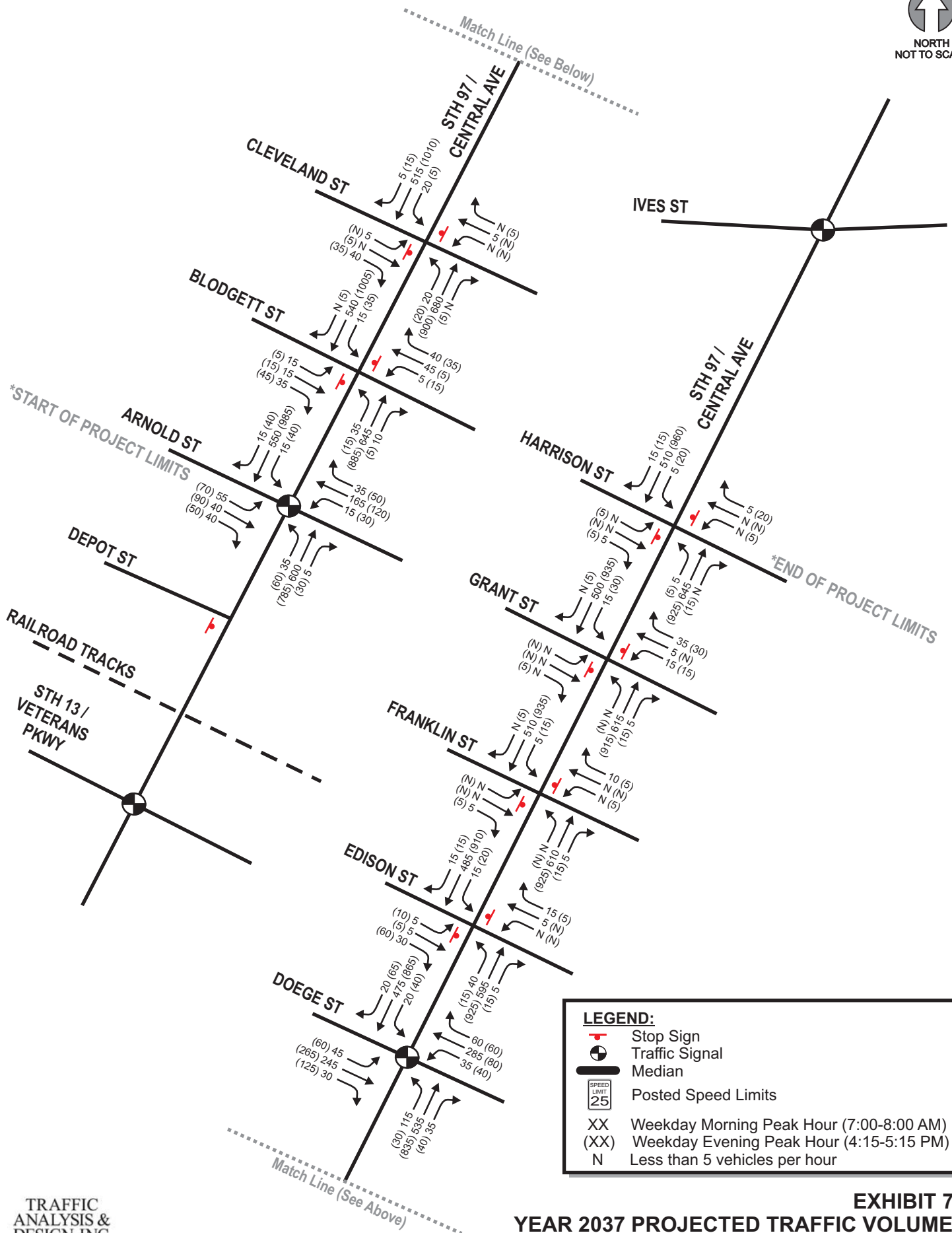
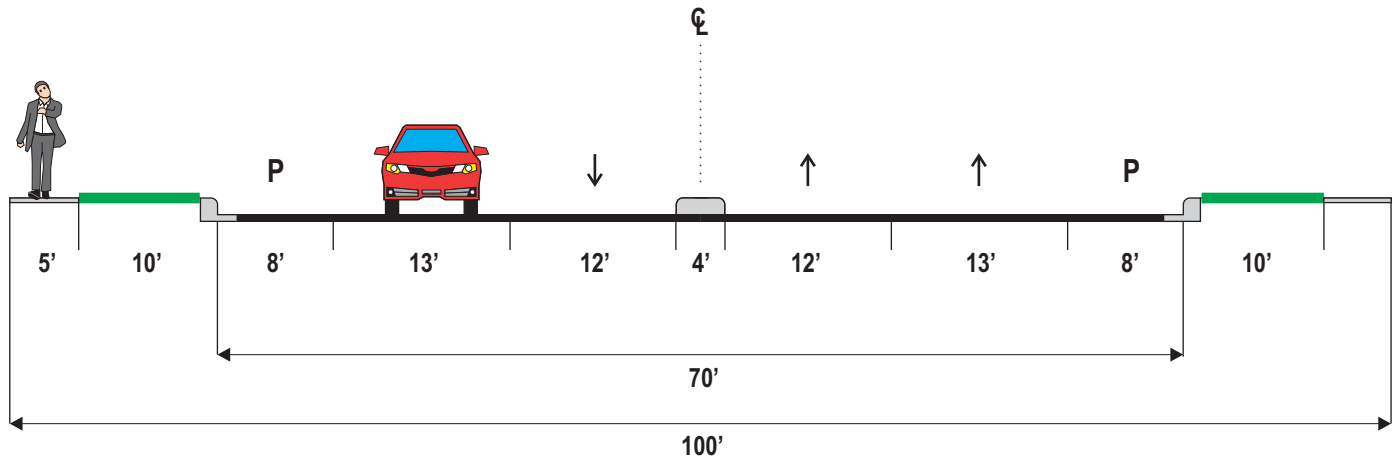
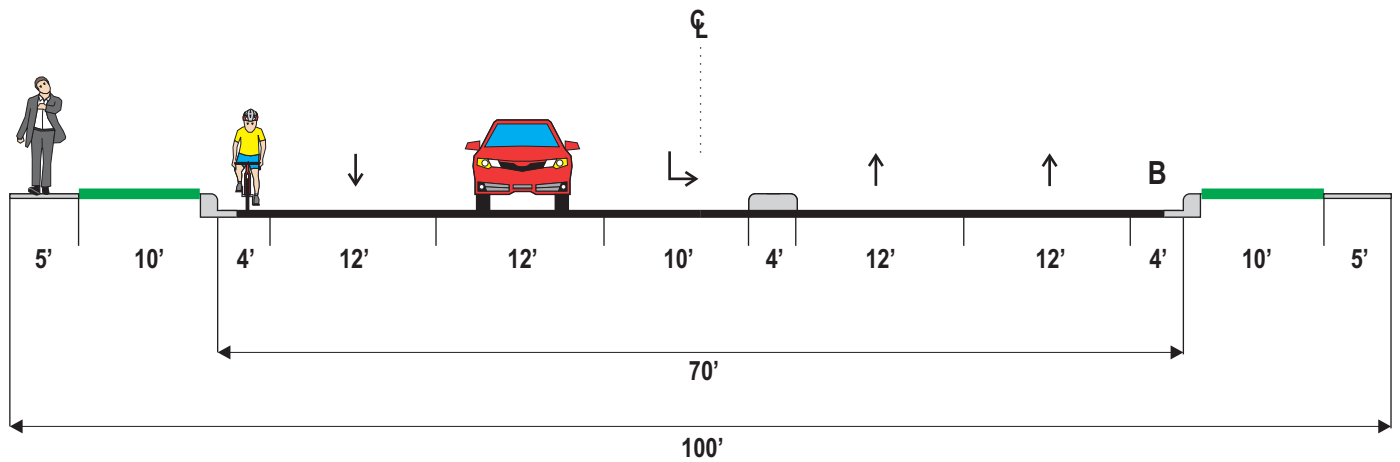


EXHIBIT 7b
YEAR 2037 PROJECTED TRAFFIC VOLUMES
STH 97 CORRIDOR STUDY
MARSHFIELD, WISCONSIN

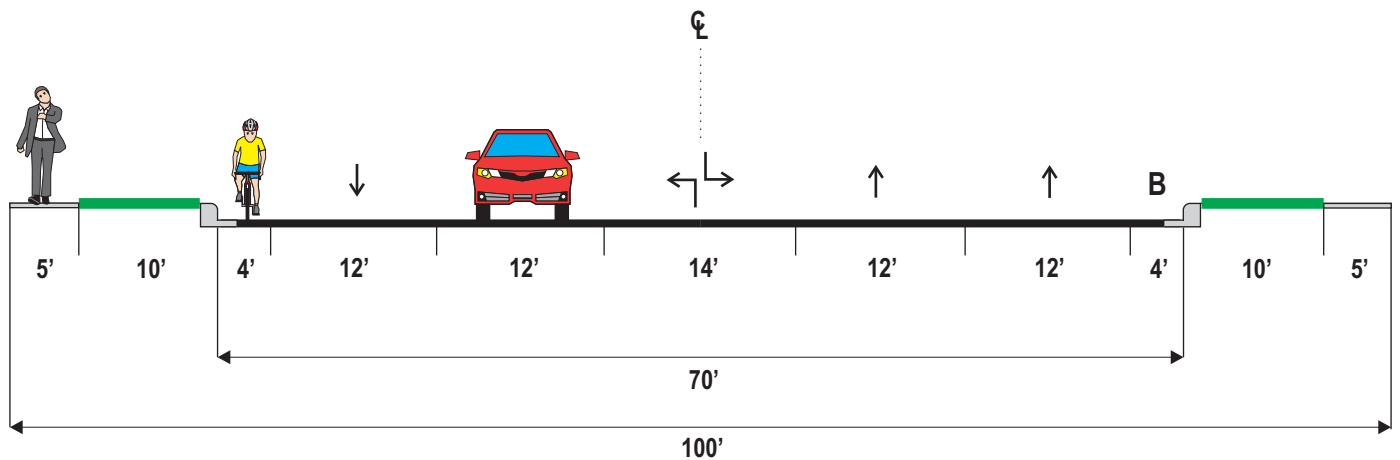
FOUR-LANE CROSS SECTION WITH PARKING LANES (EXISTING)



FOUR-LANE CROSS SECTION WITH RAISED MEDIAN



FIVE-LANE TWLTL CROSS SECTION (RECOMMENDED)



**Year 2017 Traffic Peak Hour Operating Conditions
Existing Geometrics and Traffic Control**

Intersection	Traffic Control	Peak Hour	Level of Service per Movement by Approach												Level of Service by Intersection
			Eastbound			Westbound			Northbound			Southbound			
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
STH 97 & Arnold Street	Traffic Signal	AM	C	C	C	C	D	D	A	A	A	A	A	A	B
		PM	C	C	C	C	C	C	A	A	A	A	A	A	A
STH 97 & Blodgett Street	Two-Way Stop Sign	AM	C	C	C	D	D	D	A	A	A	A	A	A	A
		PM	C	C	C	C	C	C	A	A	A	A	A	A	A
STH 97 & Cleveland Street	Two-Way Stop Sign	AM	B	B	B	C	C	C	A	A	A	A	A	A	A
		PM	C	C	C	C	C	C	A	A	A	A	A	A	A
STH 97 & Doege Street	Traffic Signal	AM	C	C	C	C	C	C	B	B	B	A	A	A	B
		PM	C	C	C	C	C	C	A	A	A	B	B	B	B
STH 97 & Edison Street	Two-Way Stop Sign	AM	B	B	B	C	C	C	A	A	A	A	A	A	A
		PM	C	C	C	C	C	C	A	A	A	A	A	A	A
STH 97 & Franklin Street	Two-Way Stop Sign	AM	B	B	B	B	B	B	A	A	A	A	A	A	A
		PM	C	C	C	C	C	C	A	A	A	A	A	A	A
STH 97 & Grant Street	Two-Way Stop Sign	AM	C	C	C	C	C	C	A	A	A	A	A	A	A
		PM	C	C	C	C	C	C	A	A	A	A	A	A	A
STH 97 & Harrison Street	Two-Way Stop Sign	AM	B	B	B	B	B	B	A	A	A	A	A	A	A
		PM	D	D	D	C	C	C	A	A	A	A	A	A	A

**Year 2017 Traffic Peak Hour Operating Conditions
Alternative 1: Existing Geometrics with Optimized Signal Timings and Offsets**

Intersection	Traffic Control	Peak Hour	Level of Service per Movement by Approach												Level of Service by Intersection
			Eastbound			Westbound			Northbound			Southbound			
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
STH 97 & Arnold Street	Traffic Signal	AM	C	C	C	C	D	D	A	A	A	A	A	A	B
		PM	C	C	C	C	C	C	A	A	A	A	A	A	A
STH 97 & Blodgett Street	Two-Way Stop Sign	AM	C	C	C	D	D	D	A	A	A	A	A	A	A
		PM	C	C	C	C	C	C	A	A	A	A	A	A	A
STH 97 & Cleveland Street	Two-Way Stop Sign	AM	B	B	B	C	C	C	A	A	A	A	A	A	A
		PM	C	C	C	C	C	C	A	A	A	A	A	A	A
STH 97 & Doege Street	Traffic Signal	AM	C	C	C	C	C	C	B	B	B	B	B	B	B
		PM	C	C	C	C	C	C	A	A	A	B	B	B	B
STH 97 & Edison Street	Two-Way Stop Sign	AM	B	B	B	C	C	C	A	A	A	A	A	A	A
		PM	C	C	C	C	C	C	A	A	A	A	A	A	A
STH 97 & Franklin Street	Two-Way Stop Sign	AM	B	B	B	B	B	B	A	A	A	A	A	A	A
		PM	C	C	C	C	C	C	A	A	A	A	A	A	A
STH 97 & Grant Street	Two-Way Stop Sign	AM	C	C	C	C	C	C	A	A	A	A	A	A	A
		PM	C	C	C	C	C	C	A	A	A	A	A	A	A
STH 97 & Harrison Street	Two-Way Stop Sign	AM	B	B	B	B	B	B	A	A	A	A	A	A	A
		PM	D	D	D	C	C	C	A	A	A	A	A	A	A

Year 2017 Traffic Peak Hour Operating Conditions

Alternative 2: Four-Lane Cross Section with Raised Median and Optimized Signal Timings and Offsets

Intersection	Traffic Control	Peak Hour	Level of Service per Movement by Approach												Level of Service by Intersection
			Eastbound			Westbound			Northbound			Southbound			
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
STH 97 & Arnold Street	Traffic Signal	AM	C	C	C	C	D	D	A	A	A	A	A	A	B
		PM	C	C	C	C	C	C	A	A	A	A	A	A	A
STH 97 & Blodgett Street	Two-Way Stop Sign	AM	C	C	C	D	D	D	A	A	A	A	A	A	A
		PM	C	C	C	C	C	C	A	A	A	A	A	A	A
STH 97 & Cleveland Street	Two-Way Stop Sign	AM	B	B	B	C	C	C	A	A	A	A	A	A	A
		PM	C	C	C	C	C	C	A	A	A	A	A	A	A
STH 97 & Doege Street	Traffic Signal	AM	C	C	C	C	C	C	A	A	A	A	A	A	B
		PM	C	C	C	C	C	C	A	A	A	A	A	A	B
STH 97 & Edison Street	Two-Way Stop Sign	AM	B	B	B	C	C	C	A	A	A	A	A	A	A
		PM	C	C	C	C	C	C	A	A	A	A	A	A	A
STH 97 & Franklin Street	Two-Way Stop Sign	AM	B	B	B	B	B	B	A	A	A	A	A	A	A
		PM	C	C	C	C	C	C	A	A	A	A	A	A	A
STH 97 & Grant Street	Two-Way Stop Sign	AM	C	C	C	C	C	C	A	A	A	A	A	A	A
		PM	C	C	C	C	C	C	A	A	A	A	A	A	A
STH 97 & Harrison Street	Two-Way Stop Sign	AM	B	B	B	B	B	B	A	A	A	A	A	A	A
		PM	D	D	D	C	C	C	A	A	A	A	A	A	A

Year 2017 Traffic Peak Hour Operating Conditions

Alternative 2: Five-Lane TWLTL Cross Section with Optimized Signal Timings and Offsets

Intersection	Traffic Control	Peak Hour	Level of Service per Movement by Approach												Level of Service by Intersection
			Eastbound			Westbound			Northbound			Southbound			
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
STH 97 & Arnold Street	Traffic Signal	AM	C	C	C	C	D	D	A	A	A	A	A	A	B
		PM	C	C	C	C	C	C	A	A	A	A	A	A	A
STH 97 & Blodgett Street	Two-Way Stop Sign	AM	B	B	B	C	C	C	A	A	A	A	A	A	A
		PM	B	B	B	B	B	B	A	A	A	A	A	A	A
STH 97 & Cleveland Street	Two-Way Stop Sign	AM	B	B	B	B	B	B	A	A	A	A	A	A	A
		PM	B	B	B	B	B	B	A	A	A	A	A	A	A
STH 97 & Doege Street	Traffic Signal	AM	C	C	C	C	C	C	A	A	A	A	A	A	B
		PM	C	C	C	C	C	C	A	A	A	A	A	A	B
STH 97 & Edison Street	Two-Way Stop Sign	AM	B	B	B	B	B	B	A	A	A	A	A	A	A
		PM	B	B	B	B	B	B	A	A	A	A	A	A	A
STH 97 & Franklin Street	Two-Way Stop Sign	AM	B	B	B	B	B	B	A	A	A	A	A	A	A
		PM	B	B	B	B	B	B	A	A	A	A	A	A	A
STH 97 & Grant Street	Two-Way Stop Sign	AM	B	B	B	B	B	B	A	A	A	A	A	A	A
		PM	B	B	B	B	B	B	A	A	A	A	A	A	A
STH 97 & Harrison Street	Two-Way Stop Sign	AM	B	B	B	B	B	B	A	A	A	A	A	A	A
		PM	C	C	C	B	B	B	A	A	A	A	A	A	A

**Year 2037 Traffic Peak Hour Operating Conditions
Existing Geometrics and Traffic Control**

Intersection	Traffic Control	Peak Hour	Level of Service per Movement by Approach												Level of Service by Intersection
			Eastbound			Westbound			Northbound			Southbound			
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
STH 97 & Arnold Street	Traffic Signal	AM	C	C	C	C	D	D	A	A	A	A	A	A	B
		PM	D	C	C	C	D	D	A	A	A	A	A	A	A
STH 97 & Blodgett Street	Two-Way Stop Sign	AM	F	F	F	F	F	F	A	A	A	A	A	A	A
		PM	C	C	C	C	C	C	A	A	A	A	A	A	A
STH 97 & Cleveland Street	Two-Way Stop Sign	AM	B	B	B	D	D	D	A	A	A	A	A	A	A
		PM	C	C	C	C	C	C	A	A	A	A	A	A	A
STH 97 & Doege Street	Traffic Signal	AM	C	C	C	C	D	D	B	B	B	A	A	A	C
		PM	C	C	C	C	C	C	B	B	B	B	B	B	B
STH 97 & Edison Street	Two-Way Stop Sign	AM	C	C	C	C	C	C	A	A	A	A	A	A	A
		PM	D	D	D	D	D	D	A	A	A	A	A	A	A
STH 97 & Franklin Street	Two-Way Stop Sign	AM	C	C	C	B	B	B	A	A	A	A	A	A	A
		PM	D	D	D	D	D	D	A	A	A	A	A	A	A
STH 97 & Grant Street	Two-Way Stop Sign	AM	C	C	C	C	C	C	A	A	A	A	A	A	A
		PM	D	D	D	E	E	E	A	A	A	A	A	A	A
STH 97 & Harrison Street	Two-Way Stop Sign	AM	C	C	C	C	C	C	A	A	A	A	A	A	A
		PM	E	E	E	D	D	D	A	A	A	A	A	A	A

**Year 2037 Traffic Peak Hour Operating Conditions
Alternative 1: Existing Geometrics with Optimized Signal Timings and Offsets**

Intersection	Traffic Control	Peak Hour	Level of Service per Movement by Approach												Level of Service by Intersection
			Eastbound			Westbound			Northbound			Southbound			
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
STH 97 & Arnold Street	Traffic Signal	AM	C	C	C	C	D	D	A	A	A	A	A	A	B
		PM	D	C	C	C	D	D	A	A	A	A	A	A	B
STH 97 & Blodgett Street	Two-Way Stop Sign	AM	E	E	E	F	F	F	A	A	A	A	A	A	A
		PM	C	C	C	C	C	C	A	A	A	A	A	A	A
STH 97 & Cleveland Street	Two-Way Stop Sign	AM	B	B	B	D	D	D	A	A	A	A	A	A	A
		PM	C	C	C	C	C	C	A	A	A	A	A	A	A
STH 97 & Doege Street	Traffic Signal	AM	C	C	C	C	C	C	B	B	B	B	B	B	B
		PM	C	C	C	C	C	C	B	B	B	B	B	B	B
STH 97 & Edison Street	Two-Way Stop Sign	AM	C	C	C	C	C	C	A	A	A	A	A	A	A
		PM	D	D	D	D	D	D	A	A	A	A	A	A	A
STH 97 & Franklin Street	Two-Way Stop Sign	AM	C	C	C	B	B	B	A	A	A	A	A	A	A
		PM	D	D	D	D	D	D	A	A	A	A	A	A	A
STH 97 & Grant Street	Two-Way Stop Sign	AM	C	C	C	C	C	C	A	A	A	A	A	A	A
		PM	D	D	D	E	E	E	A	A	A	A	A	A	B
STH 97 & Harrison Street	Two-Way Stop Sign	AM	C	C	C	C	C	C	A	A	A	A	A	A	A
		PM	E	E	E	D	D	D	A	A	A	A	A	A	A

Year 2037 Traffic Peak Hour Operating Conditions

Alternative 1: Four-Lane Cross Section with Raised Median and Optimized Signal Timings and Offsets

Intersection	Traffic Control	Peak Hour	Level of Service per Movement by Approach												Level of Service by Intersection
			Eastbound			Westbound			Northbound			Southbound			
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
STH 97 & Arnold Street	Traffic Signal	AM	C	C	C	C	D	D	A	A	A	A	A	A	B
		PM	D	C	C	C	C	C	A	A	A	A	A	A	B
STH 97 & Blodgett Street	Two-Way Stop Sign	AM	E	E	E	F	F	F	A	A	A	A	A	A	A
		PM	C	C	C	C	C	C	A	A	A	A	A	A	A
STH 97 & Cleveland Street	Two-Way Stop Sign	AM	B	B	B	D	D	D	A	A	A	A	A	A	A
		PM	C	C	C	B	B	B	A	A	A	A	A	A	A
STH 97 & Doege Street	Traffic Signal	AM	C	C	C	C	C	C	B	B	B	B	B	B	B
		PM	C	C	C	C	C	C	A	B	B	B	B	B	B
STH 97 & Edison Street	Two-Way Stop Sign	AM	C	C	C	C	C	C	A	A	A	A	A	A	A
		PM	D	D	D	D	D	D	B	B	B	A	A	A	A
STH 97 & Franklin Street	Two-Way Stop Sign	AM	B	B	B	B	B	B	A	A	A	A	A	A	A
		PM	D	D	D	D	D	D	B	B	B	A	A	A	A
STH 97 & Grant Street	Two-Way Stop Sign	AM	C	C	C	C	C	C	A	A	A	A	A	A	A
		PM	D	D	D	D	D	D	B	B	B	B	B	B	A
STH 97 & Harrison Street	Two-Way Stop Sign	AM	C	C	C	C	C	C	A	A	A	A	A	A	A
		PM	E	E	E	D	D	D	B	B	B	B	B	B	A

Year 2037 Traffic Peak Hour Operating Conditions

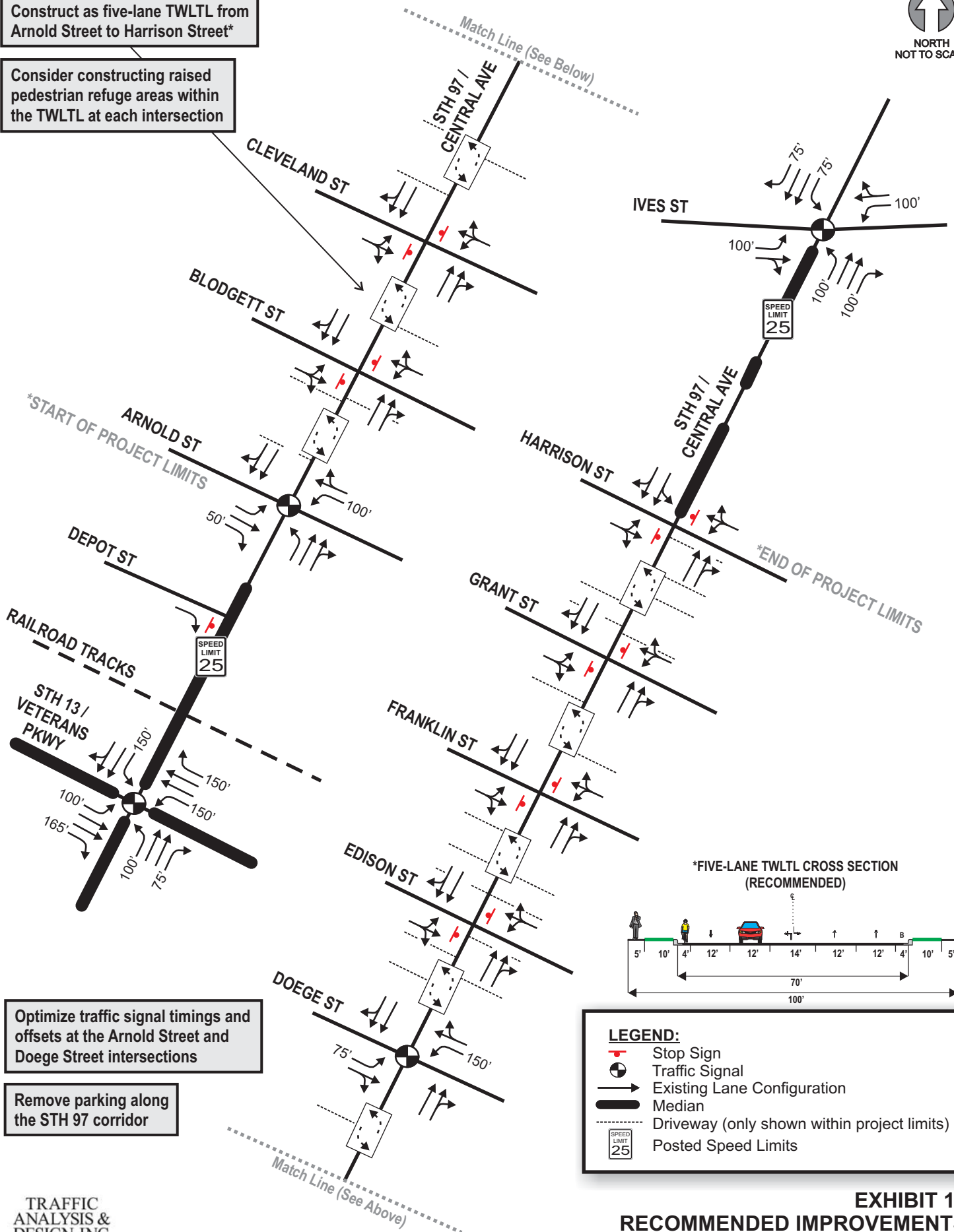
Alternative 3: Five-Lane TWLTL Cross Section with Optimized Signal Timings and Offsets

Intersection	Traffic Control	Peak Hour	Level of Service per Movement by Approach												Level of Service by Intersection
			Eastbound			Westbound			Northbound			Southbound			
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
STH 97 & Arnold Street	Traffic Signal	AM	C	C	C	C	D	D	A	A	A	A	A	A	B
		PM	D	C	C	C	C	C	A	A	A	A	A	A	B
STH 97 & Blodgett Street	Two-Way Stop Sign	AM	C	C	C	C	C	C	A	A	A	A	A	A	A
		PM	B	B	B	B	B	B	A	A	A	A	A	A	A
STH 97 & Cleveland Street	Two-Way Stop Sign	AM	B	B	B	C	C	C	A	A	A	A	A	A	A
		PM	B	B	B	B	B	B	B	B	B	A	A	A	A
STH 97 & Doege Street	Traffic Signal	AM	C	C	C	C	C	C	B	B	B	B	B	B	B
		PM	C	C	C	C	C	C	A	B	B	B	B	B	B
STH 97 & Edison Street	Two-Way Stop Sign	AM	B	B	B	B	B	B	A	A	A	A	A	A	A
		PM	C	C	C	B	B	B	B	B	B	A	A	A	A
STH 97 & Franklin Street	Two-Way Stop Sign	AM	B	B	B	B	B	B	A	A	A	A	A	A	A
		PM	B	B	B	B	B	B	B	B	B	A	A	A	A
STH 97 & Grant Street	Two-Way Stop Sign	AM	B	B	B	B	B	B	A	A	A	A	A	A	A
		PM	C	C	C	B	B	B	B	B	B	B	B	B	A
STH 97 & Harrison Street	Two-Way Stop Sign	AM	B	B	B	B	B	B	A	A	A	A	A	A	A
		PM	C	C	C	B	B	B	B	B	B	B	B	B	A

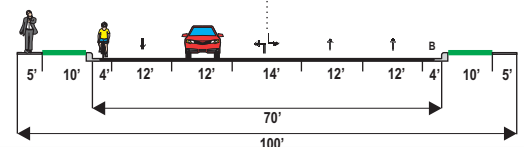


Construct as five-lane TWLTL from Arnold Street to Harrison Street*

Consider constructing raised pedestrian refuge areas within the TWLTL at each intersection



*FIVE-LANE TWLTL CROSS SECTION (RECOMMENDED)



LEGEND:

- Stop Sign
- Traffic Signal
- Existing Lane Configuration
- Median
- Driveway (only shown within project limits)
- Posted Speed Limits

Optimize traffic signal timings and offsets at the Arnold Street and Doege Street intersections

Remove parking along the STH 97 corridor

Appendix A

Traffic

Existing Traffic Counts

WisDOT Projections

Existing Traffic Signal Timings

PEAK HOUR TURNING MOVEMENT COUNT SUMMARY

Intersection: STH 97 (Central Avenue) and Arnold Street
County: Wood
Traffic Control: Traffic Signal
Project: STH 97 Corridor Study

A.M. PEAK	↓				←				↑				→				Total Vehicle Volumes
Wednesday, September 20, 2006	STH 97 (Central Avenue) From North				Arnold Street From East				STH 97 (Central Avenue) From South				Arnold Street From West				
TRAFFIC VOLUMES	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	
Start Time	2	69	1	N/A	3	21	1	N/A	3	101	5	N/A	7	8	5	N/A	
7:15 AM	2	73	1	N/A	9	43	0	N/A	0	101	7	N/A	10	14	14	N/A	
7:30 AM	4	101	3	N/A	3	36	6	N/A	1	99	7	N/A	7	3	11	N/A	
7:45 AM	2	83	4	N/A	3	18	4	N/A	1	78	3	N/A	7	5	3	N/A	
8:00 AM	10	326	9	N/A	18	118	11	N/A	5	379	22	N/A	31	30	33	N/A	
Peak Hour Volume	345				147				406				94				
U-Turn Hourly Volume			0				0				0				0		
By Approach																	
TRUCK PERCENTAGES																	
% Single Unit Trucks	N/A	N/A	N/A		N/A	N/A	N/A		N/A	N/A	N/A		N/A	N/A	N/A		
% Heavy Trucks	N/A	N/A	N/A		N/A	N/A	N/A		N/A	N/A	N/A		N/A	N/A	N/A		
% Trucks (Total)	N/A	N/A	N/A		N/A	N/A	N/A		N/A	N/A	N/A		N/A	N/A	N/A		
By Approach	9.0%				3.0%				7.0%				1.0%				
PEAK HOUR FACTORS																	
Peak Hour Factor (PHF)	0.63	0.81	0.56		0.50	0.69	0.46		0.42	0.94	0.79		0.78	0.54	0.59		
By Approach	0.80				0.71				0.93				0.62				
HOURLY VOLUME-ROUNDED	10	325	10	N/A	20	120	10	N/A	5	380	20	N/A	30	30	35	N/A	
By Approach	345				150				405				95				

P.M. PEAK	↓				←				↑				→				Total Vehicle Volumes
Wednesday, September 20, 2006	STH 97 (Central Avenue) From North				Arnold Street From East				STH 97 (Central Avenue) From South				Arnold Street From West				
TRAFFIC VOLUMES	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	
Start Time																	
4:00 PM	6	174	7	N/A	6	20	7	N/A	4	124	9	N/A	5	8	11	N/A	
4:15 PM	8	133	4	N/A	6	16	5	N/A	3	123	10	N/A	9	17	10	N/A	
4:30 PM	8	144	9	N/A	9	17	4	N/A	4	138	12	N/A	10	13	17	N/A	
4:45 PM	3	156	5	N/A	11	23	0	N/A	8	168	10	N/A	5	21	8	N/A	
Peak Hour Volume	25	607	25	N/A	32	76	16	N/A	19	553	41	N/A	29	59	46	N/A	
U-Turn Hourly Volume			0				0				0				0		
By Approach		657				124				613				134			
TRUCK PERCENTAGES																	
% Single Unit Trucks	N/A	N/A	N/A		N/A	N/A	N/A		N/A	N/A	N/A		N/A	N/A	N/A		
% Heavy Trucks	N/A	N/A	N/A		N/A	N/A	N/A		N/A	N/A	N/A		N/A	N/A	N/A		
% Trucks (Total)	N/A	N/A	N/A		N/A	N/A	N/A		N/A	N/A	N/A		N/A	N/A	N/A		
By Approach		2.0%				1.0%				1.0%				2.0%			
PEAK HOUR FACTORS																	
Peak Hour Factor (PHF)	0.78	0.87	0.69		0.73	0.83	0.57		0.59	0.82	0.85		0.73	0.70	0.68		
By Approach		0.88				0.91				0.82				0.84			
HOURLY VOLUME-ROUNDED	25	605	25	N/A	30	75	15	N/A	20	555	40	N/A	30	60	45	N/A	
By Approach		655				120				615				135			

DOT Growth Factor Group: None Used
 Adjustment Factor Used: 1.000
 Notes: U-turn volumes included in left-turn volumes.

Weekday Turning Movement Count
 STH 97 (Central Avenue) & Blodgett Street
 9/28/11 - 9/28/11
 PG & AG

Groups Printed- Unshifted - Bank 1 - Bank 2

	CENTRAL AVE From North					BLODGETT From East					CENTRAL AVE From South					BLODGETT From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:30 AM	0	53	0	0	53	0	7	6	0	13	1	46	0	0	47	1	2	3	0	6	119
06:45 AM	2	60	1	0	63	1	5	2	0	8	2	67	0	0	69	0	1	4	1	6	146
Total	2	113	1	0	116	1	12	8	0	21	3	113	0	0	116	1	3	7	1	12	265
07:00 AM	1	73	0	0	74	1	5	2	0	8	3	87	1	0	91	1	0	2	0	3	176
07:15 AM	1	65	0	0	66	1	8	7	1	17	2	108	1	0	111	3	4	4	1	12	206
07:30 AM	2	121	2	2	127	1	10	10	1	22	7	138	1	0	146	7	1	11	0	19	314
07:45 AM	6	114	0	0	120	1	5	6	0	12	7	120	0	0	127	2	4	7	0	13	272
Total	10	373	2	2	387	4	28	25	2	59	19	453	3	0	475	13	9	24	1	47	968
08:00 AM	2	79	0	0	81	2	2	5	0	9	2	81	3	0	86	2	2	6	0	10	186
08:15 AM	4	74	0	0	78	1	1	6	1	9	2	83	1	0	86	0	0	3	0	3	176
08:30 AM	2	69	0	0	71	3	0	4	0	7	3	70	1	0	74	2	1	3	0	6	158
08:45 AM	4	79	1	0	84	0	0	0	0	0	5	100	3	0	108	0	1	5	1	7	199
Total	12	301	1	0	314	6	3	15	1	25	12	334	8	0	354	4	4	17	1	26	719
09:00 AM	6	81	0	0	87	1	4	2	2	9	2	84	0	0	86	1	0	3	0	4	186
09:15 AM	5	107	1	0	113	0	2	4	1	7	2	86	3	1	92	0	2	2	0	4	216
*** BREAK ***																					
Total	11	188	1	0	200	1	6	6	3	16	4	170	3	1	178	1	2	5	0	8	402
*** BREAK ***																					
03:00 PM	0	3	0	0	3	0	1	2	0	3	1	4	0	0	5	0	0	0	0	0	11
03:15 PM	0	2	0	0	2	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	4
03:30 PM	10	141	2	0	153	1	1	5	1	8	10	148	3	1	162	2	3	6	0	11	334
03:45 PM	7	160	2	0	169	2	1	8	1	12	1	128	2	0	131	1	3	9	1	14	326
Total	17	306	4	0	327	3	3	15	2	23	12	282	5	1	300	3	6	15	1	25	675
04:00 PM	6	143	1	0	150	3	1	9	1	14	6	147	1	1	155	0	1	9	0	10	329
04:15 PM	7	160	1	0	168	2	1	9	1	13	5	143	2	0	150	0	4	6	0	10	341
04:30 PM	5	150	0	0	155	0	2	3	0	5	5	139	1	0	145	0	2	11	1	14	319
04:45 PM	4	191	1	0	196	3	1	5	0	9	3	129	1	0	133	0	5	10	0	15	353
Total	22	644	3	0	669	8	5	26	2	41	19	558	5	1	583	0	12	36	1	49	1342
05:00 PM	9	170	0	0	179	3	5	6	0	14	5	141	1	0	147	3	1	7	0	11	351
05:15 PM	4	172	2	0	178	1	0	5	0	6	1	142	2	0	145	1	1	9	1	12	341
05:30 PM	8	178	1	0	187	1	1	6	1	9	3	151	2	2	158	1	3	7	3	14	368
05:45 PM	3	170	1	0	174	5	2	6	3	16	7	127	10	0	144	1	0	10	2	13	347
Total	24	690	4	0	718	10	8	23	4	45	16	561	15	2	594	6	5	33	6	50	1407
Grand Total	98	2615	16	2	2731	33	65	118	14	230	85	2471	39	5	2600	28	41	137	11	217	5778
Apprch %	3.6	95.8	0.6	0.1		14.3	28.3	51.3	6.1		3.3	95	1.5	0.2		12.9	18.9	63.1	5.1		
Total %	1.7	45.3	0.3	0	47.3	0.6	1.1	2	0.2	4	1.5	42.8	0.7	0.1	45	0.5	0.7	2.4	0.2	3.8	
Unshifted	94	2528	16	2	2640	32	63	112	9	216	81	2379	39	4	2503	27	39	134	8	208	5567
% Unshifted	95.9	96.7	100	100	96.7	97	96.9	94.9	64.3	93.9	95.3	96.3	100	80	96.3	96.4	95.1	97.8	72.7	95.9	96.3
Bank 1	3	44	0	0	47	1	1	4	5	11	4	32	0	1	37	1	2	3	3	9	104
% Bank 1	3.1	1.7	0	0	1.7	3	1.5	3.4	35.7	4.8	4.7	1.3	0	20	1.4	3.6	4.9	2.2	27.3	4.1	1.8
Bank 2	1	43	0	0	44	0	1	2	0	3	0	60	0	0	60	0	0	0	0	0	107
% Bank 2	1	1.6	0	0	1.6	0	1.5	1.7	0	1.3	0	2.4	0	0	2.3	0	0	0	0	0	1.9

Weekday Turning Movement Count
 STH 97 (Central Avenue) & Blodgett Street
 9/28/11 - 9/28/11
 PG & AG

Groups Printed- Bank 1 - Bank 2

	CENTRAL AVE From North					BLODGETT From East					CENTRAL AVE From South					BLODGETT From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:30 AM	0	6	0	0	6	0	0	0	0	0	0	1	0	0	1	1	0	0	0	1	8
06:45 AM	1	5	0	0	6	0	0	0	0	0	0	3	0	0	3	0	0	0	1	1	10
Total	1	11	0	0	12	0	0	0	0	0	0	4	0	0	4	1	0	0	1	2	18
07:00 AM	1	5	0	0	6	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	10
07:15 AM	0	3	0	0	3	0	0	1	1	2	0	12	0	0	12	0	0	0	1	1	18
07:30 AM	0	5	0	0	5	0	0	1	1	2	0	5	0	0	5	0	0	0	0	0	12
07:45 AM	1	8	0	0	9	0	1	0	0	1	1	6	0	0	7	0	0	0	0	0	17
Total	2	21	0	0	23	0	1	2	2	5	1	27	0	0	28	0	0	0	1	1	57
08:00 AM	0	3	0	0	3	1	0	0	0	1	0	4	0	0	4	0	0	0	0	0	8
08:15 AM	0	3	0	0	3	0	0	0	1	1	1	6	0	0	7	0	0	0	0	0	11
08:30 AM	0	3	0	0	3	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	9
08:45 AM	0	3	0	0	3	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	6
Total	0	12	0	0	12	1	0	0	1	2	1	19	0	0	20	0	0	0	0	0	34
09:00 AM	0	2	0	0	2	0	0	0	1	1	0	3	0	0	3	0	0	2	0	2	8
09:15 AM	0	6	0	0	6	0	0	0	0	0	0	9	0	1	10	0	0	0	0	0	16
*** BREAK ***																					
Total	0	8	0	0	8	0	0	0	1	1	0	12	0	1	13	0	0	2	0	2	24
*** BREAK ***																					
03:00 PM	0	3	0	0	3	0	1	2	0	3	1	4	0	0	5	0	0	0	0	0	11
03:15 PM	0	2	0	0	2	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	4
03:30 PM	0	1	0	0	1	0	0	2	0	2	0	5	0	0	5	0	1	0	0	1	9
03:45 PM	0	3	0	0	3	0	0	0	0	0	0	6	0	0	6	0	1	0	0	1	10
Total	0	9	0	0	9	0	1	4	0	5	1	17	0	0	18	0	2	0	0	2	34
04:00 PM	0	3	0	0	3	0	0	0	0	0	1	4	0	0	5	0	0	1	0	1	9
04:15 PM	0	4	0	0	4	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	6
04:30 PM	1	3	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
04:45 PM	0	7	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Total	1	17	0	0	18	0	0	0	0	0	1	6	0	0	7	0	0	1	0	1	26
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	2
05:15 PM	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
05:30 PM	0	2	0	0	2	0	0	0	1	1	0	2	0	0	2	0	0	0	0	0	5
05:45 PM	0	4	0	0	4	0	0	0	0	0	0	3	0	0	3	0	0	0	1	1	8
Total	0	9	0	0	9	0	0	0	1	1	0	7	0	0	7	0	0	0	1	1	18
Grand Total	4	87	0	0	91	1	2	6	5	14	4	92	0	1	97	1	2	3	3	9	211
Apprch %	4.4	95.6	0	0		7.1	14.3	42.9	35.7		4.1	94.8	0	1		11.1	22.2	33.3	33.3		
Total %	1.9	41.2	0	0	43.1	0.5	0.9	2.8	2.4	6.6	1.9	43.6	0	0.5	46	0.5	0.9	1.4	1.4	4.3	
Bank 1	3	44	0	0	47	1	1	4	5	11	4	32	0	1	37	1	2	3	3	9	104
% Bank 1	75	50.6	0	0	51.6	100	50	66.7	100	78.6	100	34.8	0	100	38.1	100	100	100	100	100	49.3
Bank 2	1	43	0	0	44	0	1	2	0	3	0	60	0	0	60	0	0	0	0	0	107
% Bank 2	25	49.4	0	0	48.4	0	50	33.3	0	21.4	0	65.2	0	0	61.9	0	0	0	0	0	50.7

PEAK HOUR TURNING MOVEMENT COUNT SUMMARY

Intersection: STH 97 (Central Avenue) and Blodgett Street
County: Wood
Traffic Control: Two-Way Stop
Project: STH 97 Corridor Study

A.M. PEAK Wednesday, September 28, 2011	↓				←				↑				→				Total Vehicle Volumes
TRAFFIC VOLUMES	STH 97 (Central Avenue) From North				Blodgett Street From East				STH 97 (Central Avenue) From South				Blodgett Street From West				
Start Time	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	
7:00 AM	0	73	1	0	2	5	1	0	1	87	3	0	2	0	1	0	176
7:15 AM	0	65	1	0	7	8	1	1	1	108	2	0	4	4	3	1	204
7:30 AM	2	121	2	2	10	10	1	1	1	138	7	0	11	1	7	0	311
7:45 AM	0	114	6	0	6	5	1	0	0	120	7	0	7	4	2	0	272
Peak Hour Volume	2	373	10	2	25	28	4	2	3	453	19	0	24	9	13	1	963
U-Turn Hourly Volume																	
By Approach	385				57				475				46				963
TRUCK PERCENTAGES																	
% Single Unit Trucks	0.0%	3.8%	20.0%		8.0%	3.6%	0.0%		0.0%	2.2%	5.3%		0.0%	0.0%	0.0%		3.1%
% Heavy Trucks	0.0%	1.8%	0.0%		0.0%	0.0%	0.0%		0.0%	3.8%	0.0%		0.0%	0.0%	0.0%		2.5%
% Trucks (Total)	0.0%	5.6%	20.0%		8.0%	3.6%	0.0%		0.0%	6.0%	5.3%		0.0%	0.0%	0.0%		5.6%
By Approach	5.9%				5.3%				5.9%				0.0%				
PEAK HOUR FACTORS																	
Peak Hour Factor (PHF)	0.25	0.77	0.42		0.63	0.70	1.00		0.75	0.82	0.68		0.55	0.56	0.46		0.77
By Approach	0.77				0.68				0.81				0.61				
HOURLY VOLUME-ROUNDED	0	375	10	2	25	30	5	2	5	455	20	0	25	10	15	1	975
By Approach	385				60				480				50				

P.M. PEAK	↓				←				↑				→				Total Vehicle Volumes
Tuesday, September 27, 2011																	
TRAFFIC VOLUMES	STH 97 (Central Avenue) From North				Blodgett Street From East				STH 97 (Central Avenue) From South				Blodgett Street From West				
Start Time	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	
4:15 PM	1	188	4	0	5	1	3	0	1	131	3	0	10	5	0	0	
4:30 PM	0	173	10	0	6	5	3	0	1	139	5	0	7	1	3	0	
4:45 PM	2	176	4	0	5	0	1	0	2	142	1	0	9	1	1	1	
5:00 PM	1	176	8	0	6	1	1	0	2	151	3	2	7	3	1	3	
Peak Hour Volume	4	713	26	0	22	7	8	0	6	563	12	2	33	10	5	4	
U-Turn Hourly Volume																	
By Approach	743				37				581				48				1,409
TRUCK PERCENTAGES																	
% Single Unit Trucks	0.0%	1.5%	3.8%		0.0%	0.0%	0.0%		0.0%	0.2%	0.0%		0.0%	0.0%	0.0%		
% Heavy Trucks	0.0%	0.5%	0.0%		0.0%	0.0%	0.0%		0.0%	0.5%	0.0%		0.0%	0.0%	0.0%		
% Trucks (Total)	0.0%	2.0%	3.8%		0.0%	0.0%	0.0%		0.0%	0.7%	0.0%		0.0%	0.0%	0.0%		
By Approach	2.1%				0.0%				0.7%				0.0%				1.3%
PEAK HOUR FACTORS																	
Peak Hour Factor (PHF)	0.50	0.95	0.65		0.92	0.35	0.67		0.75	0.93	0.60		0.82	0.50	0.42		
By Approach	0.96				0.66				0.93				0.80				0.98
HOURLY VOLUME-ROUNDED	5	715	25	0	20	5	10	0	5	565	10	2	35	10	5	4	
By Approach	745				35				580				50				1,410

DOT Growth Factor Group: None Used
 Adjustment Factor Used: 1.000
 Notes: U-turn volumes included in left-turn volumes.

