Downtown BRT Corridor Alternatives Review: 1st, 2nd, 3rd and 4th Avenue

Bus Rapid and Conventional Transit Planning and Design Services

City of Saskatoon

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Project Team

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1 Introduction

The Preferred Configuration identifies three locations where exclusive runningways would be beneficial for the BRT lines: College Drive, Broadway Avenue and the 3rd Avenue. Within Downtown, the exclusive runningway would span 3rd Avenue north-south, from 19th Street to 25th Street.

An exclusive runningway provides a number of key benefits:

- Increased reliability;
- Shorter travel times;
- Higher total roadway capacity;
- Improved transit operating efficiency; and
- Increased ridership.

There are also indirect benefits associated with exclusive runningways:

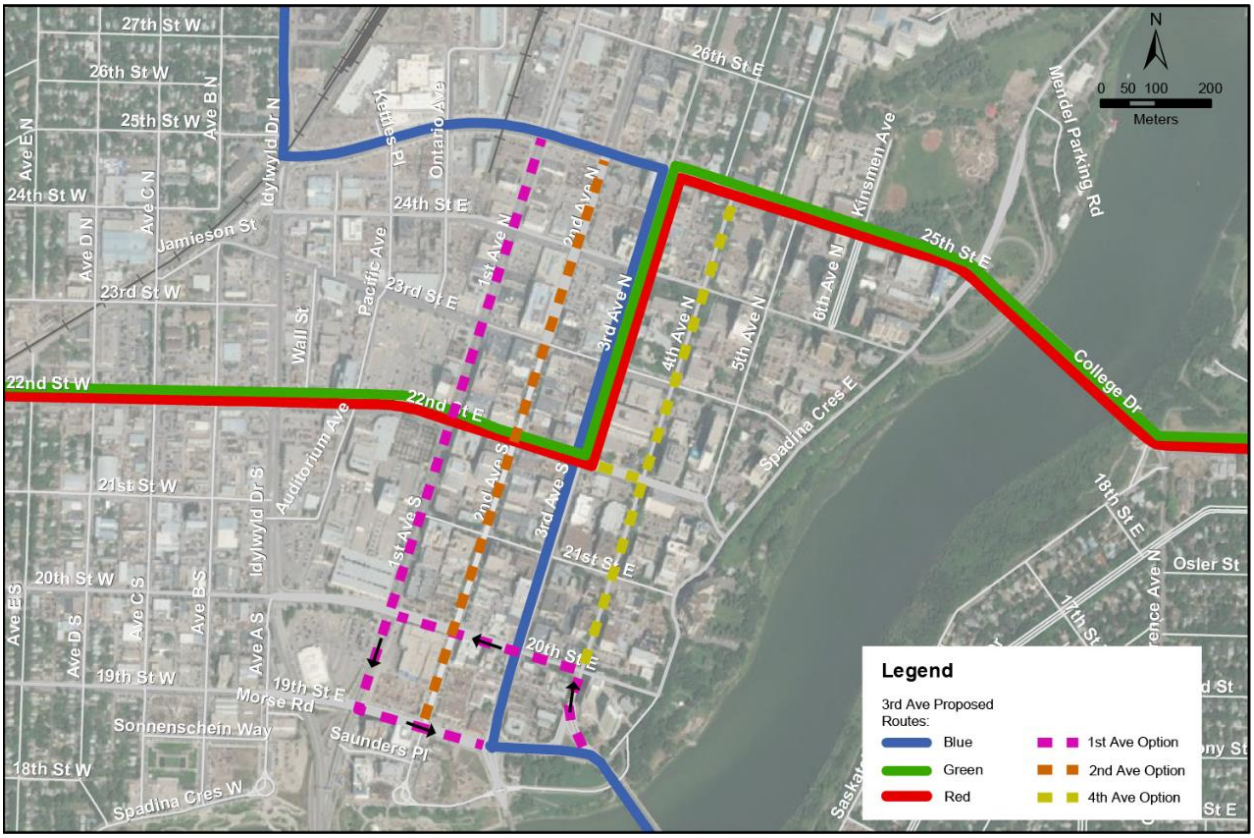
- Traffic calming effects resulting in reduced motorist speeds, and speed related incidents or accidents;
- Placemaking effects related to station presence, identity, and branding;
- Encourage active transportation modes such as walking and cycling; and
- Increase potential for transit-oriented development.

