

**To: Warden and Members of County Council**

**From: Director of Public Works**

## **Construction Staging and Traffic Control Options for Rehabilitation of Bridge on Oxford Road 59/Vansittart Avenue, Woodstock**

### **RECOMMENDATION**

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- 1. That Oxford County Council support Alternative 3 for traffic and construction staging ahead of the anticipated rehabilitation of bridge 59755 located at Oxford Road 59 and Vansittart Avenue in Woodstock to begin in early 2024, as described in Report No. PW 2023-37.**

### **REPORT HIGHLIGHT**

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- The purpose of this report is to seek County Council's endorsement, in principle, for the preferred traffic staging alternative, as described in this report, during the upcoming Oxford Road 59/Vansittart Avenue bridge construction planned to commence in early 2024.
- Following a detailed evaluation of four different traffic control alternatives, staff have determined the preferred traffic staging solution to be a partial closure reduced to a single lane with 1-way northbound traffic only.

### **Implementation Points**

Upon County Council support of the recommendation of this report, Staff will proceed with finalizing the engineering design for the rehabilitation of the bridge with our design consultant.

It should be noted that the engineering final design and subsequent 2024 construction cannot move forward unless the preferred traffic staging option has been identified. Any delay in finalizing the preferred traffic staging option will negatively impact the construction timing of the project.

Staff will prepare a communication strategy for the public, emergency/paramedic services, utilities, rail authority and City of Woodstock (City) Staff in advance of construction to ensure stakeholders are aware of the traffic staging solution.

Upon completion of the design, staff will tender this project in accordance with County of Oxford Purchasing Policy.

## Financial Impact

No financial impacts to the County's 2023 approved Business Plan and Budget will result from adopting the recommendation contained within this report.

The preferred traffic staging option will impact the anticipated 2024 construction costs to rehabilitate the bridge and will be included for consideration as part of the 2024 Business Plan and Budget.

## Communications

Public notification will be an integral part of the final design and construction process for this bridge rehabilitation project. The Project team understands the significant impact that reduced vehicular capacity over this bridge will have on many stakeholders and residents. County staff has had ongoing communications with the Area Municipality Emergency Services (Fire and Police), Paramedic Services, City Engineering staff, CP Rail and Utilities.

A summary of staff's efforts to inform the review of traffic staging options can be found below in Table 1.

Table 1 – Consultation Dates







Action	Date
Consultation Meeting 1 with Emergency Services	May 2, 2023
Consultation Meeting with the City of Woodstock	June 5, 2023
Consultation Meeting 2 with Emergency Services	August 15, 2023

Staff will continue to work with affected stakeholders during the execution of this project, as required, to ensure the appropriate level of communication and outreach is maintained, and further ensure all parties involved are updated on project status and outcomes, as needed.

Before construction, a pre-construction meeting will be held at the Oxford County Administration Building to allow residents and businesses to view the construction plans and speak to Public Works staff about the project. Public advertisement(s) will be placed on local news radio and news platforms. A Notice of Construction letter will be delivered to nearby property owners and business owners, along with posting of construction signage at the project location in advance to alert the general public.

During construction, access to businesses and commercial properties will be maintained and any interruptions will be communicated in advance. As construction begins, residents and businesses will continue to be informed about traffic control and progress through local media, *Speak Up, Oxford* and social media. If needed, expanded advertising may also be considered.

**Strategic Plan (2020-2022)**

					
<b>WORKS WELL TOGETHER</b>	<b>WELL CONNECTED</b>	<b>SHAPES THE FUTURE</b>	<b>INFORMS &amp; ENGAGES</b>	<b>PERFORMS &amp; DELIVERS</b>	<b>POSITIVE IMPACT</b>
		3.iii.	4.i. 4.ii.	5.i. 5.ii.	

**DISCUSSION**

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**Background**

In 2024, Oxford County Public Works is planning to rehabilitate the Oxford Road 59 (OR 59)/Vansittart Avenue Bridge located approximately 400m north of Devonshire Avenue in Woodstock (Attachment 1). Rehabilitation of this structure, with a current bridge condition index (BCI) of 66.1, was identified as a priority in the 2022 Oxford County Bridge Needs Study (BNS) to ensure the bridge is maintained in a state of good repair. Planning and detailed design for this project was initiated as part of the approved 2022 Capital program.