Weekday Turning Movement Count
 STH 97 (Central Avenue) & Cleveland Street
 10/5/11
 PG & AG

Groups Printed- car - medium - heavy

	CENTRAL AVE From North					CLEVELAND ST From East					CENTRAL AVE From South					CLEVELAND ST From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
*** BREAK ***																					
07:00 AM	1	87	0	0	88	0	1	0	0	1	2	78	0	0	80	0	1	0	0	1	170
07:15 AM	0	76	1	0	77	0	1	1	0	2	4	122	0	0	126	1	0	10	0	11	216
07:30 AM	2	106	1	0	109	0	0	0	3	3	4	161	1	0	166	3	1	20	2	26	304
07:45 AM	13	100	2	0	115	1	1	1	4	7	5	173	1	0	179	0	0	4	0	4	305
Total	16	369	4	0	389	1	3	2	7	13	15	534	2	0	551	4	2	34	2	42	995

*** BREAK ***

04:15 PM	1	161	3	0	165	1	0	2	1	4	1	167	1	1	170	0	0	6	2	8	347
04:30 PM	2	191	4	0	197	1	0	1	1	3	2	184	4	3	193	0	1	6	4	11	404
04:45 PM	1	206	3	1	211	0	1	2	3	6	3	170	0	0	173	2	1	7	1	11	401
Total	4	558	10	1	573	2	1	5	5	13	6	521	5	4	536	2	2	19	7	30	1152
05:00 PM	2	225	0	0	227	0	0	1	0	1	10	168	1	0	179	0	1	8	3	12	419
Grand Total	22	1152	14	1	1189	3	4	8	12	27	31	1223	8	4	1266	6	5	61	12	84	2566
Apprch %	1.9	96.9	1.2	0.1		11.1	14.8	29.6	44.4		2.4	96.6	0.6	0.3		7.1	6	72.6	14.3		
Total %	0.9	44.9	0.5	0	46.3	0.1	0.2	0.3	0.5	1.1	1.2	47.7	0.3	0.2	49.3	0.2	0.2	2.4	0.5	3.3	
car	21	1118	14	0	1153	3	4	8	8	23	31	1192	8	3	1234	6	5	60	7	78	2488
% car	95.5	97	100	0	97	100	100	100	66.7	85.2	100	97.5	100	75	97.5	100	100	98.4	58.3	92.9	97
medium	0	20	0	1	21	0	0	0	4	4	0	15	0	1	16	0	0	1	5	6	47
% medium	0	1.7	0	100	1.8	0	0	0	33.3	14.8	0	1.2	0	25	1.3	0	0	1.6	41.7	7.1	1.8
heavy	1	14	0	0	15	0	0	0	0	0	0	16	0	0	16	0	0	0	0	0	31
% heavy	4.5	1.2	0	0	1.3	0	0	0	0	0	0	1.3	0	0	1.3	0	0	0	0	0	1.2

Weekday Turning Movement Count
 STH 97 (Central Avenue) & Cleveland Street
 10/5/11
 PG & AG

Groups Printed- medium - heavy

	CENTRAL AVE From North					CLEVELAND ST From East					CENTRAL AVE From South					CLEVELAND ST From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
*** BREAK ***																					
07:00 AM	0	5	0	0	5	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	8
07:15 AM	0	4	0	0	4	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	10
07:30 AM	0	4	0	0	4	0	0	0	0	0	0	6	0	0	6	0	0	0	2	2	12
07:45 AM	1	9	0	0	10	0	0	0	1	1	0	6	0	0	6	0	0	1	0	1	18
Total	1	22	0	0	23	0	0	0	1	1	0	21	0	0	21	0	0	1	2	3	48
*** BREAK ***																					
04:15 PM	0	3	0	0	3	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	7
04:30 PM	0	2	0	0	2	0	0	0	1	1	0	2	0	1	3	0	0	0	0	0	6
04:45 PM	0	5	0	1	6	0	0	0	2	2	0	3	0	0	3	0	0	0	0	0	11
Total	0	10	0	1	11	0	0	0	3	3	0	9	0	1	10	0	0	0	0	0	24
05:00 PM	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	3	3	6
Grand Total	1	34	0	1	36	0	0	0	4	4	0	31	0	1	32	0	0	1	5	6	78
Apprch %	2.8	94.4	0	2.8		0	0	0	100		0	96.9	0	3.1		0	0	16.7	83.3		
Total %	1.3	43.6	0	1.3	46.2	0	0	0	5.1	5.1	0	39.7	0	1.3	41	0	0	1.3	6.4	7.7	
medium	0	20	0	1	21	0	0	0	4	4	0	15	0	1	16	0	0	1	5	6	47
% medium	0	58.8	0	100	58.3	0	0	0	100	100	0	48.4	0	100	50	0	0	100	100	100	60.3
heavy	1	14	0	0	15	0	0	0	0	0	0	16	0	0	16	0	0	0	0	0	31
% heavy	100	41.2	0	0	41.7	0	0	0	0	0	0	51.6	0	0	50	0	0	0	0	0	39.7

PEAK HOUR TURNING MOVEMENT COUNT SUMMARY

Intersection: STH 97 (Central Avenue) and Cleveland Street
County: Wood
Traffic Control: Two-Way Stop
Project: STH 97 Corridor Study

A.M. PEAK	↓				←				↑				→				Total Vehicle Volumes
Wednesday, October 05, 2011	STH 97 (Central Avenue) From North				Cleveland Street From East				STH 97 (Central Avenue) From South				Cleveland Street From West				
TRAFFIC VOLUMES	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	
Start Time	0	87	1	0	0	1	0	0	0	78	2	0	0	1	0	0	
7:00 AM	1	76	0	0	1	1	0	0	0	122	4	0	10	0	1	0	
7:15 AM	1	106	2	0	0	0	0	3	1	161	4	0	20	1	3	2	
7:30 AM	2	100	13	0	1	1	1	4	1	173	5	0	4	0	0	0	
7:45 AM																	
Peak Hour Volume	4	369	16	0	2	3	1	7	2	534	15	0	34	2	4	2	
U-Turn Hourly Volume			0				0				0				0		
By Approach		389				6				551				40			
TRUCK PERCENTAGES																	
% Single Unit Trucks	0.0%	3.5%	0.0%		0.0%	0.0%	0.0%		0.0%	1.7%	0.0%		2.9%	0.0%	0.0%		
% Heavy Trucks	0.0%	2.5%	6.2%		0.0%	0.0%	0.0%		0.0%	2.2%	0.0%		0.0%	0.0%	0.0%		
% Trucks (Total)	0.0%	6.0%	6.2%		0.0%	0.0%	0.0%		0.0%	3.9%	0.0%		2.9%	0.0%	0.0%		
By Approach		5.9%				0.0%				3.8%				2.5%			
PEAK HOUR FACTORS																	
Peak Hour Factor (PHF)	0.50	0.87	0.31		0.50	0.75	0.25		0.50	0.77	0.75		0.43	0.50	0.33		
By Approach		0.85				0.50				0.77				0.42			
HOURLY VOLUME-ROUNDED	5	370	15	0	0	5	0	7	0	535	15	0	35	0	5	2	
By Approach		390				5				550				40			

P.M. PEAK	↓				←				↑				→				Total Vehicle Volumes
Wednesday, October 05, 2011	STH 97 (Central Avenue) From North				Cleveland Street From East				STH 97 (Central Avenue) From South				Cleveland Street From West				
TRAFFIC VOLUMES	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	
Start Time	3	161	1	0	2	0	1	1	1	167	1	1	6	0	0	2	
4:15 PM	4	191	2	0	1	0	1	1	4	184	2	3	6	1	0	4	
4:30 PM	3	206	1	1	2	1	0	3	0	170	3	0	7	1	2	1	
4:45 PM	0	225	2	0	1	0	0	0	1	168	10	0	8	1	0	3	
5:00 PM																	
Peak Hour Volume	10	783	6	1	6	1	2	5	6	689	16	4	27	3	2	10	
U-Turn Hourly Volume																	
By Approach		799				9				711				32			
TRUCK PERCENTAGES																	
% Single Unit Trucks	0.0%	0.9%	0.0%		0.0%	0.0%	0.0%		0.0%	0.9%	0.0%		0.0%	0.0%	0.0%		
% Heavy Trucks	0.0%	0.6%	0.0%		0.0%	0.0%	0.0%		0.0%	0.6%	0.0%		0.0%	0.0%	0.0%		
% Trucks (Total)	0.0%	1.5%	0.0%		0.0%	0.0%	0.0%		0.0%	1.5%	0.0%		0.0%	0.0%	0.0%		
By Approach		1.5%				0.0%				1.5%				0.0%			
PEAK HOUR FACTORS																	
Peak Hour Factor (PHF)	0.63	0.87	0.75		0.75	0.25	0.50		0.38	0.94	0.40		0.84	0.75	0.25		
By Approach		0.88				0.75				0.94				0.80			
HOURLY VOLUME-ROUNDED	10	785	5	1	5	0	0	5	5	690	15	4	25	5	0	10	
By Approach		800				5				710				30			

DOT Growth Factor Group: None Used
 Adjustment Factor Used: 1.000
 Notes: U-turn volumes included in left-turn volumes.

Weekday Turning Movement Count
 STH 97 (Central Avenue) & Doege Street
 9/27/11 - 9/28/11
 PG & AG

Groups Printed- Unshifted - Bank 1 - Bank 2

	CENTRAL AVE From North					DOEGE From East					CENTRAL AVE From South					DOEGE From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:15 AM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
06:30 AM	2	54	2	0	58	2	19	7	0	28	15	35	3	0	53	3	7	2	1	13	152
06:45 AM	4	52	2	2	60	3	42	5	0	50	12	53	0	0	65	8	22	4	1	35	210
Total	6	106	4	2	118	6	61	12	0	79	27	88	3	0	118	11	29	6	2	48	363
07:00 AM	4	72	1	2	79	2	35	6	0	43	10	65	4	1	80	5	27	2	0	34	236
07:15 AM	2	59	3	0	64	6	46	8	0	60	24	77	12	0	113	8	52	2	1	63	300
07:30 AM	4	98	6	0	108	7	62	19	1	89	22	113	7	0	142	11	61	5	0	77	416
07:45 AM	3	105	5	0	113	7	61	11	0	79	23	117	4	0	144	11	37	9	0	57	393
Total	13	334	15	2	364	22	204	44	1	271	79	372	27	1	479	35	177	18	1	231	1345
08:00 AM	4	72	6	0	82	3	18	8	1	30	12	69	5	1	87	12	10	5	0	27	226
08:15 AM	4	69	3	0	76	1	15	5	1	22	12	68	2	0	82	6	12	8	0	26	206
08:30 AM	4	55	6	0	65	3	23	4	0	30	5	63	2	0	70	7	13	4	0	24	189
08:45 AM	2	83	6	0	91	2	12	14	0	28	1	88	2	0	91	2	14	4	1	21	231
Total	14	279	21	0	314	9	68	31	2	110	30	288	11	1	330	27	49	21	1	98	852
09:00 AM	0	69	5	0	74	3	12	6	1	22	9	79	4	0	92	11	8	10	0	29	217
09:15 AM	2	102	6	1	111	3	13	6	0	22	2	96	2	0	100	8	5	10	0	23	256
*** BREAK ***																					
Total	2	171	11	1	185	6	25	12	1	44	11	175	6	0	192	19	13	20	0	52	473
*** BREAK ***																					
03:00 PM	5	148	7	0	160	5	21	11	1	38	9	156	5	0	170	15	30	13	0	58	426
03:15 PM	4	154	6	0	164	15	39	17	0	71	2	128	7	0	137	9	17	13	0	39	411
03:30 PM	5	135	9	0	149	2	21	19	0	42	4	142	2	1	149	11	36	13	6	66	406
03:45 PM	8	153	9	0	170	8	17	16	0	41	1	140	4	0	145	14	31	17	1	63	419
Total	22	590	31	0	643	30	98	63	1	192	16	566	18	1	601	49	114	56	7	226	1662
04:00 PM	4	139	14	0	157	4	13	15	0	32	6	146	5	0	157	16	33	16	0	65	411
04:15 PM	4	178	13	1	196	5	14	12	0	31	4	128	0	1	133	10	48	24	0	82	442
04:30 PM	5	156	11	1	173	5	15	12	1	33	2	136	4	1	143	15	45	23	0	83	432
04:45 PM	4	173	11	0	188	11	17	14	1	43	4	135	10	0	149	12	39	23	1	75	455
Total	17	646	49	2	714	25	59	53	2	139	16	545	19	2	582	53	165	86	1	305	1740
05:00 PM	15	163	13	1	192	5	9	15	0	29	8	134	9	0	151	13	60	25	0	98	470
05:15 PM	6	145	15	0	166	10	19	16	0	45	5	128	2	0	135	6	46	23	0	75	421
05:30 PM	6	140	5	0	151	7	22	16	4	49	1	108	4	0	113	10	22	17	0	49	362
05:45 PM	2	118	8	0	128	6	17	10	1	34	2	128	2	0	132	9	24	16	0	49	343
Total	29	566	41	1	637	28	67	57	5	157	16	498	17	0	531	38	152	81	0	271	1596
Grand Total	103	2692	172	8	2975	126	582	272	12	992	195	2532	101	5	2833	232	699	288	12	1231	8031
Apprch %	3.5	90.5	5.8	0.3		12.7	58.7	27.4	1.2		6.9	89.4	3.6	0.2		18.8	56.8	23.4	1		
Total %	1.3	33.5	2.1	0.1	37	1.6	7.2	3.4	0.1	12.4	2.4	31.5	1.3	0.1	35.3	2.9	8.7	3.6	0.1	15.3	
Unshifted	102	2613	172	5	2892	121	574	263	9	967	192	2441	93	5	2731	230	686	280	11	1207	7797
% Unshifted	99	97.1	100	62.5	97.2	96	98.6	96.7	75	97.5	98.5	96.4	92.1	100	96.4	99.1	98.1	97.2	91.7	98.1	97.1
Bank 1	1	40	0	3	44	4	4	8	3	19	2	43	2	0	47	2	8	6	1	17	127
% Bank 1	1	1.5	0	37.5	1.5	3.2	0.7	2.9	25	1.9	1	1.7	2	0	1.7	0.9	1.1	2.1	8.3	1.4	1.6
Bank 2	0	39	0	0	39	1	4	1	0	6	1	48	6	0	55	0	5	2	0	7	107
% Bank 2	0	1.4	0	0	1.3	0.8	0.7	0.4	0	0.6	0.5	1.9	5.9	0	1.9	0	0.7	0.7	0	0.6	1.3

Weekday Turning Movement Count
 STH 97 (Central Avenue) & Doege Street
 9/27/11 - 9/28/11
 PG & AG

Groups Printed- Bank 1 - Bank 2

	CENTRAL AVE From North					DOEGE From East					CENTRAL AVE From South					DOEGE From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
*** BREAK ***																					
06:30 AM	0	5	0	0	5	0	0	1	0	1	0	2	0	0	2	0	0	0	0	0	8
06:45 AM	0	6	0	1	7	0	0	0	0	0	0	2	0	0	2	0	1	0	0	1	10
Total	0	11	0	1	12	0	0	1	0	1	0	4	0	0	4	0	1	0	0	1	18
07:00 AM	0	5	0	1	6	0	0	0	0	0	1	4	2	0	7	0	0	0	0	0	13
07:15 AM	1	2	0	0	3	0	0	0	0	0	0	9	2	0	11	0	0	0	1	1	15
07:30 AM	0	2	0	0	2	2	1	5	1	9	0	6	1	0	7	0	1	1	0	2	20
07:45 AM	0	8	0	0	8	0	0	0	0	0	0	6	0	0	6	0	4	1	0	5	19
Total	1	17	0	1	19	2	1	5	1	9	1	25	5	0	31	0	5	2	1	8	67
08:00 AM	0	3	0	0	3	0	1	0	0	1	0	5	0	0	5	0	1	0	0	1	10
08:15 AM	0	2	0	0	2	0	0	0	1	1	2	3	0	0	5	0	0	0	0	0	8
08:30 AM	0	3	0	0	3	0	1	0	0	1	0	5	1	0	6	0	0	0	0	0	10
08:45 AM	0	3	0	0	3	0	0	1	0	1	0	4	1	0	5	0	1	0	0	1	10
Total	0	11	0	0	11	0	2	1	1	4	2	17	2	0	21	0	2	0	0	2	38
09:00 AM	0	3	0	0	3	0	1	1	1	3	0	5	0	0	5	0	0	2	0	2	13
09:15 AM	0	6	0	1	7	1	2	0	0	3	0	6	1	0	7	0	0	1	0	1	18
*** BREAK ***																					
Total	0	9	0	1	10	1	3	1	1	6	0	11	1	0	12	0	0	3	0	3	31
*** BREAK ***																					
03:00 PM	0	3	0	0	3	0	0	0	0	0	0	3	0	0	3	1	4	0	0	5	11
03:15 PM	0	3	0	0	3	0	2	0	0	2	0	4	0	0	4	0	0	0	0	0	9
03:30 PM	0	1	0	0	1	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	4
03:45 PM	0	3	0	0	3	0	0	1	0	1	0	1	0	0	1	1	1	0	0	2	7
Total	0	10	0	0	10	0	2	1	0	3	0	11	0	0	11	2	5	0	0	7	31
04:00 PM	0	3	0	0	3	0	0	0	0	0	0	5	0	0	5	0	0	1	0	1	9
04:15 PM	0	3	0	0	3	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	7
04:30 PM	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	3
04:45 PM	0	4	0	0	4	1	0	0	0	1	0	2	0	0	2	0	0	0	0	0	7
Total	0	12	0	0	12	1	0	0	0	1	0	11	0	0	11	0	0	2	0	2	26
05:00 PM	0	1	0	0	1	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	4
05:15 PM	0	2	0	0	2	0	0	0	0	0	0	2	0	0	2	0	0	1	0	1	5
05:30 PM	0	2	0	0	2	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	5
05:45 PM	0	4	0	0	4	1	0	0	0	1	0	4	0	0	4	0	0	0	0	0	9
Total	0	9	0	0	9	1	0	0	0	1	0	12	0	0	12	0	0	1	0	1	23
Grand Total	1	79	0	3	83	5	8	9	3	25	3	91	8	0	102	2	13	8	1	24	234
Apprch %	1.2	95.2	0	3.6		20	32	36	12		2.9	89.2	7.8	0		8.3	54.2	33.3	4.2		
Total %	0.4	33.8	0	1.3	35.5	2.1	3.4	3.8	1.3	10.7	1.3	38.9	3.4	0	43.6	0.9	5.6	3.4	0.4	10.3	
Bank 1	1	40	0	3	44	4	4	8	3	19	2	43	2	0	47	2	8	6	1	17	127
% Bank 1	100	50.6	0	100	53	80	50	88.9	100	76	66.7	47.3	25	0	46.1	100	61.5	75	100	70.8	54.3
Bank 2	0	39	0	0	39	1	4	1	0	6	1	48	6	0	55	0	5	2	0	7	107
% Bank 2	0	49.4	0	0	47	20	50	11.1	0	24	33.3	52.7	75	0	53.9	0	38.5	25	0	29.2	45.7

PEAK HOUR TURNING MOVEMENT COUNT SUMMARY

Intersection: STH 97 (Central Avenue) and Doege Street
County: Wood
Traffic Control: Traffic Signal
Project: STH 97 Corridor Study

A.M. PEAK	↓				←				↑				→				Total Vehicle Volumes
Wednesday, September 28, 2011																	
TRAFFIC VOLUMES	STH 97 (Central Avenue) From North				Doege Street From East				STH 97 (Central Avenue) From South				Doege Street From West				
Start Time	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	
7:00 AM	1	72	4	2	6	35	2	0	4	65	10	1	2	27	5	0	
7:15 AM	3	59	2	0	8	46	6	0	12	77	24	0	2	52	8	1	
7:30 AM	6	98	4	0	19	62	7	1	7	113	22	0	5	61	11	0	
7:45 AM	5	105	3	0	11	61	7	0	4	117	23	0	9	37	11	0	
Peak Hour Volume	15	334	13	2	44	204	22	1	27	372	79	1	18	177	35	1	
U-Turn Hourly Volume																	
By Approach	362				270				478				230				
TRUCK PERCENTAGES																	
% Single Unit Trucks	0.0%	3.3%	7.7%		11.4%	0.0%	9.1%		3.7%	4.0%	0.0%		11.1%	1.1%	0.0%		
% Heavy Trucks	0.0%	1.8%	0.0%		0.0%	0.5%	0.0%		14.8%	2.7%	1.3%		0.0%	1.7%	0.0%		
% Trucks (Total)	0.0%	5.1%	7.7%		11.4%	0.5%	9.1%		18.5%	6.7%	1.3%		11.1%	2.8%	0.0%		
By Approach	5.0%				3.0%				6.5%				3.0%				
PEAK HOUR FACTORS																	
Peak Hour Factor (PHF)	0.63	0.80	0.81		0.58	0.82	0.79		0.56	0.79	0.82		0.50	0.73	0.80		
By Approach	0.80				0.77				0.83				0.75				
HOURLY VOLUME-ROUNDED	15	335	15	2	45	205	20	1	25	370	80	1	20	175	35	1	
By Approach	365				270				475				230				

P.M. PEAK	↓				←				↑				→				Total Vehicle Volumes
Tuesday, September 27, 2011																	
TRAFFIC VOLUMES	STH 97 (Central Avenue) From North				Doege Street From East				STH 97 (Central Avenue) From South				Doege Street From West				
Start Time	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	
4:15 PM	13	178	4	1	12	14	5	0	0	128	4	1	24	48	10	0	
4:30 PM	11	156	5	1	12	15	5	1	4	136	2	1	23	45	15	0	
4:45 PM	11	173	4	0	14	17	11	1	10	135	4	0	23	39	12	1	
5:00 PM	13	163	15	1	15	9	5	0	9	134	8	0	25	60	13	0	
Peak Hour Volume	48	670	28	3	53	55	26	2	23	533	18	2	95	192	50	1	
U-Turn Hourly Volume																	
By Approach	746				134				574				337				1,791
TRUCK PERCENTAGES																	
% Single Unit Trucks	0.0%	0.9%	0.0%		0.0%	0.0%	3.8%		0.0%	0.8%	0.0%		1.1%	0.0%	0.0%		
% Heavy Trucks	0.0%	0.6%	0.0%		0.0%	0.0%	0.0%		0.0%	0.9%	0.0%		0.0%	0.0%	0.0%		
% Trucks (Total)	0.0%	1.5%	0.0%		0.0%	0.0%	3.8%		0.0%	1.7%	0.0%		1.1%	0.0%	0.0%		
By Approach	1.3%				0.7%				1.6%				0.3%				1.2%
PEAK HOUR FACTORS																	
Peak Hour Factor (PHF)	0.92	0.94	0.47		0.88	0.81	0.59		0.58	0.98	0.56		0.95	0.80	0.83		
By Approach	0.96				0.80				0.95				0.86				0.95
HOURLY VOLUME-ROUNDED	50	670	30	3	55	55	25	2	25	535	20	2	95	190	50	1	
By Approach	750				135				580				335				1,800

DOT Growth Factor Group: None Used
 Adjustment Factor Used: 1.000
 Notes: U-turn volumes included in left-turn volumes.

Weekday Turning Movement Count
 STH 97 (Central Avenue) & Edison Street
 10/4/11
 PG & AG

Groups Printed- car - medium - heavy

	CENTRAL AVE From North					EDISON ST From East					CENTRAL AVE From South					EDISON ST From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
*** BREAK ***																					
07:00 AM	4	73	0	0	77	0	2	4	0	6	1	70	1	0	72	0	2	8	0	10	165
07:15 AM	2	98	1	0	101	0	0	3	0	3	9	87	1	3	100	1	0	2	0	3	207
07:30 AM	0	90	3	1	94	0	1	3	1	5	10	143	0	1	154	1	0	4	0	5	258
07:45 AM	3	109	4	3	119	1	3	1	1	6	12	142	1	1	156	1	2	5	1	9	290
Total	9	370	8	4	391	1	6	11	2	20	32	442	3	5	482	3	4	19	1	27	920

*** BREAK ***

04:15 PM	2	156	1	1	160	2	0	1	0	3	3	152	2	0	157	3	3	9	0	15	335
04:30 PM	4	168	2	0	174	0	0	4	1	5	2	198	3	0	203	2	0	13	2	17	399
04:45 PM	6	167	4	0	177	0	1	0	2	3	3	158	2	1	164	1	0	8	0	9	353
Total	12	491	7	1	511	2	1	5	3	11	8	508	7	1	524	6	3	30	2	41	1087
05:00 PM	3	175	1	0	179	0	0	0	0	0	3	168	2	0	173	6	2	15	0	23	375
Grand Total	24	1036	16	5	1081	3	7	16	5	31	43	1118	12	6	1179	15	9	64	3	91	2382
Apprch %	2.2	95.8	1.5	0.5		9.7	22.6	51.6	16.1		3.6	94.8	1	0.5		16.5	9.9	70.3	3.3		
Total %	1	43.5	0.7	0.2	45.4	0.1	0.3	0.7	0.2	1.3	1.8	46.9	0.5	0.3	49.5	0.6	0.4	2.7	0.1	3.8	
car	23	992	15	2	1032	3	7	15	4	29	43	1077	12	5	1137	15	9	64	3	91	2289
% car	95.8	95.8	93.8	40	95.5	100	100	93.8	80	93.5	100	96.3	100	83.3	96.4	100	100	100	100	100	96.1
medium	1	21	1	3	26	0	0	0	1	1	0	22	0	1	23	0	0	0	0	0	50
% medium	4.2	2	6.2	60	2.4	0	0	0	20	3.2	0	2	0	16.7	2	0	0	0	0	0	2.1
heavy	0	23	0	0	23	0	0	1	0	1	0	19	0	0	19	0	0	0	0	0	43
% heavy	0	2.2	0	0	2.1	0	0	6.2	0	3.2	0	1.7	0	0	1.6	0	0	0	0	0	1.8

Weekday Turning Movement Count
 STH 97 (Central Avenue) & Edison Street
 10/4/11
 PG & AG

Groups Printed- medium - heavy

	CENTRAL AVE From North					EDISON ST From East					CENTRAL AVE From South					EDISON ST From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
*** BREAK ***																					
07:00 AM	0	7	0	0	7	0	0	1	0	1	0	5	0	0	5	0	0	0	0	0	13
07:15 AM	1	6	0	0	7	0	0	0	0	0	0	10	0	0	10	0	0	0	0	0	17
07:30 AM	0	10	0	1	11	0	0	0	0	0	0	9	0	1	10	0	0	0	0	0	21
07:45 AM	0	5	1	1	7	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	11
Total	1	28	1	2	32	0	0	1	0	1	0	28	0	1	29	0	0	0	0	0	62
*** BREAK ***																					
04:15 PM	0	5	0	1	6	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	11
04:30 PM	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	3
04:45 PM	0	7	0	0	7	0	0	0	1	1	0	3	0	0	3	0	0	0	0	0	11
Total	0	14	0	1	15	0	0	0	1	1	0	9	0	0	9	0	0	0	0	0	25
05:00 PM	0	2	0	0	2	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	6
Grand Total	1	44	1	3	49	0	0	1	1	2	0	41	0	1	42	0	0	0	0	0	93
Apprch %	2	89.8	2	6.1		0	0	50	50		0	97.6	0	2.4		0	0	0	0		
Total %	1.1	47.3	1.1	3.2	52.7	0	0	1.1	1.1	2.2	0	44.1	0	1.1	45.2	0	0	0	0	0	
medium	1	21	1	3	26	0	0	0	1	1	0	22	0	1	23	0	0	0	0	0	50
% medium	100	47.7	100	100	53.1	0	0	0	100	50	0	53.7	0	100	54.8	0	0	0	0	0	53.8
heavy	0	23	0	0	23	0	0	1	0	1	0	19	0	0	19	0	0	0	0	0	43
% heavy	0	52.3	0	0	46.9	0	0	100	0	50	0	46.3	0	0	45.2	0	0	0	0	0	46.2

PEAK HOUR TURNING MOVEMENT COUNT SUMMARY

Intersection: STH 97 (Central Avenue) and Edison Street
County: Wood
Traffic Control: Two-Way Stop
Project: STH 97 Corridor Study

A.M. PEAK	↓				←				↑				→				Total Vehicle Volumes
Tuesday, October 04, 2011	STH 97 (Central Avenue) From North				Edison Street From East				STH 97 (Central Avenue) From South				Edison Street From West				
TRAFFIC VOLUMES	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	
Start Time	0	73	4	0	4	2	0	0	1	70	1	0	8	2	0	0	
7:00 AM	1	98	2	0	3	0	0	0	1	87	9	3	2	0	1	0	
7:15 AM	3	90	0	1	3	1	0	1	0	143	10	1	4	0	1	0	
7:30 AM	4	109	3	3	1	3	1	1	1	142	12	1	5	2	1	1	
7:45 AM	8	370	9	4	11	6	1	2	3	442	32	5	19	4	3	1	
Peak Hour Volume																	908
U-Turn Hourly Volume	0				0				0				0				0
By Approach	387				18				477				26				908
TRUCK PERCENTAGES																	
% Single Unit Trucks	12.5%	3.8%	11.1%		0.0%	0.0%	0.0%		0.0%	3.6%	0.0%		0.0%	0.0%	0.0%		3.5%
% Heavy Trucks	0.0%	3.8%	0.0%		9.1%	0.0%	0.0%		0.0%	2.7%	0.0%		0.0%	0.0%	0.0%		3.0%
% Trucks (Total)	12.5%	7.6%	11.1%		9.1%	0.0%	0.0%		0.0%	6.3%	0.0%		0.0%	0.0%	0.0%		6.5%
By Approach	7.8%				5.6%				5.8%				0.0%				
PEAK HOUR FACTORS																	
Peak Hour Factor (PHF)	0.50	0.85	0.56		0.69	0.50	0.25		0.75	0.77	0.67		0.59	0.50	0.75		0.80
By Approach	0.83				0.75				0.77				0.65				
HOURLY VOLUME-ROUNDED	10	370	10	4	10	5	0	2	5	440	30	5	20	5	5	1	910
By Approach	390				15				475				30				

P.M. PEAK	↓				←				↑				→				Total Vehicle Volumes
Tuesday, October 04, 2011	STH 97 (Central Avenue) From North				Edison Street From East				STH 97 (Central Avenue) From South				Edison Street From West				
TRAFFIC VOLUMES	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	
Start Time																	
4:15 PM	1	156	2	1	1	0	2	0	2	152	3	0	9	3	3	0	
4:30 PM	2	168	4	0	4	0	0	1	3	198	2	0	13	0	2	2	
4:45 PM	4	167	6	0	0	1	0	2	2	158	3	1	8	0	1	0	
5:00 PM	1	175	3	0	0	0	0	0	2	168	3	0	15	2	6	0	
Peak Hour Volume	8	666	15	1	5	1	2	3	9	676	11	1	45	5	12	2	
U-Turn Hourly Volume																	
By Approach	689				8				696				62				1,455
TRUCK PERCENTAGES																	
% Single Unit Trucks	0.0%	1.1%	0.0%		0.0%	0.0%	0.0%		0.0%	0.9%	0.0%		0.0%	0.0%	0.0%		
% Heavy Trucks	0.0%	1.3%	0.0%		0.0%	0.0%	0.0%		0.0%	1.0%	0.0%		0.0%	0.0%	0.0%		
% Trucks (Total)	0.0%	2.4%	0.0%		0.0%	0.0%	0.0%		0.0%	1.9%	0.0%		0.0%	0.0%	0.0%		
By Approach	2.3%				0.0%				1.8%				0.0%				2.0%
PEAK HOUR FACTORS																	
Peak Hour Factor (PHF)	0.50	0.95	0.63		0.31	0.25	0.25		0.75	0.85	0.92		0.75	0.42	0.50		
By Approach	0.96				0.50				0.86				0.67				0.92
HOURLY VOLUME-ROUNDED	10	665	15	1	5	0	0	3	10	675	10	1	45	5	10	2	
By Approach	690				5				695				60				1,450

DOT Growth Factor Group: None Used
 Adjustment Factor Used: 1.000
 Notes: U-turn volumes included in left-turn volumes.

Weekday Turning Movement Count
 STH 97 (Central Avenue) & Franklin Street
 10/4/11
 PG & AG

Groups Printed- car - medium - heavy

	CENTRAL AVE From North					FRANKLIN ST From East					CENTRAL AVE From South					FRANKLIN ST From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
*** BREAK ***																					
07:00 AM	0	79	0	0	79	0	0	1	0	1	0	70	0	0	70	0	0	1	0	1	151
07:15 AM	1	100	0	0	101	1	0	1	0	2	0	91	0	0	91	0	0	1	0	1	195
07:30 AM	1	92	0	0	93	1	0	3	1	5	0	138	2	0	140	1	0	0	0	1	239
07:45 AM	1	113	0	0	114	0	1	2	0	3	0	132	3	0	135	0	0	2	1	3	255
Total	3	384	0	0	387	2	1	7	1	11	0	431	5	0	436	1	0	4	1	6	840

*** BREAK ***

04:15 PM	1	158	0	0	159	1	0	3	0	4	0	146	3	0	149	0	0	0	2	2	314
04:30 PM	4	180	0	0	184	0	0	0	2	2	2	193	3	0	198	0	1	0	1	2	386
04:45 PM	3	169	1	0	173	1	0	1	1	3	0	150	2	0	152	1	0	1	0	2	330
Total	8	507	1	0	516	2	0	4	3	9	2	489	8	0	499	1	1	1	3	6	1030
05:00 PM	3	186	2	0	191	1	0	3	0	4	0	168	2	0	170	0	0	1	0	1	366
Grand Total	14	1077	3	0	1094	5	1	14	4	24	2	1088	15	0	1105	2	1	6	4	13	2236
Apprch %	1.3	98.4	0.3	0		20.8	4.2	58.3	16.7		0.2	98.5	1.4	0		15.4	7.7	46.2	30.8		
Total %	0.6	48.2	0.1	0	48.9	0.2	0	0.6	0.2	1.1	0.1	48.7	0.7	0	49.4	0.1	0	0.3	0.2	0.6	
car	14	1032	3	0	1049	5	1	14	4	24	2	1050	15	0	1067	2	1	6	1	10	2150
% car	100	95.8	100	0	95.9	100	100	100	100	100	100	96.5	100	0	96.6	100	100	100	25	76.9	96.2
medium	0	21	0	0	21	0	0	0	0	0	0	20	0	0	20	0	0	0	3	3	44
% medium	0	1.9	0	0	1.9	0	0	0	0	0	0	1.8	0	0	1.8	0	0	0	75	23.1	2
heavy	0	24	0	0	24	0	0	0	0	0	0	18	0	0	18	0	0	0	0	0	42
% heavy	0	2.2	0	0	2.2	0	0	0	0	0	0	1.7	0	0	1.6	0	0	0	0	0	1.9

Weekday Turning Movement Count
 STH 97 (Central Avenue) & Franklin Street
 10/4/11
 PG & AG

Groups Printed- medium - heavy

	CENTRAL AVE From North					FRANKLIN ST From East					CENTRAL AVE From South					FRANKLIN ST From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
*** BREAK ***																					
07:00 AM	0	11	0	0	11	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	16
07:15 AM	0	6	0	0	6	0	0	0	0	0	0	11	0	0	11	0	0	0	0	0	17
07:30 AM	0	10	0	0	10	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	18
07:45 AM	0	4	0	0	4	0	0	0	0	0	0	4	0	0	4	0	0	0	1	1	9
Total	0	31	0	0	31	0	0	0	0	0	0	28	0	0	28	0	0	0	1	1	60
*** BREAK ***																					
04:15 PM	0	4	0	0	4	0	0	0	0	0	0	5	0	0	5	0	0	0	2	2	11
04:30 PM	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	3
04:45 PM	0	6	0	0	6	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	8
Total	0	12	0	0	12	0	0	0	0	0	0	8	0	0	8	0	0	0	2	2	22
05:00 PM	0	2	0	0	2	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	4
Grand Total	0	45	0	0	45	0	0	0	0	0	0	38	0	0	38	0	0	0	3	3	86
Apprch %	0	100	0	0		0	0	0	0		0	100	0	0		0	0	0	100		
Total %	0	52.3	0	0	52.3	0	0	0	0	0	0	44.2	0	0	44.2	0	0	0	3.5	3.5	
medium	0	21	0	0	21	0	0	0	0	0	0	20	0	0	20	0	0	0	3	3	44
% medium	0	46.7	0	0	46.7	0	0	0	0	0	0	52.6	0	0	52.6	0	0	0	100	100	51.2
heavy	0	24	0	0	24	0	0	0	0	0	0	18	0	0	18	0	0	0	0	0	42
% heavy	0	53.3	0	0	53.3	0	0	0	0	0	0	47.4	0	0	47.4	0	0	0	0	0	48.8

PEAK HOUR TURNING MOVEMENT COUNT SUMMARY

Intersection: STH 97 (Central Avenue) and Franklin Street
County: Wood
Traffic Control: Two-Way Stop
Project: STH 97 Corridor Study

A.M. PEAK	↓				←				↑				→				Total Vehicle Volumes
Tuesday, October 04, 2011	STH 97 (Central Avenue) From North				Franklin Street From East				STH 97 (Central Avenue) From South				Franklin Street From West				
TRAFFIC VOLUMES	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	
Start Time	0	79	0	0	1	0	0	0	0	70	0	0	1	0	0	0	
7:00 AM	0	100	1	0	1	0	1	0	0	91	0	0	1	0	0	0	
7:15 AM	0	92	1	0	3	0	1	1	2	138	0	0	0	0	1	0	
7:30 AM	0	113	1	0	2	1	0	0	3	132	0	0	2	0	0	1	
7:45 AM	0																
Peak Hour Volume	0	384	3	0	7	1	2	1	5	431	0	0	4	0	1	1	
U-Turn Hourly Volume			0				0				0				0		
By Approach	387				10				436				5				838
TRUCK PERCENTAGES																	
% Single Unit Trucks	0.0%	3.9%	0.0%		0.0%	0.0%	0.0%		0.0%	3.5%	0.0%		0.0%	0.0%	0.0%		
% Heavy Trucks	0.0%	4.2%	0.0%		0.0%	0.0%	0.0%		0.0%	3.0%	0.0%		0.0%	0.0%	0.0%		
% Trucks (Total)	0.0%	8.1%	0.0%		0.0%	0.0%	0.0%		0.0%	6.5%	0.0%		0.0%	0.0%	0.0%		
By Approach			8.0%				0.0%				6.4%				0.0%		
PEAK HOUR FACTORS																	
Peak Hour Factor (PHF)	0	0.85	0.75		0.58	0.25	0.50		0.42	0.78	0		0.50	0	0.25		
By Approach			0.85				0.63				0.78				0.63		
HOURLY VOLUME-ROUNDED	0	385	5	0	5	0	0	1	5	430	0	0	5	0	0	1	
By Approach			390				5				435				5		

P.M. PEAK	↓				←				↑				→				Total Vehicle Volumes
Tuesday, October 04, 2011	STH 97 (Central Avenue) From North				Franklin Street From East				STH 97 (Central Avenue) From South				Franklin Street From West				
TRAFFIC VOLUMES	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	
Start Time																	
4:15 PM	0	158	1	0	3	0	1	0	3	146	0	0	0	0	0	2	
4:30 PM	0	180	4	0	0	0	0	2	3	193	2	0	0	1	0	1	
4:45 PM	1	169	3	0	1	0	1	1	2	150	0	0	1	0	1	0	
5:00 PM	2	186	3	0	3	0	1	0	2	168	0	0	1	0	0	0	
Peak Hour Volume	3	693	11	0	7	0	3	3	10	657	2	0	2	1	1	3	
U-Turn Hourly Volume				0				0				0				0	
By Approach	707				10				669				4			1,390	
TRUCK PERCENTAGES																	
% Single Unit Trucks	0.0%	0.9%	0.0%		0.0%	0.0%	0.0%		0.0%	0.8%	0.0%		0.0%	0.0%	0.0%		
% Heavy Trucks	0.0%	1.1%	0.0%		0.0%	0.0%	0.0%		0.0%	0.7%	0.0%		0.0%	0.0%	0.0%		
% Trucks (Total)	0.0%	2.0%	0.0%		0.0%	0.0%	0.0%		0.0%	1.5%	0.0%		0.0%	0.0%	0.0%		
By Approach	2.0%				0.0%				1.5%				0.0%			1.7%	
PEAK HOUR FACTORS																	
Peak Hour Factor (PHF)	0.38	0.93	0.69		0.58	0	0.75		0.83	0.85	0.25		0.50	0.25	0.25		
By Approach	0.93				0.63				0.84				0.50			0.91	
HOURLY VOLUME-ROUNDED	5	695	10	0	5	0	5	3	10	655	0	0	0	0	0	3	
By Approach	710				10				665				0			1,385	

DOT Growth Factor Group: None Used
 Adjustment Factor Used: 1.000
 Notes: U-turn volumes included in left-turn volumes.

Weekday Turning Movement Count
 STH 97 (Central Avenue) & Grant Street
 10/6/11
 PG & AG

Groups Printed- car - medium - heavy																					
	CENTRAL AVE From North					GRANT ST From East					CENTRAL AVE From South					GRANT ST From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
*** BREAK ***																					
07:00 AM	1	76	0	0	77	3	0	2	0	5	0	77	1	0	78	1	1	1	0	3	163
07:15 AM	3	94	0	1	98	2	2	6	0	10	0	93	1	0	94	0	0	0	1	1	203
07:30 AM	3	109	1	0	113	2	1	9	0	12	0	159	3	0	162	0	0	1	1	2	289
07:45 AM	1	121	1	0	123	4	1	7	0	12	2	141	1	0	144	1	0	0	0	1	280
Total	8	400	2	1	411	11	4	24	0	39	2	470	6	0	478	2	1	2	2	7	935
*** BREAK ***																					
04:15 PM	4	166	0	0	170	3	0	4	2	9	0	144	3	0	147	1	0	1	0	2	328
04:30 PM	2	169	0	0	171	1	0	8	2	11	1	193	1	1	196	0	1	3	0	4	382
04:45 PM	2	161	0	0	163	3	1	12	3	19	0	175	1	0	176	0	0	0	0	0	358
Total	8	496	0	0	504	7	1	24	7	39	1	512	5	1	519	1	1	4	0	6	1068
05:00 PM	12	185	4	0	201	4	0	3	4	11	1	181	4	0	186	0	0	2	1	3	401
Grand Total	28	1081	6	1	1116	22	5	51	11	89	4	1163	15	1	1183	3	2	8	3	16	2404
Apprch %	2.5	96.9	0.5	0.1		24.7	5.6	57.3	12.4		0.3	98.3	1.3	0.1		18.8	12.5	50	18.8		
Total %	1.2	45	0.2	0	46.4	0.9	0.2	2.1	0.5	3.7	0.2	48.4	0.6	0	49.2	0.1	0.1	0.3	0.1	0.7	
car	28	1039	6	0	1073	21	5	50	8	84	4	1121	15	0	1140	3	2	8	1	14	2311
% car	100	96.1	100	0	96.1	95.5	100	98	72.7	94.4	100	96.4	100	0	96.4	100	100	100	33.3	87.5	96.1
medium	0	24	0	1	25	1	0	1	2	4	0	28	0	1	29	0	0	0	2	2	60
% medium	0	2.2	0	100	2.2	4.5	0	2	18.2	4.5	0	2.4	0	100	2.5	0	0	0	66.7	12.5	2.5
heavy	0	18	0	0	18	0	0	0	1	1	0	14	0	0	14	0	0	0	0	0	33
% heavy	0	1.7	0	0	1.6	0	0	0	9.1	1.1	0	1.2	0	0	1.2	0	0	0	0	0	1.4

Weekday Turning Movement Count
 STH 97 (Central Avenue) & Grant Street
 10/6/11
 PG & AG

Groups Printed- medium - heavy

	CENTRAL AVE From North					GRANT ST From East					CENTRAL AVE From South					GRANT ST From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
*** BREAK ***																					
07:00 AM	0	5	0	0	5	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	9
07:15 AM	0	9	0	1	10	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	14
07:30 AM	0	7	0	0	7	0	0	0	0	0	0	8	0	0	8	0	0	0	1	1	16
07:45 AM	0	5	0	0	5	0	0	0	0	0	0	10	0	0	10	0	0	0	0	0	15
Total	0	26	0	1	27	0	0	0	0	0	0	26	0	0	26	0	0	0	1	1	54
*** BREAK ***																					
04:15 PM	0	8	0	0	8	1	0	0	1	2	0	2	0	0	2	0	0	0	0	0	12
04:30 PM	0	2	0	0	2	0	0	0	2	2	0	2	0	1	3	0	0	0	0	0	7
04:45 PM	0	5	0	0	5	0	0	1	0	1	0	5	0	0	5	0	0	0	0	0	11
Total	0	15	0	0	15	1	0	1	3	5	0	9	0	1	10	0	0	0	0	0	30
05:00 PM	0	1	0	0	1	0	0	0	0	0	0	7	0	0	7	0	0	0	1	1	9
Grand Total	0	42	0	1	43	1	0	1	3	5	0	42	0	1	43	0	0	0	2	2	93
Apprch %	0	97.7	0	2.3		20	0	20	60		0	97.7	0	2.3		0	0	0	100		
Total %	0	45.2	0	1.1	46.2	1.1	0	1.1	3.2	5.4	0	45.2	0	1.1	46.2	0	0	0	2.2	2.2	
medium	0	24	0	1	25	1	0	1	2	4	0	28	0	1	29	0	0	0	2	2	60
% medium	0	57.1	0	100	58.1	100	0	100	66.7	80	0	66.7	0	100	67.4	0	0	0	100	100	64.5
heavy	0	18	0	0	18	0	0	0	1	1	0	14	0	0	14	0	0	0	0	0	33
% heavy	0	42.9	0	0	41.9	0	0	0	33.3	20	0	33.3	0	0	32.6	0	0	0	0	0	35.5

PEAK HOUR TURNING MOVEMENT COUNT SUMMARY

Intersection: STH 97 (Central Avenue) and Grant Street
County: Wood
Traffic Control: Two-Way Stop
Project: STH 97 Corridor Study

A.M. PEAK	↓				←				↑				→				Total Vehicle Volumes
Thursday, October 06, 2011	STH 97 (Central Avenue) From North				Grant Street From East				STH 97 (Central Avenue) From South				Grant Street From West				
TRAFFIC VOLUMES	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	
Start Time	0	76	1	0	2	0	3	0	1	77	0	0	1	1	1	0	163
7:00 AM	0	94	3	1	6	2	2	0	1	93	0	0	0	0	0	1	201
7:15 AM	1	109	3	0	9	1	2	0	3	159	0	0	1	0	0	1	288
7:30 AM	1	121	1	0	7	1	4	0	1	141	2	0	0	0	1	0	280
7:45 AM																	
Peak Hour Volume	2	400	8	1	24	4	11	0	6	470	2	0	2	1	2	2	932
U-Turn Hourly Volume																	0
By Approach	410				39				478				5				932
TRUCK PERCENTAGES																	
% Single Unit Trucks	0.0%	4.0%	0.0%		0.0%	0.0%	0.0%		0.0%	4.0%	0.0%		0.0%	0.0%	0.0%		3.8%
% Heavy Trucks	0.0%	2.5%	0.0%		0.0%	0.0%	0.0%		0.0%	1.5%	0.0%		0.0%	0.0%	0.0%		1.8%
% Trucks (Total)	0.0%	6.5%	0.0%		0.0%	0.0%	0.0%		0.0%	5.5%	0.0%		0.0%	0.0%	0.0%		5.6%
By Approach	6.3%				0.0%				5.4%				0.0%				
PEAK HOUR FACTORS																	
Peak Hour Factor (PHF)	0.50	0.83	0.67		0.67	0.50	0.69		0.50	0.74	0.25		0.50	0.25	0.50		0.81
By Approach	0.83				0.81				0.74				0.42				
HOURLY VOLUME-ROUNDED	0	400	10	1	25	5	10	0	5	470	0	0	0	0	0	2	925
By Approach	410				40				475				0				

P.M. PEAK	↓				←				↑				→				Total Vehicle Volumes
Thursday, October 06, 2011	STH 97 (Central Avenue) From North				Grant Street From East				STH 97 (Central Avenue) From South				Grant Street From West				
TRAFFIC VOLUMES	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	
Start Time																	
4:15 PM	0	166	4	0	4	0	3	2	3	144	0	0	1	0	1	0	
4:30 PM	0	169	2	0	8	0	2	1	1	193	1	1	3	1	0	0	
4:45 PM	0	161	2	0	12	1	3	3	1	175	0	0	0	0	0	0	
5:00 PM	4	185	12	0	3	0	4	4	4	181	1	0	2	0	0	1	
Peak Hour Volume	4	681	20	0	27	1	12	10	9	693	2	1	6	1	1	1	
U-Turn Hourly Volume																	
By Approach	705				40				704				8				1,457
TRUCK PERCENTAGES																	
% Single Unit Trucks	0.0%	1.2%	0.0%		3.7%	0.0%	9.1%		0.0%	1.3%	0.0%		0.0%	0.0%	0.0%		
% Heavy Trucks	0.0%	1.1%	0.0%		0.0%	0.0%	0.0%		0.0%	1.0%	0.0%		0.0%	0.0%	0.0%		
% Trucks (Total)	0.0%	2.3%	0.0%		3.7%	0.0%	9.1%		0.0%	2.3%	0.0%		0.0%	0.0%	0.0%		
By Approach	2.2%				5.1%				2.3%				0.0%				2.3%
PEAK HOUR FACTORS																	
Peak Hour Factor (PHF)	0.25	0.92	0.42		0.56	0.25	0.75		0.56	0.90	0.50		0.50	0.25	0.25		
By Approach	0.88				0.63				0.90				0.50				0.92
HOURLY VOLUME-ROUNDED	5	680	20	0	25	0	10	10	10	695	0	1	5	0	0	1	
By Approach	705				35				705				5				1,450

DOT Growth Factor Group: None Used
 Adjustment Factor Used: 1.000
 Notes: U-turn volumes included in left-turn volumes.

