3 Street Design Toolkit

This street design toolkit provides Mobility Criteria and Guidelines which have regard for the Vision and Strategic Directions outlined in Section 2. It also provides complete street design solutions to guide the planning, design and decision making for streets in downtown Ottawa.

3.1 Mobility Criteria

The Mobility Criteria provided in this Street Design Toolkit were developed with regard to the Vision and Strategic Directions outlined in Section 2. They are organized into the following categories:

3.2 Pedestrian **(P)**

3.3 Cyclists **(C)**

3.4 Transit **(T)**

3.5 Vehicles **(V)**

This section provides a set of criteria that can be used to guide the design and evaluation of street design tools and solutions for downtown Ottawa. The criteria address the Vision and Strategic Directions for downtown Ottawa. They will also be useful criteria to aid in the completion of environmental assessments of individual projects that may emerge from the Downtown Moves initiative.

Criteria for Pedestrian Mobility

Improving the quality of the pedestrian experience is important to establishing a character and identity for downtown Ottawa, and a step toward developing downtown as a more vibrant and diverse destination and neighbourhood.

Downtown Ottawa will provide:

P1 High Pedestrian Level-of-Service

P2 Comfortable Sidewalks & Crosswalks

P3 Sustainable Planting

P4 A Family of Light Standards, Furnishings & Amenities

P5 Clear Signage & Wayfinding

P6 Pedestrian Connections Between & Through Buildings

P7 Buildings that Create a Visually Stimulating Public Realm

P8 A Network of Publicly Available Open Spaces

P9 Public Art to Add Interest to Pedestrian Environments

P10 Clearly Identifiable Gateways & Nodes

P11 Integrated Accessibility for All

P12 Pedestrian Easements for Enhanced Pedestrian Mobility

Criteria for Cycling Mobility

Creating a safe, connected bicycle network is an important part of a balanced transportation network and integral to encouraging higher bicycle ridership.

Downtown Ottawa will provide:

C1 An Integrated Network of Cycling Routes

C2 Safe, Prioritized Intersections

C3 Plentiful & Easy to Find Bicycle Parking & Amenities

C4 Bicycle Sharing Stations at Key Locations

Criteria for Transit Mobility

A fast and comprehensive transit network is a very important element to enable the efficient and continuous movement of large flows of people across downtown Ottawa.

Downtown Ottawa will provide:

T1 Efficient & Reliable Bus Transit

T2 Optimized Connectivity Between All Modes & Confederation Line Stations

T3 Improved Integration Between Bus Stops & Bicycle Lanes

T4 Enhanced Bus Stop Zones & Amenities

Criteria for Vehicle Mobility

A vibrant and economically successful downtown is supported by a cohesive and efficient road network that enables vehicle flow, provides well-located loading areas, has strategic on-street parking and offers access to off-street parking arrangements.

Downtown Ottawa will provide:

V1 Reduced Traffic Speeds for Safety & Comfort of Other Modes

V2 Suitable Access for Parking, Loading, Tour Buses & Taxi Stands

V3 Adequate Capacity & Level of Service

V4 Balanced Network of One-way & Two-way Streets

V5 Safe Interaction between Vehicle Access Points & Sidewalks

Improving the quality of the pedestrian experience is important to establish a character and identity for downtown Ottawa, and a step toward developing downtown as a more vibrant and diverse destination and neighbourhood.

The City is committed, through policies in the Official Plan and Transportation Master Plan, to changing public travel choices and reducing dependence on the automobile.

In order to support and encourage a pedestrian culture, it is important to consider a variety of elements that will enhance the pedestrian experience. They include, among others, the quality and connectivity of pedestrian spaces, accessibility of sidewalks to pedestrians of all ages and abilities, safety of the streets, animation of the public realm and permeability between sidewalks and the ground level of buildings.

P1 High Pedestrian Level-of-Service

A sidewalk's capacity to accommodate peak pedestrian volume is measured by transportation engineers in regards to its 'Level of Service' (LOS). The LOS rating is dependent on the available area per pedestrian, which is measured based on the volume of pedestrians per hour and the effective walkway width (or pedestrian clearway). Once the data is obtained, the LOS is rated on a scale of A-F, where A is the best scenario and F implies that the sidewalk is over capacity (failure). This framework does not consider other conditions, such as the presence of street trees or ground floor retail, that contribute to a sidewalk's appeal and resulting LOS.

Pedestrian LOS rating definitions given by HCM 2010

LOS A Ability to move in a desired path, no need to alter movements (Average Space: >49.2 m^2)
LOS B Occasional need to adjust path to avoid conflicts (Average Space : >8.36-49.2 m^2)
LOS C Frequent need to adjust path to avoid conflict (Average Space : >3.71-8.36 m^2)
LOS D Speed and ability to pass slower pedestrians restricted (Average Space : >2.14-3.71 m^2)
LOS E Speed restricted, very limited ability to pass slower pedestrians (Average Space : >1.02-2.14
LOS F Speeds severely restricted, frequent contact with other users (Average Space : ≤1.02 m^2)

Effective Sidewalk Width	Approximate # of Pedestrians per hour (Platoon Flow)							
	250	500	1000	2000	3000	4000	5000	6000
1.2m	LOS B	LOS B	LOS C	LOS D	LOS E	LOS E	LOS F	LOS F
1.5m	LOS B	LOS B	LOS C	LOS D	LOS D	LOS E	LOS E	LOS F
2.0m	LOS B	LOS B	LOS B	LOS C	LOS D	LOS D	LOS E	LOS E
2.5m	LOS B	LOS B	LOS B	LOS C	LOS C	LOS D	LOS D	LOS E
3.0m	LOS A	LOS B	LOS B	LOS C	LOS C	LOS D	LOS D	LOS D
3.5m	LOS A	LOS B	LOS B	LOS B	LOS C	LOS C	LOS D	LOS D
4.0m	LOS A	LOS B	LOS B	LOS B	LOS C	LOS C	LOS C	LOS D
4.5m	LOS A	LOS B	LOS B	LOS B	LOS B	LOS C	LOS C	LOS D
5.0m	LOS A	LOS B	LOS B	LOS B	LOS B	LOS C	LOS C	LOS C
5.5m	LOS A	LOS A	LOS B	LOS B	LOS B	LOS C	LOS C	LOS C
6.0m	LOS A	LOS A	LOS B	LOS B	LOS B	LOS C	LOS C	LOS C
6.5m	LOS A	LOS A	LOS B	LOS B	LOS B	LOS C	LOS C	LOS C
7.0m	LOS A	LOS A	LOS B	LOS B	LOS B	LOS B	LOS C	LOS C
7.5m	LOS A	LOS A	LOS B	LOS B	LOS B	LOS B	LOS C	LOS C
8.0m	LOS A	LOS A	LOS B	LOS B	LOS B	LOS B	LOS C	LOS C

Figure 3-1: Level of Service Definitions and Rate based on Sidewalk Width and Number of Pedestrians per Hour. Source: Data from Highway Capacity Manual, 2010, calibrated by Delcan, 2012.

P1.1 Establish pedestrian walkway widths based on pedestrian volumes and Level of Service (LOS). For the purpose of determining LOS, the peak hourly flow of pedestrians is based on the busiest 15 minutes of the day.

P1.2 "Platoon flow" is described as occurring when pedestrian-flow concentrates over short periods of time. Examples include pedestrians arriving via public transit and pedestrians controlled by traffic signals in short segments. Based on this context, the chart in Figure 3-1 helps determine the volume of pedestrians that a sidewalk can accommodate, the LOS rating of a sidewalk and the required width of the pedestrian clearway.

P1.3 In downtown Ottawa, peak hour pedestrian flows in the vicinity of the three Confederation Line stations are forecast to be approximately 6,500 at Downtown West Station, 9,400 at Downtown East Station, and 7,500 at Rideau Station (source: City of Ottawa, 2021 and 2031 AM Peak Hour Ridership Forecast Report OLRT Office). Using this LOS tool, it can be established that the clear or "effective" sidewalk width needs to be between 5.0m and 8.0m wide to achieve an LOS C rating. The "effective width" is net of the "utility zone" (when adjacent to street curbs, street lights, etc) and is also net of the "frontage zone" (when adjacent to buildings or obstacles). Within a limited right-of-way, this will have obvious implications on the space available for cyclists and vehicles. Figures 3-2 and 3-3 illustrate the elements that constitute the sidewalk width.

P1.4 More specific to where walkways meet at street corners and crosswalks, the LOS rating is determined by the following factors: volume of pedestrians, total area available per pedestrian, traffic volumes and traffic signal timing. Specific LOS for walkways at corners tends to be lower than that of the joining sidewalk. Although pedestrians are more tolerant to having less space at a corner due to standing idle, pedestrians will queue in the corner in large numbers before crossing the intersection. This means that if the LOS for a corner is desired to be equal to that of the sidewalk, the corner

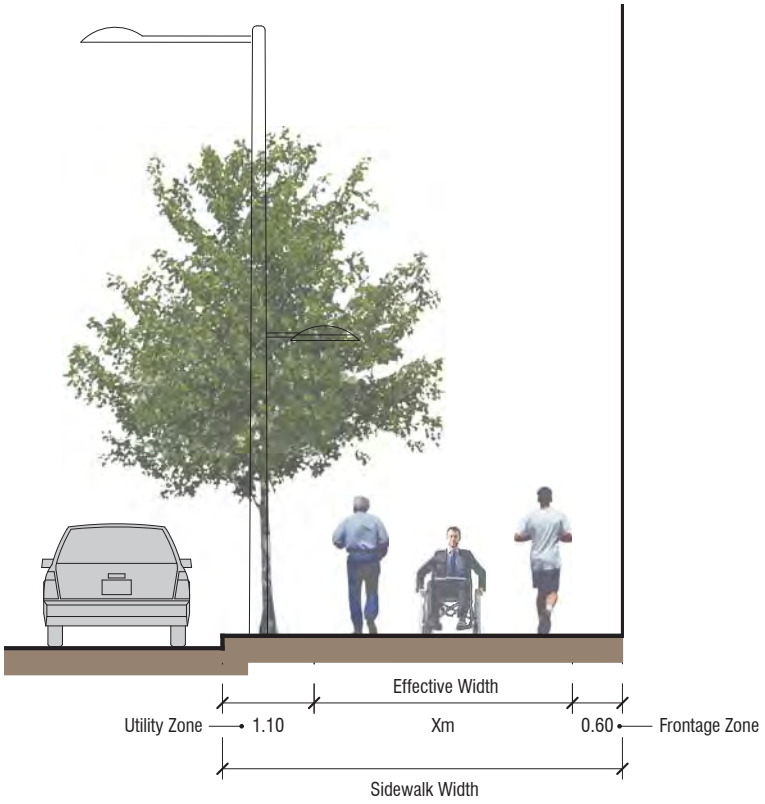


Figure 3-2: Elements that constitute sidewalk width

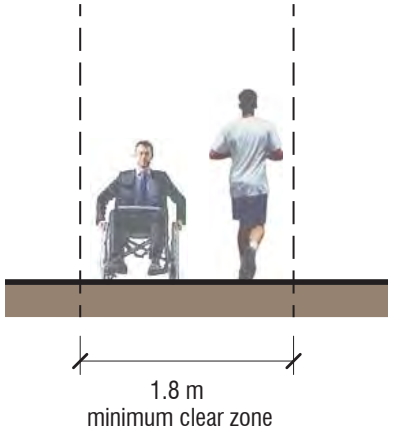


Figure 3-3: 1.8 m is the minimum clear pedestrian zone on a downtown sidewalk

area must be greater in size to accommodate the anticipated number of pedestrians. It is important to note that corners do not need a specific shape to accommodate a higher LOS, only a larger area. Scenarios to illustrate LOS for sidewalks, corners and crosswalks are available in Appendix E.

P1.5 The LOS categorization assumes that the pedestrian stream is composed of able-bodied, walking adults. The footprint and behaviour of a person using mobility assistance devices differs considerably from that of an able-bodied person. A small number of people in mobility assistance devices should not have a major impact on traffic flow. However, should numbers increase considerably as the population ages, the LOS categories may need to be revised to allot a greater amount of space per person.

Appendix E provides a visual analysis of pedestrian LOS ratios and their implications to sidewalks.

P2 Comfortable Sidewalks & Crosswalks

Creating safe, beautiful and comfortable pedestrian zones is an essential part of improving the streets of downtown Ottawa and accommodating the increased number of pedestrians moving to and from Confederation Line stations.

P2.1 Rebuild sidewalks to 3.0m wide, as a minimum;

- » Provide extra wide sidewalks for streets with or near Confederation Line stations, including Queen, Albert, O'Connor, Kent, Bank and Lyon Streets, with extra width near station entrance in accordance with pedestrian level-of-service requirements;
- » In some cases, sidewalks may not be the same width on each side of the street, for example Albert, Metcalfe, O'Connor, Kent and Bay Streets, due to differences in pedestrian level of service requirements.

P2.2 Notwithstanding the total width of the sidewalk and the arrangement of elements within the sidewalk, provide an absolute minimum 1.8m wide clear zone on all downtown sidewalks, to enable unencumbered passage of sidewalk users and maintenance vehicle access (see Figure 3-3).

P2.3 Consider the use of patterned or textured concrete, concrete pavers, or stone paving to enhance the quality of the pedestrian realm.

P2.4 Extend pedestrian zone paving materials continuously to the building frontage, do not change materials at the property line, particularly where there is a pedestrian easement. Further details are provided in P11.

P2.5 Ensure pedestrian areas are barrier free and accessible in accordance with the Ottawa Accessibility Design Standards.

P2.6 Establish maintenance standards for downtown Ottawa sidewalks and crosswalks that place them at the highest standard within the municipality, recognizing their strategic importance in providing mobility and access to downtown residences, businesses, and attractions.

P2.7 Provide crosswalk widths that are scaled to the clear width of sidewalks at the approaches, typically in the range of 3m to 5m, but never less than 3m.

P2.8 Use crosswalk bulb-outs to shorten crossing distance and expand pedestrian storage space at intersections.

P2.9 Emphasize pedestrian priority at crosswalks through the use of distinctive crosswalk surfaces such as architecturally scored concrete or oversized, durable paving stones.

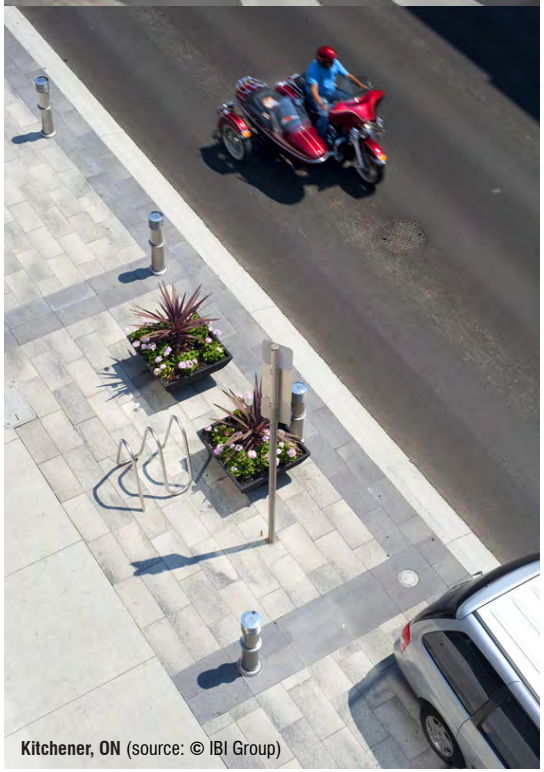
P2.10 Use pedestrian scrambles at crosswalks having very high pedestrian movements, such as on Queen Street in proximity to proposed Confederation Line station entrances, and when there is a high propensity for diagonal crossings.

