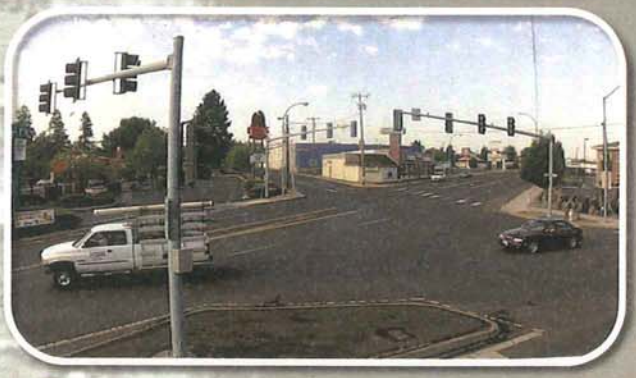
Lewis-Clark Valley Metropolitan Planning Organization

North Clarkston Circulation Study

April 15, 2014



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Executive Summary

The Lewis Clark Valley Metropolitan Planning Organization requested a circulation study of existing and future traffic conditions at seven intersections in north Clarkston. The intersection Level of Service (LOS), delay, safety, and traffic volumes were all studied. Deficiencies were determined for existing (2013), 2020 and 2040 future conditions. Solutions were developed for the deficiencies and are classified as short-term and long-term.

The majority of intersections in the study area are currently operating at an acceptable LOS. The worst intersections are Bridge St. & 2nd St. and Walmart/Costco & 5th St. The other intersections are anticipated to be operating at a LOS C or better in the year 2040, which is considered good. The Bridge St. & 2nd St. intersection is anticipated to have multiple movements experiencing delays of over 45 seconds and queue lengths exceeding 400 feet. Both of the short-term solutions are equally effective and highly recommended. Long-term Solution 1 is recommended more than Solution 2, due to both the short-term solutions being a part of it and making phased-construction possible. Long-term Solution 1 is also considerably more affordable with an estimated cost of $605,000 compared to Solution 2's roundabout with a cost of $1,338,000.

The Walmart/Costco & 5th St. intersection is not necessary failing on paper, but in the field it is. The four-way stop is currently experiencing considerable queue lengths that are backing up into the Fair St. & 5th St. intersection that is just south 170 feet. The short/long term solution that removes the north/south bound stop signs and prevents left turns will drastically improve operating conditions. This solution is very cost effective at a price of $11,000 and simple. In conclusion, the deficiencies discovered will be improved by the solutions presented in this circulation study. Traffic circulation through north Clarkston will improve considerably when these improvements are made.

North Clarkston Circulation Study

Introduction

A traffic circulation study in Clarkston, Washington was requested in order to determine deficiencies and solutions to existing and future transportation system. This study analyzes and predicts how north Clarkston will be operating through the next 20 years. Evaluating operational and safety conditions was the predominant focus of this study. Solutions for the deficiencies ranged from signal optimization to a roundabout. The following seven intersections were evaluated in this study:

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

Figure 1 shows the study intersection locations in Clarkston.

Figure 1: North Clarkston Circulation Study Intersections and Area Map

Detailed existing and future conditions technical memos of the north Clarkston area were performed at the outset of this study, and can be found in Attachments A and B.

Purpose

The North Clarkston Circulation Study was requested by the Lewis Clark Valley Metropolitan Planning Organization (LCVMPO) to better understand existing and future circulation and operational

deficiencies. This report is intended to provide innovative and cost effective solutions that resolve the deficiencies presented in the existing and future condition memos (Attachments A and B). The majority of the solutions are for the Bridge St. & 2nd St. and Walmart/Costco & 5th St. intersections. The solutions are anticipated to improve the mobility and safety through north Clarkston.

Existing Conditions

Mobility through north Clarkston is fairly good throughout most of the day, but becomes congested at several key locations between 12:00 PM - 1:00 PM and from 4:00 PM - 5:30 PM. The intersections that experience the worst congestion are Bridge St. & 2nd St., Bridge St. & 5th St., 5th St. & Walmart/Costco and Fair St. & 5th St. The Bridge St. & 2nd St. intersection had the highest peak hour volume and average daily traffic of 1,861 veh/hour and 18,350 veh/day respectively. Bridge St. & 5th St. intersection had a peak hour volume of 1,455 veh/day and the highest collision rate. All of the intersections are currently operating at an LOS C or better. The Bridge St. & 2nd St. and Bridge St. & 5th St. intersections had certain movements that were operating at a LOS D. All traffic counts were collected on weekdays and may not portray intersection operations on the weekends.

Future Conditions

Traffic mobility through north Clarkston is not anticipated to be much worse in the future than existing conditions. This is mainly due to the small growth rates that Clarkston and Lewiston are expected to have over the next 25 years. The Bridge St. & 2nd St. and Walmart/Costco & Fair St. intersections are expected to have the greatest operational and safety issues of the seven intersections. The majority of the anticipated deficiencies in 2020 and 2040 are current deficiencies for the intersections.