Weekday Turning Movement Count
 STH 97 (Central Avenue) & Harrison Street
 10/6/11
 PG & AG

Groups Printed- car - meduim - heavy

	CENTRAL AVE From North					HARRISON ST From East					CENTRAL AVE From South					HARRISON ST From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
*** BREAK ***																					
07:00 AM	0	76	1	0	77	0	0	0	0	0	0	82	0	0	82	0	0	0	0	0	159
07:15 AM	0	100	2	0	102	0	0	2	0	2	1	96	0	0	97	0	0	1	1	2	203
07:30 AM	2	115	2	0	119	0	0	2	0	2	1	160	0	0	161	1	0	1	1	3	285
07:45 AM	3	123	3	0	129	0	0	3	0	3	2	143	2	0	147	0	0	2	0	2	281
Total	5	414	8	0	427	0	0	7	0	7	4	481	2	0	487	1	0	4	2	7	928

*** BREAK ***

04:15 PM	2	171	1	0	174	2	0	3	2	7	2	144	4	0	150	3	0	1	0	4	335
04:30 PM	1	171	6	0	178	0	0	5	0	5	0	194	1	0	195	0	0	0	0	0	378
04:45 PM	4	158	1	0	163	1	0	2	1	4	1	178	1	1	181	2	0	1	3	6	354
Total	7	500	8	0	515	3	0	10	3	16	3	516	6	1	526	5	0	2	3	10	1067
05:00 PM	6	196	3	0	205	0	0	3	1	4	1	176	3	1	181	1	0	2	0	3	393
Grand Total	18	1110	19	0	1147	3	0	20	4	27	8	1173	11	2	1194	7	0	8	5	20	2388
Apprch %	1.6	96.8	1.7	0		11.1	0	74.1	14.8		0.7	98.2	0.9	0.2		35	0	40	25		
Total %	0.8	46.5	0.8	0	48	0.1	0	0.8	0.2	1.1	0.3	49.1	0.5	0.1	50	0.3	0	0.3	0.2	0.8	
car	18	1066	19	0	1103	3	0	19	4	26	8	1139	9	1	1157	7	0	8	4	19	2305
% car	100	96	100	0	96.2	100	0	95	100	96.3	100	97.1	81.8	50	96.9	100	0	100	80	95	96.5
meduim	0	27	0	0	27	0	0	1	0	1	0	19	1	1	21	0	0	0	1	1	50
% meduim	0	2.4	0	0	2.4	0	0	5	0	3.7	0	1.6	9.1	50	1.8	0	0	0	20	5	2.1
heavy	0	17	0	0	17	0	0	0	0	0	0	15	1	0	16	0	0	0	0	0	33
% heavy	0	1.5	0	0	1.5	0	0	0	0	0	0	1.3	9.1	0	1.3	0	0	0	0	0	1.4

Weekday Turning Movement Count
 STH 97 (Central Avenue) & Harrison Street
 10/6/11
 PG & AG

Groups Printed- meduim - heavy

	CENTRAL AVE From North					HARRISON ST From East					CENTRAL AVE From South					HARRISON ST From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
*** BREAK ***																					
07:00 AM	0	5	0	0	5	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	9
07:15 AM	0	7	0	0	7	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	11
07:30 AM	0	8	0	0	8	0	0	1	0	1	0	8	0	0	8	0	0	0	1	1	18
07:45 AM	0	4	0	0	4	0	0	0	0	0	0	10	0	0	10	0	0	0	0	0	14
Total	0	24	0	0	24	0	0	1	0	1	0	26	0	0	26	0	0	0	1	1	52
*** BREAK ***																					
04:15 PM	0	8	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
04:30 PM	0	3	0	0	3	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	5
04:45 PM	0	7	0	0	7	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	10
Total	0	18	0	0	18	0	0	0	0	0	0	4	1	0	5	0	0	0	0	0	23
05:00 PM	0	2	0	0	2	0	0	0	0	0	0	4	1	1	6	0	0	0	0	0	8
Grand Total	0	44	0	0	44	0	0	1	0	1	0	34	2	1	37	0	0	0	1	1	83
Apprch %	0	100	0	0		0	0	100	0		0	91.9	5.4	2.7		0	0	0	100		
Total %	0	53	0	0	53	0	0	1.2	0	1.2	0	41	2.4	1.2	44.6	0	0	0	1.2	1.2	
meduim	0	27	0	0	27	0	0	1	0	1	0	19	1	1	21	0	0	0	1	1	50
% meduim	0	61.4	0	0	61.4	0	0	100	0	100	0	55.9	50	100	56.8	0	0	0	100	100	60.2
heavy	0	17	0	0	17	0	0	0	0	0	0	15	1	0	16	0	0	0	0	0	33
% heavy	0	38.6	0	0	38.6	0	0	0	0	0	0	44.1	50	0	43.2	0	0	0	0	0	39.8

PEAK HOUR TURNING MOVEMENT COUNT SUMMARY

Intersection: STH 97 (Central Avenue) and Harrison Street
County: Wood
Traffic Control: Two-Way Stop
Project: STH 97 Corridor Study

A.M. PEAK	↓				←				↑				→				Total Vehicle Volumes
Thursday, October 06, 2011	STH 97 (Central Avenue) From North				Harrison Street From East				STH 97 (Central Avenue) From South				Harrison Street From West				
TRAFFIC VOLUMES	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	
Start Time	1	76	0	0	0	0	0	0	0	82	0	0	0	0	0	0	159
7:00 AM	2	100	0	0	2	0	0	0	0	96	1	0	1	0	0	1	202
7:15 AM	2	115	2	0	2	0	0	0	0	160	1	0	1	0	1	1	284
7:30 AM	3	123	3	0	3	0	0	0	2	143	2	0	2	0	0	0	281
7:45 AM	8	414	5	0	7	0	0	0	2	481	4	0	4	0	1	2	926
Peak Hour Volume			0				0				0				0		0
U-Turn Hourly Volume																	
By Approach	427				7				487				5				926
TRUCK PERCENTAGES																	
% Single Unit Trucks	0.0%	3.6%	0.0%		14.3%	0.0%	0.0%		0.0%	3.5%	0.0%		0.0%	0.0%	0.0%		3.6%
% Heavy Trucks	0.0%	2.2%	0.0%		0.0%	0.0%	0.0%		0.0%	1.9%	0.0%		0.0%	0.0%	0.0%		1.9%
% Trucks (Total)	0.0%	5.8%	0.0%		14.3%	0.0%	0.0%		0.0%	5.4%	0.0%		0.0%	0.0%	0.0%		5.5%
By Approach	5.6%				14.3%				5.3%				0.0%				
PEAK HOUR FACTORS																	
Peak Hour Factor (PHF)	0.67	0.84	0.42		0.58	0	0		0.25	0.75	0.50		0.50	0	0.25		0.82
By Approach	0.83				0.58				0.76				0.63				
HOURLY VOLUME-ROUNDED	10	415	5	0	5	0	0	0	0	480	5	0	5	0	0	2	925
By Approach	430				5				485				5				

P.M. PEAK	↓				←				↑				→				Total Vehicle Volumes
Thursday, October 06, 2011	STH 97 (Central Avenue) From North				Harrison Street From East				STH 97 (Central Avenue) From South				Harrison Street From West				
TRAFFIC VOLUMES	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	Right	Thru	Left	Ped/Bike	
Start Time	1	171	2	0	3	0	2	2	4	144	2	0	1	0	3	0	
4:15 PM	6	171	1	0	5	0	0	0	1	194	0	0	0	0	0	0	
4:30 PM	1	158	4	0	2	0	1	1	1	178	1	1	1	0	2	3	
4:45 PM	3	196	6	0	3	0	0	1	3	176	1	1	2	0	1	0	
5:00 PM																	
Peak Hour Volume	11	696	13	0	13	0	3	4	9	692	4	2	4	0	6	3	
U-Turn Hourly Volume			0				0				0				0		
By Approach	720				16				705				10				1,451
TRUCK PERCENTAGES																	
% Single Unit Trucks	0.0%	1.7%	0.0%		0.0%	0.0%	0.0%		11.1%	0.3%	0.0%		0.0%	0.0%	0.0%		
% Heavy Trucks	0.0%	1.2%	0.0%		0.0%	0.0%	0.0%		11.1%	0.9%	0.0%		0.0%	0.0%	0.0%		
% Trucks (Total)	0.0%	2.9%	0.0%		0.0%	0.0%	0.0%		22.2%	1.2%	0.0%		0.0%	0.0%	0.0%		
By Approach	2.8%				0.0%				1.5%				0.0%				2.1%
PEAK HOUR FACTORS																	
Peak Hour Factor (PHF)	0.46	0.89	0.54		0.65	0	0.38		0.56	0.89	0.50		0.50	0	0.50		
By Approach	0.88				0.80				0.90				0.62				0.93
HOURLY VOLUME-ROUNDED	10	695	15	0	15	0	5	4	10	690	5	2	5	0	5	3	
By Approach	720				20				705				10				1,455

DOT Growth Factor Group: None Used
 Adjustment Factor Used: 1.000
 Notes: U-turn volumes included in left-turn volumes.

WisDot Bureau of Planning
Traffic Forecasting Section
Forecast by: Kim Tran
Phone: (608) 264-7265
Email: kim.tran@dot.wi.gov

Projected AM Design Hour Traffic Volumes

 Indicates roundabout

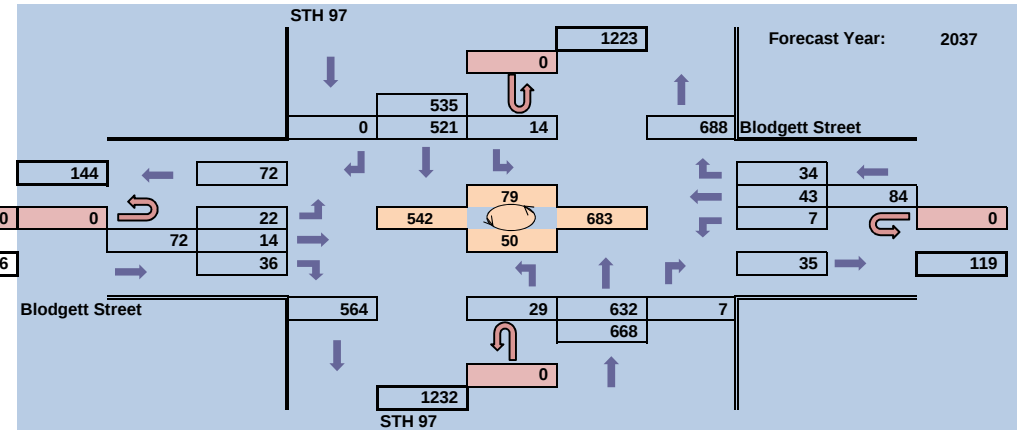
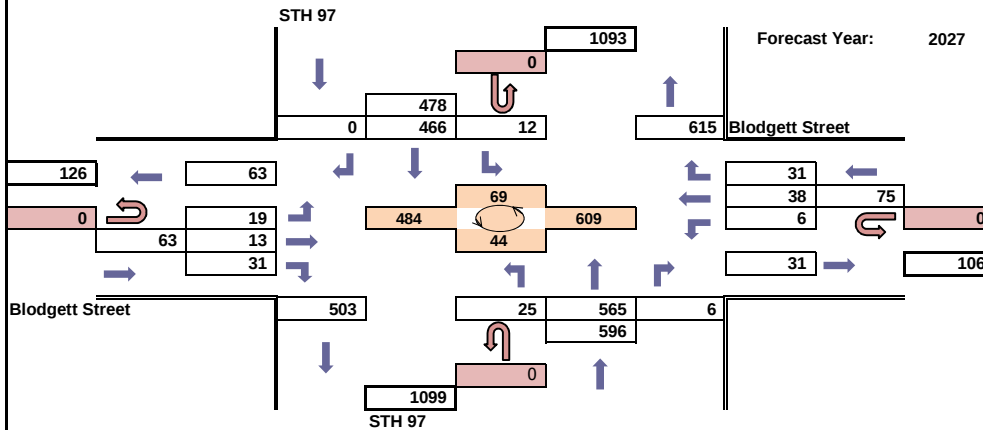
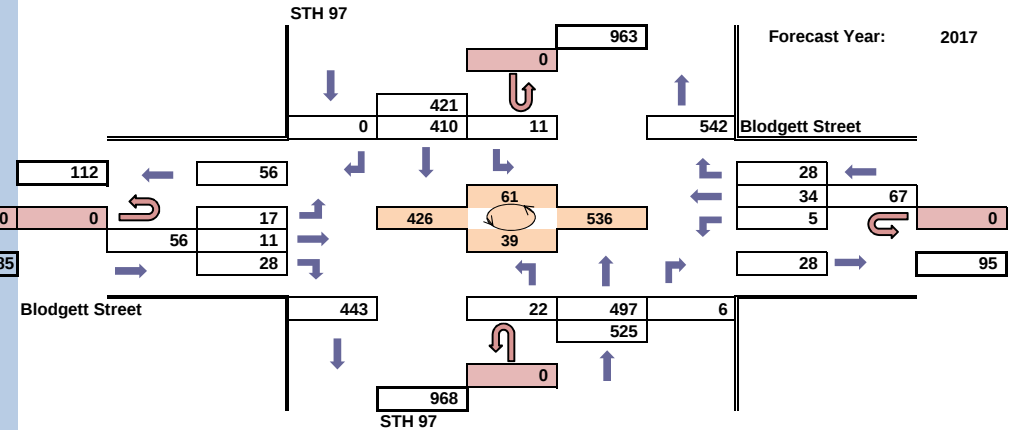
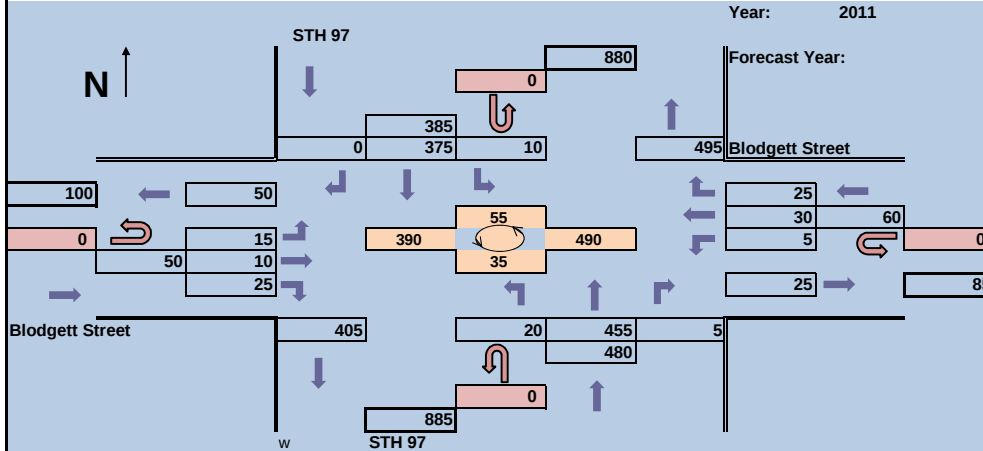
Design Hour: 7AM - 8AM

Forecast Completed: 10-26-11

Project Description

Project ID: 6380-06-05
Location: STH 97 and Blodgett Street
Route: STH 97
Region/County: NC - Rhinelander - Wood

Design Hour Turning Movement Data



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Projected PM Design Hour Traffic Volumes

Design Hour: 4:15PM - 5:15PM

Forecast Completed: 10-26-11

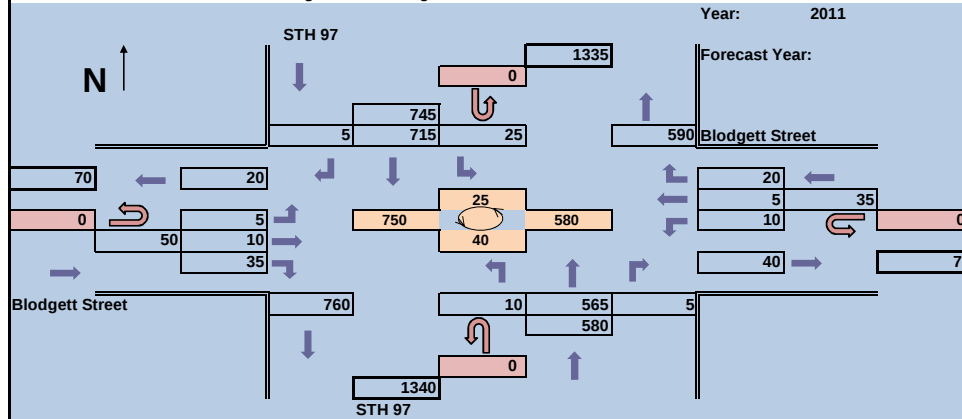
Project Description

Project ID: 6380-06-05
Location: STH 97 and Blodgett Street
Route: STH 97
Region/County: NC - Rhinelander - Wood

Design Hour Turning Movement Data

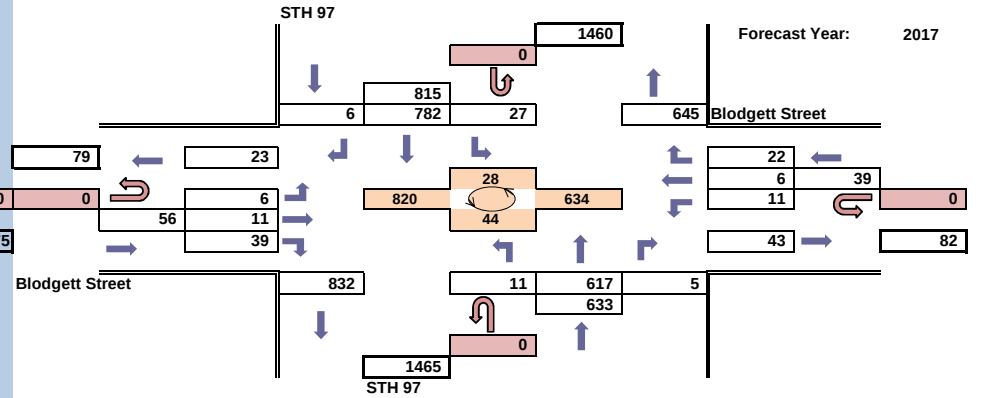
Year: 2011

Forecast Year:



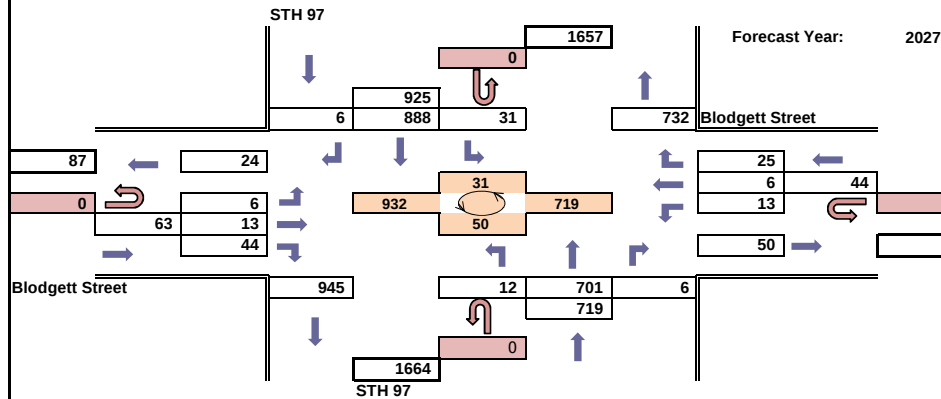
Year: 2017

Forecast Year:



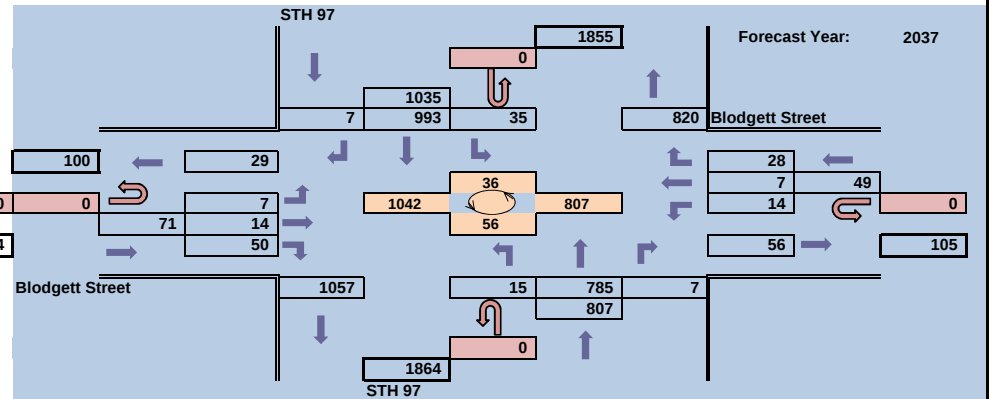
Year: 2027

Forecast Year:



Year: 2037

Forecast Year:



WisDot Bureau of Planning
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Forecast by: Kim Tran
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Projected Average Annual Daily Traffic Volumes

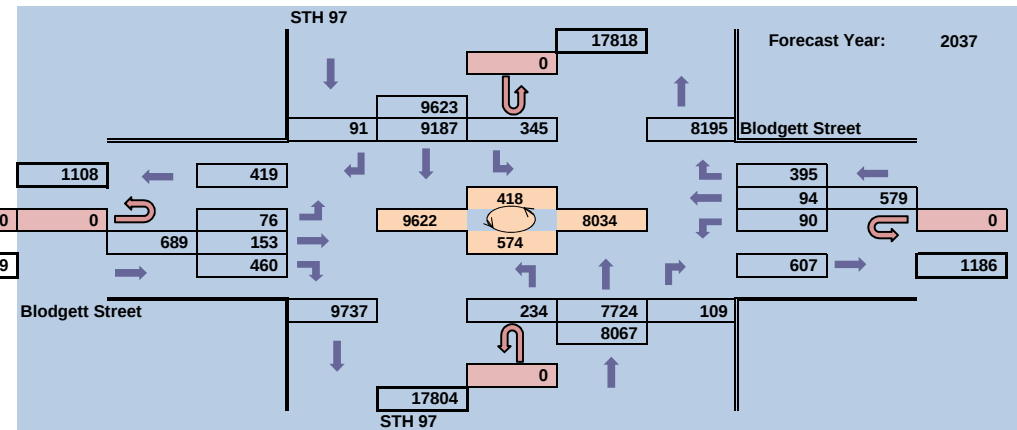
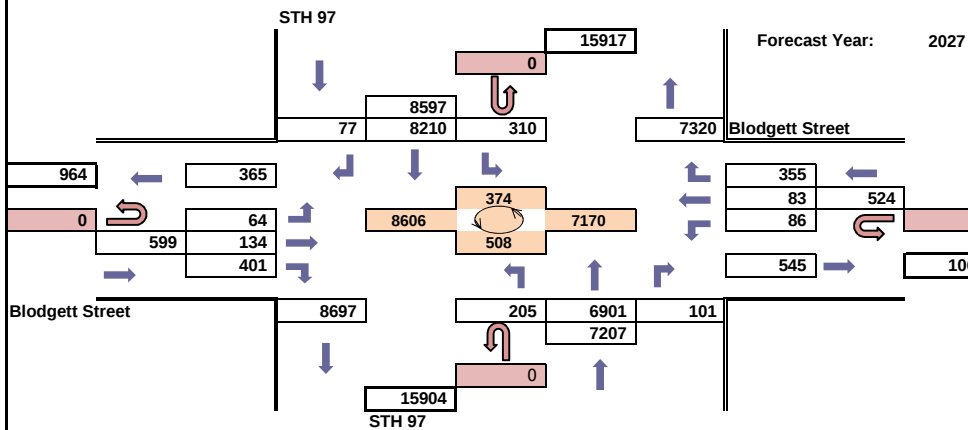
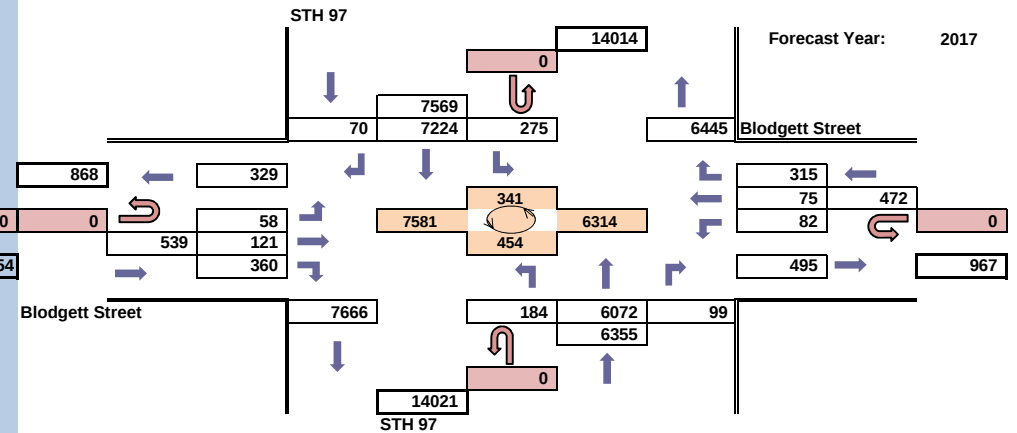
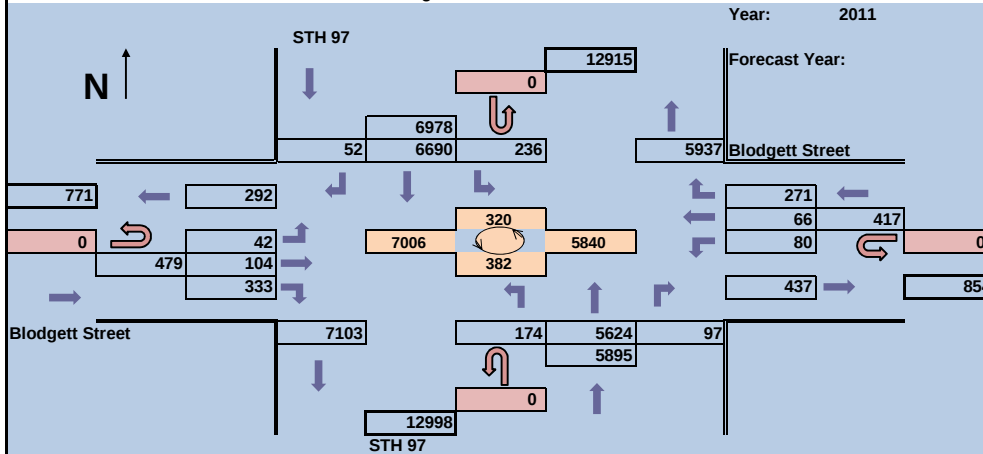
Design Hour: 24 hours

Forecast Completed: 10-26-11

Project Description

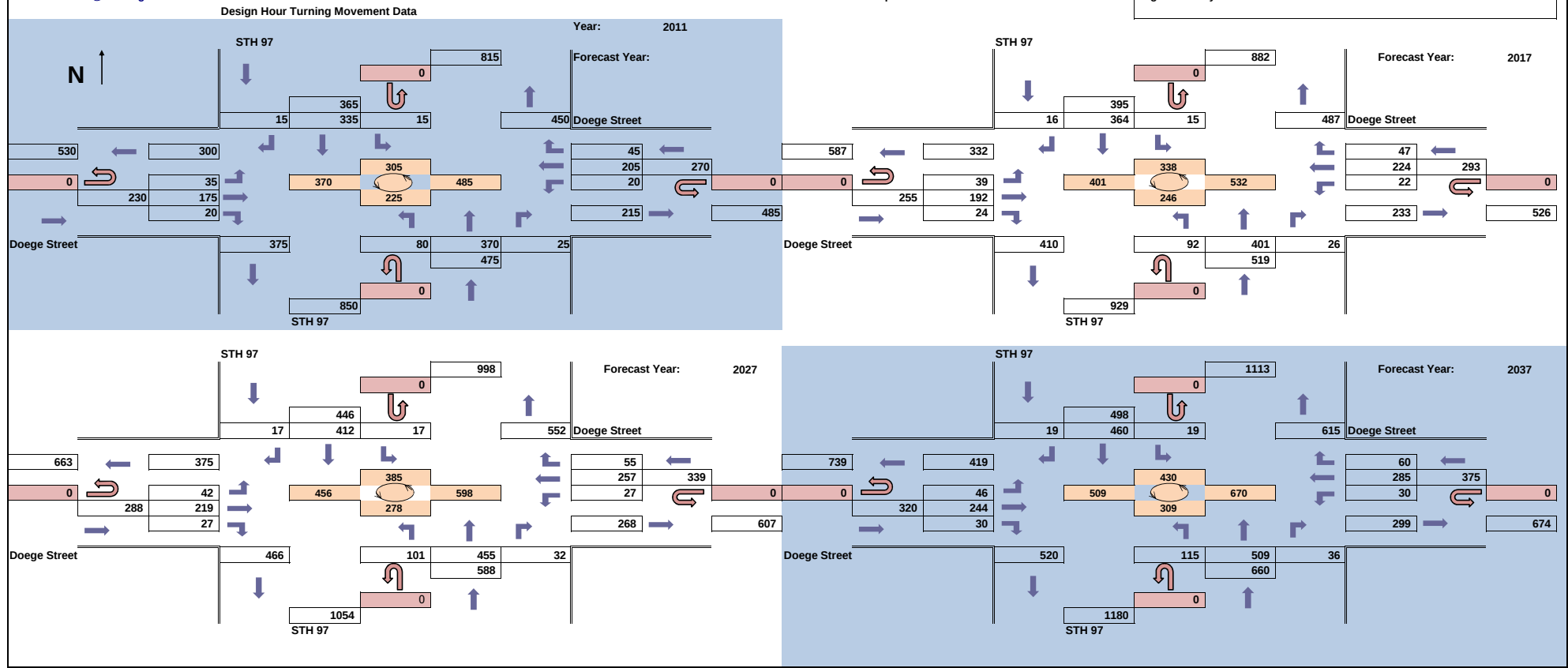
Project ID: 6380-06-05
Location: STH 97 and Blodgett Street
Route: STH 97
Region/County: NC - Rhinelander - Wood

Turning Movement Data



Project ID: 6380-06-05
Location: STH 97 and Doege Street
Route: STH 97
Region/County: NC-Rhineland

Forecast Completed: 10-26-11



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Projected Average Annual Daily Traffic Volumes

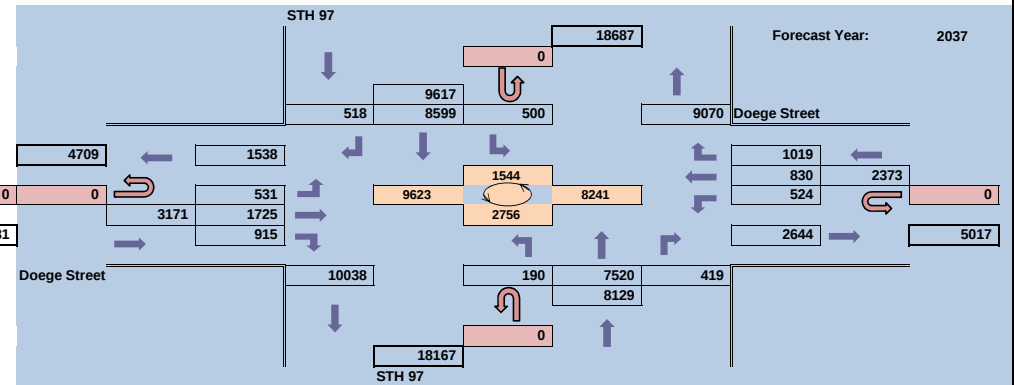
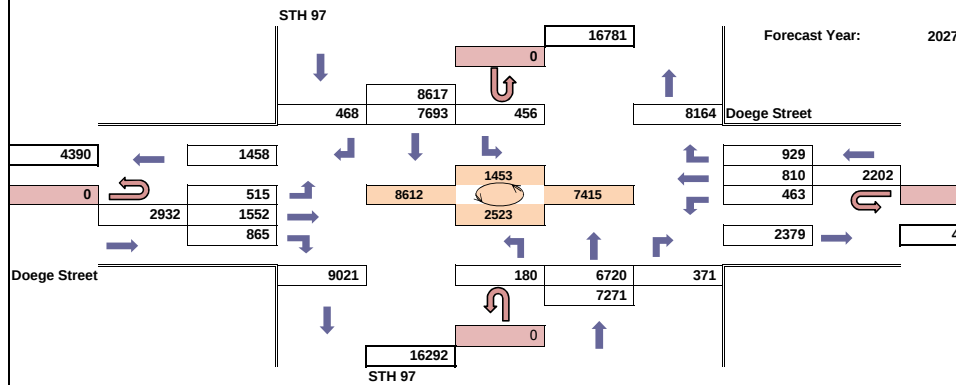
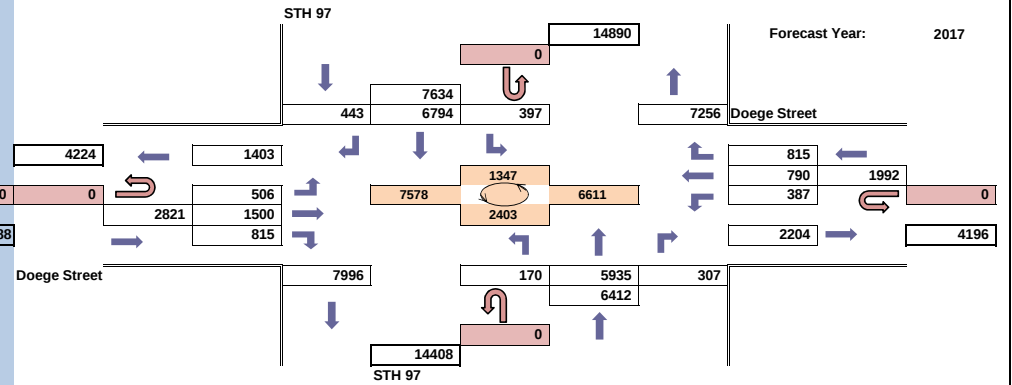
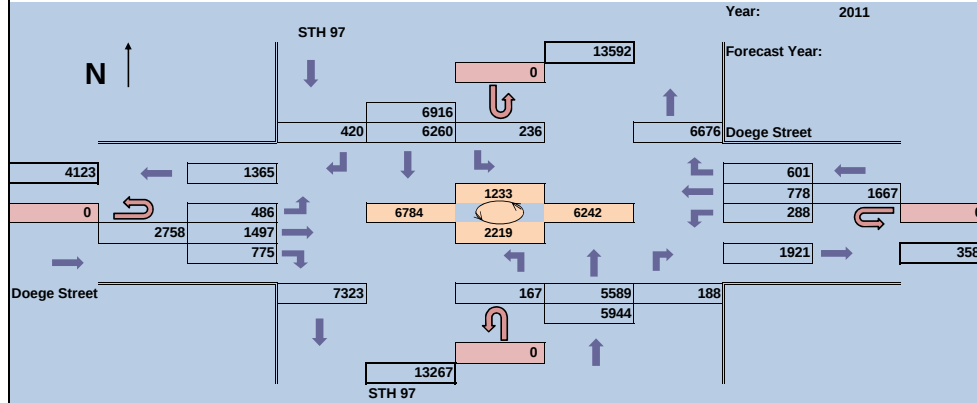
Design Hour: 24 hours

Forecast Completed: 10-26-11

Project Description

Project ID: 6380-06-05
Location: STH 97 and Doege Street
Route: STH 97
Region/County: NC-Rhineland

Turning Movement Data



TRAFFIC FORECAST REPORT

PROJECT ID(S): 6380-06-05

ROUTE(S): STH 97

REGION/COUNTY(IES): NC - Rhinelander / Wood

LOCATION: Arnold Street to Harrison Street

COMPLETED: 10-25-11

Developed by: Kim Tran

Phone: (608) 264 - 7265

FAX #: (608) 267- 1856

E-Mail ID: kim.tran@dot.wi.gov

Traffic Forecasting Section; Bureau of State Highway Programs; Division of Transportation Investment Management



N

Last Count/Forecast Years:

000 2003 COUNT

{000} 2011 COUNT

(000) 2017 AADT

-000- 2027 AADT

000 2037 AADT

Truck Class %'s

Class STH 97 Seg. 2 Seg. 3

2D #REF! #REF! #REF!

3AX #REF! #REF! #REF!

2S1+2S2 #REF! #REF! #REF!

3-S2 #REF! #REF! #REF!

DBL-BTM #REF! #REF! #REF!

TOTAL #REF! #REF! #REF!

Design Values (%)

Routes → STH 97

Design

Volume(s): #REF! #REF! #REF!

K250 #REF! #REF! #REF!

K100 #REF! #REF! #REF!

K30 #REF! #REF! #REF!

T(DHV) #REF! #REF! #REF!

D(Dsgn. Hr.) #REF! #REF! #REF!

K8(ADT) #REF! #REF! #REF!

T(A8HV) #REF! #REF! #REF!

NOTES ON THE FORECAST:

1. STH 97 is a factor group II highway indicating low to moderate fluctuation in traffic throughout the year. It is considered an urban principal arterial for count purposes along this segment of highway.

2. The historical traffic count trends will continue increasing at a decreasing rate. BoxCox regression is used to project past count data.

MORE NOTES ON THE FORECAST:

3. Truck classification percentages for STH 97 were taken from 2008 Wisconsin Vehicle Classification Data, site ID# 710527- STH 97 CENTRAL AVE SOUTH OF ARNOLD MARSHFIELD, WOOD COUNTY which is estimated at 16.5%.

Programmed EPAC Data

10/24/201
4:41:07PM

Intersection Name: Central & Arnold

Intersection Alias: CenArn

Access Code: 9999 Channel: 4 Address: 0 Revision: 3.34c

Access Data
Port 2 Comm :1200 Baud
Port 3 Comm :1200 Baud

Phase Data

Vehical Basic Timings							Vehical Density Timings		Time B4	Cars	Time To	
Phase	Min_Grn	Passage	Max1	Max2	Yellow	All Red	Added Initial	Max_Initial	Reduction	Before	Reduce	Min_Gap
1	10	4.0	25	30	3.0	1.0	0.0	0	0	0	0	0.0
2	15	5.0	35	50	3.0	2.0	0.0	0	0	0	0	0.0
3	10	4.0	25	30	3.0	1.0	0.0	0	0	0	0	0.0
4	15	5.0	35	50	3.0	2.0	0.0	0	0	0	0	0.0
5	10	4.0	25	30	3.0	1.0	0.0	0	0	0	0	0.0
6	15	5.0	35	50	3.0	2.0	0.0	0	0	0	0	0.0
7	10	4.0	25	30	3.0	1.0	0.0	0	0	0	0	0.0
8	15	5.0	35	50	3.0	2.0	0.0	0	0	0	0	0.0

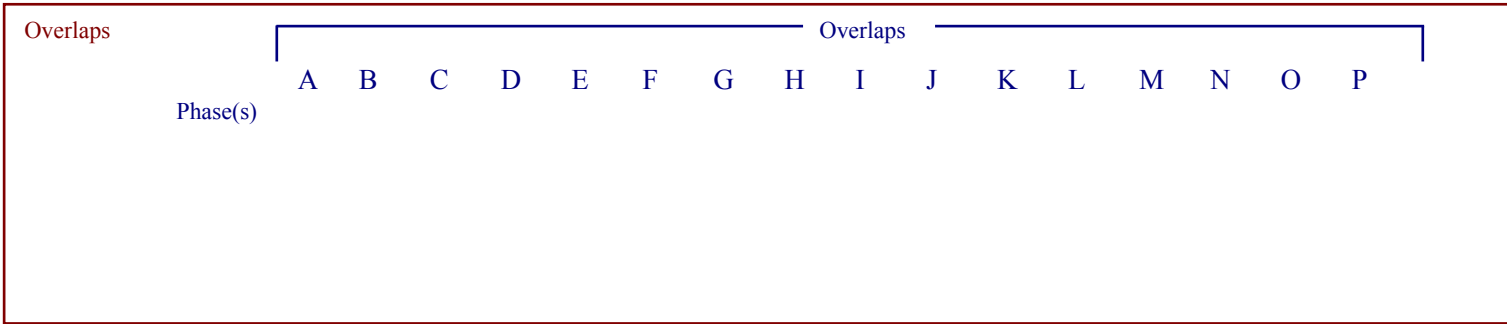
<u>Pedestrian Timing</u>			Extended	Actuated	<u>General Control</u>					<u>Miscellaneous</u>					No	
		Ped	Flashing	Ped	Rest		Non-Act	Veh	Ped	Recall		Non	Dual	Last Car	Conditional	No
Phase	Walk	Clear	Walk	Clear	in Walk	Initialize	Response	Recall	Recall	Delay		Lock	Entry	Passage	Service	Simultaneous
1	0	0	No	0	No	Inactive	None	None	None	0		No	No	No	No	Gap Out
2	7	8	No	0	No	Yellow	NonActI	None	None	0		No	No	No	No	No
3	0	0	No	0	No	Inactive	None	None	None	0		No	No	No	No	No
4	7	8	No	0	No	Inactive	NonActII	None	None	0		No	No	No	No	No
5	0	0	No	0	No	Inactive	None	None	None	0		No	No	No	No	No
6	7	8	No	0	No	Yellow	NonActI	None	None	0		No	No	No	No	No
7	0	0	No	0	No	Inactive	None	None	None	0		No	No	No	No	No
8	7	8	No	0	No	Inactive	NonActII	None	None	0		No	No	No	No	No

Special Sequence	Vehical Detector Phase Assignment				
Default Data	Assigned Phase	Mode	Switched Phase	Extend	Delay
Default Data					

Pedestrian Detector	Special Detector Phase Assignment				
Default Data	Assign Phase	Mode	Switched Phase	Extend	Delay
Default Data					

Unit Data

General Control			Remote Flash		
Startup Time: 5sec	Startup State: Flash	Red Revert: 4sec	Test A = Flash	Channel	Flash Color
Auto Ped Clear: No	Stop Time Reset: No	Alternate Sequence: 0	Flash Entry Phase	Flash Exit Phase	Flash Alternat
ABC connector Input Modes: 0			Default Data - No Flash		
ABC connector Output Modes: 0			Default Data - No Flash		
D connector Input Modes: 0			Default Data - No Flash		
D connector Output Modes: 0			Default Data - No Flash		
	Ring	Input Respons	Output Selection		
	1	Ring 1	Ring 1		
	2	Ring 2	Ring 2		
	3	None	None		
	4	None	None		



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Trail Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trail Yellow	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Trail Red	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Plus Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minus Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring			Phase(s)																
Phase	Ring	Next Phase	Concurrent Phases	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1	2		1	2	3	4	1	1	3	3	9	10	11	12	13	14	15	16
2	1	3		5	5	7	7	2	2	4	4								
3	1	4		6	6	8	8	5	6	7	8								
4	1	1																	
5	2	6																	
6	2	7																	
7	2	8																	
8	2	5																	

Alternate Sequences

Alternate Sequences

Port 1 Data

BIU	Port	Message
Addr	Status	40

Phase
Pair(s)

Default Data

No Alternate
Sequences
Programmed

Channel Assignment											
Control	Channel	Hardware Pin Set		Control	Channel	Hardware Pin Set		Control	Channel	Hardware Pin Set	
Ph.1 Veh	1	1 - Ph.1 RYG	1	Ph.2 Veh	2	2 - Ph.2 RYG	2	Ph.3 Veh	3	3 - Ph.3 RYG	3
Ph.4 Veh	4	4 - Ph.4 RYG	4	Ph.5 Veh	5	5 - Ph.5 RYG	5	Ph.6 Veh	6	6 - Ph.6 RYG	6
Ph.7 Veh	7	7 - Ph.7 RYG	7	Ph.8 Veh	8	8 - Ph.8 RYG	8	Ph.2 Ped	9	10 - Ph.2 DPW	10
Ph.4 Ped	10	12 - Ph.4 DPW	12	Ph.6 Ped	11	14 - Ph.6 DPW	14	Ph.8 Ped	12	16 - Ph.8 DPW	16
Ph.1 OLP	13	17 - Ph.1 RYG	17	Ph.2 OLP	14	18 - Ph.2 RYG	18	Ph.3 OLP	15	19 - Ph.3 RYG	19
Ph.4 OLP	16	20 - Ph.4 RYG	20	Ph.1 Ped	17	9 - Ph.1 DPW	9	Ph.3 Ped	18	11 - Ph.3 DPW	11
Ph.5 Ped	19	13 - Ph.5 DPW	13	Ph.7 Ped	20	15 - Ph.7 DPW	15				

Coordination Data

General Coordination Data

Operation Mode: 1=Auto

Coordination Mode: 2=Permissive

Yield
Maximum Mode: 0=Inhibit

Correction Mode: 3=Short Way Plus

Offset Mode: 0=Beg Grn

Force Mode: 1=Cycle

Max Dwell Time: 0

Yield Period: 0

Manual Dial: 1

Manual Split: 1

Manual Offset: 1

Dial/Split Cycle

1/1 90

2/1 90

3/1 90

Split Times and Phase Mode

Dial 1 / Split 1

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
2	47	1=Coordinate	4	43	0=Actuated	6	47	0=Actuated	8	43	0=Actuated

Dial 2 / Split 1

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
2	60	1=Coordinate	4	30	0=Actuated	6	60	0=Actuated	8	30	0=Actuated

Dial 3 / Split 1

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
2	54	1=Coordinate	4	36	0=Actuated	6	54	0=Actuated	8	36	0=Actuated

Traffic Plan Data

Plan: 1/1/1	Offset Time: 76	Alt. Sequence: 0	Mode: 0=Normal	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0
Plan: 2/1/1	Offset Time: 27	Alt. Sequence: 0	Mode: 0=Normal	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0
Plan: 3/1/1	Offset Time: 7	Alt. Sequence: 0	Mode: 0=Normal	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0

Local TBC Data

Start of Daylight Saving	Month: 3	Week: 2	Cycle Zero Reference	Hours: 0	Min: 0
End of Daylight Saving	Month: 11	Week: 1			

Source	Equate Days						
Day	1	2	3	4	5	6	7
1	7	0	0	0	0	0	0
2	3	4	5	6	0	0	0

Traffic Data

					PHASE FUNCTION															
Event	Day	Time	D/S/O	flash	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1	0:1	0/0/4		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
2	1	5:0	2/1/1		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
3	2	0:1	0/0/4		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
4	2	6:0	1/1/1		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
5	2	9:0	2/1/1		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
6	2	14:0	3/1/1		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
7	2	19:0	2/1/1		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

AUX. Events

				Aux Outputs			Det. Diag.	Det. Rpt.	Det. Mult100	Special Function Outputs								
Event	Program Day	Hour	Min.	1	2	3	D1	D2	D3	Dimming	1	2	3	4	5	6	7	8
				☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Default Data - No Special Day(s) or Week(s) Programmed

Special Functions

Function	SF1	SF2	SF3	SF4	SF5	SF6	SF7	SF8
Special Function 1	☒	☐	☐	☐	☐	☐	☐	☐
Special Function 2	☐	☒	☐	☐	☐	☐	☐	☐
Special Function 3	☐	☐	☒	☐	☐	☐	☐	☐
Special Function 4	☐	☐	☐	☒	☐	☐	☐	☐
Special Function 5	☐	☐	☐	☐	☒	☐	☐	☐
Special Function 6	☐	☐	☐	☐	☐	☒	☐	☐
Special Function 7	☐	☐	☐	☐	☐	☐	☒	☐
Special Function 8	☐	☐	☐	☐	☐	☐	☐	☒

Phase Function

Phase Function Map	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
Phase 1 Max2	X															
Phase 2 Max2		X														
Phase 3 Max2			X													
Phase 4 Max2				X												
Phase 5 Max2					X											
Phase 6 Max2						X										
Phase 7 Max2							X									
Phase 8 Max2								X								
Phase 1 Phase Omit									X							
Phase 2 Phase Omit										X						
Phase 3 Phase Omit											X					
Phase 4 Phase Omit												X				
Phase 5 Phase Omit													X			
Phase 6 Phase Omit														X		
Phase 7 Phase Omit															X	
Phase 8 Phase Omit																X

Dimming Data

Channel Red Yellow Green Alternate

☐	☐	☐	☐
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Default Data - No Dimming Programmed

Preemption Data

General Preemption Data

Ring Min Grn/Walk Time

1	10
2	10
3	10
4	10

Flash > Preempt 1 Preempt 2 = Preempt 3 Preempt 4 = Preempt 5
 Preempt 1 > Preempt 2 Preempt 3 = Preempt 4 Preempt 5 = Preempt 6

Preempt	Preempt Timers								Select			Track				Dwell Green	Return		
	Non-Locking	Link to Preempt	Delay	Extend	Duration	MaxCall	Lock-Out	Ped	Yel	Red	Grn	Ped	Yel	Red	Ped		Yel	Red	
								Clear							Clear				Clear
1	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0	
2	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0	
3	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0	
4	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0	
5	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0	
6	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0	

Preempt 1			Preempt 2			Preempt 3			Preempt 4			Preempt 5			Preempt 6		
Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls
1	No	Yes	1	No	Yes	1	No	Yes	1	No	Yes	1	No	Yes	1	No	Yes
2	No	Yes	2	No	Yes	2	No	Yes	2	No	Yes	2	No	Yes	2	No	Yes
3	No	Yes	3	No	Yes	3	No	Yes	3	No	Yes	3	No	Yes	3	No	Yes
4	No	Yes	4	No	Yes	4	No	Yes	4	No	Yes	4	No	Yes	4	No	Yes
5	No	Yes	5	No	Yes	5	No	Yes	5	No	Yes	5	No	Yes	5	No	Yes
6	No	Yes	6	No	Yes	6	No	Yes	6	No	Yes	6	No	Yes	6	No	Yes
7	No	Yes	7	No	Yes	7	No	Yes	7	No	Yes	7	No	Yes	7	No	Yes
8	No	Yes	8	No	Yes	8	No	Yes	8	No	Yes	8	No	Yes	8	No	Yes

Priority Timers										
Priority	Non-Locking	Delay	Extend	Duration	Dwell	Max_Call	Lock-Out	Skip Phases		
1	No	0	0	0	0	0	0	0=Do not Skip Phases		
2	No	0	0	0	0	0	0	0=Do not Skip Phases		
3	No	0	0	0	0	0	0	0=Do not Skip Phases		
4	No	0	0	0	0	0	0	0=Do not Skip Phases		
5	No	0	0	0	0	0	0	0=Do not Skip Phases		
6	No	0	0	0	0	0	0	0=Do not Skip Phases		