P2.11 Use raised "table top" intersections where the highest degree of pedestrian priority and emphasis is desired, such as in proximity to Confederation Line station entrances, major intersections with high pedestrian volumes, or on pedestrian promenades.

P2.12 Use mountable curbs to create a "flex space" - space in the street with pedestrian priority for cafes and markets, but where vehicles are permitted during certain times, for example, for parking, loading, deliveries, food trucks, or other vendors. Establish a paving and tactile warning band to demarcate transition from flex space to sidewalk. Consider flex space and mountable curbs for segments of Queen, Albert, Metcalfe, O'Connor and Kent Streets.

P2.13 Permit temporary sidewalk extensions into parking bays to provide a wider sidewalk during summer months. Consider sidewalk extensions for Queen, Albert, Laurier and Slater Streets.

Toronto, ON (source: CC Ryan Flores)

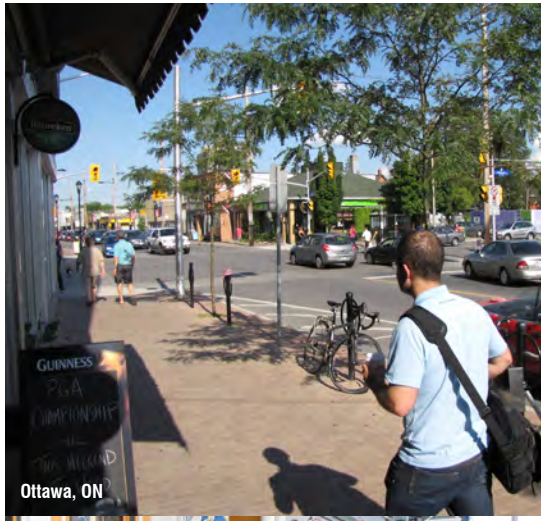

Kitchener, ON (source: © IBI Group)

P2.14 Set back buildings to create narrow pockets of public space and to create wider sidewalks in every opportunity.

P2.15 Identify short-term snow storage space on boulevards during the winter season as part of street designs.

P2.16 Provide pedestrian signals that emphasize pedestrian priority when crossing intersections:

- » Upgrade pedestrian signals at major intersection with signal timing and audible signals;
- » Correlate the signal timing with the crossing distance of the intersection, providing sufficient crossing time for all pedestrian abilities;
- » Reduce waiting time for pedestrians when using push buttons at intersections; and,
- » Set duration of the walk signal to allow pedestrians to cross the street at an average and slow pace of 0.7-0.9 metres/second (source: Transportation Impact Assessment Guidelines, City of Ottawa, October 2006 and 8-80 Cities.org).



Ottawa, ON

San Francisco, CA (source: CC Flickr user jeremyashaw

P3 Sustainable Planting

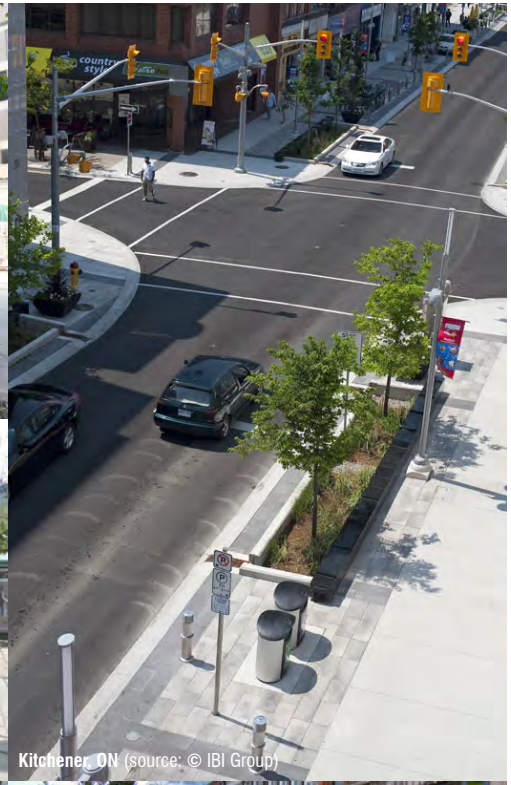
The *Downtown Ottawa Urban Design Strategy* (2004) recommends additional landscape treatment on downtown streets. That study states that at one time Ottawa's downtown streets supported a lush canopy of street trees. Today, narrow sidewalks, narrow rights-of-way, a lack of street trees and a lack of ground floor uses are some characteristics of downtown streets that contribute to unfavourable pedestrian environments. By re-balancing the space in the right-of-way, every opportunity to introduce sustainable planting in downtown Ottawa must be considered. This will contribute to provide a better transition between the lush tree-lined neighbourhoods of the Glebe and the cultural landscape of Parliament Hill.

P3.1 Develop an updated set of urban tree details and specifications for use in standard road construction documents and in site plan documents submitted as part of development proposals.

P3.2 Line the streets of downtown Ottawa with a diverse selection of resilient canopy tree species, contributing to the city's urban forest. Minimum 15 cubic metres soil per tree in a shared soil volume. Single trees require minimum 30 cubic metres soil volume. Structural soil cells or structural soils and structural sands can be used. Surfaces could be paved, with subsurface connected soil trenches.

Ottawa, ON

Ottawa, ON



Kitchener, ON (source: © IBI Group)

Ottawa, ON

Kitchener, ON (source: CC Sean Marshall)

P3.3 Where appropriate, use a diverse selection of urban tolerant shrub species to complement street tree plantings to create more dense plantings. These plants will become the understorey canopy beneath the urban forest. Minimum 3-5 cubic metres soil volume per shrub (depending on size). Soil volume can be shared, with a minimum 1.2 metres planting depth, and with connected soil volumes at grade.

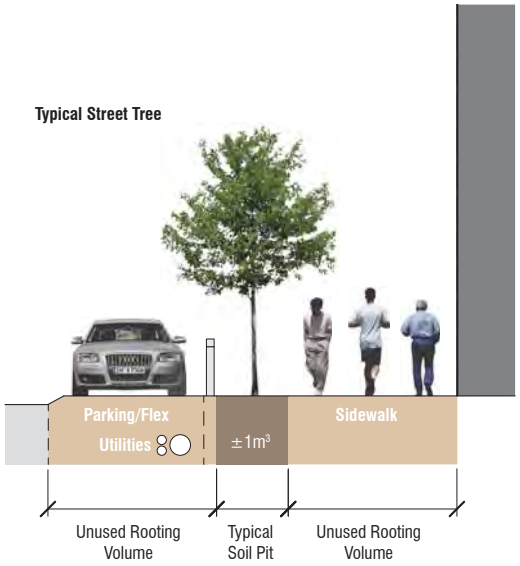
P3.4 In open pit planting beds, complement woody plants (ie. trees, shrubs) with a hardy groundcover for a comprehensive planting aesthetic, while providing a living/green barrier to pedestrian movement. Use a minimum 300mm planting depth with connected soil volumes at grade in exposed trenched soil matrices.

P3.5 Consider the planting of trees in regards to Hydro Ottawa's placement and guidelines for electricity distribution equipment. Both they type of tree and planting site must be reviewed to avoid interfering with overhead and underground utility lines.

P3.6 Unique combinations of landscape species may be used on different streets to enhance the identity of downtown Ottawa.

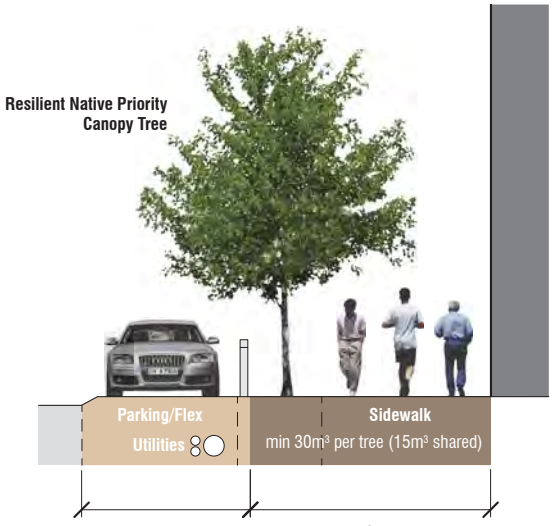
P3.7 Plant trees as well as shrubs, perennials and grasses for complete, diverse and durable landscapes.

P3.8 Ground water recharge to improve soil and vegetation environment.



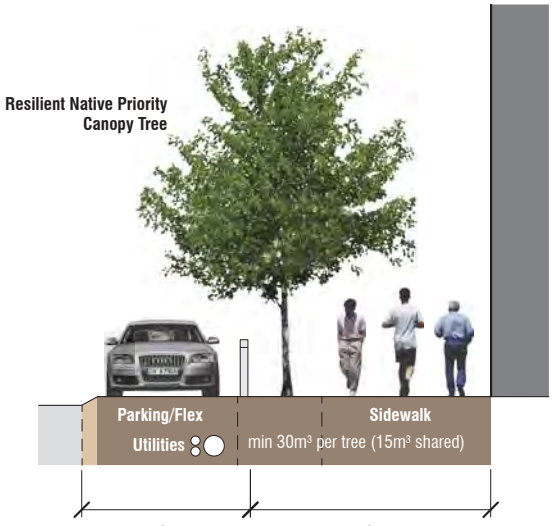
Existing Soil Volumes for Typical Planting Models

Bloor St, Toronto, ON



Connected Soil Systems
A. Suspended-Bridged Sidewalk
B. Structural Soil
C. Structural Soil Cells

Proposed Soil Volumes for New Planting Models



Connected Soil Systems
A. Structural Soil
B. Structural Soil Cells

Connected Soil Systems
A. Suspended-Bridged Sidewalk
B. Structural Soil
C. Structural Soil Cells

Proposed Soil Volumes for New Planting Models

P4 A Family of Light Standards, Furnishings & Amenities

Some of Ottawa's downtown streets have good furniture and related amenities, such as those displayed along Elgin and Bank Streets. The City published guidelines for an Integrated Street Furniture Program (ISFP) in 2009 to improve the quality of the public realm through the creation of a cohesive system of street furniture. Downtown Ottawa can benefit from the creation of its own family (or sub-family) of streetscape elements that will address the more urban context and narrow rights-of-way and help to create a visually cohesive downtown.

P4.1 Create a coordinated family of street furnishings, to include benches, transit shelters, litter/recycling receptacles, light standards, bollards and signage and wayfinding, using the recommendations from the City's Integrated Street Furniture Policy and Design Guidelines (2009):

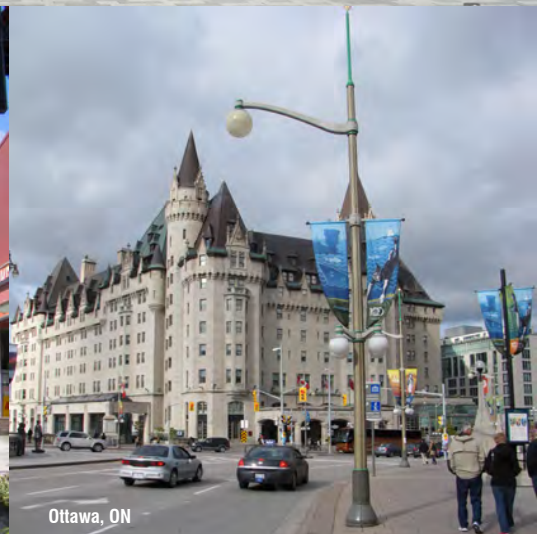
- » Install narrow bus shelters (minimum 1.5m shelter width);
- » Where possible, place shelters minimum 3.0m from curb edge;
- » If shelter cannot be accommodated, place schedule display case or bench; and,
- » Place furniture 0.6m from curb.

P4.2 Coordinate the suite of street furnishings with wayfinding and signage systems.

P4.3 Design the suite of street furnishings to have a high quality enduring and contemporary appeal, so that it can be consistently applied for years to come.

Ottawa, ON

Kitchener, ON (source: CC Sean Marshall)



Ottawa, ON

P4.4 Ensure that the design of the elements are compatible with those on Bank Street and Confederation Boulevard.

P4.5 Coordinate street lighting in accordance with the City of Ottawa's Right-of-Way Lighting Policy (2008), including:

- Sidewalks along arterial roads shall be lit to 10.0 lux with a uniformity of 4.0:1;
- Through-block pedestrian walkways shall be lit to 2.0 lux with a uniformity of 4.0:1; and,
- Bicycle lanes are to be illuminated based on the required roadway lighting levels.

P4.6 Manage clutter by placing street furniture, newspaper boxes and garbage receptacles in line between the curb and sidewalk to separate pedestrians from vehicles and cyclists travelling on the adjacent roadway.

P4.7 Encourage lighting on joint-use traffic signal poles, selecting luminaires from the City's Right-of-Way Lighting Policy (2008), Table 7.1.

P4.8 Minimize the installation of regulatory and non-regulatory signs on separate posts consolidating them wherever possible as apart of streetscape plan.

P5 Clear Signage & Wayfinding

Wayfinding and signage is an important part of creating a strong identity, while improving pedestrian orientation and sense of the city. Recent coordinated city-wide wayfinding projects have been successfully implemented in cities like Cleveland, Glasgow and London (UK).

P5.1 Design the signage and wayfinding system with a downtown Ottawa identity, complementing other street furnishings.

P5.2 Provide a directory of services/facilities on signage and wayfinding, including distances to main attractions.

P5.3 Coordinate the system in downtown Ottawa with a broad City-wide system.

P5.4 Design signage in accordance with the City's Tactile Signage Program. Characters and pictograms are raised 0.8 to 1.5mm above the surface, and have Grade 1 Braille located directly below pictograms or large text.

P5.5 Design the system to be easily interpreted by international visitors, relying on symbols.

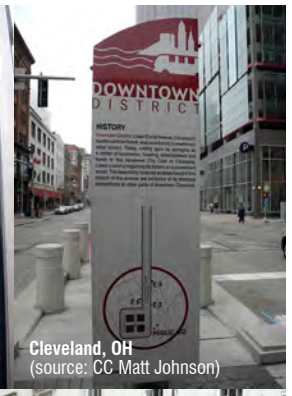
P5.6 Since space in the pedestrian realm in downtown Ottawa is so limited, carefully site signage and wayfinding.

P5.7 Integrate the system with Confederation Line signage and the existing NCC system.

P5.8 Coordinate with geo-referenced computer systems for navigation and information.

Seattle, WA (source: CC Oran Viriyincy)

Glasgow, UK (source: CC Kake Pugh)



Cleveland, OH (source: CC Matt Johnson)

London, UK (source: CC Martin Deutsch)

London, UK (source: CC Charlotte Gilhooly)

Philadelphia, PA (source: CC Eric Fredericks)

Lakeview, MI (source: CC Steven Vance)

London, UK

P6 Pedestrian Connections Between & Through Buildings

Mid-block outdoor and indoor pedestrian connections create a finer-grained, more permeable pedestrian network, improving the efficiency of walking trips.

