THE UNIVERSITY OF BRITISH COLUMBIA
School of Community
and Regional Planning (SCARP)

BUS PRIORITY IN MOTION

An Implementation Toolkit for Metro Vancouver

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Acknowledgment

This project concerns land in Metro Vancouver municipalities situated on the unceded, traditional territories of the Coast Salish First Nations peoples. We recognize that transportation systems play a role in reconciliation with Indigenous peoples and commit to engaging with the tensions and opportunities at the nexus of reconciliation and the project scope.

As a team, we acknowledge the time and resources generously provided by UBC's School of Community and Regional Planning. The support and guidance from our mentors David Kuperman and Jim Aalders from HDR Inc. have contributed immensely to this work and guided our process. We also extend gratitude to the City of Surrey Planning and Engineering teams, TransLink, and Access Planning for their time and insight.

Contents

Abbreviations and glossary

Bus Priority Measures (BPM)	Interventions that prioritize bus movement on the road network through physical, technological, or regulatory means
Right-of-way (ROW)	Through-space acquired by a governing entity for a devoted transportation purpose
Curbside management	The act of organizing various demands for curb space through clear rules about when, where, and under what conditions specific uses are permitted
Queue jump lanes	Lanes that are either short dedicated transit lanes or shared turn pockets that allow buses to bypass traffic at an intersection
Bus bulbs	Curb extensions that allow buses to pick up and drop off customers without exiting and re-merging into the traffic lane, allowing transit customers an area to wait without blocking the sidewalk
Turn Pockets	Separate lanes for vehicles turning right or left at an intersection or driveway. Turn pockets provide space for vehicles to wait for a dedicated turn signal and for pedestrians to cross an intersection
Transit Approach Lane	Short, dedicated lanes that separate buses from traffic queues at intersections in order to bypass queuing vehicles
Dedicated Bus Lane	Lanes reserved for the exclusive use of buses
Auxiliary Lane	A lane placed adjacent to a through lane for a specific use such as turning or merging
Slip Lane	A road adjustment that allows drivers to make a right turn without actually entering a intersection
Business Access and Transit (BAT) Lane/ Peak Hour Lane	Lanes that are reserved for the exclusive use of buses (and sometimes shared vehicles or access lanes) during designated peak periods and available for general use during off-peak times
Curb Zone	The area of the street between the sidewalk and road
Pedestrian Activated Crossing	Timed, pedestrian intersection crossing signals
Passive Signal Priority (PSP)	Adjusting signal timing on a corridor to promote the uninterrupted flow of all vehicles between intersections. This is a pre-timed series of green lights
Transit Signal Priority (Active) (TSP)	Set of tools and traffic management systems that detect transit vehicles and modify traffic signals to prioritize transit movements
Modal Hierarchy	The prioritization of various modes of travel and street users

General Purpose (GP) Traffic	Single-occupancy vehicles, trucks or other non-active road users
Developer Dedication	Dedication of land, road space, or lane widening provided to a municipality or transit authority that can be a condition of a developer permit issuance or rezoning application
Community Amenity Contribution (CAC)	In-kind or cash contributions provided by property owners when council grants development rights through rezoning. CACs help the city build and expand community facilities
Development Cost Charge (DCC)	Required monetary contributions by property developers to the city that pay for new or expanded infrastructure such as sewer, water, drainage, parks or roads necessary to service the demands of that new development
Arterial Road	A high-capacity urban road that sits below freeways/highways on the road hierarchy. In Metro Vancouver, arterial roads are under TransLink authority
Shared Vehicles	Vehicles carrying multiple individuals, either on a rental basis or a peer-to-peer model. Examples are taxis or ride-share apps
High Occupancy Vehicles (HOV)	A road vehicle carrying more than one person, which may be granted special lanes or access permissions to encourage ride-sharing

Executive Summary

Bus Priority in Motion is a toolkit that TransLink, municipalities, developers and other stakeholders can use to implement Bus Priority measures on the ground while avoiding common barriers.

The three objectives of this report are to:

- Understand the common barriers to Bus Priority implementation in different contexts,
- Navigate possible alternatives to mitigate the barriers, and
- Apply the toolkit on a diverse land use corridor in Metro Vancouver - 152nd St in Surrey, BC.

The toolkit summarizes the following findings:

Part 1 - Common Barriers to Bus Priority Implementation

The toolkit navigates the implementation of Bus Priority Measures by identifying five key barriers: Limited Right-of-Way, Impacts on Access, Signal Priority Logistics, Land Acquisition Concerns, and Public Communications. The toolkit delves into specific barriers under each section and proposes alternatives to approach Bus Priority measures within the specified context. Global case examples illustrate the practical implications of the barriers.

Part 2 - Application of the Toolkit in Metro Vancouver: 152nd St, Surrey

This section applies the toolkit to a diverse land use corridor in Metro Vancouver, 152nd Street. Due to the diverse land uses, specific right-of-way challenges, and future rapid transit plans, 152nd Street was identified as a preferred corridor. The case study application is organized in 3 phases, with individual intersections prioritized based on level of congestion, future development potential, and ease of Bus Priority implementation.

Conclusion

This toolkit helps readers understand why Bus Priority is challenging to implement and how to begin strategically thinking around the barriers. The hope is that anyone reading this toolkit will approach Bus Priority on a corridor with a holistic understanding of the considerations for various street users and the complex network of stakeholders involved in any decision. Ideally, this informed approach to Bus Priority implementation will lead to projects that bring people together rather than apart, and help buses move faster across the region.

About this Toolkit

What is Bus Priority?

Bus Priority falls under the category of Transit Priority measures, which are techniques that reduce delays for buses and transit vehicles on congested roads and corridors. These techniques can range from physical space separation, to operational solutions like Transit Signal Priority, or enforcement regulations that prioritize buses at the most congested times of day.

Why does Bus Priority matter?

Bus Priority has been proven to deliver significant benefits for passengers, operators, transit authorities, and the region as a whole. When delays are minimized, buses can effectively move high quantities of people using minimal road space, producing little to no emissions, and reducing mobility barriers for the public. The speed, quality, and efficiency of bus service are improved when buses avoid congestion and delays, further reducing operational costs and leading to a cycle of reinvestment in transit. Acknowledging the hierarchy of modes on a street is an important enabler for cities to deliver effective, equitable transportation systems.

What is the purpose of this toolkit?

This toolkit is designed to highlight the most common barriers to Bus Priority implementation. By better understanding what stands in the way of reliable bus service, we can identify opportunities to overcome barriers, create more equitable streets, and build legibility and confidence in transit. We draw from existing resources to help readers understand how, when, and why certain streets should prioritize buses and what the implications are for other modes.

Who is impacted by Bus Priority?

Everyone who uses streets

Transit Authorities

Local and Senior Governments

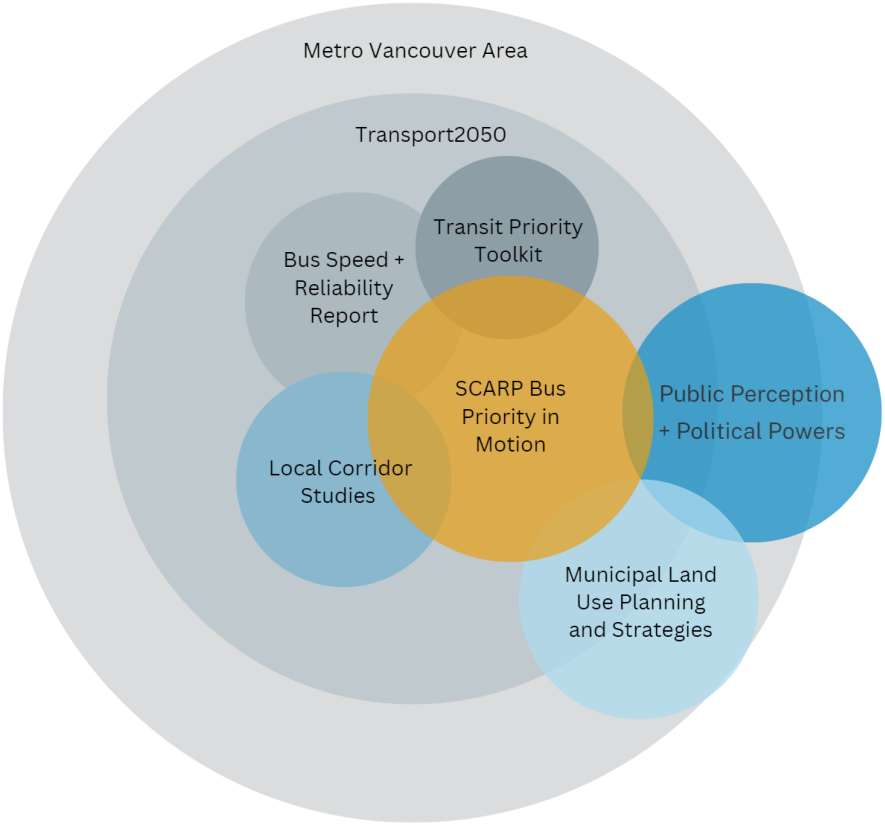
Local Businesses and BIAs

Filling the Gap

Bus Priority implementation is complex since it impacts diverse stakeholders and groups of people. Local government and transit authorities must collaborate across disciplines to achieve common strategic goals across the region.

Within the Metro Vancouver policy context, this toolkit falls under Transport 2050, TransLink's Bus Speed and Reliability Toolkit, the Transit Priority Toolkit, and municipal land use plans. However, municipal land use plans and policy intersect with areas outside of the transportation scope, balancing needs across a variety of sectors in Metro Vancouver. Public perception and opinion of Bus Priority, as well as the political response to its implementation, may prioritize different needs and can be influenced by factors outside of the region.

The Bus Priority in Motion Toolkit falls at the nexus of these areas. Linking municipal plans and public perception to Transport 2050, this toolkit offers a companion to municipalities interested in implementing Bus Priority on local corridors.



How to use this Toolkit

Implementation barrier to bus priority measures

Categories for bus priority implementation

Bus
Level **B-**1

Pedestrians
Level **P-**1

Cyclists
Level **C-**1

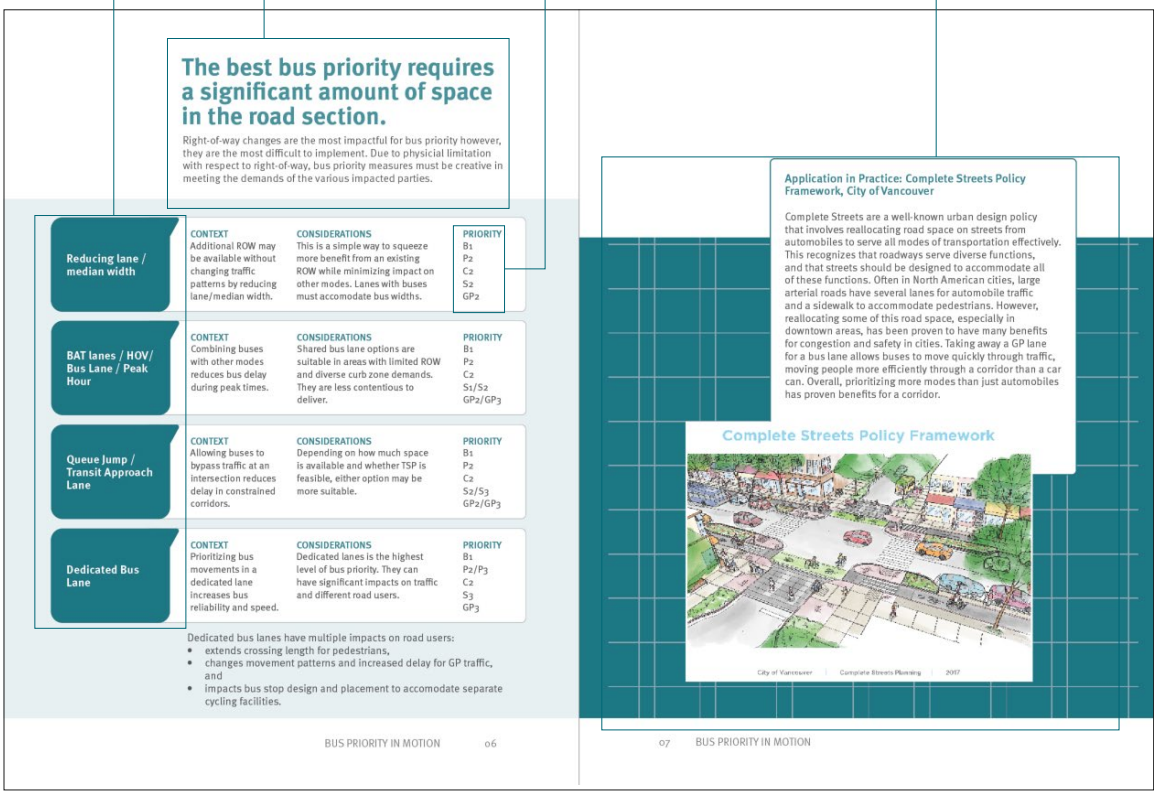
General Purpose Traffic
Level **GP-**1

Shared vehicle/taxi
Level **S-**1

Levels of Priority
HIGH - Level X-**1**
MEDIUM - Level X-**2**
LOW - Level X-**3**

The combined impacted parties and their level of priority help understand how bus priority measures would impact all in specific contexts.

Case study or practical examples illustrating the application



The best bus priority requires a significant amount of space in the road section.

Right-of-way changes are the most impactful for bus priority however, they are the most difficult to implement. Due to physicial limitation with respect to right-of-way, bus priority measures must be creative in meeting the demands of the various impacted parties.

	CONTEXT	CONSIDERATIONS	PRIORITY
Reducing lane / median width	Additional ROW may be available without changing traffic patterns by reducing lane/median width.	This is a simple way to squeeze more benefit from an existing ROW while minimizing impact on other modes. Lanes with buses must accomodate bus widths.	B_1 P_2 C_2 S_2 GP2
BAT lanes / HOV/ Bus Lane / Peak Hour	Combining buses with other modes reduces bus delay during peak times.	Shared bus lane options are suitable in areas with limited ROW and diverse curb zone demands. They are less contentious to deliver.	B_1 P_2 C_2 S_1/S_2 GP_2/GP_3
Queue Jump / Transit Approach Lane	Allowing buses to bypass traffic at an intersection reduces delay in constrained corridors.	Depending on how much space is available and whether TSP is feasible, either option may be more suitable.	B_1 P_2 C_2 S_2/S_3 GP_2/GP_3
Dedicated Bus Lane	Prioritizing bus movements in a dedicated lane increases bus reliability and speed.	Dedicated lanes is the highest level of bus priority. They can have significant impacts on traffic and different road users.	B_1 P_2/P_3 C_2 S_3 GP_3

Dedicated bus lanes have multiple impacts on road users:
- extends crossing length for pedestrians,
- changes movement patterns and increased delay for GP traffic, and
- impacts bus stop design and placement to accomodate separate cycling facilities.