Previous Reports

The following three previous studies provided potential solutions and improvements for deficiencies discovered in north Clarkston: *Traffic Impact Study for Walmart* (2008), *Lewiston-Clarkston Downtown Circulation Plan* (2011), and V*alley Destination 2040 The Long Range Transportation Plan* (2013). Recommendations from these reports were evaluated and determined effective or not.

Stakeholders

An open house was held on March 6, 2014 with the goal of obtaining public input on traffic operations in north Clarkston. Over 40 people attended the meeting and provided valuable insight to the existing traffic issues. The public was asked to evaluate the intersection solutions and suggest solutions of their own. All comments have been organized and placed in the relevant sections that follow. The comment forms and a summary of comments can be seen in Attachment C.

Solutions

The existing and future conditions memos identify deficiencies for each of the seven intersections. Solutions to the deficiencies have been categorized by short-term and long-term solutions. Short-term solutions are for deficiencies that are anticipated to occur between 2013 and 2020 and can be implemented in 12-18 months, with minimal costs and will temporarily solve the deficiencies for 3-6 years. The long-term solutions will likely require federal-aid funding, be developed through the State of Washington Transportation Improvement Program (TIP), and provide solutions for a 20-year design life (year 2040). Planning-level cost estimates were prepared for each solution, based on 2014

construction costs. The cost estimates can be found in Attachment D. The solutions vary from signal timing to replacing a signalized intersection with a roundabout. All short-term solutions had operational analyses performed using 2020 projected traffic volumes, and they show significant improvement in LOS and delay. The operational results for these solutions can be found in Attachment E. Full-page Illustrations of all of the solutions are presented in Attachment F.

Solutions to Deficiencies

Bridge St. & 2nd St. Intersection

The Bridge St. & 2nd St. intersection is in need of a short-term solution that will improve the existing operating conditions. Short-term solutions modify portions of the intersections, while keeping the costs relatively affordable. The following two solutions will improve the intersection operating conditions and are cost effective.

Short Term Solution 1 - Double Eastbound Through

Upon evaluating the traffic model and field conditions it was observed that the eastbound movement was a major contributor to the intersection's poor operating conditions. This solution entails adding an additional eastbound through lane as seen below in Figure 2. The benefits of this improvement include reduction in the queue length and overall delay, specifically the eastbound. By having two lanes, the green time for this phase of the signal can be reduced by half, which improves the intersection as a whole. The overall intersection delay would be reduced from 36 seconds (LOS D) to 29 seconds (LOS C) in 2020. This solution works well with Long-term Solution 1, as it is a phase of the solution. The estimated cost for this solution is approximately $257,000. The major expense in this solution is acquiring right-of-way, which was estimated to cost approximately $110,000. The pros and cons of this solution can be seen in Figure 3.

Figure 2: Bridge St. & 2nd St. Short-Term Solution 1

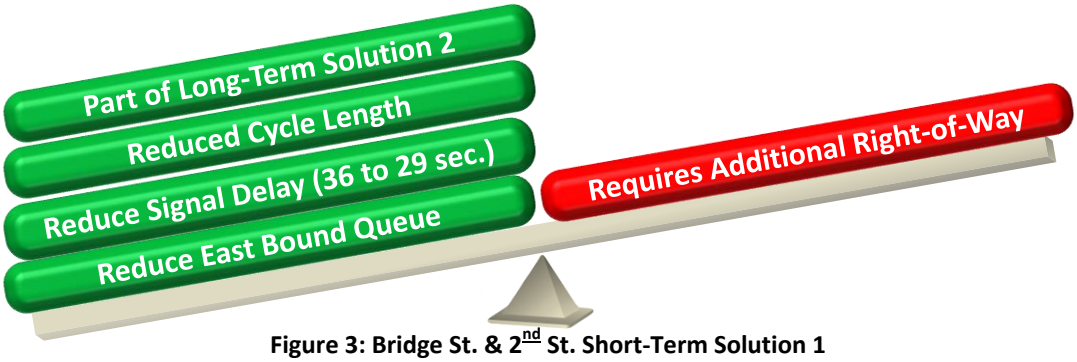

Figure 3: Bridge St. & 2nd St. Short-Term Solution 1 Pros vs. Cons

Short Term Solution 2 - Slip Lane

This solution completely eliminates the Diagonal St. eastbound movement from the intersection signal phases by adding a slip lane and reconfiguring the intersection area with a much smaller footprint, as seen in Figure 4. With these two modifications, intersection delay is anticipated to be reduced from 36 seconds (LOS D) to 26 seconds (LOS C) in 2020. This solution could also potentially serve as a long-term solution, based on model results showing the intersection operating well in 2040 . The overall cost for Solution 2 was estimated at $313,000, approximately $50,000 more than Solution 1. Figure 5 presents the positives and negatives of the solution.