Ottawa has many good indoor and outdoor pedestrian connections that are well-used, especially during winter months. Enhancing these connections will greatly improve the pedestrian environment.

P6.1 Make mid-block outdoor and indoor pedestrian connections well lit and signed to increase usage, safety and comfort. Use special surface materials and planting to identify outdoor routes.

P6.2 Explore the possibility of retail, restaurant, cafe, and other active uses along outdoor and indoor pedestrian connections.

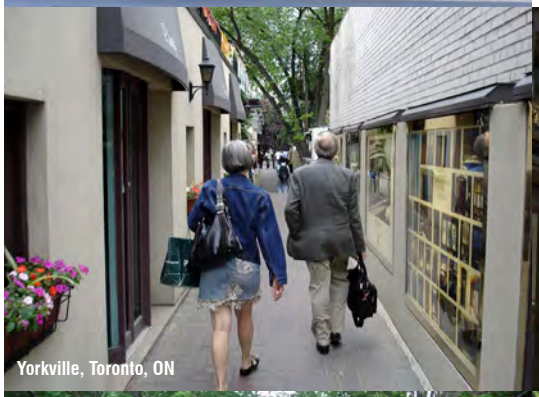
P6.3 Seek opportunities to reduce barriers in and between existing pedestrian connections.

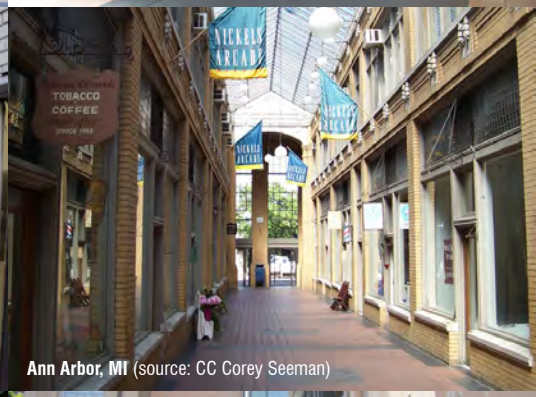
P6.4 Review and identify ways to improve personal security and accessibility among connections between and through buildings.

P6.5 Implement pedestrian connections between and through buildings via development review and/or incentive programs.

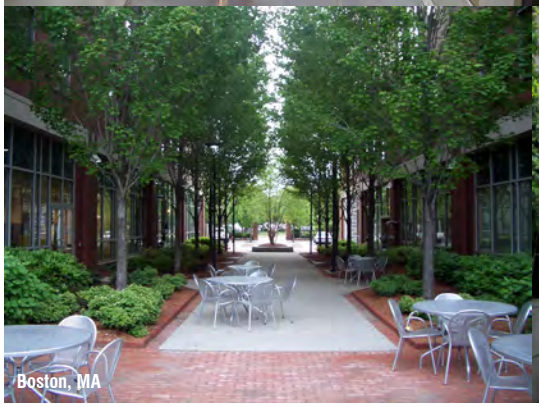
London, UK (source: CC Andrew Dunn)

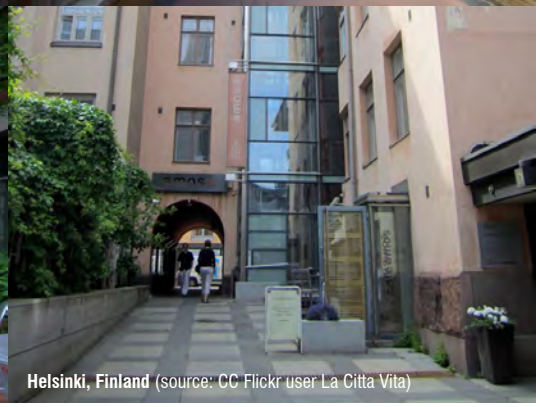
London, UK (source: CC Andrew Dunn)


Yorkville, Toronto, ON



Ann Arbor, MI (source: CC Corey Seeman)


Boston, MA


Helsinki, Finland (source: CC Flickr user La Citta Vita)

P7 Buildings that Create a Visually Stimulating Public Realm

The *Downtown Ottawa Urban Design Strategy* recommends focusing on requirements for the articulation of facades at the lower levels of buildings with emphasis on the relationship of the building to the street at grade level. This can be encouraged during the site plan control approval process managed by the City of Ottawa.

P7.1 Encourage building owners to modify their ground floor uses and facades to create more permeable, transparent and active frontages, as part of major interior renovation investments.

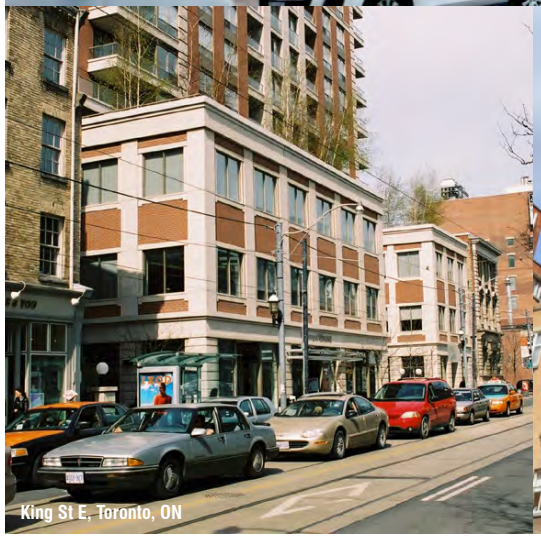
P7.2 Ensure tall buildings maintain pedestrian scale through such means as having a podium with a step back to the tower, in accordance with the City of Ottawa's Urban Design Guidelines for High-Rise Housing.

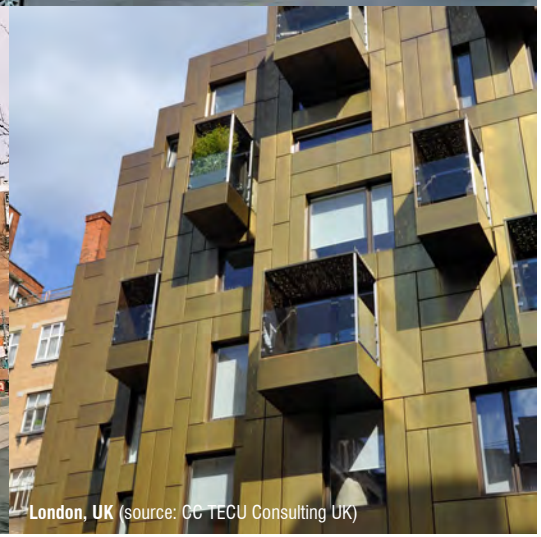
P7.3 Articulate building facades in a way that creates an interesting wall to the public room of the street. Articulation can make use of differences of transparency, quality of materials, fenestration, vertical elements and doors to break down the scale of the building.

P7.4 Ensure ground floor uses of a building are active and front onto the street. Active uses include lobbies, retail and offices. Utility rooms, garbage, loading areas and vehicle access should be at the back side of the building.

P7.5 Integrate space for outdoor cafes into the streetscape (allowing for the minimum sidewalk clear-

Yonge St, Richmond Hill, ON


King St E, Toronto, ON


London, UK (source: CC TECU Consulting UK)

ance). Outdoor cafes could be on temporary sidewalk extensions (in the parking lane) for the summer.

P7.6 Protect heritage buildings as identified in the City of Ottawa's Heritage List or under Parts IV and V of the Ontario Heritage Act.

P7.7 Ensure new buildings create a mix and variety of high quality architecture.

P7.8 Use corner sites (buildings with two frontages) as an urban design opportunity to frame the intersection, create landmark buildings, and create wider sidewalks.

P7.8 Make ground level floor heights a minimum of 4.5m for new commercial and residential buildings to allow flexibility for a diversity of future uses. This can be implemented through the Site Plan Control approval process.

P7.9 Retrofit the ground floor of existing buildings with active uses with a direct connection to the sidewalk. This is a particularly important consideration for pedestrian priority streets such as Queen, Metcalfe, Kent, O'Connor and Albert Streets.

P7.10 Where new infill development takes place, respect Hydro Ottawa's setback requirements from overhead distribution equipment to ensure safety (Hydro Ottawa Standard OLS0002).

Ottawa, ON

Yorkville, Toronto, ON

P8 A Network of Publicly Available Open Spaces

Parts of downtown Ottawa lack trees and green spaces, creating environments that are unfavourable to pedestrian activity. Although large public green spaces frame the edge of the downtown area - Parliament Hill, Major's Hill Park, Victoria Island and the banks of the Ottawa River and Rideau Canal - there is a deficiency of smaller urban open spaces in the downtown.

P8.1 As mentioned in the *Downtown Ottawa Urban Design Strategy*, and echoed in the Pedestrian Vision Plan for Public and Open Spaces, introduce a network of small open spaces before the area becomes fully built-out (refer to Section 2).

P8.2 Encourage developers to include urban open spaces in their development scenarios, employing such means as parkland dedication, amenity space provisions, and Section 37 of the Planning Act as applicable. This was successfully achieved at Minto Place, at the corner of Kent and Slater Streets, at Snider Plaza on Bank Street between Slater Street and Laurier Avenue, and at the World Exchange Plaza.

P8.3 Retrofit existing private and public open spaces that are underutilized.

P8.4 Introduce pocket parks and explore the possibility of temporary/seasonal open spaces to provide welcome relief and respite in downtown Ottawa. Quality open space will become increasingly important as downtown Ottawa intensifies.

New York, NY (source: CC Sampo Sikiö)

Port Credit, Mississauga, ON

Ottawa, ON

P8.5 Use a network of small open spaces in the right-of-way and mid-block locations to assist in connecting the civic element of downtown Ottawa with the capital landscape of the Confederation Boulevard and the Parliamentary Precinct.

P8.6 Closely coordinate with the National Capital Commission on the introduction of seating areas on semi-public space and animation of federally-owned open spaces.

P8.7 Include provisions in planning documents that enable new open spaces to be created downtown that can be integrated with streets and have a public or quasi-public function.

P8.8 Design and animate public and open spaces to be useable and appealing in all seasons with carefully located wind screens and shelters, appropriate landscape features, festivals, markets, surface treatment and amenities.

P8.9 Ensure open spaces use high quality and durable materials.

P8.10 Ensure open spaces are publicly accessible with furnishings that are coordinated with downtown Ottawa's family of streetscape furnishings.

P8.11 Design open spaces to be barrier free.

P8.12 Ensure designs provide clear views through the open space, to enhance safety.

P8.13 Include elements in open spaces to activate the street edge, eg. outdoor cafes, pop-up patios, fountains, and public art.


Oakville, ON

Madrid, ES

P9 Public Art to Add Interest to Pedestrian Environments

Public Art can play a significant role in establishing the identity of downtown Ottawa. As the capital of Canada, there is an exceptional opportunity for Ottawa to celebrate and showcase Canada's art and culture in the public realm. Currently, the City of Ottawa dedicates 1% of the construction costs of public infrastructure projects with budgets over $2 million towards the creation of public art. The NCC has created a series of public art tours (StreetSmART) in proximity to Confederation Boulevard that allows users to scan QR codes mounted in front of the artwork with their smartphone to view/hear information about the work. As per the *Ottawa 2012 Arts and Heritage Plan (2012-2018)*, recommended strategies and actions related to Ottawa's Central Area include:

P9.1 Integrate public art with streetscape elements such as seating, waste receptacles, paving, and railings.

P9.2 Design pedestrian arcades and other building elements as public art.

P9.3 Consider public art to add special identity to the public realm, with particular attention to using light to animate public space at night, especially in winter months.

P9.4 Support the development of cultural and creative districts and clusters at Confederation Line stations, including public art and native-themed installations.

P9.5 Provide increased incentives to property owners for the adaptive reuse of historically significant urban buildings and structures.

Ottawa, ON

Montreal, QC
(source: CC Flickr user art_inthecity)

Toronto, ON (source: CC Fred Lai)

Gatineau, QC (source: CC National Capital Commission)

Toronto, ON (source: CC Fred Lai)

P10 Clearly Identifiable Gateways & Nodes

Gateways are important in creating a sense of arrival when entering downtown Ottawa. Due to Ottawa's unique relationship between the Parliamentary precinct and downtown, gateways and nodes should be established to distinguish the "Crown to Town" interface as well as joining the boundaries between downtown and adjacent neighbourhoods such as LeBreton, Centretown and ByWard Market.

P10.1 Create gateways and nodes by a combination of landscape, streetscape, and built form elements specific to each threshold location.

P10.2 Establish pedestrian priority at gateway and node sites, for example, by adding amenities for pedestrians and repaving the surface with different materials, bulb-outs or colours, or by removing vehicular travel lanes or turn lanes.

P10.3 Use special and distinctive buildings at corners to help establish gateways and nodes.

Toronto, ON (source: CC Ivan Hernández)

Ottawa, ON

P11 Integrated Accessibility for All

Accommodating people of all abilities is integral to the design of pedestrian friendly streets. As per the *Ontarians with Disabilities Act* and (2001) and the *Accessibility for Ontarians with Disabilities Act* (2005), the City of Ottawa has the legislative responsibility to ensure public spaces are barrier-free and accessible to people of all ages, gender and abilities. To help ensure a consistent application of accessibility in the planning of the built environment, the City of Ottawa has developed its own *Accessibility Design Standards* (November 2012) to guide the development of accessible public facilities, roads, pathways and parks.

As all residents of Ottawa will experience variations in abilities throughout their lifespan, the following provisions will help build a pedestrian environment that is safe and usable for people of all ages, abilities and genders:

P11.1 Ensure that ground surfaces are firm, stable, well-drained, slip-resistant, with a colour contrast of at least 70% to distinguish the edges of exterior accessible routes and with a vertical change in level less than 6mm.

P11.2 Locate barrier-free rest areas adjacent to, and away from, accessible paths of travel. Ensure there is strong colour contrast to distinguish the spaces, and that there are accessible paths of travel leading to these locations.

P11.3 Minimize slope changes on accessible routes by permitting a maximum running slope gradient of 1:15 (6.67%), and providing 50 ± 10 mm wide colour-contrasted and slip-resistant strips equal to the width of the ramp. The ramp section should be no longer than 9000 mm.

P11.4 Provide tactile walking surface indicators at top of stairs, at a distance of one tread depth back from stairs, and with surface depth of 600 - 650 mm (minimum), extending the full length of the stairs.

P11.5 At pedestrian crossings at vehicular roadways, provide accessible pedestrian signals that are positioned for ease of operation by people using mobility devices, and that provide audible cues for crossing.

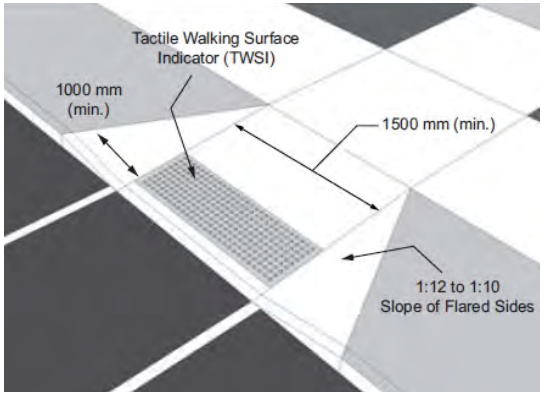
P11.6 Where gratings and covers are required, in both interior and exterior environments, ensure no opening is greater than 13 mm, in one direction and that the longer dimension of opening is perpendicular to the pedestrian path of travel.