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Application in Practice: Complete Streets Policy Framework, City of Vancouver

Complete Streets are a well-known urban design policy that involves reallocating road space on streets from automobiles to serve all modes of transportation effectively. This recognizes that roadways serve diverse functions, and that streets should be designed to accommodate all of these functions. Often in North American cities, large arterial roads have several lanes for automobile traffic and a sidewalk to accommodate pedestrians. However, reallocating some of this road space, especially in downtown areas, has been proven to have many benefits for congestion and safety in cities. Taking away a GP lane for a bus lane allows buses to move quickly through traffic, moving people more efficiently through a corridor than a car can. Overall, prioritizing more modes than just automobiles has proven benefits for a corridor.

Complete Streets Policy Framework

City of Vancouver | Complete Streets Planning | 2017

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Project phasing is done based on ease of implementation. Note, in some cases it is harder to implement BPM despite high bus delays due to the priorities outlined in the toolkit.

Land-use	Congestion		
	high	medium	low
Town Centre	Phase 1	Phase 1	Phase 2
Commercial	Phase 1	Phase 2	Phase 2
Residential	Phase 2	Phase 2	Phase 3
Agricultural Land Reserve	Phase 3	Phase 3	Phase 3

Policy scope within which the recommendations are based on

Intersection description

Solutions already identified by municipality and/or TransLink

Phase 1: High Priority

This phase recommends solutions for intersections along 152nd Street with the highest congestion and delay, along with the most future development opportunities.

152nd St @ 104th Ave

The intersection at 104th Ave is located within Guildford Town Centre's most congested and busy area. It is located in area of mixed-use, commercial and urban residential uses.

PROBLEMS

Limited Right-of-way

Impacts on Access

Land Acquisition

MUNICIPAL SOLUTIONS

The City of Surrey plans to introduce queue jump lanes, BAT lanes, TSP as well as adequate ROW that can accommodate stations, expanded pedestrian space, active transportation, and bus transfers. The City will locate commercial loading activities off-street and install fully protected left turn only phases.

RECOMMENDATIONS

Securing adequate ROW may require land acquisition through developer dedication. We recommend creating a municipal process for land acquisition, as well as collaborating with local BIAs and resident groups on a phased public engagement campaign to inform BPM implementation.

CONSIDERATIONS

Curbside space at this intersection is primarily used by commercial occupants and pedestrians accessing businesses and bus stops. While balancing high demand for curbside across users, buses should be equitably prioritized. Municipalities must consider the tradeoffs of land acquisition for additional ROW.

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RELEVANT POLICY SCOPE FROM THE TOOLKIT

The Guildford Plan is a long-term plan to guide growth in the Guildford Town Centre area over the next 30 to 50 years. The Plan describes how Guildford Centre will accommodate growth and meet City objectives related to housing, transportation, and land use. Its timing coincides with the future Surrey-Langley Skytrain extension. The Guildford Plan was approved by Council on October 30, 2023. Growth in the Guildford Plan Area will primarily be concentrated in the town centre and along 104 Avenue which is a major transportation corridor. In the long term, rapid transit will be provided on both 104 Avenue and 152 Street.

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Common implementation barriers to Bus Priority Measures

This section discusses the common barriers that municipalities face in the implementation of Bus Priority measures. These can range from lack of road space to the sentiment of those using the streets. This section identifies impacted parties and identifies pathways to findings solutions. Finally, this section uses existing case examples from the region and around the world to highlight how these could be implemented in the context of Metro Vancouver.

The following case examples have been studied as part of each barrier:

LIMITED RIGHT-OF WAY

- Curbside Demand Management, Vancouver, BC
- Complete Streets Policy Framework, Vancouver, BC

IMPACTS ON ACCESS

- Granville Street Access Strategy, Vancouver, BC
- Pedestrian Cycles and Bus Delay, San Francisco, CA
- Traffic Signal Timing Guidelines, Vancouver, BC

LAND ACQUISITION CONCERNS

- Lions Gate Bridge bus lanes, West Vancouver, BC

SIGNAL PRIORITY LOGISTICS

- NACTO Active Transit Signal Priority Guide
- Toronto Transit Commission Signal Priority, Toronto, ON

PUBLIC COMMUNICATIONS

- Transit Street Communications Campaign, Halifax, NS
- RapidBus Engagement Strategy (R2 vs R6), Metro Vancouver

Limited Right-of-Way

The limited space within an existing Right-Of-Way (ROW) is one of the most contested barriers for Bus Priority Implementation. Due to resource constraints and time, working within the existing ROW may be the only feasible option. There is only a certain amount of space available and creating priority measures for buses may involve changing or removing existing priority for other road users.

Understanding the impacted parties and the trade-offs of ROW reallocation is a critical task that informs how streets are designed and for whom.

Buses traveling in GP traffic lanes experience the same congestion as other vehicles.

Targeted Bus Priority measures that recreate hierarchy within the existing ROW can reduce bus delay and equitably move people through a corridor. For example, a bus traveling with 50 passengers should be prioritized over a single private vehicle with one occupant.

	CONTEXT	CONSIDERATIONS	PRIORITY
Primary Traffic Lane	Sections where buses share lanes with GP traffic cause bus delay.	Moving people should be prioritized over moving vehicles. Allocating dedicated lanes for buses may cause some delay to GP traffic.	B-1 P-2 C-2 S-1/S-2/S-3 GP-3
Auxiliary Lane	Bus movements must navigate the needs of turning GP traffic.	At high bus volume corridors, turning GP traffic should be regulated and/or minimized in order to reduce bus delay.	B-1 P-2/P-3 C-2 S-2/S-3 GP-2

Specific barriers associated with access lanes are detailed in Page 10.

	CONTEXT	CONSIDERATIONS	PRIORITY
Curb Zone	Bus drop-off/pickup must navigate diverse street users and their curbside demands.	Bus services are highly dependent on curbside space. While balancing high demand for curbside across users, buses should be equitably prioritized.	**Context-dependent** See Case Study on Pg 04

The demands on curb zone differ by modes. A curb zone could be used to improve bus speeds through bus bulbs or for bike rack placement, patios for pedestrians, drop-off/pick-up zones for taxis, and parking for GP. Curbside parking is common in municipalities across Metro Vancouver and changing this priority can be challenging.

CURBSIDE DEMAND MANAGEMENT

Example 1: The 2024 R6 RapidBus implementation in Surrey, BC involved re-purposing traffic lanes to prioritize better bus movement. The road contained up to 6 lanes of traffic at certain points, so one of these lanes in each direction was re-purposed as a bus lane that other vehicles could still use for turning. In areas where the road was only 4 lanes wide, lanes were narrowed to the minimum standard width to add bus lanes on each side within the existing width (TransLink 2023).

Example 2: On 49th Ave in Vancouver, curbside parking is banned at peak traffic periods in the afternoon, transforming the curbside lane into a bus lane, with allowances for vehicles to enter the lanes to turn (City of Vancouver 2024).

Current **Proposed**

The best Bus Priority requires a significant amount of road space.

Right-of-way changes are the most impactful for Bus Priority, however, they are the most difficult to implement. Due to physical limitations and culturally-informed driver behaviour, Bus Priority measures must be creative in meeting the demands of the various impacted parties.

	CONTEXT	CONSIDERATIONS	PRIORITY
Reducing lane / median width	Additional ROW may be available without changing traffic patterns by reducing lane/median width.	This is a simple way to squeeze more benefit from an existing ROW while minimizing impact on other modes. Lanes with buses must accommodate bus widths.	B1 P2 C2 S2 GP2
BAT lanes / HOV/ Bus Lane / Peak Hour	Combining buses with other modes reduces bus delay during peak times.	Shared bus lane options are suitable in areas with limited ROW and diverse curb zone demands. They are a compromise solution in areas with competing demands.	B1 P2 C2 S1/S2 GP2/GP3
Queue Jump / Transit Approach Lane	Allowing buses to bypass traffic at an intersection reduces delay in constrained corridors.	Depending on how much space is available and whether TSP is feasible, either option may be more suitable.	B1 P2 C2 S2/S3 GP2/GP3
Dedicated Bus Lane	Prioritizing bus movements in a dedicated lane increases bus reliability and speed.	Dedicated lanes is the highest level of Bus Priority. They can have significant impacts on traffic and different road users.	B1 P2/P3 C2 S3 GP3

Dedicated bus lanes have multiple impacts on road users:

- extends crossing length for pedestrians, if not converted from existing GP lanes, and
- changes movement patterns and increased delay for GP traffic, impacts bus stop design and placement to accommodate separate cycling facilities.

Application in Practice: Complete Streets Policy Framework, City of Vancouver

Complete Streets are a well-known urban design policy that involve equitably reallocating road space on streets from exclusively GP traffic to all modes of transportation. This recognizes that roadways serve diverse functions and that streets should be designed to accommodate all of these functions. Often in North American cities, large arterial roads have several lanes for automobile traffic and a sidewalk to accommodate pedestrians. Reallocating the disproportionately high space for automobiles towards buses, cyclists, and pedestrians, particularly in downtown areas, has been proven to have many benefits for congestion and safety in cities. Turning a GP lane into a bus lane allows buses to move quickly through traffic, moving people more efficiently through a corridor than a private car while creating healthier, more vibrant spaces in the city (City of Vancouver 2017).

Complete Streets Policy Framework

City of Vancouver | Complete Streets Planning | 2017

Impacts on Access

Access to businesses and side streets is an important aspect of road-space allocation, and it has an effect on bus speeds. Vehicles turning into driveways, businesses, or onto adjacent roads can delay buses and cause general congestion, especially during rush hour. This section explores the different options for regulating turning and the contexts these regulations are suitable for. Pedestrian crossings also impact bus speeds, and the diverse crossing strategies should balance local bus volumes and pedestrian volumes.

Bus Priority impacts turning movements and access for other road users.

Turn pockets and access lanes are an important way to efficiently move vehicles in various directions and provide access to areas such as businesses, homes, and parking. Implementing Bus Priority measures can impact these movements and must be balanced based on context. Additionally, the turning movements of other traffic can also impact bus service, as outlined on Page 04.

	CONTEXT	CONSIDERATIONS	PRIORITY
Right-turn movement regulations at Intersections	Right-turn movements limit curb zone bus priority opportunities.	Right-turn movements may stall due to pedestrian crossings, resulting in bus delay. Buses accessing near-side bus stops may require right-turn restrictions.	B-1 P-1 C-1/C-2 S-2/S-3 GP-3
Left-turn movement regulations at intersections	Left-turn movements impact traffic-cycle lengths and can block the ROW for buses.	Balancing the delay caused by left-turning vehicles with the priority of through traffic is context-specific and can be regulated on key bus corridors.	B-1/B-2 P-1/P-2* C-1/C-2* S-2/S-3 GP-3

Right-turn and left-turn regulations will be dependent on the lane in which the bus is traveling, such as the curbside lane, central lane, or dedicated bus-lane, among others.
Certain street configurations may accommodate separate cyclist or pedestrian movements, such as a bike turn box.

	CONTEXT	CONSIDERATIONS	PRIORITY
Mid-block access restrictions	Mid-block access can delay bus movements and limit curbside bus priority opportunities.	If leading to delay, mid-block access lanes can be regulated or moved to less congested side streets. This may cause delay for those using these access zones.	B-1/B-2 P-2 C-1/C-2 S-3 GP-3

Application in Practice: Shifting through traffic off Granville St to side streets - Vancouver, BC

On Granville Street in downtown Vancouver, most GP traffic is pushed to parallel running side streets while buses travel primarily down Granville Street. This section of Granville is a busy entertainment district with very high pedestrian volumes, so pushing most vehicle traffic to adjacent streets frees up the street for a better pedestrian experience, while also allowing for buses to move up and down the corridor with less delay.

To implement this shared transit corridor, efficient exit ramps before the downtown corridor divert traffic smoothly to adjacent corridors, ensuring minimal traffic disruption. During peak hours especially, buses benefit from having an almost exclusive corridor to avoid further delays from general traffic (NACTO 2010).

Pedestrian priority crossings extend traffic cycles, increasing bus delay.

Pedestrian priority is a critical component of walkable, vibrant cities. Strategic pedestrian priority is required in order to reduce the amount of stopping and waiting by buses while maximizing pedestrian experience and travel speeds across an intersection.

	CONTEXT	CONSIDERATIONS	PRIORITY
Longer pedestrian cycle	High volume pedestrian areas and intersections near vulnerable populations.	Higher pedestrian and cyclist volumes move through an intersection, but bus delay may increase.	B-1 P-1 C-1/C-2 S-2/S-3 GP-3
Shorter pedestrian cycle	Medium volume pedestrian areas, town centre, and commercial.	May delay pedestrian movements and require people to wait until the beginning of a crossing cycle to afford enough time.	B-1/B-2 P-1/P-2* C-1/C-2* S-2/S-3 GP-3
Pedestrian-activated crossing	Medium or intermittent volume pedestrian areas and residential.	Requires action by pedestrian. Reduces unnecessary stop time for buses when pedestrians are not present.	B-1/B-2 P-2 C-1/C-2 S-1/S-2 GP-1/GP-2
Consolidated pedestrian crossing	Low or intermittent volume pedestrian areas, residential, and ALR.	Increases pedestrian and cyclist delay and requires alternate routes. May lead to jaywalking.	B-1/B-2 P-3 C-1/C-2 S-1 GP-1

Case Study: Trade-offs between Pedestrian Cycle Lengths and Bus Delay

In San Francisco, California, pedestrian crossing signals were timed to allow for people to cross at about 1 meter per second until 2019, when the timing was increased to allow for slower 0.9 m/s walking speed. A study from the University of Chicago analyzed how bus speeds were impacted by this change in pedestrian cycle length around the city over the next few years.

The study found that signal changes to increase pedestrian crossing times resulted in more bus delays across the board throughout the city. This demonstrates one of the key trade offs involved with prioritizing one mode over the other: prioritizing pedestrian crossing may increase bus delay.

However, pedestrian and bus travel is often intertwined, and most transit users are pedestrians for part of their trip (Lo 2020).

Case Study: Accommodating longer cross times for vulnerable populations

According to the City of Vancouver's Traffic Signal Timing Guidelines (2023), crossing times should be determined based on the volume of older pedestrians who may move at a slower pace. The crossing times range from 0.8 meters/second to 1.0 meters/second, with crosswalks near hospitals and seniors centres allowing for the longest crossing time at all hours, while crosswalks near schools allow for longer cross time during school pick-up and drop-off.

Understanding who is using a crosswalk is critical for the design speed. There is a trade-off when increasing the bus stop-time to accommodate increased cross-time, but it supports equitable and accessible streets (City of Vancouver 2023).

Land Acquisition Concerns

When roadways are not wide enough to support GP lanes, bicycle lanes, sidewalks, and transit priority designs, then land acquisition may be required. This is a complex action of buying land from existing property owners adjacent to a corridor. It can be logistically difficult to coordinate the acquisition of several properties and it can be expensive for a municipality or transit agency to fund land acquisitions. If done voluntarily, land owners must be fully compensated for land they cede, and if land acquisition is needed along an entire corridor, then these expenses can become significant.

Acquiring land is resource intensive for municipalities.

There is a time-money trade-off that municipalities need to consider when acquiring land for Bus Priority measures. Purchasing land is expensive but allows for increased flexibility, whereas, land dedications through development are inexpensive but unpredictable. Both options can lead to successful Bus Priority, but are highly dependent on the context, timeline, and resource environment.