There are also a number of issues associated with the provision of exclusive runningways:

- Costlier to build, operate and enforce than operation in mixed traffic lanes;
- Traffic disruptions may occur during construction and initial operation phases;
- May increase delays to general traffic; and
- May impact on-street parking and accesses to adjacent properties.

To maximize the benefits of utilizing an exclusive runningway while mitigating potential issues, four north-south corridors within the Downtown Core were evaluated: 1st, 2nd, 3rd and 4th Avenues. Each corridor is described and assessed in the following sections. All suitable corridors are then compared to each other. Based on the analysis and comparison, one corridor is recommended as the preferred exclusive runningway route through downtown. All corridor options are shown in **Figure 1**.

Figure 1 Exclusive Runningway Corridor Options in Downtown Saskatoon



2 Exclusive Runningway Corridor Options

All four roadways span the entirety of the Downtown Core from 19th Street to 25th Street, have signalized intersections with all cross streets and have sufficient ROW for an exclusive runningway; however, they differ in proximity to key destinations, land use, roadway width, traffic levels and access to Broadway and University Bridges.

For comparison, it is assumed that all four corridors would have three stations located between 20th and 21st Street, 22nd and 23rd Street, and 24th and 25th Street, with southbound and northbound travel across Broadway Bridge via 19th except for 1st and 4th Avenue options. All four corridors have been assessed with an exclusive runningway configuration featuring centre running transit-only lanes with side loading platforms. Detailed descriptions and analysis has been provided with key points for each corridor summarized and shown in **Table 1.**

1st Avenue

1st Avenue has two through lanes in each direction with a bidirectional left turn median lane. Curbside parking is provided from 20th Street to 25th Street. An advanced left turn signal can be found at 22nd Street. With direct access to the Senator Sid Buckwold Bridge 1st Avenue is the primary north-south traffic corridor through Downtown with over 800 vehicles per hour in each direction during peak periods and expected to rise to 1300 vehicles per hour by 2043[1]. In accessing cross streets, it is important to note that it is not possible to turn northbound on to 1st Avenue from 19th Street.

[1] Growth Plan Technical Report, 2016, Urban Systems Ltd.