P11.7 Place benches and seats at 450 to 500 mm above finished floor/ground, ensuring that seat depth is between 510 to 610 mm and back support at least 1065 mm long. Street furniture can greatly help people who may have difficulty with standing or walking for extended periods.

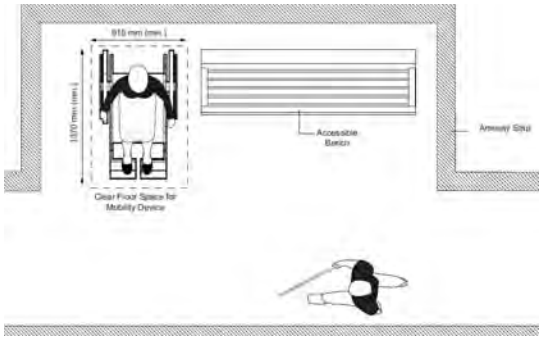
P11.8 Encourage pedestrian connections through buildings to provide signage and wayfinding cues along all interior accessible routes, including entrances and exits, to provide information and guidance for all users.

Toronto, ON


Atlanta, GA (source: GO PEDS.org)



Source: Accessibility Design Standards, City of Ottawa, November 2012


Source: Accessibility Design Standards, City of Ottawa, November 2012

P12 Pedestrian Easements for Enhanced Pedestrian Mobility

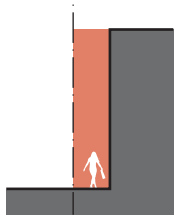
Pedestrian easements have been required by Ottawa's Official Plan in the Central Area for over 25 years.

The primary purpose of the pedestrian easement policy is to create additional space along the edges of narrow rights-of-way, specifically for the use of pedestrians. On applicable streets, the pedestrian easement is required along the full length of the property frontage. The policy is described in Annex 1 - Road Classification and Rights-of-Way in Section 7 of Volume 1 of the Official Plan.

Most streets where the policy for pedestrian easements applies are also subject to ROW widening requirements. In combining ROW widening with the pedestrian easement, even more significant increases to the space available for the pedestrian realm becomes possible.

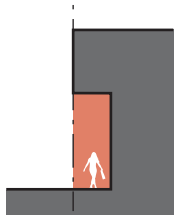
The pedestrian easements that have been created in downtown Ottawa can be divided into four different types: setback, cantilever/overhang, 2+ storey colonnade/arcade, and 1 storey colonnade/arcade. The setback (Type 1) appears to be the most common approach to addressing the pedestrian easement requirement.

The colonnades/arcades (Types 3 and 4) that have been built in Ottawa have not been particularly successful from a pedestrian, retail or design perspective, often feeling very dark, with poor visibility from the street and disconnection with the sidewalk. These deficiencies are particularly acute for single-storey colonnades/arcades (Type 4).



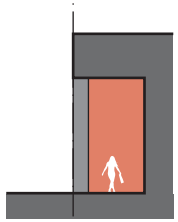
Type 1

Setback (Including Canopy)



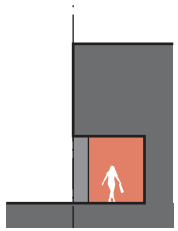
Type 2

Cantilever/Overhang



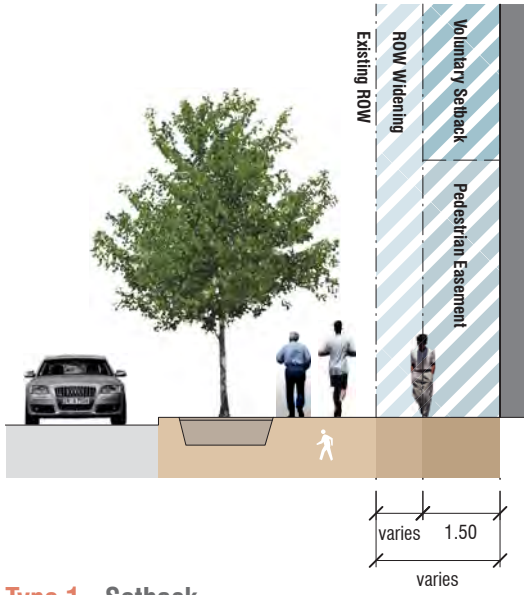
Type 3

2+ Storey Colonnade/Arcade

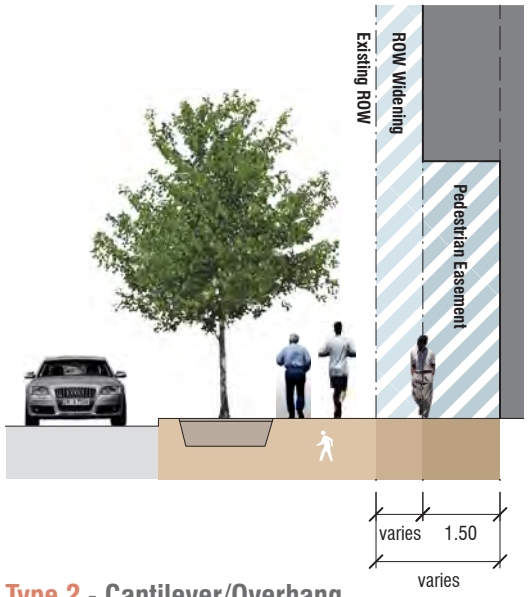


Type 4

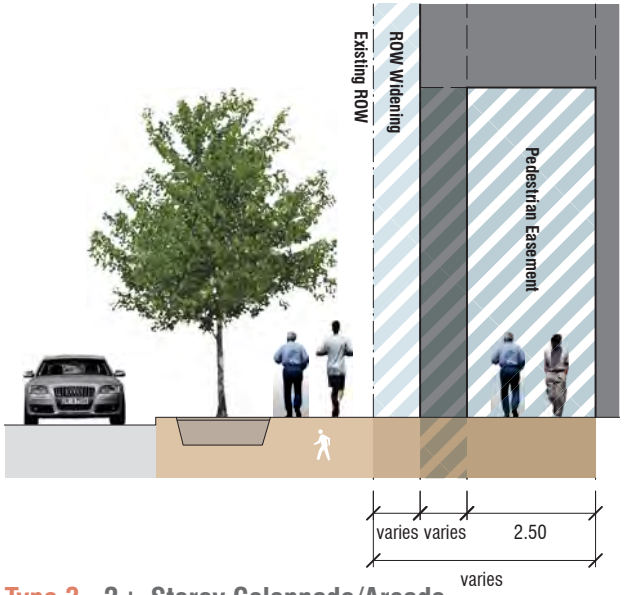
1 Storey Colonnade/Arcade



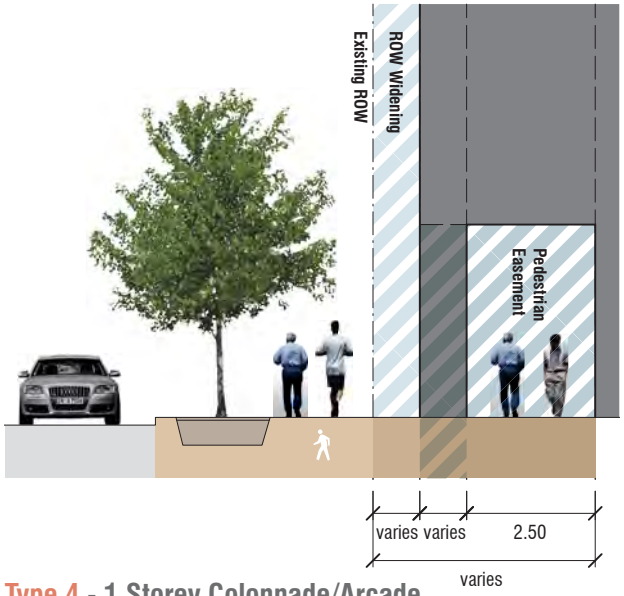
Type 1 - Setback



Type 2 - Cantilever/Overhang



Type 3 - 2+ Storey Colonnade/Arcade



Type 4 - 1 Storey Colonnade/Arcade

P12.1 Continue to require pedestrian easements to augment sidewalk capacity, increase space for pedestrians at street corners and building entrances.

P12.2 Establish a hierarchy among solutions that requires the use of setbacks and cantilevers as the typology for pedestrian easements rather than colonnades/arcades.

P12.3 Modify the Official Plan to apply the widening easement policy to Queen Street (Lyon to Elgin) and O'Connor Street (Wellington to Nepean).

P12.4 For the cantilever/overhang type, increase the minimum height of the pedestrian easement to 4.5 metres.

P12.5 For new colonnade/arcade types, increase the minimum height of the pedestrian easement to the equivalent of 2 storeys in height.

P12.6 Where setbacks and cantilevers cannot be implemented due to structural or other design issues, ensure that colonnades/arcades contribute to the augmentation of the public space of the street. The size, shape and frequency of columns and the height of the space created are important factors in determining the perception of continuity, accessibility, visibility personal security and usefulness of the colonnade/arcade space.

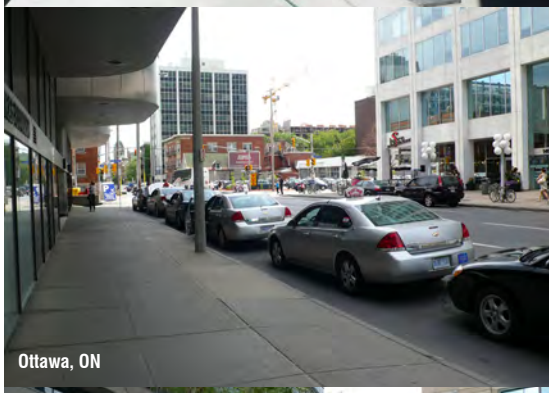
P12.7 Ensure pedestrian easements form an accessible extension of the sidewalk, and are a clearway allowing through movement with no permanent obstructions except for locations where a patio or market zone has been permitted due to adequate sidewalk width.

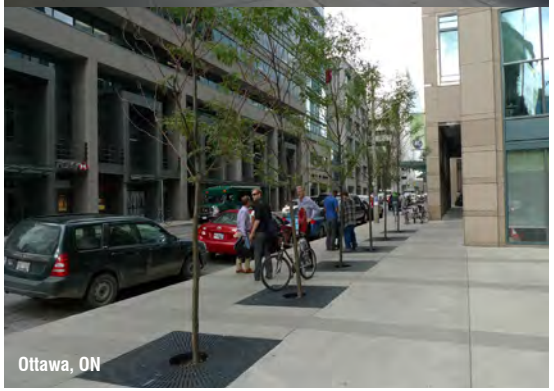
P12.8 Ensure pedestrian easements surfaces are at the same level as the adjacent sidewalk, with no steps, curbs, ramps, or other obstructions that would not be permitted on a sidewalk.

P12.9 Ensure that transitions in grade, including steps, ramps, retaining walls, and the provision of site furnishings, including seating, bike racks, displays, planters, etc. are beyond the clear pedestrian zone required in the easement policy.

P12.10 Design pedestrian easement surfaces to be contiguous and materially complementary with the adjacent sidewalk since pedestrians are meant to see and use the entire pedestrian realm without distinction. If definition is desired to indicate the boundary between public right-of-way and private property, consider a paving band, joint or saw cut line rather than completely different materials on public and private property. Consider coordinating a material palette with the local BIAs.

Ottawa, ON


Ottawa, ON


Ottawa, ON

P12.11 Extend the contiguous surface of the pedestrian easement across the full property width without interrupting surface material or grade when crossing a driveway, loading bay or access ramp.

P12.12 Depending on the micro-climate conditions including sun, rain and wind, include canopies on buildings that use the setback typology to moderate impacts on the pedestrian environment.

P12.13 For Type 2 easements (cantilever/overhang), carefully coordinate the design with streetscape planting to avoid conflicts.

3.3 Cyclists (C)

Creating a safe, connected cycling network is an important part of a balanced transportation network and integral to encouraging higher bicycle ridership.

Ottawa has a large cycling network, but much of it provides scenic and touristic routes around the perimeter of downtown, and is only beginning to provide connections into downtown for commuters. A pilot project for segregated cycling lanes on Laurier Avenue West is currently underway.

While segregated cycling lanes are becoming a popular strategy for improving cyclists' sense of safety and protecting their right-of-way, there are many other options for cycling facilities to be integrated on streets. When planning for cycling facilities, it is very important to consider the relationship between type of facility comfort and inclusiveness, conflicts with other street users and conflicts at intersections, signage, adjacent land uses and its role in the overall transportation network.

C1 An Integrated Network of Cycling Routes

There are five types of cycling facilities which together create an integrated network of bicycle routes:

Type 1: Off-street Facilities

(image source: CC David Carroll)

Type 2: Shared Spaces

Type 3a: Separated Facilities (Segregated)

(image source: CC Richard Akerman)

Type 3b: Separated Facilities (Dedicated Lanes)

(image source: CC Flickr user karmacamilleeon)

Type 4: Shared Lanes

(image source: CC Eric Gilliland)

The following table provides a summary of the typology of bicycle facilities:

Type	Subtype	Other names	Infrastructure	Interaction with Other Users (non-cyclists)	Inclusiveness	Best Application
Type 1: Off-Street Facilities	Multi-Use Pathway	Pathway Trail	Paved pathway Stone-dust pathway	High	Inclusive to cyclists of all ages and abilities	Off-street pathway shared by pedestrians and cyclists, green spaces
Type 2: Shared Spaces	Car Free Street	Pedestrian street Plaza street	Single surfaces Chicanes, furniture, planters	High	Inclusive to cyclists comfortable with mixing with pedestrians at low speeds	Narrow downtown commercial streets
	Woonerf	Shared space Home zone (UK)		Moderate to high	Inclusive to cyclists comfortable with mixing with pedestrians and vehicles at low speeds	Narrow, low volume residential streets with extensive traffic calming
Type 3a: Separated Facilities (Segregated)	Unidirectional	Segregated bicycle lane Separated bicycle lane Bicycle track On-road bicycle path Raised bicycle path Sidewalk-level bicycle path	Lateral separators (curbs, bollards, parked cars) Raised surface Road markings and signage at intersections	Low	Inclusive to cyclists comfortable with some level of interaction with vehicle traffic, particularly at intersection	Arterials with high traffic volume or high traffic speeds
	Bidirectional	On-road bicycle path Raised bicycle path Sidewalk level bicycle path Transportation path				Arterials with high traffic volume or high traffic speeds
Type 3b: Separated Facilities (Dedicated Lanes)	Standard Cycling Lane	Bike lane Bicycle lane	Painted lines or differentiated surface material or colour Road markings and signage at intersections	Moderate	Inclusive only to cyclists comfortable with the level of stress associated with travelling in close proximity to vehicle traffic	Arterial or collector streets with moderate traffic volume and speed
	Contraflow Cycling Lane	Counter-flow bike lane Counter-flow bicycle lane				One-way, one-lane streets with moderate traffic volume and speed
Type 4: Shared Lanes	Shared Lane	Shared road Designated bicycle route	Road markings and signage at intersections	Moderate to high	Inclusive only to cyclists comfortable with the elevated level of stress associated with sharing lanes with vehicle traffic	Low volume, low speed streets (preferably traffic calmed)
	Shared Bus Lane	N/A				Transit malls, streets with reserved bus lanes
	No Facility	N/A	None			Low volume, low speed streets (preferably traffic calmed)

Figure 3-4: Summary of the typology of bicycle facilities.

