

WILLINGDON AVE

Corridor Description

- This key north-south Burnaby corridor connects Burnaby Heights to Metrotown, and includes destinations such as BCIT and Brentwood.
- The corridor also serves routes that connect between Burnaby and the North Shore.
- The routes on this corridor connect the Expo Line, Millennium Line, and the R5 RapidBus.

Quick Facts

Length	9.4 km
Subregions	Vancouver/UBC, Burnaby/ New Westminster
Primary Routes	130, 222
All Routes*	25, 28, 110, 123, 130, 131, 134, 160, 222

* Does not include Routes 129, 132, 160, R5, N35 which travel on Hastings Street portion only

Notes: Corridor ranked #12 for person-delay per km in Fall 2021. The profile area includes an extension of the Willingdon corridor along Hastings Street and the approach to the Ironworkers Memorial Bridge. Ridership is reported for the location with the most cumulative passengers on-board the bus throughout the day; lower end of the range accounts only for routes using the corridor for at least 1 km and upper end of the range reflects all routes.



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

Demographics within 400m of corridor

4,300-9,500

Total ridership (daily load in one direction)

54

Bus-hours of delay per day



Willingdon Ave, continued

Corridor Significance

- **Willingdon Ave is a well-utilized transit corridor.** Line 130 has the 2nd highest boardings in Burnaby/New Westminster. Line 25, which runs on Willingdon between Brentwood Town Centre and BCIT, has the 4th highest boardings in the system. Buses carry up to a quarter of people travelling on Willingdon Ave during morning rush hours.
- **Bus performance on Willingdon impacts people traveling in Burnaby.** Willingdon ranks third highest in bus delay per kilometre and fourth highest in person-hours of delay per kilometre among profile areas. During heavier traffic, an end-to-end trip between Metrotown and Burnaby Heights can take nearly 10 minutes longer compared to a best-case trip, when the bus is able to move smoothly.

Key Challenges for Bus Speed & Reliability

- Delays caused by lack of traffic signal coordination, specifically when departing and arriving at Brentwood Station. Additional delays are mostly caused by severe roadway congestion along most of Willingdon Ave.
- Willingdon Ave has an existing transit priority lane/ HOV lane which in some areas can be used for right turns. In addition to turning movements, HOV lane violations and increasing presence of electric vehicles in Bus and HOV 3+ lanes have caused delays on between Canada Way and Brentwood Station at Halifax St.

Location of Common Causes of Bus Delay

Issue	Location(s)
Motorists turning left (or other delay from left-turns)	<ul style="list-style-type: none"> • NB/SB Willingdon Ave between Central Blvd and Goad Way
Motorists turning right (or other delay from right-turns)	<ul style="list-style-type: none"> • NB Willingdon Ave at Central Blvd • NB Willingdon Ave at Grafton St • NB Willingdon Ave between Grassmere St and Price St • NB Willingdon Ave at Brentwood Station • NB Willingdon Ave at Hastings St • NB Willingdon Ave at Kootenay Loop • SB Willingdon Ave between William St and Frances St • SB Willingdon Ave between Pender St and Gilmore Ave • SB Willingdon Ave at Ingleton Ave
Roadway congestion	<ul style="list-style-type: none"> • NB/SB Willingdon Ave between Central Blvd and Grafton St • NB Willingdon Ave between Deer Lake Pkwy and Sanderson Way • NB/SB Willingdon Ave between Brentwood Station and Halifax St • NB Willingdon Ave at Hastings St • NB Willingdon Ave at Kootenay Loop • NB/SB Willingdon Ave between Canada Way and Lougheed Hwy
Closely spaced driveways or other roadways	<ul style="list-style-type: none"> • NB Willingdon Ave at Goad Way • NB Willingdon Ave at Halifax St
Re-entering traffic from bus stops	<ul style="list-style-type: none"> • NB Willingdon Ave at Brentwood Station • SB Willingdon Ave at Hastings St
Short spacing between bus stops	<ul style="list-style-type: none"> • NB Willingdon Ave between Goad Way and Grafton St • NB Willingdon Ave at Brentwood Station • NB/SB Willingdon Ave at Lougheed Hwy
Pedestrian movements (including pedestrian signals)	<ul style="list-style-type: none"> • NB Willingdon Ave at Brentwood Station • SB Willingdon Ave at Gilmore Ave
Uncoordinated traffic signals	<ul style="list-style-type: none"> • NB Willingdon Ave at Georgia St • SB Willingdon Ave at Union St • SB Willingdon Ave between William St and Kitchener St

Willingdon Ave, continued

Potential Solutions to Address Bus Speed and Reliability Issues

Corridor has been prioritized for implementation of Rapid Transit. Final technology, design, and exact alignment are to be confirmed through the Burrard Inlet Rapid Transit study.

Map Callouts

- 1** The City of Burnaby is evaluating an alternate route via Boundary Rd, 1st Ave, and Douglas/Halifax St.
- 2** Add a NB/SB queue jump at Canada Way and Willingdon Ave




Corridor-Wide Opportunities

- At the 24 signalized intersections, solutions such as signal priority, signal coordination, or timing/phasing adjustments can help reduce delay.
- At the approximately 20 bus stops that are below spacing guidelines (300m) thoughtful removal or relocation could achieve more consistent spacing while maintaining access.
- Up to 10 km of new bus lanes could be added. Different types of lanes are appropriate in different contexts.