	CONTEXT	CONSIDERATIONS	PRIORITY
BPM through developer dedications	Municipal policies can align Bus Priority opportunities with ongoing/anticipated developments.	In areas with high development potential, municipalities can reap benefits through dedications. This could be an cost-efficient but may require intense collaboration.	B-1 P-1 C-1/C-2 S-2 GP-1/GP-2
BPM through land purchase	Municipalities can quickly roll out Bus Priority measures when ROW is purchased.	In case of limited (re)development potential, resources available for municipalities, such as funding and long-range planning, are key driving factors.	B-1 P-1 C-1/C-2 S-2 GP-1

Application in Practice: Marine Drive, City of West Vancouver BC

In 2011 in West Vancouver, BC, bus lanes were installed along Marine Drive merging onto the Lions Gate Bridge. This corridor was a major choke point for traffic moving from the North Shore to downtown Vancouver and buses were heavily delayed by congestion caused by GP traffic. These new bus lanes allowed buses to bypass high congestion traffic areas and merge with bridge traffic after the choke point, thereby decreasing bus delay significantly.

To install the new bus lanes, land was purchased along the existing ROW to widen the road. This presented additional costs because land was expensive to purchase, and the project ended up costing $1.7 million per bus lane km constructed. However, the project resulted in marked improvements for bus speeds and reliability, effectively demonstrating the value of the cost (Mundy et. al. 2017)

Signal Priority Logistics

Transit Signal Priority is an important tool that effectively decreases delay for transit vehicles at intersections. While its benefits to transit are proven, the decision as to who receives priority may be contested by those traveling through the intersection, including general traffic, transit, pedestrians, cyclists, residents, and business-owners. This section identifies the different types of signal priority and key stakeholders in its implementation.

TSP has high upfront capital and operating costs.

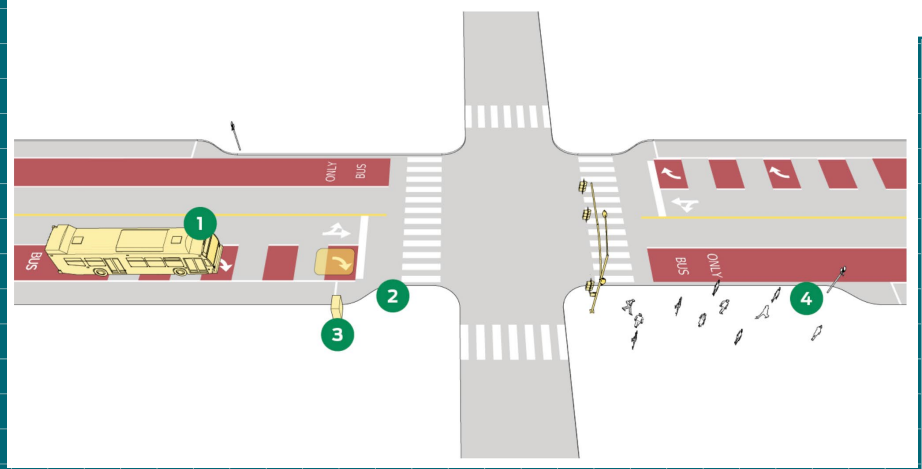
There are different approaches to implement signal priority. Transit Signal Priority is the most effective strategy to reduce bus delay as it exclusively prioritizes buses over all other vehicles. However, it can be cost-intensive and therefore transit agencies, operators, and municipalities should consider balancing TSP with other Bus Priority measures to maximize effectiveness with available resources.

	CONTEXT	CONSIDERATIONS	PRIORITY
Passive Signal Priority (PSP)	At intersections, PSP reduces dwell times for all vehicles moving at the design speed.	PSP is an affordable way to reduce vehicular delay. While cost-effective, PSP increases speed for all road users (except cyclists), not just buses.	B-2/B-3 P-2 C-3 S-1 GP-1
Transit Signal Priority (Active)	When implemented at corridor level, TSP prioritizes buses exclusively over other modes.	To be an effective measure, TSP must be implemented at the corridor level. Therefore, corridor-wide TSP requires high capital and operation costs.	B-1 P-1 C-1/C-2 S-2/S-3 GP-2/GP-3

Application in Practice: NACTO Active Transit Signal Priority Guide

This guide establishes best practices for implementing signal priority on roadways. Active Signal Priority involves use of sensors on buses and in the signal controller cabinet, and often in the ground as well. There are various methods of timing signals – green lights can be extended until a bus passes, red lights can end early for a bus to arrive, or timing can be rearranged while a vehicle is far down the street to allow for a seamless pass through an intersection. All of these treatments require coordination between the organizations operating the buses, designing the streets, and designing the transit network.

Effective TSP also requires widespread deployment throughout the system to allow for coordination of bus movement throughout entire corridors. If TSP is not coordinated well, then buses may pass through some intersections but wait longer at the next, effectively nullifying the beneficial effect of Transit Signal Priority (NACTO 2016).



TSP requires inter-jurisdictional collaboration.

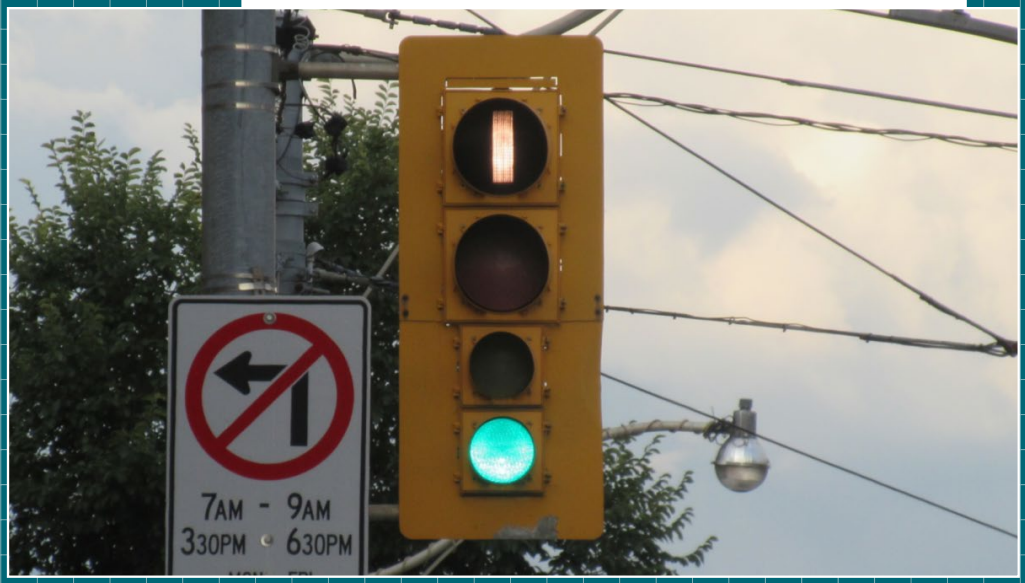
A variety of key stakeholders are involved in the implementation of TSP along a Bus Priority corridor. Each stakeholder has their own role and must work in close collaboration with others for the successful implementation of TSP. It is critical to consider the resources required to facilitate this collaboration for the applicability of TSP in various contexts.

	CONTEXT	CONSIDERATIONS
TransLink, CMBC and other contracted operators	Transit agencies and operators are responsible for service design and fleet for TSP.	Transit agencies and operators rely on municipalities for the on-street TSP infrastructure to deliver the service successfully. Aligning dedicated TSP fleet on bus priority corridors is key.
Municipal government	Municipalities are responsible for all street infrastructure, including TSP.	Municipalities must work closely with transit agencies and operators to coordinate TSP with bus service design and schedules. Municipal cost-share programs could be helpful for funding TSP based on benefits reaped by transit agencies or operators.
Provincial government	Provincial govt. can provide support for TSP through funding for investment plans.	Provincial govt. approves the funding structure for projects through the investment plans, and therefore, has a decision-making capacity to guide the funding for TSP. Outside of funding, there is limited scope for provincial support.
Federal government / First Nations	Federal govt. can provide support for TSP through funding. First Nations have land jurisdiction.	Federal govt. may have resources to provide additional funding through federal programs for significant TSP projects. First Nations are resource constrained, and therefore, can provide minimal support for TSP infrastructure, unlike municipalities.

Application in Practice: Toronto Transit Commission

In Toronto on certain high volume corridors, transit vehicles are detected as they approach an intersection by antennas embedded in the pavement about 50-250 meters in front of the intersection. This allows an automatic signal controller to make a change to the signal to allow the transit vehicle to proceed more efficiently. This system is installed city-wide to ensure that all buses have this “preemption” technology.

However, pedestrian signals are not affected by this measure, so Transit Signal Priority can be overridden by pedestrian crossing signals, making this measure less effective in areas with high pedestrian volumes (TTC 2024).



Public Communications

Public communications strategies are an opportunity to integrate local values and feedback into the final Bus Priority solution on a corridor. Successful engagement has the ability to build community buy-in, stewardship, and support for a Bus Priority project. On the other hand, ineffective engagement can stir up community tension, instigate backlash, and halt a Bus Priority project at any stage. This section explores the different formats of community engagement and the importance of timing engagement according to a community's needs in order to facilitate successful engagement and BPM.

Community pushback is a key barrier to implementation.

Public perception may differ from the beneficial impacts of Bus Priority. Each person's individual perception of Bus Priority is shaped by economic, social, cultural, and environmental factors. Understanding the unique context of certain communities is essential when engaging with the public effectively. There are a variety of different tools and strategies that stakeholders can use to create space to advance the understanding and implementation of Bus Priority.

Public forums (in-person/ virtual)

CONTEXT
The public is encouraged to share feedback on projects that impact them.

CONSIDERATIONS
Based on the medium of public forums, feedback will represent different voices. Therefore, it is imperative to consider impacted parties and use a public forum(s) that use multiple media to accommodate the community.

Examples include open houses, surveys, interviews, community discussions, etc.

In-person information sharing

CONTEXT
Project stakeholders can directly address community members in a physical space.

CONSIDERATIONS
Physical spaces pose accessibility restrictions (spatial, temporal, auditory, language, etc.) and must be considered when engaging with the public. Beneficially, it allows project stakeholders to build relationships and understanding.

Examples include pop-up spaces, permanent spaces, seminar, reaching out to people where they live, work and play, etc.

Virtual information sharing

CONTEXT
Project stakeholders can share curated information and updates in various virtual formats.

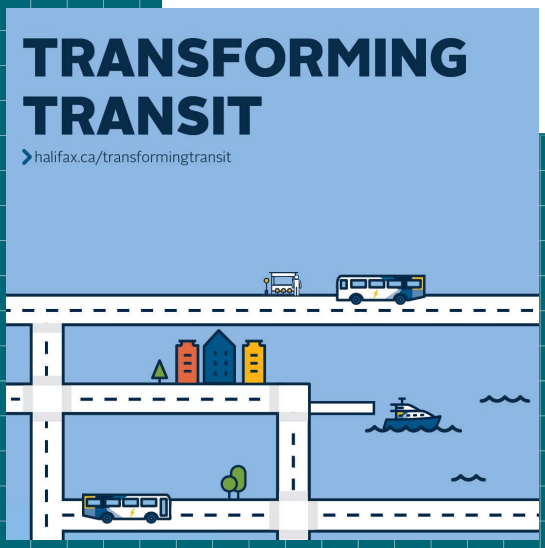
CONSIDERATIONS
Virtual spaces pose economic and cognitive accessibility restrictions but can be very effective at reaching diverse group of people across geographic and temporal spaces.

Examples include webinars, interactive websites, videos, social media pages, etc.

Case Study: Halifax Transit Street Implementation

In 2022 Halifax implemented a Bus Priority measure by only allowing buses access on a downtown street between 7 AM and 8 AM. This policy went into effect on July 4, 2022, but after just 5 days it was reversed and the road was opened back up to all traffic in the morning hours. The project failed in first implementation because of an ineffective public communications campaign, and unclear road design and signage. There were no physical barriers to the restricted corridor, only small signs and some traffic enforcement officers to dissuade vehicles from traveling down the corridor. The limited timing of the restrictions (only 1 hour per day) also caused confusion.

When implementing new bus priority measures, public communications and visual barriers are integral for GP users to understand where they can travel. Notifying the public far in advance of changes by targeting outreach to people who use the corridor will make sure that users are aware of changes and can make plans to take an alternate route during peak hours when a street has transit priority in effect (Cooke 2022).



Timing of public engagement can make or break a project.

There are multiple stages at which a community may be engaged, although best practices suggest public consultation at more than one stage (particularly including Stage 4: Monitoring). Engaging a community at the wrong time can be detrimental for a project, but strategic, timely engagement can increase community support and the effectiveness of the bus priority project overall.

	CONTEXT	CONSIDERATIONS
Stage 1: Conception	The public is consulted with a conceptual idea of the project.	Public engagement at this stage may bring out the actual needs of a community, but can sometimes result in community fatigue. This approach may not suitable with Indigenous communities, who may require options to maximize their available time.
Stage 2: Planning	Project stakeholders consult with the public with a planning directive(s).	Public engagement through the planning stage may result in a more streamlined process, but you may miss some guiding values that are important to the community. Presenting options to the community can be effective at this stage while gaining trust.
Stage 3: Implementation	The public is presented with a rigid plan and a timeline.	Stage 3 should complement other stages of engagement in order to avoid pushback from dissatisfied community members. Engagement exclusively during implementation is more performative than transformative.
Stage 4: Monitoring	The public is consulted for the outcomes of a project.	Public consultation only after project completion has very minimal ability for community stewardship and acceptance. If hosted in addition to other phases, engagement after project completion is crucial for making a case for similar future projects.

Case Study: RapidBus Engagement Strategy - R2 v R6

The RapidBus R2 community engagement occurred after the plans for the route had already been created, following years of public planning and transit investment through the Mayor's Council 10-Year Vision. When West Vancouver residents heard the plans for the R2 to travel into their Dundarave neighbourhood, they expressed severe opposition. They felt that the plans did not reflect their values and would negatively impact their community. Unfortunately, due to this backlash, the R2 route was changed to terminate at Park Royal, cutting significant planned service.

Since this experience, TransLink has changed their engagement strategy. The R6 Scott Road was launched in January 2024, with extensive public engagement beginning in Stage 1: Conception across a variety of in-person and virtual mediums. Effectively engaging Surrey residents while the project was still in early stages led to community buy-in, strengthening the support and relationship between the community, City of Surrey, and TransLink. Since its launch, the R6 has received positive feedback, likely in part due to the well-timed engagement facilitating stewardship and a sense of value in the community (TransLink 2023).

Application of the Toolkit in Metro Vancouver: 152nd Street, Surrey

This section applies the prior findings and recommendations to 152nd Street in the City of Surrey.

Why 152nd Street

152nd Street is an important north-south arterial route (part of TransLink's Major Road Network) in Surrey, British Columbia. 152nd Street serves almost 17,000 people and moves more than 3,000 people per day via transit.

152nd Street was selected as the preferred corridor to apply the Bus Priority implementation findings due to its diversity of land uses and right-of-way challenges. The corridor passes through Town Centres (Guildford, Semiahmoo), suburban and urban areas, commercial centres and the agricultural land reserve (ALR).

Challenges & Opportunities

Due to its limited road space and high future development potential, this corridor faces various challenges when it comes to implementing Bus Priority measures. As mentioned in the toolkit, these barriers are common across the region. Through a three-phased approach, Bus Priority recommendations for 152nd Street are assessed based on existing solutions and solutions built from the toolkit.