C1.1 Type 1: Off-Street Facilities

Off-street facilities, or multi-use pathways, are commonly found across Ottawa, and offer the highest degree of separation from vehicle traffic. In Ottawa, multi-use pathways are typically recreational paths shared by cyclists and pedestrians along natural corridors and/or linking key destinations.

Placement

Pedestrians and cyclists share the same surface.

- Pedestrians have highest priority, followed by cyclists.

Separated from the roadway by at least 1.5 m with a vegetation buffer or physical barrier.

Width

Minimum unobstructed travel area of 3.0 m.

- Allows only one bicycle to pass at a time.
- Cyclists must yield to pedestrians.

Adjacent clear zone of 1.5 m of each side of the pathway.

Vertical clearance of 4.0 m.

C1.2 Type 2: Shared Spaces

Shared Spaces are where cyclists share the same space as other road users, mostly pedestrians. Pedestrians, cyclists, and vehicles share the same surface.

Shared spaces can be either car free streets or Woonerfs. Both have similar characteristics in terms of providing cyclists a moderate to high degree of comfort at low speeds.

Car-Free Streets

Placement

A car-free street is any street segment on which most motorized vehicle travel is prohibited. Exceptions may include emergency and delivery vehicles. Sparks Street and portions of William Street (in the ByWard Market) are examples of car-free streets in Ottawa. Today, none of those streets allow cycling. However, there are opportunities to introduce cycling on car-free streets in the future.

- May be a conventional street, consisting of a roadway and raised sidewalks, or a specially surfaced street, consisting of single surface with no differentiation between roadway and sidewalk.

Woonerfs

Placement

A woonerf is a street with very low speed limits where pedestrians, cyclists, and automobiles share the same surface. On-street space is not specifically allocated to each type of road user.

» Pedestrians have highest priority, followed by cyclists.

Extensive traffic calming to force automobiles and cyclists to move slowly

Width

Unobstructed travel area no wider than 3.5 m.

» Allows only one vehicle to pass at a time.

» Forces vehicles to move slowly

C1.3 Type 3a: Separated Facilities (Segregated)

A segregated facility is any on-street cycling facility that is either laterally separated from traffic lanes by means of a physical barrier, or vertically separated from traffic lanes by being raised above the grade of the roadway. Curbs, bollards, painted lines, painted pavement, and parked cars (or a combination thereof) are used to achieve lateral separation. Vertically separated facilities can be raised to an intermediate grade between those of the roadway and sidewalk, or to the same grade as the sidewalk. Laterally separated cycling facilities are generally less expensive to construct because they can utilize the existing roadway surface and do not entail major changes to existing drainage systems. The construction of raised (vertically separated) facilities entails creating a new surface for cyclists and may require curb-side sewers to be moved inward to continue providing drainage for the roadway.

Segregated facilities can be either unidirectional or bidirectional. Both have similar characteristics in terms of limiting vehicle-cyclist interactions, cycling speed, and comfort. Vehicle-cyclist interactions could be further limited with vehicle turn restrictions.

Ottawa currently has three segregated cycling facilities, located on Laurier Avenue, the Portage Bridge and the Alexandra Bridge.

Unidirectional

Placement

Placed directly adjacent to the sidewalk.

Parking lane can be placed between the facility and traffic lanes except the last 20 m before an intersection.

If required, bicycle lane barriers are to be temporarily removed for planned or emergency maintenance work associated with the roadway or public utilities, as per the conditions of the City's Road Activity By-law.

Width

Absolute minimum is 1.5 m.

Recommended minimum is 1.8 m.

- Allows conventional bicycles to pass each other.
- Allows snow clearing with standard sidewalk equipment.

Current Danish standard is 2.5 m.

- Allows tricycles and cargo bicycles to pass each other.

0.5 m or wider buffer strip required if parking allowed in adjacent lane.

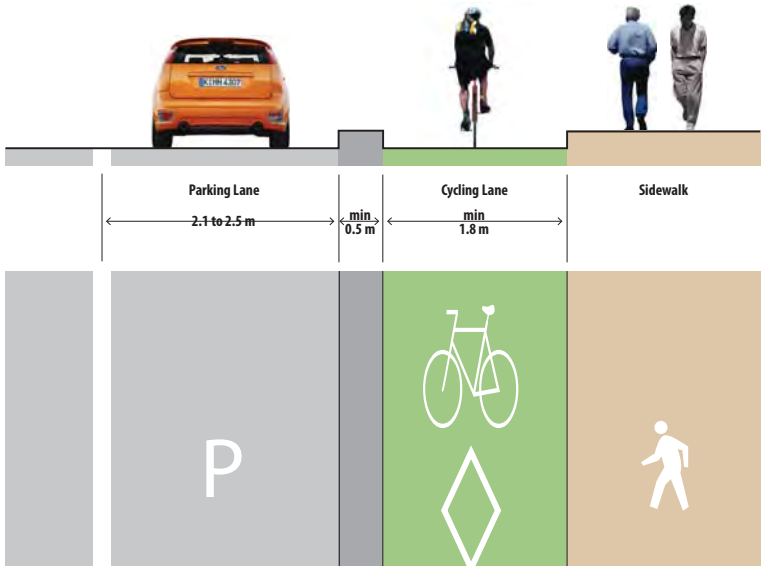


Figure 3-5: Unidirectional laterally separated facility with parking

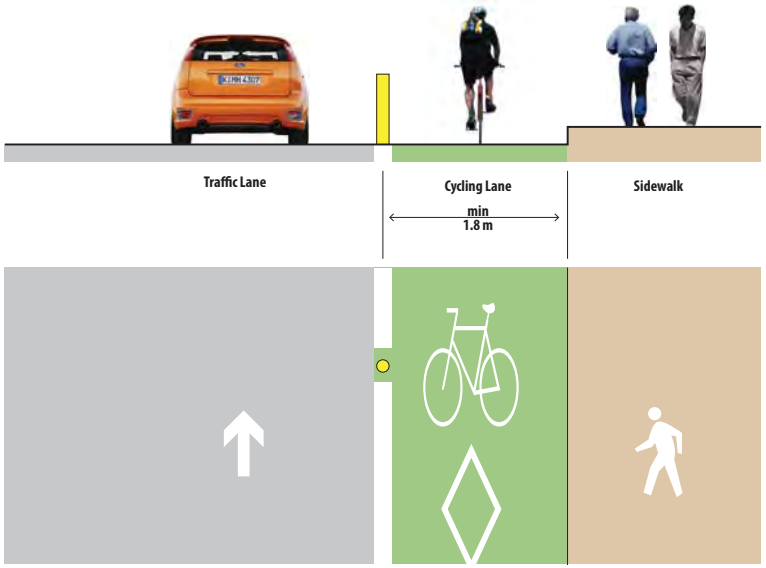


Figure 3-6: Unidirectional laterally separated facility without parking

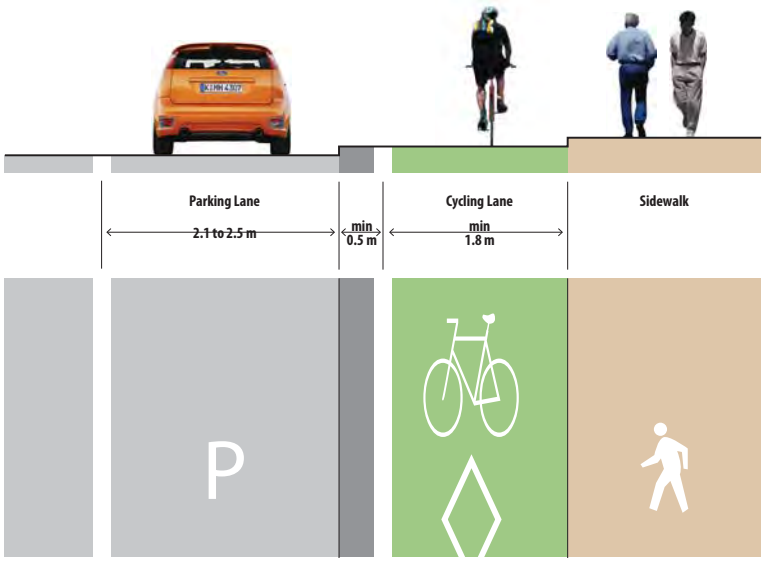


Figure 3-7: Unidirectional vertically separated facility with parking

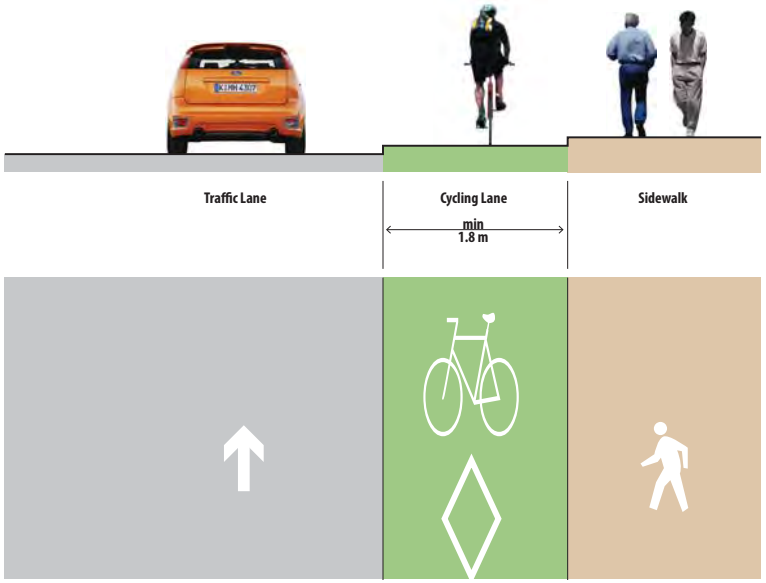


Figure 3-8: Unidirectional vertically separated facility without parking

Bidirectional

Placement

Placed directly adjacent to the sidewalk.

Parking lane can be placed between the facility and traffic lanes except the last 20 m before an intersection.

If required, bicycle lane barriers are to be temporarily removed for planned or emergency maintenance work associated with the roadway or public utilities, as per the conditions of the City's Road Activity By-law.

Width

Minimum required is 3.0 m (1.5 m per direction).

Opposite lane can be used to pass.

0.5 m or wider buffer strip required if parking allowed in adjacent lane.

When the outer lane of a bidirectional facility is facing a travel lane moving in the opposite direction, the facility shall have an additional vertical or physical separation buffer, space permitting.

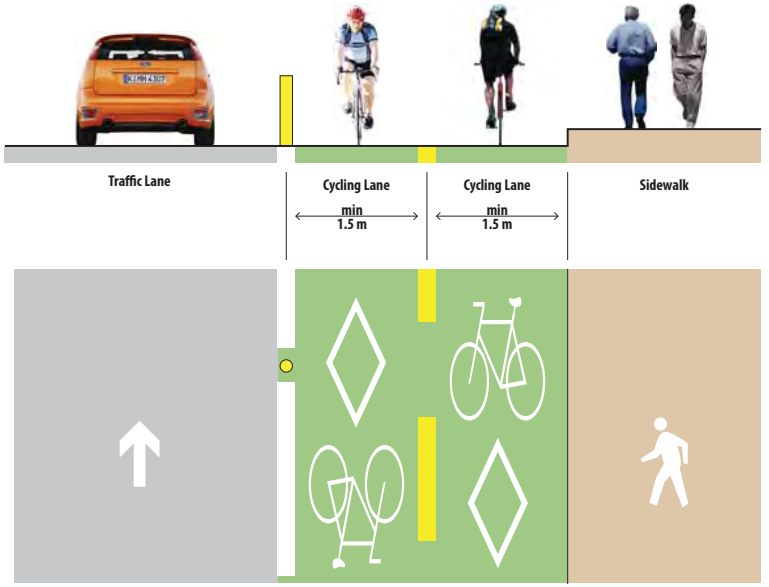


Figure 3-9: Bidirectional laterally separated facility without parking

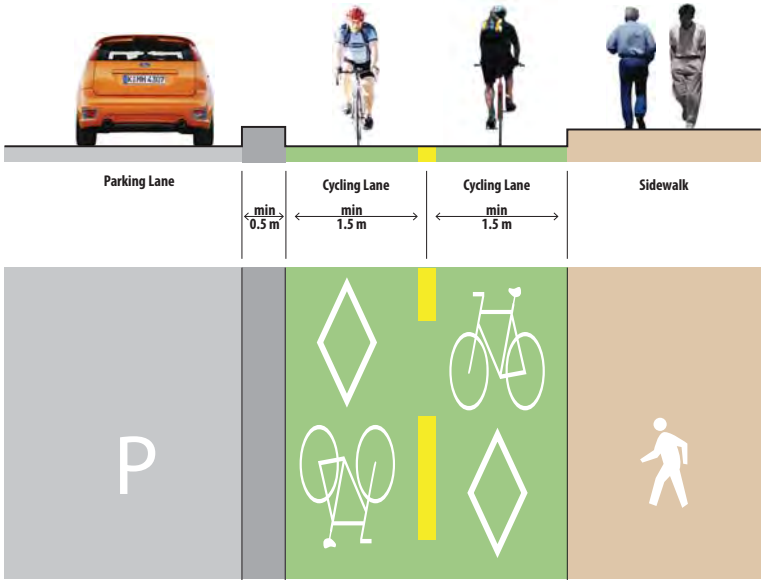


Figure 3-10: Bidirectional laterally separated facility with parking

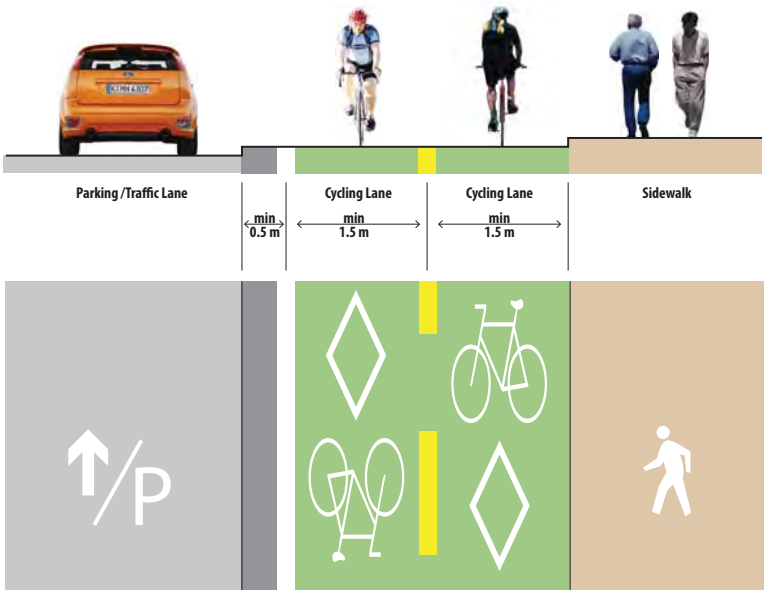


Figure 3-11: Bidirectional vertically separated facility

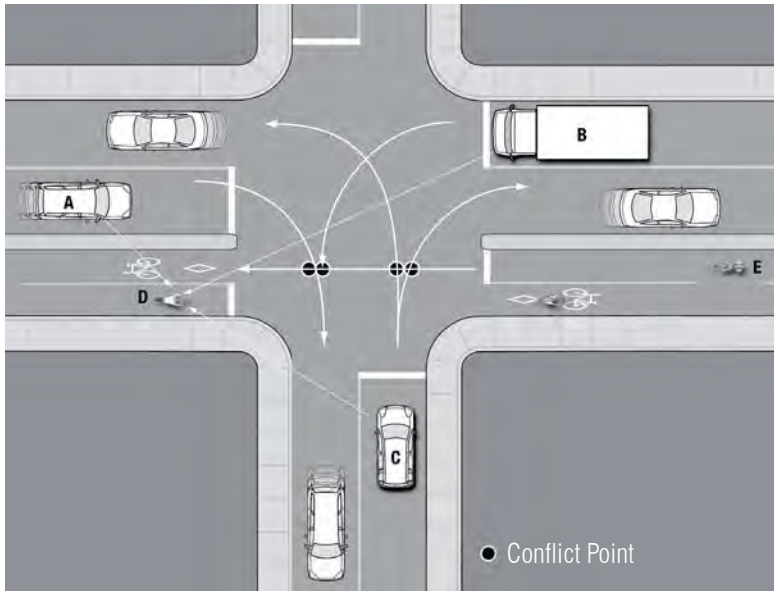


Figure 3-12: Possible bicycle-automobile conflicts at an intersection on a two-way street with a bidirectional segregated bicycle facility Source: Planning and Design for Pedestrians and Cyclists, Vélo Québec Association (2010)

Figure 3-12 shows four potential conflict points, making the combination of bi-directional cycling lanes on bidirectional streets unsafe for road users. However, bidirectional cycling facilities can be acceptable on streets with widely spaced intersections, limited number of private entrances, and no parking within the required sight triangle for motorists and cyclists. Turn restrictions for vehicles should be studied for streets with bidirectional cycling facilities to reduce potential conflict points.