Further analysis is needed for all opportunities.



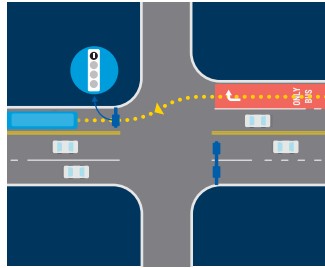
Key Opportunities

 24 Signalized intersections along corridor	 20+ Bus stops below spacing guidelines (40% of total)	 10 km New bus lanes (directional)
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Willingdon Ave, continued

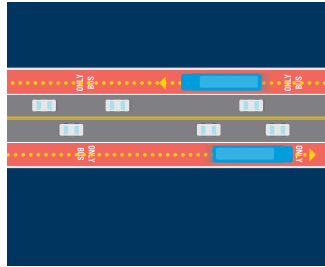
Considerations for Key Solutions

Q **QUEUE JUMPS AND APPROACH LANES**
 Queue jumps and approach lanes should be implemented strategically and in combination with intersection operations and turn solutions. They are typically implemented when the right-of-way is too limited to create a whole bus lane.

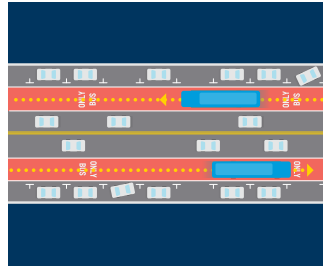


Queue jump in right-turn lane or BAT lane without a receiving lane. A specialized **transit signal** and / or phase is required to help the bus transition back into traffic.

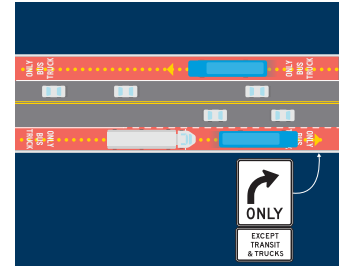
BUS LANES
 Bus lanes can be implemented in context-specific solutions that consider traffic conditions, on-street parking and access to business and destinations; and integration with facilities for bicyclists or goods movements.



Curbside bus lanes can be full-time or part-time (peak hours). They are quick to implement but may have conflicts with right turning motor vehicle traffic and require enforcement and curb management to deter parking during operating hours.



Offset bus lanes (in commercial areas) run between an on-street parking lane and a through-traffic lane and preserve parking and loading along the curb. Bus bulbs used with offset bus lanes can provide additional space for passengers at bus stops and shorten pedestrian crossing distances.



Bus lanes along freight routes can consider implementing such as freight and bus lanes or restrictions on turning movements that accommodate buses and trucks to improve freight mobility and reduce conflict with other modes of travel.

DOWNTOWN TO IRONWORKERS MEMORIAL BRIDGE



Corridor Description

- This corridor is a critical connection between Downtown Vancouver, the North Shore, and neighbourhoods in East Vancouver.
- It connects the Waterfront in Downtown Vancouver with North Shore destinations such as Capilano University, Lynn Creek, and Deep Cove.
- It also shares corridors with commercial traffic related to Port of Vancouver and Hwy 1 access.

Quick Facts

Length	9.7 km
Subregions	Vancouver/UBC, North Shore
Primary Routes	4, 7, 209, 210, 211, 214
All Routes	3, 4, 5, 7, 8, 19, 22, 28, 130, 209, 210, 211, 214, 222, N8, N15, N19, N22, N24

Notes: Consists of the Pender/Powell/Dundas/McGill and Ironworkers Memorial Bridge corridors, ranked #15 and #48 for person-delay per km in Fall 2021, respectively. Ridership is reported for the location with the most cumulative passengers on-board the bus throughout the day.

57

Maximum hourly bus trips per direction

460

Person-hours of delay per day

20,200

Total households (1,300/km² density)

44%

Low income households

38%

Zero vehicle households

4,900

Total ridership (daily load in one direction)

51

Bus-hours of delay per day

Demographics within 400m of corridor

Downtown to Ironworkers Memorial Bridge, continued

Corridor Significance

- **Ironworkers Memorial Bridge is a key connection to the North Shore.** The bridge serves routes to the North Shore from downtown Vancouver as well as from Burnaby.
- **The streets connecting buses to the bridge from Downtown Vancouver are highly utilized.** The primary bus routes that use the bridge to connect to the North Shore combine to run every 2 to 3 minutes all-day, not including various other routes that also run on these streets.
- **Social equity need is significant along the corridor.** It ranks first among areas profiled in the share of both low-income households and zero-vehicle households.

Key Challenges for Bus Speed & Reliability

- Congested and constrained roadways that carry heavy vehicle volumes between Downtown Vancouver and North Vancouver.
- Significant turn volumes at major intersections.

