

Attachment A – Existing Conditions Memo

TO: LCVMPPO

FROM: Keller Associates

DATE: 10/16/2013

SUBJECT: North Clarkston Circulation Study –Task 1 Existing Conditions

Introduction

The purpose of this technical memo is to present existing conditions for the North Clarkston Circulation Study. The memo does not present solutions for the existing conditions, as those will be evaluated in Task 4 Develop Improvement Alternatives. The memo presents the methodologies, collision analysis, traffic volumes, operational analysis, and stakeholder comments for the existing conditions of the following seven intersections:

- Bridge St. & 2nd St.
- Bridge St. & 5th St.
- Bridge St. & 6th St.
- 5th St. & Walmart/Costco
- Bridge St. & 13th St.
- 13th St. & Fair St.
- Fair St. & 5th St.

All seven of the study area intersections are shown below in Figure 1.



Figure 1: North Clarkston Circulation Study Intersections

Previous Studies

The following studies have been reviewed; Traffic Impact Study for Walmart (2008), Lewiston-Clarkston Downtown Circulation Plan (2011), and Draft - Valley Destination 2040 The Long Range Transportation Plan (2013).

Methodology

Traffic Analysis

Traffic counts were performed at each intersection on Tuesday, August 11th and Wednesday August 12th, 2013 at 7:00 AM – 9:00 AM and from 4:00 PM – 6:00 PM. Peak hour turning movements were then calculated for each intersection.

Average daily traffic (ADT) volumes were obtained from the Washington State Department of Transportation (WSDOT) for the intersections on Bridge St. WSDOT did not have ADT data for the remaining three intersections on Fair St. and the Walmart/Costco intersection. In order to estimate the ADT for these intersections the peak hour volume collected was divided by a K-value (design hour factor) of 0.10.

Collision Analysis

Collision data for the City of Clarkston from 2008 to 2012 was obtained from WSDOT. Collisions within 250 feet of an intersection were included in the total collisions for that intersection. WSDOT's current policy is to evaluate an intersection's safety if five or more collisions occur within a year. An alternate method for evaluating an intersection's safety is by determining the number of collisions per million vehicles entering an intersection. This collision rate takes into account relative exposure, which is an influential factor for the number of collisions that occur at an intersection. A collision rate, based on this alternate method, was calculated for each intersection to provide an alternate analysis for the intersection's safety. Collision data for each intersection is presented in Appendix A.

Operational Analysis

The operational conditions of the non-signalized intersections were evaluated using the Highway Capacity Software (HCS), while the signalized intersections were modeled using Synchro and Sim Traffic software. The signalized intersections were chosen to be modeled by Synchro and Sim Traffic due to realistic/accurate results and a virtual check to verify that what was occurring in the field is what was being modeled. The operational analysis evaluated the queue lengths, signal timing, level of service (LOS), and delays for the intersections. Details of the operational analyses for each intersection are presented in Appendix B.

Stakeholder Interviews

A total of nine local businesses and agency representatives were interviewed about specific intersections in this study that directly affected their business. Stakeholders were questioned about existing problems, changes they would make, positives of current

Conditions, and any concerns they had. All of the interviews were recorded in a questionnaire form and are presented in Appendix C.

Bridge St. & 2nd St. Intersection

Operational Analysis

Bridge St. & 2nd St. is a five-leg, signalized intersection that is the most complicated of all the intersections due to the geometry and high ADT. Figure 2 shows the intersection geometry and location. The intersection's peak hour volume count was over 1,800 veh/hour, which was the highest volume compared to the other six intersections. Each approach of the intersection had four movements and out of those movements 14 had less than or equal to 20 veh/hr. Figure 3 shows the peak hour volumes and LOS for each movement.

The intersection had five movements that experienced queue lengths greater than 100 feet, while eastbound Bridge St. and southbound 2nd St. had queue lengths in excess of 300 feet. The eastbound through had a very large queue length of 627 feet. Both of these movements had delays greater than 35 seconds and were operating at LOS D. The southbound movement had a delay in excess of 50 seconds. The average delay for the intersection was 34.1 seconds, which results in an overall LOS C. However, at 35 seconds it would be LOS D.

Collisions

The Bridge St. & 2nd St. intersection had a total of 37 collisions from 2008 to 2012, which is the highest number of collisions compared to all the intersections studied. The collision rate was 1.10 collisions/million vehicles (MV) entering the intersection, which is relatively low considering the geometry and difficulty of the movements. Out of the 37 collisions 8% resulted in "evident injury", 16% "possible injury" and 75% "no injury". The most frequent collision contributing circumstance was "did not grant RW to vehicle" which occurred in 9 of the 37 collisions. A possible reason is due to the large intersection size, where on-coming drivers are traveling faster than a typical intersection, and yielding drivers are not making accurate judgment based on this faster speed. Another reason may be that drivers are not visually checking all legs of the intersection prior to their movement, due to the complexity and the geometry of the intersection. The second highest circumstances were "under influence of alcohol" and "following too closely," both of these circumstances are human error, which they are virtually impossible to determine if design changes could have prevented these collisions.

With its complex geometry, this intersection has a total of 70 conflict points, while a typical four leg intersection has 32. Conflict points are diverging, merging, and crossing points of vehicles paths at an intersection. Reducing the number of conflict points at an intersection will typically reduce the number of collisions.



Figure 2: Bridge/Diagonal/2nd Intersection Overview

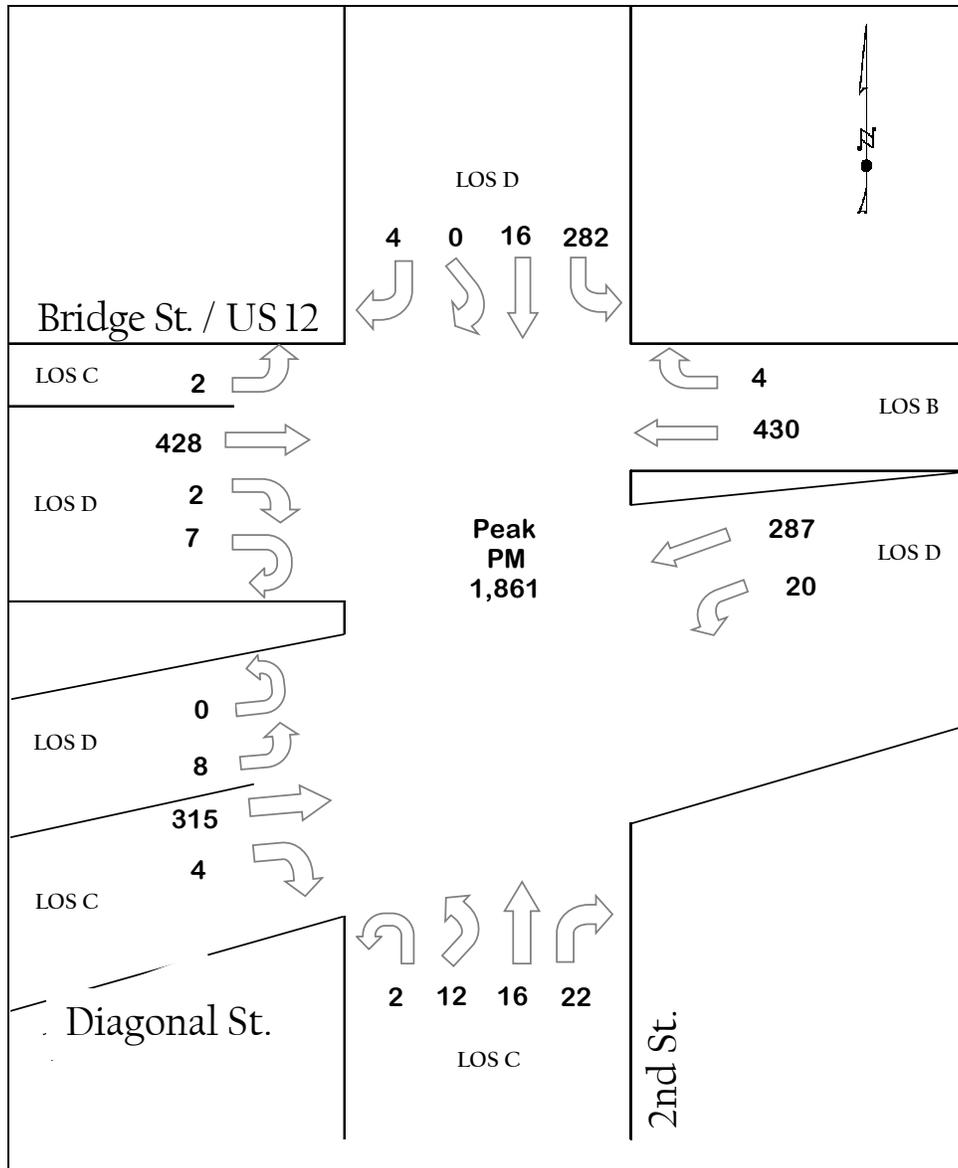


Figure 3: Bridge/Diagonal/2nd Intersection PM Peak Hour Volumes and LOS

Stakeholder Input

Table 1 presents the comments that local stakeholders had with the existing Bridge St. & 2nd St. intersection.

Table 1: Bridge St. and 2nd St. Intersection Shareholder Summary

Contact Person	Stakeholder Business	Issues
Kristy Barton	Community Bank	Traffic turns left off of 2 nd St. onto Bridge towards Lewiston, where uncontrolled left turn seems to be causing problems. Traffic light doesn't have yield to oncoming traffic and there should be a yield to on-coming traffic sign.
Kristy Barton	Community Bank	Westbound traffic where people want to go straight onto Bridge St. can be blocked sometimes due to traffic waiting to go towards Diagonal St.
Kristy Barton	Community Bank	Sees accidents at 2 nd & Bridge all of the time.
Bruce Finch	Tomato Bro/Taco Time	Timing on intersection seems too short, particularly in the north-south direction, especially during rush hour. Would like to see it remain green longer on each cycle.
Bruce Finch	Tomato Bro/Taco Time	2 nd St. southbound needs a left turn lane
Bruce Finch	Tomato Bro/Taco Time	2 nd St. southbound needs a longer green time
Deby Lutes	Columbia Bank	Bridge St. eastbound backs up to almost 5 th St.
Deby Lutes	Columbia Bank	3 rd St. /Bridge St. intersections only permit southbound to turn and not go straight.
Wanda Keefer, Belinda Campbell, & Jennifer Bly	Port of Clarkston	Signal timing seems too short.
Wanda Keefer, Belinda Campbell, & Jennifer Bly	Port of Clarkston	Eastbound traffic backs up on Bridge west of this intersection backs up sometimes to 6 th St.

Previous Studies

The Lewiston-Clarkston Downtown Circulation Plan showed the intersection operating at a LOS of C in 2009 and a LOS D in 2030. Individual movements are expected to be operating at LOS E and F by 2030. The Traffic Impact study for Walmart also reported similar results with the intersection operating at a LOS C in 2009 and LOS D in 2019.

Summary

The Bridge St. & 2nd St. intersection generated the highest number of total delay, queue lengths, and collisions compared to the other intersections studied. Although the intersection had a LOS C, several of the movements are operating at LOS D. It was somewhat surprising that there were not more collisions at this intersection because of the geometry, ADT, and complicated movements. Many of the shareholders were

negatively affected by this intersection and said there were major delays and the orientation is confusing. Mr. Finch from Tomato Brothers said the signal timing was too short for the north/south direction. Based on field observations and Synchro modeling, the 2nd St. & 5th St. intersections on Bridge St. could be coordinated to prevent vehicle arrivals when a movement is in a red phase.