Priority 1			Priority 2			Priority 3			Priority 4			Priority 5			Priority 6		
Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls
Preempt 1																	
Vehical Phases			Pedestrian Phases						Overlaps								
Ph.	Track	Dwell	Cycle	Ph. Track		Dwell		Cycle	Ovlp.	Track	Dwell	Cycle					
Default Data			Default Data						Default Data								
Preempt 2																	
Vehical Phases			Pedestrian Phases						Overlaps								
Ph.	Track	Dwell	Cycle	Ph. Track		Dwell		Cycle	Ovlp.	Track	Dwell	Cycle					
Default Data			Default Data						Default Data								
Preempt 3																	
Vehical Phases			Pedestrian Phases						Overlaps								
Ph.	Track	Dwell	Cycle	Ph. Track		Dwell		Cycle	Ovlp.	Track	Dwell	Cycle					
Default Data			Default Data						Default Data								
Preempt 4																	
Vehical Phases			Pedestrian Phases						Overlaps								
Ph.	Track	Dwell	Cycle	Ph. Track		Dwell		Cycle	Ovlp.	Track	Dwell	Cycle					
Default Data			Default Data						Default Data								

Preempt 5											
Vehical Phases				Pedestrian Phases				Overlaps			
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Cycle	Ovlp.	Track	Dwell	Cycle
Default Data				Default Data				Default Data			

Preempt 6											
Vehical Phases				Pedestrian Phases				Overlaps			
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Cycle	Ovlp.	Track	Dwell	Cycle
Default Data				Default Data				Default Data			

System/Detectors Data

Local Critical Alarms					Revert to Backup: 15	1st Phone:
Local Free: No	Cycle Failure: No	Coord Failure: No	Conflict Flash: No	Remote Flash: No	2nd Phone:	
Local Fash: No	Cycle Fault: No	Coord Fault: No	Premption: No	Voltage Monitor: No		
Special Status 1: No	Special Status 2: No	Special Status 3: No	Special Status 4: No	Special Status 5: No	Special Status 6: No	

Traffic Responsive											
System	Detector		Average	Occupancy	Min	Queue 1	System	Weight	Queue 2	System	Weight
Detector	Channel	Veh/Hr	Time(mins)	Correction/10	Volume %	Detectors	Detectors	Factor	Detectors	Detectors	Factor

Default Data				Default Data				Default Data			
Sample Interval:				Queue: 1	Input Selection: 0=Average			Queue:			
					Detector Failed Level : 0			Level	Enter	Leave	Dial / Split / Offset
				Queue: 2	Input Selection: 0=Average			/ /			
					Detector Failed Level : 0			Default Data			

Vehical Detector				Vehical Detector				Special Detector			
Diagnostic Value 0				Diagnostic Value 1				Diagnostic Value 0			
Max	No	Erratic		Max	No	Erratic		Max	No	Erratic	
Detector	Presence	Activity	Count	Detector	Presence	Activity	Count	Detector	Presence	Activity	Count

Default Data - Diag 0 Values				Default Data - No Diag 1 Values				Default Data - No Diag 0 Valu			
Pedestrian Detector				Pedestrian Detector				Special Detector			
Diagnostic Value 0				Diagnostic Value 1				Diagnostic Value 1			
Max	No	Erratic		Max	No	Erratic		Max	No	Erratic	
Detector	Presence	Activity	Count	Detector	Presence	Activity	Count	Detector	Presence	Activity	Count

Default Data - No Diag 0 Values			Default Data - No Diag 1 Values		Default Data - No Diag 1 Values	
Speed Trap Data					Speed Trap	Speed Trap
Speed Trap:			Dial/Split/Offset		Low Treshold	High Treshold
Measurement:			//			
Detector 1	Detector_2	Distance :	Default Data			

Default Data									
Volume Detector Data									
Report Interval									
Volume	Controller								
Detector	Detector								
Number	Channel								

Default Data

10/24/201
4:42:13PM

Alternate Sequences

Alternate Sequences

Port 1 Data

BIU Port Message
Addr Status 40

Phase
Pair(s)

Default Data

No Alternate
Sequences
Programmed

Channel Assignment											
Control	Channel	Hardware Pin Set		Control	Channel	Hardware Pin Set		Control	Channel	Hardware Pin Set	
Ph.1 Veh	1	1 - Ph.1 RYG	1	Ph.2 Veh	2	2 - Ph.2 RYG	2	Ph.3 Veh	3	3 - Ph.3 RYG	3
Ph.4 Veh	4	4 - Ph.4 RYG	4	Ph.5 Veh	5	5 - Ph.5 RYG	5	Ph.6 Veh	6	6 - Ph.6 RYG	6
Ph.7 Veh	7	7 - Ph.7 RYG	7	Ph.8 Veh	8	8 - Ph.8 RYG	8	Ph.2 Ped	9	10 - Ph.2 DPW	10
Ph.4 Ped	10	12 - Ph.4 DPW	12	Ph.6 Ped	11	14 - Ph.6 DPW	14	Ph.8 Ped	12	16 - Ph.8 DPW	16
Ph.1 OLP	13	17 - Ph.1 RYG	17	Ph.2 OLP	14	18 - Ph.2 RYG	18	Ph.3 OLP	15	19 - Ph.3 RYG	19
Ph.4 OLP	16	20 - Ph.4 RYG	20	Ph.1 Ped	17	9 - Ph.1 DPW	9	Ph.3 Ped	18	11 - Ph.3 DPW	11
Ph.5 Ped	19	13 - Ph.5 DPW	13	Ph.7 Ped	20	15 - Ph.7 DPW	15				

Coordination Data				Dial/Split	Cycle
General Coordination Data				1/1	90
Operation Mode: 1=Auto				2/1	90
Coordination Mode: 2=Permissive				3/1	90
Yield					
Maximum Mode: 0=Inhibit					
Correction Mode: 3=Short Way Plus					
Yield Period: 0					

Split Times and Phase Mode											
Dial 1 / Split 1											
Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
2	58	1=Coordinate	4	32	0=Actuated	6	58	0=Actuated	8	32	0=Actuated
Dial 2 / Split 1											
Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
2	51	1=Coordinate	4	39	0=Actuated	6	51	0=Actuated	8	39	0=Actuated
Dial 3 / Split 1											
Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
2	55	1=Coordinate	4	35	0=Actuated	6	55	0=Actuated	8	35	0=Actuated

Traffic Plan Data							
Plan: 1/1/1	Offset Time: 14	Alt. Sequence: 0	Mode: 0=Normal	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0	
Plan: 2/1/1	Offset Time: 88	Alt. Sequence: 0	Mode: 0=Normal	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0	
Plan: 3/1/1	Offset Time: 83	Alt. Sequence: 0	Mode: 0=Normal	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0	

Local TBC Data						Equate Days							
Start of Daylight Saving	Month: 3	Week: 2	Cycle Zero Reference	Hours: 0	Min: 0	Source							
						Day	1	2	3	4	5	6	7
						1	7	0	0	0	0	0	0
End of Daylight Saving	Month: 11	Week: 1				2	3	4	5	6	0	0	0

Traffic Data

Event	Day	Time	D/S/O	flash	PHASE FUNCTION															
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1	0:1	0/0/4		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
2	1	5:0	2/1/1		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
3	2	0:1	0/0/4		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
4	2	6:0	1/1/1		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
5	2	9:0	2/1/1		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
6	2	14:0	3/1/1		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
7	2	19:0	2/1/1		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

AUX. Events

Event	Program	Day	Hour	Min.	Aux Outputs			Det.	Det.	Det.	Special Function Outputs								
					1	2	3	Diag.	Rpt.	Mult100	Dimming	1	2	3	4	5	6	7	8
					☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐

Default Data - No Special Day(s) or Week(s) Programmed

Special Functions

Function	SF1	SF2	SF3	SF4	SF5	SF6	SF7	SF8
Special Function 1	☒	☐	☐	☐	☐	☐	☐	☐
Special Function 2	☐	☒	☐	☐	☐	☐	☐	☐
Special Function 3	☐	☐	☒	☐	☐	☐	☐	☐
Special Function 4	☐	☐	☐	☒	☐	☐	☐	☐
Special Function 5	☐	☐	☐	☐	☒	☐	☐	☐
Special Function 6	☐	☐	☐	☐	☐	☒	☐	☐
Special Function 7	☐	☐	☐	☐	☐	☐	☒	☐
Special Function 8	☐	☐	☐	☐	☐	☐	☐	☒

Phase Function

Phase Function Map	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
Phase 1 Max2	X															
Phase 2 Max2		X														
Phase 3 Max2			X													
Phase 4 Max2				X												
Phase 5 Max2					X											
Phase 6 Max2						X										
Phase 7 Max2							X									
Phase 8 Max2								X								
Phase 1 Phase Omit									X							
Phase 2 Phase Omit										X						
Phase 3 Phase Omit											X					
Phase 4 Phase Omit												X				
Phase 5 Phase Omit													X			
Phase 6 Phase Omit														X		
Phase 7 Phase Omit															X	
Phase 8 Phase Omit																X

Dimming Data

Channel Red Yellow Green Alternate

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Default Data - No Dimming Programmed

Preemption Data

General Preemption Data

Ring Min Grn/Walk Time

1	10
2	10
3	10
4	10

Flash > Preempt 1 Preempt 2 = Preempt 3 Preempt 4 = Preempt 5
 Preempt 1 > Preempt 2 Preempt 3 = Preempt 4 Preempt 5 = Preempt 6

Preempt	Preempt Timers								Select			Track				Dwell Green	Return		
	Non-Locking	Link to Preempt	Delay	Extend	Duration	MaxCall	Lock-Out	Ped	Yel	Red	Grn	Ped	Yel	Red	Ped		Yel	Red	
								Clear							Clear				Clear
1	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0	
2	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0	
3	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0	
4	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0	
5	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0	
6	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0	

Preempt 1			Preempt 2			Preempt 3			Preempt 4			Preempt 5			Preempt 6		
Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls
1	No	Yes	1	No	Yes	1	No	Yes	1	No	Yes	1	No	Yes	1	No	Yes
2	No	Yes	2	No	Yes	2	No	Yes	2	No	Yes	2	No	Yes	2	No	Yes
3	No	Yes	3	No	Yes	3	No	Yes	3	No	Yes	3	No	Yes	3	No	Yes
4	No	Yes	4	No	Yes	4	No	Yes	4	No	Yes	4	No	Yes	4	No	Yes
5	No	Yes	5	No	Yes	5	No	Yes	5	No	Yes	5	No	Yes	5	No	Yes
6	No	Yes	6	No	Yes	6	No	Yes	6	No	Yes	6	No	Yes	6	No	Yes
7	No	Yes	7	No	Yes	7	No	Yes	7	No	Yes	7	No	Yes	7	No	Yes
8	No	Yes	8	No	Yes	8	No	Yes	8	No	Yes	8	No	Yes	8	No	Yes

Priority Timers										
Priority	Non-Locking	Delay	Extend	Duration	Dwell	Max_Call	Lock-Out	Skip Phases		
1	No	0	0	0	0	0	0	0=Do not Skip Phases		
2	No	0	0	0	0	0	0	0=Do not Skip Phases		
3	No	0	0	0	0	0	0	0=Do not Skip Phases		
4	No	0	0	0	0	0	0	0=Do not Skip Phases		
5	No	0	0	0	0	0	0	0=Do not Skip Phases		
6	No	0	0	0	0	0	0	0=Do not Skip Phases		

Priority 1			Priority 2			Priority 3			Priority 4			Priority 5			Priority 6		
Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls
Preempt 1																	
Vehical Phases			Pedestrian Phases						Overlaps								
Ph.	Track	Dwell	Cycle	Ph. Track		Dwell		Cycle	Ovlp.	Track	Dwell	Cycle					
Default Data			Default Data						Default Data								
Preempt 2																	
Vehical Phases			Pedestrian Phases						Overlaps								
Ph.	Track	Dwell	Cycle	Ph. Track		Dwell		Cycle	Ovlp.	Track	Dwell	Cycle					
Default Data			Default Data						Default Data								
Preempt 3																	
Vehical Phases			Pedestrian Phases						Overlaps								
Ph.	Track	Dwell	Cycle	Ph. Track		Dwell		Cycle	Ovlp.	Track	Dwell	Cycle					
Default Data			Default Data						Default Data								
Preempt 4																	
Vehical Phases			Pedestrian Phases						Overlaps								
Ph.	Track	Dwell	Cycle	Ph. Track		Dwell		Cycle	Ovlp.	Track	Dwell	Cycle					
Default Data			Default Data						Default Data								

Preempt 5											
Vehical Phases				Pedestrian Phases				Overlaps			
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Cycle	Ovlp.	Track	Dwell	Cycle
Default Data				Default Data				Default Data			

Preempt 6											
Vehical Phases				Pedestrian Phases				Overlaps			
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Cycle	Ovlp.	Track	Dwell	Cycle
Default Data				Default Data				Default Data			

System/Detectors Data

Local Critical Alarms					Revert to Backup: 15	1st Phone:
Local Free: No	Cycle Failure: No	Coord Failure: No	Conflict Flash: No	Remote Flash: No	2nd Phone:	
Local Fash: No	Cycle Fault: No	Coord Fault: No	Premption: No	Voltage Monitor: No		
Special Status 1: No	Special Status 2: No	Special Status 3: No	Special Status 4: No	Special Status 5: No	Special Status 6: No	

Traffic Responsive											
System	Detector		Average	Occupancy	Min	Queue 1	System	Weight	Queue 2	System	Weight
Detector	Channel	Veh/Hr	Time(mins)	Correction/10	Volume %	Detectors	Detectors	Factor	Detectors	Detectors	Factor

Default Data		Default Data		Default Data	
Sample Interval:		Queue: 1	Input Selection: 0=Average	Queue:	
		Detector Failed Level : 0		Level	Enter
				Leave	Dial / Split / Offset
		Queue: 2	Input Selection: 0=Average		
		Detector Failed Level : 0		/ /	
			Default Data		

Vehical Detector				Vehical Detector				Special Detector			
Diagnostic Value 0				Diagnostic Value 1				Diagnostic Value 0			
Max	No	Erratic		Max	No	Erratic		Max	No	Erratic	
Detector	Presence	Activity	Count	Detector	Presence	Activity	Count	Detector	Presence	Activity	Count

Default Data - Diag 0 Values				Default Data - No Diag 1 Values				Default Data - No Diag 0 Valu			
Pedestrian Detector				Pedestrian Detector				Special Detector			
Diagnostic Value 0				Diagnostic Value 1				Diagnostic Value 1			
Max	No	Erratic		Max	No	Erratic		Max	No	Erratic	
Detector	Presence	Activity	Count	Detector	Presence	Activity	Count	Detector	Presence	Activity	Count

Default Data - No Diag 0 Values				Default Data - No Diag 1 Values				Default Data - No Diag 1 Values			
Speed Trap Data								Speed Trap			
Speed Trap:				Dial/Split/Offset				Low Treshold			
Measurement:				//							
Detector 1	Detector_2	Distance :		Default Data							

Default Data									
Volume Detector Data									
Report Interval									
Volume	Controller								
Detector	Detector								
Number	Channel								

Default Data

Appendix B

**Year 2011 Existing Traffic
Peak Hour Analysis Outputs**

HCM Signalized Intersection Capacity Analysis

120: W Arnold St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	30	30	10	120	25	25	435	5	10	395	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1881	1599	1752	1797		1687	3368		1656	3300	
Flt Permitted	0.56	1.00	1.00	0.73	1.00		0.49	1.00		0.47	1.00	
Satd. Flow (perm)	1051	1881	1599	1356	1797		865	3368		817	3300	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	45	34	34	11	136	28	28	494	6	11	449	11
RTOR Reduction (vph)	0	0	28	0	11	0	0	1	0	0	1	0
Lane Group Flow (vph)	45	34	6	11	153	0	28	499	0	11	459	0
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	7%	7%	7%	9%	9%	9%
Turn Type	Perm		Perm	Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	16.4	16.4	16.4	16.4	16.4		63.6	63.6		63.6	63.6	
Effective Green, g (s)	16.4	16.4	16.4	16.4	16.4		63.6	63.6		63.6	63.6	
Actuated g/C Ratio	0.18	0.18	0.18	0.18	0.18		0.71	0.71		0.71	0.71	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	192	343	291	247	327		611	2380		577	2332	
v/s Ratio Prot		0.02			c0.08			c0.15			0.14	
v/s Ratio Perm	0.04		0.00	0.01			0.03			0.01		
v/c Ratio	0.23	0.10	0.02	0.04	0.47		0.05	0.21		0.02	0.20	
Uniform Delay, d1	31.4	30.6	30.2	30.3	32.9		4.0	4.5		3.9	4.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.98	1.17	
Incremental Delay, d2	1.3	0.3	0.1	0.2	2.2		0.1	0.2		0.0	0.1	
Delay (s)	32.8	30.9	30.3	30.5	35.1		4.1	4.7		3.9	5.3	
Level of Service	C	C	C	C	D		A	A		A	A	
Approach Delay (s)		31.5			34.8			4.7			5.3	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM Average Control Delay	11.4			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.26											
Actuated Cycle Length (s)	90.0			Sum of lost time (s)			10.0					
Intersection Capacity Utilization	58.3%			ICU Level of Service			B					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

130: W Blodgett St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	10	25	5	30	30	25	465	10	10	385	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	13	13	32	6	39	39	32	604	13	13	500	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								373			726	
pX, platoon unblocked	0.98	0.98		0.98	0.98	0.98				0.98		
vC, conflicting volume	952	1208	251	990	1203	308	501			617		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	911	1173	251	950	1167	254	501			569		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	92	93	96	96	78	95	97			99		
cM capacity (veh/h)	173	182	755	180	176	721	1032			953		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	58	84	334	315	263	251						
Volume Left	13	6	32	0	13	0						
Volume Right	32	39	0	13	0	1						
cSH	308	271	1032	1700	953	1700						
Volume to Capacity	0.19	0.31	0.03	0.19	0.01	0.15						
Queue Length 95th (ft)	17	32	2	0	1	0						
Control Delay (s)	19.4	24.2	1.1	0.0	0.6	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	19.4	24.2	0.6		0.3							
Approach LOS	C	C										
Intersection Summary												
Average Delay			2.8									
Intersection Capacity Utilization			40.2%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

140: W Cleveland St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	1	25	1	5	1	15	490	1	15	370	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	6	1	30	1	6	1	18	598	1	18	451	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								750			349	
pX, platoon unblocked	0.97	0.97	0.97	0.97	0.97		0.97					
vC, conflicting volume	830	1126	229	928	1129	299	457			599		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	762	1067	141	862	1069	299	377			599		
tC, single (s)	7.6	6.6	7.0	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	98	99	96	99	97	100	98			98		
cM capacity (veh/h)	269	205	851	228	209	703	1128			947		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	38	9	317	300	244	232						
Volume Left	6	1	18	0	18	0						
Volume Right	30	1	0	1	0	6						
cSH	587	235	1128	1700	947	1700						
Volume to Capacity	0.06	0.04	0.02	0.18	0.02	0.14						
Queue Length 95th (ft)	5	3	1	0	1	0						
Control Delay (s)	11.6	20.9	0.6	0.0	0.8	0.0						
Lane LOS	B	C	A		A							
Approach Delay (s)	11.6	20.9	0.3		0.4							
Approach LOS	B	C										
Intersection Summary												
Average Delay			0.9									
Intersection Capacity Utilization			34.4%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

150: W Doege St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	175	20	25	205	45	80	390	25	15	345	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	5.2		5.2	5.2			5.2			5.2	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frt	1.00	0.98		1.00	0.97			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			1.00	
Satd. Flow (prot)	1752	1816		1752	1795			3321			3410	
Flt Permitted	0.39	1.00		0.50	1.00			0.79			0.92	
Satd. Flow (perm)	722	1816		916	1795			2644			3148	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	43	216	25	31	253	56	99	481	31	19	426	19
RTOR Reduction (vph)	0	5	0	0	9	0	0	4	0	0	3	0
Lane Group Flow (vph)	43	236	0	31	300	0	0	607	0	0	461	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	7%	7%	7%	5%	5%	5%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	25.7	25.7		25.7	25.7			53.9			53.9	
Effective Green, g (s)	25.7	25.7		25.7	25.7			53.9			53.9	
Actuated g/C Ratio	0.29	0.29		0.29	0.29			0.60			0.60	
Clearance Time (s)	5.2	5.2		5.2	5.2			5.2			5.2	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	206	519		262	513			1583			1885	
v/s Ratio Prot		0.13			c0.17							
v/s Ratio Perm	0.06			0.03				c0.23			0.15	
v/c Ratio	0.21	0.45		0.12	0.58			0.38			0.24	
Uniform Delay, d1	24.4	26.4		23.8	27.6			9.4			8.5	
Progression Factor	1.00	1.00		1.00	1.00			1.07			1.00	
Incremental Delay, d2	1.1	1.3		0.4	2.6			0.7			0.3	
Delay (s)	25.5	27.7		24.2	30.2			10.8			8.8	
Level of Service	C	C		C	C			B			A	
Approach Delay (s)		27.4			29.6			10.8			8.8	
Approach LOS		C			C			B			A	
Intersection Summary												
HCM Average Control Delay			16.8			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.45									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			10.4			
Intersection Capacity Utilization			98.8%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

160: W Edison St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	5	20	1	5	10	30	435	5	10	355	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	6	6	25	1	6	12	38	544	6	12	444	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								380				
pX, platoon unblocked	0.97	0.97		0.97	0.97	0.97				0.97		
vC, conflicting volume	838	1100	228	897	1103	275	456			550		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	760	1032	228	822	1036	178	456			463		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.2			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	98	97	97	99	97	98	97			99		
cM capacity (veh/h)	267	216	781	229	206	794	1073			1017		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	38	20	309	278	234	234						
Volume Left	6	1	38	0	12	0						
Volume Right	25	12	0	6	0	12						
cSH	445	388	1073	1700	1017	1700						
Volume to Capacity	0.08	0.05	0.03	0.16	0.01	0.14						
Queue Length 95th (ft)	7	4	3	0	1	0						
Control Delay (s)	13.8	14.8	1.3	0.0	0.6	0.0						
Lane LOS	B	B	A		A							
Approach Delay (s)	13.8	14.8	0.7		0.3							
Approach LOS	B	B										
Intersection Summary												
Average Delay			1.2									
Intersection Capacity Utilization			36.8%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

170: W Franklin St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	1	1	10	1	445	5	5	370	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	1	1	6	1	1	12	1	543	6	6	451	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								749				
pX, platoon unblocked												
vC, conflicting volume	751	1015	226	793	1013	274	452			549		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	751	1015	226	793	1013	274	452			549		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	100	99	99	100	99	98	100			99		
cM capacity (veh/h)	295	238	783	278	239	729	1077			976		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	9	15	273	277	232	227						
Volume Left	1	1	1	0	6	0						
Volume Right	6	12	0	6	0	1						
cSH	501	558	1077	1700	976	1700						
Volume to Capacity	0.02	0.03	0.00	0.16	0.01	0.13						
Queue Length 95th (ft)	1	2	0	0	0	0						
Control Delay (s)	12.3	11.6	0.0	0.0	0.3	0.0						
Lane LOS	B	B	A		A							
Approach Delay (s)	12.3	11.6	0.0		0.1							
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			23.8%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

180: W Grant St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	1	10	5	25	1	450	5	10	365	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	1	1	1	12	6	31	1	556	6	12	451	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								1126				
pX, platoon unblocked												
vC, conflicting volume	790	1040	226	813	1038	281	452			562		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	790	1040	226	813	1038	281	452			562		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	100	99	100	95	97	96	100			99		
cM capacity (veh/h)	264	229	783	269	230	722	1084			978		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	4	49	279	284	238	227						
Volume Left	1	12	1	0	12	0						
Volume Right	1	31	0	6	0	1						
cSH	318	428	1084	1700	978	1700						
Volume to Capacity	0.01	0.12	0.00	0.17	0.01	0.13						
Queue Length 95th (ft)	1	10	0	0	1	0						
Control Delay (s)	16.5	14.5	0.0	0.0	0.6	0.0						
Lane LOS	C	B	A		A							
Approach Delay (s)	16.5	14.5	0.0		0.3							
Approach LOS	C	B										
Intersection Summary												
Average Delay			0.9									
Intersection Capacity Utilization			27.3%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

190: W Harrison St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	1	1	5	5	470	1	5	370	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	1	1	6	1	1	6	6	573	1	6	451	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	775	1056	232	830	1062	287	463			574		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	775	1056	232	830	1062	287	463			574		
tC, single (s)	7.5	6.5	6.9	7.8	6.8	7.2	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.2			2.3		
p0 queue free %	100	99	99	99	99	99	99			99		
cM capacity (veh/h)	285	224	777	238	201	675	1073			968		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	9	9	293	288	232	238						
Volume Left	1	1	6	0	6	0						
Volume Right	6	6	0	1	0	12						
cSH	486	422	1073	1700	968	1700						
Volume to Capacity	0.02	0.02	0.01	0.17	0.01	0.14						
Queue Length 95th (ft)	1	2	0	0	0	0						
Control Delay (s)	12.5	13.7	0.2	0.0	0.3	0.0						
Lane LOS	B	B	A		A							
Approach Delay (s)	12.5	13.7	0.1		0.1							
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			26.5%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

120: W Arnold St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	65	35	20	85	35	45	575	20	30	710	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1787	1799		1787	3556		1770	3518	
Flt Permitted	0.64	1.00	1.00	0.71	1.00		0.33	1.00		0.40	1.00	
Satd. Flow (perm)	1184	1863	1583	1337	1799		620	3556		739	3518	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	55	71	38	22	93	38	49	632	22	33	780	33
RTOR Reduction (vph)	0	0	31	0	21	0	0	2	0	0	2	0
Lane Group Flow (vph)	55	71	7	22	110	0	49	652	0	33	811	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Perm		Perm	Perm			Perm		Perm			
Protected Phases	4				8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	15.4	15.4	15.4	15.4	15.4		64.6	64.6		64.6	64.6	
Effective Green, g (s)	15.4	15.4	15.4	15.4	15.4		64.6	64.6		64.6	64.6	
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.17		0.72	0.72		0.72	0.72	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	203	319	271	229	308		445	2552		530	2525	
v/s Ratio Prot		0.04			c0.06			0.18			c0.23	
v/s Ratio Perm	0.05		0.00	0.02			0.08			0.04		
v/c Ratio	0.27	0.22	0.02	0.10	0.36		0.11	0.26		0.06	0.32	
Uniform Delay, d1	32.4	32.1	31.0	31.4	32.9		3.9	4.4		3.8	4.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.81	0.77	
Incremental Delay, d2	1.5	0.7	0.1	0.4	1.5		0.5	0.2		0.1	0.1	
Delay (s)	33.9	32.9	31.1	31.8	34.4		4.4	4.6		3.1	3.7	
Level of Service	C	C	C	C	C		A	A		A	A	
Approach Delay (s)		32.8			34.1			4.6			3.7	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM Average Control Delay			9.1		HCM Level of Service				A			
HCM Volume to Capacity ratio			0.33									
Actuated Cycle Length (s)			90.0		Sum of lost time (s)				10.0			
Intersection Capacity Utilization			58.1%		ICU Level of Service				B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

130: W Blodgett St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	10	30	10	5	25	10	645	5	25	730	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	5	10	31	10	5	26	10	658	5	26	745	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								373			726	
pX, platoon unblocked	0.98	0.98	0.97	0.98	0.98	0.97	0.97			0.97		
vC, conflicting volume	1176	1482	375	1140	1482	332	750			663		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	998	1309	289	962	1309	240	676			583		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	93	96	94	97	97	99			97		
cM capacity (veh/h)	180	152	691	185	152	742	889			955		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	46	41	339	334	398	378						
Volume Left	5	10	10	0	26	0						
Volume Right	31	26	0	5	0	5						
cSH	329	331	889	1700	955	1700						
Volume to Capacity	0.14	0.12	0.01	0.20	0.03	0.22						
Queue Length 95th (ft)	12	10	1	0	2	0						
Control Delay (s)	17.7	17.4	0.4	0.0	0.9	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	17.7	17.4	0.2		0.4							
Approach LOS	C	C										
Intersection Summary												
Average Delay			1.3									
Intersection Capacity Utilization			49.6%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

140: W Cleveland St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	5	25	1	1	5	15	655	5	5	735	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	1	5	27	1	1	5	16	704	5	5	790	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)								750			349	
pX, platoon unblocked	0.91	0.91	0.91	0.91	0.91		0.91					
vC, conflicting volume	1197	1548	401	1175	1551	355	801			710		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1013	1401	136	989	1404	355	577			710		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	96	97	99	99	99	98			99		
cM capacity (veh/h)	172	125	811	170	125	647	901			885		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	33	8	368	358	401	406						
Volume Left	1	1	16	0	5	0						
Volume Right	27	5	0	5	0	11						
cSH	405	324	901	1700	885	1700						
Volume to Capacity	0.08	0.02	0.02	0.21	0.01	0.24						
Queue Length 95th (ft)	7	2	1	0	0	0						
Control Delay (s)	14.7	16.4	0.6	0.0	0.2	0.0						
Lane LOS	B	C	A		A							
Approach Delay (s)	14.7	16.4	0.3		0.1							
Approach LOS	B	C										
Intersection Summary												
Average Delay			0.6									
Intersection Capacity Utilization			39.0%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

150: W Doege St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	190	80	25	55	45	20	615	25	30	645	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	5.2		5.2	5.2			5.2			5.2	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frt	1.00	0.96		1.00	0.93			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1805	1816		1787	1755			3514			3530	
Flt Permitted	0.69	1.00		0.43	1.00			0.92			0.90	
Satd. Flow (perm)	1309	1816		814	1755			3240			3196	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	200	84	26	58	47	21	647	26	32	679	53
RTOR Reduction (vph)	0	18	0	0	33	0	0	3	0	0	6	0
Lane Group Flow (vph)	47	266	0	26	72	0	0	691	0	0	758	0
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	2%	2%	2%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			4			2			2		
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	26.0	26.0		26.0	26.0			53.6			53.6	
Effective Green, g (s)	26.0	26.0		26.0	26.0			53.6			53.6	
Actuated g/C Ratio	0.29	0.29		0.29	0.29			0.60			0.60	
Clearance Time (s)	5.2	5.2		5.2	5.2			5.2			5.2	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	378	525		235	507			1930			1903	
v/s Ratio Prot	c0.15			0.04								
v/s Ratio Perm	0.04			0.03				0.21			c0.24	
v/c Ratio	0.12	0.51		0.11	0.14			0.36			0.40	
Uniform Delay, d1	23.6	26.7		23.5	23.7			9.4			9.7	
Progression Factor	1.00	1.00		1.00	1.00			0.87			1.00	
Incremental Delay, d2	0.3	1.6		0.4	0.3			0.5			0.6	
Delay (s)	23.9	28.3		23.9	24.0			8.6			10.3	
Level of Service	C	C		C	C			A			B	
Approach Delay (s)	27.7			24.0			8.6			10.3		
Approach LOS	C			C			A			B		
Intersection Summary												
HCM Average Control Delay			13.6	HCM Level of Service			B					
HCM Volume to Capacity ratio			0.43									
Actuated Cycle Length (s)			90.0	Sum of lost time (s)			10.4					
Intersection Capacity Utilization			71.2%	ICU Level of Service			C					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

160: W Edison St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	5	45	1	1	5	10	685	10	15	680	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	49	1	1	5	11	745	11	16	739	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								380				
pX, platoon unblocked	0.92	0.92		0.92	0.92	0.92				0.92		
vC, conflicting volume	1177	1554	375	1226	1554	378	750			755		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1016	1426	375	1069	1426	146	750			557		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	96	92	99	99	99	99			98		
cM capacity (veh/h)	173	122	628	143	122	810	855			928		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	60	8	383	383	386	380						
Volume Left	5	1	11	0	16	0						
Volume Right	49	5	0	11	0	11						
cSH	388	327	855	1700	928	1700						
Volume to Capacity	0.15	0.02	0.01	0.23	0.02	0.22						
Queue Length 95th (ft)	13	2	1	0	1	0						
Control Delay (s)	16.0	16.3	0.4	0.0	0.6	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	16.0	16.3	0.2		0.3							
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.9									
Intersection Capacity Utilization			40.5%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

170: W Franklin St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	5	1	5	1	685	10	10	695	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	1	1	5	5	1	5	1	753	11	11	764	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)								749				
pX, platoon unblocked	0.97	0.97		0.97	0.97	0.97				0.97		
vC, conflicting volume	1173	1554	385	1170	1552	382	769			764		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1112	1506	385	1109	1503	294	769			689		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	97	99	99	100			99		
cM capacity (veh/h)	156	117	619	157	117	685	841			872		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	8	12	377	387	393	387						
Volume Left	1	5	1	0	11	0						
Volume Right	5	5	0	11	0	5						
cSH	304	231	841	1700	872	1700						
Volume to Capacity	0.03	0.05	0.00	0.23	0.01	0.23						
Queue Length 95th (ft)	2	4	0	0	1	0						
Control Delay (s)	17.2	21.5	0.0	0.0	0.4	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	17.2	21.5	0.0		0.2							
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.4									
Intersection Capacity Utilization			36.4%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

180: W Grant St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	10	1	20	1	680	10	20	695	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	1	5	11	1	22	1	739	11	22	755	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)								1126				
pX, platoon unblocked												
vC, conflicting volume	1196	1554	380	1174	1551	375	761			750		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1196	1554	380	1174	1551	375	761			750		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	92	99	96	100			97		
cM capacity (veh/h)	135	111	623	138	106	614	847			855		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	8	34	371	380	399	383						
Volume Left	1	11	1	0	22	0						
Volume Right	5	22	0	11	0	5						
cSH	287	271	847	1700	855	1700						
Volume to Capacity	0.03	0.12	0.00	0.22	0.03	0.23						
Queue Length 95th (ft)	2	10	0	0	2	0						
Control Delay (s)	17.9	20.1	0.0	0.0	0.8	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	17.9	20.1	0.0		0.4							
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.7									
Intersection Capacity Utilization			44.0%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

190: W Harrison St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	1	5	5	1	15	5	685	10	15	710	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	1	5	5	1	16	5	745	11	16	772	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1210	1576	391	1185	1576	378	783			755		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1210	1576	391	1185	1576	378	783			755		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	99	99	96	99	97	99			98		
cM capacity (veh/h)	133	108	613	141	108	626	831			844		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	12	23	378	383	402	397						
Volume Left	5	5	5	0	16	0						
Volume Right	5	16	0	11	0	11						
cSH	200	306	831	1700	844	1700						
Volume to Capacity	0.06	0.07	0.01	0.23	0.02	0.23						
Queue Length 95th (ft)	5	6	0	0	1	0						
Control Delay (s)	24.1	17.7	0.2	0.0	0.6	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	24.1	17.7	0.1		0.3							
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.6									
Intersection Capacity Utilization			40.7%		ICU Level of Service		A					
Analysis Period (min)			15									

Appendix C
Peak Hour Analysis Outputs
No Improvements

Year 2017 Projected Traffic

Year 2037 Projected Traffic

HCM Signalized Intersection Capacity Analysis

120: W Arnold St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	35	35	10	130	25	25	470	5	10	440	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1881	1599	1752	1801		1687	3368		1656	3301	
Flt Permitted	0.53	1.00	1.00	0.73	1.00		0.46	1.00		0.45	1.00	
Satd. Flow (perm)	1001	1881	1599	1348	1801		823	3368		786	3301	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	51	40	40	11	148	28	28	534	6	11	500	11
RTOR Reduction (vph)	0	0	33	0	11	0	0	1	0	0	1	0
Lane Group Flow (vph)	51	40	7	11	165	0	28	539	0	11	510	0
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	7%	7%	7%	9%	9%	9%
Turn Type	Perm		Perm	Perm			Perm			Perm		
Protected Phases	4				8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	16.7	16.7	16.7	16.7	16.7		63.3	63.3		63.3	63.3	
Effective Green, g (s)	16.7	16.7	16.7	16.7	16.7		63.3	63.3		63.3	63.3	
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.19		0.70	0.70		0.70	0.70	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	186	349	297	250	334		579	2369		553	2322	
v/s Ratio Prot		0.02			c0.09			c0.16			0.15	
v/s Ratio Perm	0.05		0.00	0.01			0.03			0.01		
v/c Ratio	0.27	0.11	0.02	0.04	0.50		0.05	0.23		0.02	0.22	
Uniform Delay, d1	31.4	30.5	30.0	30.1	32.9		4.1	4.7		4.0	4.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.99	1.16	
Incremental Delay, d2	1.7	0.3	0.1	0.2	2.4		0.2	0.2		0.0	0.1	
Delay (s)	33.1	30.8	30.1	30.2	35.3		4.3	4.9		4.0	5.5	
Level of Service	C	C	C	C	D		A	A		A	A	
Approach Delay (s)		31.5			35.0			4.9			5.5	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM Average Control Delay			11.6	HCM Level of Service				B				
HCM Volume to Capacity ratio			0.28									
Actuated Cycle Length (s)			90.0	Sum of lost time (s)				10.0				
Intersection Capacity Utilization			58.3%	ICU Level of Service				B				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

130: W Blodgett St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	10	30	5	35	35	25	505	10	10	425	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	13	13	39	6	45	45	32	656	13	13	552	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								373			726	
pX, platoon unblocked	0.97	0.97		0.97	0.97	0.97				0.97		
vC, conflicting volume	1040	1312	277	1075	1306	334	553			669		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	982	1263	277	1019	1257	257	553			601		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	91	92	95	96	70	94	97			99		
cM capacity (veh/h)	140	159	727	156	154	713	986			919		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	65	97	360	341	289	277						
Volume Left	13	6	32	0	13	0						
Volume Right	39	45	0	13	0	1						
cSH	284	243	986	1700	919	1700						
Volume to Capacity	0.23	0.40	0.03	0.20	0.01	0.16						
Queue Length 95th (ft)	22	46	3	0	1	0						
Control Delay (s)	21.4	29.5	1.1	0.0	0.5	0.0						
Lane LOS	C	D	A		A							
Approach Delay (s)	21.4	29.5	0.6		0.3							
Approach LOS	C	D										
Intersection Summary												
Average Delay			3.4									
Intersection Capacity Utilization			43.0%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

140: W Cleveland St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	1	30	1	5	1	15	535	1	15	405	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	6	1	37	1	6	1	18	652	1	18	494	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)								750			349	
pX, platoon unblocked	0.96	0.96	0.96	0.96	0.96		0.96					
vC, conflicting volume	901	1224	250	1010	1226	327	500			654		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	812	1149	134	926	1151	327	394			654		
tC, single (s)	7.6	6.6	7.0	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	98	99	96	99	97	100	98			98		
cM capacity (veh/h)	244	181	851	201	184	675	1100			903		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	44	9	345	327	265	253						
Volume Left	6	1	18	0	18	0						
Volume Right	37	1	0	1	0	6						
cSH	588	209	1100	1700	903	1700						
Volume to Capacity	0.07	0.04	0.02	0.19	0.02	0.15						
Queue Length 95th (ft)	6	3	1	0	2	0						
Control Delay (s)	11.6	23.0	0.6	0.0	0.8	0.0						
Lane LOS	B	C	A		A							
Approach Delay (s)	11.6	23.0	0.3		0.4							
Approach LOS	B	C										
Intersection Summary												
Average Delay			0.9									
Intersection Capacity Utilization			35.6%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

150: W Doege St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	190	25	25	225	45	90	425	25	15	375	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	5.2		5.2	5.2			5.2			5.2	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frt	1.00	0.98		1.00	0.97			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			1.00	
Satd. Flow (prot)	1752	1812		1752	1798			3323			3412	
Flt Permitted	0.36	1.00		0.46	1.00			0.77			0.92	
Satd. Flow (perm)	662	1812		851	1798			2582			3147	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	49	235	31	31	278	56	111	525	31	19	463	19
RTOR Reduction (vph)	0	6	0	0	8	0	0	4	0	0	3	0
Lane Group Flow (vph)	49	260	0	31	326	0	0	663	0	0	498	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	7%	7%	7%	5%	5%	5%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	26.1	26.1		26.1	26.1			53.5			53.5	
Effective Green, g (s)	26.1	26.1		26.1	26.1			53.5			53.5	
Actuated g/C Ratio	0.29	0.29		0.29	0.29			0.59			0.59	
Clearance Time (s)	5.2	5.2		5.2	5.2			5.2			5.2	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	192	525		247	521			1535			1871	
v/s Ratio Prot		0.14			c0.18							
v/s Ratio Perm	0.07			0.04				c0.26			0.16	
v/c Ratio	0.26	0.50		0.13	0.63			0.43			0.27	
Uniform Delay, d1	24.5	26.5		23.5	27.7			10.0			8.8	
Progression Factor	1.00	1.00		1.00	1.00			1.08			1.00	
Incremental Delay, d2	1.5	1.5		0.5	3.3			0.9			0.3	
Delay (s)	26.0	28.0		24.0	31.0			11.6			9.1	
Level of Service	C	C		C	C			B			A	
Approach Delay (s)		27.7			30.4			11.6			9.1	
Approach LOS		C			C			B			A	
Intersection Summary												
HCM Average Control Delay			17.4			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			10.4			
Intersection Capacity Utilization			102.9%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

160: W Edison St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	5	20	1	5	10	35	470	5	10	385	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	6	6	25	1	6	12	44	588	6	12	481	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								380				
pX, platoon unblocked	0.95	0.95		0.95	0.95	0.95				0.95		
vC, conflicting volume	909	1194	247	972	1197	297	494			594		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	804	1103	247	870	1106	161	494			472		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.2			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	97	97	97	99	97	98	96			99		
cM capacity (veh/h)	243	192	759	206	183	803	1038			994		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	38	20	338	300	253	253						
Volume Left	6	1	44	0	12	0						
Volume Right	25	12	0	6	0	12						
cSH	411	358	1038	1700	994	1700						
Volume to Capacity	0.09	0.06	0.04	0.18	0.01	0.15						
Queue Length 95th (ft)	7	4	3	0	1	0						
Control Delay (s)	14.6	15.6	1.5	0.0	0.5	0.0						
Lane LOS	B	C	A		A							
Approach Delay (s)	14.6	15.6	0.8		0.3							
Approach LOS	B	C										
Intersection Summary												
Average Delay			1.3									
Intersection Capacity Utilization			38.8%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

170: W Franklin St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	1	1	10	1	480	5	5	400	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	1	1	6	1	1	12	1	585	6	6	488	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								749				
pX, platoon unblocked												
vC, conflicting volume	809	1095	245	854	1092	296	489			591		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	809	1095	245	854	1092	296	489			591		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	100	99	99	100	99	98	100			99		
cM capacity (veh/h)	268	214	762	251	215	707	1043			940		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	9	15	294	299	250	245						
Volume Left	1	1	1	0	6	0						
Volume Right	6	12	0	6	0	1						
cSH	468	526	1043	1700	940	1700						
Volume to Capacity	0.02	0.03	0.00	0.18	0.01	0.14						
Queue Length 95th (ft)	1	2	0	0	0	0						
Control Delay (s)	12.8	12.0	0.0	0.0	0.3	0.0						
Lane LOS	B	B	A		A							
Approach Delay (s)	12.8	12.0	0.0		0.1							
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			24.6%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

180: W Grant St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	1	10	5	25	1	485	5	10	395	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	1	1	1	12	6	31	1	599	6	12	488	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								1126				
pX, platoon unblocked												
vC, conflicting volume	849	1120	244	875	1118	302	489			605		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	849	1120	244	875	1118	302	489			605		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	99	99	100	95	97	96	100			99		
cM capacity (veh/h)	238	205	762	243	206	700	1050			942		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	4	49	301	306	256	245						
Volume Left	1	12	1	0	12	0						
Volume Right	1	31	0	6	0	1						
cSH	289	395	1050	1700	942	1700						
Volume to Capacity	0.01	0.12	0.00	0.18	0.01	0.14						
Queue Length 95th (ft)	1	11	0	0	1	0						
Control Delay (s)	17.6	15.4	0.0	0.0	0.6	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	17.6	15.4	0.0		0.3							
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.8									
Intersection Capacity Utilization			28.1%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

190: W Harrison St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	1	1	5	5	505	1	5	400	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	1	1	6	1	1	6	6	616	1	6	488	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	833	1135	250	891	1141	309	500			617		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	833	1135	250	891	1141	309	500			617		
tC, single (s)	7.5	6.5	6.9	7.8	6.8	7.2	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.2			2.3		
p0 queue free %	100	99	99	99	99	99	99			99		
cM capacity (veh/h)	258	201	756	214	180	653	1040			932		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	9	9	314	309	250	256						
Volume Left	1	1	6	0	6	0						
Volume Right	6	6	0	1	0	12						
cSH	453	391	1040	1700	932	1700						
Volume to Capacity	0.02	0.02	0.01	0.18	0.01	0.15						
Queue Length 95th (ft)	1	2	0	0	0	0						
Control Delay (s)	13.1	14.4	0.2	0.0	0.3	0.0						
Lane LOS	B	B	A		A							
Approach Delay (s)	13.1	14.4	0.1		0.1							
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			27.5%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

120: W Arnold St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	70	40	20	95	40	50	620	20	35	780	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1787	1797		1787	3557		1770	3517	
Flt Permitted	0.59	1.00	1.00	0.71	1.00		0.30	1.00		0.37	1.00	
Satd. Flow (perm)	1104	1863	1583	1330	1797		560	3557		698	3517	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	60	77	44	22	104	44	55	681	22	38	857	38
RTOR Reduction (vph)	0	0	36	0	21	0	0	2	0	0	2	0
Lane Group Flow (vph)	60	77	8	22	127	0	55	701	0	38	893	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Perm		Perm	Perm			Perm		Perm			
Protected Phases	4				8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	15.7	15.7	15.7	15.7	15.7		64.3	64.3		64.3	64.3	
Effective Green, g (s)	15.7	15.7	15.7	15.7	15.7		64.3	64.3		64.3	64.3	
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.17		0.71	0.71		0.71	0.71	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	193	325	276	232	313		400	2541		499	2513	
v/s Ratio Prot		0.04			c0.07			0.20			c0.25	
v/s Ratio Perm	0.05		0.00	0.02			0.10			0.05		
v/c Ratio	0.31	0.24	0.03	0.09	0.40		0.14	0.28		0.08	0.36	
Uniform Delay, d1	32.4	32.0	30.8	31.2	33.0		4.1	4.6		3.9	4.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.79	0.75	
Incremental Delay, d2	1.9	0.8	0.1	0.4	1.8		0.7	0.3		0.1	0.2	
Delay (s)	34.4	32.8	30.9	31.6	34.8		4.8	4.8		3.2	3.8	
Level of Service	C	C	C	C	C		A	A		A	A	
Approach Delay (s)		32.8			34.4			4.8			3.8	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM Average Control Delay			9.3		HCM Level of Service				A			
HCM Volume to Capacity ratio			0.36									
Actuated Cycle Length (s)			90.0		Sum of lost time (s)				10.0			
Intersection Capacity Utilization			76.8%		ICU Level of Service				D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

130: W Blodgett St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	10	35	10	5	25	10	700	5	25	805	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	5	10	36	10	5	26	10	714	5	26	821	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								373			726	
pX, platoon unblocked	0.97	0.97	0.95	0.97	0.97	0.96	0.95			0.96		
vC, conflicting volume	1281	1615	413	1240	1615	360	827			719		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1026	1371	271	984	1371	241	707			616		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	93	95	94	96	97	99			97		
cM capacity (veh/h)	169	137	695	173	137	733	847			918		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	51	41	367	362	436	416						
Volume Left	5	10	10	0	26	0						
Volume Right	36	26	0	5	0	5						
cSH	327	312	847	1700	918	1700						
Volume to Capacity	0.16	0.13	0.01	0.21	0.03	0.24						
Queue Length 95th (ft)	14	11	1	0	2	0						
Control Delay (s)	18.0	18.3	0.4	0.0	0.8	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	18.0	18.3	0.2		0.4							
Approach LOS	C	C										
Intersection Summary												
Average Delay			1.3									
Intersection Capacity Utilization			51.8%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

140: W Cleveland St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	5	25	1	1	5	15	710	5	5	810	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	1	5	27	1	1	5	16	763	5	5	871	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								750			349	
pX, platoon unblocked	0.89	0.89	0.89	0.89	0.89		0.89					
vC, conflicting volume	1307	1688	441	1274	1691	384	882			769		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1102	1530	131	1065	1533	384	626			769		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	95	97	99	99	99	98			99		
cM capacity (veh/h)	145	103	803	146	102	620	849			841		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	33	8	398	387	441	446						
Volume Left	1	1	16	0	5	0						
Volume Right	27	5	0	5	0	11						
cSH	358	283	849	1700	841	1700						
Volume to Capacity	0.09	0.03	0.02	0.23	0.01	0.26						
Queue Length 95th (ft)	8	2	1	0	0	0						
Control Delay (s)	16.1	18.0	0.6	0.0	0.2	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	16.1	18.0	0.3		0.1							
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.6									
Intersection Capacity Utilization			40.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

150: W Doege St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	205	95	30	60	50	25	660	30	30	700	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	5.2		5.2	5.2			5.2			5.2	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frt	1.00	0.95		1.00	0.93			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1805	1810		1787	1752			3511			3530	
Flt Permitted	0.68	1.00		0.39	1.00			0.91			0.90	
Satd. Flow (perm)	1296	1810		732	1752			3193			3192	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	216	100	32	63	53	26	695	32	32	737	58
RTOR Reduction (vph)	0	20	0	0	35	0	0	3	0	0	6	0
Lane Group Flow (vph)	53	296	0	32	81	0	0	750	0	0	821	0
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	2%	2%	2%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	26.4	26.4		26.4	26.4			53.2			53.2	
Effective Green, g (s)	26.4	26.4		26.4	26.4			53.2			53.2	
Actuated g/C Ratio	0.29	0.29		0.29	0.29			0.59			0.59	
Clearance Time (s)	5.2	5.2		5.2	5.2			5.2			5.2	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	380	531		215	514			1887			1887	
v/s Ratio Prot		c0.16			0.05							
v/s Ratio Perm	0.04			0.04				0.23			c0.26	
v/c Ratio	0.14	0.56		0.15	0.16			0.40			0.44	
Uniform Delay, d1	23.4	26.9		23.5	23.6			9.8			10.1	
Progression Factor	1.00	1.00		1.00	1.00			0.86			1.00	
Incremental Delay, d2	0.4	2.2		0.7	0.3			0.6			0.7	
Delay (s)	23.8	29.0		24.2	23.9			9.0			10.9	
Level of Service	C	C		C	C			A			B	
Approach Delay (s)		28.3			23.9			9.0			10.9	
Approach LOS		C			C			A			B	
Intersection Summary												
HCM Average Control Delay			14.2			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			10.4			
Intersection Capacity Utilization			76.9%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