Figure 4: Bridge St. & 2nd St. Short-Term Solution 2

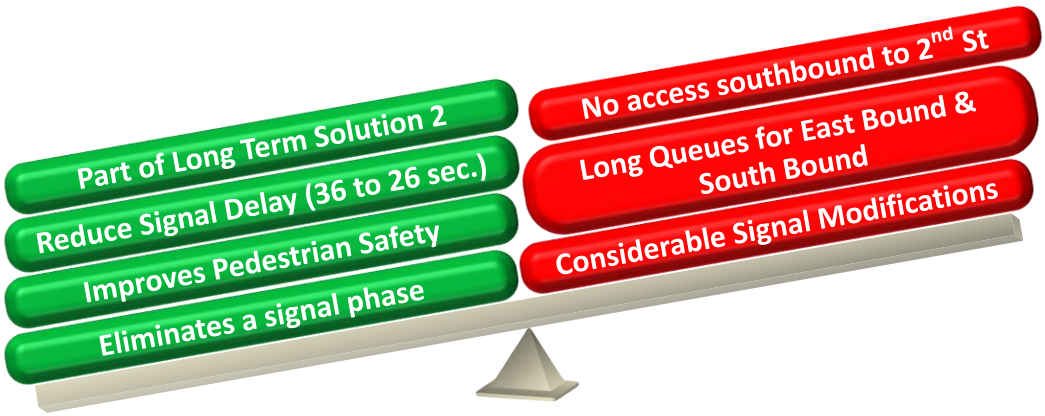

Figure 5: Bridge St. & 2nd St. Short-Term Solution 2 Pros vs. Cons

Stakeholder Summary

When stakeholders were asked if the short-term solutions would affect their visits to adjacent businesses, 66% and 56% said no change for Solutions 1 and 2, respectively. Approximately 16% of the stakeholders thought that they would make fewer trips to the adjacent business with Solution 2 and 9% for Solution 1. Figure 6 shows that Short-term Solution 2 was slightly more popular than Solution 1. Solution 2 had 9% of stakeholders saying they would make more trips to the adjacent businesses.

Question: Do you have a preferred alternative?

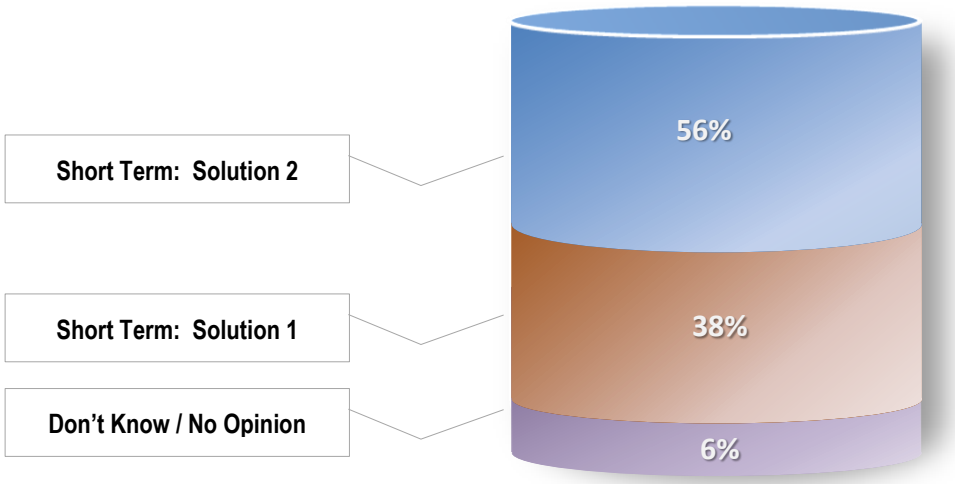

Figure 6: Bridge St. & 2nd St. Short-Term Solutions Open House Summary

Bridge St. & 2nd St. Intersection

Long-Term Solution 1 – Slip Lane and Double EB & SB Lanes

This long term solution combines the concepts from the Short-term Solutions 1 & 2 mentioned previously and adds an additional southbound turn lane. Figure 7 shows the overall layout of the intersection. In having the bypass lane, it reduces the overall cycle length of the intersection and reduces the crossing distances for pedestrians. By adding an additional southbound lane and

eastbound lane, the queue lengths and delay for these movements will be drastically reduced. Compared to the existing intersection geometry, this solution better resembles a typical four legged intersection. Although an operational analysis or full scale traffic simulation was not conducted on this solution, it is anticipated to greatly improve the operating conditions of the intersection. Certain portions of this solution were modeled as previously mentioned in the short-term solutions. In combining these solutions it is anticipated to have even better operational improvements. The estimated cost for this solution is approximately $591,000, which is the sum of Short-term Solutions 1 & 2. The pros and cons of this solution can be seen in Figure 8.