Bridge St. & 5th St Intersection

Operational Analysis

Bridge St. & 5th St. is a four-leg signalized intersection that is approximately 900 feet west of the Bridge St. & 2nd St. intersection. Figure 4 shows the geometry and location of the intersection. All legs of the intersection have 5-section signal heads, commonly known as “dog house” signals for protected/permitted left-turn operation. This intersection is a major route for business access to the north. Figure 5 shows the peak hour volumes and LOS for each movement.

The intersection had a peak hour total of 1,455 vehicles, which is the second highest in this study. The intersection’s traffic volumes are distributed fairly well as the east/west movement is responsible for 56% of the traffic and the north/south 44%. The eastbound left onto 5th St. northbound had a peak hour volume of 107 vehicles, which is a fairly high for this movement. This high turning volume is most likely due to the businesses just north and east of intersection, such as Walmart, Costco, McDonalds, Pizza Hut, and Albertsons. The westbound traffic appears to be taking another route to access the businesses, as there were a total of 42 vehicles combined between the AM and PM peak hour that turned right on to 5th St. northbound.

The average delay for the intersection was 24.1 seconds, which is second highest and resulted in a LOS C. The westbound through movement had the longest queue length of 332 feet and the longest delay at 38.8 seconds, which results in a LOS D for that movement. The modeling and field observations show that the signal timing between the 2nd St. & Bridge St. intersection and the Bridge St. & 5th St. intersection is not timed ideally, as westbound traffic from Bridge St. & 2nd St. is arriving during a westbound red phase at the Bridge St. & 5th St. intersection. This is resulting in excessive queue lengths and delay times, which could be reduced by changing the signal timing plans. The timing between these two intersections and the westbound movement should accommodate the westbound platoons such that they are arriving when the Bridge St. & 5th St. intersection is in a green phase. The eastbound through and northbound through both experienced delays between 22 and 26 seconds, even though the eastbound through had approximately 100 more vehicles per hour.

The intersection is operating at an acceptable LOS, but the signals are in need of retiming. Bridge St. (Highway 12) should be coordinated to be in a green phase when the westbound traffic from Bridge St. & 2nd St arrive. The timing plan should shift towards reducing delays on Bridge St. and placing slightly higher delays on the cross-streets.



Figure 4: Bridge & 5th/ Bridge & 6th Intersection Overview

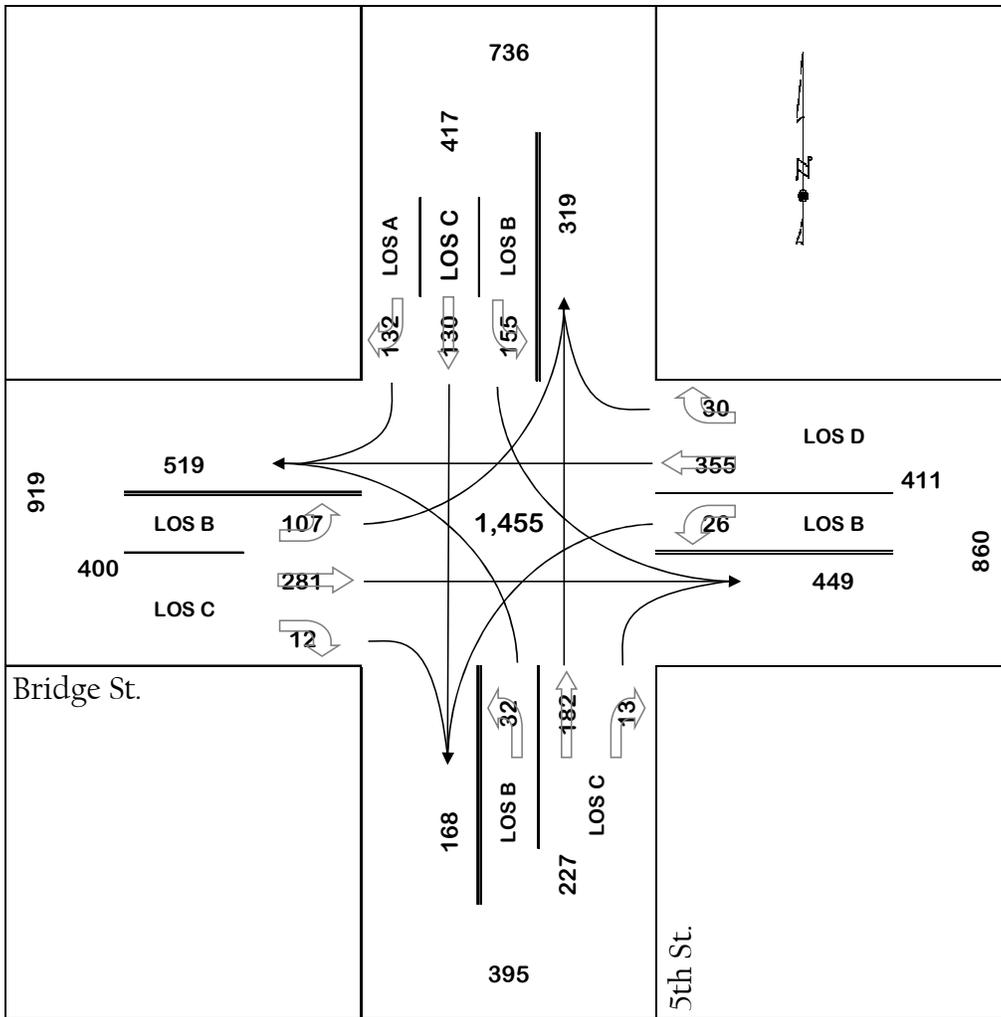


Figure 5: Bridge St. & 5th St. Intersection PM Peak Hour Volumes and LOS

Collision Analysis

A total of 23 collisions have occurred over five years at the Bridge St. & 5th St. intersection. The intersection had the second highest number of collisions, but had the highest collision rate at 1.26 collisions/MV entering the intersections. Five collisions occurred in 2012, which by WSDOT’s guidelines this intersection would be subjected to a safety analysis. The highest contributing collision circumstance was vehicles “did not grant RW to vehicle”. Out of the 23 collisions one resulted in evident injury, four as possible injury and 18 that resulted in no injury.

Stakeholder Issues

Table 2 presents the issues that local stakeholders had with the existing Bridge St. & 5th St. intersection.

Table 2: Bridge St. and 5th St. Intersection Shareholder Summary

Contact Person	Stakeholder Business	Issues
Rory Delene	Albertsons	Light switches too quickly for traffic turning right from Bridge onto 5 th St.
Rory Delene	Albertsons	First of the month traffic backs up bad, because of food stamp recipients.
Rory Delene	Albertsons	5 th Street is too bogged down.
Marty Huddleston	Jiffy Lube	Lights tend to seem to have a mind of their own. Timing seems to be off. Either too long or too short.
Marty Huddleston	Jiffy Lube	Intersection is not well lighted.
Deby Lutes	Jiffy Lube	Bridge Street eastbound backs up to almost 5 th Street.
Deby Lutes	Jiffy Lube	Doesn't like that 3 rd St. southbound across Bridge St. only allows right turn only. Northbound does not have same restriction.
Deby Lutes	Jiffy Lube	Has seen several accidents at 3 rd St. and Bridge St. Intersection.
Wanda Keefer, Belinda Campbell, & Jennifer Bly	Port of Clarkston	Signal timing seems too short at this intersection.
Wanda Keefer, Belinda Campbell, & Jennifer Bly	Port of Clarkston	This intersection has traffic back up to Fair St. to the north.

Previous Studies

This intersection was not studied in this Lewiston-Clarkston Downtown Circulation Plan, but it was reported that queues occasionally backed up enough to interfere with the traffic signal at 5th St. & Fair St. intersection. The Traffic Impact Study for Walmart shows this intersection operating at a LOS C in 2009 and a LOS D in 2019.

Summary

The Bridge St. & 5th St. intersection had the second highest peak hour volume of the intersections analyzed. It had the highest collision rate of the intersections studies with 1.26 collisions/MV entering the intersection. The local stakeholders had the most issues with this intersection and the majority of them said the intersection was too congested and had unnecessary queues. Ms. Delene from Albertsons reported that their delivery trucks no longer arrive during the day and come during late hours to avoid the congestion. Based on field observation and the Synchro model, the Bridge St. & 5th St. and Bridge St. & 2nd St. intersections should be coordinated so that the westbound traffic from Bridge St. &

2nd St. does not arrive at a red phase. The westbound movement is a major reason for this intersection's operating condition and congestion.

Bridge St. & 6th St. Intersection

Operational Analysis

Bridge St. & 6th St. is a two-way stop controlled intersection that had a peak hour volume of 963 vehicles. Figure 4 (shown previously) illustrates the intersection geometry and location. This intersection is approximately 250 feet west of the Bridge St. & 5th St. intersection. State Route 129 starts at this intersection and proceeds south towards Asotin. This intersection is much different than Bridge St. & 5th St. intersection, as the traffic is not well distributed between all the movements. Bridge St. has 89% of the traffic while 6th St./SR 129 has the remaining 11%. The southbound movement had just 9 vehicles during the peak hour. Figure 6 shows the peak hour volumes and LOS for each movement.

The worst queue occurred at the north through (typical) movement, which had a queue length of approximately one vehicles. All movements on Bridge St. operate at LOS A. The northbound and southbound through and left movements all had delays of approximately 20 seconds, which results in a LOS C. These are acceptable delays and are not detrimental to the intersection's operational condition as these movements only make up 11% of the total vehicles entering the intersection. Overall this intersection is performing at an acceptable LOS with very minor queues and delay times. The intersection had an average delay of 2.4 seconds per vehicle, which is very low.

Collision Analysis

A total of nine collisions occurred over five years at Bridge St. & 6th St. intersection. The intersection had a collision rate of 0.5 collisions/MV vehicles entering the intersection. The two way left turn lane offers room for vehicles to safely pull out into the intersection and then make the transition to the lane when an acceptable gap occurs. Three of the collisions occurred during 2011 and 2012, raising little concern with regards to the safety of the intersection. Seven of the nine collisions "did not grant RW to vehicle" and were entering at an angle. These types of collisions were most likely related to northbound and southbound, where vehicles are required to make a permissive movement.

Stakeholder Issues

Table 3 presents the comments that local stakeholders had with the existing Bridge St. & 6th St. intersection.

Table 3: Bridge St. and 6th St. Intersection Shareholder Summary

Contact Person	Stakeholder Business	Issues
Wanda Keefer, Belinda Campbell, & Jennifer Bly	Port of Clarkston	Northbound traffic traveling across Bridge St. is difficult to manage
Wanda Keefer, Belinda Campbell, & Jennifer Bly	Port of Clarkston	Currently traffic traveling northbound tends to turn east onto Bridge to move over to 5 th Street to access Walmart, Costco, Albertsons, etc.

Previous Studies

The Traffic Impact Study (TIS) for Walmart shows this intersection operating at a LOS E in 2009 and a LOS F in 2019. The TIS appears to have anticipated much higher traffic volumes using 6th St. as a route to and from Walmart than what is actually occurring.

Summary

The Bridge St. & 6th St. intersection is currently operating at an acceptable LOS and had minor delays. There were few stakeholder comments about this intersection and it appears to be operating very well. The collision rate was one of the lowest of the intersections analyzed and it is not anticipated to increase in the near future.