160: W Edison St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	5	50	1	1	5	10	740	10	15	735	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	54	1	1	5	11	804	11	16	799	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								380				
pX, platoon unblocked	0.91	0.91		0.91	0.91	0.91				0.91		
vC, conflicting volume	1267	1674	405	1321	1674	408	810			815		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1087	1536	405	1146	1536	138	810			588		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	95	91	99	99	99	99			98		
cM capacity (veh/h)	151	103	601	121	103	808	812			891		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	65	8	413	413	416	410						
Volume Left	5	1	11	0	16	0						
Volume Right	54	5	0	11	0	11						
cSH	364	289	812	1700	891	1700						
Volume to Capacity	0.18	0.03	0.01	0.24	0.02	0.24						
Queue Length 95th (ft)	16	2	1	0	1	0						
Control Delay (s)	17.0	17.8	0.4	0.0	0.6	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	17.0	17.8	0.2		0.3							
Approach LOS	C	C										
Intersection Summary												
Average Delay			1.0									
Intersection Capacity Utilization			42.3%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

170: W Franklin St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	5	1	5	1	740	10	10	750	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	1	1	5	5	1	5	1	813	11	11	824	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								749				
pX, platoon unblocked	0.95	0.95		0.95	0.95	0.95				0.95		
vC, conflicting volume	1264	1675	415	1261	1673	412	830			824		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1174	1607	415	1171	1604	278	830			712		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	96	99	99	100			99		
cM capacity (veh/h)	138	99	592	139	100	689	798			840		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	8	12	408	418	423	418						
Volume Left	1	5	1	0	11	0						
Volume Right	5	5	0	11	0	5						
cSH	272	206	798	1700	840	1700						
Volume to Capacity	0.03	0.06	0.00	0.25	0.01	0.25						
Queue Length 95th (ft)	2	5	0	0	1	0						
Control Delay (s)	18.6	23.5	0.0	0.0	0.4	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	18.6	23.5	0.0		0.2							
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.4									
Intersection Capacity Utilization			38.0%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

180: W Grant St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	10	1	20	1	735	10	20	750	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	1	5	11	1	22	1	799	11	22	815	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								1126				
pX, platoon unblocked												
vC, conflicting volume	1285	1673	410	1264	1671	405	821			810		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1285	1673	410	1264	1671	405	821			810		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	91	99	96	100			97		
cM capacity (veh/h)	116	94	596	118	90	587	804			812		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	8	34	401	410	429	413						
Volume Left	1	11	1	0	22	0						
Volume Right	5	22	0	11	0	5						
cSH	253	239	804	1700	812	1700						
Volume to Capacity	0.03	0.14	0.00	0.24	0.03	0.24						
Queue Length 95th (ft)	2	12	0	0	2	0						
Control Delay (s)	19.7	22.5	0.0	0.0	0.8	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	19.7	22.5	0.0		0.4							
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.7									
Intersection Capacity Utilization			45.5%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

190: W Harrison St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	1	5	5	1	15	5	740	10	15	765	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	1	5	5	1	16	5	804	11	16	832	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1299	1696	421	1275	1696	408	842			815		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1299	1696	421	1275	1696	408	842			815		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	99	99	96	99	97	99			98		
cM capacity (veh/h)	114	91	587	121	91	599	789			802		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	12	23	408	413	432	427						
Volume Left	5	5	5	0	16	0						
Volume Right	5	16	0	11	0	11						
cSH	174	272	789	1700	802	1700						
Volume to Capacity	0.07	0.08	0.01	0.24	0.02	0.25						
Queue Length 95th (ft)	5	7	1	0	2	0						
Control Delay (s)	27.3	19.5	0.2	0.0	0.6	0.0						
Lane LOS	D	C	A		A							
Approach Delay (s)	27.3	19.5	0.1		0.3							
Approach LOS	D	C										
Intersection Summary												
Average Delay			0.7									
Intersection Capacity Utilization			42.2%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

120: W Arnold St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	40	40	15	165	35	35	600	5	15	550	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1881	1599	1752	1796		1687	3369		1656	3299	
Flt Permitted	0.44	1.00	1.00	0.73	1.00		0.40	1.00		0.38	1.00	
Satd. Flow (perm)	831	1881	1599	1342	1796		705	3369		655	3299	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	62	45	45	17	188	40	40	682	6	17	625	17
RTOR Reduction (vph)	0	0	36	0	12	0	0	0	0	0	1	0
Lane Group Flow (vph)	62	45	9	17	216	0	40	688	0	17	641	0
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	7%	7%	7%	9%	9%	9%
Turn Type	Perm		Perm	Perm			Perm			Perm		
Protected Phases	4				8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	18.8	18.8	18.8	18.8	18.8		61.2	61.2		61.2	61.2	
Effective Green, g (s)	18.8	18.8	18.8	18.8	18.8		61.2	61.2		61.2	61.2	
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21		0.68	0.68		0.68	0.68	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	174	393	334	280	375		479	2291		445	2243	
v/s Ratio Prot		0.02			c0.12			c0.20			0.19	
v/s Ratio Perm	0.07		0.01	0.01			0.06			0.03		
v/c Ratio	0.36	0.11	0.03	0.06	0.58		0.08	0.30		0.04	0.29	
Uniform Delay, d1	30.4	28.9	28.3	28.5	32.0		4.9	5.8		4.7	5.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.03	1.17	
Incremental Delay, d2	2.6	0.3	0.1	0.2	3.4		0.3	0.3		0.1	0.1	
Delay (s)	33.0	29.1	28.4	28.7	35.4		5.2	6.1		4.9	6.9	
Level of Service	C	C	C	C	D		A	A		A	A	
Approach Delay (s)		30.5			35.0			6.1			6.8	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM Average Control Delay			12.4	HCM Level of Service					B			
HCM Volume to Capacity ratio			0.37									
Actuated Cycle Length (s)			90.0	Sum of lost time (s)					10.0			
Intersection Capacity Utilization			66.6%	ICU Level of Service					C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

130: W Blodgett St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	15	35	5	45	40	35	645	10	15	540	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	19	19	45	6	58	52	45	838	13	19	701	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								373			726	
pX, platoon unblocked	0.94	0.94	0.99	0.94	0.94	0.94	0.99			0.94		
vC, conflicting volume	1332	1682	351	1380	1677	425	703			851		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1185	1558	329	1236	1552	249	683			704		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	68	80	93	93	39	93	95			98		
cM capacity (veh/h)	62	99	667	91	95	694	872			808		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	84	117	464	432	370	352						
Volume Left	19	6	45	0	19	0						
Volume Right	45	52	0	13	0	1						
cSH	145	154	872	1700	808	1700						
Volume to Capacity	0.58	0.76	0.05	0.25	0.02	0.21						
Queue Length 95th (ft)	75	118	4	0	2	0						
Control Delay (s)	59.4	79.2	1.5	0.0	0.8	0.0						
Lane LOS	F	F	A		A							
Approach Delay (s)	59.4	79.2	0.8		0.4							
Approach LOS	F	F										
Intersection Summary												
Average Delay			8.4									
Intersection Capacity Utilization			53.5%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

140: W Cleveland St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	1	40	1	5	1	20	680	1	20	515	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	6	1	49	1	6	1	24	829	1	24	628	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								750			349	
pX, platoon unblocked	0.93	0.93	0.93	0.93	0.93		0.93					
vC, conflicting volume	1148	1559	317	1291	1562	415	634			830		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1008	1451	115	1162	1453	415	456			830		
tC, single (s)	7.6	6.6	7.0	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	96	99	94	99	95	100	98			97		
cM capacity (veh/h)	165	113	848	127	116	592	1011			772		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	56	9	439	416	338	320						
Volume Left	6	1	24	0	24	0						
Volume Right	49	1	0	1	0	6						
cSH	533	133	1011	1700	772	1700						
Volume to Capacity	0.11	0.06	0.02	0.24	0.03	0.19						
Queue Length 95th (ft)	9	5	2	0	2	0						
Control Delay (s)	12.5	34.0	0.7	0.0	1.1	0.0						
Lane LOS	B	D	A		A							
Approach Delay (s)	12.5	34.0	0.4		0.5							
Approach LOS	B	D										
Intersection Summary												
Average Delay			1.1									
Intersection Capacity Utilization			43.4%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

150: W Doege St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	245	30	35	285	60	115	535	35	20	475	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	5.2		5.2	5.2			5.2			5.2	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frt	1.00	0.98		1.00	0.97			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			1.00	
Satd. Flow (prot)	1752	1814		1752	1797			3320			3411	
Flt Permitted	0.23	1.00		0.36	1.00			0.70			0.90	
Satd. Flow (perm)	427	1814		655	1797			2357			3085	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	56	302	37	43	352	74	142	660	43	25	586	25
RTOR Reduction (vph)	0	5	0	0	8	0	0	4	0	0	3	0
Lane Group Flow (vph)	56	334	0	43	418	0	0	841	0	0	633	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	7%	7%	7%	5%	5%	5%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	26.4	26.4		26.4	26.4			53.2			53.2	
Effective Green, g (s)	26.4	26.4		26.4	26.4			53.2			53.2	
Actuated g/C Ratio	0.29	0.29		0.29	0.29			0.59			0.59	
Clearance Time (s)	5.2	5.2		5.2	5.2			5.2			5.2	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	125	532		192	527			1393			1824	
v/s Ratio Prot		0.18			c0.23							
v/s Ratio Perm	0.13			0.07				c0.36			0.21	
v/c Ratio	0.45	0.63		0.22	0.79			0.60			0.35	
Uniform Delay, d1	25.9	27.5		24.1	29.3			11.7			9.5	
Progression Factor	1.00	1.00		1.00	1.00			1.08			1.00	
Incremental Delay, d2	5.3	3.3		1.2	9.1			1.9			0.5	
Delay (s)	31.1	30.8		25.3	38.4			14.6			10.0	
Level of Service	C	C		C	D			B			A	
Approach Delay (s)		30.9			37.2			14.6			10.0	
Approach LOS		C			D			B			A	
Intersection Summary												
HCM Average Control Delay			20.6			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			10.4			
Intersection Capacity Utilization			107.1%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

160: W Edison St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	5	30	1	5	15	40	595	5	15	485	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	6	6	38	1	6	19	50	744	6	19	606	19
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)								380				
pX, platoon unblocked	0.91	0.91		0.91	0.91	0.91				0.91		
vC, conflicting volume	1147	1503	312	1228	1509	375	625			750		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	967	1358	312	1056	1365	120	625			532		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.2			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	96	95	95	99	95	98	95			98		
cM capacity (veh/h)	171	127	689	136	119	817	926			904		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	50	26	422	378	322	322						
Volume Left	6	1	50	0	19	0						
Volume Right	38	19	0	6	0	19						
cSH	356	311	926	1700	904	1700						
Volume to Capacity	0.14	0.08	0.05	0.22	0.02	0.19						
Queue Length 95th (ft)	12	7	4	0	2	0						
Control Delay (s)	16.7	17.7	1.6	0.0	0.7	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	16.7	17.7	0.9		0.4							
Approach LOS	C	C										
Intersection Summary												
Average Delay			1.5									
Intersection Capacity Utilization			46.3%	ICU Level of Service						A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

170: W Franklin St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	1	1	10	1	610	5	5	510	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	1	1	6	1	1	12	1	744	6	6	622	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)								749				
pX, platoon unblocked												
vC, conflicting volume	1022	1387	312	1079	1385	375	623			750		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1022	1387	312	1079	1385	375	623			750		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	99	99	99	99	99	98	100			99		
cM capacity (veh/h)	187	143	690	171	143	628	927			817		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	9	15	373	378	317	312						
Volume Left	1	1	1	0	6	0						
Volume Right	6	12	0	6	0	1						
cSH	357	418	927	1700	817	1700						
Volume to Capacity	0.02	0.04	0.00	0.22	0.01	0.18						
Queue Length 95th (ft)	2	3	0	0	1	0						
Control Delay (s)	15.3	13.9	0.0	0.0	0.3	0.0						
Lane LOS	C	B	A		A							
Approach Delay (s)	15.3	13.9	0.0		0.1							
Approach LOS	C	B										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			27.7%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

180: W Grant St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	1	15	5	35	1	615	5	15	500	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	1	1	1	19	6	43	1	759	6	19	617	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								1126				
pX, platoon unblocked												
vC, conflicting volume	1083	1423	309	1112	1420	383	619			765		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1083	1423	309	1112	1420	383	619			765		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	99	99	100	89	95	93	100			98		
cM capacity (veh/h)	153	134	693	161	134	621	938			818		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	4	68	381	386	327	310						
Volume Left	1	19	1	0	19	0						
Volume Right	1	43	0	6	0	1						
cSH	195	295	938	1700	818	1700						
Volume to Capacity	0.02	0.23	0.00	0.23	0.02	0.18						
Queue Length 95th (ft)	1	22	0	0	2	0						
Control Delay (s)	23.9	20.8	0.0	0.0	0.8	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	23.9	20.8	0.0		0.4							
Approach LOS	C	C										
Intersection Summary												
Average Delay			1.2									
Intersection Capacity Utilization			35.4%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

190: W Harrison St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	1	1	5	5	645	1	5	510	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	1	1	6	1	1	6	6	787	1	6	622	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1055	1443	320	1129	1452	394	640			788		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1055	1443	320	1129	1452	394	640			788		
tC, single (s)	7.5	6.5	6.9	7.8	6.8	7.2	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.2			2.3		
p0 queue free %	99	99	99	99	99	99	99			99		
cM capacity (veh/h)	177	132	682	141	115	572	920			802		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	9	9	399	395	317	329						
Volume Left	1	1	6	0	6	0						
Volume Right	6	6	0	1	0	18						
cSH	340	285	920	1700	802	1700						
Volume to Capacity	0.03	0.03	0.01	0.23	0.01	0.19						
Queue Length 95th (ft)	2	2	1	0	1	0						
Control Delay (s)	15.9	18.0	0.2	0.0	0.3	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	15.9	18.0	0.1		0.1							
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			31.4%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

120: W Arnold St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	90	50	30	120	50	60	785	30	40	985	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1787	1798		1787	3555		1770	3518	
Flt Permitted	0.51	1.00	1.00	0.69	1.00		0.22	1.00		0.29	1.00	
Satd. Flow (perm)	947	1863	1583	1304	1798		414	3555		549	3518	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	77	99	55	33	132	55	66	863	33	44	1082	44
RTOR Reduction (vph)	0	0	45	0	20	0	0	2	0	0	2	0
Lane Group Flow (vph)	77	99	10	33	167	0	66	894	0	44	1124	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Perm		Perm	Perm			Perm			Perm		
Protected Phases	4				8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	16.9	16.9	16.9	16.9	16.9		63.1	63.1		63.1	63.1	
Effective Green, g (s)	16.9	16.9	16.9	16.9	16.9		63.1	63.1		63.1	63.1	
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.19		0.70	0.70		0.70	0.70	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	178	350	297	245	338		290	2492		385	2467	
v/s Ratio Prot		0.05			c0.09			0.25			c0.32	
v/s Ratio Perm	0.08		0.01	0.03			0.16			0.08		
v/c Ratio	0.43	0.28	0.03	0.13	0.49		0.23	0.36		0.11	0.46	
Uniform Delay, d1	32.3	31.4	29.9	30.5	32.7		4.8	5.4		4.4	5.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.74	0.68	
Incremental Delay, d2	3.5	0.9	0.1	0.5	2.4		1.8	0.4		0.2	0.3	
Delay (s)	35.8	32.3	30.0	31.0	35.1		6.6	5.8		3.5	4.3	
Level of Service	D	C	C	C	D		A	A		A	A	
Approach Delay (s)		32.9			34.5			5.8			4.3	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM Average Control Delay			10.0	HCM Level of Service					A			
HCM Volume to Capacity ratio			0.46									
Actuated Cycle Length (s)			90.0	Sum of lost time (s)					10.0			
Intersection Capacity Utilization			82.7%	ICU Level of Service					E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

130: W Blodgett St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	15	45	15	5	35	15	885	5	35	1005	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	5	15	46	15	5	36	15	903	5	36	1026	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								373			726	
pX, platoon unblocked	0.93	0.93	0.88	0.93	0.93	0.92	0.88			0.92		
vC, conflicting volume	1620	2038	515	1574	2038	454	1031			908		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1113	1565	192	1064	1565	228	775			723		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	84	94	88	95	95	98			96		
cM capacity (veh/h)	133	97	728	131	97	717	746			804		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	66	56	467	457	548	518						
Volume Left	5	15	15	0	36	0						
Volume Right	46	36	0	5	0	5						
cSH	257	256	746	1700	804	1700						
Volume to Capacity	0.26	0.22	0.02	0.27	0.04	0.30						
Queue Length 95th (ft)	25	20	2	0	3	0						
Control Delay (s)	23.8	23.0	0.6	0.0	1.2	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	23.8	23.0	0.3		0.6							
Approach LOS	C	C										
Intersection Summary												
Average Delay			1.8									
Intersection Capacity Utilization			67.6%		ICU Level of Service				C			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

140: W Cleveland St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	5	35	1	1	5	20	900	5	5	1010	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	1	5	38	1	1	5	22	968	5	5	1086	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								750			349	
pX, platoon unblocked	0.85	0.85	0.84	0.85	0.85	0.97	0.84			0.97		
vC, conflicting volume	1638	2121	551	1608	2126	487	1102			973		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1251	1817	85	1216	1823	410	741			912		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	92	95	99	98	99	97			99		
cM capacity (veh/h)	107	65	809	103	64	579	724			721		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	44	8	505	489	548	559						
Volume Left	1	1	22	0	5	0						
Volume Right	38	5	0	5	0	16						
cSH	316	207	724	1700	721	1700						
Volume to Capacity	0.14	0.04	0.03	0.29	0.01	0.33						
Queue Length 95th (ft)	12	3	2	0	1	0						
Control Delay (s)	18.2	23.1	0.8	0.0	0.2	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	18.2	23.1	0.4		0.1							
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.7									
Intersection Capacity Utilization			49.3%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

150: W Doege St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	265	125	40	80	60	30	835	40	40	865	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	5.2		5.2	5.2			5.2			5.2	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frt	1.00	0.95		1.00	0.94			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1805	1808		1787	1760			3510			3531	
Flt Permitted	0.66	1.00		0.27	1.00			0.89			0.87	
Satd. Flow (perm)	1245	1808		512	1760			3125			3086	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	279	132	42	84	63	32	879	42	42	911	68
RTOR Reduction (vph)	0	19	0	0	31	0	0	3	0	0	6	0
Lane Group Flow (vph)	63	392	0	42	116	0	0	950	0	0	1015	0
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	2%	2%	2%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			4			2			2		
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	27.7	27.7		27.7	27.7			51.9			51.9	
Effective Green, g (s)	27.7	27.7		27.7	27.7			51.9			51.9	
Actuated g/C Ratio	0.31	0.31		0.31	0.31			0.58			0.58	
Clearance Time (s)	5.2	5.2		5.2	5.2			5.2			5.2	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	383	556		158	542			1802			1780	
v/s Ratio Prot	c0.22			0.07								
v/s Ratio Perm	0.05			0.08				0.30			c0.33	
v/c Ratio	0.16	0.70		0.27	0.21			0.53			0.57	
Uniform Delay, d1	22.7	27.5		23.5	23.1			11.6			12.0	
Progression Factor	1.00	1.00		1.00	1.00			0.82			1.00	
Incremental Delay, d2	0.4	5.1		1.9	0.4			1.1			1.3	
Delay (s)	23.1	32.6		25.4	23.5			10.5			13.4	
Level of Service	C	C		C	C			B			B	
Approach Delay (s)	31.3			23.9			10.5			13.4		
Approach LOS	C			C			B			B		
Intersection Summary												
HCM Average Control Delay			16.3	HCM Level of Service				B				
HCM Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			90.0	Sum of lost time (s)				10.4				
Intersection Capacity Utilization			111.0%	ICU Level of Service				H				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

160: W Edison St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	5	60	1	1	5	15	925	15	20	910	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	5	65	1	1	5	16	1005	16	22	989	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								380				
pX, platoon unblocked	0.85	0.85		0.85	0.85	0.85				0.85		
vC, conflicting volume	1582	2095	503	1652	2095	511	1005			1022		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1338	1940	503	1421	1940	83	1005			682		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	90	87	98	98	99	98			97		
cM capacity (veh/h)	91	54	519	65	54	824	685			774		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	82	8	519	519	516	511						
Volume Left	11	1	16	0	22	0						
Volume Right	65	5	0	16	0	16						
cSH	235	175	685	1700	774	1700						
Volume to Capacity	0.35	0.04	0.02	0.31	0.03	0.30						
Queue Length 95th (ft)	37	3	2	0	2	0						
Control Delay (s)	28.2	26.6	0.7	0.0	0.8	0.0						
Lane LOS	D	D	A		A							
Approach Delay (s)	28.2	26.6	0.3		0.4							
Approach LOS	D	D										
Intersection Summary												
Average Delay			1.5									
Intersection Capacity Utilization			52.5%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

170: W Franklin St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	5	1	5	1	925	15	15	935	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	1	1	5	5	1	5	1	1016	16	16	1027	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								749				
pX, platoon unblocked	0.89	0.89		0.89	0.89	0.89				0.89		
vC, conflicting volume	1580	2098	516	1580	2093	516	1033			1033		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1398	1983	516	1398	1977	199	1033			781		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	98	99	94	98	99	100			98		
cM capacity (veh/h)	87	54	509	87	54	723	668			738		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	8	12	509	525	530	519						
Volume Left	1	5	1	0	16	0						
Volume Right	5	5	0	16	0	5						
cSH	175	132	668	1700	738	1700						
Volume to Capacity	0.04	0.09	0.00	0.31	0.02	0.31						
Queue Length 95th (ft)	3	7	0	0	2	0						
Control Delay (s)	26.5	34.9	0.0	0.0	0.6	0.0						
Lane LOS	D	D	A		A							
Approach Delay (s)	26.5	34.9	0.0		0.3							
Approach LOS	D	D										
Intersection Summary												
Average Delay			0.5									
Intersection Capacity Utilization			46.6%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

180: W Grant St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	15	1	30	1	915	15	30	935	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	1	5	16	1	33	1	995	16	33	1016	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								1126				
pX, platoon unblocked	0.95	0.95		0.95	0.95	0.95				0.95		
vC, conflicting volume	1617	2097	511	1584	2092	505	1022			1011		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1540	2047	511	1505	2041	366	1022			900		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	98	99	77	98	94	100			95		
cM capacity (veh/h)	68	51	513	72	49	589	675			711		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	8	50	498	514	541	514						
Volume Left	1	16	1	0	33	0						
Volume Right	5	33	0	16	0	5						
cSH	159	165	675	1700	711	1700						
Volume to Capacity	0.05	0.30	0.00	0.30	0.05	0.30						
Queue Length 95th (ft)	4	30	0	0	4	0						
Control Delay (s)	28.8	36.1	0.0	0.0	1.3	0.0						
Lane LOS	D	E	A		A							
Approach Delay (s)	28.8	36.1	0.0		0.6							
Approach LOS	D	E										
Intersection Summary												
Average Delay			1.3									
Intersection Capacity Utilization			59.7%		ICU Level of Service				B			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

190: W Harrison St & STH 97

12/5/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	1	5	5	1	20	5	925	15	20	960	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	1	5	5	1	22	5	1005	16	22	1043	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1631	2128	530	1596	2128	511	1060			1022		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1631	2128	530	1596	2128	511	1060			1022		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	98	99	92	98	96	99			97		
cM capacity (veh/h)	63	48	499	69	48	513	653			669		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	12	28	508	519	543	538						
Volume Left	5	5	5	0	22	0						
Volume Right	5	22	0	16	0	16						
cSH	99	196	653	1700	669	1700						
Volume to Capacity	0.12	0.14	0.01	0.31	0.03	0.32						
Queue Length 95th (ft)	10	12	1	0	3	0						
Control Delay (s)	46.1	26.4	0.2	0.0	0.9	0.0						
Lane LOS	E	D	A		A							
Approach Delay (s)	46.1	26.4	0.1		0.5							
Approach LOS	E	D										
Intersection Summary												
Average Delay			0.9									
Intersection Capacity Utilization			51.3%		ICU Level of Service				A			
Analysis Period (min)			15									

Appendix D

Peak Hour Analysis Outputs

Optimized Traffic Signals

Year 2017 Projected Traffic

Year 2037 Projected Traffic

HCM Signalized Intersection Capacity Analysis

120: W Arnold St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	35	35	10	130	25	25	470	5	10	440	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1881	1599	1752	1801		1687	3368		1656	3301	
Flt Permitted	0.53	1.00	1.00	0.73	1.00		0.46	1.00		0.45	1.00	
Satd. Flow (perm)	1001	1881	1599	1348	1801		823	3368		786	3301	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	51	40	40	11	148	28	28	534	6	11	500	11
RTOR Reduction (vph)	0	0	33	0	10	0	0	1	0	0	1	0
Lane Group Flow (vph)	51	40	7	11	166	0	28	539	0	11	510	0
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	7%	7%	7%	9%	9%	9%
Turn Type	Perm		Perm	Perm			Perm			Perm		
Protected Phases	4				8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	16.7	16.7	16.7	16.7	16.7		63.3	63.3		63.3	63.3	
Effective Green, g (s)	16.7	16.7	16.7	16.7	16.7		63.3	63.3		63.3	63.3	
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.19		0.70	0.70		0.70	0.70	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	186	349	297	250	334		579	2369		553	2322	
v/s Ratio Prot		0.02			c0.09			c0.16			0.15	
v/s Ratio Perm	0.05		0.00	0.01			0.03			0.01		
v/c Ratio	0.27	0.11	0.02	0.04	0.50		0.05	0.23		0.02	0.22	
Uniform Delay, d1	31.4	30.5	30.0	30.1	32.9		4.1	4.7		4.0	4.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.90	0.89	
Incremental Delay, d2	1.7	0.3	0.1	0.2	2.4		0.2	0.2		0.0	0.1	
Delay (s)	33.1	30.8	30.1	30.2	35.3		4.3	4.9		3.6	4.3	
Level of Service	C	C	C	C	D		A	A		A	A	
Approach Delay (s)		31.5			35.0			4.9			4.3	
Approach LOS		C			D			A			A	
Intersection Summary												
HCM Average Control Delay			11.1			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.28									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			58.3%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

130: W Blodgett St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	10	30	5	35	35	25	505	10	10	425	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	13	13	39	6	45	45	32	656	13	13	552	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								373			726	
pX, platoon unblocked	0.97	0.97		0.97	0.97	0.97				0.97		
vC, conflicting volume	1040	1312	277	1075	1306	334	553			669		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	982	1263	277	1019	1257	257	553			601		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	91	92	95	96	70	94	97			99		
cM capacity (veh/h)	140	159	727	156	154	713	986			919		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	65	97	360	341	289	277						
Volume Left	13	6	32	0	13	0						
Volume Right	39	45	0	13	0	1						
cSH	284	243	986	1700	919	1700						
Volume to Capacity	0.23	0.40	0.03	0.20	0.01	0.16						
Queue Length 95th (ft)	22	46	3	0	1	0						
Control Delay (s)	21.4	29.5	1.1	0.0	0.5	0.0						
Lane LOS	C	D	A		A							
Approach Delay (s)	21.4	29.5	0.6		0.3							
Approach LOS	C	D										
Intersection Summary												
Average Delay			3.4									
Intersection Capacity Utilization			43.0%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

140: W Cleveland St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	1	30	1	5	1	15	535	1	15	405	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	6	1	37	1	6	1	18	652	1	18	494	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								750			349	
pX, platoon unblocked	0.95	0.95	0.95	0.95	0.95		0.95					
vC, conflicting volume	901	1224	250	1010	1226	327	500			654		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	798	1137	116	913	1140	327	378			654		
tC, single (s)	7.6	6.6	7.0	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	98	99	96	99	97	100	98			98		
cM capacity (veh/h)	248	183	869	205	186	675	1109			903		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	44	9	345	327	265	253						
Volume Left	6	1	18	0	18	0						
Volume Right	37	1	0	1	0	6						
cSH	599	211	1109	1700	903	1700						
Volume to Capacity	0.07	0.04	0.02	0.19	0.02	0.15						
Queue Length 95th (ft)	6	3	1	0	2	0						
Control Delay (s)	11.5	22.8	0.6	0.0	0.8	0.0						
Lane LOS	B	C	A		A							
Approach Delay (s)	11.5	22.8	0.3		0.4							
Approach LOS	B	C										
Intersection Summary												
Average Delay			0.9									
Intersection Capacity Utilization			35.6%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

150: W Doege St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	190	25	25	225	45	90	425	25	15	375	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	5.2		5.2	5.2			5.2			5.2	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frt	1.00	0.98		1.00	0.97			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			1.00	
Satd. Flow (prot)	1752	1812		1752	1798			3323			3412	
Flt Permitted	0.39	1.00		0.48	1.00			0.77			0.92	
Satd. Flow (perm)	715	1812		889	1798			2580			3146	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	49	235	31	31	278	56	111	525	31	19	463	19
RTOR Reduction (vph)	0	5	0	0	9	0	0	3	0	0	3	0
Lane Group Flow (vph)	49	261	0	31	325	0	0	664	0	0	498	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	7%	7%	7%	5%	5%	5%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	28.6	28.6		28.6	28.6			51.0			51.0	
Effective Green, g (s)	28.6	28.6		28.6	28.6			51.0			51.0	
Actuated g/C Ratio	0.32	0.32		0.32	0.32			0.57			0.57	
Clearance Time (s)	5.2	5.2		5.2	5.2			5.2			5.2	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	227	576		283	571			1462			1783	
v/s Ratio Prot		0.14			c0.18							
v/s Ratio Perm	0.07			0.03				c0.26			0.16	
v/c Ratio	0.22	0.45		0.11	0.57			0.45			0.28	
Uniform Delay, d1	22.5	24.5		21.7	25.6			11.4			10.0	
Progression Factor	1.00	1.00		1.00	1.00			0.81			1.00	
Incremental Delay, d2	1.0	1.2		0.4	2.1			1.0			0.4	
Delay (s)	23.5	25.6		22.1	27.7			10.2			10.4	
Level of Service	C	C		C	C			B			B	
Approach Delay (s)		25.3			27.2			10.2			10.4	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM Average Control Delay			16.2			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			10.4			
Intersection Capacity Utilization			102.9%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

160: W Edison St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	5	20	1	5	10	35	470	5	10	385	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	6	6	25	1	6	12	44	588	6	12	481	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)								380				
pX, platoon unblocked	0.94	0.94		0.94	0.94	0.94				0.94		
vC, conflicting volume	909	1194	247	972	1197	297	494			594		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	786	1087	247	852	1090	137	494			451		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.2			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	97	97	97	99	97	98	96			99		
cM capacity (veh/h)	249	195	759	211	185	825	1038			1005		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	38	20	338	300	253	253						
Volume Left	6	1	44	0	12	0						
Volume Right	25	12	0	6	0	12						
cSH	416	365	1038	1700	1005	1700						
Volume to Capacity	0.09	0.05	0.04	0.18	0.01	0.15						
Queue Length 95th (ft)	7	4	3	0	1	0						
Control Delay (s)	14.5	15.4	1.5	0.0	0.5	0.0						
Lane LOS	B	C	A		A							
Approach Delay (s)	14.5	15.4	0.8		0.3							
Approach LOS	B	C										
Intersection Summary												
Average Delay			1.2									
Intersection Capacity Utilization			38.8%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

170: W Franklin St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	1	1	10	1	480	5	5	400	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	1	1	6	1	1	12	1	585	6	6	488	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								749				
pX, platoon unblocked												
vC, conflicting volume	809	1095	245	854	1092	296	489			591		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	809	1095	245	854	1092	296	489			591		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	100	99	99	100	99	98	100			99		
cM capacity (veh/h)	268	214	762	251	215	707	1043			940		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	9	15	294	299	250	245						
Volume Left	1	1	1	0	6	0						
Volume Right	6	12	0	6	0	1						
cSH	468	526	1043	1700	940	1700						
Volume to Capacity	0.02	0.03	0.00	0.18	0.01	0.14						
Queue Length 95th (ft)	1	2	0	0	0	0						
Control Delay (s)	12.8	12.0	0.0	0.0	0.3	0.0						
Lane LOS	B	B	A		A							
Approach Delay (s)	12.8	12.0	0.0		0.1							
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			24.6%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

180: W Grant St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	1	10	5	25	1	485	5	10	395	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	1	1	1	12	6	31	1	599	6	12	488	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								1126				
pX, platoon unblocked												
vC, conflicting volume	849	1120	244	875	1118	302	489			605		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	849	1120	244	875	1118	302	489			605		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	99	99	100	95	97	96	100			99		
cM capacity (veh/h)	238	205	762	243	206	700	1050			942		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	4	49	301	306	256	245						
Volume Left	1	12	1	0	12	0						
Volume Right	1	31	0	6	0	1						
cSH	289	395	1050	1700	942	1700						
Volume to Capacity	0.01	0.12	0.00	0.18	0.01	0.14						
Queue Length 95th (ft)	1	11	0	0	1	0						
Control Delay (s)	17.6	15.4	0.0	0.0	0.6	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	17.6	15.4	0.0		0.3							
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.8									
Intersection Capacity Utilization			28.1%	ICU Level of Service				A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

190: W Harrison St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	1	1	5	5	505	1	5	400	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	1	1	6	1	1	6	6	616	1	6	488	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	833	1135	250	891	1141	309	500			617		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	833	1135	250	891	1141	309	500			617		
tC, single (s)	7.5	6.5	6.9	7.8	6.8	7.2	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.2			2.3		
p0 queue free %	100	99	99	99	99	99	99			99		
cM capacity (veh/h)	258	201	756	214	180	653	1040			932		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	9	9	314	309	250	256						
Volume Left	1	1	6	0	6	0						
Volume Right	6	6	0	1	0	12						
cSH	453	391	1040	1700	932	1700						
Volume to Capacity	0.02	0.02	0.01	0.18	0.01	0.15						
Queue Length 95th (ft)	1	2	0	0	0	0						
Control Delay (s)	13.1	14.4	0.2	0.0	0.3	0.0						
Lane LOS	B	B	A		A							
Approach Delay (s)	13.1	14.4	0.1		0.1							
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			27.5%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

120: W Arnold St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	70	40	20	95	40	50	620	20	35	780	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1787	1797		1787	3557		1770	3517	
Flt Permitted	0.59	1.00	1.00	0.71	1.00		0.30	1.00		0.37	1.00	
Satd. Flow (perm)	1104	1863	1583	1330	1797		560	3557		698	3517	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	60	77	44	22	104	44	55	681	22	38	857	38
RTOR Reduction (vph)	0	0	36	0	19	0	0	2	0	0	3	0
Lane Group Flow (vph)	60	77	8	22	129	0	55	701	0	38	892	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Perm		Perm	Perm			Perm		Perm			
Protected Phases	4				8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	15.7	15.7	15.7	15.7	15.7		64.3	64.3		64.3	64.3	
Effective Green, g (s)	15.7	15.7	15.7	15.7	15.7		64.3	64.3		64.3	64.3	
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.17		0.71	0.71		0.71	0.71	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	193	325	276	232	313		400	2541		499	2513	
v/s Ratio Prot		0.04			c0.07			0.20			c0.25	
v/s Ratio Perm	0.05		0.00	0.02			0.10			0.05		
v/c Ratio	0.31	0.24	0.03	0.09	0.41		0.14	0.28		0.08	0.36	
Uniform Delay, d1	32.4	32.0	30.8	31.2	33.0		4.1	4.6		3.9	4.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.70	0.66	
Incremental Delay, d2	1.9	0.8	0.1	0.4	1.8		0.7	0.3		0.1	0.2	
Delay (s)	34.4	32.8	30.9	31.6	34.9		4.8	4.8		2.8	3.4	
Level of Service	C	C	C	C	C		A	A		A	A	
Approach Delay (s)		32.8			34.5			4.8			3.4	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM Average Control Delay			9.1		HCM Level of Service				A			
HCM Volume to Capacity ratio			0.37									
Actuated Cycle Length (s)			90.0		Sum of lost time (s)				10.0			
Intersection Capacity Utilization			76.8%		ICU Level of Service				D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

130: W Blodgett St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	10	35	10	5	25	10	700	5	25	805	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	5	10	36	10	5	26	10	714	5	26	821	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								373			726	
pX, platoon unblocked	0.97	0.97	0.94	0.97	0.97	0.96	0.94			0.96		
vC, conflicting volume	1281	1615	413	1240	1615	360	827			719		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1019	1365	262	977	1365	241	699			616		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	93	95	94	96	97	99			97		
cM capacity (veh/h)	170	138	702	175	138	733	850			918		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	51	41	367	362	436	416						
Volume Left	5	10	10	0	26	0						
Volume Right	36	26	0	5	0	5						
cSH	330	314	850	1700	918	1700						
Volume to Capacity	0.15	0.13	0.01	0.21	0.03	0.24						
Queue Length 95th (ft)	14	11	1	0	2	0						
Control Delay (s)	17.9	18.2	0.4	0.0	0.8	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	17.9	18.2	0.2		0.4							
Approach LOS	C	C										
Intersection Summary												
Average Delay			1.3									
Intersection Capacity Utilization			51.8%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

140: W Cleveland St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	5	25	1	1	5	15	710	5	5	810	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	1	5	27	1	1	5	16	763	5	5	871	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								750			349	
pX, platoon unblocked	0.89	0.89	0.89	0.89	0.89		0.89					
vC, conflicting volume	1307	1688	441	1274	1691	384	882			769		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1097	1525	123	1060	1528	384	619			769		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	95	97	99	99	99	98			99		
cM capacity (veh/h)	146	103	810	147	103	620	852			841		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	33	8	398	387	441	446						
Volume Left	1	1	16	0	5	0						
Volume Right	27	5	0	5	0	11						
cSH	360	284	852	1700	841	1700						
Volume to Capacity	0.09	0.03	0.02	0.23	0.01	0.26						
Queue Length 95th (ft)	8	2	1	0	0	0						
Control Delay (s)	16.0	18.0	0.6	0.0	0.2	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	16.0	18.0	0.3		0.1							
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.6									
Intersection Capacity Utilization			40.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

150: W Doege St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	205	95	30	60	50	25	660	30	30	700	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	5.2		5.2	5.2			5.2			5.2	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frt	1.00	0.95		1.00	0.93			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1805	1810		1787	1752			3511			3530	
Flt Permitted	0.68	1.00		0.40	1.00			0.91			0.90	
Satd. Flow (perm)	1296	1810		746	1752			3192			3192	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	216	100	32	63	53	26	695	32	32	737	58
RTOR Reduction (vph)	0	20	0	0	37	0	0	3	0	0	5	0
Lane Group Flow (vph)	53	296	0	32	79	0	0	750	0	0	822	0
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	2%	2%	2%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	27.1	27.1		27.1	27.1			52.5			52.5	
Effective Green, g (s)	27.1	27.1		27.1	27.1			52.5			52.5	
Actuated g/C Ratio	0.30	0.30		0.30	0.30			0.58			0.58	
Clearance Time (s)	5.2	5.2		5.2	5.2			5.2			5.2	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	390	545		225	528			1862			1862	
v/s Ratio Prot		c0.16			0.05							
v/s Ratio Perm	0.04			0.04				0.23			c0.26	
v/c Ratio	0.14	0.54		0.14	0.15			0.40			0.44	
Uniform Delay, d1	22.9	26.3		23.0	23.0			10.2			10.5	
Progression Factor	1.00	1.00		1.00	1.00			0.86			1.00	
Incremental Delay, d2	0.3	1.9		0.6	0.3			0.6			0.8	
Delay (s)	23.3	28.2		23.6	23.3			9.4			11.3	
Level of Service	C	C		C	C			A			B	
Approach Delay (s)		27.5			23.4			9.4			11.3	
Approach LOS		C			C			A			B	
Intersection Summary												
HCM Average Control Delay			14.3			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			10.4			
Intersection Capacity Utilization			76.9%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

160: W Edison St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	5	50	1	1	5	10	740	10	15	735	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	54	1	1	5	11	804	11	16	799	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								380				
pX, platoon unblocked	0.90	0.90		0.90	0.90	0.90				0.90		
vC, conflicting volume	1267	1674	405	1321	1674	408	810			815		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1082	1532	405	1141	1532	130	810			582		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	95	91	99	99	99	99			98		
cM capacity (veh/h)	152	103	601	122	103	814	812			893		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	65	8	413	413	416	410						
Volume Left	5	1	11	0	16	0						
Volume Right	54	5	0	11	0	11						
cSH	364	291	812	1700	893	1700						
Volume to Capacity	0.18	0.03	0.01	0.24	0.02	0.24						
Queue Length 95th (ft)	16	2	1	0	1	0						
Control Delay (s)	17.0	17.7	0.4	0.0	0.6	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	17.0	17.7	0.2		0.3							
Approach LOS	C	C										
Intersection Summary												
Average Delay			1.0									
Intersection Capacity Utilization			42.3%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

170: W Franklin St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	5	1	5	1	740	10	10	750	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	1	1	5	5	1	5	1	813	11	11	824	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								749				
pX, platoon unblocked	0.95	0.95		0.95	0.95	0.95				0.95		
vC, conflicting volume	1264	1675	415	1261	1673	412	830			824		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1168	1602	415	1165	1599	269	830			704		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	96	99	99	100			99		
cM capacity (veh/h)	139	100	592	140	100	696	798			843		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	8	12	408	418	423	418						
Volume Left	1	5	1	0	11	0						
Volume Right	5	5	0	11	0	5						
cSH	273	208	798	1700	843	1700						
Volume to Capacity	0.03	0.06	0.00	0.25	0.01	0.25						
Queue Length 95th (ft)	2	5	0	0	1	0						
Control Delay (s)	18.6	23.4	0.0	0.0	0.4	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	18.6	23.4	0.0		0.2							
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.4									
Intersection Capacity Utilization			38.0%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

180: W Grant St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	10	1	20	1	735	10	20	750	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	1	5	11	1	22	1	799	11	22	815	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								1126				
pX, platoon unblocked												
vC, conflicting volume	1285	1673	410	1264	1671	405	821			810		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1285	1673	410	1264	1671	405	821			810		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	91	99	96	100			97		
cM capacity (veh/h)	116	94	596	118	90	587	804			812		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	8	34	401	410	429	413						
Volume Left	1	11	1	0	22	0						
Volume Right	5	22	0	11	0	5						
cSH	253	239	804	1700	812	1700						
Volume to Capacity	0.03	0.14	0.00	0.24	0.03	0.24						
Queue Length 95th (ft)	2	12	0	0	2	0						
Control Delay (s)	19.7	22.5	0.0	0.0	0.8	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	19.7	22.5	0.0		0.4							
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.7									
Intersection Capacity Utilization			45.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

190: W Harrison St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	1	5	5	1	15	5	740	10	15	765	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	1	5	5	1	16	5	804	11	16	832	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1299	1696	421	1275	1696	408	842			815		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1299	1696	421	1275	1696	408	842			815		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	99	99	96	99	97	99			98		
cM capacity (veh/h)	114	91	587	121	91	599	789			802		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	12	23	408	413	432	427						
Volume Left	5	5	5	0	16	0						
Volume Right	5	16	0	11	0	11						
cSH	174	272	789	1700	802	1700						
Volume to Capacity	0.07	0.08	0.01	0.24	0.02	0.25						
Queue Length 95th (ft)	5	7	1	0	2	0						
Control Delay (s)	27.3	19.5	0.2	0.0	0.6	0.0						
Lane LOS	D	C	A		A							
Approach Delay (s)	27.3	19.5	0.1		0.3							
Approach LOS	D	C										
Intersection Summary												
Average Delay			0.7									
Intersection Capacity Utilization			42.2%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

120: W Arnold St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	40	40	15	165	35	35	600	5	15	550	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1881	1599	1752	1796		1687	3369		1656	3299	
Flt Permitted	0.44	1.00	1.00	0.73	1.00		0.40	1.00		0.38	1.00	
Satd. Flow (perm)	828	1881	1599	1342	1796		705	3369		655	3299	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	62	45	45	17	188	40	40	682	6	17	625	17
RTOR Reduction (vph)	0	0	36	0	11	0	0	0	0	0	1	0
Lane Group Flow (vph)	62	45	9	17	217	0	40	688	0	17	641	0
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	7%	7%	7%	9%	9%	9%
Turn Type	Perm		Perm	Perm			Perm			Perm		
Protected Phases	4				8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	18.7	18.7	18.7	18.7	18.7		61.3	61.3		61.3	61.3	
Effective Green, g (s)	18.7	18.7	18.7	18.7	18.7		61.3	61.3		61.3	61.3	
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21		0.68	0.68		0.68	0.68	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	172	391	332	279	373		480	2295		446	2247	
v/s Ratio Prot		0.02			c0.12			c0.20			0.19	
v/s Ratio Perm	0.07		0.01	0.01			0.06			0.03		
v/c Ratio	0.36	0.12	0.03	0.06	0.58		0.08	0.30		0.04	0.29	
Uniform Delay, d1	30.5	28.9	28.4	28.6	32.1		4.9	5.7		4.7	5.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.89	0.86	
Incremental Delay, d2	2.7	0.3	0.1	0.2	3.6		0.3	0.3		0.1	0.1	
Delay (s)	33.2	29.2	28.5	28.8	35.7		5.2	6.1		4.3	5.0	
Level of Service	C	C	C	C	D		A	A		A	A	
Approach Delay (s)		30.6			35.2			6.0			5.0	
Approach LOS		C			D			A			A	
Intersection Summary												
HCM Average Control Delay			11.8	HCM Level of Service			B					
HCM Volume to Capacity ratio			0.37									
Actuated Cycle Length (s)			90.0	Sum of lost time (s)			10.0					
Intersection Capacity Utilization			66.6%	ICU Level of Service			C					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

130: W Blodgett St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	15	35	5	45	40	35	645	10	15	540	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	19	19	45	6	58	52	45	838	13	19	701	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								373			726	
pX, platoon unblocked	0.95	0.95	0.98	0.95	0.95	0.94	0.98			0.94		
vC, conflicting volume	1332	1682	351	1380	1677	425	703			851		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1136	1506	293	1187	1500	250	652			704		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	73	82	93	94	43	93	95			98		
cM capacity (veh/h)	73	107	694	101	103	693	884			808		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	84	117	464	432	370	352						
Volume Left	19	6	45	0	19	0						
Volume Right	45	52	0	13	0	1						
cSH	164	166	884	1700	808	1700						
Volume to Capacity	0.51	0.71	0.05	0.25	0.02	0.21						
Queue Length 95th (ft)	63	106	4	0	2	0						
Control Delay (s)	48.1	66.8	1.5	0.0	0.8	0.0						
Lane LOS	E	F	A		A							
Approach Delay (s)	48.1	66.8	0.8		0.4							
Approach LOS	E	F										
Intersection Summary												
Average Delay			7.1									
Intersection Capacity Utilization			53.5%			ICU Level of Service			A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

140: W Cleveland St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	1	40	1	5	1	20	680	1	20	515	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	6	1	49	1	6	1	24	829	1	24	628	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								750			349	
pX, platoon unblocked	0.92	0.92	0.92	0.92	0.92		0.92					
vC, conflicting volume	1148	1559	317	1291	1562	415	634			830		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	988	1435	86	1143	1438	415	430			830		
tC, single (s)	7.6	6.6	7.0	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	96	99	94	99	95	100	98			97		
cM capacity (veh/h)	169	114	877	130	117	592	1023			772		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	56	9	439	416	338	320						
Volume Left	6	1	24	0	24	0						
Volume Right	49	1	0	1	0	6						
cSH	548	134	1023	1700	772	1700						
Volume to Capacity	0.10	0.06	0.02	0.24	0.03	0.19						
Queue Length 95th (ft)	9	5	2	0	2	0						
Control Delay (s)	12.3	33.6	0.7	0.0	1.1	0.0						
Lane LOS	B	D	A		A							
Approach Delay (s)	12.3	33.6	0.4		0.5							
Approach LOS	B	D										
Intersection Summary												
Average Delay			1.1									
Intersection Capacity Utilization			43.4%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