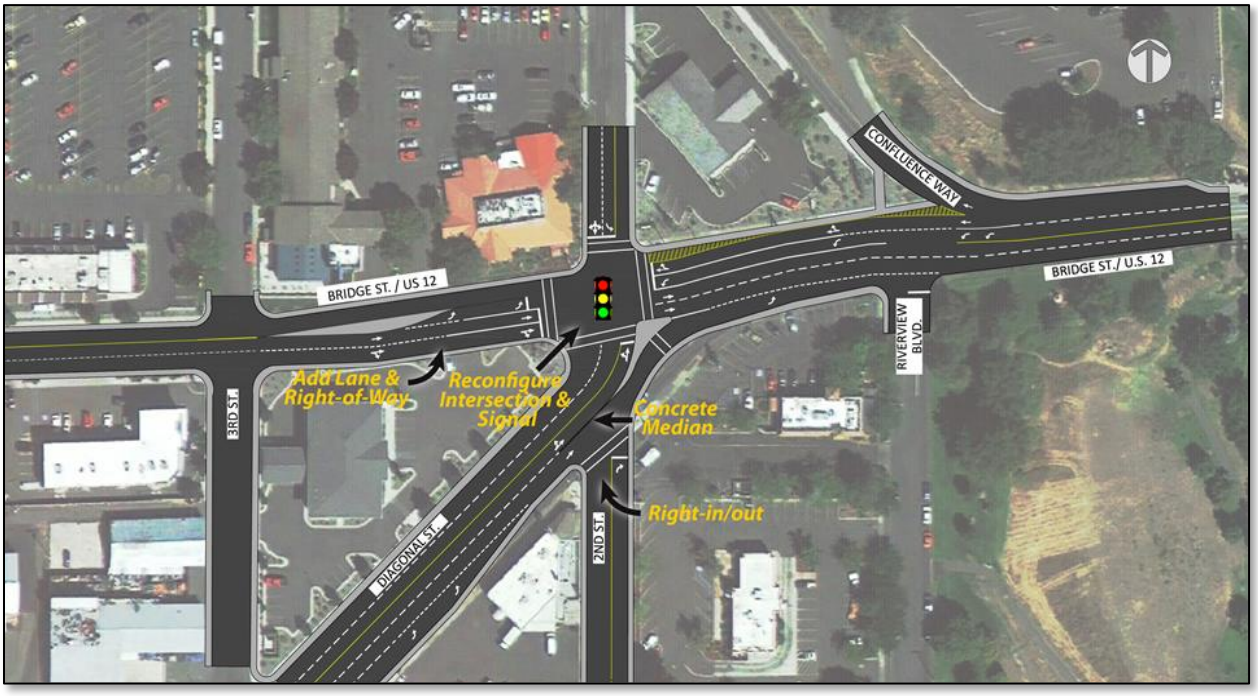

Figure 7: Bridge St. & 2nd St. Long-Term Solution 1

Figure 8: Bridge St. & 2nd St. Long-Term Solution 1 Pros vs. Cons

Long-Term Solution 2 - Roundabout

The Bridge St. & 2nd St. intersection is a prime candidate for a roundabout, based on the unique geometry, location, speed limit, and available space. Roundabouts have become more popular in recent years based on their ability to improve operational efficiency and safety. The overall delay at an intersection is typically reduced, while the most noticeable delay reductions are during non-peak periods. Roundabouts use geometric design to reduce vehicle speed and create traffic calming effects. Pedestrian crossing safety is typically improved as roundabouts have splitter islands that provide a refuge area for pedestrians to focus on one stream of traffic at a time.

Upon preliminary evaluation, a double lane roundabout is needed, as a single lane roundabout reaches capacity around 25,000 veh/day. The intersection occasionally experiences traffic volumes greater than 20,000 veh/day. A 185' inscribed diameter was selected for the double lane roundabout, which would accommodate the WB-67 design vehicle. The number of lanes, speed, and inscribed diameter are the most prominent design features that dictate the area needed for the roundabout. The estimated cost for the roundabout is approximately $1,338,000, which is much more than Long-term Solution 1. The costs are planning level estimates, but provide valuable insight to how much land would be required for a roundabout at the Bridge St. & 2nd St. intersection. Long-term Solution 2 can be seen in Figure 9 below. The pros and cons can be seen in Figure 10.