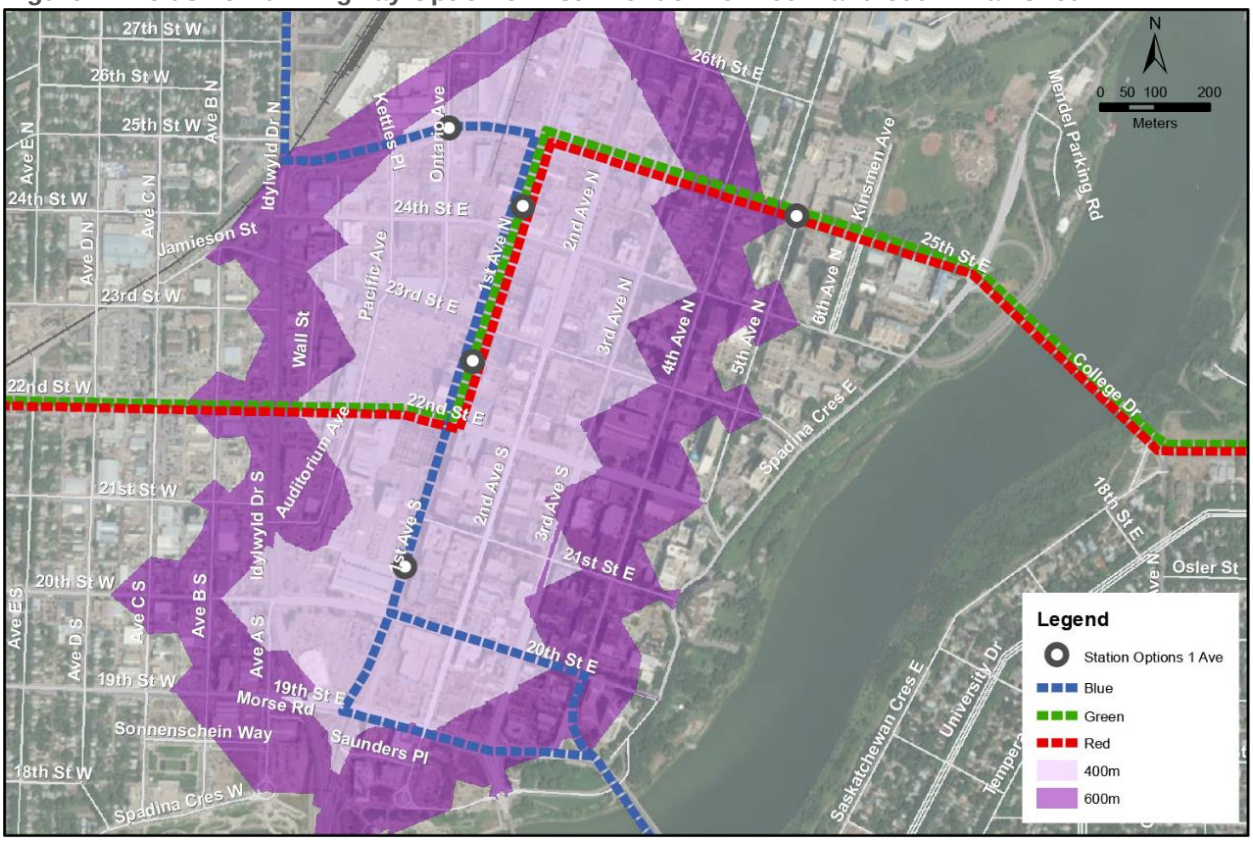
Medium density commercial and retail uses border the 1st Avenue corridor; however, north of 22nd Street 1st Avenue is predominately low density commercial and surface parking lots. A parking garage is also present at 20th Street. Major institutions and destinations on the corridor include the Federal Building, Midtown Plaza and TCU Place. Ten Saskatoon Transit (ST) routes utilize 1st Avenue, though none provide coverage along the entire corridor and simply utilize the roadway to connect to the Senator Sid Buckwold Bridge, 22nd Street or 20th Street. There is no cycling infrastructure along 1st Avenue, though the corridor has sharrows (shared-lane markings).

The potential path of the Red, Blue and Green BRT Lines, potential stations along 1st Avenue and service coverage within a 400m and 600m walk of these stations[2] are shown in **Figure 2**. Walkshed coverage from stations outside of the 1st Avenue corridor are not included in this analysis.

Discussion

1st Avenue is not considered an optimal corridor for a BRT exclusive runningway due to its distance from major commercial and residential areas on the east side of Downtown. Major institutions and destinations east of 3rd Avenue are not within 400m of a station, while a 600m walkshed does not provide coverage of all of Downtown. Access from locations west of 1st Avenue is limited by Midtown Plaza, though the area west of 1st Avenue would provide low ridership as it is either low density commercial or surface parking.

Figure 2 Exclusive Runningway Option on 1st Avenue with 400m and 600m Walkshed



[2] The catchment area for BRT Stations is 600m due to higher quality service, whereas the catchment area of local bus service is 400m.

2nd Avenue

The roadway has different characteristics between the sections north and south of 23rd Street. North of 23rd Street there are two through lanes in each direction with a left turn lane at each intersection. Advanced left turn signals are found at 24th and 25th Street. A narrow (<2m) raised median is present between 23rd and 24th Street and at the intersection with 25th Street, with a bidirectional left turn lane between 24th and 25th Street. Curbside parking is available, and no cycling infrastructure is present. Land use is predominately low density commercial and surface parking lots. ROW for this section of 2nd Avenue is comparable to 1st and 3rd Avenue. Three transit routes utilize this section of 2nd Avenue.