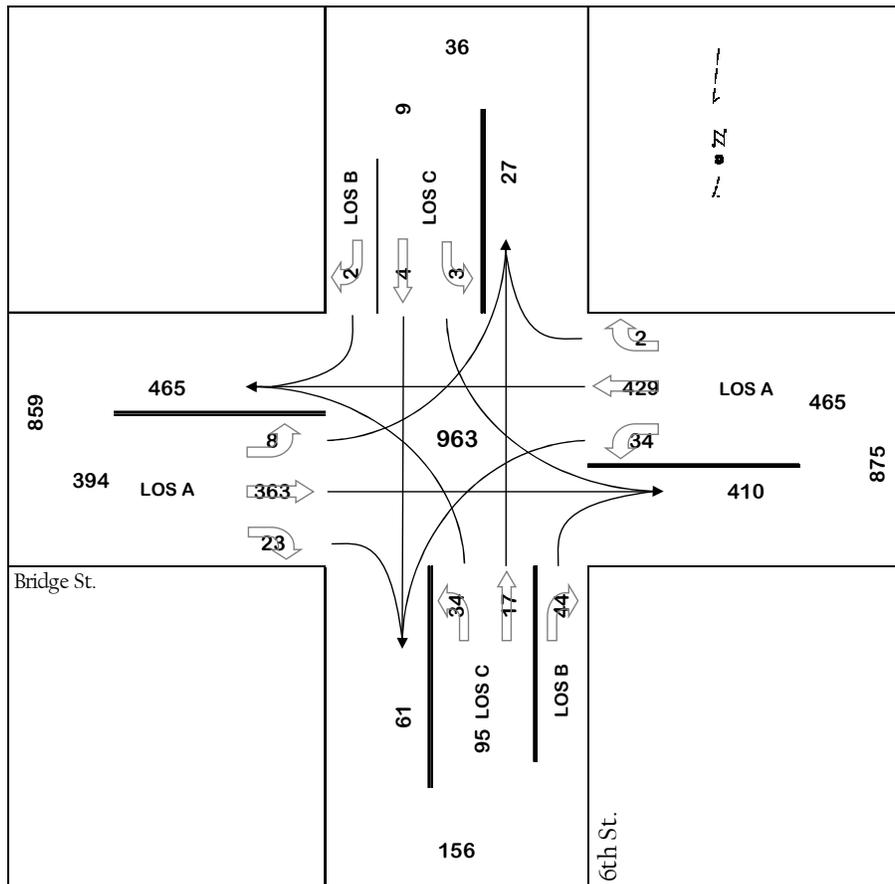


Figure 6: Bridge St. & 6th St. Intersection PM Peak Hour Volumes and LOS

Bridge St. & 13th St. Intersection

Operational Analysis

Bridge St. & 13th St. is a signalized intersection that had a peak hour movement of 1,092 vehicles. This is somewhat of an isolated signalized intersection as the closest one is over 0.25 miles away. Figure 7 shows the intersection geometry and location. The traffic volumes are fairly well distributed with the eastbound leg possessing the highest traffic flow at 308 veh/hr and the lowest traffic flow at 172 veh/hr. This intersection had the second lowest ADT in the study with 7,800 veh/day. Figure 8 shows the peak hour volumes and LOS for each movement.

The highest delay occurred for the southbound movement, which had a delay of 37 seconds. The southbound through had the highest queue length at 125 feet. All four through movements had queue lengths greater than 100 feet. The total delay for the intersection was 16.2 seconds, which is reasonably low. The intersection is operating at an acceptable LOS B and appears to be performing well based on existing conditions.

Collision Analysis

Bridge St. & 13th St. intersection had a total of 10 collisions over five years with only 1 in 2012. The intersection had a collision rate of 0.70 collisions/MV entering the intersection, which is low. The contributing circumstance for four of the collisions was “disregard stop and go light.” Three of the collisions resulted in possible injury, two as unknown and five as no injury collisions.

Stakeholder Issues

Table 4 presents the comments that local stakeholders had with the existing Bridge St. & 13th St. intersection.

Table 4: Bridge St. and 13th St. Intersection Shareholder Summary

Contact Person	Stakeholder Business	Issues
Wanda Keefer, Belinda Campbell, & Jennifer Bly	Port of Clarkston	No issue with this intersection, it appears to function well.

Previous Studies

The Traffic Impact Study for Walmart shows the intersection operating at a LOS B in 2009 and 2019.

Summary

The Bridge St. & 13th St. intersection is operating at an acceptable LOS and is averaging 2 collisions per year. The intersection has reasonable queues and currently does not have any movements operating below LOS C.



Figure 7: Bridge & 13th/ Fair & 13th Intersection Overview

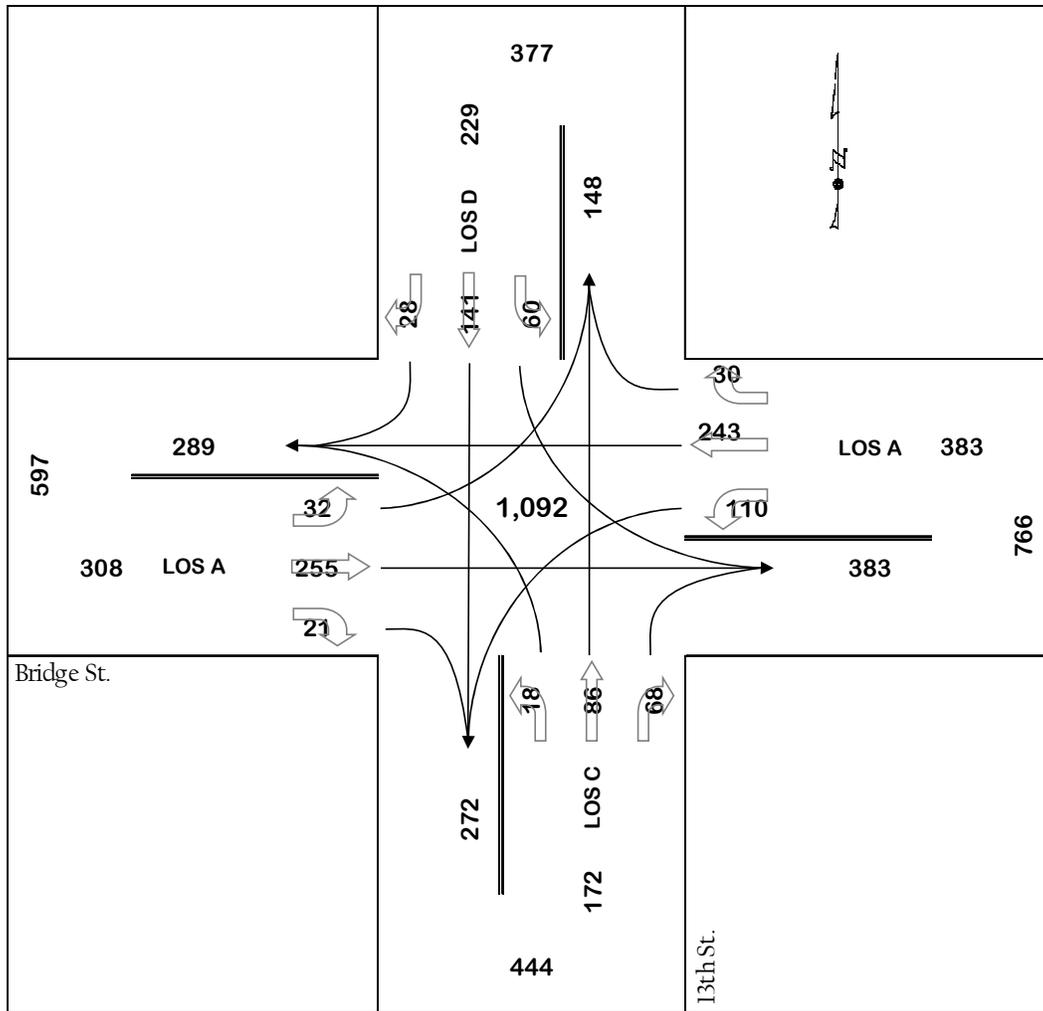


Figure 8: Bridge St. & 13th Street Intersection PM Peak Hour Volumes and LOS

Fair St. & 13th St. Intersection

Operational Analysis

Fair St. & 13th is currently a two-way stop controlled intersection with stop signs on Fair St. Figure 7 (shown previously) illustrates the intersection geometry and location. The intersection experienced an ADT of 3,920 veh/day and a peak hour volume of 392 vehicles, which are the lowest traffic volumes in this study. The northbound and southbound movements were operating at LOS A, with delays less than 8 seconds. Eastbound Fair St. had a delay of 10.5 seconds per vehicle, which resulted in LOS B. Westbound Fair St. was very similar with a delay of 12.5 seconds per vehicle, which was also LOS B. Overall the intersection is operating at a very good LOS and is not anticipated to change in the near future. Figure 9 shows the peak hour volumes and LOS for each movement.

Collision Analysis

The Fair St. & 13th St. intersection had just one collision over five years that occurred in 2008 and resulted in no injury.

Stakeholder Issues

Table 5 presents the comments that local stakeholders had with the existing Bridge St. & 13th St. intersection.

Table 5: Fair St. and 13th St. Intersection Shareholder Summary

Contact Person	Stakeholder Business	Issues
Wanda Keefer, Belinda Campbell, & Jennifer Bly	Port of Clarkston	No issue with this intersection, it appears to function well.

Previous Studies

The Traffic Impact Study for Walmart shows that this intersection was expected to be operating at a LOS B in 2009 and 2019.

Summary

The Fair St. & 13th St. had low traffic flows and is currently operating very well. There were minor delays on the cross-streets and the intersection only had one collision occur over five years. There were no stakeholder complaints about this intersection.

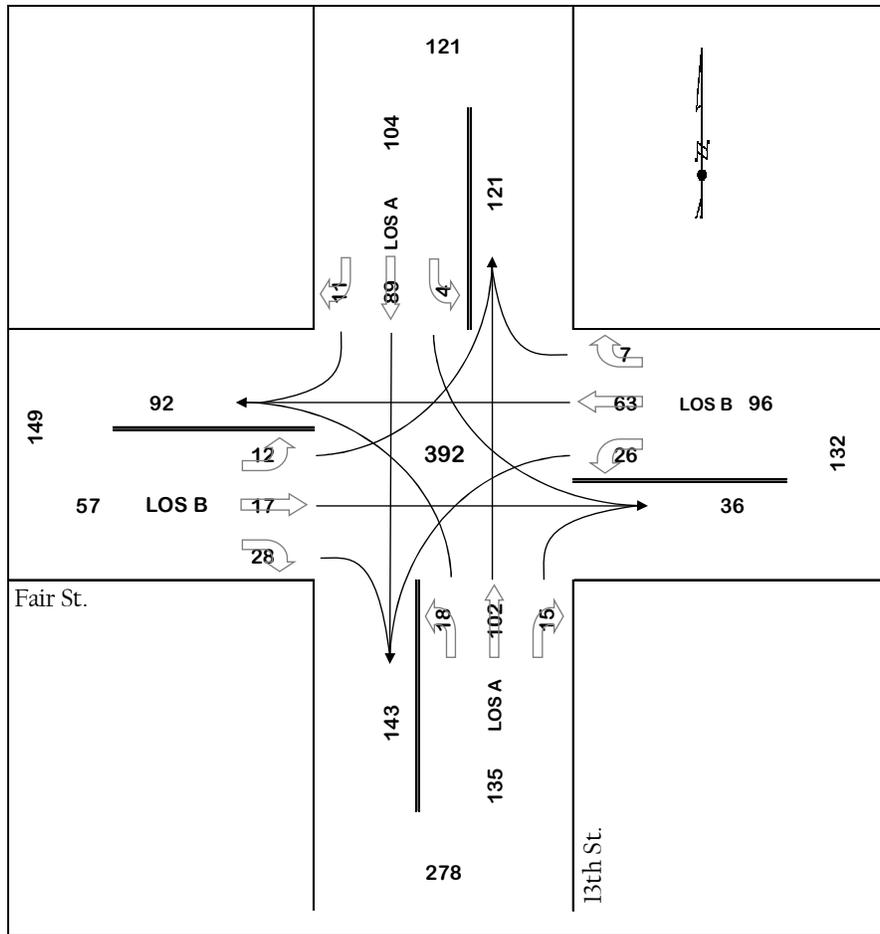


Figure 9: Fair St. & 13th St. Intersection PM Peak Hour Volumes and LOS

Fair St. & 5th St. Intersection

Operational Analysis

The Fair St. & 5th St. is a signalized intersection that is just 170 feet south (measured near-side to near-side) of the four-way stop intersection between Walmart and Costco, which provides very little room for queuing between the intersections. Figure 10 shows the intersection geometry and location. This is a major collector intersection that links US 12 to Walmart, Costco, Port of Clarkston, Motel 6, and several industrial properties. The peak hour volume was 1,037 vehicles and the calculated ADT was 10,370 veh/day. Figure 11 shows the peak hour volumes and LOS for each movement.