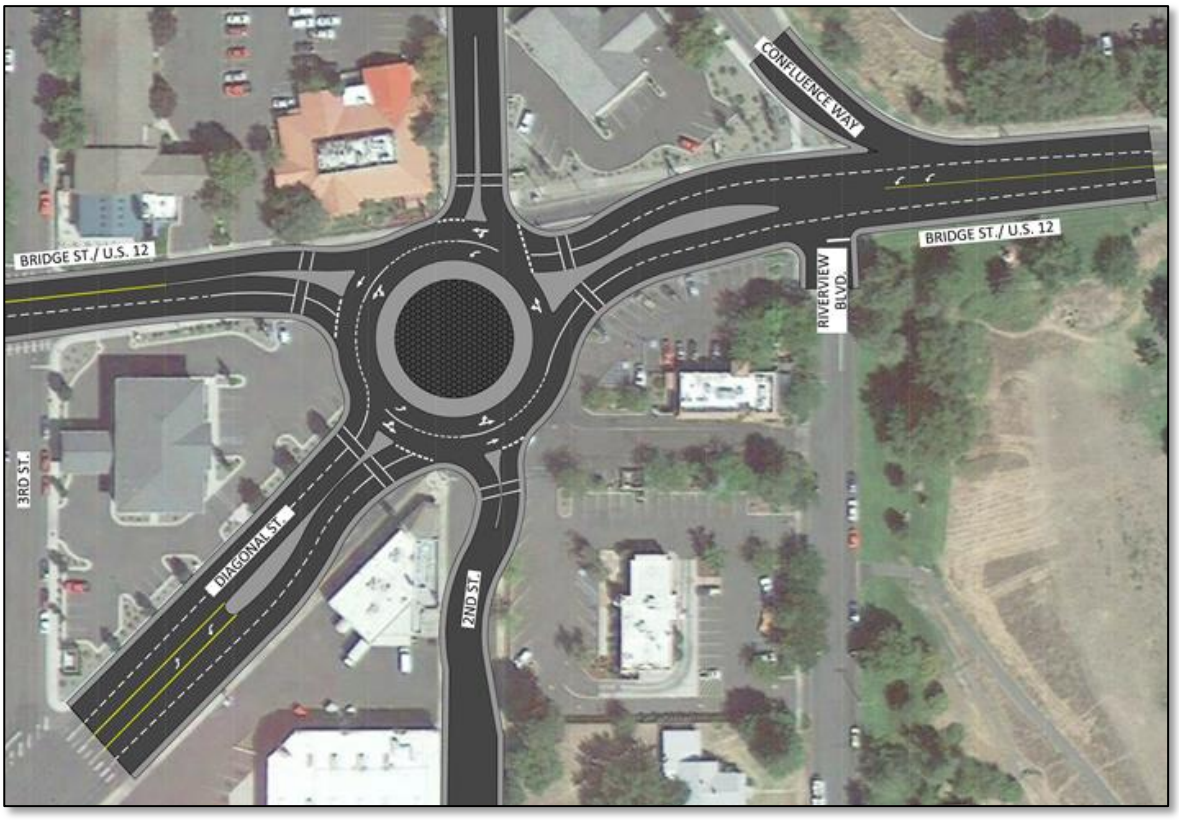

Figure 9: Bridge St. & 2nd St. Long-Term Solution 2

Figure 10: Bridge St. & 2nd St. Long-Term Solution 2
Pros vs. Cons

Previous Recommendations

The *Lewiston-Clarkston Downtown Circulation Plan* recommended converting the north leg of 2nd St. to a one-way southbound street between Fair St. and Bridge St. This is a practical option as it will eliminate one movement from the busy Bridge St. & 2nd St. intersection, which will reduce the signal cycle length. However, one negative is that it will move more traffic to the 5th St. and Bridge St. intersection. The plan also recommended changing both directions of the Bridge St. to Diagonal St. movement from two lanes to one lane. This reduces the movement capacity by half and causes lengthy queues.

The *Lewiston-Clarkston Downtown Circulation Plan* also recommended converting the eastbound left-turn Bridge St. movement to a second through lane. This is a viable option as the eastbound through has very long queue lengths. The eastbound left-turn movement currently has a peak hour traffic volume of 2 veh/hr, so it would not dramatically affect the operating conditions of this intersection by eliminating it. Upon modeling this recommendation, it reduced delay by 5 seconds and queue length by 300 feet. The downside of this recommendation is that drivers who miss a left turn would not have a chance to stay in Clarkston and would have to cross the Snake River into Lewiston before they could turn around.

Both the *Valley Destination 2040 The Long Range Transportation Plan* and the *Lewiston-Clarkston Downtown Circulation Plan* recommended replacing the signalized intersection with a two-lane roundabout. This is viable option and will more than likely make it a safer intersection. The roundabout would likely reduce the vehicle delay for the intersection and improve the operating conditions. In 2040 three of the four legs at the intersection are expected to have merge volumes greater than 1,200 veh/hr, which typically requires a double lane roundabout. A double lane roundabout will require the purchase of additional right-of-way, which will make this a more expensive option compared to working within the right-of-way.

Stakeholder Summary

When stakeholders were asked if the long-term solutions would affect their visits to adjacent businesses, 50% and 41% said no change based on Solutions 1 and 2 respectively. Less than 14% of stakeholders thought that they would make fewer trips to adjacent business, while approximately

40% did not know or have an opinion for both solutions. Stakeholders appeared to like Solution 2 slightly more than Solution 1, based on Figure 11 below. Multiple people mentioned to eliminate access to Riverview Blvd. from Bridge St. and turn Riverview into a cul-de-sac. This is a viable option as it is a dangerous movement and should be prevented if possible. Also there was considerable concern to bicyclists and pedestrian safety through this intersection.

Question: Do you have a preferred alternative?