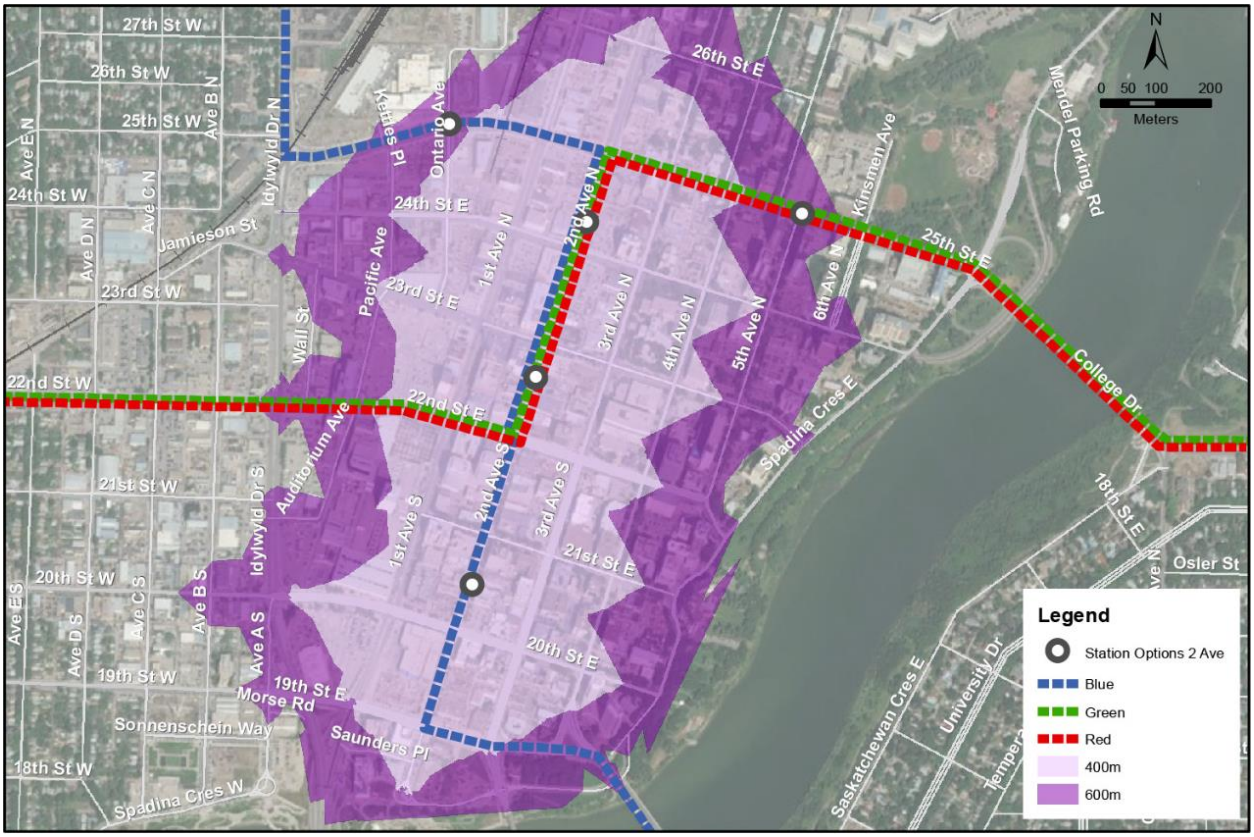
South of 23rd Street there is one through lane in each direction with a left turn lane at all intersections except for 21st Street, where they are prohibited. Marked but uncontrolled pedestrian crossings are provided midblock between every intersection, and no cycling infrastructure is present. Angled parking is provided for the medium density commercial and retail properties. A number of surface parking lots also exist on the corridor. South of 19th Street, 2nd Avenue directly connects to the River Centre featuring the Persephone Theatre and the Remai Modern art gallery, along with an urban village currently under construction. No transit routes run along this section.

The path of the Red, Blue and Green BRT Lines, stations along 2nd Avenue and service coverage within a 400m and 600m walk of these stations are shown in **Figure 3**. Walkshed coverage from stations outside of the 2nd Avenue corridor are not included in this analysis.

Discussion

2nd Avenue is not considered a suitable corridor for implementation of a BRT exclusive runningway due to the nature of the corridor south of 23rd Street. While 2nd Avenue is centrally located in Downtown with good coverage to major destinations, the inclusion of transit-only lanes would require the conversion of all angled parking to traffic lanes to compensate for the loss of the existing traffic lanes. This would have negative impacts on the corridor, which has high pedestrian and retail traffic.

Figure 3 Exclusive Runningway Option on 2nd Avenue with 400m and 600m Walkshed



3rd Avenue

3rd Avenue has two through lanes in each direction with a left turn lane at all intersections. South of 23rd Street features a raised median with trees and streetlights, while north of 23rd Street the median is painted. Advanced left turn signals can be found at 19th Street. Curbside parking exists all along the corridor. There is no cycling infrastructure along 3rd Avenue, though the corridor has sharrows (shared-lane markings). The ROW is characterized by wide lane and sidewalk widths.

