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1st Street/2nd Street Circulation Modifications Study

for the

City of Chico

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Introduction and Study Parameters

Introduction

Over the past decade, the City of Chico has worked with various stakeholders within Downtown Chico to improve access for all modes of transportation including personal vehicle, bicycle, pedestrian and transit. One of the original goals was to incorporate bicycle lanes serving east-west travel in the downtown. As a result of this goal and related process, City Staff developed an east-west corridor plan which utilized context sensitive solutions with the goal of creating complete streets that provide full access for bicyclists, pedestrians and transit users while improving or maintaining acceptable vehicle operations, without expanding current infrastructure. The intent of the corridor plan is to reinforce Downtown Chico as a major hub for shopping, dining, recreation and employment within the City and possibly extending the Core Downtown area to include 1st Street.

This report presents an analysis of the potential traffic conditions and impacts that would be associated with implementation of the corridor plan, which includes proposed modifications to the downtown transportation network on 1st and 2nd Streets in the downtown area of Chico near Chico State University. The plan consists of converting 2nd Street to three lanes west of Broadway, creation of a one-way couplet using 1st and 2nd Streets between Broadway and Flume Street, and the inclusion of roundabouts at the intersections of 1st Street-2nd Street/Flume Street and 1st Street/Salem Street. This analysis was primarily focused on modifications to the East-West transportation network, but impacts to intersecting streets were also considered. The traffic study was completed in accordance with the criteria established by the City of Chico, and is consistent with standard traffic engineering techniques.

The purpose of this traffic impact study is to provide City of Chico staff and policy makers with data that they can use to make an informed decision regarding the potential traffic impacts of the proposed modifications, and any associated improvements that would be required in order to mitigate these impacts to a level of insignificance as defined by the City of Chico's General Plan or other policies. Transportation related impacts were evaluated on a mode by mode basis. Operating conditions and impacts at intersections in the downtown on passenger vehicle traffic were determined by estimating the number of new vehicle trips likely to be rerouted due to the modifications and then analyzing the impact that rerouted traffic would be expected to have on critical intersections or roadway segments.

Project Area

Land uses within Downtown Chico consist mostly of local retail, entertainment and dining establishments. Downtown represents a major employment hub for the City. Additionally, public facilities are located in Downtown adjacent to the corridor, such as Chico City Hall and City Plaza. Downtown Chico is in close proximity to the California State University, Chico campus, with one of the University's main entrances located within the proposed project area. This proximity to the University results in a large amount of pedestrian, bicycle, vehicle and transit activity in the Downtown from University students, staff, faculty and visitors.

The study area included the 1st Street and 2nd Street corridors, which were divided into three primary segments to coincide with the location of proposed improvements:

1. *1st Street from Salem Street to Flume Street* – This street is a largely underutilized, fronted by low-intensity land uses, including a City-owned parking lot. The street is roughly parallel to Big Chico Creek which is located to the north. There is one lane in each direction east of Main Street, but the street expands to two lanes in each direction at Main Street and continues west through Broadway

where it returns back to one lane in each direction. On-street parallel parking is provided along both sides of the entire study segment.

2. *2nd Street from Orange Street-Union Pacific Railroad (UPRR) Tracks to Broadway* – This portion of 2nd Street is lined with residences and surface parking lots to the south and CSUC buildings and a parking structure to the north. Near Broadway the land use intensifies and transitions to downtown commercial uses. Currently, the street consists of two lanes in each direction with on-street parking only along the south side of the street west of Normal Avenue. The downtown transit center is located on the south side of the street between Salem Street and Normal Avenue.

3. *2nd Street from Broadway to Flume Street-1st Street* – Located within the core Downtown area, this section of 2nd Street is lined with medium- to high-intensity commercial uses which lessen near Flume Street. The street consists of two lanes in each direction and on-street parallel parking on both sides of the street. There is a City surface parking lot on the south side of the street between Wall Street and Flume Street which is the location for the Chico Farmer's Market.

In addition to these study corridors, traffic operations at the following intersections were analyzed:

1. 1st Street/Salem Street
2. 1st Street/Broadway
3. 1st Street/Main Street
4. 1st Street/Wall Street
5. 2nd Street/Orange Street
6. 2nd Street/Cherry Street
7. 2nd Street/Ivy Street
8. 2nd Street/Hazel Street
9. 2nd Street/Chestnut Street
10. 2nd Street/Normal Avenue
11. 2nd Street/Salem Street
12. 2nd Street/Broadway
13. 2nd Street/Main Street
14. 2nd Street/Wall Street
15. 2nd Street/Flume Street/1st Street

Operating conditions during the afternoon peak period were evaluated to capture the highest potential impacts for the proposed project as well as the highest volumes on the local transportation network.

The study area and the intersections included in the analysis are shown in Figure 1.

Intersection Level of Service Methodologies

Level of Service (LOS) is used to rank traffic operation on various types of facilities based on traffic volumes and roadway capacity using a series of letter designations ranging from A to F. Generally, Level of Service A represents free flow conditions and Level of Service F represents forced flow or breakdown conditions. A unit of measure that indicates a level of delay generally accompanies the LOS designation.

The study intersections were analyzed using methodologies published in the *Highway Capacity Manual* (HCM), Transportation Research Board, 2000. This source contains methodologies for various types of intersection control, all of which are related to a measurement of delay in average number of seconds per vehicle.

The Levels of Service for the intersections with side-street stop controls, or those which are unsignalized and have one or two approaches stop-controlled, were analyzed using the "Two-Way Stop-Controlled" intersection capacity method from the HCM. This methodology determines a level of service for each minor turning movement by estimating the level of average delay in seconds per vehicle. Results are presented for individual movements together with the weighted overall age delay for the intersection.

1st Street/2nd Street Circulation Modifications Study

Figure 1

City of Chico

Study Area and Existing Traffic Volumes (Existing Configuration)

The study intersections that are currently controlled by a traffic signal were evaluated using the signalized methodology from the HCM. This methodology is based on factors including traffic volumes, green time for each movement, phasing, whether or not the signals are coordinated, truck traffic, and pedestrian activity. Average stopped delay per vehicle in seconds is used as the basis for evaluation in this LOS methodology. For purposes of this study, delays were calculated using optimized signal timing.

Intersections that are proposed to be controlled by modern roundabouts were evaluated using the FHWA Roundabout Method, which is described in the Unsignalized Methodology Chapter of the HCM. This methodology determines intersection operation using the gap acceptance method using basic geometric and volume data to calculate entering and circulating flows. This information is then translated to an overall average vehicle delay, with LOS break points at the same delays as used in the signalized methodology. Because the HCM roundabout methodology is relatively unsophisticated, the much more advanced aaSIDRA roundabout analysis software was utilized in any cases where the basic HCM methodology predicts operation worse than LOS B.

The ranges of delay associated with the various levels of service are indicated in Table 1.

Table 1
Intersection Level of Service Criteria

LOS	Two-Way Stop-Controlled	**Signalized** (ranges also apply to **Roundabouts)**
A	Delay of 0 to 10 seconds. Gaps in traffic are readily available for drivers exiting the minor street.	Delay of 0 to 10 seconds. Most vehicles arrive during the green phase, so do not stop at all.
B	Delay of 10 to 15 seconds. Gaps in traffic are somewhat less readily available than with LOS A, but no queuing occurs on the minor street.	Delay of 10 to 20 seconds. More vehicles stop than with LOS A, but many drivers still do not have to stop.
C	Delay of 15 to 25 seconds. Acceptable gaps in traffic are less frequent, and drivers may approach while another vehicle is already waiting to exit the side street.	Delay of 20 to 35 seconds. The number of vehicles stopping is significant, although many still pass through without stopping.
D	Delay of 25 to 35 seconds. There are fewer acceptable gaps in traffic, and drivers may enter a queue of one or two vehicles on the side street.	Delay of 35 to 55 seconds. The influence of congestion is noticeable, and most vehicles have to stop.
E	Delay of 35 to 50 seconds. Few acceptable gaps in traffic are available, and longer queues may form on the side street.	Delay of 55 to 80 seconds. Most, if not all, vehicles must stop and drivers consider the delay excessive.
F	Delay of more than 50 seconds. Drivers may wait for long periods before there is an acceptable gap in traffic for exiting the side streets, creating long queues.	Delay of more than 80 seconds. Vehicles may wait through more than one cycle to clear the intersection.

Reference: *Highway Capacity Manual,* Transportation Research Board, 2000

Traffic Operation Standards

In the Transportation Element of its General Plan, the City of Chico establishes requirements for intersection LOS as follows:

> *T-G-11: Strive to maintain traffic LOS C on residential streets and LOS D or better on arterial and collector streets, at all intersections, and on principal arterials in the CMP during peak hours.*

T-G-12: Accept LOS E for built-out areas served by transit after finding that:

- *There is no practical and feasible way to mitigate the lower level of service; and*
- *The uses resulting in the lower level of service are of clear, overall public benefit.*

Since downtown Chico currently has frequent transit service and the nature of the study area is primarily to serve the downtown area, these standards would indicate a minimum requirement of LOS E or better, as described in General Plan Policy T-G-12.

Existing Street Conditions

Setting

Downtown Chico experiences a large amount of multimodal transportation usage, both by people within the Downtown area and those destined for adjacent areas, especially CSUC.

Vehicles

The Downtown Chico street network is a tight grid with blocks typically being about 350 feet in length. Currently, the primary north-south corridors of Main Street and Broadway compose a one-way couplet with Main Street going northbound and Broadway carrying southbound traffic. The primary east-west corridor is 2nd Street, with 1st Street as well as the one-way couplet of 3rd Street and 4th Street providing additional circulation within Downtown.

Pedestrians

Within Downtown Chico, sidewalks are provided adjacent to all streets and crosswalks are available at most intersections. The majority of signalized intersections do not have pedestrian detection equipment nor do they have pedestrian crossing signal heads, which means that a pedestrian must follow the vehicle signal to know when to cross. The exception to this is at the intersections of 2nd Street/Broadway and 2nd Street/Main Street which have pedestrian crossing signal heads with countdown timers as well as corner bulbouts.

Bicycles

Along 1st Street and 2nd Street, within the project area, there are no dedicated on-street or off-street bicycle facilities. Salem Street has recently been restriped to provide north-south Class II bicycle lanes, but no other bicycle lanes exist within downtown. On the Chico Bike Map, produced by the Butte County Association of Governments (BCAG), 2nd Street is identified as a bicycle connector; this designation does not result in any specific bicycle markings or space, but instead bicyclists are expected to share travel lanes with vehicles.

Transit

Butte County Transit, referred to as B-Line, is provided by the BCAG in coordination with the City of Chico. B-Line provides regional and local fixed route and paratransit service within Butte County. The Chico Transit Center is located on 2nd Street west of Salem Street and is commonly used by those destined for downtown or CSUC and as a transfer point for most local and regional routes. Additional transit stops are located within the downtown corridor.

Vehicle Operations

Existing peak hour traffic volumes in the Downtown study area were obtained by City staff over the last several years and complied to represent existing conditions.

Existing Intersection Levels of Service

Based on the existing traffic volumes, all of the signalized intersections are operating acceptably at LOS B or better during the p.m. peak period, except for the intersection of 2nd Street/Main Street which is currently operating at LOS E overall, which is considered acceptable under the applied standards. All of the uncontrolled intersections are operating at LOS A overall during the p.m. peak hour, and at LOS E

or better on individual movements. Because the current configuration of 1st Street/Salem Street does not result in any conflicting vehicle movements, it cannot be fully analyzed for LOS, but due to the low volumes it is expected that the intersection operates acceptably. The Level of Service calculations are summarized in Table 2, and copies are provided in Appendix A. The existing volumes for the study intersections are shown in Figure 1.

Table 2
Summary of Intersection Level of Service Calculations
Existing Roadway Configuration

Intersection	**Existing Volumes**		**Future Volumes**	
Approach	**Delay**	**LOS**	**Delay**	**LOS**
2. 1st St/Broadway	19.0	B	33.6	C
3. 1st St/Main St	5.4	A	6.6	A
4. 1st St/Wall St	3.6	A	3.8	A
Northbound Approach	*12.9*	*B*	*13.7*	*B*
5. 2nd St/Orange St	1.4	A	1.5	A
Northbound Approach	*13.2*	*B*	*14.2*	*B*
6. 2nd St/Cherry St	3.3	A	3.8	A
Northbound Approach	*17.6*	*C*	*20.4*	*C*
Southbound Approach	*21.2*	*C*	*25.8*	*D*
7. 2nd St/Ivy St	11.1	B	11.3	B
8. 2nd St/Hazel St	1.2	A	1.4	A
Northbound Approach	*15.8*	*C*	*18.6*	*C*
9. 2nd St/Chestnut St	8.8	A	8.4	B
10. 2nd St/Normal Ave	4.2	A	7.0	A
11. 2nd St/Salem St	10.9	B	11.9	B
12. 2nd St/Broadway	11.0	B	13.5	B
13. 2nd St/Main St	55.7	E	**116.9**	**F**
14. 2nd St/Wall St	3.2	A	4.7	A
Southbound Approach	*35.9*	*E*	***56.0***	***F***
15. 2nd St/Flume St/1st St	5.2	A	9.5	A
Northbound Approach	*36.1*	*E*	***68.8***	***F***
Southbound Approach	*42.0*	*E*	***84.2***	***F***

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service
Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*
Results for intersections or minor approaches that operate unacceptably are indicated in **bold**

Queuing Conditions

Queuing occurs when vehicles line up while waiting to enter an intersection. Queuing can become a major traffic flow issue if vehicles back up enough to block downstream intersections or driveways, or restrict other movements. Additionally, since vehicles are idling while queuing, excessive queuing leads to an increase in fuel consumption and vehicle emissions. Queue lengths were determined based upon simulated traffic flow utilizing the *SIM Traffic* software package. Queuing is considered unacceptable if it extends beyond the length of the entire block, if it continually blocks access to driveways, or if it extends beyond the length of the turn pocket, if a turn lane is present.

Throughout the study area, the spacing between intersections is roughly 350 feet. Under existing conditions, queuing is acceptable at most of the study intersections, with no queues extending more than approximately the entire block during peak periods. The eastbound and westbound approaches on 2nd Street/Broadway and 2nd Street/Main Street as well as the northbound approach of 2nd Street/Main Street extend to the end of the block and in some cases beyond the adjacent intersection, which is considered unacceptable.

Corridor Operations

As a metric for corridor operations travel times and speeds were calculated based upon simulated traffic flow. The travel times calculated for typical routes within the corridor are shown below in Table 3 and were used as a basis of comparison for analyzing the operations of the proposed modifications. Detailed travel time data is provided in Appendix B.

Table 3
Existing Configuration Travel Times

Route	Travel Time (seconds)	Average Speed (mph)
Northbound Main St to Westbound 2nd St	217	10
Eastbound 2nd St	230	11
Westbound 2nd St	188	13
Eastbound 2nd St to Southbound Broadway	146	15
Southbound Esplanade to Westbound 2nd St	161	14
Eastbound 2nd St to Northbound Esplanade	254	9

Collision History

The collision history for the study area was reviewed to determine any trends or patterns that may indicate a safety issue. Collision rates were calculated based on records for the three-year period between 2006 and 2008 obtained from the California Highway Patrol and published in their Statewide Integrated Traffic Records System (SWITRS) reports. As presented in Table 4, the calculated collision rates in the study area were compared to average collision rates for similar facilities statewide, as indicated in *Accident Data on California State Highways*, California Department of Transportation. The significance of these collisions was considered when determining the appropriateness of various roadway and intersection improvements.

Table 4
Collision Rates at the Study Intersections

Intersection	Number of Collisions (2006 – 2008)	Daily Volume Entering	Calculated Collision Rate (c/mve)	Statewide Avg Collision Rate (c/mve)
1. 1st St/Salem Ave	0	3,100	0.00	0.14
2. 1st St/Broadway	2	12,900	0.14	0.43
3. 1st St/Main St	5	15,800	0.29	0.43
4. 1st St/Wall St	0	2,700	0.00	0.14
5. 2nd St/Orange St	0	6,100	0.00	0.14
6. 2nd St/Cherry St	1	7,100	0.13	0.22
7. 2nd St/Ivy St	2	12,300	0.15	0.43
8. 2nd St/Hazel St	1	11,600	0.08	0.14
9. 2nd St/Chestnut St	0	11,600	0.00	0.28
10. 2nd St/Normal Ave	0	10,300	0.00	0.43
11. 2nd St/Salem St	1	13,100	0.07	0.43
12. 2nd St/Broadway	3	18,200	0.15	0.43
13. 2nd St/Main St	3	22,900	0.12	0.43
14. 2nd St/Wall St	3	9,600	**0.29**	0.22
15. 2nd St/Flume St/1st St	1	11,800	0.08	0.22
Segment	**Number of Collisions (2006 – 2008)**	**Avg Daily Segment Volume**	**Calculated Collision Rate (c/mvm)**	**Statewide Avg Collision Rate (c/mvm)**
1. 1st St from Salem St to 2nd St	4	2,900	**4.50**	3.35
2. 2nd St from Orange St to Broadway	4	8,500	0.93	3.35
3. 2nd St from Broadway to 1st St	9	9,000	**4.57**	3.35

Note: c/mve = collisions per million vehicles entering; c/mvm = collisions per million vehicles miles
Calculated collision rates greater than the statewide average rates are indicated in **bold**

The stop-controlled intersection of 2nd Street/Wall Street had a collision rate that was slightly higher than the statewide average for similar intersections in an urban setting. While this does not, in and of itself, indicate a specific safety concern, this information does indicate that further review is warranted at this study intersection. It was noted that the three reported crashes involved a pedestrian or bicyclist with pedestrian violation; improper passing and auto right-of-way violations were listed as the primary collision factors. Although all three collisions involved a pedestrian or bicyclist, no trends or patterns were discovered in regards to the direction of travel and the primary collision factors. Collision rates at the remaining study intersections are below statewide averages.

Collision rates were also calculated for the segments of 1st Street from Salem Street to 2nd Street, 2nd Street from Orange Street to Broadway and 2nd Street from Broadway to 1st Street based on records for January 1, 2006, through December 31, 2008. The average collision rate for the 1st Street study

segment over the three-year study period was 4.50 collisions per million vehicle miles (c/mvm), which is greater than the statewide collision rate for a four-lane facility in an urban area of 3.35 c/mvm. These collisions resulted in an injury rate of 25.0 percent, which is lower than the statewide average rates of 42.5 percent. The average collision rate for the segment of 2nd Street from Broadway to 1st Street was 4.57 c/mvm, which is also greater than the statewide collision rate for similar segments. These collisions resulted in an injury rate of 55.6 percent, which is higher than the statewide average rate of 42.5 percent. The average collision rate for 2nd Street from Orange Street to Broadway was 0.86 c/mvm, which is less than the statewide collision rate for similar segments.

Copies of the spreadsheets showing the derivation of the collision rates for both the study intersections and segments are provided in the Appendix C.

Future Traffic Conditions

BCAG maintains a travel demand forecasting model for the entire County of Butte. Within the Downtown Chico area the overall future growth rate was projected to be approximately one percent per year which equates to a growth rate factor of 1.22 for 20 years of growth. Future traffic volumes based on this growth rate are shown on Figure 2.

Future Intersection Conditions with Existing Roadway Configuration

With future traffic volumes and no changes to roadway configuration, signalized intersections within the study area would be expected to operate at LOS C or better during the p.m. peak hour, except for the intersection of 2nd Street/Main Street which is expected to operate at LOS F overall. The uncontrolled approaches at the intersections of 2nd Street/Wall Street and 2nd Street/Flume Street/1st Street would experience increasing delay to the side streets, resulting in operation in the LOS F range during the p.m. peak hour with delays exceeding 80 seconds in some cases. A summary of the LOS calculations is shown in Table 2. A copy of the level of service calculations is provided in Appendix A.

Queuing Conditions

Queuing conditions were analyzed for future conditions and it was found that queues will likely extend beyond the length of the entire block for most approaches at the intersections of 2nd Street/Main Street and 2nd Street/Broadway.

1st Street/2nd Street Circulation Modifications Study

Figure 2

City of Chico

Future Traffic Volumes (Existing Configuration)

Proposed Modifications

Project Profile

The proposed corridor plan consists of the conversion of 2nd Street to three lanes west of Broadway, creation of a one-way couplet using 1st and 2nd Streets between Broadway and Flume Street, and the inclusion of roundabouts at the intersections of 1st Street-2nd Street/Flume Street and 1st Street/Salem Street. These modifications create the room to add bicycle lanes on both 1st and 2nd Streets as well as increasing on-street parking in the downtown area through conversion to diagonal parking. A key principle for this project is to provide access within downtown and outlying areas for users of all modes of transportation, including drivers, pedestrians, bicyclists and transit riders. Downtown Chico experiences considerable multimodal transportation usage, both by people within the Downtown area and people destined for adjacent areas, especially CSUC. The proposed project would include three distinctive elements, as described below and shown on Figure 3.

