PWI18-9

June 7, 2018

To: Members
Public Works and Infrastructure Committee

Re: Arcola Avenue Corridor from College Avenue to Prince of Wales Drive

RECOMMENDATION

That this report be forwarded to the June 25, 2018 meeting of City Council for information.

CONCLUSION

The travelling public using Arcola Avenue between College Avenue and Prince of Wales Drive experience congestion during the morning and afternoon peak hours.

The *Transportation Master Plan* (TMP) approved by City Council on May 29, 2017 (CR17-15), identifies a number of roadway improvements in east Regina which are consistent with the *Southeast Regina Neighbourhood Plan* (SENP) approved by City Council on September 26 2016 (CR16-107).

The long term goal for the City's road network is to provide alternate routes for commuters in east Regina. Alternate routes are planned to be built in tandem with the development of east Regina. The alternate routes identified in both the TMP and SENP include the south extension of the Regina Bypass in 2019 and the extension of Wascana Parkway from Sask Polytechnic to Prince of Wales Drive at Wascana Gate North in 2034.

Administration has reviewed several potential projects to determine if any improvements could be implemented sooner to improve traffic flow along the Arcola Avenue corridor. The projects reviewed will have a moderate impact on specific intersections but a minimal impact on overall traffic flow along the corridor. None of the projects are currently identified in the City's five-year capital plan, therefore, additional funding would have to be allocated to implement any of these projects in advance of the current plan outlined by the TMP and SENP.

BACKGROUND

Design Regina: The Official Community Plan Bylaw No. 2013-48 (OCP) sets out the transportation network and road classification system for Regina (Map 5: Transportation). All roads follow a hierarchy of classification, which is the orderly grouping of roads into systems according to the type of service they provide to the public. Arcola Avenue is classified as an expressway. Other expressways include Lewvan Drive, 9th Avenue North, Victoria Avenue, Pasqua Street and Albert Street north of Ring Road

The TMP, approved by City Council on May 29, 2017 sets the policy direction for the City's transportation network including expressways. The primary function of an expressway is to

"carry relatively high volumes of traffic in conjunction with other types of roads. Direct access to and from abutting properties is prohibited" (page 48). The TMP also identifies a number of roadway improvements in east Regina which are consistent with the SENP approved by City Council on September 26, 2016.

The long term goal for the City's road network is to provide alternate routes for commuters in east Regina. Today, vehicles traveling from east Regina to other locations in the city must do so by travelling on either Arcola Avenue or Victoria Avenue. Alternate routes are planned to be built in tandem with the development of east Regina. The alternate routes identified in both the TMP and SENP include the south extension of the Regina Bypass in 2019 and the extension of Wascana Parkway from Sask Polytechnic to Prince of Wales Drive at Wascana Gate North in 2034.

The approved transportation plan in SENP further defines the classification of Arcola Avenue by identifying three access points (Woodland Grove, Chuka Boulevard and a right in/out at Anaquod Road).

Two memos related to transportation projects in the southeast area of Regina were previously provided to City Council are provided in Appendix C.

DISCUSSION

At the November 28, 2016 meeting of City Council, the Administration was directed to undertake a functional study in 2017 to explore design options to address traffic concerns in this area.

During presentation of the TMP to the Public Works and Infrastructure Committee on May 11, 2017, access from the south east was also identified by the public and members of City Council as an area that would benefit from improvements.

As the long term goal of the TMP for south east Regina is to provide alternate routes for commuters travelling for east Regina, the study was focused on determining if any projects could be advanced to reduce traffic congestion in the short term. The results of the functional review, for the study area, shown in Appendix A, are provided below.

Overview

Arcola Avenue expressway has traffic volumes ranging from 19,400 vehicles per day east of Prince of Wales Drive to 45,000 vehicles per day between Ring Road and University Park Drive. Other roads in the city that receive similar traffic volumes are Ring Road, Lewvan Drive, Pasqua Street north of Ring Road and Victoria Avenue east of Ring Road.