Location of Common Causes of Bus Delay

Issue	Location(s)
Motorists turning left (or other delay from left-turns)	<ul style="list-style-type: none"> • EB/WB Pender St between Granville St and Seymour St • EB Cordova St at Main St • EB Cordova St at Clark Dr • EB Dundas St at Nanaimo St • WB Pender St at Hamilton St • WB Powell St at Gore Ave • WB Dundas St between Victoria Dr and Wall St
Motorists turning right (or other delay from right-turns)	<ul style="list-style-type: none"> • EB Pender St between Thurlow St and Granville St • EB Pender St at Hastings St • EB/WB Pender St at Seymour St • EB Cordova St at Homer St • EB Cordova St at Main St • WB Pender St at Main St
Roadway congestion	<ul style="list-style-type: none"> • EB/WB Pender St between Thurlow St and Hastings St • EB Homer St at Pender St • EB Dundas St at Nanaimo St • WB Dundas St between Garden Dr and Commercial Dr
Closely spaced driveways or other roadways	<ul style="list-style-type: none"> • EB Cordova St between Homer St and Carrall St • EB/WB Powell St at Commercial Dr
Re-entering traffic from bus stops	<ul style="list-style-type: none"> • EB/WB Cordova St between Homer St and Carrall St • WB Dundas St at Garden Dr • WB Powell St at Commercial Dr • WB Pender St at Hamilton St
Location of bus stops	<ul style="list-style-type: none"> • EB Cordova St at Main St
Short spacing between bus stops	<ul style="list-style-type: none"> • EB Cordova St between Carrall St and Dunlevy Ave • WB Pender St at Main St • WB Pender St at Hamilton St

Downtown to Ironworkers Memorial Bridge, continued

Issue	Location(s)
Pedestrian movements (including pedestrian signals)	<ul style="list-style-type: none"> • EB/WB Pender St at Thurlow St • EB/WB Pender St at Granville St • EB/WB Pender St between Seymour St and Hastings St • EB Cordova St between Homer St and Main St • EB McGill St at Renfrew St • WB Pender St at Main St • WB Pender St between Hamilton St and Seymour St
Uncoordinated traffic signals	<ul style="list-style-type: none"> • EB Pender St between Thurlow St and Seymour St • EB Cordova St between Homer St and Main St • WB Dundas Street between Garden Dr and Templeton Dr
HOV or bus-only lane violations	<ul style="list-style-type: none"> • EB Pender St between Thurlow St and Granville St
Overhead trolley wire-related delays/conflicts	<ul style="list-style-type: none"> • EB/WB Pender St at Hastings St • WB Pender St at Howe St • WB Pender St at Burrard St
Bus/bicycle interactions	<ul style="list-style-type: none"> • EB Pender St at Seymour St • WB Pender St at Abbott St • WB Pender St between Hamilton St and Granville St

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Downtown to Ironworkers Memorial Bridge, continued



Key Opportunities



34

Signalized intersections along corridor



40+

Bus stops below spacing guidelines (60% of total)



16 km

New bus lanes (directional)

The eastern portion of the corridor has been prioritized for implementation of Rapid Transit. Final technology, design, and exact alignment are to be confirmed through the Burrard Inlet Rapid Transit study.

Map Callouts

- 1** Design subject to future study.

Corridor-Wide Opportunities

- At the 34 signalized intersections, solutions such as signal priority, signal coordination, or timing/phasing adjustments can help reduce delay.
- At the approximately 40 bus stops that are below spacing guidelines (300m) thoughtful removal or relocation could achieve more consistent spacing while maintaining access.
- Up to 16 km of new bus lanes could be added. Different types of lanes are appropriate in different contexts.

Further analysis is needed for all opportunities.

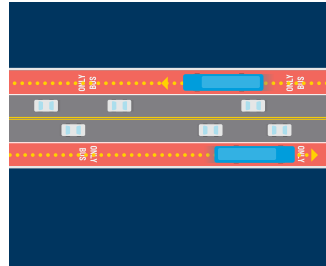
Downtown to Ironworkers Memorial Bridge, continued

Considerations for Key Solutions

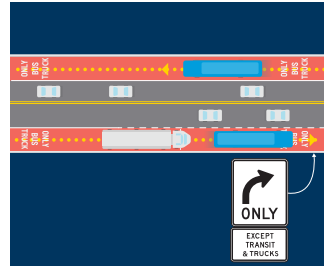


BUS LANES

Bus lanes can be implemented in context-specific solutions that consider traffic conditions, on-street parking and access to business and destinations; and integration with facilities for bicyclists or goods movements.



Curbside bus lanes can be full-time or part-time (peak hours). They are quick to implement but may have conflicts with right turning motor vehicle traffic and require enforcement and curb management to deter parking during operating hours.



Bus lanes along freight routes can consider implementing such as freight and bus lanes or restrictions on turning movements that accommodate buses and trucks to improve freight mobility and reduce conflict with other modes of travel.