The southbound through movement had the highest queue length of 174 feet, essentially the distance from the Walmart/Costco intersection, with the northbound through movement having a queue of 109 feet. The westbound right experienced a 31.7 second delay and does not currently permit right on red, in order not to contribute to queues backing from the Walmart/Costco intersection. The northeast intersection corner has a large radius that provides a right turn lane storage for approximately two vehicles. The intersection's LOS was B with an average delay of 14.5 seconds. The majority of the intersection movements had LOS of B or better. Field observation showed that the northbound queue from the Walmart/Costco intersection would back up into the intersection causing congestion and higher delays than shown for both of the intersections.

Collision Analysis

A total of eight collisions occurred over five years at the Fair St. & 5th St. intersection. Six of the eight collisions occurred in 2011, however no collisions occurred in 2012. The collisions rate was 0.42 collisions/MV vehicles entering the intersection, which is the second lowest collision rate for the intersections studied. Of the eight collisions, seven resulted in no injury and one evident injury.

Stakeholder Issues

Table 6 presents the comments that local stakeholders had with the existing Fair St. & 5th St. intersection.

Table 6: Fair St. & 5th St. Intersection Shareholder Interview Summary

Contact Person	Stakeholder Business	Issues
Deby Lutes	Columbia Bank	The Fair St. and 5 th St. intersection does not work.
Wanda Keefer, Belinda Campbell, & Jennifer Bly	Port of Clarkston	Too close to the Walmart/Costco intersection and traffic backs up into the 5 th St. & Fair St. intersection
Wanda Keefer, Belinda Campbell, & Jennifer Bly	Port of Clarkston	Traffic traveling west bound on Fair turning right onto 5th do not always obey the "No Right Turn on Red" street sign. For those that do obey it, it seems to help.
Rory Delene	Albertsons	Delivery trucks have to wait till late hours to make deliveries now due to traffic volumes on Fair Street.



Figure 10: Fair & 5th and 5th & Walmart/Costco Intersection Overview

Previous Studies

The Lewiston-Clarkston Downtown Circulation Plan showed the intersection having a LOS of B in 2009 and a LOS C in 2030. No analysis of queuing was included.

Summary

The Fair St. & 5th St. is an important intersection that provides access to Walmart, Costco, the Port of Lewiston, and many other businesses. The analysis shows the intersection currently operating at an acceptable LOS, but field observation discovered that there are several congestion issues. The 5th St. and Walmart/Costco intersection is only 170 feet north, which creates frequent congestion when the northbound movement at the Walmart/Costco intersection backs up into the Fair St. & 5th St. intersection. This analysis shows conditions better than they actually are, as the Highway Capacity Methodology does not incorporate adjacent intersection interference, such as the 5th St. & Walmart/Costco intersection. Therefore, the 5th St. & Walmart/Costco and Fair St. & 5th St. intersection’s operating conditions were evaluated together in the 5th St. & Walmart/Costco and Fair St. & 5th St. intersection operational conditions section.

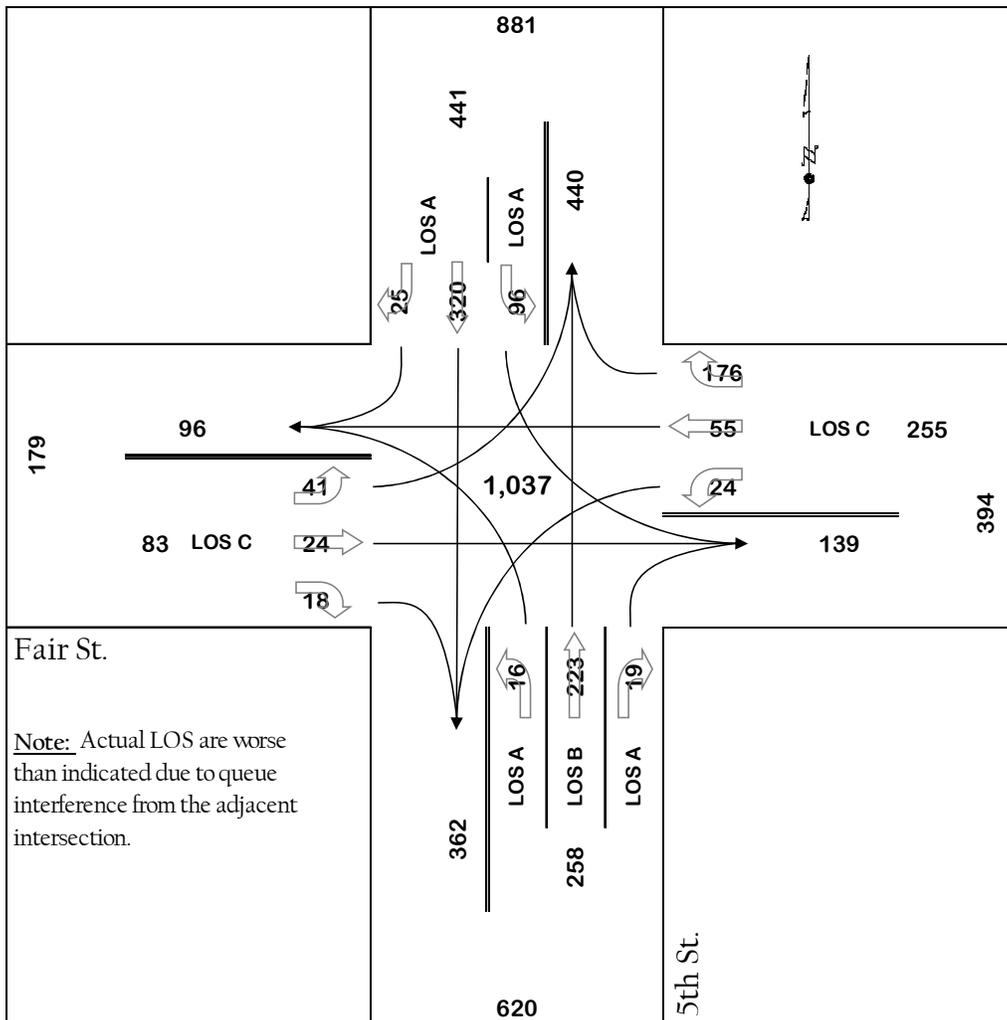


Figure 11: Fair St. & 5th St. Intersection PM Peak Hour Volumes and LOS

5th St. & Walmart/Costco Intersection

Operational Analysis

The 5th St. and Walmart/Costco intersection is a four-way stop controlled intersection that is located 170 feet north (measured near-side to near-side) of the Fair St. & 5th St. intersection. Figure 10 (shown previously) illustrates the intersection geometry and location. The intersection experienced a peak hour volume of 1,056 vehicles and an ADT of 10,560 veh/day. The eastbound left had the highest traffic movement with 270 vehicles/hour. The model showed that the northbound movement had the longest queue length at approximately 167 feet, which extends into the Fair St. and 5th St. intersection. It was observed in the field that on multiple occasions the northbound traffic would back up into the Fair St. and 5th St. intersection and create congestion and added delay. The northbound approach delay was 23 seconds, which resulted in a LOS C. The remaining intersection legs had delays between 12 and 13 seconds, which resulted in LOS B. The overall intersection delay was 17.2 seconds and resulted in LOS C. The intersection may be operating at a worse LOS than what the HCM analysis shows, as interference from adjacent intersections is not incorporated in the Highway Capacity Methodology. Figure 12 shows the peak hour volumes and LOS for each movement.

Collision Analysis

A total of six collisions occurred at the intersection of 5th St. & Walmart/Costco in the last five years. Of these six collisions, one resulted in an evident injury, while the remaining were no injury collisions. In two of the collisions, drivers disregarded the stop sign. Based on interviews with employees from the Costco gas center, it is common for vehicles to roll through the intersection and not stop. The four-way stop may actually be reducing collisions, as all vehicles are required to come to a complete stop so reaction times and breaking distances are both reduced.

Stakeholder Issues

Table 7 below presents the issues that local stakeholders had with the existing 5th St. & Walmart/Costco intersection.

Table 7: 5th St. & Walmart/Costco Shareholder Interview Summary

Contact Person	Stakeholder Business	Issues
Kristy Barton	Community Bank	Traffic backs up frequently at Costco/Walmart intersection.
Wanda Keefer, Belinda Campbell, & Jennifer Bly	Port of Clarkston	Most of the traffic coming to this intersection is turning left into Walmart.
Alan Demers	Costco	Has not notice the intersection to have really any operational issues. It is such a short distance between the Fair/ 5 th and 5 th /Walmart & Costco intersections.
Tammy Liddiard	Walmart	Traffic backs up between the two intersections, which upsets customers.

Previous Studies

The Traffic Impact Study for Walmart analyzed the intersection as a two-way stop, and showed the westbound left and the intersection average operating condition at LOS F. Eastbound rights from Walmart were shown operating at LOS B. The intersection was also analyzed as an all-way stop, which showed all movements as LOS B. Neither of the analyses included expected queue lengths.

Summary

The analysis shows the 5th St. & Walmart/Costco intersection currently operating at an acceptable LOS. However, the northbound movement is causing congestion when the queues exceed the movement storage and back up into the Fair St. & 5th St. intersection. The benefit of a four-way stop is that collisions are typically less frequent and less severe than a signalized intersection or two-way stops. This intersection is too close to the signalized intersection, which is a major reason for the congestion. This analysis shows conditions better than they actually are, as the Highway Capacity Methodology does not incorporate adjacent intersection interference, such as the 5th St. & Walmart/Costco intersection. Therefore, the 5th St. & Walmart/Costco and Fair St. & 5th St. intersection’s operating conditions were also evaluated together in the next section.