Due to development in the east, traffic volumes on Arcola Avenue are increasing, resulting in traffic congestion at many intersections during peak hours. During the peak hours, the majority of traffic will have passed along this corridor in a 40 minute period.

The Regina Bypass, currently under construction, is expected to have a significant impact on the main corridors adjacent to east Regina. In particular, Victoria Avenue and Arcola Avenue from the east city limits to the Ring Road are expected to benefit once construction is completed in

2019. The following is expected to be achieved:

- Improve traffic safety on Highway No. 1 East and Victoria Avenue.
- Divert large truck traffic from Victoria Avenue and Arcola Avenue.
- Eliminate key transportation bottlenecks while creating an efficient traffic flow on Highway No. 1.
- Provide better access to Regina, the Global Transportation Hub, Highway No. 6 and Highway No. 11.

The analysis completed for this study does not include the impact on traffic volumes along Arcola Avenue after the Regina Bypass is open in late 2019.

The Administration has information and modeling related to the Regina Bypass and the theoretical impact on Arcola Avenue and east Regina. As with all modeling, it is good practice to take real measurements to evaluate its accuracy. In this case, further analysis of the Arcola Avenue corridor is required in a future planned functional study in 2024. This study will allow the administration to evaluate the actual impact of the Regina Bypass with real data in the form of traffic counts. In turn, this allows the Administration to reaffirm the transportation projects within the SAF model. It also allows for the confirmation of timing of these road projects and informs in more detail the required improvements along the Arcola Avenue corridor and east Regina.

The 2024 study would also consider any major reconfigurations of the Arcola Avenue and Ring Road interchange. Evaluation of the Arcola Avenue and Ring Road interchange as part of the future functional study would allow the Administration to explore improvements and the cost effectiveness of these improvements.

Methodology

The review assessed potential improvements to the road network with a focus on determining if any projects could be advanced in the short term (by 2020) to reduce traffic congestion. Improvements considered include projects currently identified in the TMP, as well as additional projects.

The potential improvements are:

- Providing southbound dual left turn lanes at the Park Street intersection.
- Widening the Ring Road overpass by one lane to provide dual left turn lanes at intersections on either side of the interchange.
- Providing eastbound dual left turn lanes at University Park Drive.
- Provide a third eastbound lane from the east side of the Ring Road interchange to the Pilot Butte Creek bridge.
- Providing dual eastbound left turn lanes at Prince of Wales Drive.
- Providing a new northbound on-ramp to Ring Road at the Assiniboine Avenue overpass.
- Extending Wascana Parkway from south of Sask Polytechnic to Prince of Wales Drive.

The assessment included reviewing the level of service (LOS) on portions of Arcola Avenue. The LOS methodology is based on the Institute of Transportation Engineers (ITE) *Highway Capacity Manual*. The LOS is a qualitative measure used to assess the quality of traffic service on a given roadway. The LOS is used to analyze roadways by categorizing traffic flow and assigning quality levels of traffic based on performance measures like speed, traffic flow, and expected delays. The LOS will typically decline during the morning and afternoon peak hour traffic. Appendix B summarizes the LOS criteria used by the City, and other jurisdictions, when evaluating roadways or signalized intersections.

It should be noted that the LOS alphabetic rankings are not used in the same way as a school report card. Roadways at LOS C and D, for example, provide the optimized value for taxpayers, as they handle the highest volume of traffic with acceptable delays. Providing a LOS of A would result in overbuilt roads and increased infrastructure maintenance costs. The City typically considers a roadway with a LOS D as acceptable during peak traffic hours and considers improvements when the LOS reaches F. This is to ensure that we are fiscally responsible with our infrastructure, as we do not want to overbuild for a short peak in traffic.

The potential improvements were evaluated based on the following LOS scenarios: 1) the current LOS in 2018 with no improvements; 2) the LOS with implementation of the improvement by 2020; and, 3) the LOS with the improvement after the full development of the road network in the east Regina by 2040. The LOS reported is for the afternoon peak hour traffic during a typical weekday and assumes the implementation of transportation projects as outlined in the TMP by 2040 including the impact of the future extension of Wascana Parkway. The afternoon peak hour was used for analysis, as it typically has higher volumes than the morning peak hour.