Road Diet

2nd Street would be converted from the existing four-lane configuration to a three-lane configuration between Orange Street and Broadway. The section would include one through lane in each direction, a center median that can be used as a turn lane at intersections, and a Class II bicycle lane in each direction. Existing parking would be maintained on the south side of the street.

One-way Couplet

A one-way couple would be created using 1st Street and 2nd Street between Broadway and Flume Street with 1st Street carrying westbound traffic and 2nd Street carrying eastbound traffic. Each street would provide two one-way vehicle travel lanes and a Class II bicycle lane. The majority of existing parking would remain; in some areas parallel parking would be converted to diagonal parking resulting in an increase in the on-street parking supply.

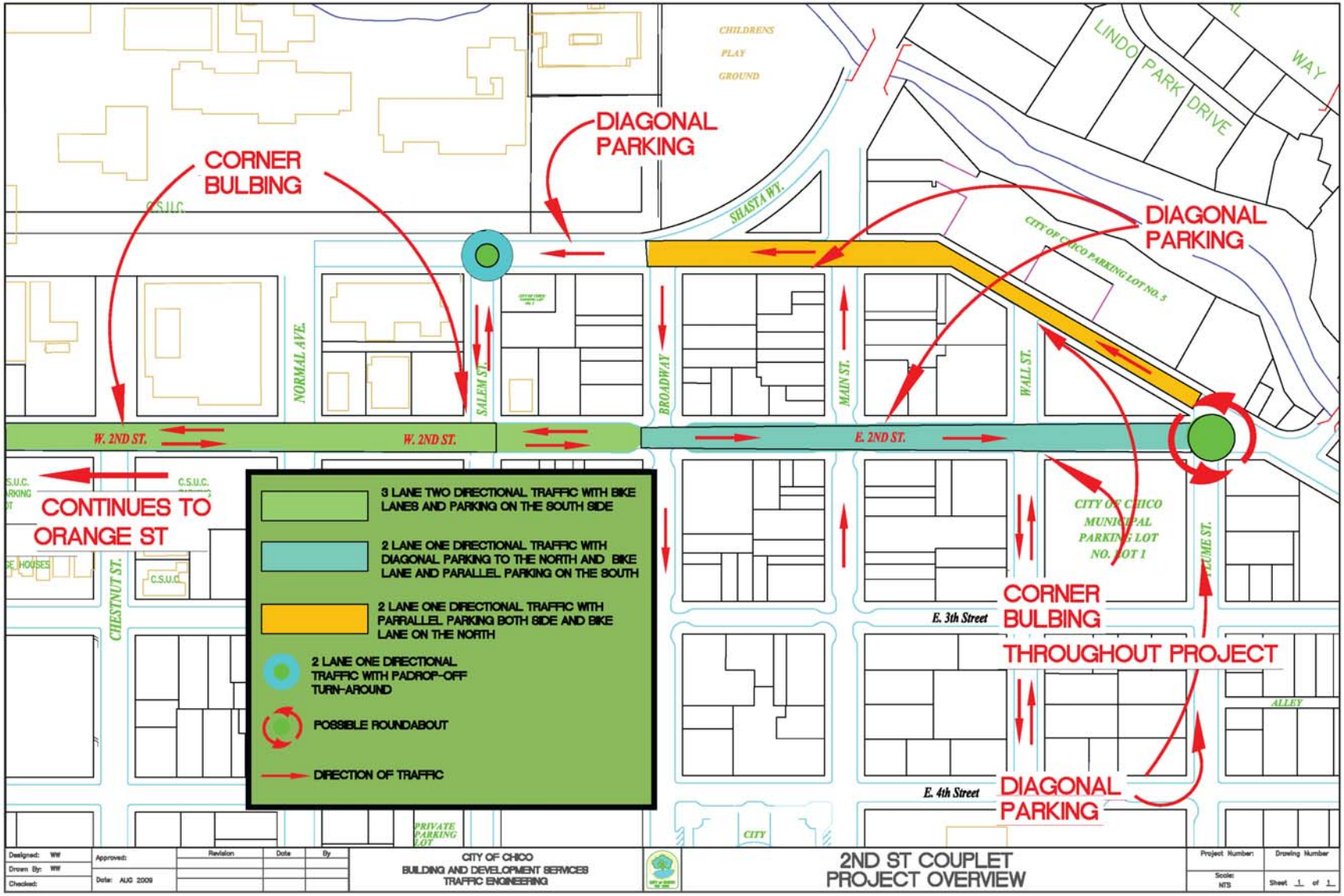
Intersection Modifications

Installation of a roundabout is proposed at 1st Street-2nd Street/Flume Street and a drop-off circle is included at 1st Street/Salem Street bordering the CSUC campus.

Additionally, a change in the cycle length from 45 seconds to 60 seconds is proposed for all signalized intersections along the Main Street and Broadway corridors and vehicle and pedestrian detection equipment is to be installed at some intersections.

The intersection of 1st Street/Broadway would be modified to provide an exclusive pedestrian phase. This added pedestrian phase is necessary due to a lack of opportunity for pedestrians to cross the intersection with a protected phase following the creation of the one-way couplet modification which will result in a heavy westbound left turn movement.

Other intersections will be modified to include the installation of pedestrian bulbouts (an extension of the sidewalk into the intersection so that they reduce pedestrian crossing distance and increase the visibility of pedestrians waiting to cross). These bulbouts would require drivers to complete a turning movement at a slower speed, but do not otherwise restrict vehicle turning movements within the intersection. The bulbouts would be designed to 'shadow' the adjacent on-street parking, but not extend into any existing or planned bike lanes.



Source: City of Chico

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1st Street/2nd Street Circulation Modifications Study

City of Chico

Figure 3

Proposed Configuration

Transition

On the west end of the project, it is expected that the transition would occur at Orange Street. The eastbound curb lane would become a right turn only lane with through traffic merging into the left lane; the second westbound lane would open west of Orange Street. Two through lanes would be maintained on each side of the railroad to provide as much vehicle storage as possible when a train passes. On the east end of the project, the transition would be handled by the roundabout at 1st Street-2nd Street/Flume Street.

Plan Consistency

Currently, the City of Chico is updating its General Plan for the horizon year of 2030. While this update is still in draft form and will not be finalized and adopted until after this report is finalized, the proposed General Plan updates have been considered to ensure that the project would be consistent with this update as well as the existing General Plan.

In 2006, the City completed the *Chico Downtown Access Planning Charrette*. Among other topics, this charrette identified improved pedestrian and bicycle access within the Downtown as a major goal. The proposed project is consistent with these goals of improving pedestrian and bicycle access.

Projected Traffic Volumes

To asses impacts associated with the proposed modifications, existing traffic volumes were redistributed throughout the Downtown network. This redistribution of volumes was done along likely routes to be used, based upon route travel time, distance and proximity to destinations. Projected existing traffic volumes with the proposed project are shown on Figure 4 and projected future traffic volumes are shown on Figure 5.

Multimodal Transportation

Vehicle Access

All westbound vehicles trips on 2nd Street would be diverted to 1st Street then southbound at Broadway to ultimately continue westbound on 2nd Street. It is expected that most trips would be diverted by no more than one or two blocks, representing less than 1,000 feet; however, for trips destined within Downtown, a driver may choose to park along the modified route and walk the remaining distance, which is expected to be less than 500 feet depending on parking availability.

Pedestrians

While the pedestrian network would not be reconfigured with the proposed project, pedestrian improvements such as intersection bulbouts, signal detection equipment and signal pedestrian heads are proposed. The bulbouts, coupled with the reduction in the number of vehicle lanes, would reduce pedestrian crossing distance and the installation of pedestrian signal heads would help to prevent pedestrian crossings at inappropriate times. The one-way conversion would remove some pedestrian-vehicle conflicts by eliminating some turning movements; however, some intersection turning movements are projected to increase, mainly the southbound right turn at 2nd Street/Broadway and the eastbound left turn at 2nd Street/Main Street.

1st Street/2nd Street Circulation Modifications Study

Figure 4

City of Chico

Existing Traffic Volumes (Proposed Conversion)

1st Street/2nd Street Circulation Modifications Study

Figure 5

City of Chico

Future Traffic Volumes (Proposed Conversion)

Bicycle Travel

Bicycle circulation is expected to be greatly improved by dedicating space on the road for bicycle use that will increase bicyclist comfort and safety by providing separation from vehicle traffic. Some bicycle trips may be slightly diverted due to the one-way conversion, but this diversion is expected to be no more than one to two blocks and is expected to have minimal impact on those trips. There is a possibility of bicyclists choosing to ride the opposite direction on one-way streets, which is both unsafe and a violation of the California Vehicle Code which requires bicyclists to follow the same rules of driving as a motorist (CVC § 21200(a)). Additionally, this corridor experiences a large volume of commercial deliveries and it is common for delivery trucks to stop in the outside lane to complete the delivery. There is a possibility that truck drivers may illegally block the newly created bicycle lane to complete the delivery (CVC § 21211(b)).

To provide convenient eastbound travel exiting the CSUC area along 1st Street, the installation of a bidirectional, Class I Bicycle Path is proposed adjacent to 1st Street continuing northbound along Esplanade and rejoining on-street facilities at Memorial Way.

Transit

The only proposed change to transit routes is that some buses would be rerouted by about one to two blocks due to the one-way conversion on 1st Street and 2nd Street. While this will require relocation of some transit stops, this is expected to be less than 500 feet. Additionally, some routes are expected to benefit by the one-way conversion as it will be easier to make left-turn movements at critical intersections.

Vehicle Operations

Re-routed Existing Volumes – Intersection Level of Service

With the implementation of the proposed modification, all intersections are expected to operate acceptably at LOS E or better except for the intersection of 1st Street/Broadway which is expected to operate at LOS F. The minor approaches on all intersections that are side-street stop-controlled are expected to operate acceptably at LOS C or better, as shown in Table 5; detailed results are provided in Appendix A. It should be noted that due to the non-standard configuration of the drop-off circle at 1st Street/Salem Street it is not possible to calculate LOS at this location, but due to the projected low volumes and the fact that the purpose of the intersection is for parking and passenger loading activity, it is expected that the intersection will operate acceptably.

To achieve acceptable operations at the intersection of 1st Street/Broadway, it is recommended that both pedestrian and vehicle detection equipment be installed and that the signal timing be modified to be fully actuated (rather than pre-timed). This modification will affect coordination with adjacent signals, but full coordination is not possible because of heavy traffic volumes near saturation flow in both the southbound and westbound directions. Furthermore, the pedestrian detection equipment is important to ensure that a pedestrian-exclusive phase, which prohibits vehicles movements, is activated only when there is pedestrian demand.

Table 5
Summary of Intersection Level of Service Calculations
Proposed Roadway Configuration

Intersection *Approach*	**Existing Volumes**		**Future Volumes**	
	Delay	**LOS**	**Delay**	**LOS**
2. 1st St/Broadway	**92.8**	**F**	**	**F**
Mitigated	40.7	D	47.6	D
3. 1st St/Main St	13.9	B	32.9	C
4. 1st St/Wall St	1.9	A	2.0	A
Northbound Approach	*13.6*	*B*	*14.7*	*B*
5. 2nd St/Orange St	1.5	A	1.7	A
Northbound Approach	*14.7*	*B*	*16.2*	*C*
6. 2nd St/Cherry St	3.4	A	4.1	A
Northbound Approach	*18.8*	*C*	*22.2*	*C*
Southbound Approach	*24.4*	*C*	*31.2*	*D*
7. 2nd St/Ivy St	14.3	B	16.1	B
8. 2nd St/Hazel St	1.2	A	1.3	A
Northbound Approach	*16.5*	*C*	*18.8*	*C*
9. 2nd St/Chestnut St	15.4	B	19.2	B
10. 2nd St/Normal Ave	8.1	A	10.2	B
11. 2nd St/Salem St	10.8	B	13.5	B
12. 2nd St/Broadway	7.5	A	11.4	B
13. 2nd St/Main St	13.9	B	16.4	B
14. 2nd St/Wall St	5.0	A	6.2	A
Northbound Approach	*19.2*	*C*	*23.3*	*C*
Southbound Approach	*24.3*	*C*	*31.9*	*D*
15. 2nd St/Flume St/1st St (roundabout)	3.3	A	3.5	A
Northbound Approach	*9.2*	*A*	*9.0*	*A*
Westbound Approach	*2.4*	*A*	*2.7*	*A*
Eastbound Approach	*3.2*	*A*	*3.5*	*A*

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service
Results for intersections or minor approaches that do not achieve acceptable operations are indicated in **bold**
** = delay greater than 120 seconds; Shaded cells = mitigation
Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

All intersections are projected to operate with less delay or only a negligible increase in delay with the proposed project as compared to the existing configuration. The only intersection with a noticeable

increase in delay is 1st Street/Broadway, but with mitigations this intersection is expected to operate acceptably. Conversely, average delay at the intersection of 2nd Street/Main Street is expected decrease by more than 40 seconds.

Corridor Performance

As with existing conditions, corridor travel times were calculated for various typical routes within the Downtown and are shown in Table 6; detailed travel time data provided in Appendix B. All routes are expected to experience either shorter travel times or a negligible increase in travel time. The decrease or negligible increases are due to the fact that although the route may be longer, traffic is expected to flow more efficiency, resulting in less delay at intersections.

Table 6
Proposed Configuration Travel Times

Route	Existing Configuration		Proposed Configuration	
	Travel Time (seconds)	Average Speed (mph)	Travel Time (seconds)	Average Speed (mph)
Northbound Main St to Westbound 2nd St	217	10		
Via 1st St			*203*	*13*
Via 3rd St			*250*	*9*
Eastbound 2nd St	230	11	188	13
Westbound 2nd St	188	13		
Via 1st St			*205*	*14*
Eastbound 2nd St to Southbound Broadway	146	15	163	13
Southbound Esplanade to Westbound 2nd St	161	14	151	14
Eastbound 2nd St to Northbound Esplanade	254	9	187	11

Note: Modified routes are indicated in *italics*

Future Intersection Conditions with Proposed Roadway Configuration

With future traffic volumes developed as previously described and no changes to roadway configuration, signalized intersections within the study area would be expected to operate at LOS C or better during the p.m. peak hour, except for the intersection of 2nd Street/Main Street which is expected to operate at LOS F overall. The uncontrolled intersections would experience increasing delay to the side streets, with operation in the LOS F range during the p.m. peak hour, including delays that exceed 80 seconds in some cases. A summary of the LOS calculations is shown in Table 5. A copy of the level of service calculations is provided in Appendix A.

Under future volumes and with the project, all intersections are expected to continue operating acceptably at LOS E or better except for the intersection of 1st Street/Broadway, which is expected to operate at LOS F. In addition to the proposed modifications to this intersection necessary for near-term operations, re-timing of the coordinated corridor would be needed to serve the future traffic volumes.

As with existing conditions, all intersections are projected to operate with a decrease in delay or only a negligible increase with the proposed project as compared to the existing configuration. The exception is at 1st Street/Broadway, but with mitigations this intersection is expected to operate acceptably. Under future traffic volumes the average delay at the intersection of 2nd Street/Main Street is expected to decrease by approximately 100 seconds.

Queuing

With the implementation of the proposed modification and under projected existing and future traffic volumes it is expected that queuing would be acceptable at all intersections, with queuing not expected to extend beyond the total length of the block or available turn pockets.

Medians are desired within Downtown as they provide opportunities for landscaping while visually narrowing the road, which can create a traffic calming benefit. Queuing was further examined to determine where medians could be installed without impacting traffic operations. Locations identified for possible median placement on 2nd Street include:

- west of Chestnut Street, extending approximately to mid-block
- west of Hazel Street, extending approximately to mid-block
- between Normal Avenue and Salem Street, leaving at least a 75-foot left turn lane for both side streets

Installation of medians at these locations may restrict turning movements at some driveways so it is recommended that the City consider these restrictions prior to installation of any medians. Although the block of 2nd Street between Orange Street and Cherry Street is not projected to have major left-turn queuing in the afternoon peak hour, it is recommended that medians not be installed on this block because Cherry Street provides access for a CSUC parking structure and generally experiences significant queuing in the morning.

Roundabout

This project includes the installation of a modern roundabout at the intersection of 2nd Street/1st Street/Flume Street. A modern roundabout was chosen over other types of intersection control as it is expected to best handle the transition between one-way and two-way traffic while accommodating the awkward angle that 1st Street approaches the intersection. A single-lane roundabout is expected to adequately accommodate projected future volumes and operate at LOS A. The preliminary roundabout has been laid out to allow for truck turning as well as full access for emergency vehicles. Additionally, the roundabout would allow for full pedestrian and bicycle access through either a mixed use path or separated bicycle and pedestrian paths around the entire roundabout. Direct access to the Annie's Glenn Bicycle trailhead located off of Orient Street would also be provided. A *Roundabout Design Report* will be completed by W-Trans which will include details on roundabout design and operations.

Drop-off Circle

The project as proposed would result in converting the intersection of 1st Street/Salem Street to a drop-off circle that would also act as an entry to CSUC with a specified drop-off area located on the west side of the intersection. The drop-off circle would be different than a modern roundabout because it will not have a raised center island. Due to limited space, it is not possible to design the drop-off circle for truck turning movements, including buses and emergency vehicles, without being able to drive over

the center of the intersection. Since the majority of through traffic is expected to be diverted to Broadway and 2nd Street, it is expected that most of the traffic on the blocks adjacent to 1st Street/Salem Street would be destined for those blocks only so the circle as been designed for low volumes. The circle would connect to the proposed Class I Bicycle Path that will run along 1st Street and the Esplanade and will provide access to University Bicycle Parking while enhancing pedestrian access for the entire intersection. Design of the drop-off circle has been coordinated with CSUC to ensure that it will meet the University's operating needs. W-Trans will provide the City with a memo detailing the design elements.

Other Considerations

Air Quality and Emissions

The use of personal vehicles is considered to be one of the leading contributors of pollution believed to be causing global climate change, including greenhouse gases. Transportation policy decisions greatly affect the number and character of personal vehicle trips made. Within a downtown corridor with characteristics such as 1st and 2nd Streets in Chico the common cause of an increase in emissions is vehicle idling and stop and go traffic caused by congestion. When a vehicle accelerates from a complete stop, generally more fuel is consumed than when a vehicle is traveling at a constant speed. Additionally, when a vehicle is idling, fuel is being consumed without the vehicle traveling.

By increasing traffic flow efficiency within downtown, this project is expected to reduce the amount of vehicle idling and associated stop and go traffic, which would result in a decrease in vehicle emissions. Furthermore, by enhancing bicycle circulation, the attractiveness of using of bicycles as a mode of transportation to replace vehicle trips is enhanced.

Safety

While it is impossible to predict future safety conditions of the corridor, some general trends can be expected based upon the following reasons:

- The statewide average collision rate of two-lane and three-lane streets is considerably lower than the average collision rate for four-lane facilities.
- While bicycles and vehicle traffic are not completely separated, the dedicated bicycle lanes reduce potential vehicle-bicycle conflicts.
- Pedestrian exposure to vehicle traffic will be reduced by the presence of bulbouts and the reduction in the number of vehicle travel lanes, making crossing distances shorter.
- Roundabouts have less potential vehicle conflict points than a signalized or stop-controlled intersection. Furthermore, roundabouts result in a uniformity of speed and traffic flow which has been shown to reduce the occurrence and severity of collisions.

Because of these general trends, it is expected that the proposed project will likely increase safety for all users of the corridor.

Deliveries

Currently within the Downtown area commercial deliveries occur throughout the day and usually are completed by a delivery truck occupying a lane of traffic or parking spaces while loading or unloading. It

is not expected that this project would have any significant impact on delivery activity as there would still be at least two lanes in each direction on 1st Street and 2nd Street within the core Downtown area east of Broadway and west of Broadway there are adjacent side-streets that delivery trucks could use for loading and unloading. While no impact is expected, it is recommended that City staff monitor delivery activity and coordinate with Downtown businesses to determine if any further actions are necessary. If it is determined that deliveries require additional action, possible mitigations include establishment of formal delivery zones on side streets or restriction of delivery activity to off-peak periods.

Furthermore, with the installation of bicycle lanes, it is illegal for delivery vehicles to block the bicycle lane. It is recommended that the City coordinate an education campaign with Downtown merchants to prevent blocking of the bicycle lane.

Parking Supply

While some parallel parking will be removed to accommodate installation of the roundabout and intersection bulbouts, this loss will be offset by the installation of angled parking in some areas. It is projected that the parking supply will increase by approximately 30 to 40 spaces.

Additionally, this plan will increase the availability of bicycle parking within Downtown which will help reinforce bicycling as an attractive alternative mode of transportation.

Expansion of Downtown

Increasing utilization of 1st Street with the one-way conversion is expected to help extend the Core Downtown area to encompass parts of 1st Street. This could include greater integration with Big Chico Creek which is approximately parallel and to the north of 1st Street.