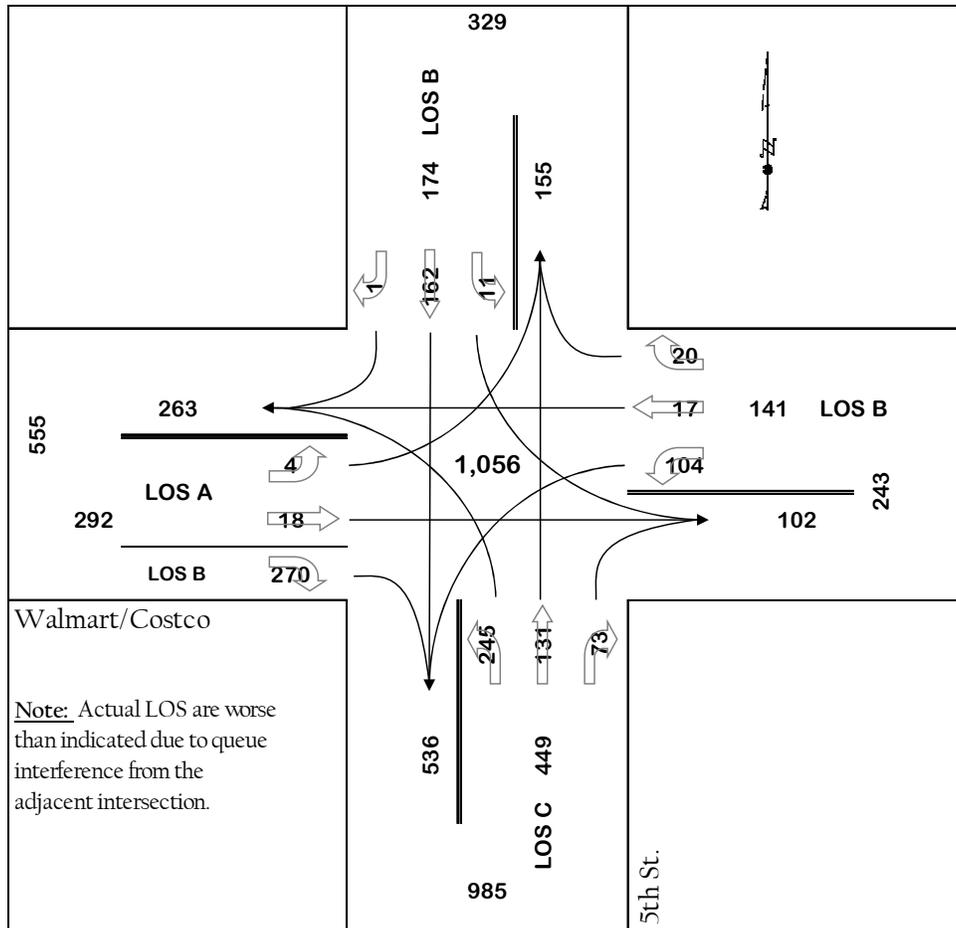


Figure 12: 5th St. & Walmart/Costco Intersection PM Peak Volume and LOS

Fair St. & 5th St. and 5th St. & Walmart/Costco Operational Summary

The previously reported operating conditions of the Fair St. & 5th St. and 5th St. & Walmart/Costco intersections may not have accurately represented what was actually occurring at these intersections. The major reason for this discrepancy is that the Highway Capacity Methodology does not incorporate interference from adjacent intersections. The HCM analyzes the intersections as being isolated, which portrays these intersections as operating better than they actually are, especially when there are queues backing up into adjacent intersections. The purpose of this section is to evaluate the two intersections together and not as isolated intersections.

When evaluating the intersections together it became evident that the intersections were experiencing interference from each other and that it was not accounted for in the HCM analysis. The two intersections are only 170 feet apart, which is only storage for approximately 7 vehicles. The northbound movement at the 5th St. & Walmart/Costco intersection was observed backing up into the Fair St. & 5th St. intersection multiple times during the PM traffic counts. This created multiple issues as vehicles had to wait for the northbound queue to diminish before proceeding, which prevented movements from completely clearing. This issue can be seen in Figure 13, as queues are backed up to the intersection. The southbound movement at the 5th St. & Fair St. intersection experienced a similar issue as the queue length was 174 feet, which partially blocks the 5th St. & Walmart/Costco Intersection. The worst case delay for a vehicle to go through both intersections was 54.7 seconds. These operational issues were not incorporated in the previous HCM LOS analysis and are major factors in the operating conditions of the intersections.



Figure 13: Queue backing up into the Fair St. & 5th St. Intersection

Local residents and stakeholders describe these two intersections as having much worse operational issues than presented in the HCS analysis. The simulation model accurately portrays what was observed during the weekday traffic counts. Additional traffic counts during the weekend or weekday midday peak may be needed at these intersections to better capture the peak volumes and issues occurring at these two intersections. This may also reveal additional operational issues and conditions that were not observed during the AM and PM weekday counts.

Existing Conditions Summary

Table 8 summarizes the traffic volumes, collision data, and LOS for all of the intersections. The Bridge St. & 2nd St. intersection has the highest peak hour volume with 1,861 vehicles, while the Fair St. & 13th St. intersection had the smallest traffic flow with just 392 vehicles/hour. The Bridge St. & 2nd St. intersection had an ADT of 18,350 which is almost two times larger than the next-largest intersection.

The observed large truck volumes through the seven intersections were minimal during peak hours and did not appear to affect the operating conditions of the intersections. Rory Delene from Albertsons mentioned that their delivery trucks are coming several hours after the peak PM times to avoid congestion and delays.

The seven intersections had a total of 93 collisions over five years. There were no collisions that resulted in a fatal or serious injury and over 74% of the collisions resulted in no injury. The most common type of collisions were entering at an angle and rear-end collisions, which combined were responsible for 58% of the collisions. Fair St. & 13th St. had the lowest collision rate, and surprisingly Bridge St. & 5th St. had the highest. The three signalized intersections on Bridge St. had the highest collision rates in the study. The Bridge St. & 5th St. intersection and Bridge St. & 2nd St. intersection both had five or more collisions in 2012 and would be subjected to a safety analysis based on WSDOT intersection safety guidelines. The remaining intersections had one or no collisions in 2012.

Table 8: Collision, ADT, and Level of Service Summary

Intersection	Type of Control	2012 ADT	2013 Peak Hour Volume (veh/hr)	Collisions 2008-2012	Collisions in 2012	Collision Rate (crash/MV ²)	LOS
Bridge St. & 2 nd St.	Signalized	18,350	1,861	37	8	1.10	C
Bridge St. & 5 th St.	Signalized	10,000	1,455	23	5	1.26	C
Bridge St. & 6 th St.	Two-Way Stop	9,850	963	9	1	0.50	B
Bridge St. & 13 th St.	Signalized	7,800	1,092	10	1	0.70	B
Fair St. & 13 th St.	Two-Way Stop	3,920 ¹	392	1	0	0.14	A
Fair St. & 5 th St.	Signalized	10,370 ¹	1,037	8	0	0.42	B ³
5 th St. & Walmart/Costco	All-Way Stop	10,560 ¹	1,056	5	0	0.31	C ³

¹ ADT values were calculated using a K-value of 0.10 and the peak hour volume observed in the field.

² MV = million vehicles

³ HCM LOS analysis does not consider interference from adjacent intersections

All intersections are currently operating at an average LOS C or better. The Bridge St. & 2nd St. and Bridge St. & 5th St. were the only intersections that had certain movements that were operating at a LOS D. The majority of the long queues and delays occurred at the Bridge St. intersections; a major reason for this could also be that the signals on Bridge St. are not coordinated with each other. The intersections on Bridge St. are not on the same timing plan and results in a high percentage of vehicles arriving during a red phase. The mobility through north Clarkston is very good during AM hours, but becomes congested during the PM peak. Since traffic counts were collected on weekdays, it will not accurately portray conditions on weekends or holidays, where certain intersections may experience a worse LOS than presented in this memo.

Appendix A – Collision Analysis

Bridge St. & 2nd St.

**Table 9: Bridge St. & 2nd St.
Intersection Collision Summary**

Year	Collisions
2012	8
2011	10
2010	9
2009	5
2008	5
Total	37
Average	7.4

Table 10: Bridge St. & 2nd St. Intersection Contributing Collision Circumstance

Contributing Collision Circumstance	Occurrences
Did Not Grant RW to Vehicle	9
Under Influence of Alcohol	7
Follow Too Closely	7
Disregard Stop and Go Light	3
Improper Turn	3
Unknown Driver Distraction	2
Inattention	1
Under Influence of Drugs	1
Exceeding Reas. Safe Speed	1
Exceeding Stated Speed Limit	1
Driver Adjusting Audio or Entertainment	1
Over Center Line	1

Table 11: Bridge St. & 2nd St. Intersection Collision Type

Type of Collision	Occurrences
Entering at angle	10
From same direction - both going straight - one stopped - rear-end	9
From opposite direction - one left turn - one straight	5
Utility Pole	3
Street Light Pole or Base	2
Wood Sign Post	1
Curb, Raised Traffic Island or Raised Median	1
Curb	1
From same direction - both going straight - both moving - rear-end	1
Tree or Stump (stationary)	1
Metal Sign Post	1
Signal Pole	1
Boulder (stationary)	1
From same direction - one right turn - one straight	1

Table 12: Bridge St. & 2nd St. Intersection Collision Injury Distribution

Injury Type	Occurrences
Evident Injury	3
Possible Injury	6
No Injury	27
Unknown	1

Bridge St. & 5th St.

**Table 13: Bridge St. & 5th St.
Intersection Collision Injury Distribution**

Injury Type	Occurrences
Evident Injury	1
Possible Injury	4
No Injury	18

**Table 15: Bridge St. & 5th St.
Intersection Collision Summary**

Year	Collisions
2012	5
2011	5
2010	5
2009	4
2008	4
Total	23
Average	4.6

Table 15: Bridge St. & 5th St. Intersection Contributing Collision Circumstances

Contributing Collision Circumstance	Occurrences
Did Not Grant RW to Vehicle	7
Follow Too Closely	3
Exceeding Reas. Safe Speed	3
Inattention	2
Disregard Stop and Go Light	2
Other	2
Improper Backing	1
Operating Defective Equipment	1
None	1
Driver Distractions Outside Vehicle	1

Table 136: Bridge St. & 5th St. Intersection Collision Type

Type of Collision	Occurrences
From same direction - both going straight - one stopped - rear-end	9
From opposite direction - one left turn - one straight	4
Entering at angle	3
From same direction - both going straight - both moving - sideswipe	2
From same direction - all others	1
From same direction - both going straight - both moving - rear-end	1
From opposite direction - one left turn - one right turn	1
Vehicle going straight hits pedestrian	1
From same direction - both going straight - one stopped - sideswipe	1

Bridge St. & 6th St.

**Table 147: Bridge St. & 6th St.
Intersection Collision Summary**

Year	Collisions
2012	1
2011	2
2010	5
2009	0
2008	1
Total	9
Average	1.8

**Table 18: Bridge St. & 6th St.
Intersection Contributing Collision Circumstances**

Contributing Collision Circumstance	Occurrences
Did Not Grant RW to Vehicle	7
Follow Too Closely	2

Table 19: Bridge St. & 6th St. Intersection Collision Type

Type of Collision	Occurrences
Entering at angle	7
From same direction - both going straight - both moving - rear-end	2

**Table 20: Bridge St. & 6th St.
Intersection Injury Distribution**

Injury Type	Occurrences
Evident Injury	1
Possible Injury	1
No Injury	7

Bridge St. & 13th St.

**Table 21: Bridge St. & 13th St.
Intersection Collision Summary**

Year	Collisions
2012	1
2011	3
2010	3
2009	1
2008	2
Total	10
Average	2.0

Table 22: Bridge St. & 13th St. Intersection Contributing Collision Circumstances

Contributing Collision Circumstance	Occurrence
Disregard Stop and Go Light	4
Follow Too Closely	2
Did Not Grant RW to Vehicle	2
Under Influence of Alcohol	2

Table 23: Bridge St. & 13th St. Intersection Type of Collision

Type of Collision	Occurrences
Entering at angle	4
From opposite direction - one left turn - one straight	2
From same direction - both going straight - one stopped - rear-end	2
Wood Sign Post	1
One parked--one moving	1

Table 24: Bridge St. & 13th St. Intersection Collision

Injury Type	Occurrences
No Injury	5
Possible Injury	3
Unknown	2

Fair St. & 5th St.