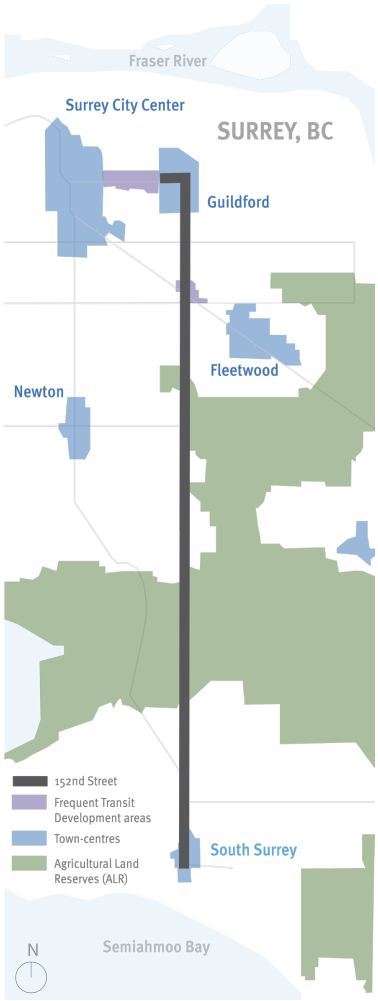


Figure: Map of 152nd Street in Surrey

The decision to approach this phasing by specific intersections was a result of priorities outlined through engagement with City of Surrey planning staff and previous technical feasibility studies.

PHASE 1

Bus priority on intersections with high congestion, primarily in Town Centres. These are also the intersections that see the highest delay, future population growth, and development potential.

PHASE 2

Bus priority on intersections with moderate congestion. This phase would be completed only after Phase 1 improvements are complete.

PHASE 3

Bus priority on less congested intersections, but with future development potential. These will be completed once Phase 1 and 2 are complete.

Phase 1: High Priority

This phase recommends solutions for intersections along 152nd Street with the highest congestion and delay, along with the most future development opportunities.

152nd St @ 104th Ave

The intersection at 104th Ave is located within Guildford Town Centre's most congested and busy area. It is located in an area of mixed-use, commercial and urban residential uses.

BARRIERS

Limited ROW

Impacts on Access

Land Acquisition Concerns

MUNICIPAL SOLUTIONS

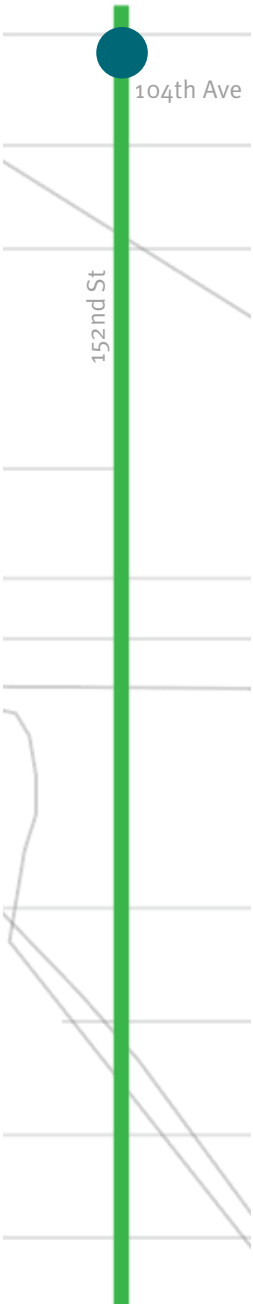
The City of Surrey plans to introduce queue jump lanes, BAT lanes, TSP, as well as adequate ROW that can accommodate stations. Expanded pedestrian space, active transportation, and bus transfers are also planned. The City will locate commercial loading activities off-street and install fully protected left turn only phases.

RECOMMENDATIONS

Securing adequate ROW may require land acquisition through developer dedication. We recommend creating a municipal process for land acquisition, as well as collaborating with local BIAs and resident groups on a phased public engagement campaign to inform BPM implementation.

CONSIDERATIONS

Curbside space at this intersection is primarily used by commercial occupants and pedestrians accessing businesses and bus stops. While balancing high demand for curbside across users, buses should be equitably prioritized. Municipalities must consider the trade-offs of land acquisition for additional ROW.



RELEVANT POLICY SCOPE

The Guildford Plan is a long-term plan to guide growth in the Guildford Town Centre area over the next 30 to 50 years. The Plan describes how Guildford Centre will accommodate growth and meet City objectives related to housing, transportation, and land use. Its timing coincides with the future Surrey-Langley SkyTrain extension. The plan was approved by Council on October 30, 2023. Growth in the Guildford Plan Area will primarily be concentrated in the Town Centre and along 104 Avenue, which is a major transportation corridor. In the long term, rapid transit will be provided on both 104 Avenue and 152 Street.

152nd St @ 16th Ave

This intersection is a critical junction in Semiahmoo Town Centre. It contains primarily commercial, mixed-use and urban residential uses.

BARRIERS

Limited ROW

Impacts on Access

Land Acquisition Concerns

MUNICIPAL SOLUTIONS

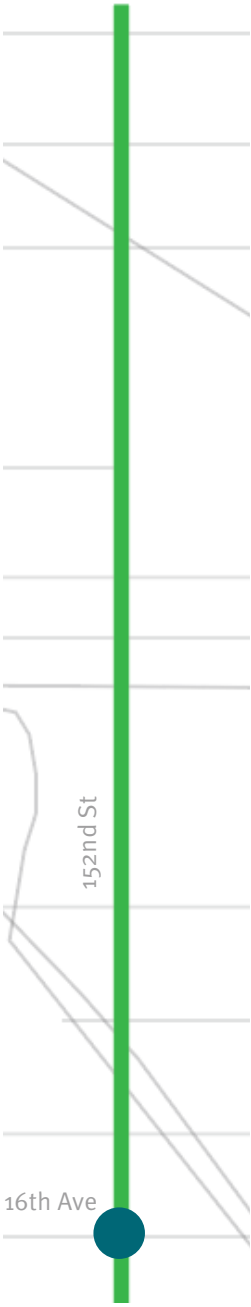
The City's primary approach is ROW expansion. The City expects to secure a 34m ROW for sidewalks, cycling facilities, wider boulevards, and turn lanes. At White Rock Transit Exchange at 16th Ave, an off-street layover facility is planned to accommodate an expansion of bus transit service and shorter term RapidBus extension. This land for the facility is to be allocated through the Semiahmoo Shopping Centre redevelopment to support the transit-oriented communities.

RECOMMENDATIONS

Securing adequate ROW may require land acquisition through developer dedication. We recommend creating a municipal process for land acquisition, as well as collaborating with local BIAs and resident groups on a phased public engagement campaign to inform about BPM.

CONSIDERATIONS

There is significant existing development along the corridor so ROW expansion through redevelopment is unlikely. To accommodate, the plan reduced boulevards and omitted protected cycling facilities. The plan identifies an option to support on-street parking which may reduce BPM opportunities.



RELEVANT POLICY SCOPE

The Semiahmoo Town Centre Plan was approved by Council on January 31, 2022. The Plan envisions a compact, sustainable, transit-supportive urban centre that forms the cultural and commercial heart of South Surrey. Additionally, the City of White Rock is currently developing an Integrated Transportation and Infrastructure Master Plan (ITIMP). The ITIMP will be a comprehensive multi-modal transportation master plan that will guide transportation investments, municipal infrastructure improvements, capital expenditures, and decision making for the next 20 years. In the shorter term the Mayors' Council 10 Year Vision Phase 3 identifies the R1 Rapid Bus as being extended to Semiahmoo Town Centre along 152nd Street in the short-term.

Phase 2: Crucial Next Steps

This phase details the recommendations for intersections along 152nd Street with medium levels of congestion and future development opportunities with a longer-term vision. We recommend that these intersections be considered for Bus Priority improvements only after Phase 1 intersections are complete.

152nd St @ Fraser Highway

This intersection is located south of Guildford, with commercial, industrial, and residential land uses.

BARRIERS

Limited ROW

Impacts on Access

Land Acquisition

MUNICIPAL SOLUTIONS

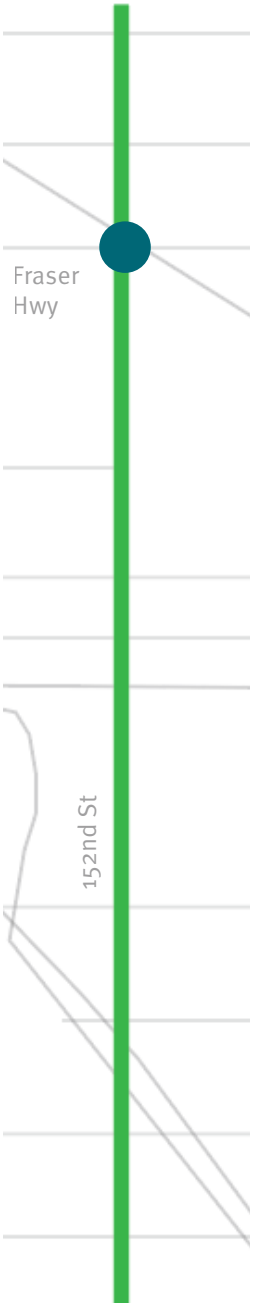
The future 152nd St SkyTrain station has high redevelopment potential with anticipated high-volume bus transfers. The City recommends enhancements to the 152nd St stations and will seek to recover funding for area transit enhancements through development dedications. This maybe in the form of a monetary contributions from any new residential development in the Fleetwood Plan area.

RECOMMENDATIONS

We recommend locating commercial loading activities off-street, with installation of BAT lanes to minimize impacts and encourage alternative modes for deliveries. We also recommend installing fully protected left turn only phases, protected cycling lanes, curb extensions, and pedestrian priority crossings.

CONSIDERATIONS

Planning for BPM must be phased to align with the construction and eventual opening of the SkyTrain station higher expected density in the area. Pedestrian and cyclist priority and safety are essential considerations in this plan, particularly at this intersection which is known for its high speeds and congestion.



RELEVANT POLICY SCOPE

The Fleetwood Plan anticipates significant development and redevelopment to take place around the future Surrey-Langley SkyTrain station at 152nd St and Fraser Highway. The plan provides a new vision for the area, which will be a distinct urban centre around Fraser Highway and consist of mostly high-rise development and urban residential uses around the future SkyTrain station.

152nd St @ Highway 10

This is a busy commercial intersection, just south of Newton. It contains both commercial and residential uses.

BARRIERS

Limited ROW

Impacts on Access

MUNICIPAL SOLUTIONS

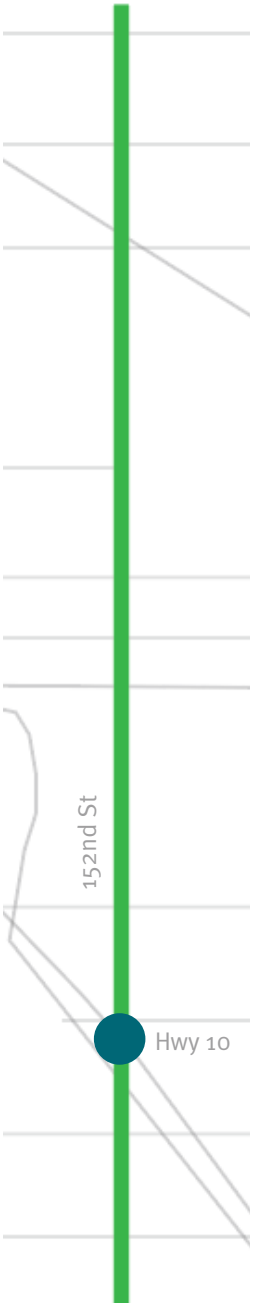
Existing BPM infrastructure are protected left turns on all corners and a painted bicycle lane in the Westbound direction on Highway 10.

RECOMMENDATIONS

As no major development is planned and land acquisition is not reasonable at this time, we recommend tools such as adjusting pedestrian cycles and BAT lanes near commercial areas to reduce bus delay. As a future BRT corridor, we recommend removing slip lanes to create right turn lanes.

CONSIDERATIONS

The South Newton Neighborhood Concept Plan designates the area around this intersection as commercial and residential. Highway 10 is a major east-west connector route with high levels of traffic and high speeds up to 80km/hr. Pedestrian and cyclist safety considerations must be taken into account.



RELEVANT POLICY SCOPE

The South Newton Neighborhood Concept Plan was established in 1999. It set the growth and land use objectives for the area, including a neighborhood dominated by single-family residences and a small commercial centre at the intersection. No major transportation improvements have been made since the original 1999 document was formalized, although development, delay, and congestion have increased.

Phase 3: Future Potential

This phase details the recommendations for intersections along 152nd Street with lower congestion and delay. While there may be future development potential around these intersections, we recommend addressing these intersections once Phase 1 and 2 are complete and if resources are available.

152nd St @ 64th Ave

This intersection is located between East Newton Business Park and the Sullivan neighborhood. It has both commercial and residential land uses.

BARRIERS

Impacts on Access

TSP Logistics

EXISTING SOLUTIONS

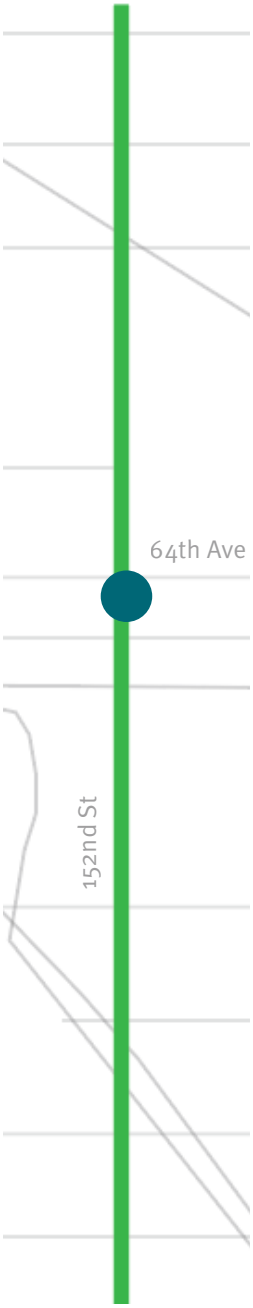
This intersection has protected left turn lanes in all directions. The City of Surrey has discussed widening the intersection to accommodate walking and bicycling facilities to improve overall safety.

RECOMMENDATIONS

While the surrounding neighborhood is not expected to develop significantly over the next 5-10 years, we recommend tools such as adjusted pedestrian cycles and bus bulbs. BAT lanes may be considered to improve bus speed and delay in the commercial loading zones.

CONSIDERATIONS

The curbside space is primarily used by industrial and railway lands. The locations of bus stops pose safety issues for pedestrians and cyclists. Incorporating specific considerations for railway tracks is an important aspect of BPM implementation at this intersection.



RELEVANT POLICY SCOPE

The East Newton Business Park Neighbourhood Concept Plan area is approximately 94.5 acres. It is bounded by 152nd St to the west and ALR to the north, east, and south. As its use is primarily for business and industrial purposes, vehicle access considerations must be taken into account, particularly in terms of commercial loading times. Temporal restrictions on business access lanes (where applied) should be in effect during peak bus transit hours.