The proposed deck replacement that is being completed as part of reconstruction is a project of a generational magnitude, meaning that such a substantial undertaking is only necessary once in a generation. It is not anticipated that the deck will require any asset renewal over the next 75 years of the asset.

The OR 59 Bridge spans the Canadian Pacific Railway (CPR) and Thames River and is part of a Class 2 major urban arterial roadway in the City of Woodstock with an Annual Average Daily Traffic (AADT) volume of 13,410 vehicles per day. As a primary transportation route that accommodates high traffic volumes, construction staging and traffic control measures are key considerations for this project to mitigate disruption for all road users and ensure business continuity of other essential services.

Construction staging for bridge rehabilitation typically involves full or partial closure with single-lane traffic control. From an engineering and construction perspective, full closure is generally preferred as it reduces overall construction duration and associated costs, produces a higher-end quality of work, and improves worker safety. Full closure, however, is not always feasible due to lack of suitable detour routes and negative impacts on residents, traffic, businesses, emergency response times and other municipal services (transit, garbage/recycling collection).

Partial bridge closure allows for the accommodation of traffic but requires work to be completed in two stages extending the overall duration of construction and potentially into cold weather periods that can impact the quality of work and increase costs. Partial closure also increases the safety risk for workers with the presence of live traffic within the construction zone.

To rehabilitate the OR 59 Bridge, construction can be completed in either one phase (full closure scenario) or two phases (partial closure scenario), of which both approaches present challenges, benefits, and drawbacks.

To assist in determining a preferred traffic staging approach, staff procured Paradigm Transportation Solutions Ltd. to complete a Traffic Closure Impact Assessment (TCIA). The assessment considered four different traffic staging options and analyzed existing and forecasted traffic operations at the following intersections:

- Oxford Road 30 and Oxford Road 17;
- Oxford Road 59 and Oxford Road 17;
- Oxford Road 4 and Oxford Road 17;
- Vansittart Avenue and Tecumseh Street;
- Vansittart Avenue and Devonshire Avenue;
- Devonshire Avenue and Oxford Road 4;
- Dundas Street and Oxford Road 30;
- Dundas Street and Vansittart Avenue \*; and
- Dundas Street and Oxford Road 4.

\* Analysis included the anticipated signal timing of the new stoplights planned in fall, 2023.

Another important consideration of the TCIA was the potential impact that the Canada's Outdoor Farm Show, held on Tuesday, Wednesday, and Thursday of the second week of September, would have on overall traffic patterns of a detour route. Each year it is estimated that over 40,000 exhibitors, vendors and attendees visit the show.

## Comments

### Traffic Control Option Alternative Solutions

As part of detailed design and project planning, construction staging and associated traffic control measures are assessed for any bridge construction project. Bridge rehab construction staging typically involves full closure or partial closure with single-lane traffic control.

Four (4) alternative solutions were identified as possible traffic control measures during construction:

- **Alternative 1** - full closure with detour routes using County Roads;
- **Alternative 2** - partial closure reduced to single lane with 2-Way Alternating Portable Temporary Traffic Signals (PTTS);
- **Alternative 3** - partial closure reduced to single lane with 1-way northbound traffic only; and
- **Alternative 4** - partial closure reduced to single lane with 1-way southbound traffic only.

### Evaluation of Traffic Control Option Alternative Solutions

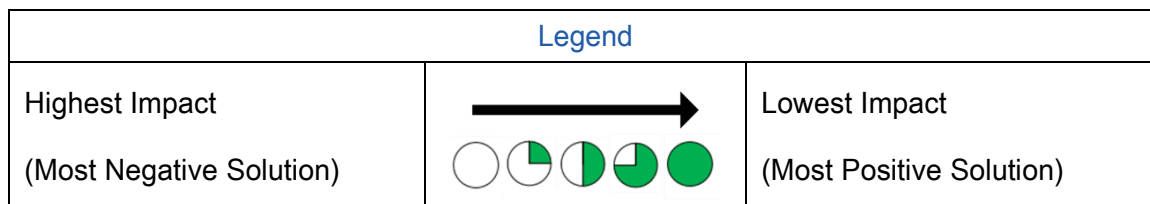
To determine the preferred traffic control approach during construction, staff considered the following criteria for identifying the preferred alternative:

- Impact on Emergency Services;
- Engineering and Constructability;
- Site Safety;
- Traffic Impact; and
- Project Cost.