**Table 25: Fair St. & 5th St.
Intersection Collision Summary**

Year	Collisions
2012	0
2011	6
2010	0
2009	1
2008	1
Total	8
Average	1.6

Table 26: Fair St. & 5th St. Intersection Contributing Collision Circumstance

Contributing Collision Circumstance	Occurrences
Follow Too Closely	2
Disregard Stop Sign - Flashing Red	1
Driver Distractions Outside Vehicle	1
Driver Interacting with Passengers, Anim	1
Other	1
Apparently Asleep	1
None	1

Table 27: Fair St. & 5th St. Intersection Collision Type

Type of Collision	Occurrences
From same direction - both going straight - one stopped - rear-end	4
Entering at angle	2
Other object	1
From same direction - one right turn - one straight	1

**Table 28: Fair St. & 5th St.
Intersection Collision Injury Distribution**

Injury Type	Occurrences
No Injury	7
Evident Injury	1

Appendix B – Operational Analysis

Synchro Analysis

Lanes, Volumes, Timings
2: 5th St & Bridge

9/30/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	↖
Volume (vph)	107	281	12	26	355	30	32	182	13	155	130	132
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	110		0	125		0	100		0	120		120
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit		0.994			0.988			0.990				0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1852	0	1770	1840	0	1770	1844	0	1770	1863	1583
Fit Permitted	0.197			0.500			0.669			0.485		
Satd. Flow (perm)	367	1852	0	931	1840	0	1246	1844	0	903	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			4			3				140
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		332			1012			272			659	
Travel Time (s)		7.5			23.0			7.4			18.0	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	114	299	13	28	378	32	34	194	14	165	138	140
Shared Lane Traffic (%)												
Lane Group Flow (vph)	114	312	0	28	410	0	34	208	0	165	138	140
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	11.1	30.2		11.1	25.2		11.1	22.0		11.1	25.0	25.0
Total Split (s)	19.2	34.2		19.2	34.2		19.0	29.0		19.0	29.0	29.0
Total Split (%)	18.9%	33.7%		18.9%	33.7%		18.7%	28.6%		18.7%	28.6%	28.6%
Maximum Green (s)	15.0	30.0		15.0	30.0		15.0	25.0		15.0	25.0	25.0
Yellow Time (s)	3.2	3.2		3.2	3.2		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.2	4.2		4.2	4.2		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	1.0	2.5		1.5	2.5		1.0	1.0		1.0	1.0	1.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		19.0			14.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Efft Green (s)	31.4	28.1		26.6	22.0		32.0	25.8		38.0	33.0	33.0
Actuated g/C Ratio	0.40	0.36		0.34	0.28		0.41	0.33		0.48	0.42	0.42
w/c Ratio	0.39	0.47		0.07	0.79		0.06	0.34		0.31	0.18	0.19
Control Delay	18.1	22.7		14.0	38.8		14.6	25.4		15.8	20.2	4.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	18.1	22.7		14.0	38.8		14.6	25.4		15.8	20.2	4.9
LOS	B	C		B	D		B	C		B	C	A

Downtown Clarkston - PM Peak Hour 7/17/2013 Existing Conditions - existing controller settings
SJJ

Synchro 8 Report
Page 1

Lanes, Volumes, Timings
2: 5th St & Bridge

9/30/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		21.4			37.2			23.9			13.7	
Approach LOS		C			D			C			B	
Queue Length 50th (ft)	33	102		8	187		9	78		47	49	0
Queue Length 95th (ft)	69	217		23	322		29	169		103	105	40
Internal Link Dist (ft)		252			932			192			579	
Turn Bay Length (ft)	110			125			100			120		120
Base Capacity (vph)	425	771		543	727		709	607		612	783	746
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced w/c Ratio	0.27	0.40		0.05	0.56		0.05	0.34		0.27	0.18	0.19

Intersection Summary	
Area Type:	Other
Cycle Length:	101.4
Actuated Cycle Length:	78.5
Natural Cycle:	90
Control Type:	Actuated-Uncoordinated
Maximum w/c Ratio:	0.79
Intersection Signal Delay:	24.1
Intersection LOS:	C
Intersection Capacity Utilization:	59.1%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 2: 5th St & Bridge

 p1	 p2	 p3	 p4
19 s	29 s	19.2 s	34.2 s
 p5	 p6	 p7	 p8
19 s	29 s	19.2 s	34.2 s

Intersection												
Intersection Delay, s/veh	17.2											
Intersection LOS	C											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	4	18	270	104	17	20	245	131	73	11	162	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	19	281	108	18	21	255	136	76	11	169	1
Number of Lanes	0	1	1	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	2
HCM Control Delay	13.8	12.3	23	12.2
HCM LOS	B	B	C	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	55%	18%	0%	74%	6%
Vol Thru, %	29%	82%	0%	12%	93%
Vol Right, %	16%	0%	100%	14%	1%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	449	22	270	141	174
LT Vol	131	18	0	17	162
Through Vol	73	0	270	20	1
RT Vol	245	4	0	104	11
Lane Flow Rate	468	23	281	147	181
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.735	0.043	0.468	0.275	0.317
Departure Headway (Hd)	5.658	6.911	6.103	6.748	6.29
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	631	521	593	535	575
Service Time	3.757	4.611	3.803	4.76	4.302
HCM Lane V/C Ratio	0.742	0.044	0.474	0.275	0.315
HCM Control Delay	23	9.9	14.1	12.3	12.2
HCM Lane LOS	C	A	B	B	B
HCM 95th-ile Q	6.4	0.1	2.5	1.1	1.4

Notes
 ~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection												
Intersection Delay, s/veh	2.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	8	363	23	34	429	2	34	17	44	3	4	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	110	-	-	110	-	-	-	-	50	-	-	50
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	378	24	35	447	2	35	18	46	3	4	2
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	449	0	0	402	0	0	928	927	390	935	938	448
Stage 1	-	-	-	-	-	-	407	407	-	519	519	-
Stage 2	-	-	-	-	-	-	521	520	-	416	419	-
Follow-up Headway	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Capacity-1 Maneuver	1111	-	-	1157	-	-	248	268	658	246	264	611
Stage 1	-	-	-	-	-	-	621	597	-	540	533	-
Stage 2	-	-	-	-	-	-	539	532	-	614	590	-
Time blocked-Platoon, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	1111	-	-	1157	-	-	237	258	658	211	254	611
Mov Capacity-2 Maneuver	-	-	-	-	-	-	237	258	-	211	254	-
Stage 1	-	-	-	-	-	-	617	593	-	536	517	-
Stage 2	-	-	-	-	-	-	517	516	-	550	586	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0.6			18.3			18.7		
HCM LOS							C			C		
Minor Lane / Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	283	658	1111	-	-	1157	-	-	247	611		
HCM Lane V/C Ratio	0.242	0.046	0.008	-	-	0.031	-	-	0.032	0.002		
HCM Control Delay (s)	21.7	10.7	8.265	-	-	8.21	-	-	20.1	10.9		
HCM Lane LOS	C	B	A			A			C	B		
HCM 95th %tile Q(veh)	0.924	0.146	0.023	-	-	0.095	-	-	0.1	0.007		
Notes	~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined											

Lanes, Volumes, Timings
12: 5th St & Fair

9/30/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	41	24	18	24	55	176	16	223	19	96	320	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		50	130		130	160		0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit		0.971				0.850			0.850		0.989	
Fit Protected		0.976			0.985		0.950			0.950		
Satd. Flow (prot)	0	1765	0	0	1835	1583	1770	1363	1583	1770	1842	0
Fit Permitted		0.828			0.899		0.486			0.588		
Satd. Flow (perm)	0	1498	0	0	1675	1583	905	1363	1583	1095	1842	0
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		14							55		4	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		290			660			659			258	
Travel Time (s)		7.9			18.0			18.0			7.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	46	27	20	27	61	196	18	248	21	107	356	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	93	0	0	88	196	18	248	21	107	384	0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	6.0	10.0	10.0	6.0	10.0	
Minimum Split (s)	26.2	26.2		26.2	26.2	26.2	10.2	26.2	26.2	10.2	26.2	
Total Split (s)	39.2	39.2		39.2	39.2	39.2	29.2	39.2	39.2	29.2	39.2	
Total Split (%)	36.4%	36.4%		36.4%	36.4%	36.4%	27.1%	36.4%	36.4%	27.1%	36.4%	
Maximum Green (s)	35.0	35.0		35.0	35.0	35.0	25.0	35.0	35.0	25.0	35.0	
Yellow Time (s)	3.2	3.2		3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		4.2			4.2	4.2	4.2	4.2	4.2	4.2	4.2	
Lead/Lag							Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.0	3.0	3.0	2.0	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0	15.0		15.0	15.0		15.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effect Green (s)		13.8			13.8	13.8	41.7	35.7	35.7	44.2	41.7	
Actuated g/C Ratio		0.21			0.21	0.21	0.63	0.54	0.54	0.67	0.63	
w/c Ratio		0.29			0.25	0.59	0.03	0.25	0.02	0.13	0.33	
Control Delay		21.9			24.0	31.7	5.1	10.4	0.6	5.5	8.1	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		21.9			24.0	31.7	5.1	10.4	0.6	5.5	8.1	
LOS		C			C	C	A	B	A	A	A	

Downtown Clarkston - PM Peak Hour 7/17/2013 Existing Conditions - existing controller settings
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Lanes, Volumes, Timings
12: 5th St & Fair

9/30/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		21.9			29.3			9.3			7.5	
Approach LOS		C			C			A			A	
Queue Length 50th (ft)		28			31	74	2	52	0	13	53	
Queue Length 95th (ft)		63			65	134	10	109	3	35	174	
Internal Link Dist (ft)		210			530			579			178	
Turn Bay Length (ft)						50	130		130	160		
Base Capacity (vph)		810			899	849	1133	1009	883	1270	1167	
Starvation Cap Reductn		0			0	0	0	0	0	0	0	
Spillback Cap Reductn		0			0	0	0	0	0	0	0	
Storage Cap Reductn		0			0	0	0	0	0	0	0	
Reduced w/c Ratio		0.11			0.10	0.23	0.02	0.25	0.02	0.08	0.33	

Intersection Summary

Area Type:	Other
Cycle Length:	107.6
Actuated Cycle Length:	65.8
Natural Cycle:	65
Control Type:	Actuated-Uncoordinated
Maximum w/c Ratio:	0.59
Intersection Signal Delay:	14.5
Intersection LOS:	B
Intersection Capacity Utilization:	45.2%
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 12: 5th St & Fair



Lanes, Volumes, Timings
17: Diagonal & 2nd St & Bridge

9/30/2013

Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	2	428	2	7	20	287	430	4	2	12	16	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0			0		150		0		0
Storage Lanes	1		0			2		1		0		0
Taper Length (ft)	25					25				25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00
Fit		0.997					0.999				0.944	
Fit Protected	0.950					0.950					0.987	
Satd. Flow (prot)	1770	1857	0	0	0	3433	1861	0	0	0	1736	0
Fit Permitted	0.388					0.496					0.940	
Satd. Flow (perm)	723	1857	0	0	0	1792	1861	0	0	0	1653	0
Right Turn on Red				Yes				Yes				Yes
Satd. Flow (RTOR)		1									23	
Link Speed (mph)		30					30				30	
Link Distance (ft)		1012					313				335	
Travel Time (s)		23.0					7.1				7.6	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	2	455	2	7	21	305	457	4	2	13	17	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	2	464	0	0	0	326	461	0	0	0	55	0
Turn Type	Perm	NA		custom		Prot	NA		Perm	Perm	NA	
Protected Phases		2				1	6				8	
Permitted Phases	2				1				8	8		
Detector Phase	2	2			1	1	6		8	8	8	
Switch Phase												
Minimum Initial (s)	8.0	8.0			8.0	8.0	8.0		8.0	8.0	8.0	
Minimum Split (s)	14.2	14.2			29.2	29.2	26.2		39.2	39.2	39.2	
Total Split (s)	41.2	41.2			41.2	41.2	51.2		39.2	39.2	39.2	
Total Split (%)	28.9%	28.9%			28.9%	28.9%	35.9%		27.5%	27.5%	27.5%	
Maximum Green (s)	35.0	35.0			35.0	35.0	45.0		33.0	33.0	33.0	
Yellow Time (s)	3.2	3.2			3.2	3.2	3.2		3.2	3.2	3.2	
All-Red Time (s)	3.0	3.0			3.0	3.0	3.0		3.0	3.0	3.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2			6.2	6.2	6.2		6.2	6.2	6.2	
Lead/Lag	Lead	Lead			Lag	Lag						
Lead-Lag Optimize?	Yes	Yes			Yes	Yes						
Vehicle Extension (s)	2.5	2.5			2.5	2.5	2.5		1.5	1.5	1.5	
Recall Mode	None	None			None	None	Max		None	None	None	
Walk Time (s)					8.0	8.0	10.0					
Flash Dont Walk (s)					15.0	15.0	10.0					
Pedestrian Calls (#/hr)					0	0	0					
Act Efect Green (s)	35.7	35.7				23.5	65.7				21.0	
Actuated g/C Ratio	0.35	0.35				0.23	0.65				0.21	
w/c Ratio	0.01	0.71				0.79	0.38				0.15	
Control Delay	32.5	39.7				52.6	11.6				24.3	
Queue Delay	0.0	0.0				0.0	0.0				0.0	
Total Delay	32.5	39.7				52.6	11.6				24.3	
LOS	C	D				D	B				C	