150: W Doege St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	245	30	35	285	60	115	535	35	20	475	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	5.2		5.2	5.2			5.2			5.2	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frt	1.00	0.98		1.00	0.97			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			1.00	
Satd. Flow (prot)	1752	1814		1752	1797			3320			3411	
Flt Permitted	0.28	1.00		0.39	1.00			0.69			0.90	
Satd. Flow (perm)	517	1814		723	1797			2325			3083	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	56	302	37	43	352	74	142	660	43	25	586	25
RTOR Reduction (vph)	0	5	0	0	9	0	0	4	0	0	3	0
Lane Group Flow (vph)	56	334	0	43	417	0	0	841	0	0	633	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	7%	7%	7%	5%	5%	5%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	29.7	29.7		29.7	29.7			49.9			49.9	
Effective Green, g (s)	29.7	29.7		29.7	29.7			49.9			49.9	
Actuated g/C Ratio	0.33	0.33		0.33	0.33			0.55			0.55	
Clearance Time (s)	5.2	5.2		5.2	5.2			5.2			5.2	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	171	599		239	593			1289			1709	
v/s Ratio Prot		0.18			c0.23							
v/s Ratio Perm	0.11			0.06				c0.36			0.21	
v/c Ratio	0.33	0.56		0.18	0.70			0.65			0.37	
Uniform Delay, d1	22.6	24.7		21.5	26.3			14.0			11.2	
Progression Factor	1.00	1.00		1.00	1.00			0.77			1.00	
Incremental Delay, d2	2.3	1.9		0.8	4.7			2.5			0.6	
Delay (s)	25.0	26.7		22.2	31.0			13.3			11.9	
Level of Service	C	C		C	C			B			B	
Approach Delay (s)		26.4			30.2			13.3			11.9	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM Average Control Delay			18.5			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			10.4			
Intersection Capacity Utilization			107.1%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

160: W Edison St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	5	30	1	5	15	40	595	5	15	485	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	6	6	38	1	6	19	50	744	6	19	606	19
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								380				
pX, platoon unblocked	0.90	0.90		0.90	0.90	0.90				0.90		
vC, conflicting volume	1147	1503	312	1228	1509	375	625			750		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	937	1334	312	1028	1341	78	625			495		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.2			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	96	95	95	99	95	98	95			98		
cM capacity (veh/h)	177	129	689	141	122	857	926			920		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	50	26	422	378	322	322						
Volume Left	6	1	50	0	19	0						
Volume Right	38	19	0	6	0	19						
cSH	362	320	926	1700	920	1700						
Volume to Capacity	0.14	0.08	0.05	0.22	0.02	0.19						
Queue Length 95th (ft)	12	7	4	0	2	0						
Control Delay (s)	16.5	17.3	1.6	0.0	0.7	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	16.5	17.3	0.9		0.4							
Approach LOS	C	C										
Intersection Summary												
Average Delay			1.5									
Intersection Capacity Utilization			46.3%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

170: W Franklin St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	1	1	10	1	610	5	5	510	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	1	1	6	1	1	12	1	744	6	6	622	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								749				
pX, platoon unblocked												
vC, conflicting volume	1022	1387	312	1079	1385	375	623			750		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1022	1387	312	1079	1385	375	623			750		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	99	99	99	99	99	98	100			99		
cM capacity (veh/h)	187	143	690	171	143	628	927			817		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	9	15	373	378	317	312						
Volume Left	1	1	1	0	6	0						
Volume Right	6	12	0	6	0	1						
cSH	357	418	927	1700	817	1700						
Volume to Capacity	0.02	0.04	0.00	0.22	0.01	0.18						
Queue Length 95th (ft)	2	3	0	0	1	0						
Control Delay (s)	15.3	13.9	0.0	0.0	0.3	0.0						
Lane LOS	C	B	A		A							
Approach Delay (s)	15.3	13.9	0.0		0.1							
Approach LOS	C	B										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			27.7%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

180: W Grant St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	1	15	5	35	1	615	5	15	500	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	1	1	1	19	6	43	1	759	6	19	617	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								1126				
pX, platoon unblocked												
vC, conflicting volume	1083	1423	309	1112	1420	383	619			765		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1083	1423	309	1112	1420	383	619			765		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	99	99	100	89	95	93	100			98		
cM capacity (veh/h)	153	134	693	161	134	621	938			818		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	4	68	381	386	327	310						
Volume Left	1	19	1	0	19	0						
Volume Right	1	43	0	6	0	1						
cSH	195	295	938	1700	818	1700						
Volume to Capacity	0.02	0.23	0.00	0.23	0.02	0.18						
Queue Length 95th (ft)	1	22	0	0	2	0						
Control Delay (s)	23.9	20.8	0.0	0.0	0.8	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	23.9	20.8	0.0		0.4							
Approach LOS	C	C										
Intersection Summary												
Average Delay			1.2									
Intersection Capacity Utilization			35.4%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

190: W Harrison St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	1	1	5	5	645	1	5	510	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	1	1	6	1	1	6	6	787	1	6	622	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1055	1443	320	1129	1452	394	640			788		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1055	1443	320	1129	1452	394	640			788		
tC, single (s)	7.5	6.5	6.9	7.8	6.8	7.2	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.2			2.3		
p0 queue free %	99	99	99	99	99	99	99			99		
cM capacity (veh/h)	177	132	682	141	115	572	920			802		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	9	9	399	395	317	329						
Volume Left	1	1	6	0	6	0						
Volume Right	6	6	0	1	0	18						
cSH	340	285	920	1700	802	1700						
Volume to Capacity	0.03	0.03	0.01	0.23	0.01	0.19						
Queue Length 95th (ft)	2	2	1	0	1	0						
Control Delay (s)	15.9	18.0	0.2	0.0	0.3	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	15.9	18.0	0.1		0.1							
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			31.4%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

120: W Arnold St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	90	50	30	120	50	60	785	30	40	985	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1787	1798		1787	3555		1770	3518	
Flt Permitted	0.51	1.00	1.00	0.69	1.00		0.22	1.00		0.29	1.00	
Satd. Flow (perm)	947	1863	1583	1304	1798		414	3555		549	3518	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	77	99	55	33	132	55	66	863	33	44	1082	44
RTOR Reduction (vph)	0	0	45	0	19	0	0	2	0	0	2	0
Lane Group Flow (vph)	77	99	10	33	168	0	66	894	0	44	1124	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Perm		Perm	Perm		Perm			Perm			
Protected Phases	4			8		2			6			
Permitted Phases	4		4	8		2			6			
Actuated Green, G (s)	16.9	16.9	16.9	16.9	16.9	63.1		63.1	63.1		63.1	
Effective Green, g (s)	16.9	16.9	16.9	16.9	16.9	63.1		63.1	63.1		63.1	
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.19	0.70		0.70	0.70		0.70	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
Lane Grp Cap (vph)	178	350	297	245	338	290		2492	385		2467	
v/s Ratio Prot	0.05				c0.09		0.25				c0.32	
v/s Ratio Perm	0.08	0.01		0.03			0.16		0.08			
v/c Ratio	0.43	0.28	0.03	0.13	0.50	0.23		0.36	0.11		0.46	
Uniform Delay, d1	32.3	31.4	29.9	30.5	32.7	4.8		5.4	4.4		5.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.81		0.72	
Incremental Delay, d2	3.5	0.9	0.1	0.5	2.4	1.8		0.4	0.2		0.3	
Delay (s)	35.8	32.3	30.0	31.0	35.2	6.6		5.8	3.8		4.5	
Level of Service	D	C	C	C	D	A		A	A		A	
Approach Delay (s)	32.9				34.5		5.8				4.5	
Approach LOS	C				C		A				A	
Intersection Summary												
HCM Average Control Delay			10.1	HCM Level of Service			B					
HCM Volume to Capacity ratio			0.46									
Actuated Cycle Length (s)			90.0	Sum of lost time (s)			10.0					
Intersection Capacity Utilization			82.7%	ICU Level of Service			E					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

130: W Blodgett St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	15	45	15	5	35	15	885	5	35	1005	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	5	15	46	15	5	36	15	903	5	36	1026	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								373			726	
pX, platoon unblocked	0.92	0.92	0.88	0.92	0.92	0.92	0.88			0.92		
vC, conflicting volume	1620	2038	515	1574	2038	454	1031			908		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1095	1551	163	1045	1551	228	752			723		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	84	94	89	95	95	98			96		
cM capacity (veh/h)	136	98	752	134	98	717	754			804		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	66	56	467	457	548	518						
Volume Left	5	15	15	0	36	0						
Volume Right	46	36	0	5	0	5						
cSH	261	260	754	1700	804	1700						
Volume to Capacity	0.25	0.22	0.02	0.27	0.04	0.30						
Queue Length 95th (ft)	25	20	2	0	3	0						
Control Delay (s)	23.4	22.6	0.6	0.0	1.2	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	23.4	22.6	0.3		0.6							
Approach LOS	C	C										
Intersection Summary												
Average Delay			1.8									
Intersection Capacity Utilization			67.6%		ICU Level of Service					C		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

140: W Cleveland St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	5	35	1	1	5	20	900	5	5	1010	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	1	5	38	1	1	5	22	968	5	5	1086	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)								750			349	
pX, platoon unblocked	0.85	0.85	0.83	0.85	0.85	0.97	0.83			0.97		
vC, conflicting volume	1638	2121	551	1608	2126	487	1102			973		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1235	1806	58	1200	1812	410	720			912		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	92	95	99	98	99	97			99		
cM capacity (veh/h)	109	65	834	105	65	579	730			721		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	44	8	505	489	548	559						
Volume Left	1	1	22	0	5	0						
Volume Right	38	5	0	5	0	16						
cSH	321	209	730	1700	721	1700						
Volume to Capacity	0.14	0.04	0.03	0.29	0.01	0.33						
Queue Length 95th (ft)	12	3	2	0	1	0						
Control Delay (s)	18.0	22.9	0.8	0.0	0.2	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	18.0	22.9	0.4		0.1							
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.7									
Intersection Capacity Utilization			49.3%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

150: W Doege St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	265	125	40	80	60	30	835	40	40	865	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	5.2		5.2	5.2			5.2			5.2	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frt	1.00	0.95		1.00	0.94			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1805	1808		1787	1760			3510			3531	
Flt Permitted	0.66	1.00		0.30	1.00			0.89			0.87	
Satd. Flow (perm)	1252	1808		556	1760			3124			3085	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	279	132	42	84	63	32	879	42	42	911	68
RTOR Reduction (vph)	0	20	0	0	32	0	0	3	0	0	5	0
Lane Group Flow (vph)	63	391	0	42	115	0	0	950	0	0	1016	0
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	2%	2%	2%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			4			2			2		
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	29.4	29.4		29.4	29.4			50.2			50.2	
Effective Green, g (s)	29.4	29.4		29.4	29.4			50.2			50.2	
Actuated g/C Ratio	0.33	0.33		0.33	0.33			0.56			0.56	
Clearance Time (s)	5.2	5.2		5.2	5.2			5.2			5.2	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	409	591		182	575			1742			1721	
v/s Ratio Prot	c0.22			0.07								
v/s Ratio Perm	0.05			0.08				0.30			c0.33	
v/c Ratio	0.15	0.66		0.23	0.20			0.55			0.59	
Uniform Delay, d1	21.5	26.0		22.1	21.8			12.6			13.1	
Progression Factor	1.00	1.00		1.00	1.00			0.81			1.00	
Incremental Delay, d2	0.4	3.7		1.4	0.4			1.2			1.5	
Delay (s)	21.9	29.7		23.4	22.2			11.4			14.6	
Level of Service	C	C		C	C			B			B	
Approach Delay (s)	28.7			22.5			11.4			14.6		
Approach LOS	C			C			B			B		
Intersection Summary												
HCM Average Control Delay			16.5	HCM Level of Service			B					
HCM Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			90.0	Sum of lost time (s)			10.4					
Intersection Capacity Utilization			111.0%	ICU Level of Service			H					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

160: W Edison St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	5	60	1	1	5	15	925	15	20	910	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	5	65	1	1	5	16	1005	16	22	989	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								380				
pX, platoon unblocked	0.85	0.85		0.85	0.85	0.85				0.85		
vC, conflicting volume	1582	2095	503	1652	2095	511	1005			1022		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1324	1930	503	1407	1930	58	1005			662		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	90	87	98	98	99	98			97		
cM capacity (veh/h)	92	54	519	66	54	848	685			781		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	82	8	519	519	516	511						
Volume Left	11	1	16	0	22	0						
Volume Right	65	5	0	16	0	16						
cSH	237	177	685	1700	781	1700						
Volume to Capacity	0.34	0.04	0.02	0.31	0.03	0.30						
Queue Length 95th (ft)	37	3	2	0	2	0						
Control Delay (s)	28.0	26.3	0.7	0.0	0.8	0.0						
Lane LOS	D	D	A		A							
Approach Delay (s)	28.0	26.3	0.3		0.4							
Approach LOS	D	D										
Intersection Summary												
Average Delay			1.5									
Intersection Capacity Utilization			52.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

170: W Franklin St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	5	1	5	1	925	15	15	935	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	1	1	5	5	1	5	1	1016	16	16	1027	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								749				
pX, platoon unblocked	0.88	0.88		0.88	0.88	0.88				0.88		
vC, conflicting volume	1580	2098	516	1580	2093	516	1033			1033		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1382	1973	516	1382	1967	171	1033			759		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	98	99	94	98	99	100			98		
cM capacity (veh/h)	88	54	509	88	54	745	668			744		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	8	12	509	525	530	519						
Volume Left	1	5	1	0	16	0						
Volume Right	5	5	0	16	0	5						
cSH	177	135	668	1700	744	1700						
Volume to Capacity	0.04	0.09	0.00	0.31	0.02	0.31						
Queue Length 95th (ft)	3	7	0	0	2	0						
Control Delay (s)	26.3	34.4	0.0	0.0	0.6	0.0						
Lane LOS	D	D	A		A							
Approach Delay (s)	26.3	34.4	0.0		0.3							
Approach LOS	D	D										
Intersection Summary												
Average Delay			0.5									
Intersection Capacity Utilization			46.6%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

180: W Grant St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	15	1	30	1	915	15	30	935	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	1	5	16	1	33	1	995	16	33	1016	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								1126				
pX, platoon unblocked	0.94	0.94		0.94	0.94	0.94				0.94		
vC, conflicting volume	1617	2097	511	1584	2092	505	1022			1011		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1522	2036	511	1488	2030	335	1022			875		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	98	99	78	98	95	100			95		
cM capacity (veh/h)	69	51	513	73	49	610	675			718		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	8	50	498	514	541	514						
Volume Left	1	16	1	0	33	0						
Volume Right	5	33	0	16	0	5						
cSH	160	168	675	1700	718	1700						
Volume to Capacity	0.05	0.30	0.00	0.30	0.05	0.30						
Queue Length 95th (ft)	4	29	0	0	4	0						
Control Delay (s)	28.5	35.3	0.0	0.0	1.2	0.0						
Lane LOS	D	E	A		A							
Approach Delay (s)	28.5	35.3	0.0		0.6							
Approach LOS	D	E										
Intersection Summary												
Average Delay			1.3									
Intersection Capacity Utilization			59.7%		ICU Level of Service				B			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

190: W Harrison St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	1	5	5	1	20	5	925	15	20	960	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	1	5	5	1	22	5	1005	16	22	1043	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1631	2128	530	1596	2128	511	1060			1022		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1631	2128	530	1596	2128	511	1060			1022		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	98	99	92	98	96	99			97		
cM capacity (veh/h)	63	48	499	69	48	513	653			669		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	12	28	508	519	543	538						
Volume Left	5	5	5	0	22	0						
Volume Right	5	22	0	16	0	16						
cSH	99	196	653	1700	669	1700						
Volume to Capacity	0.12	0.14	0.01	0.31	0.03	0.32						
Queue Length 95th (ft)	10	12	1	0	3	0						
Control Delay (s)	46.1	26.4	0.2	0.0	0.9	0.0						
Lane LOS	E	D	A		A							
Approach Delay (s)	46.1	26.4	0.1		0.5							
Approach LOS	E	D										
Intersection Summary												
Average Delay			0.9									
Intersection Capacity Utilization			51.3%		ICU Level of Service				A			
Analysis Period (min)			15									

Appendix E
Peak Hour Analysis Outputs
Four-Lane Cross Section with Raised Median

Year 2017 Projected Traffic

Year 2037 Projected Traffic

HCM Signalized Intersection Capacity Analysis

120: W Arnold St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	35	35	10	130	25	25	470	5	10	440	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1881	1599	1752	1801		1687	3368		1656	3301	
Flt Permitted	0.53	1.00	1.00	0.73	1.00		0.46	1.00		0.45	1.00	
Satd. Flow (perm)	1001	1881	1599	1348	1801		823	3368		786	3301	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	51	40	40	11	148	28	28	534	6	11	500	11
RTOR Reduction (vph)	0	0	33	0	10	0	0	1	0	0	1	0
Lane Group Flow (vph)	51	40	7	11	166	0	28	539	0	11	510	0
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	7%	7%	7%	9%	9%	9%
Turn Type	Perm		Perm	Perm			Perm		Perm			
Protected Phases	4			8			2		6			
Permitted Phases	4		4	8			2		6			
Actuated Green, G (s)	16.7	16.7	16.7	16.7	16.7		63.3	63.3		63.3	63.3	
Effective Green, g (s)	16.7	16.7	16.7	16.7	16.7		63.3	63.3		63.3	63.3	
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.19		0.70	0.70		0.70	0.70	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	186	349	297	250	334		579	2369		553	2322	
v/s Ratio Prot		0.02			c0.09			c0.16			0.15	
v/s Ratio Perm	0.05		0.00	0.01			0.03			0.01		
v/c Ratio	0.27	0.11	0.02	0.04	0.50		0.05	0.23		0.02	0.22	
Uniform Delay, d1	31.4	30.5	30.0	30.1	32.9		4.1	4.7		4.0	4.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.76	0.75	
Incremental Delay, d2	1.7	0.3	0.1	0.2	2.4		0.2	0.2		0.0	0.1	
Delay (s)	33.1	30.8	30.1	30.2	35.3		4.3	4.9		3.1	3.6	
Level of Service	C	C	C	C	D		A	A		A	A	
Approach Delay (s)		31.5			35.0			4.9			3.6	
Approach LOS		C			D			A			A	
Intersection Summary												
HCM Average Control Delay			10.9	HCM Level of Service				B				
HCM Volume to Capacity ratio			0.28									
Actuated Cycle Length (s)			90.0	Sum of lost time (s)				10.0				
Intersection Capacity Utilization			58.3%	ICU Level of Service				B				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

130: W Blodgett St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	10	30	5	35	35	25	505	10	10	425	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	13	13	39	6	45	45	32	656	13	13	552	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								373			726	
pX, platoon unblocked	0.98	0.98		0.98	0.98	0.98				0.98		
vC, conflicting volume	1040	1312	277	1075	1306	334	553			669		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	995	1274	277	1031	1268	273	553			615		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	91	92	95	96	70	93	97			99		
cM capacity (veh/h)	137	157	727	153	152	699	986			913		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	65	97	32	437	232	13	368	185				
Volume Left	13	6	32	0	0	13	0	0				
Volume Right	39	45	0	0	13	0	0	1				
cSH	281	240	986	1700	1700	913	1700	1700				
Volume to Capacity	0.23	0.41	0.03	0.26	0.14	0.01	0.22	0.11				
Queue Length 95th (ft)	22	46	3	0	0	1	0	0				
Control Delay (s)	21.6	29.9	8.8	0.0	0.0	9.0	0.0	0.0				
Lane LOS	C	D	A			A						
Approach Delay (s)	21.6	29.9	0.4			0.2						
Approach LOS	C	D										
Intersection Summary												
Average Delay			3.3									
Intersection Capacity Utilization			33.3%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

140: W Cleveland St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	1	30	1	5	1	15	535	1	15	405	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	6	1	37	1	6	1	18	652	1	18	494	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								750			349	
pX, platoon unblocked	0.96	0.96	0.96	0.96	0.96		0.96					
vC, conflicting volume	901	1224	250	1010	1226	327	500			654		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	809	1147	131	924	1149	327	391			654		
tC, single (s)	7.6	6.6	7.0	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	98	99	96	99	97	100	98			98		
cM capacity (veh/h)	245	181	855	202	185	675	1102			903		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	44	9	18	435	219	18	329	171				
Volume Left	6	1	18	0	0	18	0	0				
Volume Right	37	1	0	0	1	0	0	6				
cSH	590	209	1102	1700	1700	903	1700	1700				
Volume to Capacity	0.07	0.04	0.02	0.26	0.13	0.02	0.19	0.10				
Queue Length 95th (ft)	6	3	1	0	0	2	0	0				
Control Delay (s)	11.6	23.0	8.3	0.0	0.0	9.1	0.0	0.0				
Lane LOS	B	C	A			A						
Approach Delay (s)	11.6	23.0	0.2			0.3						
Approach LOS	B	C										
Intersection Summary												
Average Delay			0.8									
Intersection Capacity Utilization			24.8%			ICU Level of Service			A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

150: W Doege St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	190	25	25	225	45	90	425	25	15	375	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	5.2		5.2	5.2		5.2	5.2		5.2	5.2	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1812		1752	1798		1687	3346		1719	3418	
Flt Permitted	0.38	1.00		0.48	1.00		0.47	1.00		0.42	1.00	
Satd. Flow (perm)	705	1812		882	1798		829	3346		768	3418	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	49	235	31	31	278	56	111	525	31	19	463	19
RTOR Reduction (vph)	0	6	0	0	8	0	0	4	0	0	3	0
Lane Group Flow (vph)	49	260	0	31	326	0	111	552	0	19	479	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	7%	7%	7%	5%	5%	5%
Turn Type	Perm		Perm			Perm			Perm			
Protected Phases	4		4			2			2			
Permitted Phases	4		4			2			2			
Actuated Green, G (s)	28.1	28.1		28.1	28.1		51.5	51.5		51.5	51.5	
Effective Green, g (s)	28.1	28.1		28.1	28.1		51.5	51.5		51.5	51.5	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.57	0.57		0.57	0.57	
Clearance Time (s)	5.2	5.2		5.2	5.2		5.2	5.2		5.2	5.2	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	220	566		275	561		474	1915		439	1956	
v/s Ratio Prot		0.14			c0.18			c0.16			0.14	
v/s Ratio Perm	0.07			0.04			0.13			0.02		
v/c Ratio	0.22	0.46		0.11	0.58		0.23	0.29		0.04	0.24	
Uniform Delay, d1	22.9	24.9		22.1	26.0		9.5	9.9		8.4	9.6	
Progression Factor	1.00	1.00		1.00	1.00		0.88	0.89		1.00	1.00	
Incremental Delay, d2	1.1	1.2		0.4	2.4		1.1	0.4		0.2	0.3	
Delay (s)	24.0	26.1		22.4	28.4		9.5	9.1		8.6	9.9	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)		25.8			27.9			9.2			9.8	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM Average Control Delay			15.9	HCM Level of Service			B					
HCM Volume to Capacity ratio			0.39									
Actuated Cycle Length (s)			90.0	Sum of lost time (s)			10.4					
Intersection Capacity Utilization			102.9%	ICU Level of Service			G					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

160: W Edison St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	5	20	1	5	10	35	470	5	10	385	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	6	6	25	1	6	12	44	588	6	12	481	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								380				
pX, platoon unblocked	0.95	0.95		0.95	0.95	0.95				0.95		
vC, conflicting volume	909	1194	247	972	1197	297	494			594		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	803	1102	247	869	1105	160	494			472		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.2			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	97	97	97	99	97	98	96			99		
cM capacity (veh/h)	243	192	759	206	183	804	1038			995		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	38	20	44	392	202	12	321	173				
Volume Left	6	1	44	0	0	12	0	0				
Volume Right	25	12	0	0	6	0	0	12				
cSH	411	359	1038	1700	1700	995	1700	1700				
Volume to Capacity	0.09	0.06	0.04	0.23	0.12	0.01	0.19	0.10				
Queue Length 95th (ft)	7	4	3	0	0	1	0	0				
Control Delay (s)	14.6	15.6	8.6	0.0	0.0	8.7	0.0	0.0				
Lane LOS	B	C	A			A						
Approach Delay (s)	14.6	15.6	0.6			0.2						
Approach LOS	B	C										
Intersection Summary												
Average Delay			1.1									
Intersection Capacity Utilization			29.8%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

170: W Franklin St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	1	1	10	1	480	5	5	400	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	1	1	6	1	1	12	1	585	6	6	488	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								749				
pX, platoon unblocked												
vC, conflicting volume	809	1095	245	854	1092	296	489			591		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	809	1095	245	854	1092	296	489			591		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	100	99	99	100	99	98	100			99		
cM capacity (veh/h)	268	214	762	251	215	707	1043			940		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	9	15	1	390	201	6	325	164				
Volume Left	1	1	1	0	0	6	0	0				
Volume Right	6	12	0	0	6	0	0	1				
cSH	468	526	1043	1700	1700	940	1700	1700				
Volume to Capacity	0.02	0.03	0.00	0.23	0.12	0.01	0.19	0.10				
Queue Length 95th (ft)	1	2	0	0	0	0	0	0				
Control Delay (s)	12.8	12.0	8.5	0.0	0.0	8.9	0.0	0.0				
Lane LOS	B	B	A			A						
Approach Delay (s)	12.8	12.0	0.0			0.1						
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			23.4%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

180: W Grant St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	1	10	5	25	1	485	5	10	395	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	1	1	1	12	6	31	1	599	6	12	488	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								1126				
pX, platoon unblocked												
vC, conflicting volume	849	1120	244	875	1118	302	489			605		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	849	1120	244	875	1118	302	489			605		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	99	99	100	95	97	96	100			99		
cM capacity (veh/h)	238	205	762	243	206	700	1050			942		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	4	49	1	399	206	12	325	164				
Volume Left	1	12	1	0	0	12	0	0				
Volume Right	1	31	0	0	6	0	0	1				
cSH	289	395	1050	1700	1700	942	1700	1700				
Volume to Capacity	0.01	0.12	0.00	0.23	0.12	0.01	0.19	0.10				
Queue Length 95th (ft)	1	11	0	0	0	1	0	0				
Control Delay (s)	17.6	15.4	8.4	0.0	0.0	8.9	0.0	0.0				
Lane LOS	C	C	A			A						
Approach Delay (s)	17.6	15.4	0.0			0.2						
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.8									
Intersection Capacity Utilization			23.6%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

190: W Harrison St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	1	1	5	5	505	1	5	400	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	1	1	6	1	1	6	6	616	1	6	488	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	833	1135	250	891	1141	309	500			617		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	833	1135	250	891	1141	309	500			617		
tC, single (s)	7.5	6.5	6.9	7.8	6.8	7.2	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.2			2.3		
p0 queue free %	100	99	99	99	99	99	99			99		
cM capacity (veh/h)	258	201	756	214	180	653	1040			932		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	9	9	6	411	207	6	325	175				
Volume Left	1	1	6	0	0	6	0	0				
Volume Right	6	6	0	0	1	0	0	12				
cSH	453	391	1040	1700	1700	932	1700	1700				
Volume to Capacity	0.02	0.02	0.01	0.24	0.12	0.01	0.19	0.10				
Queue Length 95th (ft)	1	2	0	0	0	0	0	0				
Control Delay (s)	13.1	14.4	8.5	0.0	0.0	8.9	0.0	0.0				
Lane LOS	B	B	A			A						
Approach Delay (s)	13.1	14.4	0.1			0.1						
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			24.0%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

120: W Arnold St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	70	40	20	95	40	50	620	20	35	780	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1787	1797		1787	3557		1770	3517	
Flt Permitted	0.59	1.00	1.00	0.71	1.00		0.30	1.00		0.37	1.00	
Satd. Flow (perm)	1104	1863	1583	1330	1797		560	3557		698	3517	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	60	77	44	22	104	44	55	681	22	38	857	38
RTOR Reduction (vph)	0	0	36	0	19	0	0	2	0	0	3	0
Lane Group Flow (vph)	60	77	8	22	129	0	55	701	0	38	892	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Perm		Perm	Perm			Perm		Perm			
Protected Phases	4				8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	15.7	15.7	15.7	15.7	15.7		64.3	64.3		64.3	64.3	
Effective Green, g (s)	15.7	15.7	15.7	15.7	15.7		64.3	64.3		64.3	64.3	
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.17		0.71	0.71		0.71	0.71	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	193	325	276	232	313		400	2541		499	2513	
v/s Ratio Prot		0.04			c0.07			0.20			c0.25	
v/s Ratio Perm	0.05		0.00	0.02			0.10			0.05		
v/c Ratio	0.31	0.24	0.03	0.09	0.41		0.14	0.28		0.08	0.36	
Uniform Delay, d1	32.4	32.0	30.8	31.2	33.0		4.1	4.6		3.9	4.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.77	0.74	
Incremental Delay, d2	1.9	0.8	0.1	0.4	1.8		0.7	0.3		0.1	0.2	
Delay (s)	34.4	32.8	30.9	31.6	34.9		4.8	4.8		3.1	3.8	
Level of Service	C	C	C	C	C		A	A		A	A	
Approach Delay (s)		32.8			34.5			4.8			3.8	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM Average Control Delay			9.3		HCM Level of Service				A			
HCM Volume to Capacity ratio			0.37									
Actuated Cycle Length (s)			90.0		Sum of lost time (s)				10.0			
Intersection Capacity Utilization			76.8%		ICU Level of Service				D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

130: W Blodgett St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	10	35	10	5	25	10	700	5	25	805	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	5	10	36	10	5	26	10	714	5	26	821	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								373			726	
pX, platoon unblocked	0.98	0.98	0.96	0.98	0.98	0.96	0.96			0.96		
vC, conflicting volume	1281	1615	413	1240	1615	360	827			719		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1052	1394	298	1010	1394	246	730			621		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	92	95	94	96	97	99			97		
cM capacity (veh/h)	163	134	674	167	134	729	839			916		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	51	41	10	476	243	26	548	279				
Volume Left	5	10	10	0	0	26	0	0				
Volume Right	36	26	0	0	5	0	0	5				
cSH	318	304	839	1700	1700	916	1700	1700				
Volume to Capacity	0.16	0.13	0.01	0.28	0.14	0.03	0.32	0.16				
Queue Length 95th (ft)	14	11	1	0	0	2	0	0				
Control Delay (s)	18.5	18.7	9.3	0.0	0.0	9.0	0.0	0.0				
Lane LOS	C	C	A			A						
Approach Delay (s)	18.5	18.7	0.1			0.3						
Approach LOS	C	C										
Intersection Summary												
Average Delay			1.2									
Intersection Capacity Utilization			33.7%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

140: W Cleveland St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	5	25	1	1	5	15	710	5	5	810	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	1	5	27	1	1	5	16	763	5	5	871	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								750			349	
pX, platoon unblocked	0.90	0.90	0.90	0.90	0.90		0.90					
vC, conflicting volume	1307	1688	441	1274	1691	384	882			769		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1113	1538	148	1077	1541	384	639			769		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	95	97	99	99	99	98			99		
cM capacity (veh/h)	143	102	788	144	102	620	844			841		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	33	8	16	509	260	5	581	301				
Volume Left	1	1	16	0	0	5	0	0				
Volume Right	27	5	0	0	5	0	0	11				
cSH	354	282	844	1700	1700	841	1700	1700				
Volume to Capacity	0.09	0.03	0.02	0.30	0.15	0.01	0.34	0.18				
Queue Length 95th (ft)	8	2	1	0	0	0	0	0				
Control Delay (s)	16.2	18.1	9.3	0.0	0.0	9.3	0.0	0.0				
Lane LOS	C	C	A			A						
Approach Delay (s)	16.2	18.1	0.2			0.1						
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.5									
Intersection Capacity Utilization			32.7%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

150: W Doege St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	205	95	30	60	50	25	660	30	30	700	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	5.2		5.2	5.2		5.2	5.2		5.2	5.2	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.93		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1810		1787	1752		1770	3516		1787	3535	
Flt Permitted	0.68	1.00		0.38	1.00		0.31	1.00		0.34	1.00	
Satd. Flow (perm)	1296	1810		716	1752		584	3516		647	3535	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	216	100	32	63	53	26	695	32	32	737	58
RTOR Reduction (vph)	0	19	0	0	34	0	0	4	0	0	6	0
Lane Group Flow (vph)	53	297	0	32	82	0	26	723	0	32	789	0
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	2%	2%	2%	1%	1%	1%
Turn Type	Perm		Perm			Perm			Perm			
Protected Phases	4		4			2			2			
Permitted Phases	4		4			2			2			
Actuated Green, G (s)	25.7	25.7		25.7	25.7		53.9	53.9		53.9	53.9	
Effective Green, g (s)	25.7	25.7		25.7	25.7		53.9	53.9		53.9	53.9	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.60	0.60		0.60	0.60	
Clearance Time (s)	5.2	5.2		5.2	5.2		5.2	5.2		5.2	5.2	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	370	517		204	500		350	2106		387	2117	
v/s Ratio Prot	c0.16		0.05			0.21			c0.22			
v/s Ratio Perm	0.04		0.04			0.04			0.05			
v/c Ratio	0.14	0.58		0.16	0.16		0.07	0.34		0.08	0.37	
Uniform Delay, d1	23.9	27.5		24.0	24.1		7.6	9.1		7.6	9.3	
Progression Factor	1.00	1.00		1.00	1.00		0.88	0.87		1.00	1.00	
Incremental Delay, d2	0.4	2.5		0.8	0.3		0.4	0.4		0.4	0.5	
Delay (s)	24.3	30.0		24.8	24.4		7.1	8.4		8.0	9.8	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)	29.1		24.5			8.3			9.8			
Approach LOS	C		C			A			A			
Intersection Summary												
HCM Average Control Delay			13.7		HCM Level of Service				B			
HCM Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			90.0		Sum of lost time (s)				10.4			
Intersection Capacity Utilization			61.9%		ICU Level of Service				B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

160: W Edison St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	5	50	1	1	5	10	740	10	15	735	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	54	1	1	5	11	804	11	16	799	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								380				
pX, platoon unblocked	0.91	0.91		0.91	0.91	0.91				0.91		
vC, conflicting volume	1267	1674	405	1321	1674	408	810			815		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1097	1544	405	1156	1544	154	810			602		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	95	91	99	99	99	99			98		
cM capacity (veh/h)	149	102	601	119	102	793	812			885		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	65	8	11	536	279	16	533	277				
Volume Left	5	1	11	0	0	16	0	0				
Volume Right	54	5	0	0	11	0	0	11				
cSH	362	286	812	1700	1700	885	1700	1700				
Volume to Capacity	0.18	0.03	0.01	0.32	0.16	0.02	0.31	0.16				
Queue Length 95th (ft)	16	2	1	0	0	1	0	0				
Control Delay (s)	17.1	17.9	9.5	0.0	0.0	9.1	0.0	0.0				
Lane LOS	C	C	A			A						
Approach Delay (s)	17.1	17.9	0.1			0.2						
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.9									
Intersection Capacity Utilization			31.7%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

170: W Franklin St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	5	1	5	1	740	10	10	750	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	1	1	5	5	1	5	1	813	11	11	824	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								749				
pX, platoon unblocked	0.95	0.95		0.95	0.95	0.95				0.95		
vC, conflicting volume	1264	1675	415	1261	1673	412	830			824		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1178	1610	415	1175	1607	284	830			716		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	96	99	99	100			99		
cM capacity (veh/h)	138	99	592	138	100	685	798			839		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	8	12	1	542	282	11	549	280				
Volume Left	1	5	1	0	0	11	0	0				
Volume Right	5	5	0	0	11	0	0	5				
cSH	272	206	798	1700	1700	839	1700	1700				
Volume to Capacity	0.03	0.06	0.00	0.32	0.17	0.01	0.32	0.16				
Queue Length 95th (ft)	2	5	0	0	0	1	0	0				
Control Delay (s)	18.6	23.6	9.5	0.0	0.0	9.3	0.0	0.0				
Lane LOS	C	C	A			A						
Approach Delay (s)	18.6	23.6	0.0			0.1						
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			30.9%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

180: W Grant St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	10	1	20	1	735	10	20	750	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	1	5	11	1	22	1	799	11	22	815	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)								1126				
pX, platoon unblocked												
vC, conflicting volume	1285	1673	410	1264	1671	405	821			810		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1285	1673	410	1264	1671	405	821			810		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	91	99	96	100			97		
cM capacity (veh/h)	116	94	596	118	90	587	804			812		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	8	34	1	533	277	22	543	277				
Volume Left	1	11	1	0	0	22	0	0				
Volume Right	5	22	0	0	11	0	0	5				
cSH	253	239	804	1700	1700	812	1700	1700				
Volume to Capacity	0.03	0.14	0.00	0.31	0.16	0.03	0.32	0.16				
Queue Length 95th (ft)	2	12	0	0	0	2	0	0				
Control Delay (s)	19.7	22.5	9.5	0.0	0.0	9.6	0.0	0.0				
Lane LOS	C	C	A			A						
Approach Delay (s)	19.7	22.5	0.0			0.2						
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.7									
Intersection Capacity Utilization			31.1%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

190: W Harrison St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	1	5	5	1	15	5	740	10	15	765	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	1	5	5	1	16	5	804	11	16	832	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1299	1696	421	1275	1696	408	842			815		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1299	1696	421	1275	1696	408	842			815		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	99	99	96	99	97	99			98		
cM capacity (veh/h)	114	91	587	121	91	599	789			802		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	12	23	5	536	279	16	554	288				
Volume Left	5	5	5	0	0	16	0	0				
Volume Right	5	16	0	0	11	0	0	11				
cSH	174	272	789	1700	1700	802	1700	1700				
Volume to Capacity	0.07	0.08	0.01	0.32	0.16	0.02	0.33	0.17				
Queue Length 95th (ft)	5	7	1	0	0	2	0	0				
Control Delay (s)	27.3	19.5	9.6	0.0	0.0	9.6	0.0	0.0				
Lane LOS	D	C	A			A						
Approach Delay (s)	27.3	19.5	0.1			0.2						
Approach LOS	D	C										
Intersection Summary												
Average Delay			0.6									
Intersection Capacity Utilization			31.5%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

120: W Arnold St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	40	40	15	165	35	35	600	5	15	550	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1881	1599	1752	1796		1687	3369		1656	3299	
Flt Permitted	0.44	1.00	1.00	0.73	1.00		0.40	1.00		0.38	1.00	
Satd. Flow (perm)	828	1881	1599	1342	1796		705	3369		655	3299	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	62	45	45	17	188	40	40	682	6	17	625	17
RTOR Reduction (vph)	0	0	36	0	11	0	0	0	0	0	1	0
Lane Group Flow (vph)	62	45	9	17	217	0	40	688	0	17	641	0
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	7%	7%	7%	9%	9%	9%
Turn Type	Perm		Perm	Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	18.7	18.7	18.7	18.7	18.7		61.3	61.3		61.3	61.3	
Effective Green, g (s)	18.7	18.7	18.7	18.7	18.7		61.3	61.3		61.3	61.3	
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21		0.68	0.68		0.68	0.68	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	172	391	332	279	373		480	2295		446	2247	
v/s Ratio Prot		0.02			c0.12			c0.20			0.19	
v/s Ratio Perm	0.07		0.01	0.01			0.06			0.03		
v/c Ratio	0.36	0.12	0.03	0.06	0.58		0.08	0.30		0.04	0.29	
Uniform Delay, d1	30.5	28.9	28.4	28.6	32.1		4.9	5.7		4.7	5.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.87	0.85	
Incremental Delay, d2	2.7	0.3	0.1	0.2	3.6		0.3	0.3		0.1	0.1	
Delay (s)	33.2	29.2	28.5	28.8	35.7		5.2	6.1		4.2	5.0	
Level of Service	C		C	C	D		A	A		A	A	
Approach Delay (s)		30.6			35.2			6.0			5.0	
Approach LOS		C			D			A			A	
Intersection Summary												
HCM Average Control Delay			11.7	HCM Level of Service			B					
HCM Volume to Capacity ratio			0.37									
Actuated Cycle Length (s)			90.0	Sum of lost time (s)			10.0					
Intersection Capacity Utilization			66.6%	ICU Level of Service			C					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

130: W Blodgett St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	15	35	5	45	40	35	645	10	15	540	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	19	19	45	6	58	52	45	838	13	19	701	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								373			726	
pX, platoon unblocked	0.96	0.96	0.97	0.96	0.96	0.94	0.97			0.94		
vC, conflicting volume	1332	1682	351	1380	1677	425	703			851		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1136	1503	283	1187	1497	270	643			721		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	74	82	94	94	44	92	95			98		
cM capacity (veh/h)	74	109	702	102	105	678	888			802		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	84	117	45	558	292	19	468	235				
Volume Left	19	6	45	0	0	19	0	0				
Volume Right	45	52	0	0	13	0	0	1				
cSH	167	167	888	1700	1700	802	1700	1700				
Volume to Capacity	0.51	0.70	0.05	0.33	0.17	0.02	0.28	0.14				
Queue Length 95th (ft)	62	105	4	0	0	2	0	0				
Control Delay (s)	46.9	65.4	9.3	0.0	0.0	9.6	0.0	0.0				
Lane LOS	E	F	A			A						
Approach Delay (s)	46.9	65.4	0.5			0.3						
Approach LOS	E	F										
Intersection Summary												
Average Delay			6.7									
Intersection Capacity Utilization			40.4%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

140: W Cleveland St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	1	40	1	5	1	20	680	1	20	515	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	6	1	49	1	6	1	24	829	1	24	628	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								750			349	
pX, platoon unblocked	0.92	0.92	0.92	0.92	0.92		0.92					
vC, conflicting volume	1148	1559	317	1291	1562	415	634			830		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	988	1435	86	1143	1437	415	430			830		
tC, single (s)	7.6	6.6	7.0	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	96	99	94	99	95	100	98			97		
cM capacity (veh/h)	169	114	877	130	117	592	1023			772		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	56	9	24	553	278	24	419	215				
Volume Left	6	1	24	0	0	24	0	0				
Volume Right	49	1	0	0	1	0	0	6				
cSH	548	134	1023	1700	1700	772	1700	1700				
Volume to Capacity	0.10	0.06	0.02	0.33	0.16	0.03	0.25	0.13				
Queue Length 95th (ft)	9	5	2	0	0	2	0	0				
Control Delay (s)	12.3	33.6	8.6	0.0	0.0	9.8	0.0	0.0				
Lane LOS	B	D	A			A						
Approach Delay (s)	12.3	33.6	0.2			0.4						
Approach LOS	B	D										
Intersection Summary												
Average Delay			0.9									
Intersection Capacity Utilization			29.0%			ICU Level of Service			A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

150: W Doege St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	245	30	35	285	60	115	535	35	20	475	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	5.2		5.2	5.2		5.2	5.2		5.2	5.2	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1814		1752	1797		1687	3343		1719	3417	
Flt Permitted	0.31	1.00		0.41	1.00		0.39	1.00		0.34	1.00	
Satd. Flow (perm)	563	1814		757	1797		685	3343		613	3417	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	56	302	37	43	352	74	142	660	43	25	586	25
RTOR Reduction (vph)	0	5	0	0	9	0	0	5	0	0	3	0
Lane Group Flow (vph)	56	334	0	43	417	0	142	698	0	25	608	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	7%	7%	7%	5%	5%	5%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			4			2			2		
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	31.7	31.7		31.7	31.7		47.9	47.9		47.9	47.9	
Effective Green, g (s)	31.7	31.7		31.7	31.7		47.9	47.9		47.9	47.9	
Actuated g/C Ratio	0.35	0.35		0.35	0.35		0.53	0.53		0.53	0.53	
Clearance Time (s)	5.2	5.2		5.2	5.2		5.2	5.2		5.2	5.2	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	198	639		267	633		365	1779		326	1819	
v/s Ratio Prot		0.18			c0.23			c0.21			0.18	
v/s Ratio Perm	0.10			0.06			0.21			0.04		
v/c Ratio	0.28	0.52		0.16	0.66		0.39	0.39		0.08	0.33	
Uniform Delay, d1	21.0	23.1		20.0	24.6		12.4	12.4		10.3	12.0	
Progression Factor	1.00	1.00		1.00	1.00		0.79	0.82		1.00	1.00	
Incremental Delay, d2	1.6	1.5		0.6	3.3		3.1	0.6		0.5	0.5	
Delay (s)	22.6	24.6		20.6	27.9		12.9	10.8		10.7	12.5	
Level of Service	C	C		C	C		B	B		B	B	
Approach Delay (s)		24.3			27.2			11.2			12.4	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM Average Control Delay	16.9			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.50											
Actuated Cycle Length (s)	90.0			Sum of lost time (s)			10.4					
Intersection Capacity Utilization	107.1%			ICU Level of Service			G					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

160: W Edison St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	5	30	1	5	15	40	595	5	15	485	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	6	6	38	1	6	19	50	744	6	19	606	19
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								380				
pX, platoon unblocked	0.91	0.91		0.91	0.91	0.91				0.91		
vC, conflicting volume	1147	1503	312	1228	1509	375	625			750		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	954	1348	312	1044	1355	102	625			516		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.2			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	96	95	95	99	95	98	95			98		
cM capacity (veh/h)	174	128	689	139	120	834	926			910		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	50	26	50	496	254	19	404	221				
Volume Left	6	1	50	0	0	19	0	0				
Volume Right	38	19	0	0	6	0	0	19				
cSH	359	314	926	1700	1700	910	1700	1700				
Volume to Capacity	0.14	0.08	0.05	0.29	0.15	0.02	0.24	0.13				
Queue Length 95th (ft)	12	7	4	0	0	2	0	0				
Control Delay (s)	16.6	17.5	9.1	0.0	0.0	9.0	0.0	0.0				
Lane LOS	C	C	A			A						
Approach Delay (s)	16.6	17.5	0.6			0.3						
Approach LOS	C	C										
Intersection Summary												
Average Delay			1.3									
Intersection Capacity Utilization			34.1%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

170: W Franklin St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	1	1	10	1	610	5	5	510	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	1	1	6	1	1	12	1	744	6	6	622	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								749				
pX, platoon unblocked	0.96	0.96		0.96	0.96	0.96				0.96		
vC, conflicting volume	1022	1387	312	1079	1385	375	623			750		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	943	1323	312	1003	1320	270	623			660		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	99	99	99	99	99	98	100			99		
cM capacity (veh/h)	206	150	690	188	151	705	927			851		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	9	15	1	496	254	6	415	209				
Volume Left	1	1	1	0	0	6	0	0				
Volume Right	6	12	0	0	6	0	0	1				
cSH	373	459	927	1700	1700	851	1700	1700				
Volume to Capacity	0.02	0.03	0.00	0.29	0.15	0.01	0.24	0.12				
Queue Length 95th (ft)	2	2	0	0	0	1	0	0				
Control Delay (s)	14.9	13.1	8.9	0.0	0.0	9.3	0.0	0.0				
Lane LOS	B	B	A			A						
Approach Delay (s)	14.9	13.1	0.0			0.1						
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			27.0%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

180: W Grant St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	1	15	5	35	1	615	5	15	500	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	1	1	1	19	6	43	1	759	6	19	617	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								1126				
pX, platoon unblocked												
vC, conflicting volume	1083	1423	309	1112	1420	383	619			765		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1083	1423	309	1112	1420	383	619			765		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	99	99	100	89	95	93	100			98		
cM capacity (veh/h)	153	134	693	161	134	621	938			818		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	4	68	1	506	259	19	412	207				
Volume Left	1	19	1	0	0	19	0	0				
Volume Right	1	43	0	0	6	0	0	1				
cSH	195	295	938	1700	1700	818	1700	1700				
Volume to Capacity	0.02	0.23	0.00	0.30	0.15	0.02	0.24	0.12				
Queue Length 95th (ft)	1	22	0	0	0	2	0	0				
Control Delay (s)	23.9	20.8	8.8	0.0	0.0	9.5	0.0	0.0				
Lane LOS	C	C	A			A						
Approach Delay (s)	23.9	20.8	0.0			0.3						
Approach LOS	C	C										
Intersection Summary												
Average Delay			1.1									
Intersection Capacity Utilization			27.8%			ICU Level of Service				A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

190: W Harrison St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	1	1	5	5	645	1	5	510	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	1	1	6	1	1	6	6	787	1	6	622	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1055	1443	320	1129	1452	394	640			788		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1055	1443	320	1129	1452	394	640			788		
tC, single (s)	7.5	6.5	6.9	7.8	6.8	7.2	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.2			2.3		
p0 queue free %	99	99	99	99	99	99	99			99		
cM capacity (veh/h)	177	132	682	141	115	572	920			802		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	9	9	6	524	263	6	415	226				
Volume Left	1	1	6	0	0	6	0	0				
Volume Right	6	6	0	0	1	0	0	18				
cSH	340	285	920	1700	1700	802	1700	1700				
Volume to Capacity	0.03	0.03	0.01	0.31	0.15	0.01	0.24	0.13				
Queue Length 95th (ft)	2	2	1	0	0	1	0	0				
Control Delay (s)	15.9	18.0	8.9	0.0	0.0	9.5	0.0	0.0				
Lane LOS	C	C	A			A						
Approach Delay (s)	15.9	18.0	0.1			0.1						
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			27.9%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

120: W Arnold St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	90	50	30	120	50	60	785	30	40	985	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1787	1798		1787	3555		1770	3518	
Flt Permitted	0.51	1.00	1.00	0.69	1.00		0.22	1.00		0.29	1.00	
Satd. Flow (perm)	947	1863	1583	1304	1798		414	3555		549	3518	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	77	99	55	33	132	55	66	863	33	44	1082	44
RTOR Reduction (vph)	0	0	45	0	22	0	0	2	0	0	2	0
Lane Group Flow (vph)	77	99	10	33	165	0	66	894	0	44	1124	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Perm		Perm	Perm			Perm			Perm		
Protected Phases	4				8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	16.9	16.9	16.9	16.9	16.9		63.1	63.1		63.1	63.1	
Effective Green, g (s)	16.9	16.9	16.9	16.9	16.9		63.1	63.1		63.1	63.1	
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.19		0.70	0.70		0.70	0.70	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	178	350	297	245	338		290	2492		385	2467	
v/s Ratio Prot		0.05			c0.09			0.25			c0.32	
v/s Ratio Perm	0.08		0.01	0.03			0.16			0.08		
v/c Ratio	0.43	0.28	0.03	0.13	0.49		0.23	0.36		0.11	0.46	
Uniform Delay, d1	32.3	31.4	29.9	30.5	32.7		4.8	5.4		4.4	5.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.20	1.01	
Incremental Delay, d2	3.5	0.9	0.1	0.5	2.3		1.8	0.4		0.3	0.3	
Delay (s)	35.8	32.3	30.0	31.0	35.0		6.6	5.8		5.5	6.2	
Level of Service	D	C	C	C	C		A	A		A	A	
Approach Delay (s)		32.9			34.4			5.8			6.2	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM Average Control Delay			10.9	HCM Level of Service					B			
HCM Volume to Capacity ratio			0.46									
Actuated Cycle Length (s)			90.0	Sum of lost time (s)					10.0			
Intersection Capacity Utilization			82.7%	ICU Level of Service					E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

