



BURNSIDE

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Appendix G

GO Station and Bus Loop Memo

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***If technical reports are required in an alternative format for accessibility needs, please contact:**

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Memorandum: Precinct Bus Loop Options Feasibility Review

Date: November 19, 2021 **Project No.:** 300051307
Project Name: Regional Road 43 (Bridge Street) and Adjacent Municipal Roads
Client Name: Niagara Region
To: Maged Elmadhoon, P.Eng
From: Ray Bacquie, P.Eng., MBA and
Fraser Robinson, P.Eng.

1.0 Introduction

The design of the GO Transit Station on the VIA Station site is not formally part of the Bridge Street Municipal Class Environmental Assessment (MCEA) and will be a separate planning and design process. Options for the station design, however, were developed with the understanding that the vehicular and bicycle lanes proposed may be impacted by on-street bus bays.

In support of the Environmental Assessment for Regional Road 43 (Bridge Street), Burnside developed alternative concepts to provide an alternative to the on-street bus bays initially proposed in the Precinct Area Plan, to allow the preferred Bridge Street configuration. The concept includes using the existing VIA station parking area west of the station building to construct off-street bus loops for GO Transit, City of Niagara Falls Transit and, if possible, Charter buses. Vacant land east of the VIA station was used to develop a concept to relocate up to three WEGO buses from on-street bays to an off-street bus loop.

The analysis addresses the commitments to Via Rail operations for 8 parking spaces adjacent to the Via and GO rail station and maintain maintenance access to the rail rack access.

The intent of these options is to allow a continuous bike lane on both sides of Bridge Street in the near term and allow sufficient width for a centre left turn lane on Bridge Street through the station area in the ultimate configuration.

2.0 Design Considerations

2.1 Bus Capacity Needs and Opportunities

The original Precinct Plan accommodated buses in an off-street bay west of the GO Station and on-street, including:

- 2 City bus bays (off-street bus bay west of the GO Station)
- 1 GO Transit bus bay (off-street bus bay west of the GO Station)
- 1 Articulated bus bay (off-street bus bay west of the GO Station)
- 3 bus bays (on-street west of the GO Station)
- 3 WEGO bus bays (on-street east of the GO Station)
- 2 Private (intercity) bus parking spaces (on-street east of the GO Station)
- 15 auto parking spaces for VIA staff and others (off-street east of the GO Station)

Through discussions with Region and City staff, the bus needs and additional preferred bus bays were refined including increased likelihood of use of articulated rather than standard buses, as defined below:

- 1 x 50ft I-Bus GO Transit bus bay
- 1 x 50ft I-Bus Private (intercity) bus bay
- 3 x 40ft B-12 bus bays
- 2 x 60ft A-Bus bus bays
- 2 x 60ft WEGO bus bays
- 1 x 40ft WEGO B-12 bus
- 8 auto parking spaces for VIA staff and others

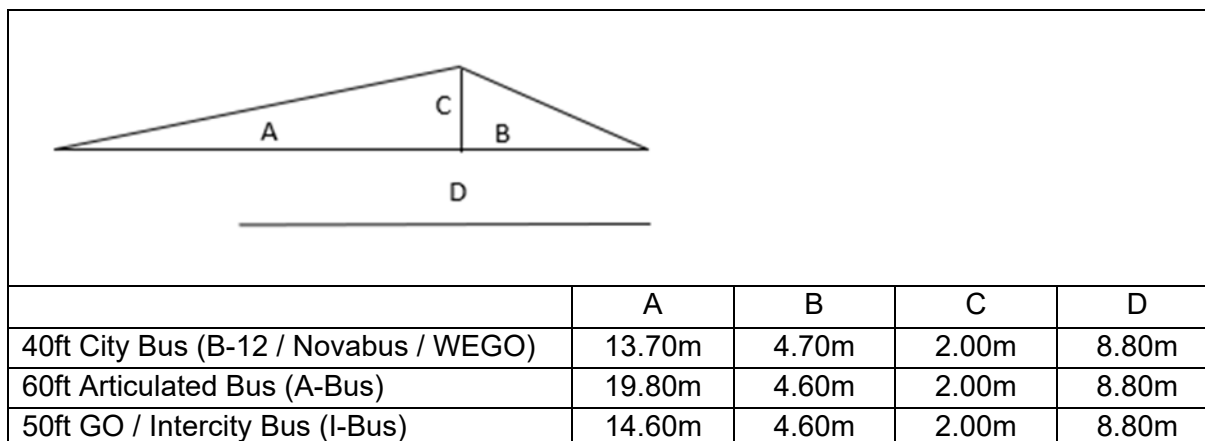
There will also be the need for accommodation for 1 to 2 GO bus spaces either in the bus loops or in staging areas within proximity to the GO station.