MAIN ST / KINGSWAY

Potential Solutions to Address Bus Speed and Reliability Issues



Corridor Description

- The Kingsway / Main Street corridor is a major connection between Southwest Burnaby and Downtown Vancouver/Chinatown.
- The neighbourhoods surrounding Kingsway feature shopping and dining destinations.
- The corridor connects passengers travelling along Kingsway with the Expo Line, serving Main Street-Science World Station.
- Many trolley routes converge north of Broadway.

Quick Facts

Length	10.2 km
Subregions	Vancouver/UBC, Burnaby/ New Westminister
Primary Routes	19, N19
All Routes	3, 8, 19, 22, 25, 26, N8, N19

Notes: Consists of the Main St and Kingsway corridors, ranked #16 and #18 for person-delay per km in Fall 2021, respectively. Ridership is reported for the location with the most cumulative passengers on-board the bus throughout the day.



21

Maximum hourly bus trips per direction



680

Person-hours of delay per day



35,400

Total households (1,900/km² density)



37%

Low income households



27%

Zero vehicle households

4,200

Total ridership (daily load in one direction)

48

Bus-hours of delay per day

Demographics within 400m of corridor



Main St / Kingsway, continued

Corridor Significance

- **Main St and Kingsway are significant transit streets.** Route 19, the primary route serving both of the streets profiled, arrives roughly every 7 minutes all day. Buses arrive every 2 to 3 minutes along Main St. Approximately 6% of bus journeys in Vancouver/UBC begin on Main St/Kingsway.
- **Variability along Main and Kingsway is second highest among areas profiled.** During heavier traffic, an end-to-end bus trip along this corridor can take over 15 minutes longer compared to a best-case trip, when the bus is able to move smoothly.
- **Buses serve an important mobility need on Main St and Kingsway.** A quarter to a third of people traveling on these streets are on buses in the morning rush hours. The area profiled ranks fifth for the share of zero-vehicle households.

Key Challenges for Bus Speed & Reliability

- Active business districts with high levels of pedestrian activity and on-street parking.
- Many intersections lack left-turn pockets for vehicles turning left, affecting autos and buses; on Main St, some SB left-turns are restricted in the PM peak. SB buses must cross two travel lanes to turn left from Main St onto Kingsway.
- Where there is on-street parking, buses must merge back into traffic from bus stops when bus-only lanes are not in effect.
- Varying bus lane hours may affect compliance. Lanes are in effect between 7 am – 7 pm on Main St (all days) and in the peak direction on Kingsway (SB 3-6 pm, NB 7-9:30 am weekdays). Operators have reported unauthorized vehicles in bus lanes.
- Trolley buses are unable to pass each other at bus stops without passing wire.

Location of Common Causes of Bus Delay

Issue	Location(s)
Motorists turning left (or other delay from left-turns)	<ul style="list-style-type: none"> • NB Main St at Hastings • NB Main St at Pender • SB Main St at Kingsway
Motorists turning right	<ul style="list-style-type: none"> • NB/SB Kingsway at Boundary Rd • NB/SB Kingsway at Joyce St • NB/SB Kingsway at Rupert St • NB/SB Kingsway at Earles St • NB/SB Kingsway at Victoria Dr • NB/SB Kingsway at Knight St • NB/SB Kingsway at 12 Ave • NB/SB Kingsway at Broadway • NB Main at Terminal Ave
Roadway congestion	<ul style="list-style-type: none"> • NB Kingsway at Willingdon Ave • NB/SB Kingsway between Earles St and Knight St • SB Kingsway at Fraser St • NB Kingsway between St. George and Broadway • SB Kingsway between Main St and 12 Ave • NB Main St between 2 Ave and Terminal Ave • SB Main St between Switchmen St and 2 Ave • NB/SB Main St between Georgia St and Hastings St

Main St / Kingsway, continued

Issue	Location(s)
Re-entering traffic from bus stops	<ul style="list-style-type: none"> • NB/SB Kingsway between Willingdon Ave and Main St • NB/SB Main St between Kingsway and Hastings
Short spacing between bus stops	<ul style="list-style-type: none"> • NB Kingsway at Boundary St and Rupert St • SB Main St from E 5 Ave and E 2 Ave
Pedestrian movements (including pedestrian signals)	<ul style="list-style-type: none"> • NB/SB Kingsway at Willingdon Ave • NB/SB Kingsway at Boundary Rd • NB/SB Kingsway at Joyce St • NB/SB Kingsway at Victoria Dr • NB/SB Kingsway at Knight St • NB/SB Kingsway at Fraser St • NB/SB Kingsway between 12 St and Broadway • NB/SB Main St between 2 Ave and Terminal Ave • NB/SB Main St between Georgia St and Hastings St
Uncoordinated traffic signals	<ul style="list-style-type: none"> • NB/SB Kingsway at Boundary St, Gladstone St, and Broadway
HOV or bus-only lane violations	<ul style="list-style-type: none"> • NB/SB Main St between Terminal Ave and Kingsway • NB/SB Kingsway between Main St and Fraser St
Overhead trolley wire-related delays/conflicts	<ul style="list-style-type: none"> • NB/SB Main St between Kingsway and Hastings St • NB/SB Kingsway at Willingdon Ave and Joyce St

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Main St / Kingsway, continued



Key Opportunities



30+

Signalized intersections along corridor



50

Bus stops below spacing guidelines (2/3 of total)



16 km

New bus lanes (directional)

Map Callouts

- 1 Add right-turn lane and signal on NB Main at Pender St. and Hastings St.
- 2 Adjust trolley wire infrastructure between Kingsway and Hastings to optimize operations and reduce delays.
- 3 At this and other locations, manage right-turn lanes and signals to clear right-turning vehicles in front of buses, while minimizing impacts to pedestrian crossings.
- 4 Opportunity to enhance bus priority between Boundary Rd and Willingdon Ave when Kingsway becomes 3 lanes in each direction.