Potential Improvements

There are three strategies to improving LOS on roadways and at signalized intersections: 1) increase the supporting infrastructure at an intersection; 2) optimize signalized intersections; and, 3) change the number/type of vehicles using the intersection.

1. Increase the Supporting Infrastructure at Intersection along the Corridor

   This can be in the form of road widening, adding turning lanes or providing for more directional movement through the intersection.

   a. Arcola Avenue from College Avenue to Ring Road

      This section of Arcola Avenue is currently a six lane, divided arterial road (including three lanes in each direction). Proposed improvements reviewed included the addition of dual south bound left turn lanes at the intersection of Arcola Avenue and Park Street.

      The LOS analysis for the Arcola Avenue and Park Street Intersection is shown in Table 1. The analysis indicates the proposed dual left turn lane will not immediately improve LOS. However, they may be required in the future to maintain LOS at this intersection.

Table 1: Arcola Avenue and Park Street Intersection

As is:	
Intersection Level of Service – 2018	D
With Improvements:	
Intersection Level of Service – 2020	D
Intersection Level of Service – 2040	D
Estimated Cost	$300,000
Timing or Estimated Project Schedule	2024
Impact of Moving Timing to 2020	No change to LOS. Require funding request in 2020

No improvements to the Lacon Street/Dixon Drive or College Avenue intersections are proposed in the short term. However, the impact to the corridor by converting the Lacon Street/Dixon Drive intersection to a rights-in/right-out only intersection as well as removing the eastbound left turn at the College Avenue intersection should be reviewed as part of the larger functional study to be completed in 2024.

b. Arcola Avenue and Ring Road Interchange

A major restriction to the traffic flow on Arcola Avenue is the width of the existing bridge crossing Ring Road. The most recent bridge rehabilitation work was completed in 2010. Future widening of the bridge is an aspect of increasing capacity of this corridor; however, to obtain the best financial value of the last rehabilitation the widening is not currently planned for another 25 to 30 years.

This report considers adding a third lane on one side of the bridge, which would allow for dual left turn lanes for eastbound and westbound traffic on the bridge.

The LOS of the west intersection is summarized in Table 2. The analysis indicated the improvement will improve LOS in the short term, but LOS will decline again in the future.

Table 2: Arcola Avenue and Ring Road Overpass West Intersection

As is:	
Intersection Level of Service – 2018	F
With Improvements:	
Intersection Level of Service – 2020	E
Intersection Level of Service – 2040	F
Estimated Cost	$4,000,000
Timing	Not included in current plan
Impact of Moving Timing to 2020	Minor change to LOS. Requires additional funding.

c. Arcola Avenue from Ring Road to Pilot Butte Creek

In this section of Arcola Avenue, there are two proposed improvements: 1) the addition of a third eastbound lane from the overpass to Pilot Butte Creek; and, 2) installation of dual, eastbound left turn lanes at the University Park intersection.

The proposed improvements will improve LOS at the University Park Drive intersection in the short term. LOS further improves in the long term when the Wascana Parkway extension is implemented.

Table 3: University Park Drive Intersection Improvements

As is:	
Intersection Level of Service – 2018	F
With Improvements:	
Intersection Level of Service – 2020	E
Intersection Level of Service – 2040	D
Estimated Cost	$1,000,000
Timing	2024
Impact of Moving Timing to 2020	Improves LOS Requires additional funding.

d. Arcola Avenue from Pilot Butte Creek to Prince of Wales

Proposed improvements in this section include providing dual, eastbound left turn lanes at the Prince of Wales intersection.

The LOS analysis indicates the existing intersection is currently operating at an acceptable level of service. Improvements may be required in the future to maintain the LOS.