2.2 Design Requirements

Bus loop alternatives were developed incorporating operating needs such as bus maneuverability, boarding and alighting requirements and pedestrian and cyclist flows and safety. Minimum dimensions for GO rail operations were considered including platform and shelter requirements and fencing, however it is noted that the bus bay configurations may not require adherence to the GO rail / Metrolinx standards.

Consideration was given to the bus drive aisle and loading zone requirements for GO Transit buses based upon Metrolinx Bulletin FEA-002 "Amendment Notice: Bus Infrastructure", August 12, 2020 modifications to the DRM. The requirements include consideration of minimum space for bus passing in the bus loop and minimum horizontal bus loading / clearance platform space. Bus bay dimensions used are as summarized in Figure 2.1.

Figure 2.1: Bus Bay Dimensions



In developing and assessing the bus bay alternatives, we note the following:

- Steering while stopped was modelled only for the maneuver to leave the bus bays;
- No reversing of busses was modelled;
- Maneuvers were generally modelled at 5 kph when entering / leaving the bus bay and otherwise at 15 kph and
- The 0.5m clearance required by Metrolinx Bulletin FEA-002 between the GO bus travelled path and all curbs and above-grade features could not be met everywhere. Discussions should be held during detailed design to confirm if Metrolinx can accept limited clearance reductions the Niagara Region's bus loop provided detailed design cannot resolve the clearance restrictions.

3.0 Bus Loop Configuration Options

Bus Loop concepts were developed to assess the feasibility of accommodating all bus bay capacity needs. The analysis included the development and assessment of the feasibility and relative merits of one-way and two-way bus loop concepts for bus bays.