Recirculation

To provide an opportunity for northbound drivers on Main Street to return to downtown if they miss their destination, circulation will be provided through a City-owned parking lot northeast of the intersection of 1st Street/Main Street. Drivers traveling on 1st Street, 2nd Street or Broadway would be able to utilize the grid network to re-enter downtown, and the roundabout at 1st Street-2nd Street/ Flume Street allows for an easy U-turn movement.

Other Designs Considered

In the process of developing this proposed project, several alternatives were considered, but rejected due to less optimal projected operations. These alternatives are described below.

2nd Street Road Diet

Instead of creating the one-way couplet the idea of creating a three-lane road diet for the entire length of 2nd Street from Orange Street to Flume Street was considered. This alternative was rejected because under projected future volumes queues at the intersections of 2nd Street/Broadway and 2nd Street/Main Street would extend beyond mid-block, specifically the left turn queues would extend beyond the capacity of the left turn lane, which would cause further congestion for both left turning and through vehicles. Additionally, this alternative does not have the benefit of trying to extend the core Downtown business area to along 1st Street.

Signalization of 2nd Street/Flume Street/1st Street

It was determined that enhanced intersection control was necessary at the intersection of 2nd Street/ Flume Street/1st Street to improve the existing non-standard alignment. As an alternative to the proposed roundabout, signalization of the intersection was considered. In order to signalize the intersection additional channelization would need to be installed which would result in restricting some movements. Additionally, roundabouts generally are safer than signalized intersections and will better handle the one-way transition and prevent drivers from entering the wrong way on the one-way couplet.

Conclusions and Recommendations

Conclusions

Existing Configuration

- Currently, all study intersections operate acceptably according to City standards.
- Based upon future projected volumes, with the existing roadway configuration, all study intersections are expected to operate acceptably, except the intersection of 2nd Street/Main Street, which is expected to operate at LOS F.
- The segments of 1st Street from Salem Street to Flume Street-2nd Street and 2nd Street from Broadway to Flume Street-1st Street experience collision rates that are higher than the statewide average compared to similar types of facilities.

One-Way Conversion

- With the proposed one-way conversion of 1st and 2nd Streets (east of Broadway) and potential recirculation of existing traffic volumes, all study intersections are expected to operate acceptably except for the intersection of 1st Street/Broadway, which is expected to operate at LOS F.
- Based upon future projected traffic volumes along with the one-way conversion, all study intersections are expected to operate acceptably except for the intersection of 1st Street/Broadway which is expected to operate at LOS F.

Road Diet

- With the proposed conversion of 2nd Street from four to three lanes (west of Broadway) and existing traffic volumes, all study intersections are expected to operate acceptably.
- Based upon future projected traffic volumes along with the road diet, all study intersections are expected to operate acceptably.
- If a road diet were implemented for the entire length of 2nd Street from Orange Street to Flume Street, queuing would be unacceptable at the intersections of 2nd Street/Broadway and 2nd Street/Main Street.

Roundabout at 1st Street/2nd Street/Flume Street

The Roundabout Design Report will provide more detail.

- The proposed roundabout is expected to accommodate movements of a large fire truck on all approaches, a box truck on all approaches and a WB-45 semi-truck on all movements except for the northbound right turn. The northbound right turn by a WB-45 is an unlikely movement and alternative routes are available.
- The proposed roundabout is expected to operate acceptably and to greatly reduce delay on the approach which currently has the worst operation.

Drop-off Circle at 1st Street/Salem Street

The Drop-off Circle Design Memo will provide more detail.

- Due to the anticipated low-volume, low-speed nature of the drop-off circle and since the intent is to be more of an entry-way rather than an intersection for through traffic, the operations of the intersection were not considered.

Recommendations

One-Way Conversion

- In order to accommodate pedestrian movements at 1st Street/Broadway, it is recommended that exclusive pedestrian phasing be utilized. This will result in the signal not being in coordination with adjacent intersections, but due to the projected heavy southbound and westbound movements it may not be possible to coordinate the signal for major movements even without the exclusive pedestrian phasing.

- It is recommended that both vehicle detection and pedestrian detection equipment be installed at the intersection of 1st Street/Broadway along with actuated-coordinated signal timing. With this improvement, the intersection is expected to operate acceptably at LOS D.

- Along with the suggested improvements for 1st Street/Broadway, it is recommended that the City monitor operations at this intersection and when it begins to operate unacceptably the signal cycle length should be modified to better serve actual traffic volumes. This may result in this signal having a different cycle length than adjacent signals, but this is expected to have little impact on coordination because of the recommended exclusive pedestrian phasing and the heavy southbound and westbound movements which would make full coordination difficult.

Pedestrian Enhancements

- At intersections with high pedestrian crossing volumes, such as 2nd Street/Broadway and 2nd Street/Main Street, it is recommended that the City install the "LOOK" marking as shown below in Plate 1, on the pedestrian approaches to the intersection. This marking is intended to remind pedestrians to check in all directions prior to entering the intersection, which is especially important at intersections with heavy turning movements which create the most significant conflict point for pedestrians crossing the street.

Plate 1 – LOOK symbol

Bicycle Enhancements

- If colored bike lanes are to be utilized, it is recommended that they be a green color.

- To prevent opposite direction traffic, it is recommended that signs be posted along the bicycle lane indicating wrong-way travel. An example of this sign is shown below in Plate 2. If compliance issues exist, additional education programs as well as specialized police enforcement may be necessary.

Plate 2 – Front (left) and back (right) of bicycle lane signs that indicate the wrong way of travel

- It is recommended that the City coordinate an education campaign for Downtown merchants to inform them that it is illegal for delivery vehicles to block bicycle lanes and to ensure that bicycle lanes remain unobstructed.

- To increase bicycle lane visibility and to prevent traffic or parked delivery vehicles from infringing on the bicycle lanes, the City may want to consider coloring the bicycle lanes. It should be noted that colored bicycle lanes have not been adopted as part of the California Manual on Uniform Traffic Control Devices, but many agencies around California have utilized this concept. If the City does pursue coloring the bicycle lanes, a green color is recommended.

<u>Roundabout at 1st Street/2nd Street/Flume Street</u>

- Because of the existing speeds on the Camellia Way Bridge and need to control speeds entering the future roundabout, additional traffic calming elements such as curb extensions or expansion of the existing median should be completed on Camellia Way between the bridge and Memorial Way.

<u>Medians</u>

- Medians could be installed on 2nd Street west of Chestnut Street, Hazel Street and between Normal Avenue and Salem Street without impacting the queuing space needed in left-turn pockets at nearby intersections.

- Maintaining adequate storage for left turn movements should be considered in any median design.

- Installation of medians may restrict turning movements into driveways, so it is recommended that the City fully consider these turning restrictions prior to installation of medians.

Study Participants and References

Study Participants

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CHI900-7

Appendix A

Level of Service Calculations

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL2	SWL	SWR
Lane Configurations											
Volume (vph)	0	123	43	140	86	0	0	0	55	836	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0					6.0	
Lane Util. Factor		1.00		0.95	0.95					0.97	
Frpb, ped/bikes		0.98		1.00	1.00					0.99	
Flpb, ped/bikes		1.00		0.95	0.99					0.94	
Frt		0.96		1.00	1.00					0.98	
Flt Protected		1.00		0.95	0.99					0.96	
Satd. Flow (prot)		1587		1441	1393					2713	
Flt Permitted		1.00		0.64	0.87					0.96	
Satd. Flow (perm)		1587		976	1233					2713	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	134	47	152	93	0	0	0	60	909	114
RTOR Reduction (vph)	0	28	0	0	0	0	0	0	0	21	0
Lane Group Flow (vph)	0	153	0	114	131	0	0	0	0	1062	0
Confl. Peds. (#/hr)	50		50	50		50	50	50	50	50	50
Parking (#/hr)					0					0	
Turn Type				Perm					Perm		
Protected Phases		4			8					6	
Permitted Phases				8					6		
Actuated Green, G (s)		15.0		15.0	15.0					22.0	
Effective Green, g (s)		13.0		13.0	13.0					20.0	
Actuated g/C Ratio		0.29		0.29	0.29					0.44	
Clearance Time (s)		4.0		4.0	4.0					4.0	
Lane Grp Cap (vph)		458		282	356					1206	
v/s Ratio Prot		0.10									
v/s Ratio Perm				c0.12	0.11					0.39	
v/c Ratio		0.33		0.40	0.37					0.88	
Uniform Delay, d1		12.6		12.9	12.7					11.4	
Progression Factor		1.00		0.85	0.84					1.00	
Incremental Delay, d2		2.0		4.1	2.8					9.4	
Delay (s)		14.6		15.0	13.5					20.8	
Level of Service		B		B	B					C	
Approach Delay (s)		14.6			14.2		0.0			20.8	
Approach LOS		B			B		A			C	

Intersection Summary			
HCM Average Control Delay	19.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	50	0	0	140	40	60	1250	40	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0			6.0				
Lane Util. Factor		0.95			0.95			0.91				
Frpb, ped/bikes		1.00			0.98			1.00				
Flpb, ped/bikes		0.97			1.00			1.00				
Frt		1.00			0.97			1.00				
Flt Protected		0.97			1.00			1.00				
Satd. Flow (prot)		2826			3031			4185				
Flt Permitted		0.70			1.00			1.00				
Satd. Flow (perm)		2046			3031			4185				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	130	54	0	0	152	43	65	1359	43	0	0	0
RTOR Reduction (vph)	0	0	0	0	9	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	184	0	0	186	0	0	1460	0	0	0	0
Confl. Peds. (#/hr)	50		50	50		50	50		50	50		50
Parking (#/hr)		0						25			0	
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Actuated Green, G (s)		15.0			15.0			22.0				
Effective Green, g (s)		13.0			13.0			20.0				
Actuated g/C Ratio		0.29			0.29			0.44				
Clearance Time (s)		4.0			4.0			4.0				
Lane Grp Cap (vph)		591			876			1860				
v/s Ratio Prot					0.06							
v/s Ratio Perm		c0.09						0.35				
v/c Ratio		0.31			0.21			0.78				
Uniform Delay, d1		12.5			12.1			10.7				
Progression Factor		1.24			1.00			0.26				
Incremental Delay, d2		1.2			0.6			0.3				
Delay (s)		16.6			12.7			3.1				
Level of Service		B			B			A				
Approach Delay (s)		16.6			12.7			3.1			0.0	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	50	15	50	130	50	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	16	54	141	54	0
Pedestrians	50			50	50	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.0			3.0	3.0	
Percent Blockage	6			6	6	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	372					
pX, platoon unblocked						
vC, conflicting volume			121		412	162
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			121		412	162
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		89	100
cM capacity (veh/h)			1385		511	787

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	71	196	54
Volume Left	0	54	54
Volume Right	16	0	0
cSH	1700	1385	511
Volume to Capacity	0.04	0.04	0.11
Queue Length 95th (ft)	0	3	9
Control Delay (s)	0.0	2.4	12.9
Lane LOS		A	B
Approach Delay (s)	0.0	2.4	12.9
Approach LOS			B

Intersection Summary			
Average Delay		3.6	
Intersection Capacity Utilization		37.7%	ICU Level of Service A
Analysis Period (min)		15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	280	25	15	280	25	35
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	304	27	16	304	27	38
Pedestrians	50			50	50	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.0			3.0	3.0	
Percent Blockage	6			6	6	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				680		
pX, platoon unblocked						
vC, conflicting volume			382		603	266
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			382		603	266
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		93	94
cM capacity (veh/h)			1108		378	653

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	203	129	118	203	65
Volume Left	0	0	16	0	27
Volume Right	0	27	0	0	38
cSH	1700	1700	1108	1700	502
Volume to Capacity	0.12	0.08	0.01	0.12	0.13
Queue Length 95th (ft)	0	0	1	0	11
Control Delay (s)	0.0	0.0	1.3	0.0	13.2
Lane LOS			A		B
Approach Delay (s)	0.0		0.5		13.2
Approach LOS					B

Intersection Summary			
Average Delay		1.4	
Intersection Capacity Utilization		40.8%	ICU Level of Service A
Analysis Period (min)		15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	30	300	20	30	250	30	10	20	30	25	5	10
Sign Control		Free			Free			Stop			Stop	
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)	33	326	22	33	272	33	11	22	33	27	5	11
Pedestrians		50			50			50			50	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.0			3.0			3.0			3.0	
Percent Blockage		6			6			6			6	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					355							
pX, platoon unblocked												
vC, conflicting volume	354			398			717	872	274	725	866	252
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	354			398			717	872	274	725	866	252
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			97			95	91	95	87	98	98
cM capacity (veh/h)	1134			1093			240	242	645	217	243	667

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	196	185	168	168	65	43
Volume Left	33	0	33	0	11	27
Volume Right	0	22	0	33	33	11
cSH	1134	1700	1093	1700	351	265
Volume to Capacity	0.03	0.11	0.03	0.10	0.19	0.16
Queue Length 95th (ft)	2	0	2	0	17	14
Control Delay (s)	1.6	0.0	1.8	0.0	17.6	21.2
Lane LOS	A		A		C	C
Approach Delay (s)	0.8		0.9		17.6	21.2
Approach LOS					C	C

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	26	347	36	24	267	100	28	159	44	117	152	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.99			0.97		1.00	0.98		1.00	0.99	
Flpb, ped/bikes		1.00			1.00		0.95	1.00		0.95	1.00	
Frt		0.99			0.96		1.00	0.97		1.00	0.98	
Flt Protected		1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2858			2728		1518	1596		1521	1628	
Flt Permitted		0.91			0.91		0.64	1.00		0.62	1.00	
Satd. Flow (perm)		2619			2502		1019	1596		993	1628	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	28	377	39	26	290	109	30	173	48	127	165	25
RTOR Reduction (vph)	0	16	0	0	68	0	0	22	0	0	12	0
Lane Group Flow (vph)	0	428	0	0	357	0	30	199	0	127	178	0
Confl. Peds. (#/hr)	50		50	50		50	50		50	50		50
Parking (#/hr)		10			10							
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4	4		4		
Actuated Green, G (s)		19.0			19.0		18.0	18.0		18.0	18.0	
Effective Green, g (s)		17.0			17.0		16.0	16.0		16.0	16.0	
Actuated g/C Ratio		0.38			0.38		0.36	0.36		0.36	0.36	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		989			945		362	567		353	579	
v/s Ratio Prot								0.12			0.11	
v/s Ratio Perm		c0.16			0.14		0.03			c0.13		
v/c Ratio		0.43			0.38		0.08	0.35		0.36	0.31	
Uniform Delay, d1		10.4			10.2		9.6	10.7		10.7	10.5	
Progression Factor		1.00			0.76		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.4			1.1		0.4	1.7		2.8	1.4	
Delay (s)		11.8			8.8		10.1	12.4		13.6	11.9	
Level of Service		B			A		B	B		B	B	
Approach Delay (s)		11.8			8.8			12.1			12.5	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	530	30	30	400	30	30
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	576	33	33	435	33	33
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	352			338		
pX, platoon unblocked						
vC, conflicting volume			609		875	304
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			609		875	304
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		88	95
cM capacity (veh/h)			966		279	692

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	384	225	178	290	65
Volume Left	0	0	33	0	33
Volume Right	0	33	0	0	33
cSH	1700	1700	966	1700	398
Volume to Capacity	0.23	0.13	0.03	0.17	0.16
Queue Length 95th (ft)	0	0	3	0	15
Control Delay (s)	0.0	0.0	1.9	0.0	15.8
Lane LOS			A		C
Approach Delay (s)	0.0		0.7		15.8
Approach LOS					C

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	46.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	515	101	51	360	109	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	0.98			1.00	0.96	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.98			1.00	0.93	
Flt Protected	1.00			0.99	0.98	
Satd. Flow (prot)	3046			2914	1470	
Flt Permitted	1.00			0.83	0.98	
Satd. Flow (perm)	3046			2426	1470	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	560	110	55	391	118	118
RTOR Reduction (vph)	36	0	0	0	80	0
Lane Group Flow (vph)	634	0	0	446	156	0
Confl. Peds. (#/hr)		50	50		50	50
Parking (#/hr)		10		10		0
Turn Type			Perm			
Protected Phases	2			2	4	
Permitted Phases			2			
Actuated Green, G (s)	22.0			22.0	15.0	
Effective Green, g (s)	20.0			20.0	13.0	
Actuated g/C Ratio	0.44			0.44	0.29	
Clearance Time (s)	4.0			4.0	4.0	
Lane Grp Cap (vph)	1354			1078	425	
v/s Ratio Prot	c0.21				c0.11	
v/s Ratio Perm				0.18		
v/c Ratio	0.47			0.41	0.37	
Uniform Delay, d1	8.8			8.5	12.7	
Progression Factor	0.63			0.90	1.00	
Incremental Delay, d2	1.1			1.1	2.4	
Delay (s)	6.6			8.7	15.2	
Level of Service	A			A	B	
Approach Delay (s)	6.6			8.7	15.2	
Approach LOS	A			A	B	

Intersection Summary			
HCM Average Control Delay	8.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	560	40	10	400	18	5	3	20	10	3	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.95			0.97	
Flpb, ped/bikes		1.00			1.00			0.99			0.97	
Frt		0.99			0.99			0.90			0.95	
Flt Protected		1.00			1.00			0.99			0.98	
Satd. Flow (prot)		2882			2788			1405			1465	
Flt Permitted		0.92			0.94			0.96			0.88	
Satd. Flow (perm)		2662			2623			1361			1321	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	609	43	11	435	20	5	3	22	11	3	9
RTOR Reduction (vph)	0	9	0	0	6	0	0	18	0	0	7	0
Lane Group Flow (vph)	0	676	0	0	460	0	0	12	0	0	16	0
Confl. Peds. (#/hr)	50		50	50		50	50		50	50		50
Parking (#/hr)		10			25							
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		26.0			26.0			11.0			11.0	
Effective Green, g (s)		24.0			24.0			9.0			9.0	
Actuated g/C Ratio		0.53			0.53			0.20			0.20	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1420			1399			272			264	
v/s Ratio Prot												
v/s Ratio Perm		c0.25			0.18			0.01			c0.01	
v/c Ratio		0.48			0.33			0.05			0.06	
Uniform Delay, d1		6.6			5.9			14.5			14.6	
Progression Factor		0.32			0.77			1.00			1.00	
Incremental Delay, d2		1.0			0.1			0.1			0.1	
Delay (s)		3.1			4.7			14.6			14.7	
Level of Service		A			A			B			B	
Approach Delay (s)		3.1			4.7			14.6			14.7	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	4.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	62	462	54	44	292	46	65	74	131	29	81	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	8	12	12	12
Total Lost time (s)		6.0			6.0			6.0	6.0		6.0	
Lane Util. Factor		0.95			0.95			1.00	1.00		1.00	
Frpb, ped/bikes		0.96			0.95			1.00	0.75		0.90	
Flpb, ped/bikes		0.98			0.98			0.92	1.00		0.97	
Frt		0.99			0.98			1.00	0.85		0.95	
Flt Protected		0.99			0.99			0.98	1.00		0.99	
Satd. Flow (prot)		2597			2568			1350	923		1236	
Flt Permitted		0.87			0.85			0.78	1.00		0.93	
Satd. Flow (perm)		2266			2185			1071	923		1162	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	67	502	59	48	317	50	71	80	142	32	88	77
RTOR Reduction (vph)	0	17	0	0	24	0	0	0	58	0	51	0
Lane Group Flow (vph)	0	611	0	0	391	0	0	151	84	0	146	0
Confl. Peds. (#/hr)	200		200	200		200	200		200	200		200
Parking (#/hr)		25			25			0			0	
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		22.0			22.0			15.0	15.0		15.0	
Effective Green, g (s)		20.0			20.0			13.0	13.0		13.0	
Actuated g/C Ratio		0.44			0.44			0.29	0.29		0.29	
Clearance Time (s)		4.0			4.0			4.0	4.0		4.0	
Lane Grp Cap (vph)		1007			971			309	267		336	
v/s Ratio Prot												
v/s Ratio Perm		c0.27			0.18			c0.14	0.09		0.13	
v/c Ratio		0.61			0.40			0.49	0.31		0.43	
Uniform Delay, d1		9.5			8.5			13.2	12.5		13.0	
Progression Factor		0.24			1.41			1.00	1.00		1.00	
Incremental Delay, d2		2.5			0.8			5.4	3.0		4.0	
Delay (s)		4.7			12.7			18.7	15.6		17.1	
Level of Service		A			B			B	B		B	
Approach Delay (s)		4.7			12.7			17.2			17.1	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	10.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	460	158	176	275	0	0	0	0	85	764	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0						6.0	
Lane Util. Factor		0.95			0.95						0.91	
Frpb, ped/bikes		0.94			1.00						0.97	
Flpb, ped/bikes		1.00			0.96						0.98	
Frt		0.96			1.00						0.98	
Flt Protected		1.00			0.98						1.00	
Satd. Flow (prot)		2543			2671						3932	
Flt Permitted		1.00			0.62						1.00	
Satd. Flow (perm)		2543			1688						3932	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	500	172	191	299	0	0	0	0	92	830	122
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	0	37	0
Lane Group Flow (vph)	0	667	0	0	490	0	0	0	0	0	1007	0
Confl. Peds. (#/hr)	200		200	200		200	200		200	200		200
Parking (#/hr)		25			25			25			25	
Turn Type				Perm						Perm		
Protected Phases		4			8						2	
Permitted Phases				8						2		
Actuated Green, G (s)		20.0			20.0						17.0	
Effective Green, g (s)		18.0			18.0						15.0	
Actuated g/C Ratio		0.40			0.40						0.33	
Clearance Time (s)		4.0			4.0						4.0	
Lane Grp Cap (vph)		1017			675						1311	
v/s Ratio Prot		0.26										
v/s Ratio Perm					c0.29						0.26	
v/c Ratio		0.66			0.99dl						0.77	
Uniform Delay, d1		11.0			11.4						13.4	
Progression Factor		0.62			1.17						0.46	
Incremental Delay, d2		2.7			4.7						2.6	
Delay (s)		9.5			18.1						8.7	
Level of Service		A			B						A	
Approach Delay (s)		9.5			18.1			0.0			8.7	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	203	424	0	0	307	38	217	1166	231	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0			6.0				
Lane Util. Factor		0.95			0.95			0.91				
Frpb, ped/bikes		1.00			0.97			0.96				
Flpb, ped/bikes		0.95			1.00			0.97				
Frt		1.00			0.98			0.98				
Flt Protected		0.98			1.00			0.99				
Satd. Flow (prot)		2650			2704			3835				
Flt Permitted		0.73			1.00			0.99				
Satd. Flow (perm)		1974			2704			3835				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	221	461	0	0	334	41	236	1267	251	0	0	0
RTOR Reduction (vph)	0	0	0	0	3	0	0	25	0	0	0	0
Lane Group Flow (vph)	0	682	0	0	372	0	0	1729	0	0	0	0
Confl. Peds. (#/hr)	200		200	200		200	200		200	200		200
Parking (#/hr)		25			25			25			0	
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Actuated Green, G (s)		17.0			17.0			20.0				
Effective Green, g (s)		15.0			15.0			18.0				
Actuated g/C Ratio		0.33			0.33			0.40				
Clearance Time (s)		4.0			4.0			4.0				
Lane Grp Cap (vph)		658			901			1534				
v/s Ratio Prot					0.14							
v/s Ratio Perm		c0.35						0.45				
v/c Ratio		1.04			0.41			1.13				
Uniform Delay, d1		15.0			11.6			13.5				
Progression Factor		0.74			1.00			0.25				
Incremental Delay, d2		41.5			1.4			62.7				
Delay (s)		52.6			13.0			66.0				
Level of Service		D			B			E				
Approach Delay (s)		52.6			13.0			66.0			0.0	
Approach LOS		D			B			E			A	