Corridor-Wide Opportunities

- At the 30+ signalized intersections, solutions such as signal priority, signal coordination, or timing/phasing adjustments can help reduce delay.
- At the approximately 50 bus stops that are below spacing guidelines (300m) thoughtful removal or relocation could achieve more consistent spacing while maintaining access.
- Up to 16 km of new bus lanes could be added. Different types of lanes are appropriate in different contexts.

Further analysis is needed for all opportunities.

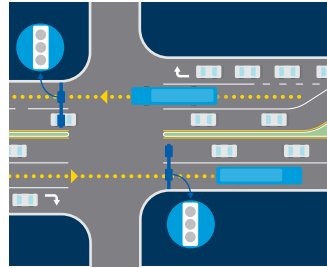
Main St / Kingsway, continued

Considerations for Key Solutions



LEFT- AND RIGHT-TURN SOLUTIONS

Where right-of-way permits, turn solutions include dedicated turn pockets. Where right-of-way is limited, solutions include turn restrictions for general traffic but permitted for buses.

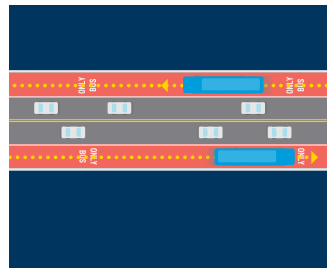


Turn pockets separate buses and motor vehicle traffic to reduce time spent by buses queuing behind general traffic. Consider turn pockets when turn volumes are high.

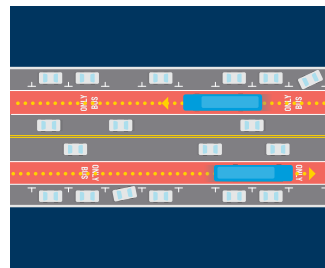


BUS LANES

Bus lanes can be implemented in context-specific solutions that consider traffic conditions, on-street parking and access to business and destinations; and integration with facilities for bicyclists or goods movements.



Curbside bus lanes can be full-time or part-time (peak hours). They are quick to implement but may have conflicts with right turning motor vehicle traffic and require enforcement and curb management to deter parking during operating hours.



Offset bus lanes (in commercial areas) run between an on-street parking lane and a through-traffic lane and preserve parking and loading along the curb. Bus bulbs used with offset bus lanes can provide additional space for passengers at bus stops and shorten pedestrian crossing distances.

WEST 4TH AVE



Corridor Description

- West 4th Ave connects Dunbar, Kitsilano, and West Point Grey with Downtown, and UBC.
- The corridor provides transit connections to the Canada and Millennium Lines, serving Olympic Village and VCC-Clark stations.
- The surrounding areas feature destinations for shopping and enjoying the waterfront.

Quick Facts

Length	10.2 km
Subregion	Vancouver/UBC
Primary Routes	84; 4, 44
All Routes	4, 7, 14, 44, 50, 84

Notes: Corridor ranked #17 for person-delay per km in Fall 2021. Profile area does not extend as far to the west as the corridor and includes an extension to VCC-Clark Station on the east. Ridership is reported for the location with the most cumulative passengers on-board the bus throughout the day; lower end of the range accounts only for routes using the corridor for at least 1 km and upper end of the range reflects all routes. Analysis was completed using data from 2021, before bus priority improvements were implemented along W 4th Ave. See case study for further detail.

 33 Maximum hourly bus trips per direction	 560 Person-hours of delay per day	 34,700 Total households (2,600/km ² density)	 36% Low income households	 35% Zero vehicle households
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5,800-6,000
 Total ridership (daily load in one direction)

38
 Bus-hours of delay per day

Demographics within 400m of corridor



West 4th Ave, continued

Corridor Significance

- **West 4th Ave serves a high density of people living in Vancouver.** West 4th Ave ranks third in total household density and second in the share of zero-vehicle households among profile areas.
- **Buses serve an important mobility need on West 4th Ave.** Up to 60% of people traveling along the corridor in the morning rush hours are on buses. The primary routes serving the corridor arrive every 3 minutes or more often all day.
- **Performance on West 4th Ave impacts people traveling by bus throughout Vancouver.** During heavier traffic, an end-to-end trip between VCC and UBC can take nearly 10 minutes longer compared to a best-case trip, when the bus is able to move smoothly.