130: W Blodgett St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	15	45	15	5	35	15	885	5	35	1005	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	5	15	46	15	5	36	15	903	5	36	1026	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								373			726	
pX, platoon unblocked	0.92	0.92	0.88	0.92	0.92	0.92	0.88			0.92		
vC, conflicting volume	1620	2038	515	1574	2038	454	1031			908		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1119	1572	186	1069	1572	236	770			729		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	84	94	88	95	95	98			96		
cM capacity (veh/h)	131	96	733	129	96	711	748			802		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	66	56	15	602	306	36	684	347				
Volume Left	5	15	15	0	0	36	0	0				
Volume Right	46	36	0	0	5	0	0	5				
cSH	255	253	748	1700	1700	802	1700	1700				
Volume to Capacity	0.26	0.22	0.02	0.35	0.18	0.04	0.40	0.20				
Queue Length 95th (ft)	25	21	2	0	0	3	0	0				
Control Delay (s)	24.1	23.2	9.9	0.0	0.0	9.7	0.0	0.0				
Lane LOS	C	C	A			A						
Approach Delay (s)	24.1	23.2	0.2			0.3						
Approach LOS	C	C										
Intersection Summary												
Average Delay			1.6									
Intersection Capacity Utilization			43.3%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

140: W Cleveland St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	5	35	1	1	5	20	900	5	5	1010	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	1	5	38	1	1	5	22	968	5	5	1086	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								750			349	
pX, platoon unblocked	0.85	0.85	0.84	0.85	0.85	0.98	0.84			0.98		
vC, conflicting volume	1638	2121	551	1608	2126	487	1102			973		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1269	1839	69	1233	1846	427	728			925		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	91	95	99	98	99	97			99		
cM capacity (veh/h)	102	62	824	99	62	568	728			717		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	44	8	22	645	328	5	724	378				
Volume Left	1	1	22	0	0	5	0	0				
Volume Right	38	5	0	0	5	0	0	16				
cSH	309	200	728	1700	1700	717	1700	1700				
Volume to Capacity	0.14	0.04	0.03	0.38	0.19	0.01	0.43	0.22				
Queue Length 95th (ft)	12	3	2	0	0	1	0	0				
Control Delay (s)	18.6	23.8	10.1	0.0	0.0	10.1	0.0	0.0				
Lane LOS	C	C	B			B						
Approach Delay (s)	18.6	23.8	0.2			0.0						
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.6									
Intersection Capacity Utilization			38.4%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

150: W Doege St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	265	125	40	80	60	30	835	40	40	865	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	5.2		5.2	5.2		5.2	5.2		5.2	5.2	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.94		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1808		1787	1760		1770	3515		1787	3537	
Flt Permitted	0.66	1.00		0.30	1.00		0.23	1.00		0.25	1.00	
Satd. Flow (perm)	1255	1808		573	1760		424	3515		469	3537	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	279	132	42	84	63	32	879	42	42	911	68
RTOR Reduction (vph)	0	21	0	0	34	0	0	3	0	0	5	0
Lane Group Flow (vph)	63	390	0	42	113	0	32	918	0	42	974	0
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	2%	2%	2%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			4			2			2		
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	30.1	30.1		30.1	30.1		49.5	49.5		49.5	49.5	
Effective Green, g (s)	30.1	30.1		30.1	30.1		49.5	49.5		49.5	49.5	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.55	0.55		0.55	0.55	
Clearance Time (s)	5.2	5.2		5.2	5.2		5.2	5.2		5.2	5.2	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	420	605		192	589		233	1933		258	1945	
v/s Ratio Prot	c0.22			0.06			0.26			c0.28		
v/s Ratio Perm	0.05			0.07			0.08			0.09		
v/c Ratio	0.15	0.64		0.22	0.19		0.14	0.47		0.16	0.50	
Uniform Delay, d1	21.0	25.4		21.5	21.3		9.9	12.3		10.0	12.6	
Progression Factor	1.00	1.00		1.00	1.00		0.82	0.79		1.00	1.00	
Incremental Delay, d2	0.3	3.2		1.2	0.3		1.2	0.8		1.4	0.9	
Delay (s)	21.3	28.6		22.7	21.6		9.3	10.5		11.4	13.5	
Level of Service	C	C		C	C		A	B		B	B	
Approach Delay (s)	27.6			21.9			10.5			13.4		
Approach LOS	C			C			B			B		
Intersection Summary												
HCM Average Control Delay			15.5	HCM Level of Service			B					
HCM Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			90.0	Sum of lost time (s)			10.4					
Intersection Capacity Utilization			88.6%	ICU Level of Service			E					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

160: W Edison St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	5	60	1	1	5	15	925	15	20	910	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	5	65	1	1	5	16	1005	16	22	989	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								380				
pX, platoon unblocked	0.85	0.85		0.85	0.85	0.85				0.85		
vC, conflicting volume	1582	2095	503	1652	2095	511	1005			1022		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1330	1934	503	1413	1934	68	1005			670		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	90	87	98	98	99	98			97		
cM capacity (veh/h)	92	54	519	66	54	838	685			778		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	82	8	16	670	351	22	659	346				
Volume Left	11	1	16	0	0	22	0	0				
Volume Right	65	5	0	0	16	0	0	16				
cSH	236	176	685	1700	1700	778	1700	1700				
Volume to Capacity	0.35	0.04	0.02	0.39	0.21	0.03	0.39	0.20				
Queue Length 95th (ft)	37	3	2	0	0	2	0	0				
Control Delay (s)	28.1	26.4	10.4	0.0	0.0	9.8	0.0	0.0				
Lane LOS	D	D	B			A						
Approach Delay (s)	28.1	26.4	0.2			0.2						
Approach LOS	D	D										
Intersection Summary												
Average Delay			1.3									
Intersection Capacity Utilization			38.6%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

170: W Franklin St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	5	1	5	1	925	15	15	935	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	1	1	5	5	1	5	1	1016	16	16	1027	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								749				
pX, platoon unblocked	0.88	0.88		0.88	0.88	0.88				0.88		
vC, conflicting volume	1580	2098	516	1580	2093	516	1033			1033		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1377	1970	516	1377	1964	163	1033			753		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	98	99	94	98	99	100			98		
cM capacity (veh/h)	89	54	509	89	55	752	668			747		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	8	12	1	678	355	16	685	348				
Volume Left	1	5	1	0	0	16	0	0				
Volume Right	5	5	0	0	16	0	0	5				
cSH	177	135	668	1700	1700	747	1700	1700				
Volume to Capacity	0.04	0.09	0.00	0.40	0.21	0.02	0.40	0.20				
Queue Length 95th (ft)	3	7	0	0	0	2	0	0				
Control Delay (s)	26.3	34.2	10.4	0.0	0.0	9.9	0.0	0.0				
Lane LOS	D	D	B			A						
Approach Delay (s)	26.3	34.2	0.0			0.2						
Approach LOS	D	D										
Intersection Summary												
Average Delay			0.4									
Intersection Capacity Utilization			36.0%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

180: W Grant St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	15	1	30	1	915	15	30	935	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	1	5	16	1	33	1	995	16	33	1016	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								1126				
pX, platoon unblocked	0.93	0.93		0.93	0.93	0.93				0.93		
vC, conflicting volume	1617	2097	511	1584	2092	505	1022			1011		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1513	2029	511	1478	2023	318	1022			861		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	98	99	78	98	95	100			95		
cM capacity (veh/h)	70	52	513	74	49	623	675			722		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	8	50	1	663	348	33	678	344				
Volume Left	1	16	1	0	0	33	0	0				
Volume Right	5	33	0	0	16	0	0	5				
cSH	161	170	675	1700	1700	722	1700	1700				
Volume to Capacity	0.05	0.29	0.00	0.39	0.20	0.05	0.40	0.20				
Queue Length 95th (ft)	4	29	0	0	0	4	0	0				
Control Delay (s)	28.4	34.7	10.3	0.0	0.0	10.2	0.0	0.0				
Lane LOS	D	D	B			B						
Approach Delay (s)	28.4	34.7	0.0			0.3						
Approach LOS	D	D										
Intersection Summary												
Average Delay			1.1									
Intersection Capacity Utilization			38.0%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

190: W Harrison St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	1	5	5	1	20	5	925	15	20	960	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	1	5	5	1	22	5	1005	16	22	1043	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1631	2128	530	1596	2128	511	1060			1022		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1631	2128	530	1596	2128	511	1060			1022		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	98	99	92	98	96	99			97		
cM capacity (veh/h)	63	48	499	69	48	513	653			669		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	12	28	5	670	351	22	696	364				
Volume Left	5	5	5	0	0	22	0	0				
Volume Right	5	22	0	0	16	0	0	16				
cSH	99	196	653	1700	1700	669	1700	1700				
Volume to Capacity	0.12	0.14	0.01	0.39	0.21	0.03	0.41	0.21				
Queue Length 95th (ft)	10	12	1	0	0	3	0	0				
Control Delay (s)	46.1	26.4	10.6	0.0	0.0	10.6	0.0	0.0				
Lane LOS	E	D	B			B						
Approach Delay (s)	46.1	26.4	0.1			0.2						
Approach LOS	E	D										
Intersection Summary												
Average Delay			0.7									
Intersection Capacity Utilization			37.0%		ICU Level of Service			A				
Analysis Period (min)			15									

Appendix F

Peak Hour Analysis Outputs

Five-Lane TWLTL Cross Section

Year 2017 Projected Traffic

Year 2037 Projected Traffic

HCM Signalized Intersection Capacity Analysis

120: W Arnold St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	35	35	10	130	25	25	470	5	10	440	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1881	1599	1752	1801		1687	3368		1656	3301	
Flt Permitted	0.53	1.00	1.00	0.73	1.00		0.46	1.00		0.45	1.00	
Satd. Flow (perm)	1001	1881	1599	1348	1801		823	3368		786	3301	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	51	40	40	11	148	28	28	534	6	11	500	11
RTOR Reduction (vph)	0	0	33	0	10	0	0	1	0	0	1	0
Lane Group Flow (vph)	51	40	7	11	166	0	28	539	0	11	510	0
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	7%	7%	7%	9%	9%	9%
Turn Type	Perm		Perm	Perm			Perm		Perm			
Protected Phases	4				8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	16.7	16.7	16.7	16.7	16.7		63.3	63.3		63.3	63.3	
Effective Green, g (s)	16.7	16.7	16.7	16.7	16.7		63.3	63.3		63.3	63.3	
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.19		0.70	0.70		0.70	0.70	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	186	349	297	250	334		579	2369		553	2322	
v/s Ratio Prot		0.02			c0.09			c0.16			0.15	
v/s Ratio Perm	0.05		0.00	0.01			0.03			0.01		
v/c Ratio	0.27	0.11	0.02	0.04	0.50		0.05	0.23		0.02	0.22	
Uniform Delay, d1	31.4	30.5	30.0	30.1	32.9		4.1	4.7		4.0	4.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.76	0.75	
Incremental Delay, d2	1.7	0.3	0.1	0.2	2.4		0.2	0.2		0.0	0.1	
Delay (s)	33.1	30.8	30.1	30.2	35.3		4.3	4.9		3.1	3.6	
Level of Service	C	C	C	C	D		A	A		A	A	
Approach Delay (s)		31.5			35.0			4.9			3.6	
Approach LOS		C			D			A			A	
Intersection Summary												
HCM Average Control Delay			10.9	HCM Level of Service			B					
HCM Volume to Capacity ratio			0.28									
Actuated Cycle Length (s)			90.0	Sum of lost time (s)			10.0					
Intersection Capacity Utilization			58.3%	ICU Level of Service			B					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

130: W Blodgett St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	10	30	5	35	35	25	505	10	10	425	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	13	13	39	6	45	45	32	656	13	13	552	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage (veh)								2			2	
Upstream signal (ft)								373			726	
pX, platoon unblocked	0.97	0.97	1.00	0.97	0.97	0.97	1.00			0.97		
vC, conflicting volume	1040	1312	277	1075	1306	334	553			669		
vC1, stage 1 conf vol	579	579		727	727							
vC2, stage 2 conf vol	461	734		347	579							
vCu, unblocked vol	958	1240	266	994	1234	243	544			588		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.2			4.2		
tC, 2 stage (s)	6.5	5.5		6.6	5.6							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	96	96	95	98	87	94	97			99		
cM capacity (veh/h)	363	349	735	343	338	724	990			924		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	65	97	32	437	232	13	368	185				
Volume Left	13	6	32	0	0	13	0	0				
Volume Right	39	45	0	0	13	0	0	1				
cSH	515	450	990	1700	1700	924	1700	1700				
Volume to Capacity	0.13	0.22	0.03	0.26	0.14	0.01	0.22	0.11				
Queue Length 95th (ft)	11	20	3	0	0	1	0	0				
Control Delay (s)	13.0	15.2	8.8	0.0	0.0	9.0	0.0	0.0				
Lane LOS	B	C	A			A						
Approach Delay (s)	13.0	15.2	0.4			0.2						
Approach LOS	B	C										
Intersection Summary												
Average Delay			1.9									
Intersection Capacity Utilization			33.3%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

140: W Cleveland St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	1	30	1	5	1	15	535	1	15	405	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	6	1	37	1	6	1	18	652	1	18	494	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage (veh)								2			2	
Upstream signal (ft)								750			349	
pX, platoon unblocked	0.95	0.95	0.95	0.95	0.95		0.95					
vC, conflicting volume	901	1224	250	1010	1226	327	500			654		
vC1, stage 1 conf vol	534	534		690	690							
vC2, stage 2 conf vol	367	690		321	537							
vCu, unblocked vol	790	1130	105	906	1133	327	369			654		
tC, single (s)	7.6	6.6	7.0	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)	6.6	5.6		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	99	100	96	100	98	100	98			98		
cM capacity (veh/h)	451	362	879	372	374	675	1114			903		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	44	9	18	435	219	18	329	171				
Volume Left	6	1	18	0	0	18	0	0				
Volume Right	37	1	0	0	1	0	0	6				
cSH	751	399	1114	1700	1700	903	1700	1700				
Volume to Capacity	0.06	0.02	0.02	0.26	0.13	0.02	0.19	0.10				
Queue Length 95th (ft)	5	2	1	0	0	2	0	0				
Control Delay (s)	10.1	14.2	8.3	0.0	0.0	9.1	0.0	0.0				
Lane LOS	B	B	A			A						
Approach Delay (s)	10.1	14.2	0.2			0.3						
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.7									
Intersection Capacity Utilization			24.8%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

150: W Doege St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	190	25	25	225	45	90	425	25	15	375	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	5.2		5.2	5.2		5.2	5.2		5.2	5.2	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1812		1752	1798		1687	3346		1719	3418	
Flt Permitted	0.38	1.00		0.48	1.00		0.47	1.00		0.42	1.00	
Satd. Flow (perm)	705	1812		882	1798		829	3346		768	3418	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	49	235	31	31	278	56	111	525	31	19	463	19
RTOR Reduction (vph)	0	6	0	0	8	0	0	4	0	0	3	0
Lane Group Flow (vph)	49	260	0	31	326	0	111	552	0	19	479	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	7%	7%	7%	5%	5%	5%
Turn Type	Perm		Perm			Perm			Perm			
Protected Phases	4		4			2			2			
Permitted Phases	4		4			2			2			
Actuated Green, G (s)	28.1	28.1		28.1	28.1		51.5	51.5		51.5	51.5	
Effective Green, g (s)	28.1	28.1		28.1	28.1		51.5	51.5		51.5	51.5	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.57	0.57		0.57	0.57	
Clearance Time (s)	5.2	5.2		5.2	5.2		5.2	5.2		5.2	5.2	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	220	566		275	561		474	1915		439	1956	
v/s Ratio Prot		0.14			c0.18			c0.16			0.14	
v/s Ratio Perm	0.07			0.04			0.13			0.02		
v/c Ratio	0.22	0.46		0.11	0.58		0.23	0.29		0.04	0.24	
Uniform Delay, d1	22.9	24.9		22.1	26.0		9.5	9.9		8.4	9.6	
Progression Factor	1.00	1.00		1.00	1.00		0.88	0.89		1.00	1.00	
Incremental Delay, d2	1.1	1.2		0.4	2.4		1.1	0.4		0.2	0.3	
Delay (s)	24.0	26.1		22.4	28.4		9.5	9.1		8.6	9.9	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)		25.8			27.9			9.2			9.8	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM Average Control Delay			15.9	HCM Level of Service			B					
HCM Volume to Capacity ratio			0.39									
Actuated Cycle Length (s)			90.0	Sum of lost time (s)			10.4					
Intersection Capacity Utilization			102.9%	ICU Level of Service			G					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

160: W Edison St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	5	20	1	5	10	35	470	5	10	385	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	6	6	25	1	6	12	44	588	6	12	481	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage (veh)								2			2	
Upstream signal (ft)								380				
pX, platoon unblocked	0.94	0.94		0.94	0.94	0.94				0.94		
vC, conflicting volume	909	1194	247	972	1197	297	494			594		
vC1, stage 1 conf vol	512	512		678	678							
vC2, stage 2 conf vol	397	681		294	519							
vCu, unblocked vol	780	1082	247	847	1085	130	494			445		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.2			4.3		
tC, 2 stage (s)	6.5	5.5		6.6	5.6							
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	99	98	97	100	98	98	96			99		
cM capacity (veh/h)	447	384	759	390	364	832	1038			1008		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	38	20	44	392	202	12	321	173				
Volume Left	6	1	44	0	0	12	0	0				
Volume Right	25	12	0	0	6	0	0	12				
cSH	593	565	1038	1700	1700	1008	1700	1700				
Volume to Capacity	0.06	0.04	0.04	0.23	0.12	0.01	0.19	0.10				
Queue Length 95th (ft)	5	3	3	0	0	1	0	0				
Control Delay (s)	11.5	11.6	8.6	0.0	0.0	8.6	0.0	0.0				
Lane LOS	B	B	A			A						
Approach Delay (s)	11.5	11.6	0.6			0.2						
Approach LOS	B	B										
Intersection Summary												
Average Delay			1.0									
Intersection Capacity Utilization			29.8%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

170: W Franklin St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	1	1	10	1	480	5	5	400	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	1	1	6	1	1	12	1	585	6	6	488	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage (veh)								2			2	
Upstream signal (ft)								749				
pX, platoon unblocked	0.99	0.99		0.99	0.99	0.99				0.99		
vC, conflicting volume	809	1095	245	854	1092	296	489			591		
vC1, stage 1 conf vol	501	501		591	591							
vC2, stage 2 conf vol	308	594		263	501							
vCu, unblocked vol	787	1076	245	832	1073	269	489			568		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.3		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	100	100	99	100	100	98	100			99		
cM capacity (veh/h)	465	407	762	436	410	728	1043			951		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	9	15	1	390	201	6	325	164				
Volume Left	1	1	1	0	0	6	0	0				
Volume Right	6	12	0	0	6	0	0	1				
cSH	627	650	1043	1700	1700	951	1700	1700				
Volume to Capacity	0.01	0.02	0.00	0.23	0.12	0.01	0.19	0.10				
Queue Length 95th (ft)	1	2	0	0	0	0	0	0				
Control Delay (s)	10.8	10.7	8.5	0.0	0.0	8.8	0.0	0.0				
Lane LOS	B	B	A			A						
Approach Delay (s)	10.8	10.7	0.0			0.1						
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			23.4%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

180: W Grant St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	1	10	5	25	1	485	5	10	395	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	1	1	1	12	6	31	1	599	6	12	488	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage (veh)								2			2	
Upstream signal (ft)								1126				
pX, platoon unblocked												
vC, conflicting volume	849	1120	244	875	1118	302	489			605		
vC1, stage 1 conf vol	513	513		604	604							
vC2, stage 2 conf vol	336	607		270	514							
vCu, unblocked vol	849	1120	244	875	1118	302	489			605		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	100	100	100	97	98	96	100			99		
cM capacity (veh/h)	436	393	762	419	398	700	1050			942		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	4	49	1	399	206	12	325	164				
Volume Left	1	12	1	0	0	12	0	0				
Volume Right	1	31	0	0	6	0	0	1				
cSH	488	554	1050	1700	1700	942	1700	1700				
Volume to Capacity	0.01	0.09	0.00	0.23	0.12	0.01	0.19	0.10				
Queue Length 95th (ft)	1	7	0	0	0	1	0	0				
Control Delay (s)	12.4	12.1	8.4	0.0	0.0	8.9	0.0	0.0				
Lane LOS	B	B	A			A						
Approach Delay (s)	12.4	12.1	0.0			0.2						
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.7									
Intersection Capacity Utilization			23.6%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

190: W Harrison St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	1	1	5	5	505	1	5	400	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	1	1	6	1	1	6	6	616	1	6	488	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage (veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	833	1135	250	891	1141	309	500			617		
vC1, stage 1 conf vol	506	506		629	629							
vC2, stage 2 conf vol	327	629		263	512							
vCu, unblocked vol	833	1135	250	891	1141	309	500			617		
tC, single (s)	7.5	6.5	6.9	7.8	6.8	7.2	4.2			4.2		
tC, 2 stage (s)	6.5	5.5		6.8	5.8							
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.2			2.3		
p0 queue free %	100	100	99	100	100	99	99			99		
cM capacity (veh/h)	453	390	756	376	362	653	1040			932		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	9	9	6	411	207	6	325	175				
Volume Left	1	1	6	0	0	6	0	0				
Volume Right	6	6	0	0	1	0	0	12				
cSH	615	535	1040	1700	1700	932	1700	1700				
Volume to Capacity	0.01	0.02	0.01	0.24	0.12	0.01	0.19	0.10				
Queue Length 95th (ft)	1	1	0	0	0	0	0	0				
Control Delay (s)	10.9	11.8	8.5	0.0	0.0	8.9	0.0	0.0				
Lane LOS	B	B	A			A						
Approach Delay (s)	10.9	11.8	0.1			0.1						
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			24.0%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

120: W Arnold St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	70	40	20	95	40	50	620	20	35	780	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1787	1797		1787	3557		1770	3517	
Flt Permitted	0.59	1.00	1.00	0.71	1.00		0.30	1.00		0.37	1.00	
Satd. Flow (perm)	1104	1863	1583	1330	1797		560	3557		698	3517	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	60	77	44	22	104	44	55	681	22	38	857	38
RTOR Reduction (vph)	0	0	36	0	19	0	0	2	0	0	3	0
Lane Group Flow (vph)	60	77	8	22	129	0	55	701	0	38	892	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Perm		Perm	Perm			Perm		Perm			
Protected Phases	4				8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	15.7	15.7	15.7	15.7	15.7		64.3	64.3		64.3	64.3	
Effective Green, g (s)	15.7	15.7	15.7	15.7	15.7		64.3	64.3		64.3	64.3	
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.17		0.71	0.71		0.71	0.71	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	193	325	276	232	313		400	2541		499	2513	
v/s Ratio Prot		0.04			c0.07			0.20			c0.25	
v/s Ratio Perm	0.05		0.00	0.02			0.10			0.05		
v/c Ratio	0.31	0.24	0.03	0.09	0.41		0.14	0.28		0.08	0.36	
Uniform Delay, d1	32.4	32.0	30.8	31.2	33.0		4.1	4.6		3.9	4.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.77	0.74	
Incremental Delay, d2	1.9	0.8	0.1	0.4	1.8		0.7	0.3		0.1	0.2	
Delay (s)	34.4	32.8	30.9	31.6	34.9		4.8	4.8		3.1	3.8	
Level of Service	C	C	C	C	C		A	A		A	A	
Approach Delay (s)		32.8			34.5			4.8			3.8	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM Average Control Delay			9.3		HCM Level of Service				A			
HCM Volume to Capacity ratio			0.37									
Actuated Cycle Length (s)			90.0		Sum of lost time (s)				10.0			
Intersection Capacity Utilization			76.8%		ICU Level of Service				D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

130: W Blodgett St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	10	35	10	5	25	10	700	5	25	805	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	5	10	36	10	5	26	10	714	5	26	821	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage veh								2			2	
Upstream signal (ft)								373			726	
pX, platoon unblocked	0.96	0.96	0.93	0.96	0.96	0.95	0.93			0.95		
vC, conflicting volume	1281	1615	413	1240	1615	360	827			719		
vC1, stage 1 conf vol	875	875		737	737							
vC2, stage 2 conf vol	406	740		503	878							
vCu, unblocked vol	971	1320	231	929	1320	219	674			598		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	97	95	97	98	97	99			97		
cM capacity (veh/h)	328	314	726	367	315	751	860			925		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	51	41	10	476	243	26	548	279				
Volume Left	5	10	10	0	0	26	0	0				
Volume Right	36	26	0	0	5	0	0	5				
cSH	524	524	860	1700	1700	925	1700	1700				
Volume to Capacity	0.10	0.08	0.01	0.28	0.14	0.03	0.32	0.16				
Queue Length 95th (ft)	8	6	1	0	0	2	0	0				
Control Delay (s)	12.6	12.5	9.2	0.0	0.0	9.0	0.0	0.0				
Lane LOS	B	B	A			A						
Approach Delay (s)	12.6	12.5	0.1			0.3						
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.9									
Intersection Capacity Utilization			33.7%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

140: W Cleveland St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	5	25	1	1	5	15	710	5	5	810	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	1	5	27	1	1	5	16	763	5	5	871	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage (veh)								2			2	
Upstream signal (ft)								750			349	
pX, platoon unblocked	0.90	0.90	0.89	0.90	0.90	1.00	0.89			1.00		
vC, conflicting volume	1307	1688	441	1274	1691	384	882			769		
vC1, stage 1 conf vol	887	887		798	798							
vC2, stage 2 conf vol	420	801		476	892							
vCu, unblocked vol	1088	1514	135	1052	1517	373	629			759		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	98	97	100	100	99	98			99		
cM capacity (veh/h)	340	297	799	321	294	627	848			844		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	33	8	16	509	260	5	581	301				
Volume Left	1	1	16	0	0	5	0	0				
Volume Right	27	5	0	0	5	0	0	11				
cSH	608	483	848	1700	1700	844	1700	1700				
Volume to Capacity	0.05	0.02	0.02	0.30	0.15	0.01	0.34	0.18				
Queue Length 95th (ft)	4	1	1	0	0	0	0	0				
Control Delay (s)	11.3	12.6	9.3	0.0	0.0	9.3	0.0	0.0				
Lane LOS	B	B	A			A						
Approach Delay (s)	11.3	12.6	0.2			0.1						
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.4									
Intersection Capacity Utilization			32.7%			ICU Level of Service				A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

150: W Doege St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	205	95	30	60	50	25	660	30	30	700	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	5.2		5.2	5.2		5.2	5.2		5.2	5.2	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.93		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1810		1787	1752		1770	3516		1787	3535	
Flt Permitted	0.68	1.00		0.38	1.00		0.31	1.00		0.34	1.00	
Satd. Flow (perm)	1296	1810		716	1752		584	3516		647	3535	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	216	100	32	63	53	26	695	32	32	737	58
RTOR Reduction (vph)	0	19	0	0	34	0	0	4	0	0	6	0
Lane Group Flow (vph)	53	297	0	32	82	0	26	723	0	32	789	0
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	2%	2%	2%	1%	1%	1%
Turn Type	Perm		Perm			Perm			Perm			
Protected Phases	4		4			2			2			
Permitted Phases	4		4			2			2			
Actuated Green, G (s)	25.7	25.7		25.7	25.7		53.9	53.9		53.9	53.9	
Effective Green, g (s)	25.7	25.7		25.7	25.7		53.9	53.9		53.9	53.9	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.60	0.60		0.60	0.60	
Clearance Time (s)	5.2	5.2		5.2	5.2		5.2	5.2		5.2	5.2	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	370	517		204	500		350	2106		387	2117	
v/s Ratio Prot	c0.16		0.05			0.21			c0.22			
v/s Ratio Perm	0.04		0.04			0.04			0.05			
v/c Ratio	0.14	0.58		0.16	0.16		0.07	0.34		0.08	0.37	
Uniform Delay, d1	23.9	27.5		24.0	24.1		7.6	9.1		7.6	9.3	
Progression Factor	1.00	1.00		1.00	1.00		0.88	0.87		1.00	1.00	
Incremental Delay, d2	0.4	2.5		0.8	0.3		0.4	0.4		0.4	0.5	
Delay (s)	24.3	30.0		24.8	24.4		7.1	8.4		8.0	9.8	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)	29.1		24.5			8.3			9.8			
Approach LOS	C		C			A			A			
Intersection Summary												
HCM Average Control Delay			13.7	HCM Level of Service			B					
HCM Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			90.0	Sum of lost time (s)			10.4					
Intersection Capacity Utilization			61.9%	ICU Level of Service			B					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

160: W Edison St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	5	50	1	1	5	10	740	10	15	735	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	54	1	1	5	11	804	11	16	799	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage (veh)								2			2	
Upstream signal (ft)								380				
pX, platoon unblocked	0.91	0.91		0.91	0.91	0.91				0.91		
vC, conflicting volume	1267	1674	405	1321	1674	408	810			815		
vC1, stage 1 conf vol	837	837		832	832							
vC2, stage 2 conf vol	430	837		489	842							
vCu, unblocked vol	1087	1536	405	1146	1536	138	810			588		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	98	91	100	100	99	99			98		
cM capacity (veh/h)	306	291	601	321	291	807	812			890		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	65	8	11	536	279	16	533	277				
Volume Left	5	1	11	0	0	16	0	0				
Volume Right	54	5	0	0	11	0	0	11				
cSH	514	549	812	1700	1700	890	1700	1700				
Volume to Capacity	0.13	0.01	0.01	0.32	0.16	0.02	0.31	0.16				
Queue Length 95th (ft)	11	1	1	0	0	1	0	0				
Control Delay (s)	13.0	11.7	9.5	0.0	0.0	9.1	0.0	0.0				
Lane LOS	B	B	A			A						
Approach Delay (s)	13.0	11.7	0.1			0.2						
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.7									
Intersection Capacity Utilization			31.7%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

170: W Franklin St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	5	1	5	1	740	10	10	750	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	1	1	5	5	1	5	1	813	11	11	824	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage (veh)								2			2	
Upstream signal (ft)								749				
pX, platoon unblocked	0.93	0.93		0.93	0.93	0.93				0.93		
vC, conflicting volume	1264	1675	415	1261	1673	412	830			824		
vC1, stage 1 conf vol	849	849		821	821							
vC2, stage 2 conf vol	415	826		440	852							
vCu, unblocked vol	1136	1578	415	1133	1575	222	830			665		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	98	100	99	100			99		
cM capacity (veh/h)	302	290	592	339	292	734	798			858		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	8	12	1	542	282	11	549	280				
Volume Left	1	5	1	0	0	11	0	0				
Volume Right	5	5	0	0	11	0	0	5				
cSH	460	440	798	1700	1700	858	1700	1700				
Volume to Capacity	0.02	0.03	0.00	0.32	0.17	0.01	0.32	0.16				
Queue Length 95th (ft)	1	2	0	0	0	1	0	0				
Control Delay (s)	13.0	13.4	9.5	0.0	0.0	9.3	0.0	0.0				
Lane LOS	B	B	A			A						
Approach Delay (s)	13.0	13.4	0.0			0.1						
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.2									
Intersection Capacity Utilization			30.9%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

180: W Grant St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	10	1	20	1	735	10	20	750	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	1	5	11	1	22	1	799	11	22	815	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage (veh)								2			2	
Upstream signal (ft)								1126				
pX, platoon unblocked	0.98	0.98		0.98	0.98	0.98				0.98		
vC, conflicting volume	1285	1673	410	1264	1671	405	821			810		
vC1, stage 1 conf vol	861	861		807	807							
vC2, stage 2 conf vol	424	812		457	864							
vCu, unblocked vol	1249	1645	410	1227	1642	350	821			763		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.6	5.6							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	96	100	97	100			97		
cM capacity (veh/h)	284	275	596	304	272	625	804			828		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	8	34	1	533	277	22	543	277				
Volume Left	1	11	1	0	0	22	0	0				
Volume Right	5	22	0	0	11	0	0	5				
cSH	450	452	804	1700	1700	828	1700	1700				
Volume to Capacity	0.02	0.07	0.00	0.31	0.16	0.03	0.32	0.16				
Queue Length 95th (ft)	1	6	0	0	0	2	0	0				
Control Delay (s)	13.1	13.6	9.5	0.0	0.0	9.5	0.0	0.0				
Lane LOS	B	B	A			A						
Approach Delay (s)	13.1	13.6	0.0			0.2						
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.5									
Intersection Capacity Utilization			31.1%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

190: W Harrison St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	1	5	5	1	15	5	740	10	15	765	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	1	5	5	1	16	5	804	11	16	832	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage veh								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1299	1696	421	1275	1696	408	842			815		
vC1, stage 1 conf vol	870	870		821	821							
vC2, stage 2 conf vol	430	826		454	875							
vCu, unblocked vol	1299	1696	421	1275	1696	408	842			815		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.2		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	99	98	100	97	99			98		
cM capacity (veh/h)	279	269	587	297	271	599	789			802		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	12	23	5	536	279	16	554	288				
Volume Left	5	5	5	0	0	16	0	0				
Volume Right	5	16	0	0	11	0	0	11				
cSH	365	461	789	1700	1700	802	1700	1700				
Volume to Capacity	0.03	0.05	0.01	0.32	0.16	0.02	0.33	0.17				
Queue Length 95th (ft)	3	4	1	0	0	2	0	0				
Control Delay (s)	15.2	13.2	9.6	0.0	0.0	9.6	0.0	0.0				
Lane LOS	C	B	A			A						
Approach Delay (s)	15.2	13.2	0.1			0.2						
Approach LOS	C	B										
Intersection Summary												
Average Delay			0.4									
Intersection Capacity Utilization			31.5%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

120: W Arnold St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	40	40	15	165	35	35	600	5	15	550	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1881	1599	1752	1796		1687	3369		1656	3299	
Flt Permitted	0.44	1.00	1.00	0.73	1.00		0.40	1.00		0.38	1.00	
Satd. Flow (perm)	828	1881	1599	1342	1796		705	3369		655	3299	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	62	45	45	17	188	40	40	682	6	17	625	17
RTOR Reduction (vph)	0	0	36	0	11	0	0	0	0	0	1	0
Lane Group Flow (vph)	62	45	9	17	217	0	40	688	0	17	641	0
Heavy Vehicles (%)	1%	1%	1%	3%	3%	3%	7%	7%	7%	9%	9%	9%
Turn Type	Perm		Perm	Perm			Perm			Perm		
Protected Phases	4				8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	18.7	18.7	18.7	18.7	18.7		61.3	61.3		61.3	61.3	
Effective Green, g (s)	18.7	18.7	18.7	18.7	18.7		61.3	61.3		61.3	61.3	
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21		0.68	0.68		0.68	0.68	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	172	391	332	279	373		480	2295		446	2247	
v/s Ratio Prot		0.02			c0.12			c0.20			0.19	
v/s Ratio Perm	0.07		0.01	0.01			0.06			0.03		
v/c Ratio	0.36	0.12	0.03	0.06	0.58		0.08	0.30		0.04	0.29	
Uniform Delay, d1	30.5	28.9	28.4	28.6	32.1		4.9	5.7		4.7	5.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.87	0.85	
Incremental Delay, d2	2.7	0.3	0.1	0.2	3.6		0.3	0.3		0.1	0.1	
Delay (s)	33.2	29.2	28.5	28.8	35.7		5.2	6.1		4.2	5.0	
Level of Service	C	C	C	C	D		A	A		A	A	
Approach Delay (s)		30.6			35.2			6.0			5.0	
Approach LOS		C			D			A			A	
Intersection Summary												
HCM Average Control Delay	11.7			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.37											
Actuated Cycle Length (s)	90.0			Sum of lost time (s)			10.0					
Intersection Capacity Utilization	66.6%			ICU Level of Service			C					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

130: W Blodgett St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	15	35	5	45	40	35	645	10	15	540	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	19	19	45	6	58	52	45	838	13	19	701	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage (veh)								2			2	
Upstream signal (ft)								373			726	
pX, platoon unblocked	0.96	0.96	0.95	0.96	0.96	0.94	0.95			0.94		
vC, conflicting volume	1332	1682	351	1380	1677	425	703			851		
vC1, stage 1 conf vol	741	741		935	935							
vC2, stage 2 conf vol	591	942		445	742							
vCu, unblocked vol	1031	1396	214	1081	1390	248	583			702		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.2			4.2		
tC, 2 stage (s)	6.5	5.5		6.6	5.6							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	94	93	94	98	79	93	95			98		
cM capacity (veh/h)	301	286	758	277	278	695	913			809		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	84	117	45	558	292	19	468	235				
Volume Left	19	6	45	0	0	19	0	0				
Volume Right	45	52	0	0	13	0	0	1				
cSH	438	379	913	1700	1700	809	1700	1700				
Volume to Capacity	0.19	0.31	0.05	0.33	0.17	0.02	0.28	0.14				
Queue Length 95th (ft)	18	32	4	0	0	2	0	0				
Control Delay (s)	15.2	18.7	9.2	0.0	0.0	9.6	0.0	0.0				
Lane LOS	C	C	A			A						
Approach Delay (s)	15.2	18.7	0.5			0.3						
Approach LOS	C	C										
Intersection Summary												
Average Delay			2.2									
Intersection Capacity Utilization			40.4%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

140: W Cleveland St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	1	40	1	5	1	20	680	1	20	515	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	6	1	49	1	6	1	24	829	1	24	628	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage (veh)								2			2	
Upstream signal (ft)								750			349	
pX, platoon unblocked	0.92	0.92	0.91	0.92	0.92	0.99	0.91			0.99		
vC, conflicting volume	1148	1559	317	1291	1562	415	634			830		
vC1, stage 1 conf vol	680	680		879	879							
vC2, stage 2 conf vol	468	879		412	683							
vCu, unblocked vol	951	1399	67	1107	1402	399	413			817		
tC, single (s)	7.6	6.6	7.0	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)	6.6	5.6		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	98	100	95	100	98	100	98			97		
cM capacity (veh/h)	381	289	896	290	303	603	1032			777		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	56	9	24	553	278	24	419	215				
Volume Left	6	1	24	0	0	24	0	0				
Volume Right	49	1	0	0	1	0	0	6				
cSH	751	324	1032	1700	1700	777	1700	1700				
Volume to Capacity	0.07	0.03	0.02	0.33	0.16	0.03	0.25	0.13				
Queue Length 95th (ft)	6	2	2	0	0	2	0	0				
Control Delay (s)	10.2	16.4	8.6	0.0	0.0	9.8	0.0	0.0				
Lane LOS	B	C	A			A						
Approach Delay (s)	10.2	16.4	0.2			0.4						
Approach LOS	B	C										
Intersection Summary												
Average Delay			0.7									
Intersection Capacity Utilization			29.0%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

150: W Doege St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	245	30	35	285	60	115	535	35	20	475	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	5.2		5.2	5.2		5.2	5.2		5.2	5.2	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1814		1752	1797		1687	3343		1719	3417	
Flt Permitted	0.31	1.00		0.41	1.00		0.39	1.00		0.34	1.00	
Satd. Flow (perm)	563	1814		757	1797		685	3343		613	3417	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	56	302	37	43	352	74	142	660	43	25	586	25
RTOR Reduction (vph)	0	5	0	0	9	0	0	5	0	0	3	0
Lane Group Flow (vph)	56	334	0	43	417	0	142	698	0	25	608	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	7%	7%	7%	5%	5%	5%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			4			2			2		
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	31.7	31.7		31.7	31.7		47.9	47.9		47.9	47.9	
Effective Green, g (s)	31.7	31.7		31.7	31.7		47.9	47.9		47.9	47.9	
Actuated g/C Ratio	0.35	0.35		0.35	0.35		0.53	0.53		0.53	0.53	
Clearance Time (s)	5.2	5.2		5.2	5.2		5.2	5.2		5.2	5.2	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	198	639		267	633		365	1779		326	1819	
v/s Ratio Prot		0.18			c0.23			c0.21			0.18	
v/s Ratio Perm	0.10			0.06			0.21			0.04		
v/c Ratio	0.28	0.52		0.16	0.66		0.39	0.39		0.08	0.33	
Uniform Delay, d1	21.0	23.1		20.0	24.6		12.4	12.4		10.3	12.0	
Progression Factor	1.00	1.00		1.00	1.00		0.79	0.82		1.00	1.00	
Incremental Delay, d2	1.6	1.5		0.6	3.3		3.1	0.6		0.5	0.5	
Delay (s)	22.6	24.6		20.6	27.9		12.9	10.8		10.7	12.5	
Level of Service	C	C		C	C		B	B		B	B	
Approach Delay (s)		24.3			27.2			11.2			12.4	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM Average Control Delay			16.9	HCM Level of Service			B					
HCM Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			90.0	Sum of lost time (s)			10.4					
Intersection Capacity Utilization			107.1%	ICU Level of Service			G					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

160: W Edison St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	5	30	1	5	15	40	595	5	15	485	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	6	6	38	1	6	19	50	744	6	19	606	19
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage (veh)								2			2	
Upstream signal (ft)								380				
pX, platoon unblocked	0.90	0.90		0.90	0.90	0.90				0.90		
vC, conflicting volume	1147	1503	312	1228	1509	375	625			750		
vC1, stage 1 conf vol	653	653		847	847							
vC2, stage 2 conf vol	494	850		381	662							
vCu, unblocked vol	938	1334	312	1028	1341	79	625			496		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.2			4.3		
tC, 2 stage (s)	6.5	5.5		6.6	5.6							
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	98	98	95	100	98	98	95			98		
cM capacity (veh/h)	371	317	689	321	298	857	926			919		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	50	26	50	496	254	19	404	221				
Volume Left	6	1	50	0	0	19	0	0				
Volume Right	38	19	0	0	6	0	0	19				
cSH	550	561	926	1700	1700	919	1700	1700				
Volume to Capacity	0.09	0.05	0.05	0.29	0.15	0.02	0.24	0.13				
Queue Length 95th (ft)	7	4	4	0	0	2	0	0				
Control Delay (s)	12.2	11.7	9.1	0.0	0.0	9.0	0.0	0.0				
Lane LOS	B	B	A			A						
Approach Delay (s)	12.2	11.7	0.6			0.3						
Approach LOS	B	B										
Intersection Summary												
Average Delay			1.0									
Intersection Capacity Utilization			34.1%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

170: W Franklin St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	1	1	10	1	610	5	5	510	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	1	1	6	1	1	12	1	744	6	6	622	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage (veh)								2			2	
Upstream signal (ft)								749				
pX, platoon unblocked	0.94	0.94		0.94	0.94	0.94				0.94		
vC, conflicting volume	1022	1387	312	1079	1385	375	623			750		
vC1, stage 1 conf vol	635	635		749	749							
vC2, stage 2 conf vol	387	752		330	635							
vCu, unblocked vol	887	1277	312	948	1275	196	623			597		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.3		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.3		
p0 queue free %	100	100	99	100	100	98	100			99		
cM capacity (veh/h)	400	352	690	388	355	766	927			876		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	9	15	1	496	254	6	415	209				
Volume Left	1	1	1	0	0	6	0	0				
Volume Right	6	12	0	0	6	0	0	1				
cSH	556	651	927	1700	1700	876	1700	1700				
Volume to Capacity	0.02	0.02	0.00	0.29	0.15	0.01	0.24	0.12				
Queue Length 95th (ft)	1	2	0	0	0	1	0	0				
Control Delay (s)	11.6	10.7	8.9	0.0	0.0	9.1	0.0	0.0				
Lane LOS	B	B	A			A						
Approach Delay (s)	11.6	10.7	0.0			0.1						
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.2									
Intersection Capacity Utilization			27.0%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

180: W Grant St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	1	15	5	35	1	615	5	15	500	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	1	1	1	19	6	43	1	759	6	19	617	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage (veh)								2			2	
Upstream signal (ft)								1126				
pX, platoon unblocked	0.99	0.99		0.99	0.99	0.99				0.99		
vC, conflicting volume	1083	1423	309	1112	1420	383	619			765		
vC1, stage 1 conf vol	655	655		765	765							
vC2, stage 2 conf vol	428	768		348	656							
vCu, unblocked vol	1059	1402	309	1088	1400	349	619			736		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	100	100	100	95	98	93	100			98		
cM capacity (veh/h)	352	321	693	342	329	645	938			828		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	4	68	1	506	259	19	412	207				
Volume Left	1	19	1	0	0	19	0	0				
Volume Right	1	43	0	0	6	0	0	1				
cSH	406	485	938	1700	1700	828	1700	1700				
Volume to Capacity	0.01	0.14	0.00	0.30	0.15	0.02	0.24	0.12				
Queue Length 95th (ft)	1	12	0	0	0	2	0	0				
Control Delay (s)	14.0	13.6	8.8	0.0	0.0	9.4	0.0	0.0				
Lane LOS	B	B	A			A						
Approach Delay (s)	14.0	13.6	0.0			0.3						
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.8									
Intersection Capacity Utilization			27.8%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

190: W Harrison St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	1	1	5	5	645	1	5	510	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	1	1	6	1	1	6	6	787	1	6	622	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage veh								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1055	1443	320	1129	1452	394	640			788		
vC1, stage 1 conf vol	643	643		799	799							
vC2, stage 2 conf vol	412	800		330	652							
vCu, unblocked vol	1055	1443	320	1129	1452	394	640			788		
tC, single (s)	7.5	6.5	6.9	7.8	6.8	7.2	4.2			4.2		
tC, 2 stage (s)	6.5	5.5		6.8	5.8							
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.2			2.3		
p0 queue free %	100	100	99	100	100	99	99			99		
cM capacity (veh/h)	371	318	682	294	292	572	920			802		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	9	9	6	524	263	6	415	226				
Volume Left	1	1	6	0	0	6	0	0				
Volume Right	6	6	0	0	1	0	0	18				
cSH	531	450	920	1700	1700	802	1700	1700				
Volume to Capacity	0.02	0.02	0.01	0.31	0.15	0.01	0.24	0.13				
Queue Length 95th (ft)	1	1	1	0	0	1	0	0				
Control Delay (s)	11.9	13.2	8.9	0.0	0.0	9.5	0.0	0.0				
Lane LOS	B	B	A			A						
Approach Delay (s)	11.9	13.2	0.1			0.1						
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.2									
Intersection Capacity Utilization			27.9%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

120: W Arnold St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	90	50	30	120	50	60	785	30	40	985	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1787	1798		1787	3555		1770	3518	
Flt Permitted	0.51	1.00	1.00	0.69	1.00		0.22	1.00		0.29	1.00	
Satd. Flow (perm)	947	1863	1583	1304	1798		414	3555		549	3518	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	77	99	55	33	132	55	66	863	33	44	1082	44
RTOR Reduction (vph)	0	0	45	0	22	0	0	2	0	0	2	0
Lane Group Flow (vph)	77	99	10	33	165	0	66	894	0	44	1124	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Perm		Perm	Perm			Perm			Perm		
Protected Phases	4			8			2			6		
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	16.9	16.9	16.9	16.9	16.9		63.1	63.1		63.1	63.1	
Effective Green, g (s)	16.9	16.9	16.9	16.9	16.9		63.1	63.1		63.1	63.1	
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.19		0.70	0.70		0.70	0.70	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	178	350	297	245	338		290	2492		385	2467	
v/s Ratio Prot		0.05			c0.09			0.25			c0.32	
v/s Ratio Perm	0.08		0.01	0.03			0.16			0.08		
v/c Ratio	0.43	0.28	0.03	0.13	0.49		0.23	0.36		0.11	0.46	
Uniform Delay, d1	32.3	31.4	29.9	30.5	32.7		4.8	5.4		4.4	5.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.20	1.01	
Incremental Delay, d2	3.5	0.9	0.1	0.5	2.3		1.8	0.4		0.3	0.3	
Delay (s)	35.8	32.3	30.0	31.0	35.0		6.6	5.8		5.5	6.2	
Level of Service	D	C	C	C	C		A	A		A	A	
Approach Delay (s)		32.9			34.4			5.8			6.2	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM Average Control Delay			10.9	HCM Level of Service					B			
HCM Volume to Capacity ratio			0.46									
Actuated Cycle Length (s)			90.0	Sum of lost time (s)					10.0			
Intersection Capacity Utilization			82.7%	ICU Level of Service					E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

130: W Blodgett St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	15	45	15	5	35	15	885	5	35	1005	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	5	15	46	15	5	36	15	903	5	36	1026	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage (veh)								2			2	
Upstream signal (ft)								373			726	
pX, platoon unblocked	0.91	0.91	0.87	0.91	0.91	0.91	0.87			0.91		
vC, conflicting volume	1620	2038	515	1574	2038	454	1031			908		
vC1, stage 1 conf vol	1099	1099		936	936							
vC2, stage 2 conf vol	520	939		638	1102							
vCu, unblocked vol	1060	1520	133	1009	1520	216	728			713		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	94	94	95	98	95	98			96		
cM capacity (veh/h)	268	252	778	304	255	727	761			808		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	66	56	15	602	306	36	684	347				
Volume Left	5	15	15	0	0	36	0	0				
Volume Right	46	36	0	0	5	0	0	5				
cSH	478	469	761	1700	1700	808	1700	1700				
Volume to Capacity	0.14	0.12	0.02	0.35	0.18	0.04	0.40	0.20				
Queue Length 95th (ft)	12	10	2	0	0	3	0	0				
Control Delay (s)	13.7	13.7	9.8	0.0	0.0	9.7	0.0	0.0				
Lane LOS	B	B	A			A						
Approach Delay (s)	13.7	13.7	0.2			0.3						
Approach LOS	B	B										
Intersection Summary												
Average Delay			1.0									
Intersection Capacity Utilization			43.3%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