Intersection Summary			
HCM Average Control Delay	55.7	HCM Level of Service	E
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	40	535	0	20	345	20	0	0	0	40	25	10
Sign Control		Free			Free			Stop			Stop	
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)	43	582	0	22	375	22	0	0	0	43	27	11
Pedestrians		50			50			50			50	
Lane Width (ft)		12.0			12.0			0.0			12.0	
Walking Speed (ft/s)		3.0			3.0			3.0			3.0	
Percent Blockage		6			6			0			6	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		351										
pX, platoon unblocked												
vC, conflicting volume	447			632			1024	1209	391	907	1198	298
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	447			632			1024	1209	391	907	1198	298
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			98			100	100	100	77	83	98
cM capacity (veh/h)	1048			947			140	161	574	188	163	622

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	237	388	209	209	82
Volume Left	43	0	22	0	43
Volume Right	0	0	0	22	11
cSH	1048	1700	947	1700	196
Volume to Capacity	0.04	0.23	0.02	0.12	0.42
Queue Length 95th (ft)	3	0	2	0	47
Control Delay (s)	1.9	0.0	1.1	0.0	35.9
Lane LOS	A		A		E
Approach Delay (s)	0.7		0.6		35.9
Approach LOS					E

Intersection Summary			
Average Delay		3.2	
Intersection Capacity Utilization		58.9%	ICU Level of Service
Analysis Period (min)		15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	520	55	50	300	180	20	20	45	20	20	20
Sign Control		Free			Free			Stop			Stop	
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)	22	565	60	54	326	196	22	22	49	22	22	22
Pedestrians		50			50			50			50	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.0			3.0			3.0			3.0	
Percent Blockage		6			6			6			6	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		720										
pX, platoon unblocked				0.99			0.99	0.99	0.99	0.99	0.99	
vC, conflicting volume	376			675			1176	1143	665	1203	1203	426
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	376			666			1173	1140	656	1200	1200	426
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			94			80	87	88	78	86	96
cM capacity (veh/h)	1117			863			110	163	411	98	150	560

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	587	60	380	196	92	65
Volume Left	22	0	54	0	22	22
Volume Right	0	60	0	196	49	22
cSH	1117	1700	863	1700	205	161
Volume to Capacity	0.02	0.04	0.06	0.12	0.45	0.41
Queue Length 95th (ft)	1	0	5	0	53	45
Control Delay (s)	0.5	0.0	2.0	0.0	36.1	42.0
Lane LOS	A		A		E	E
Approach Delay (s)	0.5		1.3		36.1	42.0
Approach LOS					E	E

Intersection Summary			
Average Delay		5.2	
Intersection Capacity Utilization		74.3%	ICU Level of Service
Analysis Period (min)		15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL2	SWL	SWR
Lane Configurations											
Volume (vph)	0	123	43	140	86	0	0	0	55	836	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0					6.0	
Lane Util. Factor		1.00		0.95	0.95					0.97	
Frpb, ped/bikes		0.98		1.00	1.00					0.99	
Flpb, ped/bikes		1.00		0.95	0.99					0.94	
Frt		0.96		1.00	1.00					0.98	
Flt Protected		1.00		0.95	0.99					0.96	
Satd. Flow (prot)		1587		1443	1393					2713	
Flt Permitted		1.00		0.63	0.86					0.96	
Satd. Flow (perm)		1587		954	1210					2713	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	0	153	54	174	107	0	0	0	68	1041	131
RTOR Reduction (vph)	0	25	0	0	0	0	0	0	0	21	0
Lane Group Flow (vph)	0	182	0	129	152	0	0	0	0	1219	0
Confl. Peds. (#/hr)	50		50	50		50	50	50	50	50	50
Parking (#/hr)					0					0	
Turn Type				Perm					Perm		
Protected Phases		4			8					6	
Permitted Phases				8					6		
Actuated Green, G (s)		15.0		15.0	15.0					22.0	
Effective Green, g (s)		13.0		13.0	13.0					20.0	
Actuated g/C Ratio		0.29		0.29	0.29					0.44	
Clearance Time (s)		4.0		4.0	4.0					4.0	
Lane Grp Cap (vph)		458		276	350					1206	
v/s Ratio Prot		0.11									
v/s Ratio Perm				c0.14	0.13					0.45	
v/c Ratio		0.40		0.47	0.43					1.01	
Uniform Delay, d1		12.9		13.2	13.0					12.5	
Progression Factor		1.00		0.72	0.71					1.00	
Incremental Delay, d2		2.6		5.2	3.6					28.7	
Delay (s)		15.4		14.7	12.9					41.2	
Level of Service		B		B	B					D	
Approach Delay (s)		15.4			13.7		0.0			41.2	
Approach LOS		B			B		A			D	

Intersection Summary			
HCM Average Control Delay	33.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	50	0	0	140	40	60	1250	40	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0			6.0				
Lane Util. Factor		0.95			0.95			0.91				
Frpb, ped/bikes		1.00			0.98			1.00				
Flpb, ped/bikes		0.97			1.00			1.00				
Frt		1.00			0.97			1.00				
Flt Protected		0.97			1.00			1.00				
Satd. Flow (prot)		2830			3029			4185				
Flt Permitted		0.69			1.00			1.00				
Satd. Flow (perm)		2018			3029			4185				
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	149	62	0	0	174	50	75	1556	50	0	0	0
RTOR Reduction (vph)	0	0	0	0	4	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	211	0	0	220	0	0	1674	0	0	0	0
Confl. Peds. (#/hr)	50		50	50		50	50		50	50		50
Parking (#/hr)		0						25			0	
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Actuated Green, G (s)		15.0			15.0			22.0				
Effective Green, g (s)		13.0			13.0			20.0				
Actuated g/C Ratio		0.29			0.29			0.44				
Clearance Time (s)		4.0			4.0			4.0				
Lane Grp Cap (vph)		583			875			1860				
v/s Ratio Prot					0.07							
v/s Ratio Perm		c0.10						0.40				
v/c Ratio		0.36			0.25			0.90				
Uniform Delay, d1		12.7			12.3			11.6				
Progression Factor		1.33			1.00			0.31				
Incremental Delay, d2		1.4			0.7			0.8				
Delay (s)		18.3			12.9			4.3				
Level of Service		B			B			A				
Approach Delay (s)		18.3			12.9			4.3			0.0	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	50	15	50	130	50	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	62	19	62	162	62	0
Pedestrians	50			50	50	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.0			3.0	3.0	
Percent Blockage	6			6	6	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	372					
pX, platoon unblocked						
vC, conflicting volume			131		458	172
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			131		458	172
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		87	100
cM capacity (veh/h)			1374		478	778

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	81	224	62
Volume Left	0	62	62
Volume Right	19	0	0
cSH	1700	1374	478
Volume to Capacity	0.05	0.05	0.13
Queue Length 95th (ft)	0	4	11
Control Delay (s)	0.0	2.4	13.7
Lane LOS		A	B
Approach Delay (s)	0.0	2.4	13.7
Approach LOS			B

Intersection Summary			
Average Delay		3.8	
Intersection Capacity Utilization		39.8%	ICU Level of Service A
Analysis Period (min)		15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	280	25	15	280	25	35
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	349	31	19	349	31	44
Pedestrians	50			50	50	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.0			3.0	3.0	
Percent Blockage	6			6	6	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				680		
pX, platoon unblocked						
vC, conflicting volume			430		676	290
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			430		676	290
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		91	93
cM capacity (veh/h)			1064		339	630

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	232	147	135	232	75
Volume Left	0	0	19	0	31
Volume Right	0	31	0	0	44
cSH	1700	1700	1064	1700	464
Volume to Capacity	0.14	0.09	0.02	0.14	0.16
Queue Length 95th (ft)	0	0	1	0	14
Control Delay (s)	0.0	0.0	1.3	0.0	14.2
Lane LOS			A		B
Approach Delay (s)	0.0		0.5		14.2
Approach LOS					B

Intersection Summary			
Average Delay		1.5	
Intersection Capacity Utilization		45.1%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
6: 2nd St & Cherry St

Existing Conditions - Future Volumes
3/3/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	30	300	20	30	250	30	10	20	30	25	5	10
Sign Control		Free			Free			Stop			Stop	
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)	37	373	25	37	311	37	12	25	37	31	6	12
Pedestrians		50			50			50			50	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.0			3.0			3.0			3.0	
Percent Blockage		6			6			6			6	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					355							
pX, platoon unblocked												
vC, conflicting volume	399			448			806	984	299	816	978	274
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	399			448			806	984	299	816	978	274
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			96			94	88	94	83	97	98
cM capacity (veh/h)	1092			1047			203	205	622	178	207	645

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	224	212	193	193	75	50
Volume Left	37	0	37	0	12	31
Volume Right	0	25	0	37	37	12
cSH	1092	1700	1047	1700	308	222
Volume to Capacity	0.03	0.12	0.04	0.11	0.24	0.22
Queue Length 95th (ft)	3	0	3	0	23	21
Control Delay (s)	1.7	0.0	1.9	0.0	20.4	25.8
Lane LOS	A		A		C	D
Approach Delay (s)	0.9		1.0		20.4	25.8
Approach LOS					C	D

Intersection Summary				
Average Delay		3.8		
Intersection Capacity Utilization		53.5%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Signalized Intersection Capacity Analysis
7: 2nd St & Ivy St

Existing Conditions - Future Volumes
3/3/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	26	347	36	24	267	100	28	159	44	117	152	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.99			0.97		1.00	0.98		1.00	0.99	
Flpb, ped/bikes		1.00			1.00		0.95	1.00		0.96	1.00	
Frt		0.99			0.96		1.00	0.97		1.00	0.98	
Flt Protected		1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2858			2730		1520	1596		1524	1627	
Flt Permitted		0.91			0.91		0.62	1.00		0.60	1.00	
Satd. Flow (perm)		2598			2482		995	1596		966	1627	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	32	432	45	30	332	124	35	198	55	146	189	29
RTOR Reduction (vph)	0	16	0	0	75	0	0	22	0	0	12	0
Lane Group Flow (vph)	0	493	0	0	411	0	35	231	0	146	206	0
Confl. Peds. (#/hr)	50		50	50		50	50		50	50		50
Parking (#/hr)		10			10							
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4	4		4		
Actuated Green, G (s)		19.0			19.0		18.0	18.0		18.0	18.0	
Effective Green, g (s)		17.0			17.0		16.0	16.0		16.0	16.0	
Actuated g/C Ratio		0.38			0.38		0.36	0.36		0.36	0.36	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		981			938		354	567		343	578	
v/s Ratio Prot								0.14			0.13	
v/s Ratio Perm		c0.19			0.17		0.04			c0.15		
v/c Ratio		0.50			0.44		0.10	0.41		0.43	0.36	
Uniform Delay, d1		10.8			10.4		9.7	10.9		11.0	10.7	
Progression Factor		1.00			0.59		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.8			1.3		0.6	2.2		3.8	1.7	
Delay (s)		12.6			7.5		10.2	13.1		14.8	12.4	
Level of Service		B			A		B	B		B	B	
Approach Delay (s)		12.6			7.5			12.7			13.4	
Approach LOS		B			A			B			B	

Intersection Summary				
HCM Average Control Delay		11.3	HCM Level of Service	B
HCM Volume to Capacity ratio		0.46		
Actuated Cycle Length (s)		45.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization		76.8%	ICU Level of Service	D
Analysis Period (min)		15		
c Critical Lane Group				

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	530	30	30	400	30	30
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	660	37	37	498	37	37
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	352			338		
pX, platoon unblocked						
vC, conflicting volume			697		1002	349
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			697		1002	349
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		84	94
cM capacity (veh/h)			895		229	648

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	440	257	203	332	75
Volume Left	0	0	37	0	37
Volume Right	0	37	0	0	37
cSH	1700	1700	895	1700	338
Volume to Capacity	0.26	0.15	0.04	0.20	0.22
Queue Length 95th (ft)	0	0	3	0	21
Control Delay (s)	0.0	0.0	2.0	0.0	18.6
Lane LOS			A		C
Approach Delay (s)	0.0		0.8		18.6
Approach LOS					C

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	515	101	51	360	109	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frpb, ped/bikes	0.98			1.00	0.96	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.98			1.00	0.93	
Flt Protected	1.00			0.99	0.98	
Satd. Flow (prot)	3045			2916	1470	
Flt Permitted	1.00			0.80	0.98	
Satd. Flow (perm)	3045			2359	1470	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	641	126	63	448	136	136
RTOR Reduction (vph)	36	0	0	0	80	0
Lane Group Flow (vph)	731	0	0	511	192	0
Confl. Peds. (#/hr)		50	50		50	50
Parking (#/hr)		10		10		0
Turn Type			Perm			
Protected Phases	2			2	4	
Permitted Phases			2			
Actuated Green, G (s)	22.0			22.0	15.0	
Effective Green, g (s)	20.0			20.0	13.0	
Actuated g/C Ratio	0.44			0.44	0.29	
Clearance Time (s)	4.0			4.0	4.0	
Lane Grp Cap (vph)	1353			1048	425	
v/s Ratio Prot	c0.24				c0.13	
v/s Ratio Perm				0.22		
v/c Ratio	0.54			0.49	0.45	
Uniform Delay, d1	9.1			8.9	13.1	
Progression Factor	0.65			0.45	1.00	
Incremental Delay, d2	1.5			1.5	3.5	
Delay (s)	7.4			5.6	16.5	
Level of Service	A			A	B	
Approach Delay (s)	7.4			5.6	16.5	
Approach LOS	A			A	B	

Intersection Summary			
HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	560	40	10	400	18	5	3	20	10	3	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			0.95			0.97	
Flpb, ped/bikes		1.00			1.00			0.99			0.97	
Frt		0.99			0.99			0.90			0.95	
Flt Protected		1.00			1.00			0.99			0.98	
Satd. Flow (prot)		2882			2790			1410			1470	
Flt Permitted		0.92			0.94			0.96			0.88	
Satd. Flow (perm)		2646			2618			1362			1324	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	37	697	50	12	498	22	6	4	25	12	4	10
RTOR Reduction (vph)	0	9	0	0	6	0	0	20	0	0	8	0
Lane Group Flow (vph)	0	775	0	0	526	0	0	15	0	0	18	0
Confl. Peds. (#/hr)	50		50	50		50	50		50	50		50
Parking (#/hr)		10			25							
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		26.0			26.0			11.0			11.0	
Effective Green, g (s)		24.0			24.0			9.0			9.0	
Actuated g/C Ratio		0.53			0.53			0.20			0.20	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1411			1396			272			265	
v/s Ratio Prot												
v/s Ratio Perm		c0.29			0.20			0.01			c0.01	
v/c Ratio		0.55			0.38			0.06			0.07	
Uniform Delay, d1		6.9			6.1			14.6			14.6	
Progression Factor		0.38			1.70			1.00			1.00	
Incremental Delay, d2		1.3			0.1			0.1			0.1	
Delay (s)		4.0			10.6			14.6			14.7	
Level of Service		A			B			B			B	
Approach Delay (s)		4.0			10.6			14.6			14.7	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	7.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	62	462	54	44	292	46	65	74	131	29	81	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	8	12	12	12
Total Lost time (s)		6.0			6.0			6.0	6.0		6.0	
Lane Util. Factor		0.95			0.95			1.00	1.00		1.00	
Frpb, ped/bikes		0.96			0.95			1.00	0.75		0.90	
Flpb, ped/bikes		0.98			0.98			0.92	1.00		0.97	
Frt		0.99			0.98			1.00	0.85		0.95	
Flt Protected		0.99			0.99			0.98	1.00		0.99	
Satd. Flow (prot)		2604			2577			1359	923		1238	
Flt Permitted		0.85			0.83			0.79	1.00		0.93	
Satd. Flow (perm)		2230			2140			1102	923		1157	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	77	575	67	55	364	57	81	92	163	36	101	88
RTOR Reduction (vph)	0	17	0	0	23	0	0	0	46	0	51	0
Lane Group Flow (vph)	0	702	0	0	453	0	0	173	117	0	174	0
Confl. Peds. (#/hr)	200		200	200		200	200		200	200		200
Parking (#/hr)		25			25			0			0	
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		22.0			22.0			15.0	15.0		15.0	
Effective Green, g (s)		20.0			20.0			13.0	13.0		13.0	
Actuated g/C Ratio		0.44			0.44			0.29	0.29		0.29	
Clearance Time (s)		4.0			4.0			4.0	4.0		4.0	
Lane Grp Cap (vph)		991			951			318	267		334	
v/s Ratio Prot												
v/s Ratio Perm		c0.31			0.21			c0.16	0.13		0.15	
v/c Ratio		0.71			0.48			0.54	0.44		0.52	
Uniform Delay, d1		10.1			8.8			13.5	13.0		13.4	
Progression Factor		0.16			1.43			1.00	1.00		1.00	
Incremental Delay, d2		3.7			0.8			6.5	5.1		5.7	
Delay (s)		5.3			13.3			20.0	18.2		19.1	
Level of Service		A			B			C	B		B	
Approach Delay (s)		5.3			13.3			19.1			19.1	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	11.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	460	158	176	275	0	0	0	0	85	764	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0						6.0	
Lane Util. Factor		0.95			0.95						0.91	
Frpb, ped/bikes		0.94			1.00						0.97	
Flpb, ped/bikes		1.00			0.97						0.98	
Frt		0.96			1.00						0.98	
Flt Protected		1.00			0.98						1.00	
Satd. Flow (prot)		2543			2689						3932	
Flt Permitted		1.00			0.59						1.00	
Satd. Flow (perm)		2543			1610						3932	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	0	573	197	219	342	0	0	0	0	106	951	139
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	37	0
Lane Group Flow (vph)	0	767	0	0	561	0	0	0	0	0	1159	0
Confl. Peds. (#/hr)	200		200	200		200	200		200	200		200
Parking (#/hr)		25			25			25			25	
Turn Type				Perm						Perm		
Protected Phases		4			8						2	
Permitted Phases				8						2		
Actuated Green, G (s)		20.0			20.0						17.0	
Effective Green, g (s)		18.0			18.0						15.0	
Actuated g/C Ratio		0.40			0.40						0.33	
Clearance Time (s)		4.0			4.0						4.0	
Lane Grp Cap (vph)		1017			644						1311	
v/s Ratio Prot		0.30										
v/s Ratio Perm					c0.35						0.29	
v/c Ratio		0.75			1.34dl						0.88	
Uniform Delay, d1		11.6			12.4						14.2	
Progression Factor		0.61			1.11						0.49	
Incremental Delay, d2		3.9			9.0						3.8	
Delay (s)		11.0			22.9						10.8	
Level of Service		B			C						B	
Approach Delay (s)		11.0			22.9			0.0			10.8	
Approach LOS		B			C			A			B	