C1.4 Type 3b: Separated Facilities (Dedicated Lanes)

Dedicated bike lanes are separated from traffic lanes by means of painted lines on the roadway. They are typically in the form of standard bike lanes, which are unidirectional running in the same direction as the adjacent traffic lane. It is also possible to implement a dedicated bike lane running in the opposite direction (contraflow bike lane) in order to allow two-way cycling travel on a one-way street.

Dedicated bike lanes in downtown Ottawa are found along Bay Street, Lyon Street, and on the Mackenzie King Bridge.

Standard Bike Lane

Placement

Can be placed directly adjacent to the curb or adjacent to a parking lane.

Usually placed on the right side of a one-way street but can be placed on the left side to avoid conflicts with bus stops along major transit corridors.

Width

Minimum is 1.5 m.

» Passing possible through use of adjacent traffic lane

Recommended width is 1.8 m.

» Allows passing within the cycling lane.

» 0.5m or wider buffer strip can be implemented.

Contraflow Bike Lane

Placement

Can be placed directly adjacent to the curb or adjacent to a parking lane.

Width

Minimum is 1.5 m.

» Passing possible through use of adjacent traffic lane.

Recommended width is 1.8 m.

» Allows passing within the cycling lane.

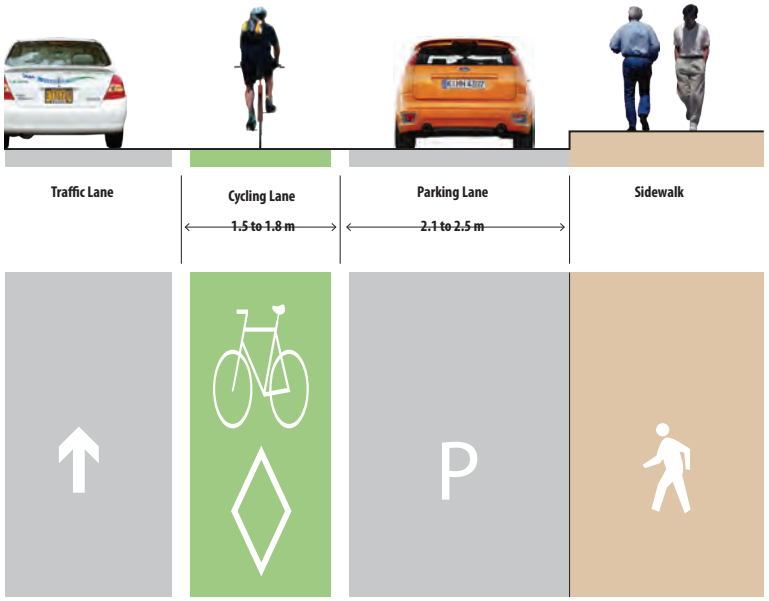


Figure 3-13: Standard bike lane

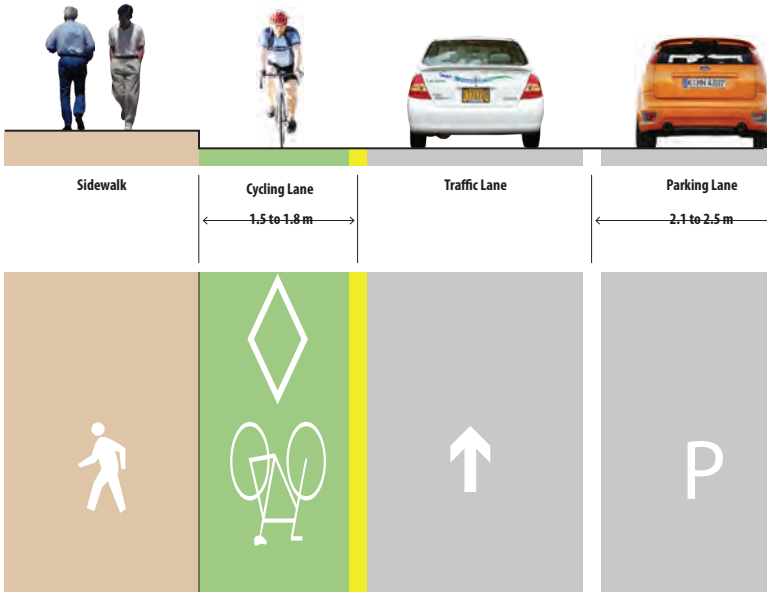


Figure 3-14: Contraflow bike lane

C1.5 Type 4: Shared Lanes

A shared lane is any roadway or part thereof that is to be shared by cyclists and motor vehicles. Shared facilities are generally designated as cycling routes and have signage to direct cycling traffic. The shared lanes may either be standard width or wide.

Standard, designated shared lanes are standard width lanes intended to be shared any class of vehicle and cyclists. It is also possible to designate reserved bus lanes for use by cyclists.

Wide shared lanes provide additional width to enable cyclists and vehicles to travel "side by side".

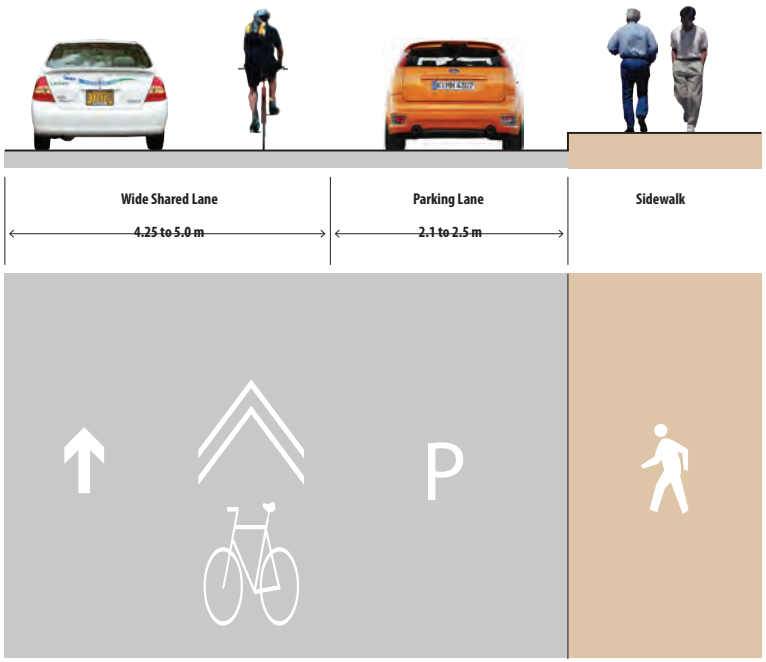


Figure 3-15: Wide Shared Lane

Shared facilities are the most common cycling facilities in downtown Ottawa, currently present on Queen, Bank, Rideau and Wellington Streets.

Shared Lanes

Placement

Can be placed directly adjacent to the curb or adjacent to a parking lane.

Same grade as roadway.

Width

Narrow shared lane 3.0 to 3.5 m is acceptable.

- Vehicles cannot pass cyclists.
- Vehicles and cyclists ride single file.

Wide Shared lane between 4.25 and 5.0 m is recommended.

- Sufficient clearance for cyclists and vehicles to travel side-by-side.
- Vehicles can pass bicycles safely.
- Can accommodate "sharrows".

Shared lane over 5.0 m not recommended.

- Vehicles may attempt to fit in side-by-side, squeezing or blocking cyclists.
- May promote excessive vehicle speeds.

Sharrows

Place immediately after an intersection and 10 m before the end of a block.

Space longitudinally at intervals of not greater than 75 m, but use judgement in most applications (Bikeway Guidelines, TAC, 2012).

Shared Bus Lane

Placement

Usually implemented in the curb lane.

Width

Recommended minimum is 4.5 m.

» Allows buses to pass cyclists within the lane.

No Facility

Placement

Any lane on any road except divided highways can be used by cyclists.

Width

Not applicable.

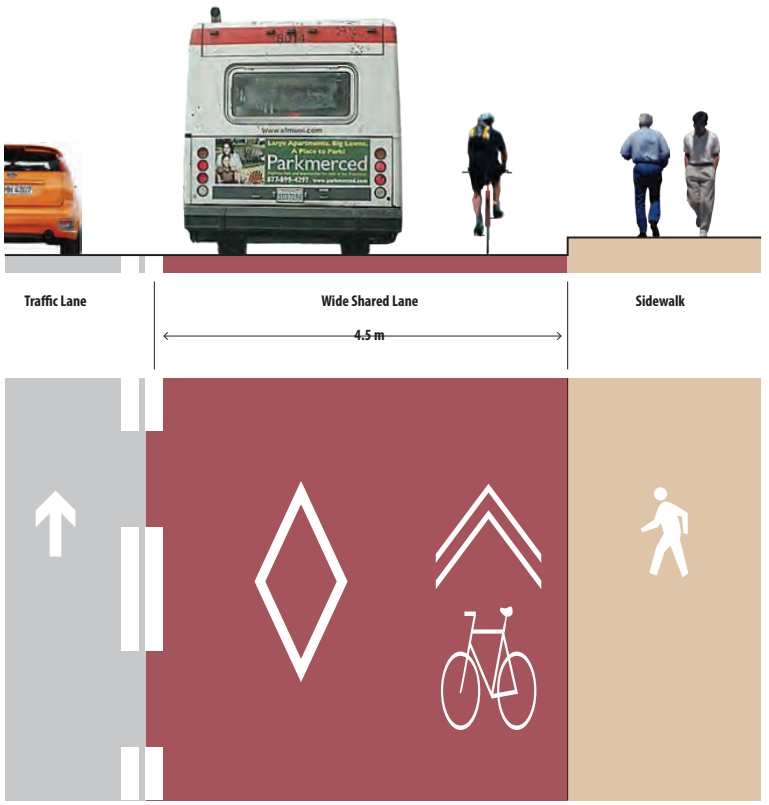


Figure 3-16: Designated Shared Bus Lane

C2 Safe, Prioritized Intersections

Intersections are primary points of conflict between cyclists and vehicles and pedestrians. Safe, prioritized intersections are essential to the overall safety of the bicycle network.

C2.1 Improve cyclists' visibility at intersections with advance stop lines that are located in front of vehicle stop lines.

C2.2 On routes with significant bicycle traffic, provide bike boxes and left turn pockets at suitable intersections to allow cyclists to move in front of stopped vehicle traffic at a red light. Cyclists are therefore more visible to motorists, can take advantage of priority left-turn phases, and are less exposed to exhaust from idling cars.

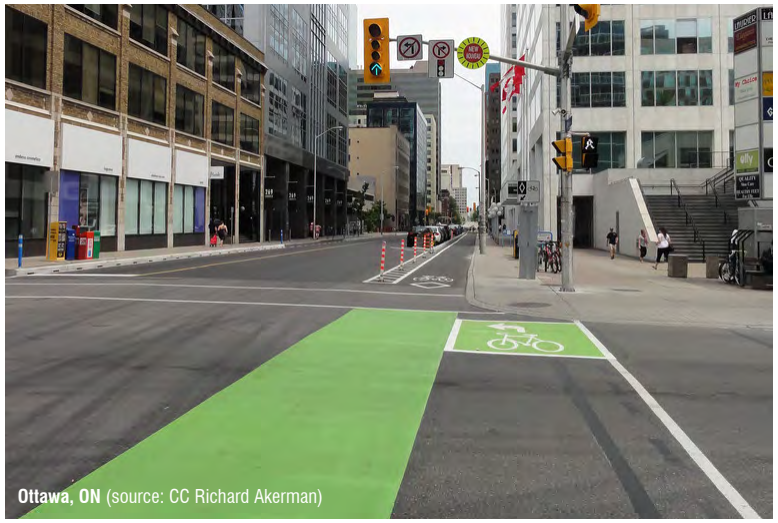
C2.3 At intersections equipped with push-button activated signals, position switches near enough to the curb edge to allow cyclists to operate them without dismounting. Alternatively, where possible, include in-pavement activation sensors.

C2.4 Restrict rights turns at a red light at appropriate intersections to reduce conflicts between motorists and cyclists.

C2.5 Protect cyclist's route through the intersection by use of road markings indicating the cycling facility as it crosses intersection.

C2.6 Two-phase crossings are an option to be considered.

Vancouver, BC (source: CC Paul Krueger)


Ottawa, ON (source: CC Richard Akerman)

C3 Plentiful & Easy to Find Bicycle Parking & Amenities

It is essential to develop bicycle parking and related amenities to further encourage cycling. The facilities should address the distinct needs of cyclists accessing shops and services in downtown Ottawa and those of commuting cyclists.

C3.1 Place bicycle parking facilities in highly visible locations near Confederation Line station entrances. As indicated by the Pedestrian/Cycling Study and Design Approach (OLRT, 2011), stations should have the following numbers of bicycle spaces:

- Minimum of 8 bicycle spaces at Downtown West Station;
- Minimum of 16 bicycles spaces at Downtown East Station; and,
- Minimum of 8 bicycle spaces at Rideau Station.

The above numbers are designed with flexibility. When bicycle parking capacity is met, introduce more parking.

C3.2 Convenient short-term bicycle parking should be available less than 15m, but no more 50m, from the cyclist's destination. It should be placed along sidewalks or other highly visible public locations so that it can be easily found and to discourage theft.