Table 4: Prince of Wale Drive Intersection Improvements

As is:	
Intersection Level of Service – 2018	C
With Improvements:	
Intersection Level of Service – 2020	C
Intersection Level of Service – 2040	C
Estimated Cost	$250,000
Timing	2024 and pending further evaluation (Refer to Appendix C)
Impact of Moving Timing to 2020	No improvement to LOS. Requires additional funding.

e. Assiniboine Avenue Westbound to Northbound Ring Road On-Ramp

Assiniboine Avenue currently provides access for commuters in east Regina to south Regina via Ring Road. The existing interchange does not allow access for commuters onto northbound Ring Road. A new on-ramp for westbound traffic on

Assiniboine Avenue to access northbound Ring Road was reviewed to potentially divert some traffic that could currently use Arcola Avenue to Assiniboine Avenue. Assiniboine Avenue is a two lane road and has limited capacity to handle additional traffic without considering the addition of turn lanes. Traffic modeling indicates the on-ramp would attract approximately 2,500 vehicles per day from Arcola Avenue.

Table 5: Assiniboine Avenue Northbound On-Ramp

As is:	
Level of Service – 2018	Not Applicable
With Improvements:	
Level of Service – 2020	Not Applicable
Level of Service – 2040	Not Applicable
Estimated Cost	$1,500,000
Timing	2028 (Refer to Appendix C)
Impact of Moving Timing to 2020	Draws some traffic away from Arcola Avenue, but increases traffic on Assiniboine Avenue

2. Optimize Signalized Intersections

   There are seven intersections along Arcola Avenue between College Avenue and Prince of Wales Drive, including five signalized intersections. Optimization of traffic signals in this corridor has previously been reviewed.

   On June 27, 2016, City Council instructed Administration through a motion to ensure that the traffic signals along the Arcola Avenue Corridor were optimized. Administration conducted a review of the Corridor and reported to City Council on November 26, 2017, that further alteration of the traffic signals would not result in any significant traffic improvements.

3. Change the Number/Type of Vehicles using Arcola Avenue

   A reduction in heavy vehicle traffic would increase the LOS. Although the number of heavy vehicles in the traffic stream is only a small percentage, their impact is prominent. Heavy vehicles impose physical and operational effects on surrounding traffic flow because of their length and size (physical) and acceleration/deceleration (operational) characteristics. With respect to intersection LOS, a single heavy vehicle may use all the time allocated for a turning signal whereas several light vehicles could have proceeded.

Summary

The projects reviewed through this study will have only a moderate impact on specific intersections with minimal impact on overall traffic flow along the corridor. None of the projects reviewed are currently identified in the City's five year capital plan. Therefore, additional funding would have to be allocated to implement any of these projects. In the short term, implementation of the eastbound dual left turns at University park Drive, as well as addition of a third eastbound lane from Ring Road to Pilot Butte Creek, can provide a

moderate improvement to the LOS at the University Park Drive intersection. The analysis indicates traffic LOS at the University Park Drive intersection is also expected to improve slightly in the year 2040. This is due to the Wascana Parkway extension helping to attract traffic away from Arcola Avenue. The cost to extend Wascana Parkway from Sask Polytechnic to Prince of Wales Drive is estimated at approximately $20 million and is tentatively planned to be implemented in 2034.

Widening the Arcola Avenue overpass by one lane on the north side to provide for dual left turn lanes at the intersections also provides a moderate improvement for LOS at the west intersection during the afternoon peak hour. A similar improvement to LOS for the westbound intersection during the morning peak hour would also be achieved. The future improvements to the bridge are considered an important aspect of increasing capacity of this corridor, however, to get the best financial value of the last rehabilitation, the timing of this improvement is 25 to 30 years out. This timing places the widening project just outside of the timeframe of the current Transportation Master Plan.

Providing dual southbound left turn lanes at Park Street does not improve LOS of this intersection now or in the future.

The eastbound dual lefts at Prince of Wales Drive are not required at this time or in the future. However, increasing the length of the single eastbound left turn lane will help to maintain the LOS at this intersection over the long term.

The Administration recommends that no additional projects be added to the capital budget. However, should City Council wish to add any of these projects to the budget the Administration recommends the following order for consideration during the 2019 budget process.