Land use is mainly medium density commercial and retail, though one high density residential building and several low density commercial buildings are located on the west side of 3rd Avenue north of 23rd Street. Several surface parking lots are dispersed along the corridor. Major institutions feature prominently along the east side of 3rd Avenue, which include City Hall, Frances Morrison Library, Canada Revenue, and City offices located in the Sturdy Stone Centre.

A large number of ST routes utilize 3rd Avenue to access the City Centre Transit Hub as well as to provide service along a central corridor within the Downtown Core.

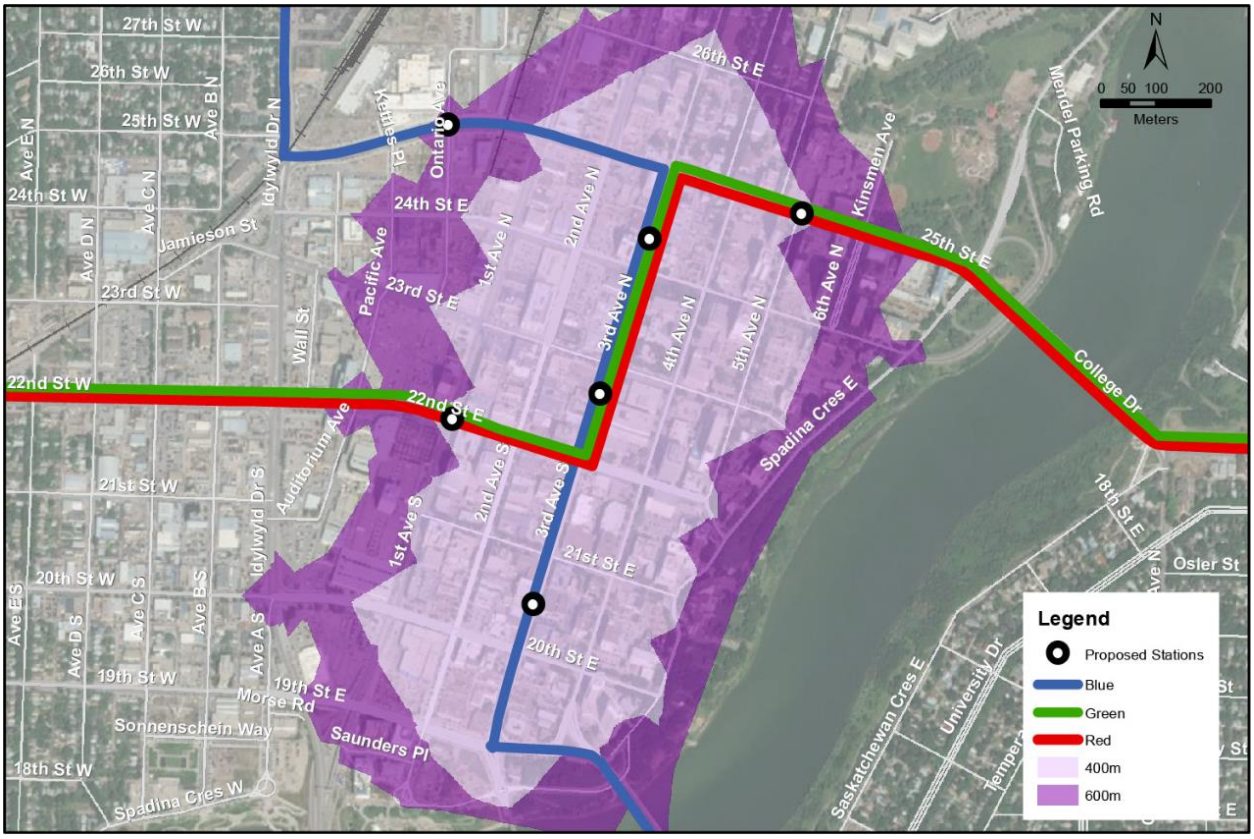
The path of the Red, Blue and Green BRT Lines, stations along 3rd Avenue and service coverage within a 400m and 600m walk of these stations are shown in **Figure 4**. Walkshed coverage from stations outside of the 3rd Avenue corridor are not included in this analysis.