Key Challenges for Bus Speed & Reliability

- Extensive commercial areas featuring on-street parking, higher density of traffic signals, and high pedestrian activity.
- Buses experience delay waiting for motorists to turn left or right and from re-entering traffic after pulling over to bus stops.

Location of Common Causes of Bus Delay

Issue	Location(s)
Motorists turning left (or other delay from left-turns)	<ul style="list-style-type: none"> • WB W 4 Ave at Alma St • EB/WB W 4 Ave at Macdonald St • WB W 4 Ave at Arbutus St • EB/WB W 4 Ave between Balsam St and Cypress St
Motorists turning right (or other delay from right-turns)	<ul style="list-style-type: none"> • EB W 4 St at Alma St • EB/WB W 4 Ave between Balsam St and Burrard St • WB W 4 Ave at Arbutus St • EB W 6 Ave from Oak St to Cambie St • WB W 6 Ave at Cambie St • EB 2 Ave from Quebec St to Main St
Roadway congestion	<ul style="list-style-type: none"> • EB/WB W 4 Ave between Larch St and Granville St • EB W 6 Ave from Alder St to Cambie St • WB 2 Ave from Main St to Cambie St • EB 2 Ave from Quebec to Main St
Re-entering traffic from bus stops	<ul style="list-style-type: none"> • WB W 4 Ave from Alma St to Dunbar St • WB W 4 Ave at Balaclava St • EB W 4 Ave at Bayswater St • EB/WB W 4 Ave between Macdonald St and Trafalgar St • EB W 4 Ave from Fir St to Granville St • WB 2 Ave at Cambie St • EB/WB 2 Ave between Ontario St and Main St
Location of bus stops	<ul style="list-style-type: none"> • EB W 4 Ave from Alma St to Collingwood St • EB W 6 Ave from Heather St to Cambie St
Pedestrian movements (including pedestrian signals)	<ul style="list-style-type: none"> • EB W 4 Ave at Alma St • EB/WB W 4 Ave between Balsam St and Burrard St • EB W 6 Ave from Alder St to Cambie St • WB 2 Ave at Cambie St • EB 2 Ave from Quebec St to Main St

West 4th Ave, continued



Key Opportunities



16

Signalized intersections along corridor



20+

Bus stops below spacing guidelines (> 1/3 of total)



9 km

New bus lanes (directional)

Map Callouts

- 1 Solutions along Greektown may include off-set or curb-side bus lanes and in-lane bus stops.
- 2 Add westbound left-turn pocket at W 4th Ave and Arbutus St.
- 3 Add westbound queue jump at Wylie St for buses to move past on-ramp to Cambie Bridge

Corridor-Wide Opportunities

- At the 16 signalized intersections, solutions such as signal priority, signal coordination, or timing/phasing adjustments can help reduce delay.
- At the approximately 20 bus stops that are below spacing guidelines (300m) thoughtful removal or relocation could achieve more consistent spacing while maintaining access.
- Up to 9 km of new bus lanes could be added. Different types of lanes are appropriate in different contexts.

Further analysis is needed for all opportunities.

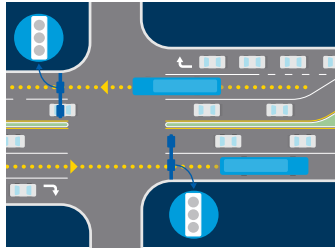
West 4th Ave, continued

Considerations for Key Solutions



LEFT- AND RIGHT-TURN SOLUTIONS

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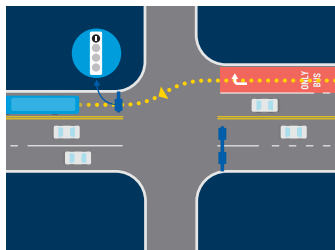


Turn pockets separate buses and motor vehicle traffic to reduce time spent by buses queuing behind general traffic. Consider turn pockets when turn volumes are high.



QUEUE JUMPS AND APPROACH LANES

Queue jumps and approach lanes should be implemented strategically and in combination with intersection operations and turn solutions. They are typically implemented when the right-of-way is too limited to create a whole bus lane.

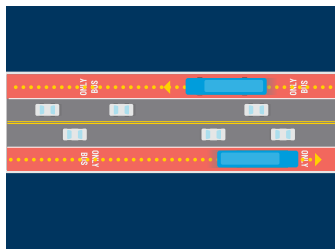


Queue jump in right-turn lane or BAT lane without a receiving lane. A specialized **transit signal** and / or phase is required to help the bus transition back into traffic.

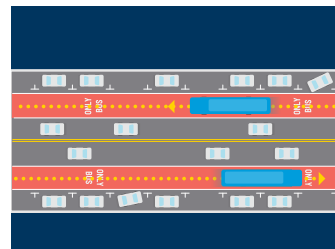


BUS LANES

Bus lanes can be implemented in context-specific solutions that consider traffic conditions, on-street parking and access to business and destinations; and integration with facilities for bicyclists or goods movements.



Curbside bus lanes can be full-time or part-time (peak hours). They are quick to implement but may have conflicts with right turning motor vehicle traffic and require enforcement and curb management to deter parking during operating hours.