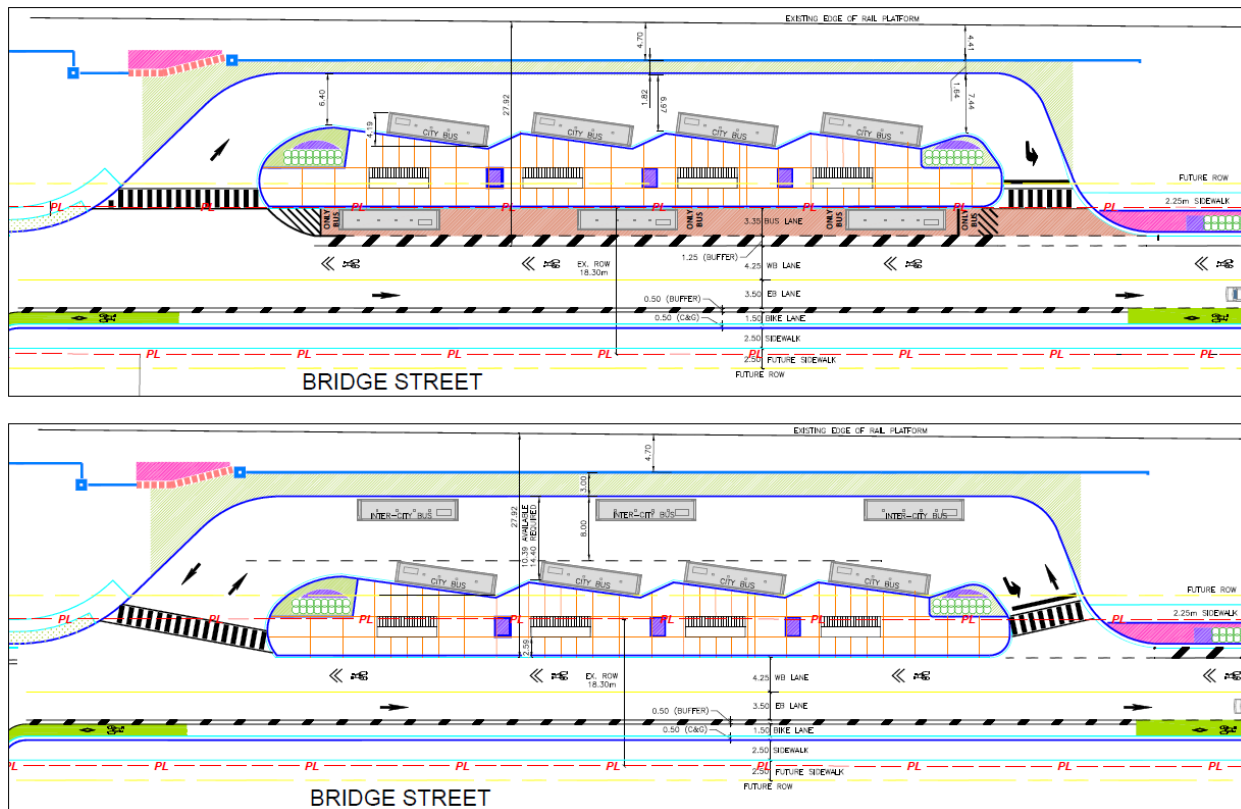
3.1 Two-Way Operation Bus Loop

In developing bus loop options, consideration was given to two-way operations. The initial concept for two-way bus operation in the West Bus Loop was deemed too constrained due to busses moving in opposite directions not being able to pass.

Burnside refined the two-way concept by moving the north bus platforms as close to the rail corridor as possible. The revision included the removal of proposed shelters from the conceptual layout to allow additional north-south width for the bus loop was to allow the creation of parallel or sawtooth eastbound bus bays along the north side of the north Bridge Street sidewalk such that there is adequate clearance to allow moving busses to passed parked busses.

Figure 3.1 illustrates the one-way and two-way bus loop concept options on the west side of the GO station. The options maximize the available space west of the station building and utilize the available space between the rail platform and Bridge Street, while maintaining road and rail operations.

Figure 3.1: West Side Bus Bay Options



It is noted however, that this configuration only allows only one direction of bus to operate at a time which will result in delays and may pose safety concerns. We anticipate the following additional operational difficulties involved in creating a two-way bus loop:

- Eastbound buses would be boarding / disembarking passengers directly onto the north side of the Bridge Street north sidewalk; the loading / queuing space would be in the direct path and obstruct pedestrians using the sidewalk.
- A two-way bus loop that boards passengers from the north side of the sidewalk would require removal of the security fence between the bus loop and Bridge Street to allow for passenger boarding and alighting. This would, however, would also allow pedestrians to short-cut mid-block across Bridge Street and the two-way bus loop. We perceive safety issues in having anything less than a continuous barrier between the sidewalk and the bus loop.

- Pedestrians who are transferring between buses may choose to walk through the bus loop interacting with moving buses; there is insufficient space to provide fencing or other controls to limit pedestrian movement within the bus loop.
- It is noted however, that even with the turning bulb, the I-Bus could not complete a left turn in or out without being in conflict with the eastbound bike lane on Bridge Street. So, for two-way operations eastbound outbound left turns from the bus loop would be problematic.
- An eastbound bus exiting the bus loop would have to cross the westbound lane of Bridge Street to continue east and straighten out in the eastbound lane before the stop bar at Erie Avenue. While the maneuver may technically be possible at low speed, it introduces a left turn driveway entrance very close to the Bridge Street / Erie Avenue intersection with associated safety and traffic concerns.

Overall, one-way bus operation is preferred in the bus loops. The development of one-way bus loops considered maximizing available lands to facilitate more bays.

3.2 West Bus Loop One-way Bus Configuration Options

The concept to remove the busses from one-street bays to an off street, one-way bus loop was expanded west beyond the existing parking lot to maximize available space. The design concept accommodates the needs of GO Transit, Niagara Falls Transit and one other standard vehicle bus that could be used for Charters, as described below:

- 2 x 50ft I-Bus GO Transit bus bay
- 2 x 40ft B-12 bus bays (for City buses)
- 2 x 60ft A-Bus bus bays (for City buses)
- 1 x 50ft I-Bus Additional bus bay (for Private intercity bus)

The designs incorporate a sidewalk to accommodate pedestrian flows along Bridge Street to the GO station. It is recognized that sidewalk north side of Bridge Street will not extend west of the GO station area in the Interim, however, when additional property is acquired on the north side, a sidewalk will be provided.

Fencing along the Bridge Street frontage of the bus loop is also incorporated into the design to discourage pedestrian movements through the bus loop and discourage midblock pedestrian movements across Bridge Street. Pedestrian interaction with buses and traffic would be undesirable from a traffic safety perspective.

Recognizing the available space limitations, the approach to accommodating GO buses between scheduled trips, an additional staging lay-by may need to be identified either in the future parking lot on the southwest corner of Bridge Street and Erie Avenue, or at an on-street location near the precinct.