Discussion

3rd Avenue is a suitable route for a BRT exclusive runningway as it is centrally located within Downtown and provides good access to major institutions and destinations. It is not constrained in its ROW, which

can maintain a traffic lane in each direction, left turn lanes at intersections and/or curbside parking with centre lanes and median converted to a centre running with-flow exclusive runningway.

Figure 4 Exclusive Runningway Option on 3rd Avenue with 400m and 600m Walkshed



4th Avenue

4th Avenue runs directly from Broadway Bridge to 25th Street with one through lane in each direction with a bidirectional left turn lane in the median and on-street parking lanes available. Parking is separated from the curb by protected bike lanes extending from 20th to 24th Street, installed in May 2016 as part of the Protected Bike Lane Demonstration Project. South of 23rd Street, the roadway is slightly narrower than 1st or 3rd Avenue, and narrows further north of 23rd Street. No transit routes run along 4th Avenue.

Land use along the corridor is predominately medium density commercial and retail. Major institutions present on 3rd Avenue are also adjacent to 4th Avenue. Some surface parking is also present. Medium density residential exists to the east of the corridor.

The path of the Red, Blue and Green BRT Lines, stations along 4th Avenue and service coverage within a 400m and 600m walk of these stations are shown in **Figure 5**. Walkshed coverage from stations outside of 4th Avenue corridor are not included in this analysis.

Discussion

4th Avenue would not be a suitable route for a BRT exclusive runningway due to the westbound transit operations on 25th Street. The corridor does possess adequate ROW, though both the on-street parking and protected bike lanes would be eliminated and remaining lanes would be narrow. Also, while not centrally located, 4th Avenue does provide coverage to most Downtown destinations. However, buses

travelling west and south from 25th Street to 4th Avenue would be required to make left turns onto 4th Avenue after stopping at the 5th Avenue Station. This would force bus operators to perform an unsafe operation as there is less than 100m for a bus to maneuver from the curbside station to the left turn lane.