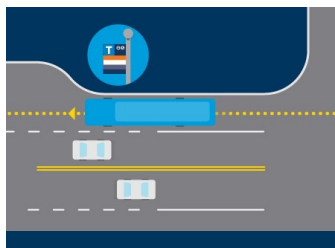


Offset bus lanes (in commercial areas) run between an on-street parking lane and a through-traffic lane and preserve parking and loading along the curb. Bus bulbs used with offset bus lanes can provide additional space for passengers at bus stops and shorten pedestrian crossing distances.



IN-LANE STOPS

In-lane stops (also called “bus bulb” or “floating bus stop”) may be temporary platforms or paved extensions of the sidewalk. Both applications improve passenger visibility for the bus and reduce passenger conflicts with pedestrians on the sidewalks.



NO 3 RD

Corridor Description

- No 3 Rd is the key north-south corridor in Richmond and connects Richmond city centre to commercial areas, neighbourhoods, and cultural and religious destinations, including Richmond City Hall and Kwantlen Polytechnic University.
- Buses on this corridor provide connections between several Canada Line stations, including Bridgeport, Aberdeen, Lansdowne, and Richmond-Brighouse stations.
- The corridor extends south of the Canada Line serving destinations including Steveston Harbour and the Riverton Recreation Complex.

Quick Facts

Length	7.0 km
Subregion	Southwest
Primary Routes	403
All Routes	402, 403, 404, 405, 406, 407, 410, 414, 416, 430, N10

Notes: Corridor ranked #22 for person-delay per km in Fall 2021. Profile area extends onto Bridgeport Rd. Ridership is reported for the location with the most cumulative passengers on-board the bus throughout the day; lower end of the range accounts only for routes using the corridor for at least 1 km and upper end of the range reflects all routes.



49

Maximum hourly bus trips per direction



340

Person-hours of delay per day



11,900

Total households (600/km² density)



38%

Low income households



13%

Zero vehicle households

Demographics within 400m of corridor

4,800-6,000

Total ridership (daily load in one direction)

34

Bus-hours of delay per day



No 3 Rd, continued

Corridor Significance

- **No 3 Rd is a major transit corridor.** During weekday peak hours, buses arrive every 3 minutes or more often. No 3 Rd ranks fifth in bus delay per kilometre.
- **Buses serve an important mobility need on No 3 Rd.** Over a third of all bus journeys in Southwest begin on this corridor. Over 40% of people traveling through the central part of the corridor are on buses in the morning rush hours, and over 20% on the southern end. The density of low-income households is 4th highest among profile areas.
- **Performance on No 3 Rd impacts people traveling by bus through Richmond.** During heavier traffic, an end-to-end trip between Steveston Hwy and Bridgeport Station can take nearly 10 minutes longer compared to a best-case trip, when the bus is able to move smoothly. Relative to the average travel time, variability on No 3 Rd is the highest among profile areas.

Key Challenges for Bus Speed & Reliability

- No 3 Rd is characterized by significant commercial areas between Bridgeport Rd and Granville Ave.
- There is significant pedestrian activity at segments near Aberdeen, Lansdowne, and Richmond-Brighouse Stations on the Canada Line.
- Eventual addition of a Canada Line station at Capstan Way could place additional pressure on curbside management and traffic signal timing.

Location of Common Causes of Bus Delay

Issue	Location(s)
Motorists turning left (or other delay from left-turns)	<ul style="list-style-type: none"> • NB No 3 Rd at Blundell Rd • NB Great Canadian Way at Bridgeport Rd • EB Steveston Hwy at No 3 Rd
Motorists turning right (or other delay from right-turns)	<ul style="list-style-type: none"> • NB/SB No 3 Rd between Granville Ave and Capstan Way • SB No 3 Rd at Blundell Rd • SB No 3 Rd at Francis Rd
Roadway congestion	<ul style="list-style-type: none"> • NB No 3 Rd at Capstan Way • SB No 3 Rd from Capstan Way to Browngate Rd • NB/SB No 3 Rd between Lansdowne Rd and Alderbridge Way • SB No 3 Rd from Lansdowne Rd to Saba Rd • NB/SB No 3 Rd at Richmond-Brighouse Station especially from Park Rd to Saba Rd • NB/SB No 3 Rd at Blundell Rd • NB No 3 Rd at Francis Rd
Closely spaced driveways or other roadways	<ul style="list-style-type: none"> • NB No 3 Rd from Leslie Rd to Aberdeen Station • NB No 3 Rd from Ackroyd Rd to Lansdowne Station • NB No 3 Rd at Richmond-Brighouse Station • SB No 3 Rd from Cook Rd to Park Rd
Re-entering traffic from bus stops	<ul style="list-style-type: none"> • SB No 3 Rd from Cook Rd to Anderson Rd
Short spacing between bus stops	<ul style="list-style-type: none"> • SB No 3 Rd from Park Rd to Anderson Rd