Intersection Summary			
HCM Average Control Delay	13.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.2%	ICU Level of Service	E
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	203	424	0	0	307	38	217	1166	231	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0			6.0				
Lane Util. Factor		0.95			0.95			0.91				
Frpb, ped/bikes		1.00			0.97			0.96				
Flpb, ped/bikes		0.96			1.00			0.97				
Frt		1.00			0.98			0.98				
Flt Protected		0.98			1.00			0.99				
Satd. Flow (prot)		2660			2704			3835				
Flt Permitted		0.72			1.00			0.99				
Satd. Flow (perm)		1938			2704			3835				
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	253	528	0	0	382	47	270	1452	288	0	0	0
RTOR Reduction (vph)	0	0	0	0	1	0	0	19	0	0	0	0
Lane Group Flow (vph)	0	781	0	0	428	0	0	1991	0	0	0	0
Confl. Peds. (#/hr)	200		200	200		200	200		200	200		200
Parking (#/hr)		25			25			25			0	
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Actuated Green, G (s)		17.0			17.0			20.0				
Effective Green, g (s)		15.0			15.0			18.0				
Actuated g/C Ratio		0.33			0.33			0.40				
Clearance Time (s)		4.0			4.0			4.0				
Lane Grp Cap (vph)		646			901			1534				
v/s Ratio Prot					0.16							
v/s Ratio Perm		c0.40						0.52				
v/c Ratio		1.21			0.47			1.30				
Uniform Delay, d1		15.0			11.9			13.5				
Progression Factor		0.83			1.00			0.20				
Incremental Delay, d2		104.6			1.8			136.1				
Delay (s)		117.1			13.7			138.8				
Level of Service		F			B			F				
Approach Delay (s)		117.1			13.7			138.8			0.0	
Approach LOS		F			B			F			A	

Intersection Summary			
HCM Average Control Delay	116.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.26		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	40	535	0	20	345	20	0	0	0	40	25	10
Sign Control		Free			Free			Stop			Stop	
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)	50	666	0	25	429	25	0	0	0	50	31	12
Pedestrians		50			50			50			50	
Lane Width (ft)		12.0			12.0			0.0			12.0	
Walking Speed (ft/s)		3.0			3.0			3.0			3.0	
Percent Blockage		6			6			0			6	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		351										
pX, platoon unblocked												
vC, conflicting volume	504			716			1158	1370	433	1024	1357	327
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	504			716			1158	1370	433	1024	1357	327
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			97			100	100	100	67	76	98
cM capacity (veh/h)	998			880			103	127	539	152	129	596

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	272	444	240	240	93
Volume Left	50	0	25	0	50
Volume Right	0	0	0	25	12
cSH	998	1700	880	1700	158
Volume to Capacity	0.05	0.26	0.03	0.14	0.59
Queue Length 95th (ft)	4	0	2	0	78
Control Delay (s)	2.0	0.0	1.2	0.0	56.0
Lane LOS	A		A		F
Approach Delay (s)	0.8		0.6		56.0
Approach LOS					F

Intersection Summary			
Average Delay		4.7	
Intersection Capacity Utilization		64.6%	ICU Level of Service C
Analysis Period (min)		15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	520	55	50	300	180	20	20	45	20	20	20
Sign Control		Free			Free			Stop			Stop	
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)	25	647	68	62	373	224	25	25	56	25	25	25
Pedestrians		50			50			50			50	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.0			3.0			3.0			3.0	
Percent Blockage		6			6			6			6	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		720										
pX, platoon unblocked				0.92			0.92	0.92	0.92	0.92	0.92	
vC, conflicting volume	423			766			1332	1295	747	1364	1364	473
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	423			705			1319	1278	685	1352	1352	473
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			92			66	80	85	61	78	95
cM capacity (veh/h)	1073			779			74	123	369	64	111	527

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	672	68	436	224	106	75
Volume Left	25	0	62	0	25	25
Volume Right	0	68	0	224	56	25
cSH	1073	1700	779	1700	154	113
Volume to Capacity	0.02	0.04	0.08	0.13	0.69	0.66
Queue Length 95th (ft)	2	0	6	0	100	85
Control Delay (s)	0.6	0.0	2.3	0.0	68.8	84.2
Lane LOS	A		A		F	F
Approach Delay (s)	0.6		1.5		68.8	84.2
Approach LOS					F	F

Intersection Summary			
Average Delay		9.5	
Intersection Capacity Utilization		84.9%	ICU Level of Service E
Analysis Period (min)		15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL	SWR
Lane Configurations										
Volume (vph)	0	0	0	510	86	0	0	0	1000	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0				6.0	
Lane Util. Factor				0.95	0.95				0.97	
Frpb, ped/bikes				1.00	1.00				1.00	
Flpb, ped/bikes				1.00	1.00				1.00	
Frt				1.00	1.00				0.99	
Flt Protected				0.95	0.97				0.95	
Satd. Flow (prot)				1513	1538				3082	
Flt Permitted				0.95	0.97				0.95	
Satd. Flow (perm)				1513	1538				3082	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	554	93	0	0	0	1087	54
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	321	326	0	0	0	1141	0
Confl. Peds. (#/hr)										
Turn Type				Perm						
Protected Phases					8				6	
Permitted Phases				8						
Actuated Green, G (s)				13.0	13.0				22.0	
Effective Green, g (s)				11.0	11.0				20.0	
Actuated g/C Ratio				0.18	0.18				0.33	
Clearance Time (s)				4.0	4.0				4.0	
Lane Grp Cap (vph)				277	282				1027	
v/s Ratio Prot									c0.37	
v/s Ratio Perm				c0.21	0.21					
v/c Ratio				1.16	1.16				1.11	
Uniform Delay, d1				24.5	24.5				20.0	
Progression Factor				0.47	0.47				1.00	
Incremental Delay, d2				98.2	96.8				63.7	
Delay (s)				109.6	108.2				83.7	
Level of Service				F	F				F	
Approach Delay (s)		0.0			108.9		0.0		83.7	
Approach LOS		A			F		A		F	

Intersection Summary				
HCM Average Control Delay	92.8	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.13			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	29.0	
Intersection Capacity Utilization	111.1%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL	SWR
Lane Configurations										
Volume (vph)	0	0	0	510	86	0	0	0	1000	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0				6.0	
Lane Util. Factor				0.95	0.95				0.97	
Frpb, ped/bikes				1.00	1.00				1.00	
Flpb, ped/bikes				1.00	1.00				1.00	
Frt				1.00	1.00				0.99	
Flt Protected				0.95	0.97				0.95	
Satd. Flow (prot)				1513	1538				3082	
Flt Permitted				0.95	0.97				0.95	
Satd. Flow (perm)				1513	1538				3082	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	554	93	0	0	0	1087	54
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	321	326	0	0	0	1141	0
Confl. Peds. (#/hr)										
Turn Type				Perm						
Protected Phases					8				6	
Permitted Phases				8						
Actuated Green, G (s)				17.3	17.3				23.7	
Effective Green, g (s)				15.3	15.3				21.7	
Actuated g/C Ratio				0.26	0.26				0.36	
Clearance Time (s)				4.0	4.0				4.0	
Vehicle Extension (s)				3.0	3.0				3.0	
Lane Grp Cap (vph)				386	392				1115	
v/s Ratio Prot									c0.37	
v/s Ratio Perm				c0.21	0.21					
v/c Ratio				0.83	0.83				1.02	
Uniform Delay, d1				21.1	21.1				19.2	
Progression Factor				0.44	0.44				1.00	
Incremental Delay, d2				11.3	11.1				33.0	
Delay (s)				20.5	20.4				52.2	
Level of Service				C	C				D	
Approach Delay (s)		0.0			20.4		0.0		52.2	
Approach LOS		A			C		A		D	

Intersection Summary				
HCM Average Control Delay	40.7	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.94			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	23.0	
Intersection Capacity Utilization	111.1%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — One-Way Conversion - Existing Volumes
3: 1st St & Main St

4/2/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	480	75	110	1440	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					6.0		6.0	6.0				
Lane Util. Factor					0.95		1.00	0.95				
Frpb, ped/bikes					0.97		1.00	1.00				
Flpb, ped/bikes					1.00		0.80	1.00				
Frt					0.98		1.00	1.00				
Flt Protected					1.00		0.95	1.00				
Satd. Flow (prot)					3032		1274	3185				
Flt Permitted					1.00		0.95	1.00				
Satd. Flow (perm)					3032		1274	3185				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	522	82	120	1565	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	5	0	6	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	599	0	114	1565	0	0	0	0
Confl. Peds. (#/hr)	200		200	200		200	200		200	200		200
Turn Type							Perm					
Protected Phases					8			2				
Permitted Phases							2					
Actuated Green, G (s)					18.0		34.0	34.0				
Effective Green, g (s)					16.0		32.0	32.0				
Actuated g/C Ratio					0.27		0.53	0.53				
Clearance Time (s)					4.0		4.0	4.0				
Lane Grp Cap (vph)					809		679	1699				
v/s Ratio Prot					c0.20			c0.49				
v/s Ratio Perm							0.09					
v/c Ratio					0.74		0.17	0.92				
Uniform Delay, d1					20.1		7.2	12.8				
Progression Factor					1.00		0.32	0.32				
Incremental Delay, d2					6.0		0.3	5.9				
Delay (s)					26.1		2.6	10.0				
Level of Service					C		A	A				
Approach Delay (s)		0.0			26.1			9.5			0.0	
Approach LOS		A			C			A			A	

Intersection Summary				
HCM Average Control Delay	13.9	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.86			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	95.9%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis — One-Way Conversion - Existing Volumes
4: 1st St & Wall St

4/2/2010

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	0	0	50	490	50	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	54	533	54	0
Pedestrians	50			50	50	
Lane Width (ft)	0.0			12.0	12.0	
Walking Speed (ft/s)	3.0			3.0	3.0	
Percent Blockage	0			6	6	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	369					
pX, platoon unblocked						
vC, conflicting volume			50		475	100
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			50		475	100
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		88	100
cM capacity (veh/h)			1468		472	835

Direction, Lane #	WB 1	WB 2	NB 1
Volume Total	232	355	54
Volume Left	54	0	54
Volume Right	0	0	0
cSH	1468	1700	472
Volume to Capacity	0.04	0.21	0.12
Queue Length 95th (ft)	3	0	10
Control Delay (s)	2.0	0.0	13.6
Lane LOS	A		B
Approach Delay (s)	0.8		13.6
Approach LOS			B

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	280	25	15	280	25	35
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	304	27	16	304	27	38
Pedestrians	50			50	50	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.0			3.0	3.0	
Percent Blockage	6			6	6	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				680		
pX, platoon unblocked						
vC, conflicting volume			382		755	418
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			382		755	418
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		92	93
cM capacity (veh/h)			1112		331	566

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	332	16	304	65
Volume Left	0	16	0	27
Volume Right	27	0	0	38
cSH	1700	1112	1700	437
Volume to Capacity	0.20	0.01	0.18	0.15
Queue Length 95th (ft)	0	1	0	13
Control Delay (s)	0.0	8.3	0.0	14.7
Lane LOS		A		B
Approach Delay (s)	0.0	0.4		14.7
Approach LOS				B

Intersection Summary			
Average Delay		1.5	
Intersection Capacity Utilization		38.5%	ICU Level of Service A
Analysis Period (min)		15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	30	300	20	30	250	30	10	20	30	25	5	10
Sign Control		Free			Free			Stop			Stop	
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)	33	326	22	33	272	33	11	22	33	27	5	11
Pedestrians		50			50			50			50	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.0			3.0			3.0			3.0	
Percent Blockage		6			6			6			6	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					355							
pX, platoon unblocked												
vC, conflicting volume	354			398			853	872	437	888	866	388
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	354			398			853	872	437	888	866	388
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			97			95	91	94	85	98	98
cM capacity (veh/h)	1137			1096			211	243	553	182	245	589

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	33	348	33	304	65	43
Volume Left	33	0	33	0	11	27
Volume Right	0	22	0	33	33	11
cSH	1137	1700	1096	1700	326	229
Volume to Capacity	0.03	0.20	0.03	0.18	0.20	0.19
Queue Length 95th (ft)	2	0	2	0	18	17
Control Delay (s)	8.3	0.0	8.4	0.0	18.8	24.4
Lane LOS	A		A		C	C
Approach Delay (s)	0.7		0.8		18.8	24.4
Approach LOS					C	C

Intersection Summary			
Average Delay		3.4	
Intersection Capacity Utilization		47.2%	ICU Level of Service A
Analysis Period (min)		15	

HCM Signalized Intersection Capacity Analysis — One-Way Conversion - Existing Volumes
7: 2nd St & Ivy St

4/2/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	26	347	36	24	267	100	28	159	44	117	152	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.97		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	0.96	1.00		0.96	1.00		0.94	1.00		0.94	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1521	1351		1524	1563		1491	1586		1495	1621	
Flt Permitted	0.49	1.00		0.47	1.00		0.64	1.00		0.62	1.00	
Satd. Flow (perm)	782	1351		759	1563		1001	1586		975	1621	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	28	377	39	26	290	109	30	173	48	127	165	25
RTOR Reduction (vph)	0	6	0	0	23	0	0	16	0	0	9	0
Lane Group Flow (vph)	28	410	0	26	376	0	30	205	0	127	181	0
Confl. Peds. (#/hr)	50		50	50		50	50		50	50		50
Parking (#/hr)		15										
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4	4		4		
Actuated Green, G (s)	33.0	33.0		33.0	33.0		19.0	19.0		19.0	19.0	
Effective Green, g (s)	31.0	31.0		31.0	31.0		17.0	17.0		17.0	17.0	
Actuated g/C Ratio	0.52	0.52		0.52	0.52		0.28	0.28		0.28	0.28	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	404	698		392	808		284	449		276	459	
v/s Ratio Prot		c0.30			0.24			0.13			0.11	
v/s Ratio Perm	0.04			0.03			0.03			c0.13		
v/c Ratio	0.07	0.59		0.07	0.47		0.11	0.46		0.46	0.39	
Uniform Delay, d1	7.3	10.1		7.3	9.2		15.9	17.7		17.7	17.3	
Progression Factor	1.00	1.00		0.58	0.54		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	3.6		0.3	1.7		0.7	3.3		5.4	2.5	
Delay (s)	7.6	13.7		4.5	6.7		16.6	21.0		23.2	19.9	
Level of Service	A	B		A	A		B	C		C	B	
Approach Delay (s)		13.3			6.6			20.5			21.2	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM Average Control Delay	14.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — One-Way Conversion - Existing Volumes
8: 2nd St & Hazel St

4/2/2010

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	530	30	30	400	30	30
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	576	33	33	435	33	33
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	352			338		
pX, platoon unblocked			0.88		0.92	0.88
vC, conflicting volume			609		1092	592
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			485		847	467
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		89	94
cM capacity (veh/h)			947		295	524

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	609	33	435	65
Volume Left	0	33	0	33
Volume Right	33	0	0	33
cSH	1700	947	1700	378
Volume to Capacity	0.36	0.03	0.26	0.17
Queue Length 95th (ft)	0	3	0	15
Control Delay (s)	0.0	8.9	0.0	16.5
Lane LOS		A		C
Approach Delay (s)	0.0	0.6		16.5
Approach LOS				C

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	515	101	51	360	109	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	6.0	6.0	
Lane Util. Factor	1.00		1.00	1.00	1.00	
Frpb, ped/bikes	0.98		1.00	1.00	0.95	
Flpb, ped/bikes	1.00		0.98	1.00	1.00	
Frt	0.98		1.00	1.00	0.93	
Flt Protected	1.00		0.95	1.00	0.98	
Satd. Flow (prot)	1612		1556	1509	1448	
Flt Permitted	1.00		0.27	1.00	0.98	
Satd. Flow (perm)	1612		449	1509	1448	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	560	110	55	391	118	118
RTOR Reduction (vph)	12	0	0	0	60	0
Lane Group Flow (vph)	658	0	55	391	176	0
Confl. Peds. (#/hr)		50	50		50	50
Parking (#/hr)		0		0		0
Turn Type			Perm			
Protected Phases	2			2	4	
Permitted Phases			2			
Actuated Green, G (s)	34.0		34.0	34.0	18.0	
Effective Green, g (s)	32.0		32.0	32.0	16.0	
Actuated g/C Ratio	0.53		0.53	0.53	0.27	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Lane Grp Cap (vph)	860		239	805	386	
v/s Ratio Prot	c0.41			0.26	c0.12	
v/s Ratio Perm			0.12			
v/c Ratio	0.77		0.23	0.49	0.46	
Uniform Delay, d1	11.0		7.4	8.8	18.4	
Progression Factor	1.03		0.86	0.82	1.00	
Incremental Delay, d2	5.9		2.0	1.8	3.8	
Delay (s)	17.3		8.4	9.1	22.2	
Level of Service	B		A	A	C	
Approach Delay (s)	17.3			9.0	22.2	
Approach LOS	B			A	C	

Intersection Summary			
HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	560	40	10	400	18	5	3	20	10	3	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00			0.93			0.96	
Flpb, ped/bikes	0.96	1.00		0.98	1.00			0.99			0.96	
Frt	1.00	0.99		1.00	0.99			0.90			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1529	1649		1554	1658			1368			1432	
Flt Permitted	0.45	1.00		0.29	1.00			0.97			0.91	
Satd. Flow (perm)	718	1649		471	1658			1341			1334	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	609	43	11	435	20	5	3	22	11	3	9
RTOR Reduction (vph)	0	4	0	0	3	0	0	16	0	0	7	0
Lane Group Flow (vph)	33	648	0	11	452	0	0	14	0	0	16	0
Confl. Peds. (#/hr)	50		50	50		50	50		50	50		50
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	34.0	34.0		34.0	34.0			18.0			18.0	
Effective Green, g (s)	32.0	32.0		32.0	32.0			16.0			16.0	
Actuated g/C Ratio	0.53	0.53		0.53	0.53			0.27			0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	383	879		251	884			358			356	
v/s Ratio Prot		c0.39			0.27							
v/s Ratio Perm	0.05			0.02				0.01			c0.01	
v/c Ratio	0.09	0.74		0.04	0.51			0.04			0.05	
Uniform Delay, d1	6.8	10.8		6.7	9.0			16.3			16.3	
Progression Factor	0.46	0.35		0.86	0.89			1.00			1.00	
Incremental Delay, d2	0.3	3.8		0.1	0.4			0.0			0.1	
Delay (s)	3.5	7.5		5.8	8.5			16.3			16.4	
Level of Service	A	A		A	A			B			B	
Approach Delay (s)		7.3			8.4			16.3			16.4	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	8.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	492	54	44	262	46	120	20	165	29	81	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	8	12	12	12
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0	6.0		6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.97		1.00	0.95			1.00	0.65		0.86	
Flpb, ped/bikes	0.80	1.00		0.89	1.00			0.80	1.00		0.96	
Frt	1.00	0.99		1.00	0.98			1.00	0.85		0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.99	
Satd. Flow (prot)	1267	1595		1417	1554			1282	807		1302	
Flt Permitted	0.54	1.00		0.31	1.00			0.66	1.00		0.94	
Satd. Flow (perm)	724	1595		464	1554			883	807		1228	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	535	59	48	285	50	130	22	179	32	88	77
RTOR Reduction (vph)	0	7	0	0	11	0	0	0	69	0	39	0
Lane Group Flow (vph)	33	588	0	48	325	0	0	152	110	0	159	0
Confl. Peds. (#/hr)	200		200	200		200	200		200	200		200
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	32.0	32.0		32.0	32.0			20.0	20.0		20.0	
Effective Green, g (s)	30.0	30.0		30.0	30.0			18.0	18.0		18.0	
Actuated g/C Ratio	0.50	0.50		0.50	0.50			0.30	0.30		0.30	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Lane Grp Cap (vph)	362	798		232	777			265	242		368	
v/s Ratio Prot		c0.37			0.21							
v/s Ratio Perm	0.05			0.10				c0.17	0.14		0.13	
v/c Ratio	0.09	0.74		0.21	0.42			0.57	0.46		0.43	
Uniform Delay, d1	7.9	11.9		8.4	9.5			17.8	17.0		16.9	
Progression Factor	0.14	0.15		0.12	0.11			1.00	1.00		1.00	
Incremental Delay, d2	0.3	4.2		1.1	0.9			8.7	6.1		3.6	
Delay (s)	1.5	6.0		2.1	2.0			26.5	23.1		20.5	
Level of Service	A	A		A	A			C	C		C	
Approach Delay (s)		5.8			2.0			24.7			20.5	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	490	170	0	0	0	0	0	0	220	900	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0									6.0	
Lane Util. Factor		0.95									0.91	
Frpb, ped/bikes		0.95									0.91	
Flpb, ped/bikes		1.00									0.97	
Frt		0.96									0.96	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		2898									3879	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		2898									3879	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	533	185	0	0	0	0	0	0	239	978	402
RTOR Reduction (vph)	0	16	0	0	0	0	0	0	0	0	112	0
Lane Group Flow (vph)	0	702	0	0	0	0	0	0	0	0	1507	0
Confl. Peds. (#/hr)	200		200	200		200	200		200	200		200
Turn Type										Perm		
Protected Phases		4									2	
Permitted Phases										2		
Actuated Green, G (s)		21.0									31.0	
Effective Green, g (s)		19.0									29.0	
Actuated g/C Ratio		0.32									0.48	
Clearance Time (s)		4.0									4.0	
Lane Grp Cap (vph)		918									1875	
v/s Ratio Prot		c0.24										
v/s Ratio Perm											0.39	
v/c Ratio		0.76									0.80	
Uniform Delay, d1		18.5									13.1	
Progression Factor		0.65									0.24	
Incremental Delay, d2		4.4									0.4	
Delay (s)		16.4									3.5	
Level of Service		B									A	
Approach Delay (s)		16.4			0.0			0.0			3.5	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	280	424	0	0	0	0	0	1270	231	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0						6.0				
Lane Util. Factor		0.95						0.91				
Frpb, ped/bikes		1.00						0.97				
Flpb, ped/bikes		0.92						1.00				
Frt		1.00						0.98				
Flt Protected		0.98						1.00				
Satd. Flow (prot)		2875						4328				
Flt Permitted		0.98						1.00				
Satd. Flow (perm)		2875						4328				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	304	461	0	0	0	0	0	1380	251	0	0	0
RTOR Reduction (vph)	0	3	0	0	0	0	0	25	0	0	0	0
Lane Group Flow (vph)	0	762	0	0	0	0	0	1606	0	0	0	0
Confl. Peds. (#/hr)	200		200	200		200	200		200	200		200
Turn Type	Perm											
Protected Phases		4						2				
Permitted Phases	4											
Actuated Green, G (s)		23.0						29.0				
Effective Green, g (s)		21.0						27.0				
Actuated g/C Ratio		0.35						0.45				
Clearance Time (s)		4.0						4.0				
Lane Grp Cap (vph)		1006						1948				
v/s Ratio Prot								c0.37				
v/s Ratio Perm		0.26										
v/c Ratio		0.76						0.82				
Uniform Delay, d1		17.2						14.4				
Progression Factor		1.38						0.32				
Incremental Delay, d2		3.2						3.1				
Delay (s)		27.1						7.7				
Level of Service		C						A				
Approach Delay (s)		27.1			0.0			7.7			0.0	
Approach LOS		C			A			A			A	