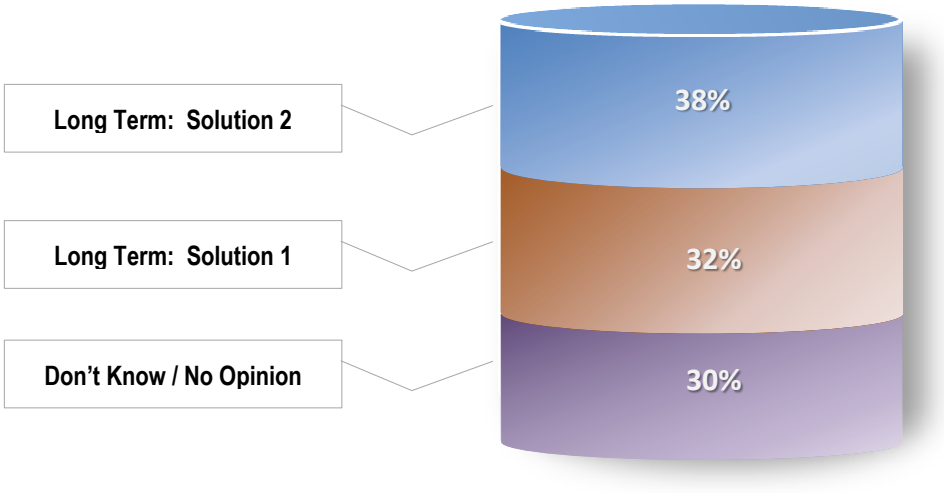

Figure 11: Bridge St. & 2nd St. Long-Term Solutions
Open House Summary

Bridge St. & 5th St. Intersection

Short-Term Solution

The Bridge St. & 5th St. intersection is anticipated to be operating at a LOS C in 2020. The eastbound and westbound movements will experience the worst delays. Signal coordination and/ or optimization would be the most cost effective short-term solution. The purpose for coordinating and/or optimizing the traffic signals is to reduce travel times, stops and delays by providing smooth traffic flow. Since both intersections experience traffic platoons, signal coordination should be strongly considered. A good example of how effective signal optimizing is the comparison of the 2020 operating conditions to the 2040. The conditions hardly changed for many of the intersections, while the traffic flow increased. This is due to the Synchro simulation in 2040 using an optimized signal timing plan. Studies have shown that adjusting timing or improving equipment can show reduction of 7-13% in overall travel time and 15-37% reduction in delay[1]. This is a very cost effective way to improve operating conditions of an intersection.

[1] Signal Optimization ITE http://www.ite.org/signal/index.asp

Long Term Solutions

All short term solutions could also serve as long term solutions for the Bridge St. & 5th St. intersection.

Previous Recommendations

The *Valley Destination 2040 The Long Range Transportation Plan* recommended modifying the north leg radius and relocating the signal poles. This work appears to have been already completed.

Fair St. & 5th St. Intersection

Short-Term Solutions

Fair St. & 5th St. intersection is anticipated to operate at an acceptable level of service as an isolated intersection. Based on our findings the intersection is not currently operating as isolated, as mentioned in the existing and future conditions memos. Providing a westbound right turn lane would help alleviate queue lengths and improve mobility into the commercial businesses to the north.

Long-Term Solutions

The short-term solutions will also serve as long term solutions for this intersection.

Previous Recommendations

The *Valley Destination 2040 The Long Range Transportation Plan* recommended adding one EBL and 1 WBR turn lanes to the intersection. All of these turn lanes can improve the operating condition of the intersection, but may not be needed. Of the three turn movements the WBR experiences the highest peak hour volume with 180 veh/hr while the other movements have approximately less than 100 veh/hr. The WBR turn would be the most desired improvement and is a realistic recommendation that would improve the LOS and mobility through the intersection.

5th St. & Walmart/Costco Intersection

Short-Term Solutions

A short-term and long-term solution for the 5th St. & Walmart/Costco Intersection can be seen in Figure 12. This simple yet highly effective solution drastically improves the intersection's operating conditions. The solution is based on eliminating left turns and north/south stops. The northbound queue lengths caused the majority of the issues, as they often back up into the adjacent intersection. This solution is anticipated to entirely eliminate the northbound delay/queue and keep the same eastbound and westbound delays of 12 seconds. Another positive aspect of this solution is that it is an effective short-term and long-term solution for the 5th St. & Walmart/Costco intersection. The estimated cost for this solution is approximately $11,000. The pros and cons of the solution can be seen in Figure 13.