Downtown Clarkston - PM Peak Hour 7/17/2013 Existing Conditions - existing controller settings
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Lanes, Volumes, Timings
17: Diagonal & 2nd St & Bridge

9/30/2013



Lane Group	SBL	SBT	SBR2	NEL	NER	NER2
Lane Configurations		↕		↕	↕	
Volume (vph)	282	16	4	8	315	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0			150	0	
Storage Lanes	0			1	2	
Taper Length (ft)	25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.88	1.00
Fit		0.998			0.850	
Fit Protected		0.955		0.950		
Satd. Flow (prot)	0	1775	0	1770	2787	0
Fit Permitted		0.700		0.950		
Satd. Flow (perm)	0	1301	0	1770	2787	0
Right Turn on Red			Yes			Yes
Satd. Flow (RTOR)		119			119	
Link Speed (mph)		25		30		
Link Distance (ft)		387		480		
Travel Time (s)		10.6		10.9		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	300	17	4	9	335	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	321	0	9	339	0
Turn Type	Perm	NA		NA	Over	
Protected Phases		4		9	1	
Permitted Phases	4					
Detector Phase	4	4		9	1	
Switch Phase						
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	39.2	39.2		14.2	29.2	
Total Split (s)	39.2	39.2		21.2	41.2	
Total Split (%)	27.5%	27.5%		14.8%	28.9%	
Maximum Green (s)	33.0	33.0		15.0	35.0	
Yellow Time (s)	3.2	3.2		3.2	3.2	
All-Red Time (s)	3.0	3.0		3.0	3.0	
Lost Time Adjust (s)		0.0		0.0	0.0	
Total Lost Time (s)		6.2		6.2	6.2	
Lead/Lag					Lag	
Lead-Lag Optimize?					Yes	
Vehicle Extension (s)	1.5	1.5		1.0	2.5	
Recall Mode	None	None		None	None	
Walk Time (s)	8.0	8.0			8.0	
Flash Dont Walk (s)	25.0	25.0			15.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effect Green (s)		21.0		8.3	23.5	
Actuated g/C Ratio		0.21		0.08	0.23	
w/c Ratio		0.88		0.06	0.46	
Control Delay		51.1		54.5	24.4	
Queue Delay		0.0		0.0	0.0	
Total Delay		51.1		54.5	24.4	
LOS		D		D	C	

Downtown Clarkston - PM Peak Hour 7/17/2013 Existing Conditions - existing controller settings
SJL

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Lanes, Volumes, Timings

17: Diagonal & 2nd St & Bridge

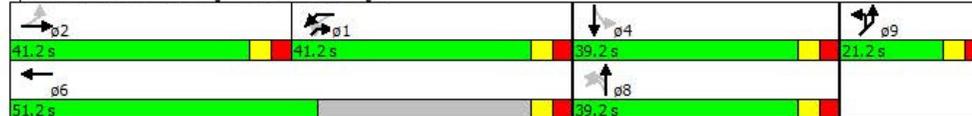
9/30/2013

Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Approach Delay		39.6					28.6				24.3	
Approach LOS		D					C				C	
Queue Length 50th (ft)	1	247				98	119				16	
Queue Length 95th (ft)	9	#627				192	313				59	
Internal Link Dist (ft)		932					233				255	
Turn Bay Length (ft)	125											
Base Capacity (vph)	258	664				640	1447				572	
Starvation Cap Reductn	0	0				0	0				0	
Spillback Cap Reductn	0	0				0	0				0	
Storage Cap Reductn	0	0				0	0				0	
Reduced w/c Ratio	0.01	0.70				0.51	0.32				0.10	

Intersection Summary

Area Type:	Other
Cycle Length:	142.8
Actuated Cycle Length:	101.7
Natural Cycle:	110
Control Type:	Actuated-Uncoordinated
Maximum w/c Ratio:	0.88
Intersection Signal Delay:	34.1
Intersection LOS:	C
Intersection Capacity Utilization:	87.0%
ICU Level of Service:	E
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 17: Diagonal & 2nd St & Bridge



Lanes, Volumes, Timings

17: Diagonal & 2nd St & Bridge

9/30/2013



Lane Group	SBL	SBT	SBR2	NEL	NER	NER2
Approach Delay		51.1		25.2		
Approach LOS		D		C		
Queue Length 50th (ft)		126		5	65	
Queue Length 95th (ft)		#624		27	142	
Internal Link Dist (ft)		307		400		
Turn Bay Length (ft)				150		
Base Capacity (vph)		517		271	1072	
Starvation Cap Reductn		0		0	0	
Spillback Cap Reductn		0		0	0	
Storage Cap Reductn		0		0	0	
Reduced w/c Ratio		0.62		0.03	0.32	
Intersection Summary						

Lanes, Volumes, Timings
3: 13th St & Bridge St

9/30/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	32	255	21	110	243	30	18	86	68	60	141	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		150	125		150	60		0	60		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit		0.989			0.983			0.934			0.975	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1828	0	1787	1835	0	1687	1765	0	1805	1837	0
Fit Permitted	0.583			0.538			0.477			0.521		
Satd. Flow (perm)	1108	1828	0	1012	1835	0	847	1765	0	990	1837	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			9			42			10	
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			27.3			27.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	3%	0%	1%	2%	0%	7%	1%	0%	0%	1%	0%
Adj. Flow (vph)	34	268	22	116	256	32	19	91	72	63	148	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	290	0	116	288	0	19	163	0	63	177	0
Turn Type	pm-pt	NA		pm-pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	10.2	28.2		10.2	29.2		26.0	26.0		27.0	27.0	
Total Split (s)	19.2	44.2		19.2	44.2		29.0	29.0		29.0	29.0	
Total Split (%)	20.8%	47.8%		20.8%	47.8%		31.4%	31.4%		31.4%	31.4%	
Maximum Green (s)	15.0	40.0		15.0	40.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	3.2	3.2		3.2	3.2		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.2	4.2		4.2	4.2		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	2.5		1.0	2.5		1.0	1.0		1.0	1.0	
Recall Mode	None	Max		None	Max		None	None		None	None	
Walk Time (s)		6.0			6.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		18.0			19.0		17.0	17.0		18.0	18.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	45.8	41.1		47.6	45.3		9.7	9.7		9.7	9.7	
Actuated g/C Ratio	0.68	0.61		0.71	0.68		0.14	0.14		0.14	0.14	
w/c Ratio	0.04	0.26		0.15	0.23		0.16	0.56		0.44	0.65	
Control Delay	3.3	7.9		3.6	6.3		28.2	27.9		36.6	37.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	3.3	7.9		3.6	6.3		28.2	27.9		36.6	37.2	

Bridge & 13th - PM Peak Hour 7/17/2013 Existing Conditions - existing controller settings
SJL

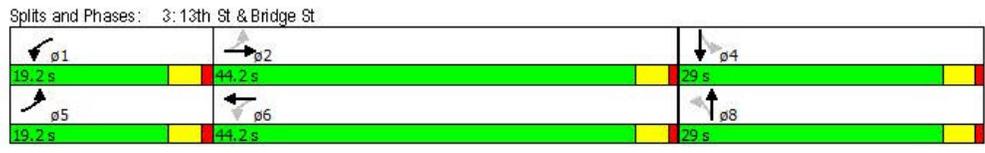
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Lanes, Volumes, Timings
 3: 13th St & Bridge St

9/30/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	A	A		A	A		C	C		D	D	
Approach Delay		7.4			5.5			27.9			37.1	
Approach LOS		A			A			C			D	
Queue Length 50th (ft)	3	51		10	27		7	47		25	67	
Queue Length 95th (ft)	11	107		28	104		25	101		60	125	
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	125			125			60			60		
Base Capacity (vph)	968	1122		915	1241		317	688		371	695	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.04	0.26		0.13	0.23		0.06	0.24		0.17	0.25	

Intersection Summary	
Area Type:	Other
Cycle Length:	92.4
Actuated Cycle Length:	67.1
Natural Cycle:	70
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.65
Intersection Signal Delay:	16.2
Intersection LOS:	B
Intersection Capacity Utilization:	48.6%
ICU Level of Service:	A
Analysis Period (min):	15



TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	KJM			Intersection	Fair St. & 13th St.			
Agency/Co.	Keller Associates			Jurisdiction				
Date Performed	7/23/2013			Analysis Year	2013			
Analysis Time Period	PM Peak							
Project Description N. Clarkston Circulation Study								
East/West Street: Fair St.				North/South Street: 13th St.				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	18	102	15	4	89	11		
Peak-Hour Factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85		
Hourly Flow Rate, HFR (veh/h)	21	119	17	4	104	12		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LTR			LTR				
Upstream Signal		1			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	12	17	28	26	63	7		
Peak-Hour Factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85		
Hourly Flow Rate, HFR (veh/h)	14	19	32	30	74	8		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach	N			N				
Storage	0			0				
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LTR			LTR				
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR	LTR			LTR		
v (veh/h)	21	4	112			65		
C (m) (veh/h)	1485	1461	621			722		
v/c	0.01	0.00	0.18			0.09		
95% queue length	0.04	0.01	0.65			0.30		
Control Delay (s/veh)	7.5	7.5	12.1			10.5		
LOS	A	A	B			B		
Approach Delay (s/veh)	--	--	12.1			10.5		
Approach LOS	--	--	B			B		

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10/3/2013

Appendix C – Stakeholder Interviews



STAKEHOLDER INTERVIEW QUESTIONNAIRE

Project Name: LCVMPO – North Clarkston Circulation Study
Project No.: 213063
Interviewer: Stillman Norton, P.E. **Date of Interview:** 9/23/2013
Stakeholder Business: Albertsons
Contact Person: Rory Delene, Manager **Phone #:** (509) 758-5523
Intersections of Emphasis: 5th & Bridge; 2nd & Bridge; 5th & Fair

Keller Associates conducted stakeholder interviews to discuss the North Clarkston Circulation Study. Particular focus was paid to intersections directly affecting each perspective business.

Question	Response
What problems/issues have you had with traffic?	<ul style="list-style-type: none"> • First of the month traffic backs up bad because of food stamps. • 5th Street is too bogged down. • Some customers have talked about not coming on the first of the month. • Light switches too quickly at 5th & Bridge. For traffic turning right from Bridge onto 5th Street. • Delivery trucks have to wait till late hours to make deliveries now due to traffic volumes on Fair Street.
Is there anything you like about the current setup?	<ul style="list-style-type: none"> •
What changes would you make if you could?	<ul style="list-style-type: none"> •
Any concerns you might have if changes were to occur?	<ul style="list-style-type: none"> • Doesn't want a lot of traffic on Fair Street due to kids playing.
Anything else you'd like to share that we haven't discussed?	