152nd St @ King George Blvd

This busy intersection in South Surrey will soon become a confluence point for the future King George BRT route.

BARRIERS

Limited ROW

TSP Logistics

EXISTING SOLUTIONS

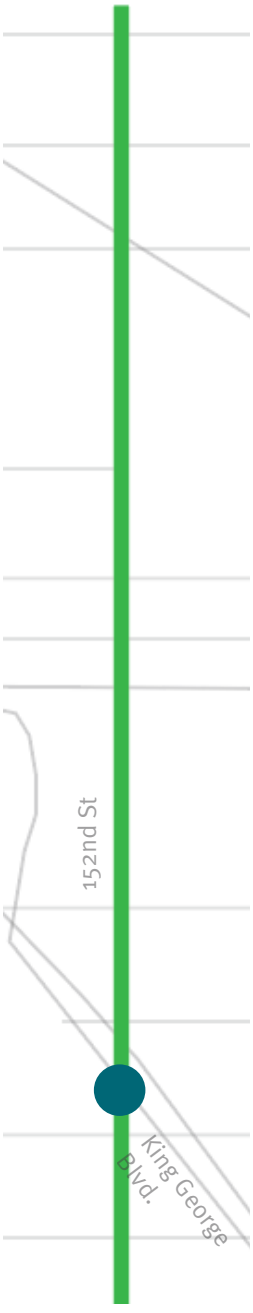
This intersection has protected left turn lanes and right-turn slip lanes. Starting in 2016, King George Blvd was widened up to the 152nd Street intersection to accommodate more sidewalks, bus stops, and bicycle lanes. This road has a wide ROW at 30m, currently 2 straight-running lanes and 2 turn-lanes in each direction.

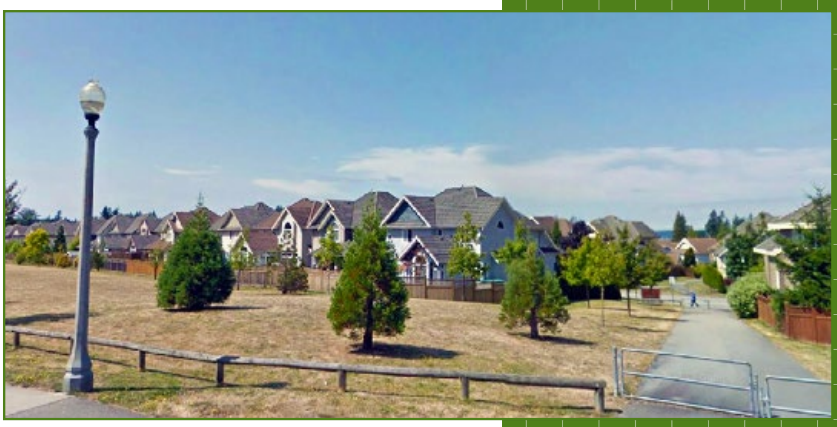
RECOMMENDATIONS

We recommend converting one lane in each direction to a peak-hour bus lane to bypass general purpose traffic during periods of high congestion. We also recommend removing slip lanes and instead creating traditional right turn lanes with raised crosswalks for increased pedestrian safety.

CONSIDERATIONS

The intersection of King George Blvd and 152nd St is the confluence of two major corridors, and thus experiences heavy bus delay. The area is primarily built for private vehicles, with large parking lots for surrounding developments and road features such as slip lanes which impacts pedestrian safety.





RELEVANT POLICY SCOPE

This intersection is located in the neighborhood of South Surrey, where commercial and residential development has grown since 1990. A strip of commercial developments runs along King George Blvd. surrounding the intersection, and the area zoning is governed by several area-specific land-use plans. The future King George Blvd. BRT will travel along this section as well, and involve bus-only lanes along the EB and WB sides of this intersection. BRT approval has the potential to reshape the intersection on both sides to allow for higher Bus Priority.

Finding the Way Forward

The aim of this toolkit is to help readers understand why Bus Priority is difficult to implement and how to begin strategically thinking around these challenges. Fortunately, much time and expertise has been devoted to creating thoughtful, innovative Bus Priority solutions. This toolkit takes it one step further. However, the work in these pages is only the beginning of exploring how to overcome common challenges around physical space constraints, technological logistics, public interface, and the communications and governance structures that bind them all together. The hope is that municipalities, transit authorities, developers, and anyone reading this toolkit will approach Bus Priority with a holistic understanding of the complex network of stakeholders that must be involved along the way. Ideally, this strategic, holistic thinking will lead to better Bus Priority projects that bring people together rather than apart, and help buses move faster across the region.

Context is Key in a Diverse Region

A key finding throughout this toolkit is that context is the key to effective Bus Priority measures. Corridors vary greatly across Metro Vancouver in terms of physical attributes, long-range plans, and land use. While this toolkit offers a simple approach to modal hierarchy, understanding the specific context of an intersection within a corridor and the broader network is an essential part of implementation. The toolkit leans towards general guidance and leaves space for context-specific insights on the fine-grained elements of implementation.

Land Use Planning and Phasing on 152nd

Applying this toolkit to 152nd highlights the importance of strategic land use planning in the success of Bus Priority and entire transit networks. Land use often dictates which bus priority measures are possible. There is a clear spill-over of land use and transportation planning, especially when looking ahead at future development and growth plans along a corridor. 152nd St also highlighted how the most congested areas are often the most difficult to implement Bus Priority. Developing a strategic timeline for the phasing of Bus Priority along a corridor is critical, and could be further explored beyond this toolkit.

Communications and Governance

Two key themes stretch across each of the barriers: communications and governance. Understanding who is in the position to make a decision, who must sign off on those decisions, and who needs to be involved or informed along the way is a critical component of successful Bus Priority implementation. Beyond implementation, maintenance and information-sharing of Bus Priority measures also require clear governance frameworks, particularly since Bus Priority is ongoing work, usually spanning entire corridors and transit networks. The success of Bus Priority is critically tied to the rest of the network, and to the collaboration of those working within that network. Cities and transportation authorities will continue to strategize the best Bus Priority and implementation strategies long beyond a single success, so these governance and communications structures within departments and between organizations must be built for longevity, while leaving space for flexibility.

Further recommended work

Bus Priority implementation research is an emerging field. This toolkit acts as a starting point, exploring the broad, common barriers to implementation. Further research is recommended on the role of governance and communication in overcoming these barriers, such as:

- What can successful Bus Priority collaboration structures (both internal and external) look like in complex stakeholder environments?
- How are countries outside of the Canadian and US context successfully doing so.

The role of phasing is integral to any Bus Priority implementation, as it always take place in a corridor context.

- What do the best strategic phasing plans look like across a corridor, particularly corridors that span diverse land uses?
- How can these plans best be founded in long-range policy making?
- Which cities have accomplished successful phasing strategies? What can Metro Vancouver learn from these examples?

Project Team

Alex Heilmann (he/him) is a graduate student at the School of Community and Regional Planning, UBC with a strong interest in Transportation Planning. He is from Boston, and he has experience working with Freight Transportation, Climate Planning, and GIS. His main interest in planning is redesigning North American cities for people instead of for cars, and building more robust urban and regional transportation systems.

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Caroline Dunaux (she/her) is a graduate student at the School of Community and Regional Planning, UBC with a focus on transportation. Her previous work at the City of Vancouver introduced her to the area of bus priority, where her research focused on understanding how passengers interact with bus bulbs and physical priority infrastructure. She is currently working at urban systems as a junior transportation planner.

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Molly Barkowsky (she/her) is a graduate student at the School of Community and Regional Planning, UBC with an interest in accessible active transportation design and planning. Her research in collaboration with the City of Vancouver and UBC centres around improving family mobility to childcare facilities through active transportation and child-friendly design. She is inspired by her background in athletics and design to create communities that support life-long mobility and health at all ages.

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Sayani Mandal (she/her) is a graduate student at the School of Community and Regional Planning, UBC with a focus on transportation. Her research focuses on the transit experiences of immigrants, and the importance of behavioral policies in mobility planning. Her work is inspired by her experiences growing up in India. Currently, she is a Student Transportation Planner in the Transit Planning team at TransLink. Prior to this, she has completed a Bachelor of Planning and worked in sustainable mobility policy-research.

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Appendix 1: Project Development and Research

This project has been undertaken over the course of eight months from September 2023 to April 2024. Therefore, this appendix consists of initial research reports, project phasing, and the summary of initial project objectives.

Background

TransLink's Transport 2050: Access for Everyone plan is a transportation plan for growth, guided by goals to make transit convenient, reliable, affordable, safe, comfortable, and carbon-free. In terms of bus priority, the plan seeks to double bus service across BC's Lower Mainland, introduce 9 new BRT lines, and enable TransLink to add rapid transit on congested corridors on the North Shore, SFU, UBC and other regional destinations. As Metro Vancouver's integrated, regional transportation authority, TransLink operates and maintains the region's transit network in coordination with 21 Metro Vancouver municipalities, local Indigenous Nations and the Province of BC.

In 2020, TransLink released Transport 2050 as the region's long-term transportation strategy in alignment with the Mayor's Council on Regional Transport, Metro Vancouver municipalities, various stakeholders, and Indigenous Nations. This plan identifies key transportation objectives to meet larger regional goals of reconciliation, equity, affordability, congestion, and climate change mitigation. To these ends, reliable public transit, particularly bus transit, is essential to providing a connected and accessible transportation system in Metro Vancouver. Across the region, buses are critical to the operational efficiency of the transit network, serving more than 60% of all transit riders. To meet the goals outlined in Transport 2050 and Metro 2050, changes to the street that prioritize buses and other higher capacity modes of transportation over personal vehicles are essential.

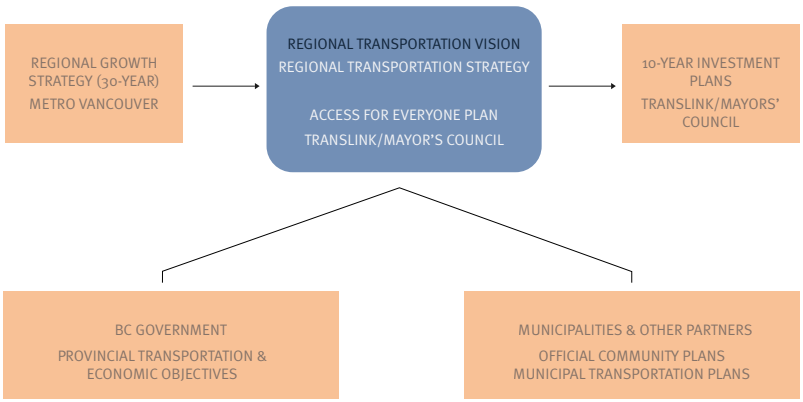


Figure 1. THE REGIONAL TRANSPORTATION VISION IN CONTEXT
Relationship of this Vision to other plans, consistent with proposed changes to TransLink's governing legislation (Source: TransLink, 2015)

As it exists today, there are many tools to improve the reliability and priority of bus service. These interventions range from dedicated bus only lanes that separate buses from the rest of the road network, to fare-payment policies that allow customers to board and alight more quickly. Although each municipality has unique characteristics and departmental structures, they all must balance competing demands on public roadways and sidewalks. The region still has a long way to go in increasing bus priority, and many corridors across the region lack adequate all day bus priority. Successful implementation of bus priority over time requires a robust set of evaluation criteria, and a coordinated effort from municipalities and TransLink to foster bus priority projects from conception to design and implementation.

The purpose of this project is to develop a Bus Priority Toolkit that TransLink and municipalities can use to effectively apply bus priority measures to specific corridors. Our process begins with TransLink corridor selection, then shifts to research on the corresponding municipalities, culminating in toolkit application on one corridor. This toolkit will be developed through an iterative process involving in-depth municipal research, ongoing policy scans, and Canadian case studies. This project provides an opportunity to fill in the missing links that exist in the regional transportation governance structure and create a resource that can be used by stakeholders for years to come. As TransLink ventures forward with its T2050 and 10-Year Priorities Investment Plan, bus priority, particularly Bus Rapid Transit, will continue to be a critical focus.

Approach to Achieving Project Objectives

Project objectives are the guiding stars for our research.They will remain constant and ensure we stay on track with our deliverables and milestones. These objectives were informed by the partner RFP and subsequent partner meetings.

Objective 1 - Research
Understand the gaps that exist between TransLink bus priority policy and municipal implementation on the ground

Objective 2 - Development
Develop a practical toolkit to evaluate bus prioritization policy implementation across the region

Objective 3 - Application
Apply the Bus Priority Toolkit to a selected TransLink corridor and incorporate design treatments and placemaking

Achieving the objectives in a phased manner

Phase 1
We will start the project by gathering preliminary information from documents relevant to the project. These include TransLink documents related to buses and bus priority, as well as transit priority corridors. Along with research on bus priority measures in Metro Vancouver, we will undergo case study research of other Canadian municipalities and their bus priority measures to inform our own recommendations for Metro Vancouver. The goal of this phase is to select three regional bus priority corridors that cross municipal boundaries. These municipalities will be the focus on Phase 2. The corridors were chosen based on criteria including total ridership, land use, political agreement, and equitable access to transit.

Phase 2
This phase will include research on the corresponding municipalities to the selected corridors, with the goal of developing a comprehensive understanding of the gaps that exist in the operational implementation of bus priority, at the municipal level.

Interviews will be conducted with municipal employees during the research process to acquire firsthand accounts of the municipal bus priority context and barriers to implementation. Information will be gathered both quantitatively and qualitatively with guiding questions as listed in Appendix 2.

Phase 3
This phase will involve the development of the Bus Priority Toolkit based on Phase 2 results. This phase will overlap and be informed by Phase 2, leaning into the iterative nature of research and toolkit preparation.

The toolkit will include various bus priority measures alongside the specific criteria for municipal bus priority implementation.

Phase 4
We will apply the toolkit to a specific corridor in the region and will recommend bus priority designs for the corridor, identify best practices, and create a graphic representation of corridor outcomes.

Phase 5
Final deliverables will be presented to HDR, the SCARP community, and other interested stakeholders.