The application of evaluation criteria led to the following findings for each traffic control alternative solution as summarized in Table 2.

Table 2 – Comparative Evaluation of Traffic Control Alternatives

Evaluation Criteria	Traffic Control Alternative			
	Full Closure (Alternative 1)	Partial Closure, Single Lane with 2-way PTTS (Alternative 2)	Partial Closure, Single Lane with 1-way Northbound (Alternative 3)	Partial Closure, Single Lane with 1-way Southbound (Alternative 4)
Impact on Emergency Services (Fire, Police, EMS)				
Engineering and Constructability				
Site/Worker Safety				
Traffic Impact				
Project Cost				
<b>OVERALL RATING</b>	 3.25 / 5	 2.50 / 5	 3.5 / 5	 3.0 / 5



**Alternative 1 – Full Closure with Detour Routes Using Local Roads (\$8.0 M)**

Traffic would be required to follow detours around the structure and no through-traffic would be permitted, including emergency services. Since the OR 59 Bridge is on a major arterial road in Woodstock and is a grade-separated crossing over the CP Rail and river, closure of the bridge to traffic during construction is not a preferred option for the Woodstock Fire Department. This solution would potentially have negative impacts on response times as the detour route would either take them to the outskirts of the City or have them travelling on roads with at-grade rail crossings that could be blocked by train traffic. To mitigate this impact, Paramedic Services would implement a temporary portable station near the north side of the closed bridge.

From a construction scheduling viewpoint, this would allow for the fastest and most predictable construction schedule and affords the greatest cost savings (~ \$1 M). This is also considered the safest option for construction workers since there is a low potential for conflict between traffic and workers on the bridge.

Full closure is the most preferred solution from an engineering perspective as it allows for the deck to be poured as one continuous slab and without loading on the bridge transient loading that may impact the concrete curing.

From a traffic detour viewpoint, this would have the most significant impact on residents who live on the north side of the construction site, and all residents and members of the travelling public who currently use that bridge daily. Full closure would also require a detour for Woodstock bus transit services. The County would be proposing two detour routes for vehicles:

1. West on Oxford Road 2 or Oxford Road 17 to Oxford Road 30 (11<sup>th</sup> Line); or
2. East on Oxford Road 2 or Oxford Road 17 to Oxford Road 4.

The proposed detour routes can be seen in Attachment 2 and would be the same as the proposed truck detour route.

**Alternative 2 – Partial Closure, Single Lane with 2-Way Alternating PTTS (\$9.0 M)**

Traffic is reduced to a shared single lane over the bridge, alternating between northbound and southbound traffic and is controlled utilizing portable temporary traffic signals.

This alternative results in long vehicular queuing and wait times for motorists, especially during am/pm peak hour (rush hour) times. This option is not preferred by the Woodstock Fire Department due to waiting time, the potential for queuing vehicles to reach the Fire Station on Vansittart Ave. and the high potential for vehicles to be unable to move out of the way of the fire truck in an emergency. While some delay in response would be experienced by Paramedic Services in this alternative, a temporary portable station would not be required.

This option is considered the least safe option for workers due higher potential for conflict from traffic constantly alternating in direction.

Single-lane traffic would have the most impact on the final construction quality of the bridge. This will require two concrete pours to construct the bridge deck and loading of the bridge as vehicles driving across it can impact the quality of the concrete during curing. The two-stage

construction will have an additional cost impact of up to \$1.0 M more than the Full Closure approach, due to longer duration to complete construction, multiple concrete deck pours, lost efficiencies during construction, alternating PTTS and could require work in cold weather at an increased cost.