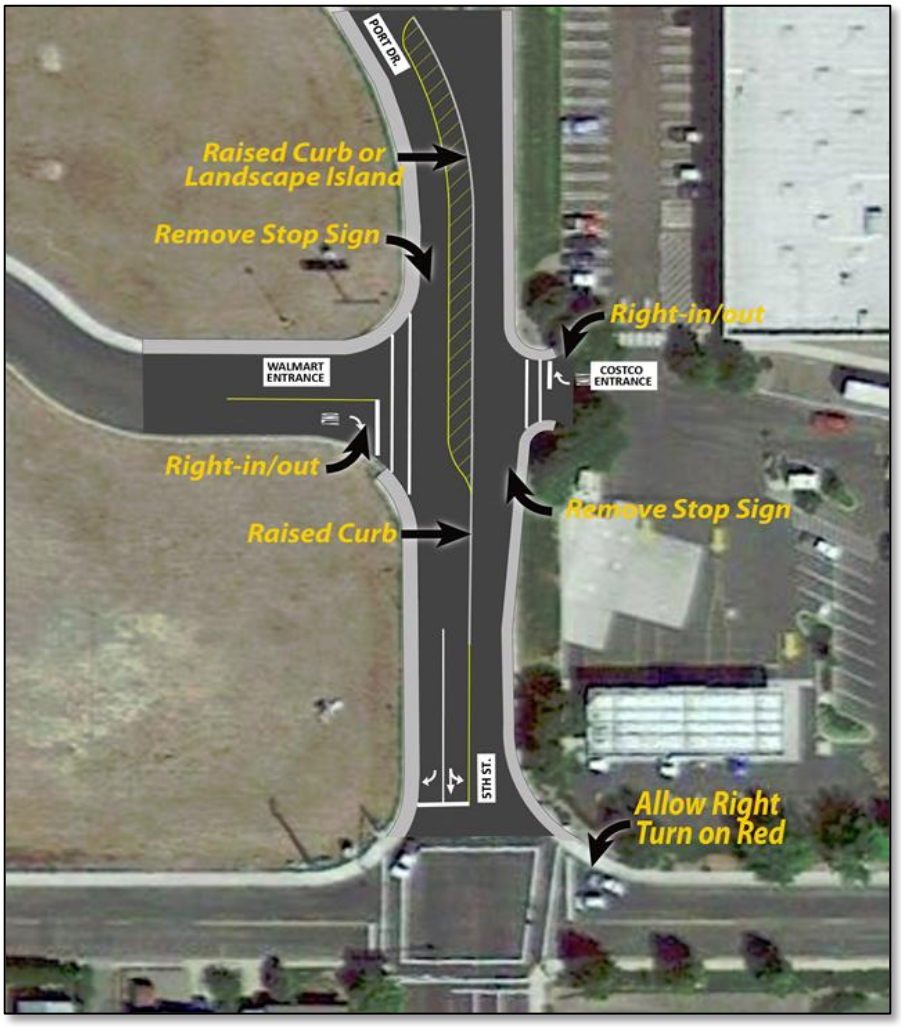

Figure 12: Walmart/Costco & Fair St. Short/Long-Term Solution

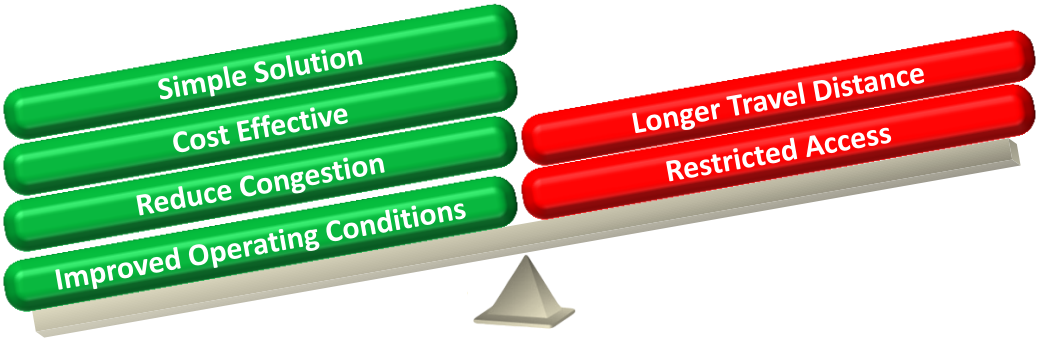

Figure 13: Walmart/Costco & Fair St. Short-Term Solution Pros vs. Cons

Long-Term Solutions

The short-term solutions will also serve as long-term solutions for this intersection.

Previous Reports

The *Draft-Valley Destination 2040 The Long Range Transportation Plan* recommended replacing the two-way stop controlled 5th St. & Walmart/Costco intersection with a roundabout. Based on the proximity (<170 feet) of the adjacent signalized Fair St. & 5th St. intersection, we do not recommend this as a solution.

The *Traffic Impact Study for Walmart* recommended converting 5th St. & Walmart/Costco to a two-way stop controlled intersection. Based on conversation with the city this was in place and was operating very poorly. In which the city modified the intersection to the current four-way stop controlled intersection. Both of these solutions provided marginal results and did not solve the congestion and queuing issues.

Stakeholder Summary

When stakeholders were asked for their opinion on the removal of the north/south stop signs, 81% liked the solution, while only 16% didn't like it. If this solution was constructed 81% of stakeholders thought there would be no change in their trips to the adjacent businesses. Figure 14 below shows the open house summary to the Walmart/Costco & 5th St. intersection solution.

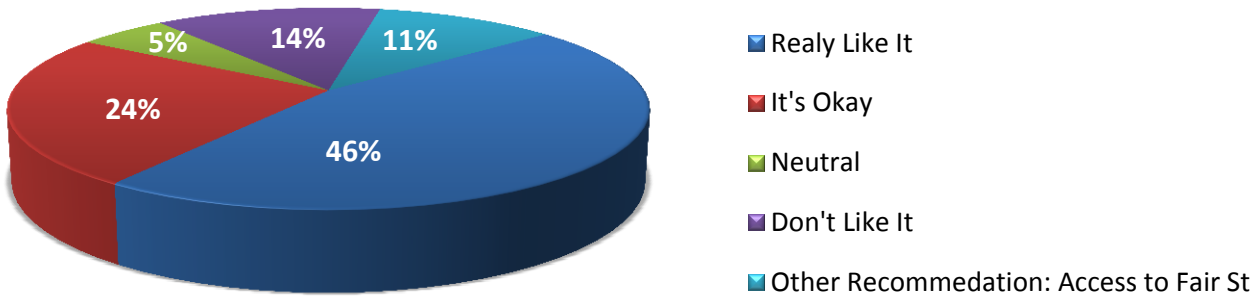

Figure 14: Walmart/Costco & 5th St. Open House Summary

Bridge St. & 6th St. Intersection

Short-Term Solutions

The Bridge St. & 6th St. intersection is anticipated to be operating at an acceptable LOS in 2020. The only short-term improvements were for existing conditions, which can be found in the existing conditions memo in Attachment A.