Figure 5 Exclusive Runningway Option on 4th Avenue with 400m and 600m Walkshed

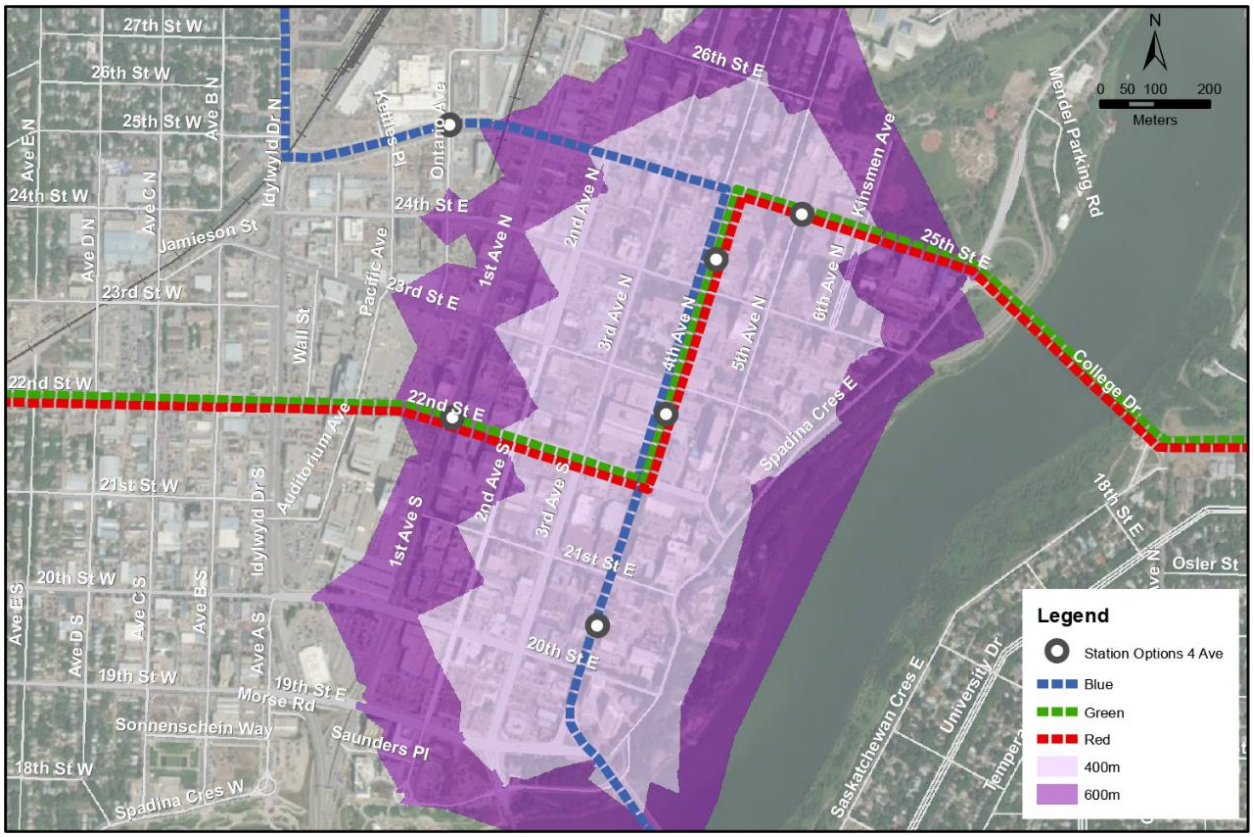


Table 1 Summary and Comparison of Route Options – 1st, 2nd, 3rd and 4th Avenues

Criteria	1st Ave	2nd Ave	3rd Ave	4th Ave
Roadway Cross-Section Width	Suitable for BRT: • ROW 30.2m • Roadway 22.6m	Unsuitable for BRT: • ROW 30.2m • Roadway 22.8m (9.2m south of 23rd St)	Suitable for BRT: • ROW 30.2m • Roadway 22.2m	Unsuitable for BRT: • ROW 30.2m • Roadway 20.2m (16.8m north of 23rd St)
Downtown Coverage	Unsuitable for BRT: • Eastern portion of Downtown further than 600m	Suitable for BRT: • Majority of Downtown within 400m	Suitable for BRT: • Majority of Downtown within 400m	Suitable for BRT: • Majority of Downtown within 600m
Transit Operations	Suitable for BRT: • No restrictions to bus operations	Unsuitable for BRT: • High pedestrian and retail activity may impede frequent BRT operation	Suitable for BRT: • No restrictions to bus operations	Unsuitable for BRT: • Buses on 25th St cannot safely enter left turn lane for 4th Ave from 5th Ave Station
Impacts from Traffic[1]	Unsuitable for BRT: • High traffic volume (AADT 14,100 at 24th St,	Unsuitable for BRT: • High pedestrian and retail activity south of 23rd St,	Suitable for BRT: • Low volume of traffic (AADT 8,000 at 24th St,	Suitable for BRT: • Moderate traffic volumes (AADT 5,000 at 24th St,

Criteria	1st Ave	2nd Ave	3rd Ave	4th Ave
	13,800 at 20th St)	high traffic volumes north of 23rd St (AADT 19,500 at 24th St)	8,200 at 20th St)	17,400 at 20th St)

[1]*Saskatoon: 2016 Average Annual Daily Traffic (AADT) Report*

3 Recommended Corridor

Based on the analysis of the four north-south corridors through Downtown, 3rd Avenue is the optimal corridor for exclusive centre running BRT lanes due to its central location, functionality, relatively low traffic volumes and road width. It is also the corridor that would receive the most benefit with the installation of an exclusive runningway, while experiencing the least negative impact.

3rd Avenue is currently the most widely used transit corridor in the Downtown Core, with 22 routes currently moving 475 passengers per hour during peak periods[3] with a bus every 80 seconds. The addition of BRT and exclusive runningway is a logical extension of the transit function of the corridor downtown.

As 3rd Avenue has the lowest traffic volume of the four corridors while maintaining adequate roadway width, the impacts to traffic flow can be mitigated, or in some aspects, improved, with exclusive centre running transit lanes. Due to the existing roadway configuration, it may be possible maintain some left turn lanes at intersections and/or curbside parking, though further analysis must be performed (to be presented in the Functional Plan). The provision of an exclusive runningway would remove a traffic lane in each direction and narrow the remaining lane, providing a measure of traffic calming on a wide street with free-flowing traffic.

[3] Growth Plan Technical Report, 2016, Urban Systems Ltd.