3.3 East Bus Loop, One-Way Operation

The configuration of the East Bus Loop is constrained by the existing VIA and GO rail station building to the west and grade to the east. (It is recognized that the bike shelter could be relocated if necessary). The east entrance to the East Bus Loop cannot be moved further east due to:

- An existing retaining wall immediately east of the conceptual location that would introduce grade issues if it were disturbed;
- Eight parking spaces requested for GO Transit / VIA staff which have been accommodated between the east entrance and the cell tower but generally occupies all of the additional available space.
- Review of the vehicle path also revealed that the buses leaving the East Bus Loop required some length along Bridge Street to “straighten out” the back end of the bus enough to be clear of the bike lanes before having to stop at Erie Avenue. Moving the west (exit) driveway of the east bus loop even further west may cause buses leaving the loop to obstruct the westbound bike lane.

As a result, the East bus loop is limited to two 60-foot articulated bus spaces. To accommodate the necessary three WEGO busses an on-street space will need to be provided. A design concept, however minimized the impact of a WEGO on-street bus bays by inseting the bay. This reduces the conflicts with the westbound dedicated bike lane; the north sidewalk can be set back far enough from the prevailing north curb to allow a single westbound WEGO on-street bus bay while maintaining the two west-bound off-street bus bays. Fencing behind the Bridge Street sidewalk within the limits of the bus loop is also incorporated into the design to discourage pedestrian movements through the bus loop.

The design concept has less an 8.0 m bus loop width but given only two bus bays with one operator (WEGO), operations is seen as manageable. To maintain the bus operations outside the VIA Rail lands, the bus loop walkway is 1.8 m at the narrowest point. Consideration could be given to negotiating with VIA Rail to provide for additional width if necessary. The impact to VIA Rail is unknown at this time.

4.0 Bus Loop Configurations and Feasibility

The preferred alternative would be to maximize the available length of the bus loops and provide one-way flow for both the West and East bus loops as illustrated in Figure 4.1 and Figure 4.2. The designs illustrate that it is feasible to operate the most buses with bus bays that are in off-street loops that do not significantly impact Bridge Street or the ability to provide active transportation facilities.