- Place bicycle parking in on-street automobile parking stalls where pedestrian traffic is high and sidewalk space is limited. This arrangement (Figure 3-18) can be removed during winter months;
- Place post-and-ring type bicycle stands on sidewalks along the curb zone. Distribute them at regular intervals, cluster more post and ring racks in front of buildings with services, and allow residents/ businesses to suggest additional locations; and,
- Adapt street furniture, such as signposts and lampposts for use as bicycle parking (Figure 3-17).

Figure 3-17: Adapting street furniture for bicycle parking. Source: Cyclehoop Ltd.

Figure 3-18: Bicycle stands in parking stalls. Source: Christopher DeWolf (left).

Figure 3-19: Examples of public bicycle parking signage. Source: OFROU 2008.

C3.3 The City of Ottawa Zoning By-law (2008-250, Part 4, Section 111) requires that off-street bicycle parking be provided based on the following:

- One bicycle parking space for every 250 m^2 of gross floor area for office and retail uses under 8,000 m^2;
- One bicycle parking space for every 500 m^2 of gross floor area for libraries, municipal services, and retail uses over 8,000 m^2 , including shopping centres;
- Bicycle parking spaces should be located to provide convenient access to main entrances or well-used areas;
- If 50 or more bicycle spaces are required, a minimum of 25% should have the following security features: be housed in a building or structure; be located in a secure area such as a supervised parking lot or enclosure with secure entrance; be bicycle lockers; and,
- Motor vehicle parking requirement should be reduced by one motor vehicle parking space for every 13 m^2 of gross floor area provided as shower rooms, change rooms, locker rooms and other similar facilities intended for the use of the bicyclists.

As the Zoning By-law requirements only apply to new development in the Study Area, the following measures are recommended to increase long-term bicycle parking on private properties:

- Develop exemplary long-term bicycle parking facilities at City-owned and occupied buildings;
- Work with federal building managers to develop bicycle parking for government employees;
- Provide resources to help building owners/managers to implement appropriately designed and located bicycle parking;
- Apply the updated bicycle parking requirement retroactively to all existing properties with grace period for compliance; and,
- Provide incentives for additional bicycle parking, such as reduced minimum car parking spaces.

C3.4 Off-street, secure and long-term bicycle parking in the Study Area should be developed and accessible to the general public. Bicycle parking within public and private parking garages could be provided. It is essential that wayfinding signage be installed on streets in the vicinity of any indoor public bicycle parking to direct cyclists to these facilities (Figure 3-19). The location of secure, indoor public bicycle parking facilities should be indicated on bicycle maps.

Another approach is to provide a dedicated bicycle parking facility, a so-called “bike station”, at one of the Confederation Line stations in downtown Ottawa. There are three distinct clienteles who could benefit from the existence of such a facility:

- Bicycle commuters without access to a private long-term parking facility;
  - Employees in small buildings (e.g., on Sparks Street).
  - Park bicycle for duration of workday.
- Outbound transit customers;
  - Residents of the study area and its environs.
  - Use bicycle to travel between home and transit.
  - Park bicycle for duration of workday.
- Inbound transit customers;
  - Employed in the study area and its environs.
  - Use bicycle to travel between transit and work.
  - Park bicycle overnight.

Given that sidewalk space is already limited and that the development of the Confederation Line will further increase pedestrian traffic, it is recommended that the bicycle station be developed off-street, preferably in a storefront close to an Confederation Line station head (Figure 3-20).

It is recommended that the bicycle station should have the following features:

- Electronically-controlled access;
  - For registered users only.
  - Entry means of dedicated electronic key or future smartcard transit pass.
  - Accessible 24/7.
- Passive security features;
  - Ample fenestration.
  - Bright illumination.
- Active security features;
  - Camera surveillance.
  - Motion detectors.
- Two-tier bicycle racks (Figure 3-21) for optimal space usage;
- Include complementary amenities;
  - Lockers.
  - Power sockets for electrically-assisted bicycles.
  - Air pump.
  - Vending machine with inner tubes and other basic parts.
- Bathrooms;
- Showers and change rooms (optional).

Figure 3-20: Integrated Bike Station into Downtown Building. Source: Momma Wheelie Biking Blog.

Figure 3-21: Two-Tier Racks at Bicycle Stations. Sources: Tony Brock/Toronto Star (left) and BeyondDC (right).

C4 Bicycle Sharing Stations at Key Locations

Bicycle sharing programs are made available to the public through a network of self-service stations. Depending on the program, users have the option of paying into an on-site terminal or use a pre-paid membership. Users can take advantage of the service for all their mobility needs or use it in conjunction with other public transit options.

In Ottawa, two bicycle-sharing programs are currently in operation. Bixi Capitale is managed by the National Capital Commission (NCC) and has a strong presence downtown. RightBike is a community owned and operated bicycle-sharing program in Westboro and Wellington West.

C4.1 Ideally place bike-sharing stations is no more than 300 m apart from one another (Vélo Québec, 2010).

C4.2 Locate bike-sharing stations in close proximity to transit stations, so that users can leverage their choice of other transportation options.

C4.3 Encourage the integration of payment systems between bicycle-sharing programs and local public transit operators.

C4.4 Where space is limited, place bicycle stands in existing on-street parking spaces.


Ottawa, ON

3.4 Transit (T)

A fast and comprehensive transit network is a very important element to enable the efficient and continuous movement of large flows of people across downtown Ottawa. As Ottawa grows economically and physically, more demand will be placed on the provision of transit.

T1 Efficient & Reliable Bus Transit

Buses will remain an important mode of transport in downtown Ottawa, even after the opening of the new Confederation Line in 2018. Local buses will continue to provide access to/from communities adjacent to downtown Ottawa (e.g. Lowertown, The Glebe), to/from Gatineau, and to/from the Confederation Line.

T1.1 Downtown streets must allow efficient movement of buses to support future growth and increased transit mode share objectives, balanced against the need to accommodate pedestrian, cycling, goods movement and automobile use.

T1.2 For streets identified in the City's Transportation Master Plan as future Transit Priority Corridors, employ operational and physical measures to improve the efficiency and reliability of transit service along those streets.

T1.3 Locate bus transit timepoints outside of the downtown area and maintain some provisions for bus lay-bys downtown.

T1.4 For safety reasons, provide a 0.6 m visual warning/detection tactile strip at the edge of the sidewalk, where the bus stop is located.

T1.5 Design curb-side transit stop loading areas to be minimum 3.0 m wide to ensure accessibility is afforded to all transit customers.

T1.6 Incorporate surface texture changes at transit stops to assist the visually challenged in locating the stop and/or shelter location.

T1.7 Include Bus Priority measures in physical road design and signalization.

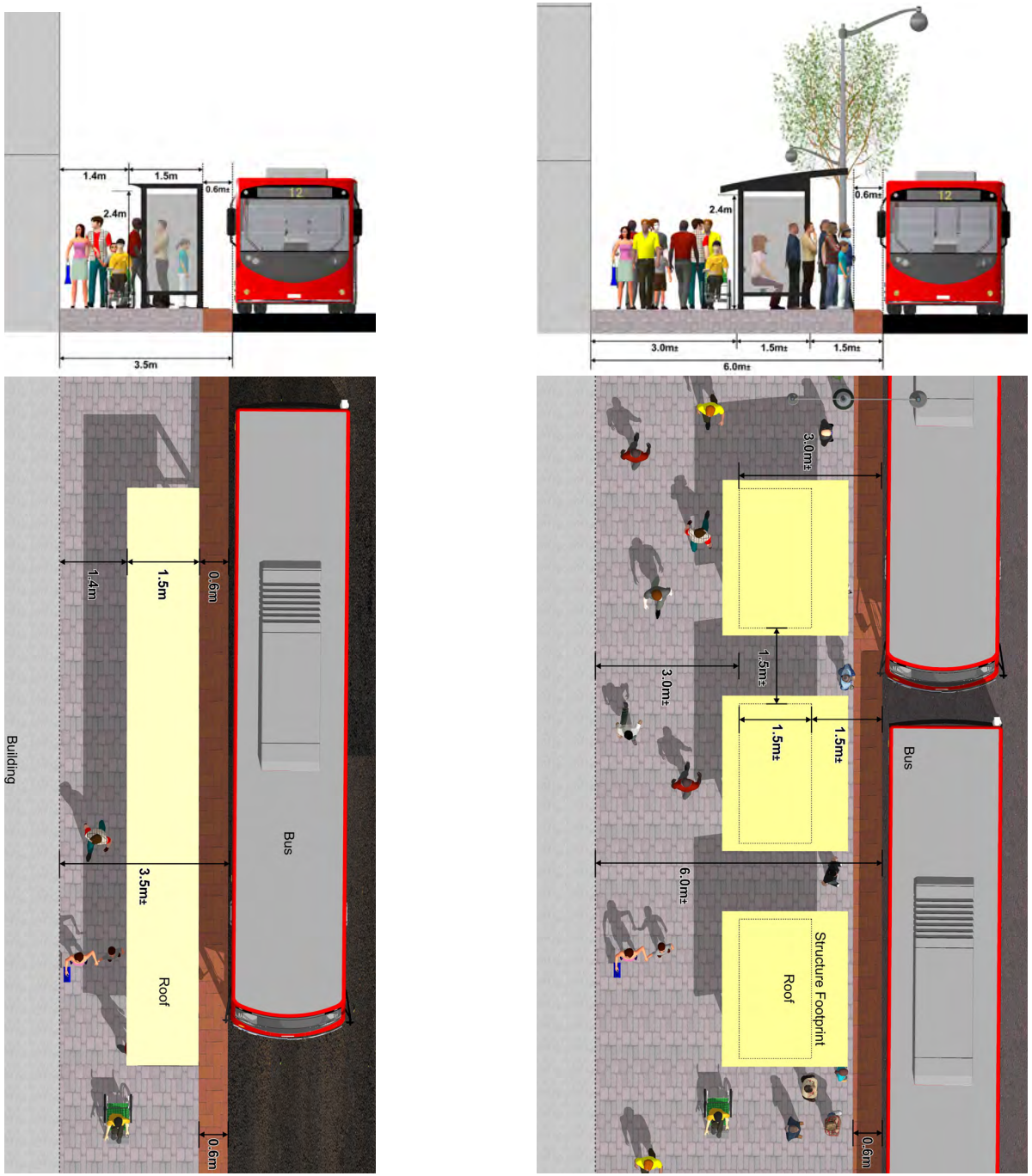


Figure 3-22: Transit shelter arrangements

The illustrations in Figure 3-22 show potential transit shelter arrangements on sidewalks with different widths. The first illustration provides an arrangement where sidewalk space is limited to a total of 3.5m or less. In this scenario, the preferred solution is to integrate the bus shelter with the adjacent building through agreements with the building owners. If this is not possible, a narrow bus shelter, with the shelter opening facing away from the street is acceptable. The second illustration shows a scenario suitable to downtown bus platforms and to be applied to Bus-Confederation Line interface blocks, as indicated in the Vision Plan for Transit Mobility (Section 2). An enclosed bus shelter is accommodated on 3.0m of the sidewalk, enabling a 3.0m pedestrian zone. Both illustrations show a 0.6m visual warning/tactile detection strip at the edge of the sidewalk.

T2 Optimized Connectivity Between All Modes and Confederation Line Stations

Local bus routes within downtown Ottawa will provide connections with planned Confederation Line stations to support transit access and mobility for residents and visitors within the downtown area and across whole city. The final location of the planned Confederation Line stations and their entrances at street level may result in the need for transit priority measures on other streets to ensure strong connections between local and rapid transit services.

T2.1 Connections must be made as convenient and efficient as possible and walking distances minimized in order to accommodate large volumes of transit customers and buses at key locations in downtown Ottawa.

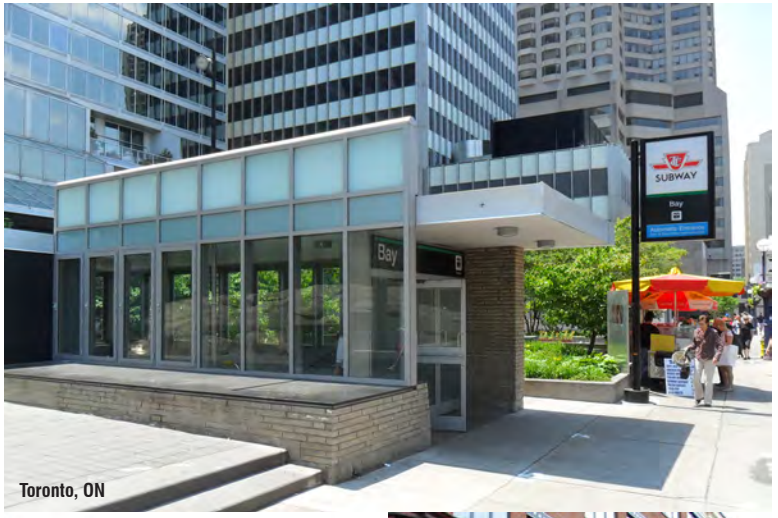
T2.2 When possible, connect local bus stop and Confederation Line station entrance on the same side of the street.

T2.3 Station entrances and connecting bus stops must be clearly identifiable and include appropriate way-finding to transit customers.

T2.4 Sufficient curb space must be available at connecting bus stops to accommodate frequent local bus service.

T2.5 Sidewalk space at bus stops serving as connections to Confederation Line stations must be designed to allow efficient passenger flow and minimize conflicts between transit customers and other pedestrians.

T2.6 Provide sufficient and accessible sheltered waiting space and amenities for transit customers connecting between Confederation Line and local bus services to ensure a safe, convenient and comfortable experience, especially during off-peak hours.



Toronto, ON


Vancouver, BC

Vancouver, BC

London, UK

T3 Improved Integration Between Bus Stops & Bicycle Lanes

Where dedicated bicycle lanes are provided adjacent to the sidewalk, conflicts between buses and bicycles may occur due to the need for buses to cross the bicycle lane to arrive at and depart from curbside stops. In these cases, strategies to mitigate potential conflicts between buses and bicycles should be considered

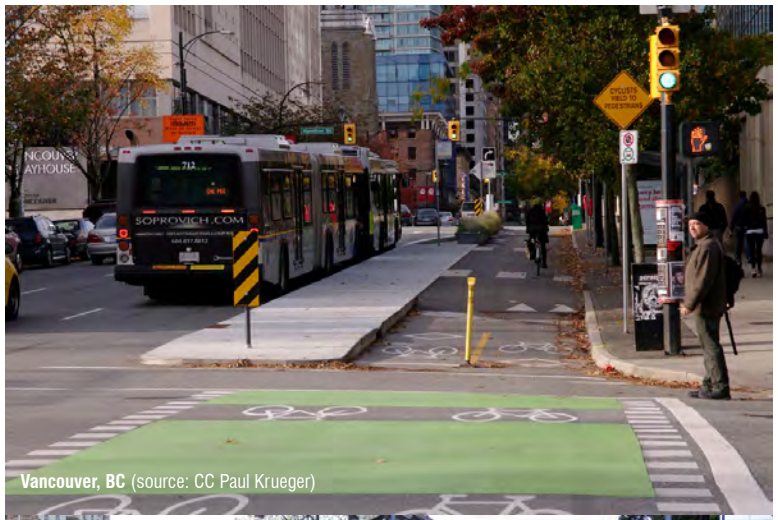
T3.1 Delineate bus stop zones that overlap bike lanes with clearly identifiable markings, such as zigzag lines or a coloured stretch of pavement (Velo Quebec).