Final outcomes will include:
- Presentation of research findings
- Bus Priority Toolkit
- Application of Toolkit on a selected corridor
- Poster of toolkit and recommendations

Project Process Diagram

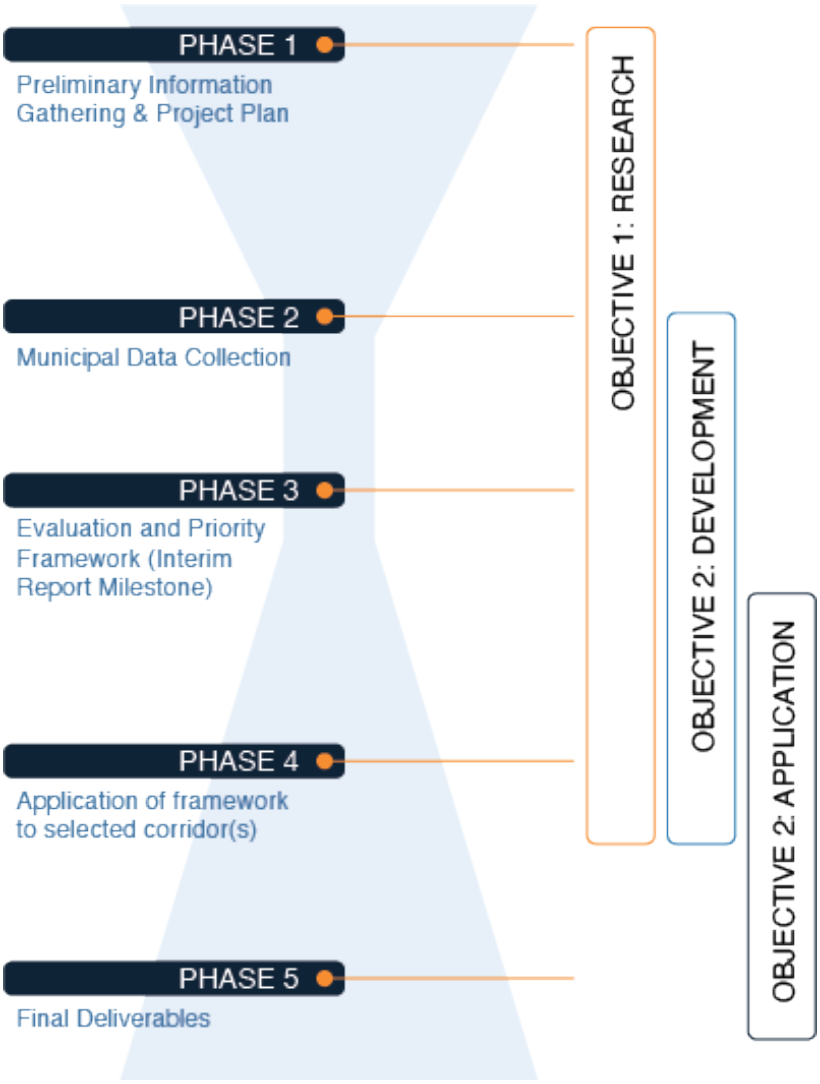


Figure 2. PROCESS DIAGRAM FOR THE PROJECT
Aligning the objectives of the project with the proposed phases

Project Phasing

PHASE 1: Preliminary Information Gathering & Project Plan

1.1 Review of TransLink Documents, transit priority areas, and corridors

1.2 Preliminary Research: Case Study of 1+ Canadian jurisdictions

PHASE 2: Municipal Data Collection

2.1 Selection of Corridors of focus

2.2 Environmental scan of existing municipal policies and plans that translate sustainable planning policy into aligned operational practice

2.3 Literature review: Case study 1+ Canadian jurisdictions

2.4 Identification of gaps in policy, plans, guidance, monitoring, and implementation mechanisms

PHASE 3: Toolkit Development (Interim Report Milestone)

3.1 Preliminary: Development of toolkit for corridors/municipalities and draft illustrations

3.2 Final Bus Priority Toolkit

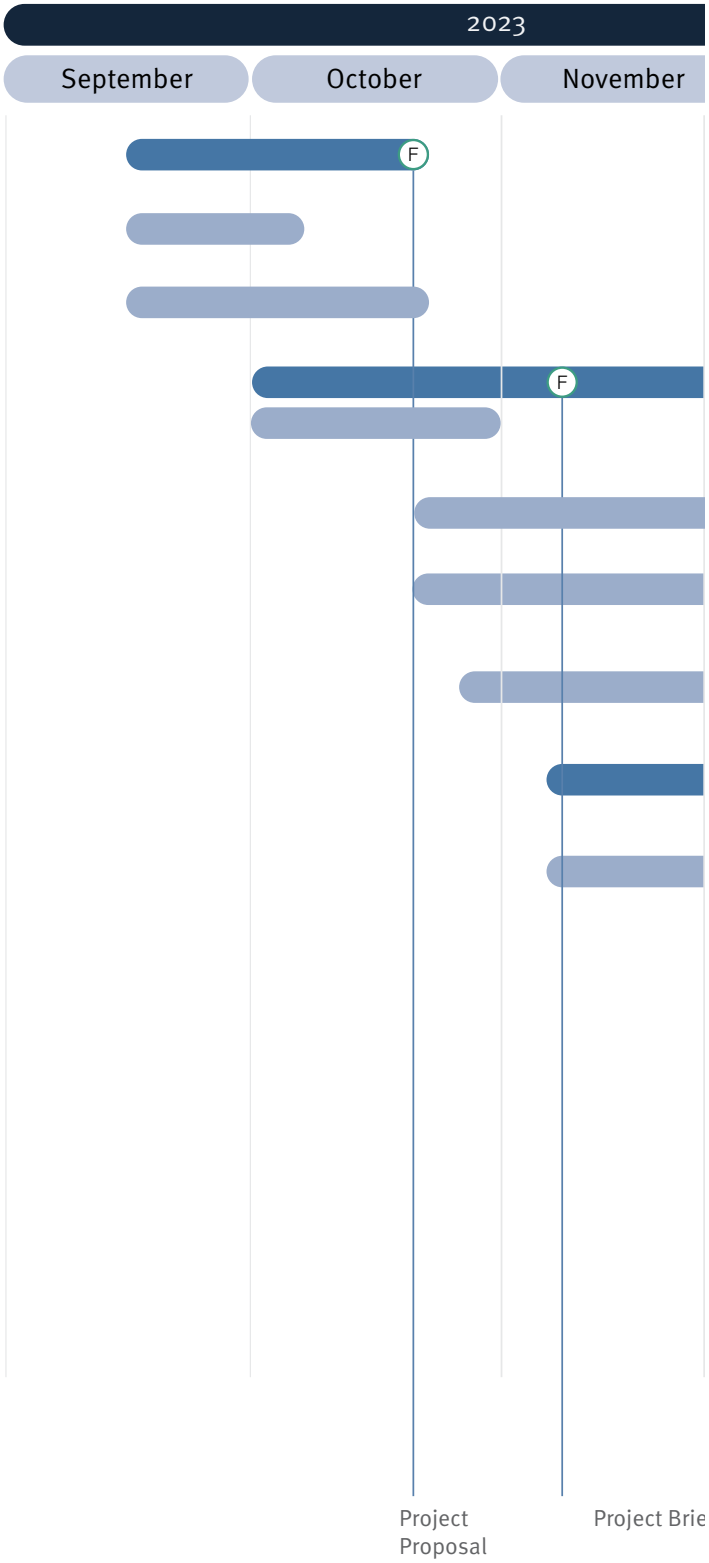
PHASE 4: Toolkit Application on selected corridor(s)

4.1 Selection of corridor(s) according to pre-identified criteria from Phase 2

4.2 Identify best practices from local/global context based on findings from framework

4.3 Identify and illustrate recommended bus priority solutions for corridor(s)

PHASE 5: Final Deliverables

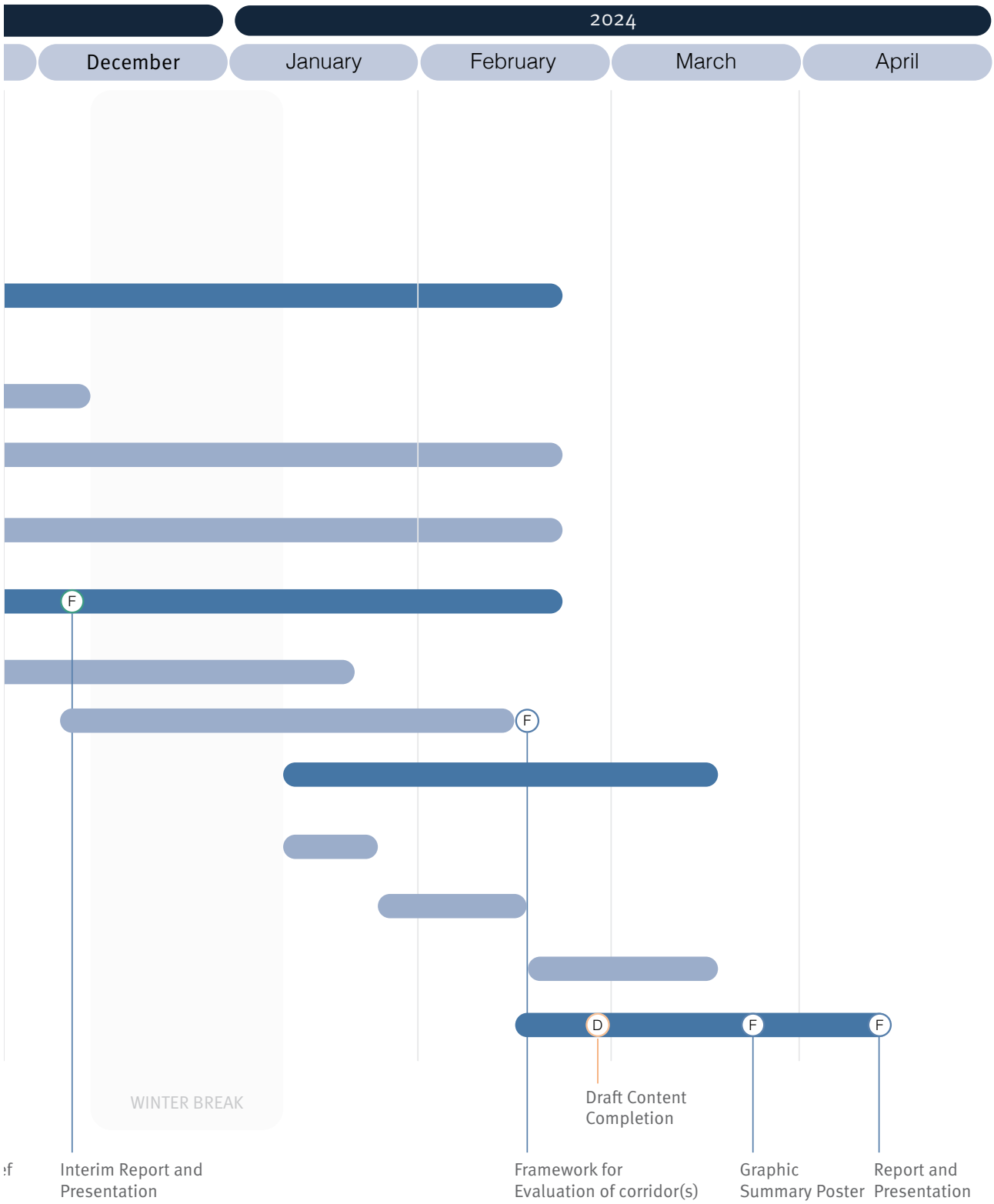


D Draft Deliverable

F Final Deliverable

Main Task

Sub-task


2024
December
January
February
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April
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F
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F
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WINTER BREAK
Draft Content Completion
Interim Report and Presentation
Framework for Evaluation of corridor(s)
Graphic Summary Poster
Report and Presentation

Best Practices from Global Case Studies

Implementation of bus priority as part a long-range plan for the City

In all the three case studies, transit priority was outlined as part of a long-range plan. While Ottawa and Halifax proposed transit priority as part of their transportation master plan, Toronto proposed bus priority as part of their 5-Year Service Plan and 10-Year Outlook.

This helps bus priority become a planned outcome that is aligned with projected growth trends of the region and ensures continuous funding.

Real-time/regular updates on bus priority implementation (spatial context)

Ottawa and Toronto produced regular reports as updates to their bus priority projects. However, this is not the most efficient method, as it may result in gaps in monitoring and evaluation.

However, Halifax uses an effective "Transit Dashboard" that regularly updates progress in bus priority implementation in the region. Although the dashboard has potential to have a better user interface, this is a good example of a method that ensures transparency.

Prioritize projects based on determining metrics that impact transit

While Halifax and Toronto do not explicitly call out their methodology for the selection of projects for bus priority, Ottawa has a framework with specific metrics for the selection of projects. This ensures that all pros and cons of a corridor are weighed out before implementation.

This results in better accountability and effective decision-making.

A plan to monitor progress and adjust plan according to challenges

Toronto implemented its first bus priority project as part of phase 1 which was an extension of the proposals laid out in TTC's 5-Year service Plan and 10-Year Outlook. However, phase 2 of the project is what became the foundation of the RapidTO.

This was a result of in-depth analysis of the outcomes from Phase 1 and devising a robust implementation plan for the next 10 years. Therefore, phasing projects and regular monitoring is crucial, alongside resilient implementation strategies.

Corridors under the lens

The goal of the corridor selection process was to choose three TransLink regional bus priority corridors, and zoom in to acquire in-depth understanding of their unique bus priority gaps and opportunities. The municipalities these corridors pass through were consequently the focus of our engagement plan and in-person stakeholder research.

The corridors were selected based on both qualitative and quantitative criteria, encompassing TransLink-identified quantitative criteria and project-specific qualitative criteria which served as important filters. The weighting system helped select corridors that would most benefit from additional bus priority, as well as those that have the potential for future growth and development. The tables below outline the chosen quantitative and qualitative criteria, along with the rationale and weight scales behind these choices.

Figure 2. QUANTITATIVE CRITERIA FOR SELECTION OF CORRIDORS OF FOCUS

Criteria	Statistic	Rationale	Weighting
RIDERSHIP & GROWTH	Population density Population forecasts Total ridership (daily/weekly) Employment/job growth	These corridors will need bus priority for adequate bus speed and capacity with growing populations and more transit ridership.	60%
DELAY & CONGESTION	Person hour delay per hr Total bus delay (hours)	Corridors with high congestion experience most delay, so they need of bus priority measures.	30%
EQUITY DEMOGRAPHICS	% low income households	Transit is particularly important to equitably mobilize populations who may not have access to car ownership.	10%

Figure 3. QUALITATIVE CRITERIA FOR SELECTION OF CORRIDORS OF FOCUS

Criteria	Statistic	Rationale
PROPOSED & PLANNED BUS PRIORITY + ROAD INFRASTRUCTRE PROJECTS	Research on policy and plans	Areas that already have policies/plans in place for bus priority measures are better suited to a policy implementation framework.
POTENTIAL FOR FUTURE DEVELOPMENT	Planned TOD developments % multifamily, commercial, single family zones	The land use and developments will justify investments in bus priority/ infrastructure to help increasing populations move.
MUNICIPAL SUPPORT FOR TRANSIT	Municipal policies, Local Transit Master Plan, Area Transport Plans	When municipalities are supportive of better transit and have policies in place to facilitate its implementation, the muni is more likely to get transit investment.

The resulting corridors from our analysis included: Willingdon Avenue in Burnaby, and King George Blvd and 152nd Street in Surrey. As per the November 2023 announcement by TransLink, King George Blvd and Willingdon Avenue have more recently been identified by TransLink as the first regional BRT routes that will be implemented.

Willingdon Avenue, Burnaby

Background

Willingdon Ave is a key north-south connection between Burnaby Heights and Metrotown. The corridor primarily travels through Burnaby, briefly crossing into Vancouver on the northernmost portion of its route towards the North Shore. With daily and express service, buses move almost a quarter of morning weekday rush hour traffic along Willingdon Ave.