Long-Term Solutions

The Bridge St. & 6th St. intersection is expected to be operating at an LOS of C in 2040 with the worst movement operating at a LOS D. The stop controlled northbound and southbound movements are anticipated to have considerable delays, but are still within the acceptable thresholds. The intersection is not anticipated to have any deficiencies that could alter the operating conditions and or the safety of the intersection. Based on existing conditions, the

collision rate this intersection is reasonably safe. There were no long term recommendations for the Bridge St. & 6th St. intersection.

Bridge St. & 13th St. Intersection

Short-Term Solutions

The Bridge St. & 13th St. intersection was not evaluated in 2020 because it was operating well in 2013 and was not anticipated to change much by 2020. The eastbound left turn lane currently has the two-way-left turn lane markings instead of a left turn lane marking. It is recommended that the two-way left turn marking should be obliterated and replaced with a left turn marking.

Long-Term Solutions

The Bridge St. & 13th St. intersection is predicted to be operating at a LOS B in 2040. The delays and queue lengths for any of the movements were minor and are not anticipated to cause any operational or safety issues. Based on the future traffic projections, this intersection is not anticipated to experience any operational issues by the year 2040.

Fair St. & 13th St. Intersection

Short-Term Solutions

The Fair St. & 13th St. intersection was not evaluated in 2020 due to how well it was operating in 2013. There were no short-term deficiencies or recommendations for the intersection.

Long-Term Solutions

The Fair St. & 13th St. intersection is anticipated to be operating at an adequate LOS in 2040 with no operational issues or long-term deficiencies.

Previous Reports

The *Lewiston-Clarkston Downtown Circulation Plan* suggested connecting the 2nd St. to Port Dr. in order to reduce congestion at 5th St. & Fair St. Intersection. This is a viable alternative, as approximately 30% (peak 131 veh/hr) of the northbound traffic at the 5th & Walmart/Costco intersection continue on Port Dr. By adding another connector road to Port Dr. it will help to alleviate the congestion at Fair St. & 5th St. and the 5th & Walmart/Costco intersections. The negative is that it will be a fairly expensive project with small operational benefits.

The *Valley Destination 2040 The Long Range Transportation Plan* also suggested widening Bridge St. by two or four lanes between 2nd St. to 15th St. Based on the anticipated traffic volumes and growth forecast, an additional four lanes will not be needed nor is there enough room. An additional two lanes would be a viable option as it doubles capacity and improves mobility. There appears to be enough room along Bridge St. to add an additional two lanes, but the additional ROW cost would be excessive and the existing roadway is not nearing capacity.

Summary

Many of the studied intersections were and are anticipated to keep operating well into the future. The Bridge St. & 2nd St. intersection was determined the worst operating intersection, as several movements will be experiencing delays and queues beyond acceptable limits. Long-term Solution 1 (Slip-Lane) is recommended for this intersection because it is 1/2 the cost of Solution 2 (Roundabout) and can be phased by constructing the short-term solutions.

The Walmart/Costco & 5th St. intersection was experiencing northbound queues that were backing up into the adjacent intersection. The short/long-term solution will resolve these queues and help this intersection operate more smoothly. People liked the additional Walmart access points along Fair St., specifically at 6th St. and 8th St. These access points would help to relieve congestion at Fair St. and 5th St. intersection.

Multiple people mentioned to eliminate access to Riverview Boulevard from Bridge St. and turn it into a cul-de-sac. This is a viable option as it is a dangerous movement and should be prevented. If this were to happen traffic would then use 2nd St. to access Riverview Blvd. The comment sheets filled out by the public were very valuable and will help to guide future design work as these projects develop.

The majority of the public responses and suggestions were positive. The solutions were well accepted with only a couple of people stating that fewer trips would be made to adjacent businesses. Many of the people had concerns for bicyclist and pedestrian safety. Improving the aesthetics and functionality of Bridge St. has the opportunity of being very rewarding for north Clarkston and its businesses. Improvements such as landscaping, ADA ramps, sidewalk improvements, way finding signs, and street lighting can all lead to a greater consumer appeal. Other modes of transportation such as biking and walking will likely increase as well, and must be accommodated and planned for.

Attachments

Attachment A – Existing Conditions Memo

Attachment B – Future Conditions Memo

Attachment C – Shareholder Summary and Comment Forms

Attachment D – Planning-level Cost Estimates

Attachment E – Short-term Solution Operational Analysis

Attachment F – Solution Figures