STAKEHOLDER INTERVIEW QUESTIONNAIRE

Project Name: LCVMPO – North Clarkston Circulation Study
Project No.: 213063
Interviewer: Stillman Norton, P.E. **Date of Interview:** 9/24/2013
Stakeholder Business: Community Bank
Contact Person: Kristy Barton, Manager **Phone #:** (509) 758-6878
Intersections of Emphasis: Bridge St. & 2nd St.

Keller Associates conducted stakeholder interviews to discuss the North Clarkston Circulation Study. Particular focus was paid to intersections directly affecting each perspective business.

Question	Response
What problems/issues have you had with traffic?	<ul style="list-style-type: none"> • 2nd Street. Traffic turns left off of 2nd onto Bridge towards Lewiston. Uncontrolled left turn seems to be causing problems. Traffic light doesn't have yield to oncoming traffic. • Sees accidents all of the time at 2nd & Bridge. • West bound traffic. People wanting to go straight on Bridge have to wait for traffic towards Diagonal. • Traffic backs up frequently through the Fair St. & 5th St. intersection south of Costco/Walmart intersection.
Is there anything you like about the current setup?	<ul style="list-style-type: none"> • Does seem to work. • Needs to maintain two-way traffic on 2nd Street between Confluence and Bridge.
What changes would you make if you could?	<ul style="list-style-type: none"> • Better turn signal for left turning traffic (east bound) onto Bridge from 2nd. Need signage for SBL yield to on-coming traffic
Any concerns you might have if changes were to occur?	
Anything else you'd like to share that we haven't discussed?	



STAKEHOLDER INTERVIEW QUESTIONNAIRE

Project Name: LCVMPO – North Clarkston Circulation Study
Project No.: 213063
Interviewer: Stillman Norton, P.E. **Date of Interview:** 9/23/2013
Stakeholder Business: Costco
Contact Person: Alan Demers, Store Manager **Phone #:** (509) 758-1800
Intersections of Emphasis: Fair & 5th; 5th & Walmart/Costco

Keller Associates conducted stakeholder interviews to discuss the North Clarkston Circulation Study. Particular focus was paid to intersections directly affecting each perspective business.

Question	Response
What problems/issues have you had with traffic?	<ul style="list-style-type: none"> • Once proposed to remove the Walmart leg stop sign. Opposed to it.
Is there anything you like about the current setup?	<ul style="list-style-type: none"> • Not too concerned with it. • Likes the one way traffic on Confluence Way. • Needs to maintain two access points.
What changes would you make if you could?	<ul style="list-style-type: none"> • Wouldn't mind seeing a roundabout at Walmart/Costco.
Any concerns you might have if changes were to occur?	<ul style="list-style-type: none"> • The access around tomatoes bros is good and helps to reduce congestion at 5th & Fair St.
Anything else you'd like to share that we haven't discussed?	



STAKEHOLDER INTERVIEW QUESTIONNAIRE

Project Name: LCVMPPO – North Clarkston Circulation Study
Project No.: 213063
Interviewer: Stillman Norton, P.E. **Date of Interview:** 9/20/2013
Stakeholder Business: Happy Day Corporation (Tomato Brothers & Taco Time)
Contact Person: Bruce Finch, Owner **Phone #:** (208) 791-3040
Intersections of Emphasis: Bridge St. & 2nd St.

Keller Associates conducted stakeholder interviews to discuss the North Clarkston Circulation Study. Particular focus was paid to intersections directly affecting each perspective business.

Question	Response
What problems/issues have you had with traffic?	<ul style="list-style-type: none"> • Timing on intersection seems too short, particularly in the north-south direction, especially during rush hour. Would like to see it remain green longer on each rotation. • Concerned with traffic on Riverview turning right onto Bridge St, eastbound traffic makes sudden lanes changes. • 2nd St. South needs a longer green time.
Is there anything you like about the current setup?	<ul style="list-style-type: none"> •
What changes would you make if you could?	<ul style="list-style-type: none"> • 2nd Street southbound to have a left turn lane. • Walmart needs another additional entrance
Any concerns you might have if changes were to occur?	<ul style="list-style-type: none"> • If customer misses Bridge Street curb cut, wouldn't be able to make a left at 2nd Street if it were only one way. • Coming out of Costco has a right turn only lane and people use it to turn left .
Anything else you'd like to share that we haven't discussed?	



STAKEHOLDER INTERVIEW QUESTIONNAIRE

Project Name: LCVMPO – North Clarkston Circulation Study
Project No.: 213063
Interviewer: Stillman Norton, P.E. **Date of Interview:** 9/23/2013
Stakeholder Business: Jiffy Lube
Contact Person: Marty Huddleston, Manager **Phone #:** (509) 758-4814
Intersections of Emphasis: 5th & Bridge

Keller Associates conducted stakeholder interviews to discuss the North Clarkston Circulation Study. Particular focus was paid to intersections directly affecting each perspective business.

Question	Response
What problems/issues have you had with traffic?	<ul style="list-style-type: none"> • Intersection not real well lit. • Lights tend to seem to have a mind of their own. Timing seems to be off. Either too long or too short. • Vehicles could wait several minutes even when there is no one else coming.
Is there anything you like about the current setup?	<ul style="list-style-type: none"> • Other than timing, everything seems fine.
What changes would you make if you could?	<ul style="list-style-type: none"> • Timing at intersections.
Any concerns you might have if changes were to occur?	<ul style="list-style-type: none"> • One way traffic might hurt his business, doesn't think it is a good idea to make a one way street.
Anything else you'd like to share that we haven't discussed?	



STAKEHOLDER INTERVIEW QUESTIONAIRRE

Project Name: LCVMPO – North Clarkston Circulation Study
Project No.: 213063
Interviewer: Stillman Norton, P.E. **Date of Interview:** 9/23/2013
Stakeholder Business: Columbia Bank
Contact Person: Deby Lutes, Branch Manager **Phone #:** (509) 758-4814
Intersections of Emphasis: 5th & Bridge

Keller Associates conducted stakeholder interviews to discuss the North Clarkston Circulation Study. Particular focus was paid to intersections directly affecting each perspective business.

Question	Response
What problems/issues have you had with traffic?	<ul style="list-style-type: none"> • Bridge Street east bound backs up to almost 5th Street. • Doesn't like that 3rd Street south bound only allows right turn only. North bound does not have same restriction. • 3rd St. southbound only permits you to turn. • Has seen several accidents at 3rd and Bridge. • Intersection near Walmart/Costco does not work
Is there anything you like about the current setup?	
What changes would you make if you could?	<ul style="list-style-type: none"> • One way traffic. One way towards Costco & Fair Street. One way east bound on Bridge Street.
Any concerns you might have if changes were to occur?	
Anything else you'd like to share that we haven't discussed?	



STAKEHOLDER INTERVIEW QUESTIONNAIRE

Project Name: LCVMPPO – North Clarkston Circulation Study

Project No.: 213063

Interviewer: Stillman Norton, P.E.

Date of Interview: 9/26/2013

Stakeholder Business: Port of Clarkston

Contact Person: Wanda Keefer, Belinda Campbell, Jennifer Bly, Port of Clarkston

Phone #: (509) 758-5272

Intersections of Emphasis: All

Keller Associates conducted stakeholder interviews to discuss the North Clarkston Circulation Study. Particular focus was paid to intersections directly affecting each perspective business.

Question	Response
What problems/issues have you had with traffic?	<p>Intersection – 5th & Diagonal</p> <ul style="list-style-type: none"> • This intersection is really important to the Port that it be addressed. • Difficult to cross intersection driving northward or southward on 5th. • Traffic coming from 6th & Diagonal doesn't seem to pause enough to provide openings for crossing traffic at 5th & Diagonal. • Pedestrian traffic crossing north-south needs some sort of a safe haven halfway across. Crosswalks are currently too long and pedestrians have to wait a long time for an opening. <p>Intersection – 2nd & Bridge</p> <ul style="list-style-type: none"> • Signal timing seems too short at this intersection. • Traffic bottle necks onto bridge east of this intersection. • East bound traffic backs up on Bridge west of this intersection, sometimes all the way back to 6th street. • Some at the port would like to see a roundabout here, others would not. <p>Intersection – 5th & Bridge</p> <ul style="list-style-type: none"> • Signal timing seems too short at this intersection. • In addition to traffic backing up from 2nd & Bridge, this intersection gets traffic that backs up from 5th & Fair to the north.

Question	Response
	<p>Intersection – 6th & Bridge</p> <ul style="list-style-type: none"> • Currently traffic traveling northbound across Bridge is difficult to manage. • 6th Street between Bridge & Fair may become more of a business district in the future and may be a better means of accessing Walmart at some point. • Currently traffic traveling northbound tends to turn east onto Bridge to move over to 5th Street to access Walmart, Costco, Albertsons, etc. <p>Intersection – 5th & Fair</p> <ul style="list-style-type: none"> • Too close to Walmart/Costco intersection. • Traffic backs up from Walmart/Costco intersection. • Round-a-bout might be nice here but there may not be space. • Traffic traveling west bound on Fair turning right onto 5th does not always obey the “No Right Turn on Red” street sign. For those that do obey it, it seems to help. <p>Intersection – 5th & Walmart/Costco</p> <ul style="list-style-type: none"> • Most of the traffic coming to this intersection is turning left into Walmart. • At one point it was considered to remove the Walmart leg stop sign. Not a good idea. •
Is there anything you like about the current setup?	<p>Intersection – 13th & Bridge</p> <ul style="list-style-type: none"> • No issue with this intersection. Thinks it functions well. <p>Intersection – 13th & Fair</p> <ul style="list-style-type: none"> • No issue with this intersection. Thinks it functions well.
What changes would you make if you could?	<p>Intersection – 5th & Walmart/Costco</p> <ul style="list-style-type: none"> • There used to be a left turning lane for southbound traffic on 5th turning left into Costco. Port would like to see that turning lane restored.
Any concerns you might have if changes were to occur?	<p>Intersection – 5th & Walmart/Costco</p> <ul style="list-style-type: none"> • Did not like the idea of adding a concrete island to prevent left turns at this intersection.
Anything else you'd like to share that we haven't discussed?	<ul style="list-style-type: none"> • Would like to see 10th Street completed between Fair & Port. Thinks this would alleviate traffic traveling to Port area. • Would like to see an access to Walmart off of Fair Street.



STAKEHOLDER INTERVIEW QUESTIONNAIRE

Project Name: LCVMPPO – North Clarkston Circulation Study

Project No.: 213063

Interviewer: Stillman Norton, P.E.

Date of Interview: 10/14/2013

Stakeholder Business: Walmart

Contact Person: Tammy Liddiard, Manager

Phone #: (509) 758-8532

Intersections of Emphasis: Fair & 5th; 5th & Walmart/Costco

Keller Associates conducted stakeholder interviews to discuss the North Clarkston Circulation Study. Particular focus was paid to intersections directly affecting each perspective business.

Question	Response
What problems/issues have you had with traffic?	Peak flows occur between the hours of 11:30 to 1:30 and 3:30 to 6:00PM. Biggest issue is upset customers. Lunchtime traffic seems to be the worst. Lights don't stay long enough. Traffic backs up between the two intersections.
Is there anything you like about the current setup?	Not excited about inability to turn left, so wouldn't want to change that.
What changes would you make if you could?	Would be a fan of a new entrance on Fair Street. Another entrance.
Any concerns you might have if changes were to occur?	
Anything else you'd like to share that we haven't discussed?	
Other Thoughts?	Agrees that that are backing up issues at 5 th & Bridge and 2 nd & Bridge.