- Implementation of University Park Drive Intersection Improvements
- Confirm Location of the Wascana Parkway Extension
- Begin Land Acquisition Process for Wascana Parkway Extension

As discussed in the report, the intersection improvements at University Park Drive would allow for some temporary relief at that intersection and would have a minimal impact on the SAF Model. With respect to the Wascana Parkway Extension, advancing the entire project would have significant impact to the SAF Model. However, confirming the road alignment and beginning land acquisition would allow the City to prepare for the future project.

RECOMMENDATION IMPLICATIONS

Financial Implications

The approximate timing of the various growth-related transportation projects is based upon the work completed for the Servicing Agreement Fee (SAF) and Development Levy (DL) Policy Review and Final Phasing and Financing Plan, Council Report CR15-138, approved December 14, 2015. As indicated in CR15-138, to maintain the reserve deficit and SAF rate at an

acceptable level most transportation projects were delayed from two to 12 years in order to prioritize and fund a number of critical water and wastewater projects.

Water and wastewater projects were prioritized, as they are most urgently required to enable system upgrades to foster growth in the city. This approach minimized financial risk to the taxpayers. This approach also resulted in temporary service level reductions (related to the road network) for all residents of the city, with potential implications including increased congestion, more use of local roads and challenges meeting emergency response times, especially in peak travel periods.

This decision allowed the City to not rely on debt to fund growth projects. It allowed the City to retain flexibility to use debt to address existing infrastructure and asset renewal needs and service improvements. All growth-related capital SAF projects (including delayed transportation projects) will be built by the end of the model period (2040).

Environmental Implications

None with respect to this report.

Policy and/or Strategic Implications

The OCP provides the framework to guide the development of the City's infrastructure to accommodate long term growth. This study is consistent with the policies contained within Part A of the OCP with respect to:

Section D3: Transportation

Goal 1: Sustainable Transportation Choices

5.1 Use the Transportation Master Plan, which shall be consistent with the objectives and policies of this Plan, as the guiding document for transportation policy and planning within the city.

Goal 4: Road Network Capacity

5.20 Consider improvements to existing infrastructure before constructing new or expanded roadways.

Section D4: Infrastructure

Goal 3 – Planned Infrastructure for Growth

The infrastructure needed for growth will be planned from a long-term perspective.

6.6 Develop infrastructure plans that will:

6.6.1 Address both short and long term growth requirements.

6.6.3 Optimize use of existing infrastructure to minimize financial and environmental impacts of growth.

Goal 5 – Infrastructure Staging

Build infrastructure in a sequential and coordinated manner.

6.14 Plan and build infrastructure from a long-term perspective and permit servicing only when aligned with the servicing needs for long-term growth.

6.15 Align new infrastructure with planned upgrades to existing City assets.

The TMP provides direction to inform decisions related to transportation infrastructure for the next 25 years. This study is consistent with the Part D of the TMP with respect to:

Section D2: Integrate Transportation and Land Use Planning

Goal 5: Transportation and Land Use Planning Processes will be Coordinated.

1.2 Employ integrated land use forecasting and transportation models as part of long-range planning and engineering activities.

Section D5: Optimize Road Network Capacity

Goal 22: Use of existing road network capacity will be maximized before expansion.

5.12 Implement localized improvements to address bottlenecks in the existing road network.

Other Implications

None with respect to this report.

Accessibility Implications

None with respect to this report.

COMMUNICATIONS

Internal stakeholders directly affected by the supporting reports have been engaged. Development of the TMP also involved a high level of consultation with internal staff to ensure that the directions, Goals and Policies would be feasible and respond to local conditions. Staff

members from a variety of areas were represented and provided valuable feedback during development of the TMP.

DELEGATED AUTHORITY

There is no delegated authority associated with this report as it is for information purposes only.

Respectfully submitted,

Louise Folk, Director
Development Services

Respectfully submitted,

Diana Hawryluk, Executive Director
City Planning and Development

Prepared by: Bill Wright