Figure 4.1: Proposed Bus Loop Configuration – West Side

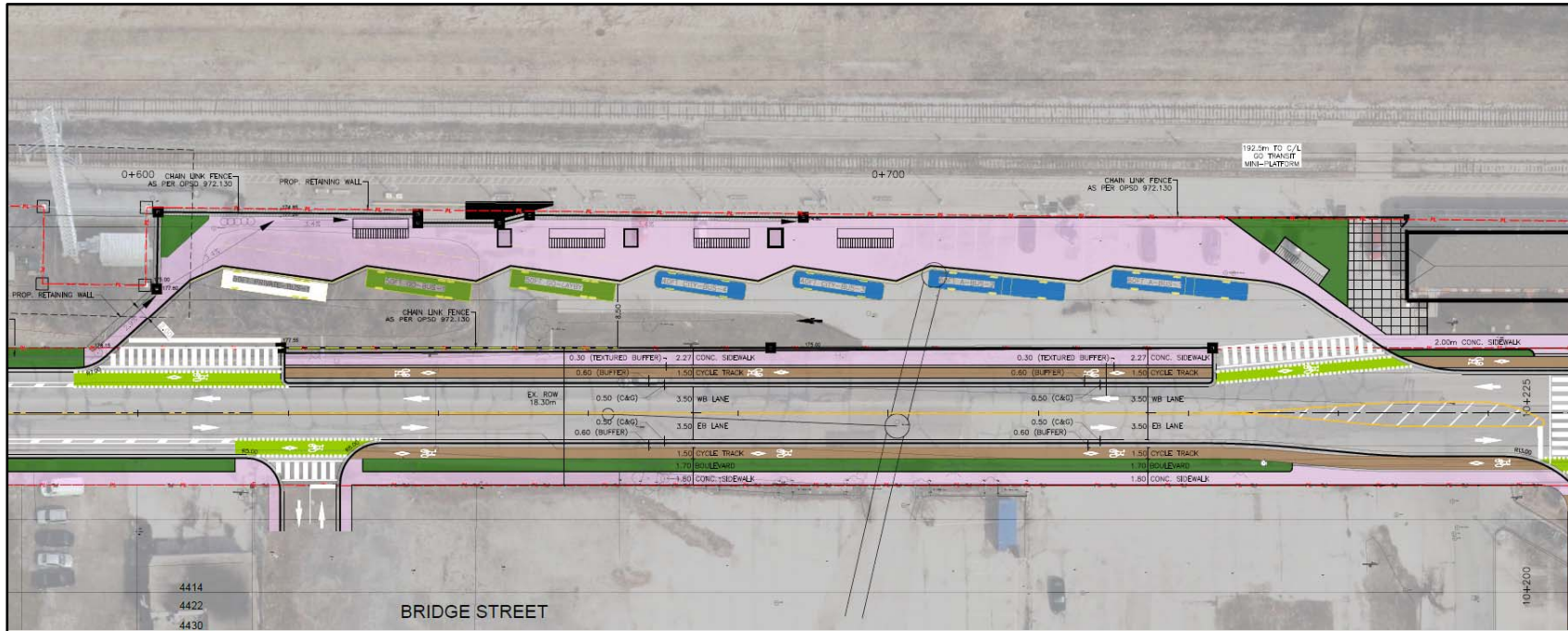
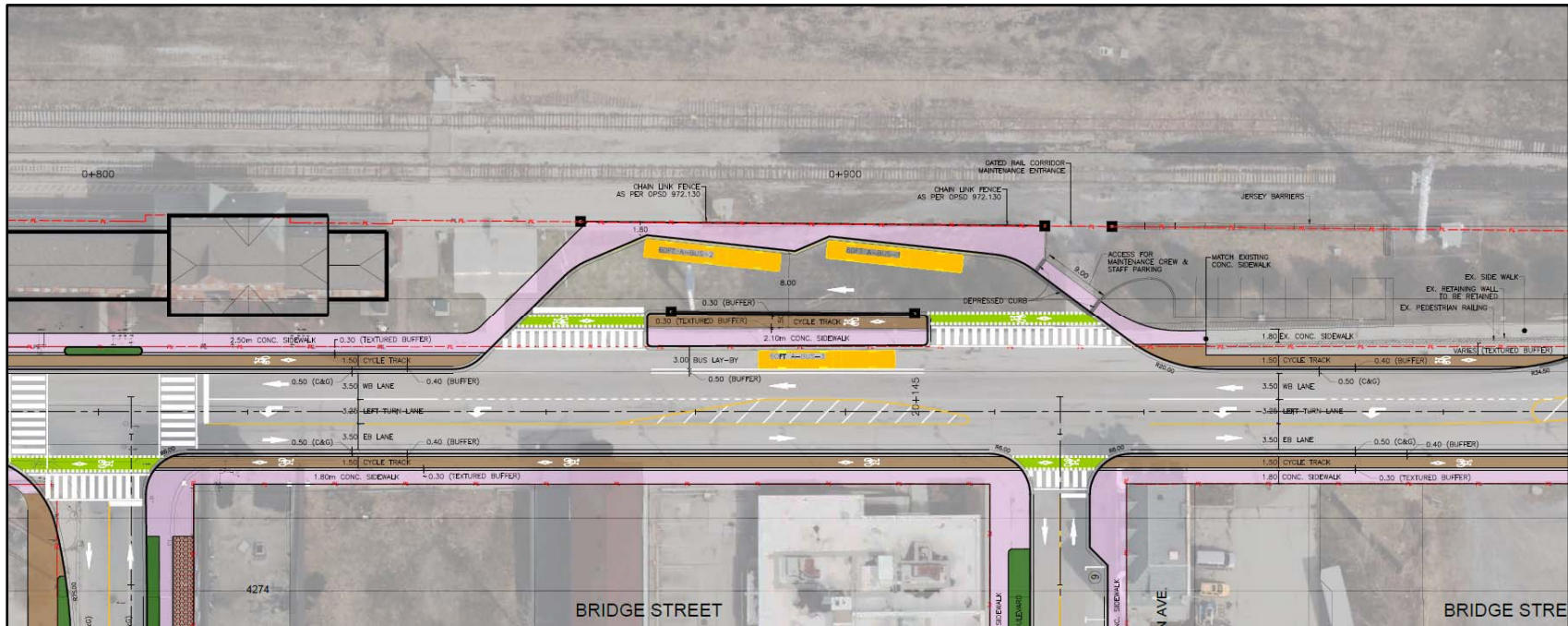


Figure 4.2: Proposed Bus Loop Configuration – East Side



Ray Bacquie, P.Eng.

Enclosure(s)

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