No 3 Rd, continued

Issue	Location(s)
Pedestrian movements (including pedestrian signals)	<ul style="list-style-type: none"> • NB No 3 Rd from Cook Rd to Saba Rd at Richmond-Brighthouse Station • SB No 3 Rd from Lansdowne Rd to Saba Rd between Lansdowne Station and Richmond-Brighthouse Station • SB No 3 Rd from Cook Rd to Granville Ave • EB Steveston Hwy at No 3 Rd
Uncoordinated traffic signals	<ul style="list-style-type: none"> • NB Great Canadian Way at Bridgeport Rd
Pedestrian access and/or safety	<ul style="list-style-type: none"> • SB No 3 Rd at Anderson Rd
Bus/bicycle interactions	<ul style="list-style-type: none"> • Throughout the profile area where bus lanes are unprotected and adjacent to bus stops, especially NB from Cook Rd to Capstan Way and SB from Alderbridge Way to Cook Rd

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No 3 Rd, continued

Potential Solutions to Address Bus Speed and Reliability Issues

Part of corridor will be developed into BRT/RapidBus, with final design, including exact alignment, to be confirmed.

Bus priority measures shown represent near-term solutions.

Map Callouts

- 1** Convert and lengthen existing EB left-turn lane into a bus-only left-turn lane. Add a second EB left-turn lane for vehicles which will require additional ROW.
- 2** Convert existing WB left-turn lane into a bus only left-turn lane and extend by closing EB left-turn lane from Bridgeport to Sexsmith.
- 3** Add a shared left-turn lane for buses and vehicles onto Steveston Hwy or a bus-only left-turn lane.

Corridor-Wide Opportunities

- At the 21 signalized intersections, solutions such as signal priority, signal coordination, or timing/phasing adjustments can help reduce delay.
- At the approximately 60 bus stops that are below spacing guidelines (300m) thoughtful removal or relocation could achieve more consistent spacing while maintaining access.
- Up to 14 km of new bus lanes could be added. Different types of lanes are appropriate in different contexts.

Further analysis is needed for all opportunities

Key Opportunities



21

Signalized intersections along corridor



60+

Bus stops below spacing guidelines (>50% of total)



14 km

New bus lanes (directional)



Part of corridor will be developed into BRT/Rapid-Bus, with final design, including exact alignment, to be confirmed. Bus priority measures shown represent near-term solutions.

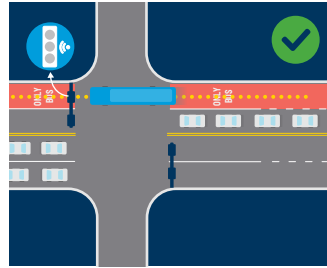
No 3 Rd, continued

Considerations for Key Solutions

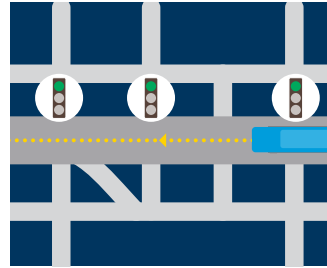


INTERSECTION OPERATIONS

Intersection operations can include providing active signal priority, passive signal priority, or adding a new traffic signal or signal phase that benefits the direction of bus travel, or coordinating signals along a corridor to prioritize bus travel and reduce delay.



Active signal priority includes detecting an approaching bus in advance of an intersection and extending green times so the bus doesn't wait at the signal.

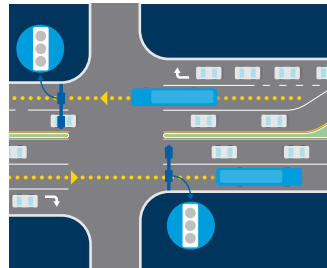


Passive signal priority includes coordinating/timing signals to create a "green wave" based on the expected speed of bus travel.



LEFT- AND RIGHT-TURN SOLUTIONS

Where right-of-way permits, turn solutions include dedicated turn pockets. Where right-of-way is limited, solutions include turn restrictions for general traffic but permitted for buses.

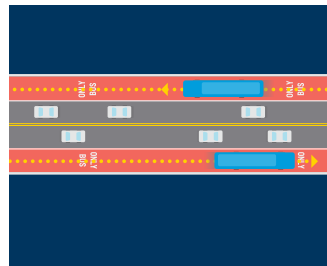


Turn pockets separate buses and motor vehicle traffic to reduce time spent by buses queuing behind general traffic. Consider turn pockets when turn volumes are high.

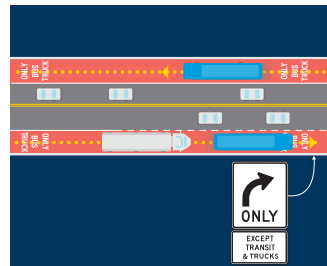


BUS LANES

Bus lanes can be implemented in context-specific solutions that consider traffic conditions, on-street parking and access to business and destinations; and integration with facilities for bicyclists or goods movements.



Curbside bus lanes can be full-time or part-time (peak hours). They are quick to implement but may have conflicts with right turning motor vehicle traffic and require enforcement and curb management to deter parking during operating hours.



Bus lanes along freight routes can consider implementing such as freight and bus lanes or restrictions on turning movements that accommodate buses and trucks to improve freight mobility and reduce conflict with other modes of travel.