Intersection Summary				
HCM Average Control Delay	13.9	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.79			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	72.7%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	50	540	35	0	0	0	0	50	50	40	25	0
Sign Control		Free			Free			Stop			Stop	
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)	54	587	38	0	0	0	0	54	54	43	27	0
Pedestrians		50			50			50			50	
Lane Width (ft)		12.0			0.0			12.0			12.0	
Walking Speed (ft/s)		3.0			3.0			3.0			3.0	
Percent Blockage		6			0			6			6	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		351										
pX, platoon unblocked												
vC, conflicting volume	50			675			828	815	412	584	834	100
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	50			675			828	815	412	584	834	100
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			100			100	80	90	83	90	100
cM capacity (veh/h)	1468			862			193	267	556	254	260	835

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	348	332	109	71
Volume Left	54	0	0	43
Volume Right	0	38	54	0
cSH	1468	1700	360	256
Volume to Capacity	0.04	0.20	0.30	0.28
Queue Length 95th (ft)	3	0	31	27
Control Delay (s)	1.5	0.0	19.2	24.3
Lane LOS	A		C	C
Approach Delay (s)	0.7		19.2	24.3
Approach LOS			C	C

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		

MOVEMENT SUMMARY

Site: PM Existing Volumes

2nd Street/Flume Street/1st Street Roundabout
PM Peak Hour - Existing Volumes
Downtown Chico One-Way Couplet Study
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South	Flume Street										
3L	L	54	2.0	0.175	11.0	LOS B	1.2	30.1	0.69	0.82	15.7
8R	R	49	2.0	0.175	7.2	LOS A	1.2	30.1	0.69	0.70	16.5
Approach		103	2.0	0.175	9.2	LOS B	1.2	30.1	0.69	0.76	16.0
East	2nd Street										
1L	L	65	2.0	0.498	7.3	LOS A	5.1	129.3	0.38	0.78	18.5
6R	R	522	2.0	0.496	1.8	LOS A	5.1	129.3	0.38	0.26	20.2
Approach		587	2.0	0.497	2.4	LOS A	5.1	129.3	0.38	0.31	20.0
West	2nd Street										
5L	L	22	2.0	0.543	8.7	LOS A	5.7	145.1	0.39	0.82	19.2
2T	T	565	2.0	0.542	2.9	LOS A	5.7	145.1	0.39	0.34	21.4
2R	R	60	2.0	0.543	4.4	LOS A	5.7	145.1	0.39	0.47	20.9
Approach		647	2.0	0.542	3.2	LOS A	5.7	145.1	0.39	0.37	21.2
All Vehicles		1337	2.0	0.543	3.3	LOS A	5.7	145.1	0.41	0.38	20.1

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

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SIDRA INTERSECTION 4.0.9.973
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SIDRA INTERSECTION

HCM Signalized Intersection Capacity Analysis
2: 1st St & Broadway

One-Way Conversion - Future Volumes
4/2/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL	SWR
Lane Configurations										
Volume (vph)	0	0	0	510	86	0	0	0	1000	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0				6.0	
Lane Util. Factor				0.95	0.95				0.97	
Frpb, ped/bikes				1.00	1.00				0.98	
Flpb, ped/bikes				0.70	0.79				1.00	
Frt				1.00	1.00				0.99	
Flt Protected				0.95	0.97				0.95	
Satd. Flow (prot)				1059	1208				3029	
Flt Permitted				0.95	0.97				0.95	
Satd. Flow (perm)				1059	1208				3029	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	0	0	0	635	107	0	0	0	1245	62
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	368	374	0	0	0	1307	0
Confl. Peds. (#/hr)	200		200	200		200	200	200	200	200
Turn Type				Perm						
Protected Phases					8				6	
Permitted Phases				8						
Actuated Green, G (s)				14.0	14.0				19.0	
Effective Green, g (s)				12.0	12.0				17.0	
Actuated g/C Ratio				0.20	0.20				0.28	
Clearance Time (s)				4.0	4.0				4.0	
Lane Grp Cap (vph)				212	242				858	
v/s Ratio Prot									c0.43	
v/s Ratio Perm				c0.35	0.31					
v/c Ratio				1.74	1.55				1.52	
Uniform Delay, d1				24.0	24.0				21.5	
Progression Factor				0.85	0.85				1.00	
Incremental Delay, d2				344.1	258.9				241.4	
Delay (s)				364.5	279.2				262.9	
Level of Service				F	F				F	
Approach Delay (s)		0.0			321.5		0.0		262.9	
Approach LOS		A			F		A		F	

Intersection Summary			
HCM Average Control Delay	284.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.61		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	31.0
Intersection Capacity Utilization	132.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Conversion - Future Volumes (mitigated)
2: 1st St & Broadway

4/2/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL	SWR
Lane Configurations										
Volume (vph)	0	0	0	510	86	0	0	0	1000	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0				6.0	
Lane Util. Factor				0.95	0.95				0.97	
Frpb, ped/bikes				1.00	1.00				1.00	
Flpb, ped/bikes				1.00	1.00				1.00	
Frt				1.00	1.00				0.99	
Flt Protected				0.95	0.97				0.95	
Satd. Flow (prot)				1513	1538				3082	
Flt Permitted				0.95	0.97				0.95	
Satd. Flow (perm)				1513	1538				3082	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	0	0	0	635	107	0	0	0	1245	62
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	368	374	0	0	0	1307	0
Confl. Peds. (#/hr)										
Turn Type				Perm						
Protected Phases					8				6	
Permitted Phases				8						
Actuated Green, G (s)				24.5	24.5				43.5	
Effective Green, g (s)				22.5	22.5				41.5	
Actuated g/C Ratio				0.25	0.25				0.46	
Clearance Time (s)				4.0	4.0				4.0	
Vehicle Extension (s)				3.0	3.0				3.0	
Lane Grp Cap (vph)				378	385				1421	
v/s Ratio Prot									c0.42	
v/s Ratio Perm				c0.24	0.24					
v/c Ratio				0.97	0.97				0.92	
Uniform Delay, d1				33.5	33.4				22.7	
Progression Factor				1.00	1.00				1.00	
Incremental Delay, d2				39.0	38.1				11.1	
Delay (s)				72.5	71.6				33.8	
Level of Service				E	E				C	
Approach Delay (s)		0.0			72.0		0.0		33.8	
Approach LOS		A			E		A		C	

Intersection Summary				
HCM Average Control Delay	47.6	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.94			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	26.0	
Intersection Capacity Utilization	132.0%	ICU Level of Service	H	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — One-Way Conversion - Future Volumes
3: 1st St & Main St

4/2/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	480	75	110	1440	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					6.0		6.0	6.0				
Lane Util. Factor					0.95		1.00	0.95				
Frpb, ped/bikes					0.97		1.00	1.00				
Flpb, ped/bikes					1.00		0.80	1.00				
Frt					0.98		1.00	1.00				
Flt Protected					1.00		0.95	1.00				
Satd. Flow (prot)					3034		1274	3185				
Flt Permitted					1.00		0.95	1.00				
Satd. Flow (perm)					3034		1274	3185				
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	0	0	0	0	598	93	137	1793	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	3	0	4	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	688	0	133	1793	0	0	0	0
Confl. Peds. (#/hr)	200		200	200		200	200		200	200		200
Turn Type							Perm					
Protected Phases					8			2				
Permitted Phases							2					
Actuated Green, G (s)					18.0		34.0	34.0				
Effective Green, g (s)					16.0		32.0	32.0				
Actuated g/C Ratio					0.27		0.53	0.53				
Clearance Time (s)					4.0		4.0	4.0				
Lane Grp Cap (vph)					809		679	1699				
v/s Ratio Prot					c0.23			c0.56				
v/s Ratio Perm							0.10					
v/c Ratio					0.85		0.20	1.06				
Uniform Delay, d1					20.9		7.3	14.0				
Progression Factor					1.00		0.35	0.32				
Incremental Delay, d2					10.9		0.2	31.1				
Delay (s)					31.8		2.8	35.6				
Level of Service					C		A	D				
Approach Delay (s)		0.0			31.8			33.3			0.0	
Approach LOS		A			C			C			A	

Intersection Summary				
HCM Average Control Delay	32.9	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.99			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	117.2%	ICU Level of Service	H	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	0	0	50	490	50	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	0	0	62	610	62	0
Pedestrians	50			50	50	
Lane Width (ft)	0.0			12.0	12.0	
Walking Speed (ft/s)	3.0			3.0	3.0	
Percent Blockage	0			6	6	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	369					
pX, platoon unblocked						
vC, conflicting volume			50		529	100
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			50		529	100
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		86	100
cM capacity (veh/h)			1468		433	835

Direction, Lane #	WB 1	WB 2	NB 1
Volume Total	266	407	62
Volume Left	62	0	62
Volume Right	0	0	0
cSH	1468	1700	433
Volume to Capacity	0.04	0.24	0.14
Queue Length 95th (ft)	3	0	12
Control Delay (s)	2.1	0.0	14.7
Lane LOS	A		B
Approach Delay (s)	0.8		14.7
Approach LOS			B

Intersection Summary			
Average Delay		2.0	
Intersection Capacity Utilization		43.1%	ICU Level of Service A
Analysis Period (min)		15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	280	25	15	280	25	35
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	349	31	19	349	31	44
Pedestrians	50			50	50	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.0			3.0	3.0	
Percent Blockage	6			6	6	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				680		
pX, platoon unblocked						
vC, conflicting volume			430		850	464
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			430		850	464
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		89	92
cM capacity (veh/h)			1067		290	533

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	380	19	349	75
Volume Left	0	19	0	31
Volume Right	31	0	0	44
cSH	1700	1067	1700	395
Volume to Capacity	0.22	0.02	0.21	0.19
Queue Length 95th (ft)	0	1	0	17
Control Delay (s)	0.0	8.4	0.0	16.2
Lane LOS		A		C
Approach Delay (s)	0.0	0.4		16.2
Approach LOS				C

Intersection Summary			
Average Delay		1.7	
Intersection Capacity Utilization		42.2%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis — One-Way Conversion - Future Volumes
6: 2nd St & Cherry St

4/2/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	30	300	20	30	250	30	10	20	30	25	5	10
Sign Control		Free			Free			Stop			Stop	
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)	37	373	25	37	311	37	12	25	37	31	6	12
Pedestrians		50			50			50			50	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.0			3.0			3.0			3.0	
Percent Blockage		6			6			6			6	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					355							
pX, platoon unblocked												
vC, conflicting volume	399			448			962	984	486	1003	978	430
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	399			448			962	984	486	1003	978	430
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			96			93	88	93	79	97	98
cM capacity (veh/h)	1096			1050			175	206	519	145	208	558

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	37	398	37	349	75	50
Volume Left	37	0	37	0	12	31
Volume Right	0	25	0	37	37	12
cSH	1096	1700	1050	1700	283	186
Volume to Capacity	0.03	0.23	0.04	0.21	0.26	0.27
Queue Length 95th (ft)	3	0	3	0	26	26
Control Delay (s)	8.4	0.0	8.6	0.0	22.2	31.2
Lane LOS	A		A		C	D
Approach Delay (s)	0.7		0.8		22.2	31.2
Approach LOS					C	D

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis — One-Way Conversion - Future Volumes
7: 2nd St & Ivy St

4/2/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	26	347	36	24	267	100	28	159	44	117	152	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.97		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	0.96	1.00		0.96	1.00		0.94	1.00		0.94	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1530	1350		1533	1564		1495	1586		1502	1621	
Flt Permitted	0.44	1.00		0.42	1.00		0.62	1.00		0.57	1.00	
Satd. Flow (perm)	705	1350		678	1564		978	1586		894	1621	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	32	432	45	30	332	124	35	198	55	146	189	29
RTOR Reduction (vph)	0	6	0	0	22	0	0	16	0	0	9	0
Lane Group Flow (vph)	32	471	0	30	434	0	35	237	0	146	209	0
Confl. Peds. (#/hr)	50		50	50		50	50		50	50		50
Parking (#/hr)		15										
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4	4		4		
Actuated Green, G (s)	33.0	33.0		33.0	33.0		19.0	19.0		19.0	19.0	
Effective Green, g (s)	31.0	31.0		31.0	31.0		17.0	17.0		17.0	17.0	
Actuated g/C Ratio	0.52	0.52		0.52	0.52		0.28	0.28		0.28	0.28	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	364	698		350	808		277	449		253	459	
v/s Ratio Prot		c0.35			0.28			0.15			0.13	
v/s Ratio Perm	0.05			0.04			0.04			c0.16		
v/c Ratio	0.09	0.67		0.09	0.54		0.13	0.53		0.58	0.45	
Uniform Delay, d1	7.3	10.8		7.3	9.7		16.0	18.1		18.4	17.7	
Progression Factor	1.00	1.00		0.62	0.60		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	5.2		0.4	2.2		0.9	4.4		9.3	3.2	
Delay (s)	7.8	15.9		5.0	8.0		16.9	22.5		27.7	20.9	
Level of Service	A	B		A	A		B	C		C	C	
Approach Delay (s)		15.4			7.8			21.8			23.6	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	530	30	30	400	30	30
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	660	37	37	498	37	37
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	352			338		
pX, platoon unblocked			0.81		0.87	0.81
vC, conflicting volume			697		1251	678
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			512		898	489
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		86	92
cM capacity (veh/h)			856		259	470

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	697	37	498	75
Volume Left	0	37	0	37
Volume Right	37	0	0	37
cSH	1700	856	1700	334
Volume to Capacity	0.41	0.04	0.29	0.22
Queue Length 95th (ft)	0	3	0	21
Control Delay (s)	0.0	9.4	0.0	18.8
Lane LOS		A		C
Approach Delay (s)	0.0	0.7		18.8
Approach LOS				C

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	515	101	51	360	109	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	6.0	6.0	
Lane Util. Factor	1.00		1.00	1.00	1.00	
Frpb, ped/bikes	0.98		1.00	1.00	0.95	
Flpb, ped/bikes	1.00		0.98	1.00	1.00	
Frt	0.98		1.00	1.00	0.93	
Flt Protected	1.00		0.95	1.00	0.98	
Satd. Flow (prot)	1612		1566	1509	1448	
Flt Permitted	1.00		0.20	1.00	0.98	
Satd. Flow (perm)	1612		332	1509	1448	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	641	126	63	448	136	136
RTOR Reduction (vph)	12	0	0	0	60	0
Lane Group Flow (vph)	755	0	63	448	212	0
Confl. Peds. (#/hr)		50	50		50	50
Parking (#/hr)		0		0		0
Turn Type			Perm			
Protected Phases	2			2	4	
Permitted Phases			2			
Actuated Green, G (s)	34.0		34.0	34.0	18.0	
Effective Green, g (s)	32.0		32.0	32.0	16.0	
Actuated g/C Ratio	0.53		0.53	0.53	0.27	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Lane Grp Cap (vph)	860		177	805	386	
v/s Ratio Prot	c0.47			0.30	c0.15	
v/s Ratio Perm			0.19			
v/c Ratio	0.88		0.36	0.56	0.55	
Uniform Delay, d1	12.3		8.1	9.3	18.9	
Progression Factor	0.99		0.87	0.84	1.00	
Incremental Delay, d2	11.0		4.6	2.3	5.5	
Delay (s)	23.2		11.6	10.1	24.4	
Level of Service	C		B	B	C	
Approach Delay (s)	23.2			10.3	24.4	
Approach LOS	C			B	C	

Intersection Summary			
HCM Average Control Delay	19.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	560	40	10	400	18	5	3	20	10	3	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00			0.93			0.96	
Flpb, ped/bikes	0.97	1.00		0.98	1.00			0.99			0.96	
Frt	1.00	0.99		1.00	0.99			0.90			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1538	1648		1564	1659			1374			1438	
Flt Permitted	0.39	1.00		0.22	1.00			0.97			0.91	
Satd. Flow (perm)	635	1648		356	1659			1344			1337	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	37	697	50	12	498	22	6	4	25	12	4	10
RTOR Reduction (vph)	0	4	0	0	3	0	0	18	0	0	7	0
Lane Group Flow (vph)	37	743	0	12	517	0	0	17	0	0	19	0
Confl. Peds. (#/hr)	50		50	50		50	50		50	50		50
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	34.0	34.0		34.0	34.0			18.0			18.0	
Effective Green, g (s)	32.0	32.0		32.0	32.0			16.0			16.0	
Actuated g/C Ratio	0.53	0.53		0.53	0.53			0.27			0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	339	879		190	885			358			357	
v/s Ratio Prot		c0.45			0.31							
v/s Ratio Perm	0.06			0.03				0.01			c0.01	
v/c Ratio	0.11	0.85		0.06	0.58			0.05			0.05	
Uniform Delay, d1	6.9	11.9		6.8	9.5			16.3			16.4	
Progression Factor	0.55	0.40		0.85	0.96			1.00			1.00	
Incremental Delay, d2	0.3	5.5		0.1	0.8			0.1			0.1	
Delay (s)	4.1	10.3		5.9	9.9			16.4			16.4	
Level of Service	A	B		A	A			B			B	
Approach Delay (s)		10.0			9.8			16.4			16.4	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	10.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	492	54	44	262	46	120	20	165	29	81	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	8	12	12	12
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0	6.0		6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.97		1.00	0.95			1.00	0.65		0.86	
Flpb, ped/bikes	0.82	1.00		0.91	1.00			0.81	1.00		0.96	
Frt	1.00	0.99		1.00	0.98			1.00	0.85		0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.99	
Satd. Flow (prot)	1299	1595		1456	1554			1302	807		1305	
Flt Permitted	0.50	1.00		0.24	1.00			0.62	1.00		0.93	
Satd. Flow (perm)	680	1595		370	1554			847	807		1223	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	37	612	67	55	326	57	149	25	205	36	101	88
RTOR Reduction (vph)	0	7	0	0	11	0	0	0	55	0	39	0
Lane Group Flow (vph)	37	673	0	55	373	0	0	174	150	0	187	0
Confl. Peds. (#/hr)	200		200	200		200	200		200	200		200
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	32.0	32.0		32.0	32.0			20.0	20.0		20.0	
Effective Green, g (s)	30.0	30.0		30.0	30.0			18.0	18.0		18.0	
Actuated g/C Ratio	0.50	0.50		0.50	0.50			0.30	0.30		0.30	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Lane Grp Cap (vph)	340	798		185	777			254	242		367	
v/s Ratio Prot		c0.42			0.24							
v/s Ratio Perm	0.05			0.15				c0.21	0.19		0.15	
v/c Ratio	0.11	0.84		0.30	0.48			0.69	0.62		0.51	
Uniform Delay, d1	7.9	13.0		8.8	9.9			18.5	18.0		17.3	
Progression Factor	0.29	0.20		0.16	0.12			1.00	1.00		1.00	
Incremental Delay, d2	0.4	6.2		1.6	0.9			14.0	11.3		5.0	
Delay (s)	2.7	8.8		3.0	2.1			32.5	29.4		22.3	
Level of Service	A	A		A	A			C	C		C	
Approach Delay (s)		8.5			2.2			30.8			22.3	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	13.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	95.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	490	170	0	0	0	0	0	0	220	900	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0									6.0	
Lane Util. Factor		0.95									0.91	
Frpb, ped/bikes		0.95									0.91	
Flpb, ped/bikes		1.00									0.97	
Frt		0.96									0.96	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		2898									3879	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		2898									3879	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	0	610	212	0	0	0	0	0	0	274	1120	461
RTOR Reduction (vph)	0	13	0	0	0	0	0	0	0	0	106	0
Lane Group Flow (vph)	0	809	0	0	0	0	0	0	0	0	1749	0
Confl. Peds. (#/hr)	200		200	200		200	200		200	200		200
Turn Type										Perm		
Protected Phases		4									2	
Permitted Phases										2		
Actuated Green, G (s)		20.0									32.0	
Effective Green, g (s)		18.0									30.0	
Actuated g/C Ratio		0.30									0.50	
Clearance Time (s)		4.0									4.0	
Lane Grp Cap (vph)		869									1940	
v/s Ratio Prot		c0.28										
v/s Ratio Perm											0.45	
v/c Ratio		0.93									0.90	
Uniform Delay, d1		20.4									13.7	
Progression Factor		0.65									0.34	
Incremental Delay, d2		11.7									0.8	
Delay (s)		25.1									5.4	
Level of Service		C									A	
Approach Delay (s)		25.1			0.0			0.0			5.4	
Approach LOS		C			A			A			A	