**Alternative 3 – Partial Closure, Single Lane with 1-Way Northbound Traffic Only (\$8.87 M)**

Throughout the duration of the construction contract, a single lane for northbound traffic only will be maintained.

This is the preferred option for the Woodstock Fire Department as a result of all Woodstock fire stations being located on the south side of the construction site. While some delay in response may be experienced by Paramedic Services in this alternative, a temporary portable station would not be required.

This alternative is considered safer than Alternative 2 for construction worker safety, as a result of traffic being maintained from one direction; however, a proposed risk still exists compared to Full Closure.

Similar to Alternative 2, this scenario also requires a longer duration to complete and would cost up to \$870,000 more than a Full Closure. In addition, this approach could require work in cold weather at a further increased cost and, due to single-lane traffic during construction, has a greater impact on construction quality compared to a full road closure.

**Alternative 4 – Partial Closure, Single Lane with 1-Way Southbound Traffic Only (\$8.87 M)**

Similar to Alternative 3, throughout the duration of the construction contract, a single lane for southbound traffic only will be maintained.

This alternative is not preferred by the Woodstock Fire Department as it is more critical to get to the emergency site than to return to a base. While some delay in response may be experienced by Paramedic Services in this alternative, a temporary portable station would not be required.

Alternative 4 is considered safer for construction workers than Alternative 2, as traffic is only maintained in one direction.

However, similar to Alternative 2 and 3, this scenario also has a greater impact on the quality of the construction compared to the Full Closure approach. As well, this approach requires a longer duration to complete, which is estimated to cost up to an additional \$870,000 compared to the Full Closure approach and could require work in cold weather at a further increased cost, due to single-lane traffic during construction.

As well, Woodstock Police Services communicated that they would be able to continue services with minimal, if any, impact on all alternative solutions. It was also assumed, regardless of the preferred traffic solution chosen, that a truck traffic detour route would be implemented, as shown in Attachment 2.

## Selection of Preferred Alternative

Based on the results of the comparative evaluation as summarized in Table 2, staff identified the preferred traffic staging solution to be **Alternative 3 – partial closure reduced to a single lane with 1-way northbound traffic only** for the following reasons:

- Least impact on Woodstock Fire Department response times, as a result of maintaining constant northbound traffic for vehicles requiring access to portions of Woodstock located north of the construction site.
- The bridge can be designed and constructed while maintaining a single lane open to traffic in order to maintain a key connecting link for the community.
- Maintaining one-way northbound will provide some mitigation of overall traffic diversion from the construction site. This will help reduce putting the other local roads over capacity. It maintains access north of the bridge for transit, waste collection vehicles and emergency service vehicles.
- From the perspective of workplace safety for construction workers, the provision for dedicated one-way traffic throughout construction affords consistent and predictable vehicle movements throughout the construction site as opposed to Alternative 2 (Partial Closure with single lane, alternating 2-way PTTS).
- While approximately \$870 K more expensive than Alternative 1 - Full Closure, this preferred alternative similar to Alternative 4 (Partial Closure with single lane, 1-way southbound) is approximately \$130 K less expensive than Alternative 2 (Partial Closure with single lane, alternating 2-way PTTS) as no temporary signals, construction flagging, etc. are required.



## Conclusions

Each year construction projects on roadways impact residents, businesses, transit and emergency services when they can no longer travel their preferred route. Construction, such as the work proposed for the OR 59 Bridge, is a generational project and will benefit the residents and travelling public that have used this structure for many years. While there is no perfect traffic staging proposal that can meet all the needs of the project and the community, staff believe that proceeding with **Alternative 3 - partial closure reduced to a single lane with 1-way northbound traffic only** is the preferred recommendation for this project.

## SIGNATURES

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### Report Author:

Original signed by

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### Departmental Approval:

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### Approved for submission:

Original signed by

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Benjamin R. Addley  
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## ATTACHMENTS

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Attachment 1: Bridge 59755 Location Map, August 2023  
Attachment 2: Bridge 59755 Traffic Detour Routes