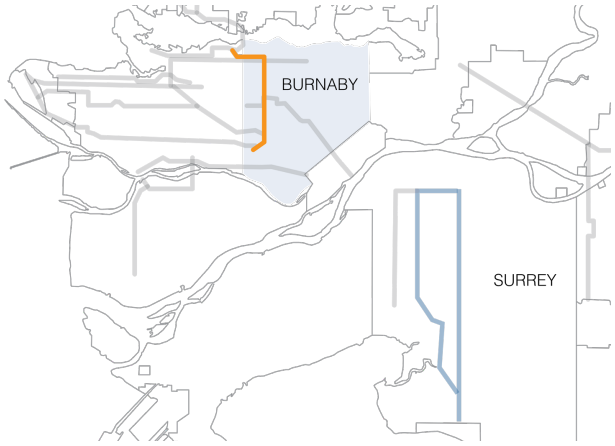


Figure 8. MUNICIPAL CONTEXT FOR WILLINGDON AVENUE

Key Demographics

52 Maximum hourly bus trips per direction	**670** Person-hours of delay per day	**15,300** Total households (800/km² density)	**37%** Low income households	**18%** Zero vehicle households
4,300-9,500 Total ridership (daily load in one direction)	**54** Bus-hours of delay per day			

Demographics within 400m of corridor

TRANSLINK

Transportation Context

The 9.4km corridor offers two SkyTrain connections at Brentwood and Metrotown and services 11 bus routes. The primary routes are the 130, which offers daily service between Metrotown and Phibbs Exchange, and the 222, a weekday express bus of the same route. Willingdon Ave has been recently identified as part of the planned Bus Rapid Transit route between Metrotown to Park Royal.

Land Use

The land use along this corridor is varied, primarily including detached residential, comprehensive development, and institutional (BCIT). Additional land uses include commercial, parks, and multifamily residential.

Key Challenges

The Willingdon corridor experiences significant bus delay, ranking third highest in bus delay in the region. The 130 has the second highest bus boardings between Burnaby and New Westminster, and buses can carry around a quarter of travelers during peak morning rush. The transit priority and HOV lane between Deer Lake Parkway and Lougheed Highway can also be used as a right turn lane, delaying bus movements. Right turn delays and roadway congestion are the key issues along this corridor.

Hastings Street
Hastings Street is a significant east-west arterial through Vancouver and Burnaby with high frequency of bus service and significant vehicular congestion.

Opportunities: There is an opportunity to introduce left-turn pockets and adequate right-turn lanes to reduce bus delays and extend the HOV hours to address delay, including weekends.

Willingdon Linear Park
A safe, accessible urban park that travels 13 blocks north-south on the east side of Willingdon Ave. The park contains a multi-use path, art installations, street furniture, and other public amenities.

Opportunities: This section of corridor has scope to integrate bus routes with bike and pedestrian travel. This in turn, can ease the introduction of right-turn lanes through residential area to eliminate bus delays.

Brentwood Town Centre
Brentwood is a shopping centre and residential hub in Burnaby, with key transit connections to the region, including a station on the SkyTrain Millennium Line.

Opportunities: There is opportunity to extend HOV/ bus lane through Brentwood, working with new developments under construction to allocate road space.

BCIT
BCIT is a vocational and technical school along the Willingdon corridor, drawing tens of thousands of people to its campus each day.

Opportunities: This corridor section has potential to extend HOV lane further south of Deer Lake Pkwy to improve speed and reliability of connections from Metrotown. There are opportunities to also improve bike/ pedestrian opportunities for last-mile connections.

Metrotown
Metrotown is a town centre and transit hub serving southwest Burnaby, with transit connections across the region. Congestion is an acute problem.

Opportunities: At Willingdon Avenue, signal timing could be improved to prioritize bus movements and bus-turning movements. Wide ROW means opportunities for road reallocation for bus priority.

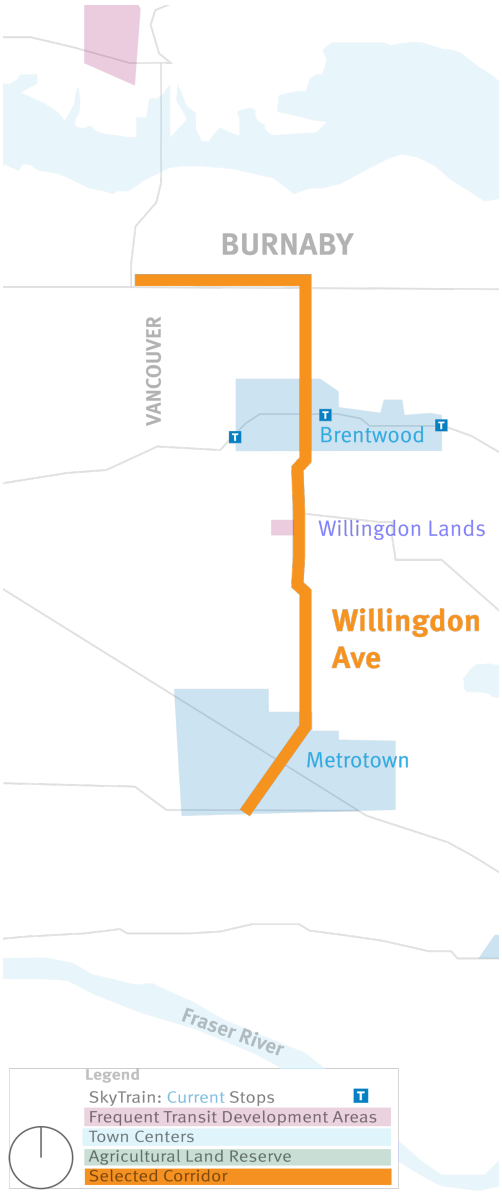


Figure 9. WILLINGDON AVENUE - Spatial Context

King George Boulevard, Surrey

Background

King George is the main north-south corridor in Surrey, connecting South Surrey to Surrey Center through neighborhoods, commercial areas, and agricultural land. The corridor is important for transit within Surrey between commercial and residential areas, as well as serving SkyTrain connections for travel to regional destinations. The road is 4 to 8 lanes wide for most of its length, with most lanes used for General Purpose traffic and some bus-only sections.

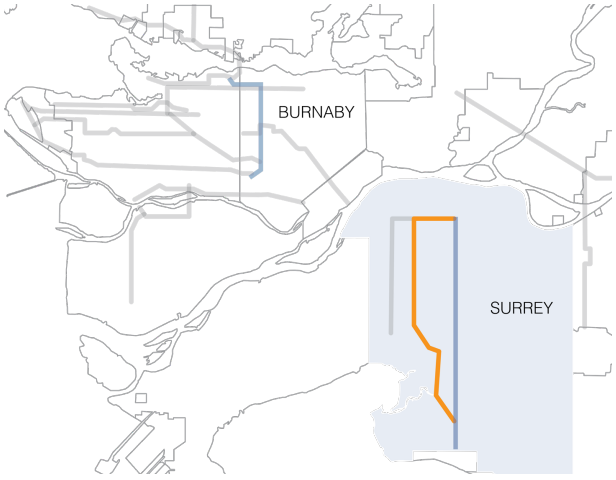
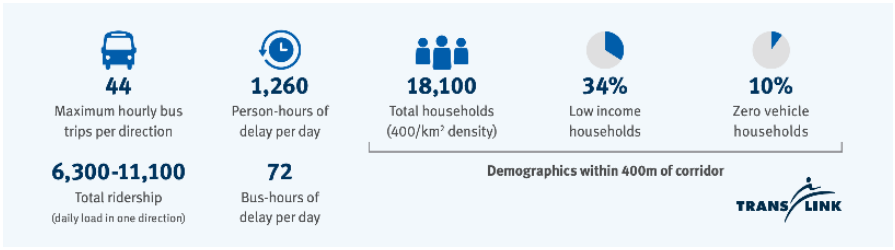


Figure 4. MUNICIPAL CONTEXT FOR THE KING GEORGE BOULEVARD

Key Demographics



Transportation Context

Land Use

King George is most noticeably the location of a future BRT line, where the R1 Rapid Bus currently runs. The R1 is the 9th busiest bus route in Metro Vancouver, with over 4 million boardings per year. These bus routes connect to King George and Surrey Central SkyTrain stations, as well as Fraser Highway and Highway 10. The north of the corridor is primarily commercial, passing through Surrey Centre and Newton, while the southern portion passes through the ALR before reaching South Surrey's commercial and residential zone.

Key Challenges

This corridor is ranked first in person-hour delay in the region, and first in total bus hours delay, and are generally hesitant to convert road lanes to transit priority lanes. Road right of way is the number one issue; as sidewalks are very close to property lines, purchasing property isn't feasible. In all, there is little appetite for converting traffic lanes using excess space, making it difficult for planners to implement additional bus priority measures.

Surrey Central
Once a suburban town centre, this area has been the focus of significant development. It is transforming into a walkable, transit-oriented downtown core for business, culture and entertainment. The area is also home to two Expo Line SkyTrain stations: Surrey Central and King George.

Opportunities: Updated Neighborhood Plans for Town Centers along King George Boulevard have modified zoning to allow for an additional 133,000 residents in the future, and an additional 42,000 jobs. Surrey City Center, Newton Center, and Semiahmoo Town Center are the main density areas, where zoning allows for buildup of higher density residences.

Newton Exchange
Newton is a bright, culturally diverse community that also acts as an industrial hub. It is Surrey's most populous town centre. Newton is home to the region's largest South Asian community and the heart of South Asian commercial activity.

Opportunities: Updated Neighborhood Plans for Town Centers along King George Boulevard have modified zoning to allow for an additional 133,000 residents in the future, and an additional 42,000 jobs. Surrey City Center, Newton Center, and Semiahmoo Town Center are areas that allow zoning for higher density residences.

Agricultural Land Reserve
The Agricultural Land Reserve (ALR) is a provincial zone in which agriculture is the priority use. Farming is encouraged and non-farm uses, such as residential dwellings, are restricted.

Opportunities: On King George Blvd, the ALR lands south of Newton narrow into one lane each direction. As there are only two lanes throughout this section, opportunities for bus priority revolve around bus stop placement and road widening.

South Surrey
South Surrey is the largest of Surrey's Town Centres. It is located north of the City of White Rock and west to the Township of Langley. It encompasses neighbourhoods such as Crescent Beach, Grandview Heights, Darts Hill, Rosemary Heights, Campbell Heights, and Semiahmoo Town Centre.

Opportunities: Updated Neighborhood Plans for Town Centers along King George Boulevard have modified zoning to allow for an additional 133,000 residents in the future, and an additional 42,000 jobs. Surrey City Center, Newton Center, and Semiahmoo Town Center are the main density areas, where zoning allows for buildup of higher density residences.

Figure 5. KING GEORGE BOULEVARD - Spatial Context

152nd Street, Surrey

Background

152nd Street is a 17.9 km corridor that stretches from Northeast Surrey to Southeast Surrey. It is an arterial road that is both part of TransLink's Major Road Network and Frequent Transit Network. 152nd Street passes through various land uses and geographies; most notably, the corridor passes through Guildford Town Centre, Fleetwood Town Centre and Semiahmoo Town Centre. 152nd Street experiences congestion of varying degree throughout the corridor and land uses.

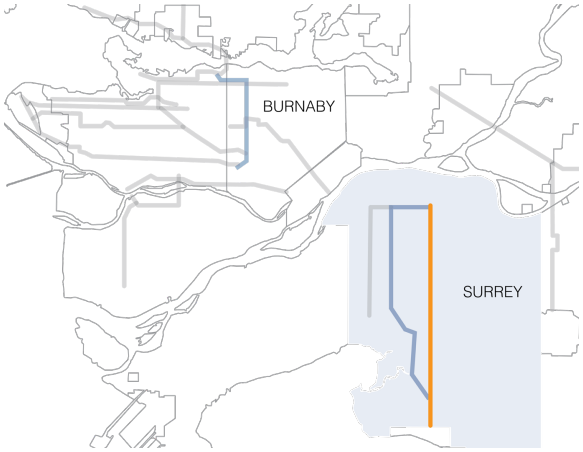
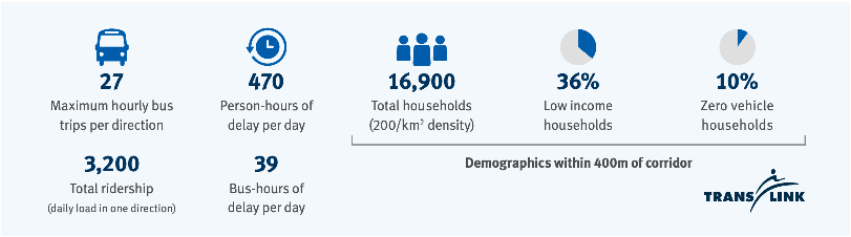


Figure 6. MUNICIPAL CONTEXT FOR 152ND STREET

Key Demographics



Transportation Context

Land Use

The corridor passes through many different land uses and zones. In the town centres, 152nd street is surrounded by predominately mixed use, commercial and multi-family residential zones. Between the town centres is residential/single use. There is a large section of 152nd street between the Serpentine and Nickomel rivers that is designated as Agricultural, as part of the agricultural land reserve (ALR). This mix of land uses makes 152nd an interesting case study for bus priority.

Key Challenges

Surrey is very car centric municipality. Management and council is focused on vehicular flow and are often hesitant to convert road lanes to transit priority lanes. Road right of way is the critical issue; as sidewalks are very close to property lines, purchasing property is rarely feasible. In all, there is little appetite for converting traffic lanes using excess space, making it difficult for planners to implement additional bus priority measures.

Guildford

Guildford is located in the northeast corner of Surrey. The Fraser River borders the northern edge of the community, with Whalley to the west and Langley to the east. The southern border stretches from 96 Avenue to 84 Avenue.

Opportunities: The Guildford Plan is a growth strategy for Guildford Centre over the next 30-50 years, primarily concentrated in the town centre and along 104 Avenue. Existing commercial areas outside the town centre will also be re-imagined. A wider road allowance on 152nd Street has been identified to protect for future rapid transit. Opportunities exist for adding a bus only lane in the southbound direction around 96th Ave, as well as more queue jumps and bus bulbs for congestion mitigation.

Fleetwood

Fleetwood is the smallest and newest of Surrey's Town Centres, centrally located in the north. The neighbourhood is a diverse residential area of mostly single family homes. It is one of the fastest growing areas of Surrey.

Opportunities: The future Fleetwood Plan focuses on opportunities to integrate new housing, job space, and amenities in the town center. New SkyTrain stations at the intersections of Fraser Highway and 152 Street, 160 Street and 166 Street will support convenient access to improved transit services. Opportunities exist for BAT lanes, queue jumps and turn pockets.

Agricultural Land Reserve

The Agricultural Land Reserve (ALR) is a provincial zone in which agriculture is the priority use. Farming is encouraged and non-farm uses, such as residential dwellings, are restricted.

Opportunities: On 152nd St, the area between the Serpentine and Nicomekl Rivers is designated ALR and narrows to one lane each direction. As there are only two lanes throughout this section, opportunities for bus priority revolve around bus stop placement and road widening.

South Surrey

South Surrey is the largest of Surrey's Town Centres. It is located north of the City of White Rock and west to the Township of Langley. It encompasses neighbourhoods such as Crescent Beach, Grandview Heights, Darts Hill, Rosemary Heights, Campbell Heights, and Semiahmoo Town Centre.

Opportunities: The future King George Blvd BRT route will merge onto 152nd Street in South Surrey. There is opportunity to integrate other bus priority measures around this section of the corridor.