Intersection Summary				
HCM Average Control Delay	11.4	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.91			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	82.7%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	280	424	0	0	0	0	0	1270	231	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0						6.0				
Lane Util. Factor		0.95						0.91				
Frpb, ped/bikes		1.00						0.97				
Flpb, ped/bikes		0.92						1.00				
Frt		1.00						0.98				
Flt Protected		0.98						1.00				
Satd. Flow (prot)		2875						4328				
Flt Permitted		0.98						1.00				
Satd. Flow (perm)		2875						4328				
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%	122%
Adj. Flow (vph)	349	528	0	0	0	0	0	1581	288	0	0	0
RTOR Reduction (vph)	0	2	0	0	0	0	0	15	0	0	0	0
Lane Group Flow (vph)	0	875	0	0	0	0	0	1854	0	0	0	0
Confl. Peds. (#/hr)	200		200	200		200	200		200	200		200
Turn Type	Perm											
Protected Phases		4						2				
Permitted Phases	4											
Actuated Green, G (s)		22.0						30.0				
Effective Green, g (s)		20.0						28.0				
Actuated g/C Ratio		0.33						0.47				
Clearance Time (s)		4.0						4.0				
Lane Grp Cap (vph)		958						2020				
v/s Ratio Prot								c0.43				
v/s Ratio Perm		0.30										
v/c Ratio		0.91						0.92				
Uniform Delay, d1		19.2						14.9				
Progression Factor		1.18						0.32				
Incremental Delay, d2		6.3						5.6				
Delay (s)		29.0						10.4				
Level of Service		C						B				
Approach Delay (s)		29.0			0.0			10.4			0.0	
Approach LOS		C			A			B			A	

Intersection Summary				
HCM Average Control Delay	16.4	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.92			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	86.2%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	50	540	35	0	0	0	0	50	50	40	25	0
Sign Control		Free			Free			Stop			Stop	
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)	62	672	44	0	0	0	0	62	62	50	31	0
Pedestrians		50			50			50			50	
Lane Width (ft)		12.0			0.0			12.0			12.0	
Walking Speed (ft/s)		3.0			3.0			3.0			3.0	
Percent Blockage		6			0			6			6	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		351										
pX, platoon unblocked												
vC, conflicting volume	50			766			934	919	458	654	940	100
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	50			766			934	919	458	654	940	100
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			100			100	73	88	76	86	100
cM capacity (veh/h)	1468			796			157	231	519	207	224	835

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	398	380	124	81
Volume Left	62	0	0	50
Volume Right	0	44	62	0
cSH	1468	1700	319	213
Volume to Capacity	0.04	0.22	0.39	0.38
Queue Length 95th (ft)	3	0	45	42
Control Delay (s)	1.5	0.0	23.3	31.9
Lane LOS	A		C	D
Approach Delay (s)	0.8		23.3	31.9
Approach LOS			C	D

Intersection Summary				
Average Delay		6.2		
Intersection Capacity Utilization		66.6%	ICU Level of Service	C
Analysis Period (min)		15		

MOVEMENT SUMMARY

Site: PM Future Volumes

2nd Street/Flume Street/1st Street Roundabout
PM Peak Hour - Future Volumes
Downtown Chico One-Way Couplet Study
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South	Flume Street										
3L	L	63	2.0	0.183	10.8	LOS B	1.4	34.9	0.75	0.82	15.9
8R	R	56	2.0	0.183	7.0	LOS A	1.4	34.9	0.75	0.72	16.6
Approach		119	2.0	0.183	9.0	LOS B	1.4	34.9	0.75	0.77	16.2
East	2nd Street										
1L	L	74	2.0	0.577	7.5	LOS A	6.6	168.1	0.46	0.76	18.5
6R	R	598	2.0	0.577	2.1	LOS A	6.6	168.1	0.46	0.29	19.7
Approach		672	2.0	0.577	2.7	LOS A	6.6	168.1	0.46	0.34	19.5
West	2nd Street										
5L	L	24	2.0	0.628	9.0	LOS A	7.6	192.8	0.49	0.79	19.2
2T	T	647	2.0	0.628	3.1	LOS A	7.6	192.8	0.49	0.38	20.7
2R	R	68	2.0	0.627	4.6	LOS A	7.6	192.8	0.49	0.48	20.5
Approach		740	2.0	0.628	3.5	LOS A	7.6	192.8	0.49	0.41	20.6
All Vehicles		1532	2.0	0.628	3.5	LOS A	7.6	192.8	0.50	0.41	19.7

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

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SIDRA INTERSECTION 4.0.9.973
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Project: N:\AAA\BUX\CHI\900CHI\CHI900-7 First-Second Street\roundabouts\Sidra\2nd-Flume.sip
8000493, W-TRANS, FLOATING

Appendix B

Travel Time Data

Arterial Level of Service: WB #1

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
3rd St.	105	21.8	31.9	0.1	7
2nd St	13	49.2	58.8	0.1	4
Broadway	12	11.2	21.0	0.1	10
Salem Ave	11	17.9	27.6	0.1	9
Normal Ave	10	8.0	17.9	0.1	13
Chestnut St	9	12.7	22.2	0.1	11
Hazel St	8	1.4	10.3	0.1	22
Ivy St	7	6.9	15.7	0.1	15
Cherry St	6	1.8	11.7	0.1	21
Total		130.9	217.0	0.6	10

Arterial Level of Service: EB #2

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Cherry St	6	1.3	9.8	0.1	23
Ivy St	7	8.7	17.4	0.1	14
Hazel St	8	1.3	10.3	0.1	23
Chestnut St	9	6.3	15.1	0.1	15
Normal Ave	10	3.1	12.6	0.1	19
Salem Ave	11	8.2	17.7	0.1	13
Broadway	12	15.9	25.0	0.1	10
Main St	13	51.0	60.0	0.1	4
Wall St	14	19.0	27.5	0.1	9
1st St	15	25.0	34.7	0.1	8
Total		139.7	230.0	0.7	11

Arterial Level of Service: WB #2

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Wall St	14	2.0	11.6	0.1	22
Main St	13	13.9	22.8	0.1	11
Broadway	12	29.9	38.7	0.1	6
Salem Ave	11	17.9	27.6	0.1	9
Normal Ave	10	8.0	17.9	0.1	13
Chestnut St	9	12.7	22.2	0.1	11
Hazel St	8	1.4	10.3	0.1	22
Ivy St	7	6.9	15.7	0.1	15
Cherry St	6	1.8	11.7	0.1	21
Orange St	5	1.0	9.5	0.1	23
Total		95.7	187.9	0.7	13

Arterial Level of Service: EB #3

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Cherry St	6	1.3	9.8	0.1	23
Ivy St	7	8.7	17.4	0.1	14
Hazel St	8	1.3	10.3	0.1	23
Chestnut St	9	6.3	15.1	0.1	15
Normal Ave	10	3.1	12.6	0.1	19
Salem Ave	11	8.2	17.7	0.1	13
Broadway #3	12	22.1	33.2	0.1	7
3rd St	104	6.6	17.4	0.1	14
	108	2.6	12.5	0.1	19
Total		60.2	145.9	0.6	15

Arterial Level of Service: WB #4

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
1st St	2	11.0	21.6	0.1	14
2nd St #4	12	19.2	33.3	0.1	7
Salem Ave	11	8.2	19.0	0.1	13
Normal Ave	10	8.0	17.9	0.1	13
Chestnut St	9	12.7	22.2	0.1	11
Hazel St	8	1.4	10.3	0.1	22
Ivy St	7	6.9	15.7	0.1	15
Cherry St	6	1.8	11.7	0.1	21
Orange St	5	1.0	9.5	0.1	23
Total		70.4	161.3	0.6	14

Arterial Level of Service
Eastbound 2nd Street to Northbound Esplanade

Existing Conditions - Existing Volumes
2/10/2010

Arterial Level of Service: EB #5

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Cherry St	6	1.3	9.8	0.1	23
Ivy St	7	8.7	17.4	0.1	14
Hazel St	8	1.3	10.3	0.1	23
Chestnut St	9	6.3	15.1	0.1	15
Normal Ave	10	3.1	12.6	0.1	19
Salem Ave	11	8.2	17.7	0.1	13
Broadway	12	15.9	25.0	0.1	10
Main St	13	119.3	128.8	0.1	2
1st St	3	7.1	17.7	0.1	12
Total		171.2	254.3	0.6	9

Arterial Level of Service
Eastbound 2nd Street

One-Way Conversion - Existing Volumes (mitigated)
3/8/2010

Arterial Level of Service: EB #6

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Cherry St	6	1.8	10.4	0.1	22
Ivy St	7	9.3	18.3	0.1	14
Hazel St	8	2.1	11.2	0.1	22
Chestnut St	9	22.6	31.6	0.1	8
Normal Ave	10	6.1	15.7	0.1	15
Salem Ave	11	6.1	15.5	0.1	15
Broadway	12	11.6	20.7	0.1	12
Main St	13	28.4	38.0	0.1	6
Wall St	14	3.7	13.1	0.1	18
	29	1.2	6.7	0.0	20
Flume St	15	3.6	7.1	0.0	17
Total		96.4	188.1	0.7	13

Arterial Level of Service: WB #7

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Wall St	4	2.2	16.0	0.1	19
Main St	3	15.5	24.7	0.1	10
Broadway	2	27.6	37.4	0.1	6
2nd St #7	12	8.7	23.5	0.1	10
Salem Ave	11	4.8	15.8	0.1	16
Normal Ave	10	11.5	21.0	0.1	11
Chestnut St	9	8.4	18.2	0.1	13
Hazel St	8	0.8	9.8	0.1	23
Ivy St	7	6.1	15.2	0.1	16
Cherry St	6	1.9	11.8	0.1	20
Orange St	5	1.2	9.8	0.1	23
Total		88.6	203.3	0.7	13

Arterial Level of Service: EB #8

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Cherry St	6	1.8	10.4	0.1	22
Ivy St	7	9.3	18.3	0.1	14
Hazel St	8	2.1	11.2	0.1	22
Chestnut St	9	22.6	31.6	0.1	8
Normal Ave	10	6.1	15.7	0.1	15
Salem Ave	11	6.1	15.5	0.1	15
Broadway	12	11.6	20.7	0.1	12
Main St	13	33.8	44.3	0.1	5
1st St #7	3	8.9	19.6	0.1	11
Total		102.2	187.2	0.6	11

Arterial Level of Service: WB #9

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
1st St	2	15.8	27.1	0.1	11
2nd St #9	12	7.4	22.1	0.1	11
Salem Ave	11	4.8	15.8	0.1	16
Normal Ave	10	11.5	21.0	0.1	11
Chestnut St	9	8.4	18.2	0.1	13
Hazel St	8	0.8	9.8	0.1	23
Ivy St	7	6.1	15.2	0.1	16
Cherry St	6	1.9	11.8	0.1	20
Orange St	5	1.2	9.8	0.1	23
Total		57.9	150.9	0.6	14

Arterial Level of Service: EB #10

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Cherry St	6	1.8	10.4	0.1	22
Ivy St	7	9.3	18.3	0.1	14
Hazel St	8	2.1	11.2	0.1	22
Chestnut St	9	22.6	31.6	0.1	8
Normal Ave	10	6.1	15.7	0.1	15
Salem Ave	11	6.1	15.5	0.1	15
Broadway #10	12	17.5	28.6	0.1	9
3rd St	104	8.7	19.7	0.1	12
	108	2.3	12.4	0.1	19
Total		76.4	163.3	0.6	13

Arterial Level of Service: WB #11

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
3rd St.	105	6.2	17.0	0.1	14
Broadway	104	13.9	24.1	0.1	9
Salem Ave #11	103	33.1	44.5	0.1	5
2nd St	11	75.4	86.8	0.1	3
Normal Ave	10	1.7	12.3	0.1	19
Chestnut St	9	8.4	18.2	0.1	13
Hazel St	8	0.8	9.8	0.1	23
Ivy St	7	6.1	15.2	0.1	16
Cherry St	6	1.9	11.8	0.1	20
Orange St	5	1.2	9.8	0.1	23
Total		148.6	249.5	0.6	9

Arterial Level of Service: WB #12

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
3rd St.	105	3.4	13.4	0.1	17
2nd St	13	6.9	15.7	0.1	16
1st St	3	5.5	16.3	0.1	13
Broadway	2	24.6	34.7	0.1	7
2nd St #12	12	8.7	23.5	0.1	10
Salem Ave	11	4.8	15.8	0.1	16
Normal Ave	10	11.5	21.0	0.1	11
Chestnut St	9	8.4	18.2	0.1	13
Hazel St	8	0.8	9.8	0.1	23
Ivy St	7	6.1	15.2	0.1	16
Cherry St	6	1.9	11.8	0.1	20
Orange St	5	1.2	9.8	0.1	23
Total		83.7	205.3	0.8	14

Appendix C

Collision Data

INTERSECTION COLLISION RATE CALCULATIONS

First-Second Street Couplet for City of Chico

Intersection # 1: 1st Street & Salem Street

Date of Count: Wednesday, June 13, 2007

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
ADT: 3100
Start Date: January 1, 2006
End Date: December 31, 2008
Number of Years: 3

Intersection Type: TEE
Control Type: STOP & YIELD SIGNS
Area: URBAN

$$\text{collision rate} = \frac{\text{NUMBER OF COLLISIONS x 1 MILLION}}{\text{ADT x 365 DAYS PER YEAR x NUMBER OF YEARS}}$$

$$\text{collision rate} = \frac{0 \times 1{,}000{,}000}{3{,}100 \times 365 \times 3}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.00 c/mve**	**0.0%**	**0.0%**
Statewide Average*	**0.14 c/mve**	**0.8%**	**42.4%**

ADT = average daily total vehicles entering intersection (adjusted for seasonal & weekday changes)
c/mve = collisions per million vehicles entering intersection
* *2007 Collision Data on California State Highways*, Caltrans

Intersection # 2: 1st Street & Broadway

Date of Count: Wednesday, June 13, 2007

Number of Collisions: 2
Number of Injuries: 0
Number of Fatalities: 0
ADT: 12900
Start Date: January 1, 2006
End Date: December 31, 2008
Number of Years: 3

Intersection Type: FOUR-LEGGED
Control Type: SIGNALS
Area: URBAN

$$\text{collision rate} = \frac{\text{NUMBER OF COLLISIONS x 1 MILLION}}{\text{ADT x 365 DAYS PER YEAR x NUMBER OF YEARS}}$$

$$\text{collision rate} = \frac{2 \times 1{,}000{,}000}{12{,}900 \times 365 \times 3}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.14 c/mve**	**0.0%**	**0.0%**
Statewide Average*	**0.43 c/mve**	**0.4%**	**43.9%**

ADT = average daily total vehicles entering intersection (adjusted for seasonal & weekday changes)
c/mve = collisions per million vehicles entering intersection
* *2007 Collision Data on California State Highways*, Caltrans

INTERSECTION COLLISION RATE CALCULATIONS

City of

Intersection # 3: 1st Street & Main Street

Date of Count: Wednesday, June 13, 2007

Number of Collisions: 5
Number of Injuries: 4
Number of Fatalities: 0
ADT: 15800
Start Date: January 1, 2006
End Date: December 31, 2008
Number of Years: 3

Intersection Type: FOUR-LEGGED
Control Type: SIGNALS
Area: URBAN

$$\text{collision rate} = \frac{\text{NUMBER OF COLLISIONS x 1 MILLION}}{\text{ADT x 365 DAYS PER YEAR x NUMBER OF YEARS}}$$

$$\text{collision rate} = \frac{5 \times 1{,}000{,}000}{15{,}800 \times 365 \times 3}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.29 c/mve**	**0.0%**	**80.0%**
Statewide Average*	**0.43 c/mve**	**0.4%**	**43.9%**

ADT = average daily total vehicles entering intersection (adjusted for seasonal & weekday changes)
c/mve = collisions per million vehicles entering intersection
* *2007 Collision Data on California State Highways*, Caltrans

Intersection # 4: 1st Street & Wall Street

Date of Count: Wednesday, June 13, 2007

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
ADT: 2700
Start Date: January 1, 2006
End Date: December 31, 2008
Number of Years: 3

Intersection Type: TEE
Control Type: STOP & YIELD SIGNS
Area: URBAN

$$\text{collision rate} = \frac{\text{NUMBER OF COLLISIONS x 1 MILLION}}{\text{ADT x 365 DAYS PER YEAR x NUMBER OF YEARS}}$$

$$\text{collision rate} = \frac{0 \times 1{,}000{,}000}{2{,}700 \times 365 \times 3}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.00 c/mve**	**0.0%**	**0.0%**
Statewide Average*	**0.14 c/mve**	**0.8%**	**42.4%**

ADT = average daily total vehicles entering intersection (adjusted for seasonal & weekday changes)
c/mve = collisions per million vehicles entering intersection
* *2007 Collision Data on California State Highways*, Caltrans

INTERSECTION COLLISION RATE CALCULATIONS

City of

Intersection # 5: 2nd Street & Orange Street

Date of Count: Wednesday, June 13, 2007

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
ADT: 6100
Start Date: January 1, 2006
End Date: December 31, 2008
Number of Years: 3

Intersection Type: TEE
Control Type: STOP & YIELD SIGNS
Area: URBAN

$$\text{collision rate} = \frac{\text{NUMBER OF COLLISIONS x 1 MILLION}}{\text{ADT x 365 DAYS PER YEAR x NUMBER OF YEARS}}$$

$$\text{collision rate} = \frac{0 \times 1{,}000{,}000}{6{,}100 \times 365 \times 3}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.00 c/mve**	**0.0%**	**0.0%**
Statewide Average*	**0.14 c/mve**	**0.8%**	**42.4%**

ADT = average daily total vehicles entering intersection (adjusted for seasonal & weekday changes)
c/mve = collisions per million vehicles entering intersection
* *2007 Collision Data on California State Highways*, Caltrans

Intersection # 6: 2nd Street & Cherry Street

Date of Count: Wednesday, June 13, 2007

Number of Collisions: 1
Number of Injuries: 0
Number of Fatalities: 0
ADT: 7100
Start Date: January 1, 2006
End Date: December 31, 2008
Number of Years: 3

Intersection Type: FOUR-LEGGED
Control Type: STOP & YIELD SIGNS
Area: URBAN

$$\text{collision rate} = \frac{\text{NUMBER OF COLLISIONS x 1 MILLION}}{\text{ADT x 365 DAYS PER YEAR x NUMBER OF YEARS}}$$

$$\text{collision rate} = \frac{1 \times 1{,}000{,}000}{7{,}100 \times 365 \times 3}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.13 c/mve**	**0.0%**	**0.0%**
Statewide Average*	**0.22 c/mve**	**0.7%**	**42.2%**