140: W Cleveland St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	5	35	1	1	5	20	900	5	5	1010	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	1	5	38	1	1	5	22	968	5	5	1086	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage (veh)								2			2	
Upstream signal (ft)								750			349	
pX, platoon unblocked	0.86	0.86	0.83	0.86	0.86	0.95	0.83			0.95		
vC, conflicting volume	1638	2121	551	1608	2126	487	1102			973		
vC1, stage 1 conf vol	1105	1105		1013	1013							
vC2, stage 2 conf vol	533	1016		594	1113							
vCu, unblocked vol	1153	1716	62	1118	1722	355	723			867		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	98	95	100	100	99	97			99		
cM capacity (veh/h)	288	245	830	262	239	615	729			734		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	44	8	22	645	328	5	724	378				
Volume Left	1	1	22	0	0	5	0	0				
Volume Right	38	5	0	0	5	0	0	16				
cSH	621	434	729	1700	1700	734	1700	1700				
Volume to Capacity	0.07	0.02	0.03	0.38	0.19	0.01	0.43	0.22				
Queue Length 95th (ft)	6	1	2	0	0	1	0	0				
Control Delay (s)	11.2	13.4	10.1	0.0	0.0	9.9	0.0	0.0				
Lane LOS	B	B	B			A						
Approach Delay (s)	11.2	13.4	0.2			0.0						
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.4									
Intersection Capacity Utilization			38.4%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

150: W Doege St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	265	125	40	80	60	30	835	40	40	865	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	5.2		5.2	5.2		5.2	5.2		5.2	5.2	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.94		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1808		1787	1760		1770	3515		1787	3537	
Flt Permitted	0.66	1.00		0.30	1.00		0.23	1.00		0.25	1.00	
Satd. Flow (perm)	1255	1808		573	1760		424	3515		469	3537	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	279	132	42	84	63	32	879	42	42	911	68
RTOR Reduction (vph)	0	21	0	0	34	0	0	3	0	0	5	0
Lane Group Flow (vph)	63	390	0	42	113	0	32	918	0	42	974	0
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	2%	2%	2%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			4			2			2		
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	30.1	30.1		30.1	30.1		49.5	49.5		49.5	49.5	
Effective Green, g (s)	30.1	30.1		30.1	30.1		49.5	49.5		49.5	49.5	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.55	0.55		0.55	0.55	
Clearance Time (s)	5.2	5.2		5.2	5.2		5.2	5.2		5.2	5.2	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	420	605		192	589		233	1933		258	1945	
v/s Ratio Prot	c0.22			0.06			0.26			c0.28		
v/s Ratio Perm	0.05			0.07			0.08			0.09		
v/c Ratio	0.15	0.64		0.22	0.19		0.14	0.47		0.16	0.50	
Uniform Delay, d1	21.0	25.4		21.5	21.3		9.9	12.3		10.0	12.6	
Progression Factor	1.00	1.00		1.00	1.00		0.82	0.79		1.00	1.00	
Incremental Delay, d2	0.3	3.2		1.2	0.3		1.2	0.8		1.4	0.9	
Delay (s)	21.3	28.6		22.7	21.6		9.3	10.5		11.4	13.5	
Level of Service	C	C		C	C		A	B		B	B	
Approach Delay (s)	27.6			21.9			10.5			13.4		
Approach LOS	C			C			B			B		
Intersection Summary												
HCM Average Control Delay			15.5	HCM Level of Service				B				
HCM Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			90.0	Sum of lost time (s)				10.4				
Intersection Capacity Utilization			88.6%	ICU Level of Service				E				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

160: W Edison St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	5	60	1	1	5	15	925	15	20	910	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	5	65	1	1	5	16	1005	16	22	989	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage (veh)								2			2	
Upstream signal (ft)								380				
pX, platoon unblocked	0.85	0.85		0.85	0.85	0.85				0.85		
vC, conflicting volume	1582	2095	503	1652	2095	511	1005			1022		
vC1, stage 1 conf vol	1041	1041		1046	1046							
vC2, stage 2 conf vol	541	1054		606	1049							
vCu, unblocked vol	1325	1931	503	1408	1931	60	1005			663		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	98	87	100	100	99	98			97		
cM capacity (veh/h)	231	226	519	250	224	846	685			780		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	82	8	16	670	351	22	659	346				
Volume Left	11	1	16	0	0	22	0	0				
Volume Right	65	5	0	0	16	0	0	16				
cSH	414	487	685	1700	1700	780	1700	1700				
Volume to Capacity	0.20	0.02	0.02	0.39	0.21	0.03	0.39	0.20				
Queue Length 95th (ft)	18	1	2	0	0	2	0	0				
Control Delay (s)	15.8	12.5	10.4	0.0	0.0	9.7	0.0	0.0				
Lane LOS	C	B	B			A						
Approach Delay (s)	15.8	12.5	0.2			0.2						
Approach LOS	C	B										
Intersection Summary												
Average Delay			0.8									
Intersection Capacity Utilization			38.6%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

170: W Franklin St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	5	1	5	1	925	15	15	935	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	1	1	5	5	1	5	1	1016	16	16	1027	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage (veh)								2			2	
Upstream signal (ft)								749				
pX, platoon unblocked	0.86	0.86		0.86	0.86	0.86				0.86		
vC, conflicting volume	1580	2098	516	1580	2093	516	1033			1033		
vC1, stage 1 conf vol	1063	1063		1027	1027							
vC2, stage 2 conf vol	516	1035		553	1066							
vCu, unblocked vol	1353	1954	516	1353	1948	120	1033			719		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	98	100	99	100			98		
cM capacity (veh/h)	226	227	509	282	231	790	668			757		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	8	12	1	678	355	16	685	348				
Volume Left	1	5	1	0	0	16	0	0				
Volume Right	5	5	0	0	16	0	0	5				
cSH	375	387	668	1700	1700	757	1700	1700				
Volume to Capacity	0.02	0.03	0.00	0.40	0.21	0.02	0.40	0.20				
Queue Length 95th (ft)	2	2	0	0	0	2	0	0				
Control Delay (s)	14.8	14.6	10.4	0.0	0.0	9.9	0.0	0.0				
Lane LOS	B	B	B			A						
Approach Delay (s)	14.8	14.6	0.0			0.2						
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.2									
Intersection Capacity Utilization			36.0%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

180: W Grant St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	5	15	1	30	1	915	15	30	935	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	1	5	16	1	33	1	995	16	33	1016	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage (veh)								2			2	
Upstream signal (ft)								1126				
pX, platoon unblocked	0.90	0.90		0.90	0.90	0.90				0.90		
vC, conflicting volume	1617	2097	511	1584	2092	505	1022			1011		
vC1, stage 1 conf vol	1084	1084		1005	1005							
vC2, stage 2 conf vol	533	1013		579	1087							
vCu, unblocked vol	1457	1993	511	1421	1987	217	1022			781		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.6	5.6							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	94	99	95	100			96		
cM capacity (veh/h)	211	215	513	259	214	698	675			746		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	8	50	1	663	348	33	678	344				
Volume Left	1	16	1	0	0	33	0	0				
Volume Right	5	33	0	0	16	0	0	5				
cSH	366	435	675	1700	1700	746	1700	1700				
Volume to Capacity	0.02	0.11	0.00	0.39	0.20	0.04	0.40	0.20				
Queue Length 95th (ft)	2	10	0	0	0	3	0	0				
Control Delay (s)	15.1	14.3	10.3	0.0	0.0	10.0	0.0	0.0				
Lane LOS	C	B	B			B						
Approach Delay (s)	15.1	14.3	0.0			0.3						
Approach LOS	C	B										
Intersection Summary												
Average Delay			0.6									
Intersection Capacity Utilization			38.0%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

190: W Harrison St & STH 97

12/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	1	5	5	1	20	5	925	15	20	960	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	1	5	5	1	22	5	1005	16	22	1043	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage veh								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1631	2128	530	1596	2128	511	1060			1022		
vC1, stage 1 conf vol	1095	1095		1024	1024							
vC2, stage 2 conf vol	536	1033		571	1103							
vCu, unblocked vol	1631	2128	530	1596	2128	511	1060			1022		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.2		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	99	99	98	99	96	99			97		
cM capacity (veh/h)	202	201	499	223	206	513	653			669		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	12	28	5	670	351	22	696	364				
Volume Left	5	5	5	0	0	22	0	0				
Volume Right	5	22	0	0	16	0	0	16				
cSH	277	392	653	1700	1700	669	1700	1700				
Volume to Capacity	0.04	0.07	0.01	0.39	0.21	0.03	0.41	0.21				
Queue Length 95th (ft)	3	6	1	0	0	3	0	0				
Control Delay (s)	18.6	14.9	10.6	0.0	0.0	10.6	0.0	0.0				
Lane LOS	C	B	B			B						
Approach Delay (s)	18.6	14.9	0.1			0.2						
Approach LOS	C	B										
Intersection Summary												
Average Delay			0.4									
Intersection Capacity Utilization			37.0%		ICU Level of Service				A			
Analysis Period (min)			15									

Appendix G

Corridor MOE Analysis Outputs

Year 2011 Existing Conditions

Year 2037 Projected Traffic (No Improvements)

Year 2037 Projected Traffic (Optimized Signal Timings)

Year 2037 Projected Traffic (Four-Lane Cross Section with Raised Median)

Year 2037 Projected Traffic (Five-Lane TWLTL Cross Section)

STH 97

Direction	NB	SB	All
Control Delay / Veh (s/v)	2	2	2
Queue Delay / Veh (s/v)	0	0	0
Total Delay / Veh (s/v)	2	2	2
Total Delay (hr)	2	2	4
Stops / Veh	0.15	0.16	0.15
Stops (#)	582	482	1064
Average Speed (mph)	21	21	21
Total Travel Time (hr)	13	11	24
Distance Traveled (mi)	277	230	507
Fuel Consumed (gal)	16	13	30
Fuel Economy (mpg)	16.9	17.1	17.0
CO Emissions (kg)	1.15	0.94	2.09
NOx Emissions (kg)	0.22	0.18	0.41
VOC Emissions (kg)	0.27	0.22	0.48
Unserved Vehicles (#)	0	0	0
Vehicles in dilemma zone (#)	0	0	0
Performance Index	4.0	3.1	7.1

STH 97

Direction	NB	SB	All
Control Delay / Veh (s/v)	2	2	2
Queue Delay / Veh (s/v)	0	0	0
Total Delay / Veh (s/v)	2	2	2
Total Delay (hr)	3	3	6
Stops / Veh	0.11	0.13	0.12
Stops (#)	584	786	1370
Average Speed (mph)	21	21	21
Total Travel Time (hr)	18	21	39
Distance Traveled (mi)	393	438	831
Fuel Consumed (gal)	22	25	47
Fuel Economy (mpg)	18.0	17.4	17.7
CO Emissions (kg)	1.53	1.76	3.28
NOx Emissions (kg)	0.30	0.34	0.64
VOC Emissions (kg)	0.35	0.41	0.76
Unserviced Vehicles (#)	0	0	0
Vehicles in dilemma zone (#)	0	0	0
Performance Index	4.2	5.5	9.7

STH 97

Direction	NB	SB	All
Control Delay / Veh (s/v)	3	2	3
Queue Delay / Veh (s/v)	0	0	0
Total Delay / Veh (s/v)	3	2	3
Total Delay (hr)	4	3	7
Stops / Veh	0.19	0.18	0.19
Stops (#)	991	769	1760
Average Speed (mph)	19	20	20
Total Travel Time (hr)	20	16	35
Distance Traveled (mi)	380	318	698
Fuel Consumed (gal)	24	19	44
Fuel Economy (mpg)	15.7	16.4	16.0
CO Emissions (kg)	1.68	1.36	3.04
NOx Emissions (kg)	0.33	0.26	0.59
VOC Emissions (kg)	0.39	0.31	0.71
Unserviced Vehicles (#)	0	0	0
Vehicles in dilemma zone (#)	0	0	0
Performance Index	7.2	5.1	12.2

STH 97

Direction	NB	SB	All
Control Delay / Veh (s/v)	2	3	2
Queue Delay / Veh (s/v)	0	0	0
Total Delay / Veh (s/v)	2	3	2
Total Delay (hr)	5	6	10
Stops / Veh	0.13	0.17	0.15
Stops (#)	955	1346	2301
Average Speed (mph)	21	20	20
Total Travel Time (hr)	26	30	56
Distance Traveled (mi)	534	595	1129
Fuel Consumed (gal)	31	36	67
Fuel Economy (mpg)	17.2	16.4	16.8
CO Emissions (kg)	2.17	2.53	4.70
NOx Emissions (kg)	0.42	0.49	0.91
VOC Emissions (kg)	0.50	0.59	1.09
Unserviced Vehicles (#)	0	0	0
Vehicles in dilemma zone (#)	0	0	0
Performance Index	7.2	9.6	16.8

STH 97

Direction	NB	SB	All
Control Delay / Veh (s/v)	3	2	3
Queue Delay / Veh (s/v)	0	0	0
Total Delay / Veh (s/v)	3	2	3
Total Delay (hr)	4	3	7
Stops / Veh	0.16	0.15	0.16
Stops (#)	859	654	1513
Average Speed (mph)	20	20	20
Total Travel Time (hr)	19	16	35
Distance Traveled (mi)	380	318	698
Fuel Consumed (gal)	23	19	42
Fuel Economy (mpg)	16.2	16.8	16.4
CO Emissions (kg)	1.64	1.33	2.97
NOx Emissions (kg)	0.32	0.26	0.58
VOC Emissions (kg)	0.38	0.31	0.69
Unserved Vehicles (#)	0	0	0
Vehicles in dilemma zone (#)	0	0	0
Performance Index	6.6	4.8	11.4

STH 97

Direction	NB	SB	All
Control Delay / Veh (s/v)	2	3	3
Queue Delay / Veh (s/v)	0	0	0
Total Delay / Veh (s/v)	2	3	3
Total Delay (hr)	5	6	11
Stops / Veh	0.13	0.17	0.15
Stops (#)	976	1386	2362
Average Speed (mph)	20	20	20
Total Travel Time (hr)	26	30	56
Distance Traveled (mi)	534	595	1129
Fuel Consumed (gal)	31	37	68
Fuel Economy (mpg)	17.1	16.2	16.6
CO Emissions (kg)	2.19	2.57	4.76
NOx Emissions (kg)	0.43	0.50	0.93
VOC Emissions (kg)	0.51	0.59	1.10
Unserviced Vehicles (#)	0	0	0
Vehicles in dilemma zone (#)	0	0	0
Performance Index	7.6	10.2	17.8

STH 97

Direction	NB	SB	All
Control Delay / Veh (s/v)	3	3	3
Queue Delay / Veh (s/v)	0	0	0
Total Delay / Veh (s/v)	3	3	3
Total Delay (hr)	4	3	7
Stops / Veh	0.14	0.14	0.14
Stops (#)	722	598	1320
Average Speed (mph)	20	20	20
Total Travel Time (hr)	19	16	35
Distance Traveled (mi)	380	318	698
Fuel Consumed (gal)	23	19	41
Fuel Economy (mpg)	16.8	16.9	16.9
CO Emissions (kg)	1.58	1.31	2.89
NOx Emissions (kg)	0.31	0.26	0.56
VOC Emissions (kg)	0.37	0.30	0.67
Unserviced Vehicles (#)	0	0	0
Vehicles in dilemma zone (#)	0	0	0
Performance Index	5.7	4.6	10.4

STH 97

Direction	NB	SB	All
Control Delay / Veh (s/v)	2	3	3
Queue Delay / Veh (s/v)	0	0	0
Total Delay / Veh (s/v)	2	3	3
Total Delay (hr)	5	6	11
Stops / Veh	0.11	0.15	0.13
Stops (#)	834	1188	2022
Average Speed (mph)	21	20	20
Total Travel Time (hr)	26	30	56
Distance Traveled (mi)	534	595	1129
Fuel Consumed (gal)	31	36	66
Fuel Economy (mpg)	17.5	16.6	17.0
CO Emissions (kg)	2.13	2.51	4.64
NOx Emissions (kg)	0.42	0.49	0.90
VOC Emissions (kg)	0.49	0.58	1.08
Unserviced Vehicles (#)	0	0	0
Vehicles in dilemma zone (#)	0	0	0
Performance Index	6.8	9.6	16.4

STH 97

Direction	NB	SB	All
Control Delay / Veh (s/v)	3	3	3
Queue Delay / Veh (s/v)	0	0	0
Total Delay / Veh (s/v)	3	3	3
Total Delay (hr)	4	3	7
Stops / Veh	0.14	0.14	0.14
Stops (#)	721	597	1318
Average Speed (mph)	20	20	20
Total Travel Time (hr)	19	16	35
Distance Traveled (mi)	380	318	698
Fuel Consumed (gal)	23	19	41
Fuel Economy (mpg)	16.8	16.9	16.9
CO Emissions (kg)	1.58	1.31	2.89
NOx Emissions (kg)	0.31	0.26	0.56
VOC Emissions (kg)	0.37	0.30	0.67
Unserviced Vehicles (#)	0	0	0
Vehicles in dilemma zone (#)	0	0	0
Performance Index	5.7	4.6	10.4

STH 97

Direction	NB	SB	All
Control Delay / Veh (s/v)	2	3	3
Queue Delay / Veh (s/v)	0	0	0
Total Delay / Veh (s/v)	2	3	3
Total Delay (hr)	5	6	11
Stops / Veh	0.11	0.15	0.13
Stops (#)	833	1187	2020
Average Speed (mph)	21	20	20
Total Travel Time (hr)	26	30	56
Distance Traveled (mi)	534	595	1129
Fuel Consumed (gal)	31	36	66
Fuel Economy (mpg)	17.5	16.6	17.0
CO Emissions (kg)	2.13	2.51	4.64
NOx Emissions (kg)	0.42	0.49	0.90
VOC Emissions (kg)	0.49	0.58	1.08
Unserved Vehicles (#)	0	0	0
Vehicles in dilemma zone (#)	0	0	0
Performance Index	6.8	9.6	16.4

Appendix H

Roundabout (RODEL) Analysis Outputs

Year 2017 Projected Traffic

Year 2037 Projected Traffic

1:11:11		2017 STH 97/ARNOLD ST (MARSHFIELD)				112	
E	(m)	8.00	4.30	8.00	4.30	TIME PERIOD	min 90
L'	(m)	40.00	40.00	40.00	40.00	TIME SLICE	min 15
V	(m)	7.30	3.65	7.30	3.65	RESULTS PERIOD	min 15 75
RAD	(m)	20.00	20.00	20.00	20.00	TIME COST	\$/hr 15.00
PHI	(d)	25.00	25.00	25.00	25.00	FLOW PERIOD	min 15 75
DIA	(m)	50.00	50.00	50.00	50.00	FLOW TYPE	pcu/veh VEH
GRAD SEP		0	0	0	0	FLOW PEAK	am/op/pm AM
LEG NAME	PCU	TURNS (1st exit, 2nd..U)				CAPF CL	FLOW RATIO FLOW TIME
STH 97 SB	1.09	10	440	10	0	1.00 50	0.75 1.170 0.75 15 45 75
ARNOLD EB	1.01	35	35	45	0	1.00 50	0.75 1.170 0.75 15 45 75
STH 97 NB	1.07	5	470	25	0	1.00 50	0.75 1.170 0.75 15 45 75
ARNOLD WB	1.03	25	130	10	0	1.00 50	0.75 1.170 0.75 15 45 75
FLOW	veh	460	115	500	165	AVEDEL	s 2.5
CAPACITY	veh	2133	1034	2229	975	LOS SIG	A
AVE DELAY	secs	2.1	3.8	2.0	4.3	LOS UNSIG	A
MAX DELAY	secs	2.8	5.1	2.7	5.9		
AVE QUEUE	veh	0.3	0.1	0.3	0.2	VEHIC HRS	0.9
MAX QUEUE	veh	0.3	0.1	0.3	0.2	COST	\$ 13

1:11:11		2017 STH 97/ARNOLD ST (MARSHFIELD)				113	
E	(m)	8.00	4.30	8.00	4.30	TIME PERIOD	min 90
L'	(m)	40.00	40.00	40.00	40.00	TIME SLICE	min 15
V	(m)	7.30	3.65	7.30	3.65	RESULTS PERIOD	min 15 75
RAD	(m)	20.00	20.00	20.00	20.00	TIME COST	\$/hr 15.00
PHI	(d)	25.00	25.00	25.00	25.00	FLOW PERIOD	min 15 75
DIA	(m)	50.00	50.00	50.00	50.00	FLOW TYPE	pcu/veh VEH
GRAD SEP		0	0	0	0	FLOW PEAK	am/op/pm AM
LEG NAME	PCU	TURNS (1st exit, 2nd..U)				CAPF CL	FLOW RATIO FLOW TIME
STH 97 SB	1.09	10	440	10	0	1.00 85	0.75 1.170 0.75 15 45 75
ARNOLD EB	1.01	35	35	45	0	1.00 85	0.75 1.170 0.75 15 45 75
STH 97 NB	1.07	5	470	25	0	1.00 85	0.75 1.170 0.75 15 45 75
ARNOLD WB	1.03	25	130	10	0	1.00 85	0.75 1.170 0.75 15 45 75
FLOW	veh	460	115	500	165	AVEDEL	s 3.0
CAPACITY	veh	1943	829	2036	774	LOS SIG	A
AVE DELAY	secs	2.4	4.9	2.3	5.7	LOS UNSIG	A
MAX DELAY	secs	3.2	6.7	3.0	8.0		
AVE QUEUE	veh	0.3	0.2	0.3	0.3	VEHIC HRS	1.0
MAX QUEUE	veh	0.4	0.2	0.4	0.3	COST	\$ 16

1:11:11		2017 STH 97/ARNOLD ST (MARSHFIELD)				114	
E	(m)	8.00	4.30	8.00	4.30	TIME PERIOD	min 90
L'	(m)	40.00	40.00	40.00	40.00	TIME SLICE	min 15
V	(m)	7.30	3.65	7.30	3.65	RESULTS PERIOD	min 15 75
RAD	(m)	20.00	20.00	20.00	20.00	TIME COST	\$/hr 15.00
PHI	(d)	25.00	25.00	25.00	25.00	FLOW PERIOD	min 15 75
DIA	(m)	50.00	50.00	50.00	50.00	FLOW TYPE	pcu/veh VEH
GRAD SEP		0	0	0	0	FLOW PEAK	am/op/pm PM
LEG NAME	PCU	TURNS (1st exit, 2nd..U)				CAPF CL	FLOW RATIO
STH 97 SB	1.02	35	780	35	0	1.00 50	0.75 1.036 0.75
ARNOLD EB	1.02	40	70	55	0	1.00 50	0.75 1.036 0.75
STH 97 NB	1.01	20	620	50	0	1.00 50	0.75 1.036 0.75
ARNOLD WB	1.01	40	95	20	0	1.00 50	0.75 1.036 0.75
FLOW	veh	850	165	690	155	AVEDEL	s 2.8
CAPACITY	veh	2283	838	2308	910	LOS SIG	A
AVE DELAY	secs	2.5	5.3	2.2	4.7	LOS UNSIG	A
MAX DELAY	secs	3.1	6.7	2.7	5.9		
AVE QUEUE	veh	0.6	0.2	0.4	0.2	VEHIC HRS	1.4
MAX QUEUE	veh	0.7	0.3	0.5	0.2	COST	\$ 22

1:11:11		2017 STH 97/ARNOLD ST (MARSHFIELD)				115	
E	(m)	8.00	4.30	8.00	4.30	TIME PERIOD	min 90
L'	(m)	40.00	40.00	40.00	40.00	TIME SLICE	min 15
V	(m)	7.30	3.65	7.30	3.65	RESULTS PERIOD	min 15 75
RAD	(m)	20.00	20.00	20.00	20.00	TIME COST	\$/hr 15.00
PHI	(d)	25.00	25.00	25.00	25.00	FLOW PERIOD	min 15 75
DIA	(m)	50.00	50.00	50.00	50.00	FLOW TYPE	pcu/veh VEH
GRAD SEP		0	0	0	0	FLOW PEAK	am/op/pm PM
LEG NAME	PCU	TURNS (1st exit, 2nd..U)				CAPF CL	FLOW RATIO
STH 97 SB	1.02	35	780	35	0	1.00 85	0.75 1.036 0.75
ARNOLD EB	1.02	40	70	55	0	1.00 85	0.75 1.036 0.75
STH 97 NB	1.01	20	620	50	0	1.00 85	0.75 1.036 0.75
ARNOLD WB	1.01	40	95	20	0	1.00 85	0.75 1.036 0.75
FLOW	veh	850	165	690	155	AVEDEL	s 3.5
CAPACITY	veh	2080	635	2103	705	LOS SIG	A
AVE DELAY	secs	2.9	7.6	2.5	6.4	LOS UNSIG	A
MAX DELAY	secs	3.7	10.0	3.1	8.3		
AVE QUEUE	veh	0.7	0.4	0.5	0.3	VEHIC HRS	1.8
MAX QUEUE	veh	0.8	0.4	0.6	0.3	COST	\$ 27

1:11:11		2037 STH 97/ARNOLD ST (MARSHFIELD)				114	
E	(m)	8.00	4.30	8.00	4.30	TIME PERIOD	min 90
L'	(m)	40.00	40.00	40.00	40.00	TIME SLICE	min 15
V	(m)	7.30	3.65	7.30	3.65	RESULTS PERIOD	min 15 75
RAD	(m)	20.00	20.00	20.00	20.00	TIME COST	\$/hr 15.00
PHI	(d)	25.00	25.00	25.00	25.00	FLOW PERIOD	min 15 75
DIA	(m)	50.00	50.00	50.00	50.00	FLOW TYPE	pcu/veh VEH
GRAD	SEP	0	0	0	0	FLOW PEAK	am/op/pm AM
LEG NAME	PCU	TURNS (1st exit, 2nd..U)				CAPF CL	FLOW RATIO
STH 97 SB	1.09	15	550	15	0	1.00 50	0.75 1.170 0.75
ARNOLD EB	1.01	40	40	55	0	1.00 50	0.75 1.170 0.75
STH 97 NB	1.07	5	600	35	0	1.00 50	0.75 1.170 0.75
ARNOLD WB	1.03	35	165	15	0	1.00 50	0.75 1.170 0.75
FLOW	veh	580	135	640	215	AVEDEL	s 2.8
CAPACITY	veh	2097	965	2215	891	LOS	SIG A
AVE DELAY	secs	2.3	4.2	2.2	5.2	LOS	UNSIG A
MAX DELAY	secs	3.1	5.8	3.0	7.3		
AVE QUEUE	veh	0.4	0.2	0.4	0.3	VEHIC	HRS 1.2
MAX QUEUE	veh	0.4	0.2	0.5	0.4	COST	\$ 19

1:11:11		2037 STH 97/ARNOLD ST (MARSHFIELD)				115	
E	(m)	8.00	4.30	8.00	4.30	TIME PERIOD	min 90
L'	(m)	40.00	40.00	40.00	40.00	TIME SLICE	min 15
V	(m)	7.30	3.65	7.30	3.65	RESULTS PERIOD	min 15 75
RAD	(m)	20.00	20.00	20.00	20.00	TIME COST	\$/hr 15.00
PHI	(d)	25.00	25.00	25.00	25.00	FLOW PERIOD	min 15 75
DIA	(m)	50.00	50.00	50.00	50.00	FLOW TYPE	pcu/veh VEH
GRAD	SEP	0	0	0	0	FLOW PEAK	am/op/pm AM
LEG NAME	PCU	TURNS (1st exit, 2nd..U)				CAPF CL	FLOW RATIO
STH 97 SB	1.09	15	550	15	0	1.00 85	0.75 1.170 0.75
ARNOLD EB	1.01	40	40	55	0	1.00 85	0.75 1.170 0.75
STH 97 NB	1.07	5	600	35	0	1.00 85	0.75 1.170 0.75
ARNOLD WB	1.03	35	165	15	0	1.00 85	0.75 1.170 0.75
FLOW	veh	580	135	640	215	AVEDEL	s 3.5
CAPACITY	veh	1907	760	2021	690	LOS	SIG A
AVE DELAY	secs	2.7	5.6	2.6	7.4	LOS	UNSIG A
MAX DELAY	secs	3.6	7.8	3.4	10.9		
AVE QUEUE	veh	0.4	0.2	0.5	0.5	VEHIC	HRS 1.5
MAX QUEUE	veh	0.5	0.3	0.5	0.6	COST	\$ 23

1:11:11		2037 STH 97/ARNOLD ST (MARSHFIELD)				116	
E	(m)	8.00	4.30	8.00	4.30	TIME PERIOD	min 90
L'	(m)	40.00	40.00	40.00	40.00	TIME SLICE	min 15
V	(m)	7.30	3.65	7.30	3.65	RESULTS PERIOD	min 15 75
RAD	(m)	20.00	20.00	20.00	20.00	TIME COST	\$/hr 15.00
PHI	(d)	25.00	25.00	25.00	25.00	FLOW PERIOD	min 15 75
DIA	(m)	50.00	50.00	50.00	50.00	FLOW TYPE	pcu/veh VEH
GRAD SEP		0	0	0	0	FLOW PEAK	am/op/pm PM
LEG NAME	PCU	TURNS (1st exit, 2nd..U)				CAPF CL	FLOW RATIO
STH 97 SB	1.02	40	985	40	0	1.00 50	0.75 1.036 0.75
ARNOLD EB	1.02	50	90	70	0	1.00 50	0.75 1.036 0.75
STH 97 NB	1.01	30	785	60	0	1.00 50	0.75 1.036 0.75
ARNOLD WB	1.01	50	120	30	0	1.00 50	0.75 1.036 0.75
FLOW	veh	1065	210	875	200	AVEDEL	s 3.4
CAPACITY	veh	2249	719	2278	807	LOS SIG	A
AVE DELAY	secs	3.0	7.0	2.5	5.8	LOS UNSIG	A
MAX DELAY	secs	3.9	9.4	3.2	7.6		
AVE QUEUE	veh	0.9	0.4	0.6	0.3	VEHIC HRS	2.2
MAX QUEUE	veh	1.1	0.5	0.7	0.4	COST	\$ 34

1:11:11		2037 STH 97/ARNOLD ST (MARSHFIELD)				117	
E	(m)	8.00	4.30	8.00	4.30	TIME PERIOD	min 90
L'	(m)	40.00	40.00	40.00	40.00	TIME SLICE	min 15
V	(m)	7.30	3.65	7.30	3.65	RESULTS PERIOD	min 15 75
RAD	(m)	20.00	20.00	20.00	20.00	TIME COST	\$/hr 15.00
PHI	(d)	25.00	25.00	25.00	25.00	FLOW PERIOD	min 15 75
DIA	(m)	50.00	50.00	50.00	50.00	FLOW TYPE	pcu/veh VEH
GRAD SEP		0	0	0	0	FLOW PEAK	am/op/pm PM
LEG NAME	PCU	TURNS (1st exit, 2nd..U)				CAPF CL	FLOW RATIO
STH 97 SB	1.02	40	985	40	0	1.00 85	0.75 1.036 0.75
ARNOLD EB	1.02	50	90	70	0	1.00 85	0.75 1.036 0.75
STH 97 NB	1.01	30	785	60	0	1.00 85	0.75 1.036 0.75
ARNOLD WB	1.01	50	120	30	0	1.00 85	0.75 1.036 0.75
FLOW	veh	1065	210	875	200	AVEDEL	s 4.6
CAPACITY	veh	2046	517	2073	602	LOS SIG	A
AVE DELAY	secs	3.6	11.9	3.0	8.9	LOS UNSIG	A
MAX DELAY	secs	4.8	17.0	3.8	12.0		
AVE QUEUE	veh	1.1	0.7	0.7	0.5	VEHIC HRS	3.0
MAX QUEUE	veh	1.3	0.9	0.8	0.6	COST	\$ 45

1:11:11		2017 STH 97/DOEGE ST (MARSHFIELD)				115	
E	(m)	8.00	4.30	8.00	4.30	TIME PERIOD	min 90
L'	(m)	40.00	40.00	40.00	40.00	TIME SLICE	min 15
V	(m)	7.30	3.65	7.30	3.65	RESULTS PERIOD	min 15 75
RAD	(m)	20.00	20.00	20.00	20.00	TIME COST	\$/hr 15.00
PHI	(d)	25.00	25.00	25.00	25.00	FLOW PERIOD	min 15 75
DIA	(m)	50.00	50.00	50.00	50.00	FLOW TYPE	pcu/veh VEH
GRAD	SEP	0	0	0	0	FLOW PEAK	am/op/pm AM
LEG NAME	PCU	TURNS (1st exit, 2nd..U)				CAPF CL	FLOW RATIO
STH 97 SB	1.05	15	375	15	0	1.00 50	0.75 1.616 0.75
DOEGE EB	1.03	25	190	40	0	1.00 50	0.75 1.616 0.75
STH 97 NB	1.07	25	425	90	0	1.00 50	0.75 1.616 0.75
DOEGE WB	1.03	45	225	25	0	1.00 50	0.75 1.616 0.75
FLOW	veh	405	255	540	295	AVEDEL	s 3.2
CAPACITY	veh	2083	1049	2115	966	LOS	SIG A
AVE DELAY	secs	2.1	4.5	2.3	5.4	LOS	UNSIG A
MAX DELAY	secs	3.4	7.5	3.7	9.4		
AVE QUEUE	veh	0.2	0.3	0.4	0.5	VEHIC	HRS 1.3
MAX QUEUE	veh	0.3	0.4	0.4	0.6	COST	\$ 20

1:11:11		2017 STH 97/DOEGE ST (MARSHFIELD)				116	
E	(m)	8.00	4.30	8.00	4.30	TIME PERIOD	min 90
L'	(m)	40.00	40.00	40.00	40.00	TIME SLICE	min 15
V	(m)	7.30	3.65	7.30	3.65	RESULTS PERIOD	min 15 75
RAD	(m)	20.00	20.00	20.00	20.00	TIME COST	\$/hr 15.00
PHI	(d)	25.00	25.00	25.00	25.00	FLOW PERIOD	min 15 75
DIA	(m)	50.00	50.00	50.00	50.00	FLOW TYPE	pcu/veh VEH
GRAD	SEP	0	0	0	0	FLOW PEAK	am/op/pm AM
LEG NAME	PCU	TURNS (1st exit, 2nd..U)				CAPF CL	FLOW RATIO
STH 97 SB	1.05	15	375	15	0	1.00 85	0.75 1.616 0.75
DOEGE EB	1.03	25	190	40	0	1.00 85	0.75 1.616 0.75
STH 97 NB	1.07	25	425	90	0	1.00 85	0.75 1.616 0.75
DOEGE WB	1.03	45	225	25	0	1.00 85	0.75 1.616 0.75
FLOW	veh	405	255	540	295	AVEDEL	s 4.2
CAPACITY	veh	1886	848	1922	765	LOS	SIG A
AVE DELAY	secs	2.4	6.1	2.6	8.1	LOS	UNSIG A
MAX DELAY	secs	3.9	10.4	4.2	14.6		
AVE QUEUE	veh	0.3	0.5	0.4	0.7	VEHIC	HRS 1.7
MAX QUEUE	veh	0.4	0.6	0.5	1.0	COST	\$ 26

1:11:11		2017 STH 97/DOEGE ST (MARSHFIELD)										117	
E	(m)	8.00	4.30	8.00	4.30	TIME PERIOD				min	90		
L'	(m)	40.00	40.00	40.00	40.00	TIME SLICE				min	15		
V	(m)	7.30	3.65	7.30	3.65	RESULTS PERIOD				min	15 75		
RAD	(m)	20.00	20.00	20.00	20.00	TIME COST				\$/hr	15.00		
PHI	(d)	25.00	25.00	25.00	25.00	FLOW PERIOD				min	15 75		
DIA	(m)	50.00	50.00	50.00	50.00	FLOW TYPE				pcu/veh	VEH		
GRAD	SEP	0	0	0	0	FLOW PEAK				am/op/pm	PM		
LEG NAME		PCU	TURNS (1st exit, 2nd..U)				CAPF	CL	FLOW RATIO			FLOW TIME	
STH 97	SB	1.01	55	700	30	0	1.00	50	0.75	0.891	0.75	15	45 75
DOEGE	EB	1.00	95	205	50	0	1.00	50	0.75	0.891	0.75	15	45 75
STH 97	NB	1.02	30	660	25	0	1.00	50	0.75	0.891	0.75	15	45 75
DOEGE	WB	1.01	50	60	30	0	1.00	50	0.75	0.891	0.75	15	45 75
FLOW		veh	785	350	715	140	AVEDEL				s	3.2	
CAPACITY		veh	2343	901	2195	902	LOS				SIG	A	
AVE DELAY		secs	2.3	6.4	2.4	4.7	LOS				UNSIG	A	
MAX DELAY		secs	2.6	7.5	2.7	5.3							
AVE QUEUE		veh	0.5	0.6	0.5	0.2	VEHIC				HRS	1.8	
MAX QUEUE		veh	0.5	0.7	0.5	0.2	COST				\$	27	

1:11:11		2017 STH 97/DOEGE ST (MARSHFIELD)										118	
E	(m)	8.00	4.30	8.00	4.30	TIME PERIOD				min	90		
L'	(m)	40.00	40.00	40.00	40.00	TIME SLICE				min	15		
V	(m)	7.30	3.65	7.30	3.65	RESULTS PERIOD				min	15 75		
RAD	(m)	20.00	20.00	20.00	20.00	TIME COST				\$/hr	15.00		
PHI	(d)	25.00	25.00	25.00	25.00	FLOW PERIOD				min	15 75		
DIA	(m)	50.00	50.00	50.00	50.00	FLOW TYPE				pcu/veh	VEH		
GRAD	SEP	0	0	0	0	FLOW PEAK				am/op/pm	PM		
LEG NAME		PCU	TURNS (1st exit, 2nd..U)				CAPF	CL	FLOW RATIO			FLOW TIME	
STH 97	SB	1.01	55	700	30	0	1.00	85	0.75	0.891	0.75	15	45 75
DOEGE	EB	1.00	95	205	50	0	1.00	85	0.75	0.891	0.75	15	45 75
STH 97	NB	1.02	30	660	25	0	1.00	85	0.75	0.891	0.75	15	45 75
DOEGE	WB	1.01	50	60	30	0	1.00	85	0.75	0.891	0.75	15	45 75
FLOW		veh	785	350	715	140	AVEDEL				s	4.3	
CAPACITY		veh	2138	694	1992	697	LOS				SIG	A	
AVE DELAY		secs	2.6	10.3	2.8	6.4	LOS				UNSIG	A	
MAX DELAY		secs	3.0	12.4	3.2	7.3							
AVE QUEUE		veh	0.6	1.0	0.6	0.3	VEHIC				HRS	2.4	
MAX QUEUE		veh	0.6	1.2	0.6	0.3	COST				\$	36	

1:11:11		2037 STH 97/DOEGE ST (MARSHFIELD)				117	
E	(m)	8.00	4.30	8.00	4.30	TIME PERIOD	min 90
L'	(m)	40.00	40.00	40.00	40.00	TIME SLICE	min 15
V	(m)	7.30	3.65	7.30	3.65	RESULTS PERIOD	min 15 75
RAD	(m)	20.00	20.00	20.00	20.00	TIME COST	\$/hr 15.00
PHI	(d)	25.00	25.00	25.00	25.00	FLOW PERIOD	min 15 75
DIA	(m)	50.00	50.00	50.00	50.00	FLOW TYPE	pcu/veh VEH
GRAD SEP		0	0	0	0	FLOW PEAK	am/op/pm AM
LEG NAME	PCU	TURNS (1st exit, 2nd..U)				CAPF CL	FLOW RATIO
STH 97 SB	1.05	20	475	20	0	1.00 50	0.75 1.616 0.75
DOEGE EB	1.03	30	245	45	0	1.00 50	0.75 1.616 0.75
STH 97 NB	1.07	35	535	115	0	1.00 50	0.75 1.616 0.75
DOEGE WB	1.03	60	285	35	0	1.00 50	0.75 1.616 0.75
FLOW	veh	515	320	685	380	AVEDEL	s 4.1
CAPACITY	veh	2012	985	2068	888	LOS SIG	A
AVE DELAY	secs	2.4	5.5	2.6	7.7	LOS UNSIG	A
MAX DELAY	secs	3.9	9.5	4.3	14.3		
AVE QUEUE	veh	0.4	0.5	0.5	0.8	VEHIC HRS	2.1
MAX QUEUE	veh	0.5	0.7	0.7	1.2	COST	\$ 32

1:11:11		2037 STH 97/DOEGE ST (MARSHFIELD)				118	
E	(m)	8.00	4.30	8.00	4.30	TIME PERIOD	min 90
L'	(m)	40.00	40.00	40.00	40.00	TIME SLICE	min 15
V	(m)	7.30	3.65	7.30	3.65	RESULTS PERIOD	min 15 75
RAD	(m)	20.00	20.00	20.00	20.00	TIME COST	\$/hr 15.00
PHI	(d)	25.00	25.00	25.00	25.00	FLOW PERIOD	min 15 75
DIA	(m)	50.00	50.00	50.00	50.00	FLOW TYPE	pcu/veh VEH
GRAD SEP		0	0	0	0	FLOW PEAK	am/op/pm AM
LEG NAME	PCU	TURNS (1st exit, 2nd..U)				CAPF CL	FLOW RATIO
STH 97 SB	1.05	20	475	20	0	1.00 85	0.75 1.616 0.75
DOEGE EB	1.03	30	245	45	0	1.00 85	0.75 1.616 0.75
STH 97 NB	1.07	35	535	115	0	1.00 85	0.75 1.616 0.75
DOEGE WB	1.03	60	285	35	0	1.00 85	0.75 1.616 0.75
FLOW	veh	515	320	685	380	AVEDEL	s 6.3
CAPACITY	veh	1815	785	1875	687	LOS SIG	A
AVE DELAY	secs	2.8	8.2	3.0	15.1	LOS UNSIG	A
MAX DELAY	secs	4.6	14.8	5.2	30.6		
AVE QUEUE	veh	0.4	0.8	0.6	1.7	VEHIC HRS	3.3
MAX QUEUE	veh	0.5	1.1	0.8	2.7	COST	\$ 50

1:11:11		2037 STH 97/DOEGE ST (MARSHFIELD)										119	
E	(m)	8.00	4.30	8.00	4.30					TIME PERIOD	min	90	
L'	(m)	40.00	40.00	40.00	40.00					TIME SLICE	min	15	
V	(m)	7.30	3.65	7.30	3.65					RESULTS PERIOD	min	15 75	
RAD	(m)	20.00	20.00	20.00	20.00					TIME COST	\$/hr	15.00	
PHI	(d)	25.00	25.00	25.00	25.00					FLOW PERIOD	min	15 75	
DIA	(m)	50.00	50.00	50.00	50.00					FLOW TYPE	pcu/veh	VEH	
GRAD	SEP	0	0	0	0					FLOW PEAK	am/op/pm	PM	
LEG NAME		PCU	TURNS (1st exit, 2nd..U)				CAPF	CL	FLOW RATIO			FLOW TIME	
STH 97	SB	1.01	65	865	40	0	1.00	50	0.75	0.891	0.75	15	45 75
DOEGE	EB	1.00	125	265	60	0	1.00	50	0.75	0.891	0.75	15	45 75
STH 97	NB	1.02	40	835	30	0	1.00	50	0.75	0.891	0.75	15	45 75
DOEGE	WB	1.01	60	80	40	0	1.00	50	0.75	0.891	0.75	15	45 75
FLOW		veh	970	450	905	180					AVEDEL	s	4.3
CAPACITY		veh	2317	799	2136	798					LOS	SIG	A
AVE DELAY		secs	2.6	10.1	2.9	5.7					LOS	UNSIG	A
MAX DELAY		secs	3.0	12.5	3.3	6.6							
AVE QUEUE		veh	0.7	1.3	0.7	0.3					VEHIC	HRS	3.0
MAX QUEUE		veh	0.8	1.5	0.8	0.3					COST	\$	45

1:11:11		2037 STH 97/DOEGE ST (MARSHFIELD)										120	
E	(m)	8.00	4.30	8.00	4.30	TIME PERIOD				min	90		
L'	(m)	40.00	40.00	40.00	40.00	TIME SLICE				min	15		
V	(m)	7.30	3.65	7.30	3.65	RESULTS PERIOD				min	15 75		
RAD	(m)	20.00	20.00	20.00	20.00	TIME COST				\$/hr	15.00		
PHI	(d)	25.00	25.00	25.00	25.00	FLOW PERIOD				min	15 75		
DIA	(m)	50.00	50.00	50.00	50.00	FLOW TYPE				pcu/veh	VEH		
GRAD	SEP	0	0	0	0	FLOW PEAK				am/op/pm	PM		
LEG NAME		PCU	TURNS (1st exit, 2nd..U)				CAPF	CL	FLOW RATIO			FLOW TIME	
STH 97	SB	1.01	65	865	40	0	1.00	85	0.75	0.891	0.75	15	45 75
DOEGE	EB	1.00	125	265	60	0	1.00	85	0.75	0.891	0.75	15	45 75
STH 97	NB	1.02	40	835	30	0	1.00	85	0.75	0.891	0.75	15	45 75
DOEGE	WB	1.01	60	80	40	0	1.00	85	0.75	0.891	0.75	15	45 75
FLOW		veh	970	450	905	180					AVEDEL	s	7.5
CAPACITY		veh	2112	593	1933	593					LOS	SIG	A
AVE DELAY		secs	3.1	24.8	3.4	8.5					LOS	UNSIG	A
MAX DELAY		secs	3.6	34.8	4.0	10.1							
AVE QUEUE		veh	0.9	3.2	0.9	0.4					VEHIC	HRS	5.2
MAX QUEUE		veh	0.9	4.2	1.0	0.5					COST	\$	78

Appendix I

Intersection Control Evaluation Matrix

Intersection Control Evaluation Matrix

STH 97 Intersections with Arnold Street and Doege Street

Design Year 2037

Factor	Discussion
Safety	The intersection crash rates were calculated to be 0.79 and 1.06 crashes per million entering vehicles (MEV) at Arnold Street and Doege Street, respectively. The crash rate of 1.06 crashes per MEV at Doege Street is higher than the statewide average crash rate of 0.96 crashes per MEV for similar urban signalized intersections that experienced five or more crashes in one year (<i>Intersection Crash Summary Statistics for Wisconsin 2005</i>, Knapp and Campbell). Ninety-six crashes were reported along the STH 97 project corridor during the five year time period from 2005 through 2009, 35 of which occurred within the functional area of the Doege Street intersection. Of these 35 crashes, 16 were rear-end crashes and 16 were angle crashes. A collision diagram and statistical summary of crashes at the two intersections have been prepared. Under traffic signal control, left-turn lanes would be implemented along the STH 97 at the Doege Street intersection (they are already present at the Arnold Street intersection) in order to separate left-turning vehicles from the through traffic lanes, which is expected to reduce the number of rear-end collisions that occur each year. Under roundabout control, the number of conflict points at each of the intersections would be reduced as drivers only need to be aware of traffic approaching from the left.
Operational Analysis	A complete operational analysis report has been completed for these intersections analyzing traffic conditions under traffic signal and roundabout control: Traffic signal control is expected to operate at LOS C or better for all movements with the recommended five-lane TWLTL cross section, except for the westbound through and right-turn movements at Arnold Street during the morning peak hour and the eastbound left-turn movement at Arnold Street during the evening peak hour which are expected to operate at LOS D. Roundabout control is expected to operate at LOS A for all movements during the weekday morning and evening peak hours.
Construction Costs	Traffic signal control construction costs are expected to be lower than roundabout control construction costs.
Right-of-Way	Roundabout control is expected to require additional right-of-way while traffic signal control is not expected to require any additional right-of-way.
Practical Feasibility	Traffic signal control is a feasible alternative as it is already in place at the STH 97 intersections with Arnold Street and Doege Street. Roundabout control is <i>not</i> a feasible alternative due to the urban environment in which the intersections are located, and due to the presence of existing traffic signals along the STH 97 corridor north and south of the project limits.
Operation/Maintenance Costs	The roundabout control alternative is expected to have lower operation and maintenance costs than the traffic signal control alternative.
Environment	Neither of the alternatives are expected to have impacts to archaeological, wetland, or hazardous materials; however, the roundabout control option is expected to require the purchase of additional right-of-way that would need to be investigated for these impacts.
Pedestrians & Bicycles	Sidewalks currently exist along both sides of the STH 97 project corridor and along all of the intersecting side-streets (including Arnold Street and Doege Street). Bike lanes are not currently provided along the project corridor, but they are present along STH 97 north of the project limits and they are provided for in the recommended five-lane TWLTL cross section. Due to the presence of bike lanes and the expected pedestrian traffic, traffic signal control is the preferred alternative at the Arnold Street and Doege Street intersections as it provides controlled opportunities for bicyclists and pedestrians to safely cross the road.
Recommendation	Traffic signal control is recommended as the long term solution. Traffic signal control provides a safe, cost effective alternative while maintaining acceptable intersection operations (LOS C or better, with a few exceptions).