Figure 7. 152nd STREET - Spatial Context

Appendix 2: Field Visit and Engagement Summary

Field Trip Summary

The purpose of the corridor visits was to gain a qualitative, on the ground understanding of the selected corridors. On Saturday, November 18 we rode the local buses along each corridor in both directions, analyzing street conditions, bus stops, land use, and existing bus priority measures. This section explores the key themes that emerged from each corridor visit.

Surrey - 152nd / King George

Diverse Land Use

At the northern end of the corridor, land use is primarily zoned for commercial and mixed use development around Guildford Town Centre. Going south, land use shifts to residential, single family zoning. Even further south, the corridor enters the Agricultural Land Reserve (ALR), where floodplains and farmland expand east and west.

Auto-centric Road Network

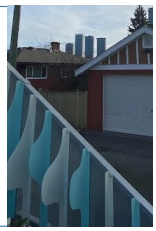
The City of Surrey is a car-centric municipality, with the political landscape and City Council being strong supporters of general purpose traffic interventions and vehicular traffic flow. 152nd Street is an arterial road with no on-street parking on either side. This allows additional room for cars to move freely. Buses travel on the same lane as general purpose traffic, and often merge with bike lanes to reach bus stops.

Consistent Limited Bus Priority

Transportation planners and engineers in Surrey are limited in terms of what bus priority interventions can be implemented on the ground. For example, as Council is hesitant to implement any bus priority that removes or limits vehicular flow, engineers have few choices. Therefore, they tend to select options that maintain vehicular traffic flow.

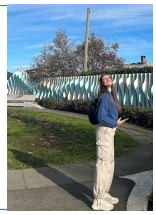
Burnaby - Willingdon

Stark Land Use Changes



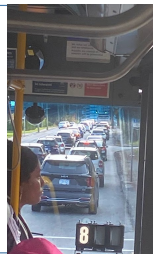
Stark land use changes mark the corridor, particularly near high-density town centers of Brentwood and Metrotown, which contrast from residential surroundings. Institutional, commercial, and parkland also contribute to the diversity of this corridor, allowing a range of users and uses to benefit from reliable, fast bus service.

Multi-modal Integration Opportunities



The City of Burnaby's land acquisition of 1.7 kilometres of land along the east side of Willingdon Ave has led to the creation of a large linear park with a multi-modal pathway. A variety of public amenities make this park a key opportunity for integration with bus priority measures along Willingdon Ave.

Intense Congestion near Transit Hubs



The buses traveling along Willingdon Ave interact with key transit nodes along the corridor, including Metrotown, Brentwood, and Hastings Street. These commercial and residential hubs bring a variety of travellers by bus and car, leading to competing priorities on the street and intensive competition for road space at all times throughout the week.

Engagement Summary

We are running engagement with municipal staff in Surrey and Burnaby, the municipalities that our chosen corridors intersect, to understand on-the-ground challenges and opportunities in implementing bus priority strategies at the municipal level. This will reveal specific plans and experiences that staff faced in the field during their work.

TIMELINE

- **November**
  Connect and reach out to municipal staff, set up meetings
- **November - January**
  Schedule and conduct interviews
- **January**
  Analyze and organize key findings

MUNICIPAL STAKEHOLDERS

Planning Division

The planners at the municipalities work on preparing plans and policies to support bus priority, and leading public engagement for implementation of bus priority.

Burnaby:
- Sam Tomkins, Transportation Planning Technician

Surrey:
- Rafael Villareal, Director-Transportation
- Paul Hilsdon, Transportation Planner
- Brian Haney, Transportation Planner
- Peter Klitz, Team Lead, Transportation Policy and Planning
- Patrick Klassen, Community Planning Manager

Engineering Division

The engineers work to prepare network and infrastructure designs for bus priority implementation, and work closely to align with quantitative needs of the corridor. Much of the on-the-ground building and design is done by engineers.

Burnaby:
- Fred Lin, Senior Manager-Transportation

Surrey:
- Ahkshid Rosti, Transportation Engineer Manager

EMERGING THEMES

- A toolkit is needed for decision-makers and public stakeholders.
- Communication and storytelling has an important role in driving change.
- Funding gap is a key constraint in implementation.
- Limitations on land and road right-of-way delays implementation.

Appendix 3: Initial Findings

Emerging Findings

From initial research, interviews, and field visits, some common threads have emerged about the challenges faced by planners and municipalities when applying bus priority measures. The four main themes at this stage of research involve decision makers, funding, communication, and road space.

Decision makers

City council is often the decision maker for road reallocation and large capital projects, and their decisions do not always align with planner goals:

Surrey is semi-urban, and a car-dependent municipality. It is difficult to remove general traffic lanes and make them exclusive for buses due to the lack of available road ROW, as well as council and decision makers (and residents) favoring the prioritization of general purpose traffic lanes. Any large-scale changes to the road ROW/elimination of automobile lanes are usually squashed by council before even being presented to the general public. However, transit initiatives such as BRT are more popular among residents than allocating road space for bicycle lanes and bus only lanes.

Burnaby is urban, and there is more emphasis on transit development in the city. There are challenges with reallocating road ROW, and acquiring land for road-widening is expensive. Willingdon Ave has a transportation plan for bus service upgrades, and it includes removing parking around the corridor. This is a difficult process to undergo politically, but overall there is support for transit development in the municipality.

Funding

Funding plays a role in deciding which bus priority measures can be implemented:

Generally, TransLink and the municipality provide funding for building bus priority measures, such as right and left turn lanes. Paint is used effectively to denote bus-only lanes, as it is expensive to use over large areas. Easy wins such as road space reallocation are preferred.

In Surrey, it is cheaper for the city to combine bike and bus lanes together. While the "best" way is to expand the ROW by purchasing property or encroaching on sidewalks, this is not ideal. There is a general sentiment that the federal and provincial governments should play a larger role in funding transportation infrastructure projects like bus priority.

Communication & Storytelling

Communication and storytelling is beneficial to show residents and decision-makers why bus priority is needed. There is belief that most residents and municipal decision makers would support bus priority measures if the effects were clear, and it was explained well how bus priority would reduce overall traffic and congestion. Inadequate communication between planners, engineers, and the general public hinders application of bus priority measures.

Right-of-way limitations

Limitations on the road right-of-way are often the largest hindrances to applying more robust bus priority. Road widening is not an option in most places, with roads already at their limit and very close to property lines (particularly along 152nd Ave). Purchasing property is often not feasible either. There is some opportunity for road widening to add bus lanes when roads are being rebuilt or in heavily developing areas, but overall bus lanes have to be added by removing a general traffic lane.

Next Steps

In this final section, we aim to identify our emerging questions and the key challenges in order to create space for external feedback and idea generation. After conducting several hours of municipal engagement, our team has realized the need for a potential recalibration of our target audience and the final outcome. We strive to meet our client's vision for the project while also developing an output that will be valued by the final audience and best suits our abilities as a team.

Storytelling and our mode of communication are powerful tools. We welcome feedback on how we can best communicate our research and for whom we should be developing our product.

Key Challenges

! Municipal staff have indicated they are not interested in a toolkit created for internal use.

! Additional engagement is needed to indicate what stakeholders and decision makers would like to see.

! At the halfway point, changing the final outcome is possible but requires immediate action and ubiquitous support from SCARP and HDR.

Emerging Questions

? Who is the ideal audience of this toolkit?

After talking to municipal staff, it seems they are not interested in a toolkit for internal usage, as they already have access to the TransLink Transit Priority Toolkit for the same purpose, but recognized the value of an accessible overview on bus priority that could be shared with decision-makers and public stakeholders. How can we realign project goals with this?

? What format/medium is best suited to communicate with our (potential) new target audience?

Options could include: pamphlet, video, interactive website, report or a combination of mediums. How can we best tell the story of why bus priority is important? What visuals will support this storytelling? Where will this final product be located?

? How can we leverage our existing research on the three corridors to best support the municipalities without conflict/overlap?

Two of our selected corridors have recently been identified as BRT candidates for the region. Municipal staff in Burnaby and Surrey are currently doing extensive research to best understand the context, constraints, and opportunities for bus priority to serve the regional transportation goals of BRT. We recognize they are taking this research seriously and aim to support their work without repeating it.

Options moving forward

1 Create a communications plan that builds awareness around bus priority and its benefits, as a companion to the Transit Priority Toolkit

2 Create a toolkit for municipalities that focuses on design options on the select corridors

3 Maintain the same course, and create a toolkit to navigate key bus priority implementation challenges

References

Agrawal, A., Goldman, T., Hannaford, N. (2021 April). Shared-Use Bus Priority Lanes on City Streets: Case Studies in Design and Management. Mineta Transportation Institute. https://nacto.org/docs/usdg/shared_use_bus_priority_lanes_on_city_streets_agrawal.pdf.

BC Ministry of Transportation. (2019). Supplement to TAC Geometric Design. Retrieved from https://www2.gov.bc.ca/gov/content/transportation/transportation-infrastructure/engineering-standards-guidelines/highway-design-survey/tac-bc.

City of Ottawa. (2019). Transportation Master Plan. Engage Ottawa. Retrieved from https://engage.ottawa.ca/

City of Ottawa. (2021). Blair Road Widening & Transit Priority, Innes Road to Blair LRT Station: StandAlone Environmental Assessment Study. Ottawa. Retrieved from https://ottawa.ca/en/parking-roads-and-travel/

City of Ottawa. (2023, March). Transit and Road Project Prioritization Frameworks. Retrieved from https://engage.ottawa.ca/11511/widgets/45934/documents/100591

City of Surrey. (1995). King George Highway Land Use/ Development Concept Plan. Retrieved from https://www.surrey.ca/sites/default/files/media/documents/KingGeorgeHwyCorridor.pdf.

City of Surrey. (2022). Semiahmoo Town Centre Plan. Retrieved from https://www.surrey.ca/renovating-building-development/land-planning-development/land-use-planning/south-surrey-land-use-plans/semiahmoo-town-centre-plan.

City of Surrey. (2023). Guildford Plan. Retrieved from https://www.surrey.ca/renovating-building-development/land-planning-development/land-use-planning/guildford-land-use-plans/guildford-plan.

City of Surrey. (n.d.). Coastal Flood Adaptation. Retrieved November 4, 2023, from https://www.surrey.ca/services-payments/water-drainage-sewer/flood-control-and-prevention/coastal-floodadaptation/152-upgrades

City of Vancouver. (2012). Transportation 2040. Retrieved from https://vancouver.ca/streets-transportation/transportation-2040.aspx.

City of Vancouver (2017). Complete Streets Policy Framework. Retrieved from https://council.vancouver.ca/20170517/documents/cfsc6-Presentation.pdf.

City of Vancouver.(2023). Metro 2050. Retrieved from https://metrovancouver.org/services/regional-planning/metro-2050-the-regional-growth-strategy.

City of Vancouver. (2023). Traffic Signal Timing Guidelines. Retrieved from https://vancouver.ca/files/cov/eng-tdm-signal-timing-guidelines-phase-1-final.pdf

City of Vancouver. (2024) Bus corridor improvements. Retrieved from https://vancouver.ca/streets-transportation/bus-network-improvements.aspx.

Cooke, Alex. (2022, September 14). Halifax mulls revisiting Spring Garden bus-only pilot after 1st try ‘didn’t go well’. Global News. https://globalnews.ca/news/9128168/spring-garden-bus-pilot-revisit-2023/.

General Mayor's Council on Regional Transportation. (2015). Regional Transportation Investments: a Vision for Metro Vancouver. https://www.translink.ca/-/media/translink/documents/abouttranslink/governance-and-board/council-minutes-and-reports/2015/march/mayors_council_vision

Halifax Regional Municipality. (2017, December 20). Integrated Mobility Plan (IMP) - Final Report. Retrieved from https://www.halifax.ca/sites/default/files/documents/about-the-city/regional-communityplanning/IMP_report_171220-WEB.pdf

Halifax Regional Municipality. (n.d.). Bayers Road Transit Priority. Retrieved from https://www.halifax.ca/abouthalifax/regional-community-planning/transportation-planning/transit-priority/bayers-road

Halifax Regional Municipality. (n.d.). Catalogue - Halifax Regional Municipality Open Data. ArcGIS. Retrieved from https://catalogue-hrm.opendata.arcgis.com/datasets/9946a2cc5f8f490aaeef1a3a7835c726_0/Explore

Halifax Regional Municipality. (n.d.). IMP Monitoring and Evaluation Quarterly Updates. Halifax. Retrieved from https://www.halifax.ca/about-halifax/regional-community-planning/transportation-planning/impmonitoring-evaluation/imp-quarterly-updates

Halifax Regional Municipality. (n.d.). Part 7 - Transit Priority Measures. Moving Forward Together. Retrieved from https://www.halifax.ca/transportation/halifax-transit/moving-forward-together/part-7-transitpriority-measures

Halifax Regional Municipality. (n.d.). Rapid Transit Strategy. Retrieved from https://www.halifax.ca/transportation/

Lo, Agnes. (May 2020). San Francisco Case Study: Pedestrian Safety and Bus Efficiency Tradeoffs. University of Chicago. https://knowledge.uchicago.edu/record/2795?ln=en&v=pdf

Mitchell, Don. (2022, August 18). Transit priority signal, designated bus lane now operating at Main and MacNab streets: City. Global News. https://globalnews.ca/news/9071163/hamilton-priority-signal-designated-bus-lane-now-operating-main-macnab/

NACTO. (2010). Transit Mall to Shared Transit Street, Granville Street, Vancouver. Retrieved from https://nacto.org/case-study/transit-mall-shared-transit-street-granville-street-vancouver/

Mundy, Deborah. Trompet, Mark. Cohen, Judith. Graham, Daniel. (2017). The Identification and Management of Bus Priority Schemes. Imperial College London. (ISBN 978-1-5262-0693-0).

NACTO. (2016, April 14) Active Transit Signal Priority. Retrieved from https://nacto.org/publication/transit-street-design-guide/intersections/signals-operations/active-transit-signal-priority/

Toronto Transit Commission. (2024). Traffic Signal Prioritization. Retrieved from https://www.toronto.ca/services-payments/streets-parking-transportation/traffic-management/traffic-signals-street-signs/traffic-signal-operations/traffic-signal-prioritization/.

TransLink. (2020). Transit Priority Toolkit. Retrieved from https://www.translink.ca/plans-and-projects/projects/bus-projects/bus-speed-and-reliability.

TransLink.(2022). Transport 2050. Retrieved from https://www.translink.ca/-/media/translink/documents/plans-and-projects/regional-transportation-strategy/transport-2050/transport_2050_summary_document.pdf

TransLink. (2022). 2022 Investment Plan. Retrieved from https://www.translink.ca/plans-and-projects/strategies-plans-and-guidelines/transit-and-transportation-planning/ten-year-investment-plan.

TransLink. (2023). Bus Speed and Reliability Report. Retrieved from https://www.translink.ca/plans-and-projects/projects/bus-projects/bus-speed-and-reliability.

TransLink. (2023) R6 Scott Road RapidBus. https://www.translink.ca/plans-and-projects/projects/bus-projects/r6-scott-road-rapidbus

WSP. (2022, January 19). 152 Street Transit Feasibility Study. City of Surrey. Project No.: 211-05155.

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