ADT = average daily total vehicles entering intersection (adjusted for seasonal & weekday changes)
c/mve = collisions per million vehicles entering intersection
* *2007 Collision Data on California State Highways*, Caltrans

INTERSECTION COLLISION RATE CALCULATIONS

City of

Intersection # 7: 2nd Street & Ivy Street

Date of Count: Wednesday, June 13, 2007

Number of Collisions: 2
Number of Injuries: 1
Number of Fatalities: 0
ADT: 12300
Start Date: January 1, 2006
End Date: December 31, 2008
Number of Years: 3

Intersection Type: FOUR-LEGGED
Control Type: SIGNALS
Area: URBAN

$$\text{collision rate} = \frac{\text{NUMBER OF COLLISIONS x 1 MILLION}}{\text{ADT x 365 DAYS PER YEAR x NUMBER OF YEARS}}$$

$$\text{collision rate} = \frac{2 \times 1{,}000{,}000}{12{,}300 \times 365 \times 3}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.15 c/mve**	**0.0%**	**50.0%**
Statewide Average*	**0.43 c/mve**	**0.4%**	**43.9%**

ADT = average daily total vehicles entering intersection (adjusted for seasonal & weekday changes)
c/mve = collisions per million vehicles entering intersection
* *2007 Collision Data on California State Highways*, Caltrans

Intersection # 8: 2nd Street & Hazel Street

Date of Count: Wednesday, June 13, 2007

Number of Collisions: 1
Number of Injuries: 0
Number of Fatalities: 0
ADT: 11600
Start Date: January 1, 2006
End Date: December 31, 2008
Number of Years: 3

Intersection Type: TEE
Control Type: STOP & YIELD SIGNS
Area: URBAN

$$\text{collision rate} = \frac{\text{NUMBER OF COLLISIONS x 1 MILLION}}{\text{ADT x 365 DAYS PER YEAR x NUMBER OF YEARS}}$$

$$\text{collision rate} = \frac{1 \times 1{,}000{,}000}{11{,}600 \times 365 \times 3}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.08 c/mve**	**0.0%**	**0.0%**
Statewide Average*	**0.14 c/mve**	**0.8%**	**42.4%**

ADT = average daily total vehicles entering intersection (adjusted for seasonal & weekday changes)
c/mve = collisions per million vehicles entering intersection
* *2007 Collision Data on California State Highways*, Caltrans

INTERSECTION COLLISION RATE CALCULATIONS

City of

Intersection # 9: 2nd Street & Chestnut Street

Date of Count: Wednesday, June 13, 2007

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
ADT: 11600
Start Date: January 1, 2006
End Date: December 31, 2008
Number of Years: 3

Intersection Type: TEE
Control Type: SIGNALS
Area: URBAN

$$\text{collision rate} = \frac{\text{NUMBER OF COLLISIONS x 1 MILLION}}{\text{ADT x 365 DAYS PER YEAR x NUMBER OF YEARS}}$$

$$\text{collision rate} = \frac{0 \times 1{,}000{,}000}{11{,}600 \times 365 \times 3}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.00 c/mve**	**0.0%**	**0.0%**
Statewide Average*	**0.28 c/mve**	**0.4%**	**43.3%**

ADT = average daily total vehicles entering intersection (adjusted for seasonal & weekday changes)
c/mve = collisions per million vehicles entering intersection
* *2007 Collision Data on California State Highways*, Caltrans

Intersection # 10: 2nd Street & Normal Avenue

Date of Count: Wednesday, June 13, 2007

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
ADT: 10300
Start Date: January 1, 2006
End Date: December 31, 2008
Number of Years: 3

Intersection Type: FOUR-LEGGED
Control Type: SIGNALS
Area: URBAN

$$\text{collision rate} = \frac{\text{NUMBER OF COLLISIONS x 1 MILLION}}{\text{ADT x 365 DAYS PER YEAR x NUMBER OF YEARS}}$$

$$\text{collision rate} = \frac{0 \times 1{,}000{,}000}{10{,}300 \times 365 \times 3}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.00 c/mve**	**0.0%**	**0.0%**
Statewide Average*	**0.43 c/mve**	**0.4%**	**43.9%**

ADT = average daily total vehicles entering intersection (adjusted for seasonal & weekday changes)
c/mve = collisions per million vehicles entering intersection
* *2007 Collision Data on California State Highways*, Caltrans

INTERSECTION COLLISION RATE CALCULATIONS

City of

Intersection # 11: 2nd Street & Salem Street

Date of Count: Wednesday, June 13, 2007

Number of Collisions: 1
Number of Injuries: 1
Number of Fatalities: 0
ADT: 13100
Start Date: January 1, 2006
End Date: December 31, 2008
Number of Years: 3

Intersection Type: FOUR-LEGGED
Control Type: SIGNALS
Area: URBAN

$$\text{collision rate} = \frac{\text{NUMBER OF COLLISIONS x 1 MILLION}}{\text{ADT x 365 DAYS PER YEAR x NUMBER OF YEARS}}$$

$$\text{collision rate} = \frac{1 \times 1{,}000{,}000}{13{,}100 \times 365 \times 3}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.07 c/mve**	**0.0%**	**0.0%**
Statewide Average*	**0.43 c/mve**	**0.4%**	**43.9%**

ADT = average daily total vehicles entering intersection (adjusted for seasonal & weekday changes)
c/mve = collisions per million vehicles entering intersection
* *2007 Collision Data on California State Highways*, Caltrans

Intersection # 12: 2nd Street & Broadway

Date of Count: Wednesday, June 13, 2007

Number of Collisions: 3
Number of Injuries: 1
Number of Fatalities: 0
ADT: 18200
Start Date: January 1, 2006
End Date: December 31, 2008
Number of Years: 3

Intersection Type: FOUR-LEGGED
Control Type: SIGNALS
Area: URBAN

$$\text{collision rate} = \frac{\text{NUMBER OF COLLISIONS x 1 MILLION}}{\text{ADT x 365 DAYS PER YEAR x NUMBER OF YEARS}}$$

$$\text{collision rate} = \frac{3 \times 1{,}000{,}000}{18{,}200 \times 365 \times 3}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.15 c/mve**	**0.0%**	**33.3%**
Statewide Average*	**0.43 c/mve**	**0.4%**	**43.9%**

ADT = average daily total vehicles entering intersection (adjusted for seasonal & weekday changes)
c/mve = collisions per million vehicles entering intersection
* *2007 Collision Data on California State Highways*, Caltrans

INTERSECTION COLLISION RATE CALCULATIONS

City of

Intersection # 13: 2nd Street & Main Street

Date of Count: Wednesday, June 13, 2007

Number of Collisions: 3
Number of Injuries: 1
Number of Fatalities: 0
ADT: 22900
Start Date: January 1, 2006
End Date: December 31, 2008
Number of Years: 3

Intersection Type: FOUR-LEGGED
Control Type: SIGNALS
Area: URBAN

$$\text{collision rate} = \frac{\text{NUMBER OF COLLISIONS x 1 MILLION}}{\text{ADT x 365 DAYS PER YEAR x NUMBER OF YEARS}}$$

$$\text{collision rate} = \frac{3 \times 1{,}000{,}000}{22{,}900 \times 365 \times 3}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.12 c/mve**	**0.0%**	**33.3%**
Statewide Average*	**0.43 c/mve**	**0.4%**	**43.9%**

ADT = average daily total vehicles entering intersection (adjusted for seasonal & weekday changes)
c/mve = collisions per million vehicles entering intersection
* *2007 Collision Data on California State Highways*, Caltrans

Intersection # 14: 2nd Street & Wall Street

Date of Count: Wednesday, June 13, 2007

Number of Collisions: 3
Number of Injuries: 3
Number of Fatalities: 0
ADT: 9600
Start Date: January 1, 2006
End Date: December 31, 2008
Number of Years: 3

Intersection Type: FOUR-LEGGED
Control Type: STOP & YIELD SIGNS
Area: URBAN

$$\text{collision rate} = \frac{\text{NUMBER OF COLLISIONS x 1 MILLION}}{\text{ADT x 365 DAYS PER YEAR x NUMBER OF YEARS}}$$

$$\text{collision rate} = \frac{3 \times 1{,}000{,}000}{9{,}600 \times 365 \times 3}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.29 c/mve**	**0.0%**	**100.0%**
Statewide Average*	**0.22 c/mve**	**0.7%**	**42.2%**

ADT = average daily total vehicles entering intersection (adjusted for seasonal & weekday changes)
c/mve = collisions per million vehicles entering intersection
* *2007 Collision Data on California State Highways*, Caltrans

INTERSECTION COLLISION RATE CALCULATIONS

City of

Intersection # 15: 2nd Street & 1st Street

Date of Count: Wednesday, June 13, 2007

Number of Collisions: 1
Number of Injuries: 0
Number of Fatalities: 0
ADT: 11800
Start Date: January 1, 2006
End Date: December 31, 2008
Number of Years: 3

Intersection Type: FOUR-LEGGED
Control Type: STOP & YIELD SIGNS
Area: URBAN

$$\text{collision rate} = \frac{\text{NUMBER OF COLLISIONS x 1 MILLION}}{\text{ADT x 365 DAYS PER YEAR x NUMBER OF YEARS}}$$

$$\text{collision rate} = \frac{1 \times 1{,}000{,}000}{11{,}800 \times 365 \times 3}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.08 c/mve**	**0.0%**	**0.0%**
Statewide Average*	**0.22 c/mve**	**0.7%**	**42.2%**

ADT = average daily total vehicles entering intersection (adjusted for seasonal & weekday changes)
c/mve = collisions per million vehicles entering intersection
* *2007 Collision Data on California State Highways*, Caltrans

SEGMENT COLLISION RATE CALCULATIONS
First-Second Street Couplet for City of Chico

Location: 1st Street from Salem Street to 2nd Street

Date of Count: Wednesday, June 13, 2007
ADT: 2,900

Number of Collisions: 4
Number of Injuries: 1
Number of Fatalities: 0
Start Date: January 1, 2006
End Date: December 31, 2008
Number of Years: 3

Highway Type: UNDIVIDED 4 LANES
Area: Urban
Design Speed: >45

Segment Length: 0.3 miles
Direction: EAST/WEST

$$\frac{\text{NUMBER OF COLLISIONS} \times 1\text{ MILLION}}{\text{ADT} \times 365\text{ DAYS PER YEAR} \times \text{SEGMENT LENGTH} \times \text{NUMBER OF YEARS}}$$

$$\frac{4 \times 1{,}000{,}000}{2{,}900 \times 365 \times 0.28 \times 3}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Segment	**4.50 c/mvm**	**0.0%**	**25.0%**
Statewide Average*	**3.35 c/mvm**	**0.6%**	**42.5%**

ADT = average daily traffic volume (adjusted for seasonal & weekday changes)
c/mvm = collisions per million vehicle miles
* *2007 Collision Data on California State Highways* , Caltrans

Location: 2nd Street from Orange Street to Broadway

Date of Count: Wednesday, June 13, 2007
ADT: 8,500

Number of Collisions: 4
Number of Injuries: 2
Number of Fatalities: 0
Start Date: January 1, 2006
End Date: December 31, 2008
Number of Years: 3

Highway Type: UNDIVIDED 4 LANES
Area: Urban
Design Speed: >45

Segment Length: 0.5 miles
Direction: EAST/WEST

$$\frac{\text{NUMBER OF COLLISIONS} \times 1\text{ MILLION}}{\text{ADT} \times 365\text{ DAYS PER YEAR} \times \text{SEGMENT LENGTH} \times \text{NUMBER OF YEARS}}$$

$$\frac{4 \times 1{,}000{,}000}{8{,}500 \times 365 \times 0.5 \times 3}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Segment	**0.86 c/mvm**	**0.0%**	**50.0%**
Statewide Average*	**3.35 c/mvm**	**0.6%**	**42.5%**

ADT = average daily traffic volume (adjusted for seasonal & weekday changes)
c/mvm = collisions per million vehicle miles
* *2007 Collision Data on California State Highways* , Caltrans

SEGMENT COLLISION RATE CALCULATIONS

First-Second Street Couplet for City of Chico

Location: 2nd Street from Broadway to 1st Street

Date of Count: Wednesday, June 13, 2007
ADT: 9,000

Number of Collisions: 9
Number of Injuries: 5
Number of Fatalities: 0
Start Date: January 1, 2006
End Date: December 31, 2008
Number of Years: 3

Highway Type: UNDIVIDED 4 LANES
Area: Urban
Design Speed: >45

Segment Length: 0.2 miles
Direction: EAST/WEST

$$\frac{\text{NUMBER OF COLLISIONS x 1 MILLION}}{\text{ADT x 365 DAYS PER YEAR x SEGMENT LENGTH x NUMBER OF YEARS}}$$

$$\frac{9 \times 1{,}000{,}000}{9{,}000 \times 365 \times 0.2 \times 3}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Segment	**4.57 c/mvm**	**0.0%**	**55.6%**
Statewide Average*	**3.35 c/mvm**	**0.6%**	**42.5%**

ADT = average daily traffic volume (adjusted for seasonal & weekday changes)
c/mvm = collisions per million vehicle miles
* *2007 Collision Data on California State Highways* , Caltrans

CHI900-7 Reported Collisions
1st-2nd Street Corridor

Collision Report Summary

4/2/2010

Date Range Reported: 1/1/06 - 12/31/08

Total Number of Collisions: 2

Report#	Date	Time	Location	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Dir. of Travel 1	Movement Prec. Coll. 1	Dir. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil.	Ver.
2479223	2/19/06	19:42	Broadway & W 1st St	44'	South	Rear-End	Parked Motor Vehicle	South	Other	South	Parked	Wrong Side of Road	0	0	
3403028	10/9/07	09:27	W 1st St & Broadway	0'	In Int.	Broadside	Bicycle	South	Making Left Turn	East	Proceeding Straight	Traffic Signals and Signs	0	0	

CHI900-7 Reported Collisions
1st-2nd Street Corridor

Collision Report Summary

4/2/2010

Date Range Reported: 1/1/06 - 12/31/08

Total Number of Collisions: 1

Report#	Date	Time	Location	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Dir. of Travel 1	Movement Prec. Coll. 1	Dir. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil.	Ver.
2563788	3/31/06	01:54	E 1st St & Flume St	61'	West	Hit Object	Fixed Object	North	Proceeding Straight			Driving Under Influence	0	0	

CHI900-7 Reported Collisions
1st-2nd Street Corridor

Collision Report Summary

4/2/2010

Date Range Reported: 1/1/06 - 12/31/08

Total Number of Collisions: 3

Report#	Date	Time	Location	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Dir. of Travel 1	Movement Prec. Coll. 1	Dir. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil.	Ver.
2499706	2/26/06	21:39	Main St & E 1st St	0'	In Int.	Head-On	Fixed Object	North	Proceeding Straight			Driving Under Influence	0	0	
3338645	8/26/07	02:25	Main St & E 1st St	145'	North	Hit Object	Fixed Object	South	Traveling Wrong Way			Driving Under Influence	0	0	
3470187	11/12/07	14:26	E 1 St St & Main St	129'	East	Other	Parked Motor Vehicle	West	Not Stated	Not Stat	Not Stated	Unsafe Speed	1	0	

CHI900-7 Reported Collisions
1st-2nd Street Corridor

Collision Report Summary

4/2/2010

Date Range Reported: 1/1/06 - 12/31/08

Total Number of Collisions: 2

Report#	Date	Time	Location	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Dir. of Travel 1	Movement Prec. Coll. 1	Dir. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil.	Ver.
3054455	2/2/07	13:57	Esplanade & West 1st Av	66'	North	Rear-End	Other Motor Vehicle	South	Slowing/Stopping	South	Stopped in Road	Unsafe Speed	2	0	
3336281	9/1/07	20:45	Esplanade & West 1st Av	17'	North	Broadside	Other Motor Vehicle	West	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	1	0	

CHI900-7 Reported Collisions
1st-2nd Street Corridor

Collision Report Summary

4/2/2010

Date Range Reported: 1/1/06 - 12/31/08

Total Number of Collisions: 2

Report#	Date	Time	Location	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Dir. of Travel 1	Movement Prec. Coll. 1	Dir. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil.	Ver.
3111061	3/30/07	12:27	East 2nd St & Wall St	0'	In Int.	Vehicle - Pedestrian	Pedestrian	East	Proceeding Straight	North	Other	Improper Passing	1	0	
3316399	8/8/07	18:54	E 2nd St & Wall St	0'	In Int.	Broadside	Bicycle	North	Proceeding Straight	East	Proceeding Straight	Auto R/W Violation	1	0	

CHI900-7 Reported Collisions
1st-2nd Street Corridor

Collision Report Summary

4/2/2010

Date Range Reported: 1/1/06 - 12/31/08

Total Number of Collisions: 1

Report#	Date	Time	Location	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Dir. of Travel 1	Movement Prec. Coll. 1	Dir. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil.	Ver.
2707702	7/9/06	00:14	E 2nd St & Main St	172'	East	Vehicle - Pedestrian	Pedestrian	South	Other	East	Proceeding Straight	Pedestrian Violation	1	0	

CHI900-7 Reported Collisions
1st-2nd Street Corridor

Collision Report Summary

4/2/2010

Date Range Reported: 1/1/06 - 12/31/08

Total Number of Collisions: 1

Report#	Date	Time	Location	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Dir. of Travel 1	Movement Prec. Coll. 1	Dir. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil.	Ver.
2661358	6/16/06	10:49	2nd St & Salem St	29'	East	Broadside	Bicycle	East	Other Unsafe Turning	East	Proceeding Straight	Improper Turning	1	0	

CHI900-7 Reported Collisions
1st-2nd Street Corridor

Collision Report Summary

4/2/2010

Date Range Reported: 1/1/06 - 12/31/08

Total Number of Collisions: 3

Report#	Date	Time	Location	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Dir. of Travel 1	Movement Prec. Coll. 1	Dir. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil.	Ver.
2941741	12/7/06	17:12	W 2nd St & Main St	0'	In Int.	Sideswipe	Other Motor Vehicle	North	Changing Lanes	North	Proceeding Straight	Unsafe Lane Change	0	0	
3169111	4/28/07	22:42	E 2nd St & Main St	27'	East	Sideswipe	Other Motor Vehicle	North	Making Right Turn	West	Stopped in Road	Driving Under Influence	0	0	
3719867	5/5/08	11:19	Main St & E 2nd St	0'	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	North	Proceeding Straight	Driving Under Influence	1	0	

CHI900-7 Reported Collisions
1st-2nd Street Corridor

Collision Report Summary

4/2/2010

Date Range Reported: 1/1/06 - 12/31/08

Total Number of Collisions: 2

Report#	Date	Time	Location	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Dir. of Travel 1	Movement Prec. Coll. 1	Dir. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil.	Ver.
3182956	4/29/07	18:35	Ivy St & W 2nd St	0'	In Int.	Broadside	Other Motor Vehicle	East	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	1	0	
4016025	12/18/08	21:57	Ivy St & W 2nd St	0'	In Int.	Broadside	Other Motor Vehicle	North	Proceeding Straight	East	Proceeding Straight	Driving Under Influence	0	0	

CHI900-7 Reported Collisions
1st-2nd Street Corridor

Collision Report Summary

4/2/2010

Date Range Reported: 1/1/06 - 12/31/08

Total Number of Collisions: 1

Report#	Date	Time	Location	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Dir. of Travel 1	Movement Prec. Coll. 1	Dir. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil.	Ver.
3194470	5/13/07	20:20	W 2nd St & Hazel St	135'	East	Sideswipe	Parked Motor Vehicle	West	Proceeding Straight	Not Stat	Parked	Wrong Side of Road	0	0	

CHI900-7 Reported Collisions
1st-2nd Street Corridor

Collision Report Summary

4/2/2010

Date Range Reported: 1/1/06 - 12/31/08

Total Number of Collisions: 1

Report#	Date	Time	Location	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Dir. of Travel 1	Movement Prec. Coll. 1	Dir. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil.	Ver.
3870612	9/13/08	02:03	Cherry St & W 2nd St	96'	South	Sideswipe	Parked Motor Vehicle	North	Proceeding Straight	South	Parked	Wrong Side of Road	0	0	

CHI900-7 Reported Collisions
1st-2nd Street Corridor

Collision Report Summary

4/2/2010

Date Range Reported: 1/1/06 - 12/31/08

Total Number of Collisions: 3

Report#	Date	Time	Location	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Dir. of Travel 1	Movement Prec. Coll. 1	Dir. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil.	Ver.
2625837	5/7/06	07:41	Broadway St & W 2nd St	0'	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	1	0	
3051114	2/21/07	01:02	W 2nd St & Broadway St	135'	East	Sideswipe	Parked Motor Vehicle	East	Proceeding Straight	Not Stat	Parked	Driving Under Influence	0	0	
3608568	2/8/08	19:56	Broadway & W 2nd St	0'	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	South	Proceeding Straight	Not Stated	0	0	