T3.2 Where a bus stop is located near-side of an intersection, demarcate the bicycle lane with broken white lines beginning 20 metres before the bus stop to allow for buses to move to curbside.

T3.3 Where a bus stop is located mid-block, demarcate the bicycle lane with broken white lines beginning 34 metres before the stop, and continuing through 15 additional metres after the stop.

T3.4 Where a painted bicycle lane runs adjacent to the sidewalk, bring it to sidewalk level at bus stops to allow passengers getting on and off the bus to easily reach the sidewalk by crossing the bicycle lane. Demarcate bus stop zones with tactile surface indicators and/or coloured paving. This particular guideline is recommended for bus stops with low transit volumes.

T3.5 Where a bicycle lane is physically separated from vehicle lanes, bring it to sidewalk level at bus stops to allow passengers getting on and off the bus to reach the curb by crossing the bicycle lane. Additionally, reserve an area between the bicycle lane and the vehicle lane that is minimum 1.0 metre wide to facilitate embarking and disembarking passengers (Velo Quebec).



Vancouver, BC (source: CC Paul Krueger)

Paris, FR (source: CC Vladimir Zlokazov)

Toronto, ON (source: CC Sean Marshall)

T4 Enhanced Bus Stop Zones & Amenities

Transit customers are also pedestrians at each end of their trip, and the transit stop is where the transition between transit and walking is made. Bus stop location, spacing and design must be carefully considered in order to provide a comfortable and enjoyable transit experience that integrates into the streetscape.

T4.1 Encourage the redevelopment of spaces adjacent to the Confederation Line stations through place-making initiatives.

T4.2 Use bump-outs or "bus bulges" to provide bus priority at transit stops and to provide more space for waiting passengers and for transit stop amenities.

T4.3 Provide transit shelters and other amenities to provide weather protected and safe waiting spaces for transit customers, appropriate to the context.

T4.4 Design "signature" bus shelters and associated signage to match the architectural quality and visual style of the Confederation Line station entrances, making them emblematic of Ottawa and contributing to street art.

T4.5 Where new development is proposed, investigate opportunities to integrate shelters and amenities through use of setbacks, overhangs, canopies, etc.

T4.6 Provide recycling and waste receptacles in proximity to bus stops, in the 1.1m utility zone as outlined in P2.1 (Section 3).

T4.7 Provide sufficient clear space along the curb at bus stops, as determined by OCTranspo, to allow efficient passenger flows and minimizing conflicts with other pedestrians.

T4.8 Where flex spaces are proposed, locate bus shelters within 3 metres of the street edge. In addition, do not place on-street parking immediately adjacent to bus shelters.


Ottawa, ON

Vancouver, BC

Paris, FR (source: CC David Fernández)

3.5 Vehicles (V)

A vibrant and economically successful downtown is supported by a cohesive and efficient road network that enables vehicle flow, provides well-located loading areas, has strategic on-street parking and offers access to off-street parking arrangements.

In addition, as downtown Ottawa houses some of the most popular touristic destinations in the National Capital Region, it is equally important to consider Tour Bus parking needs.

V1 Reduced Traffic Speeds for Safety & Comfort of Other Modes

Downtown Ottawa streets will benefit from reduced traffic speeds in order to provide for a safer and more comfortable environment for all street users. In this context, traffic calming is a term used to describe a combination of features employed to slow down traffic speeds. The main objective of traffic calming is to modify motorists' behaviour in order to improve safety conditions for everyone who uses the street. This objective is consistent with the City Council goals to create a more sustainable and liveable downtown, and rebalancing the space amongst all street users.

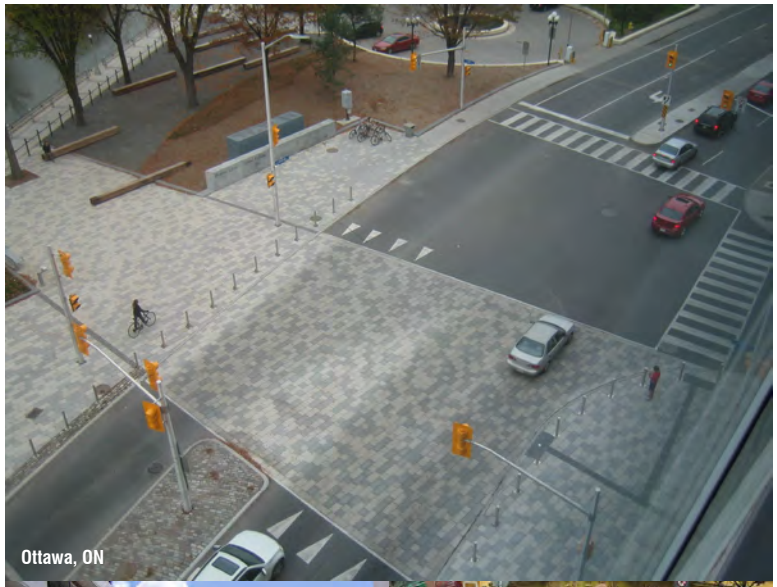
V1.1 Consider the use of raised intersections or textured cross-walks where the highest degree of traffic calming and pedestrian priority is desired.

V1.2 Employ traffic calming measures in conjunction with pedestrian priority signals to further improve the pedestrian experience at intersections.

V1.3 Where applicable, introduce physical traffic calming measures, such as speed humps, chicanes, raised crosswalks, raised intersections, traffic islands, curb extensions and full or directional closures, while addressing accessibility, emergency service vehicles, access, and vehicle mobility interests.

V1.4 Utilize non-physical forms of traffic calming measures, like edge lines, parking, and parking islands, where the right-of-way is constrained and physical space is unavailable.

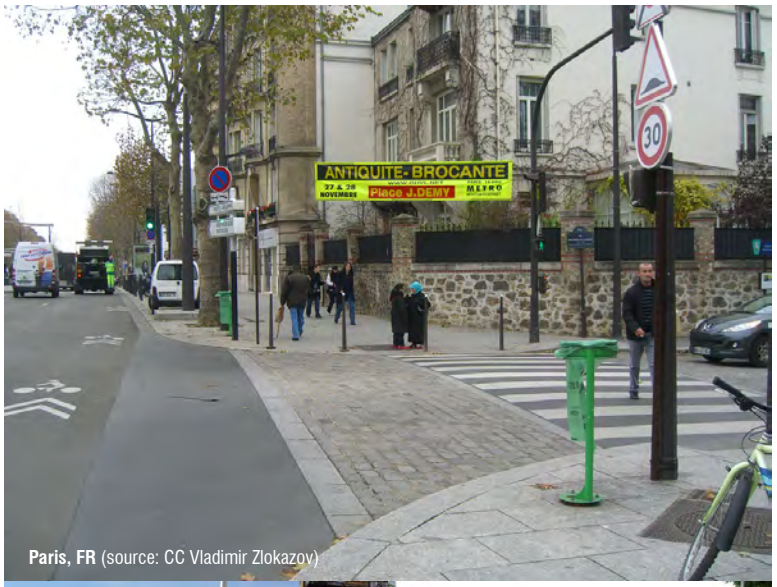
V1.5 Develop a set of key criteria to evaluate the appropriateness of traffic calming implementation in downtown Ottawa streets, or blocks of streets.



Ottawa, ON

Arcachon, FR (source: CC Henry de Saussure Copeland)

Dublin, IE (source: CC Flickr user ddartley)



Paris, FR (source: CC Vladimir Zlokazov)

Ottawa, ON

Utrecht, NL (source: CC Greg Raisman)

V2 Suitable Access for Parking, Loading, Tour Buses & Taxi Stands

Downtown Ottawa has a healthy supply of approximately 750 on-street parking spaces. On-street parking spaces have restrictions to avoid long-term parking, peak hour traffic and by-law requirements.

In 2010, the City of Ottawa transitioned from single space parking metres to multi-space Pay and Display machines. On-street parking is now identified by signage located at either end of block faces, and individual parking stalls are no longer demarcated.

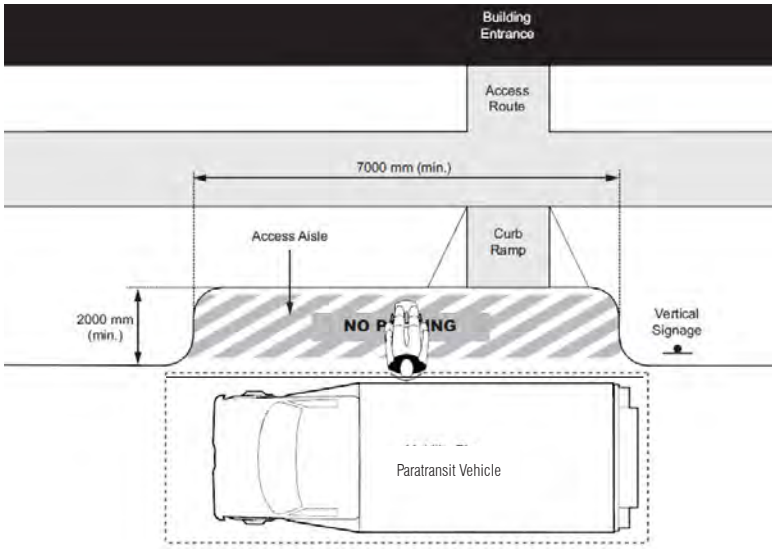
V2.1 Locate paid on-street parking at highly visible and convenient locations to serve short-term needs of local businesses.

V2.2 Provide on-street parallel parking stalls according to the following guidelines: 6 to 6.7 m long to provide maneuvering space for vehicles. Stalls at either end of a series may be as short as 5.5 m, provided there is no obstruction in front or behind the stall. Parallel parking stalls are 2.3 m to 2.7 m wide. Stalls are often wider if the parking lane is used as a travel lane during peak periods, or if the parking turnover is high. Angled parking stalls are generally denoted by lines 5.5 m long.

V2.3 Where designated on site loading zones cannot be accommodated, explore the use of on-street parking areas as loading zones at off-peak hours. Loading zones are vital in the downtown core, as there are not many driveways, parking lots or areas for them to pull off the road near their destination to supply local businesses.

V2.4 Provide loading zones and lay-by areas to measure 2.4 m wide to accommodate a wide range of personal and commercial vehicles. The length of the loading zone/lay-by is determined by the projected vehicle usage and local demand for on-street parking.

V2.5 Consider allocating passenger loading and drop-off curb space along the street where possible, providing a side aisle at least 7 metres in length and 2 metres in width adjacent to the vehicle pull-up space in order to facilitate passenger loading and unloading. Delineate the side aisle with diagonal pavement markings to indicate that it is not a space for parking, and provide at least one curb ramp leading to the sidewalk.



Source: Accessibility Design Standards, City of Ottawa, November 2012

V2.6 Provide taxi zones in close proximity to offices, hotels and restaurants. Taxi zones follow the same guidelines as stated for the above noted loading zones.

V2.7 Review the existing Tour Bus on-street parking, loading and pick-up/drop-off zones in downtown Ottawa and develop a cohesive strategy to address future Tour Bus parking considerations.

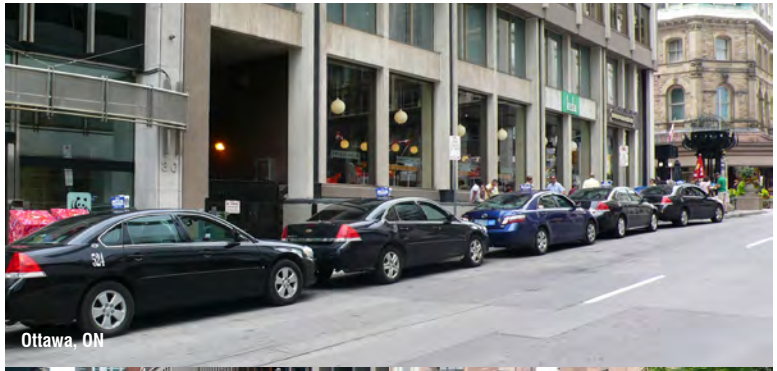
V2.8 At Tour Bus on-street and/or loading areas, consider painting the curb with a different colour to deter other vehicles from illegally occupying the dedicated Tour Bus space.

V2.9 Upgrade on-street meters for Tour Bus zones so that payment can be completed with a credit card and payment receipts are provided.

V2.10 Make the City of Ottawa's "24-hour Tour Bus Parking Permit" available for purchase on-line.

V2.11 Promote the use of car-sharing programs by encouraging building owners to locate car-share spaces in their parking areas through the development review process.

V2.12 Locate car-sharing spaces in parking areas in close proximity to Confederation Line stations.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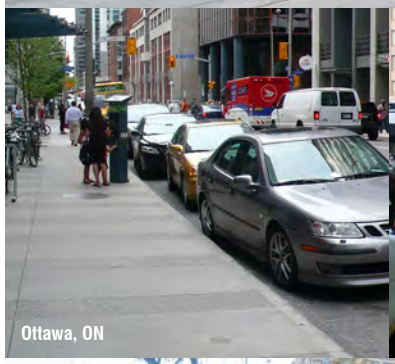
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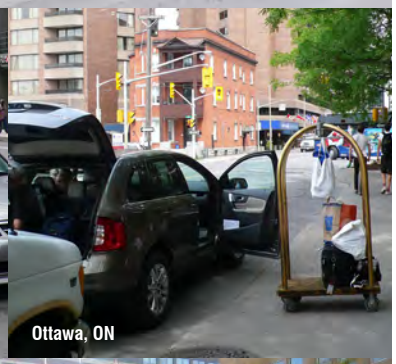
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Ottawa, ON

V3 Adequate Capacity & Level of Service

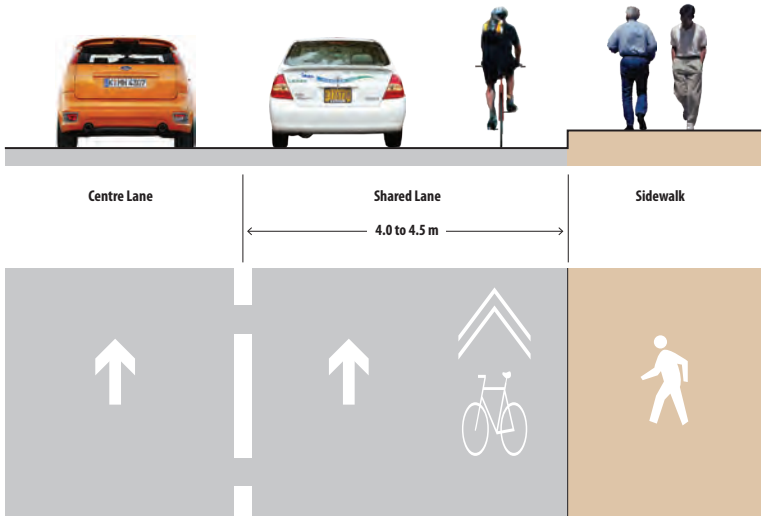
According to the Geometric Design Guide for Canadian Roads published by the Transportation Association of Canada (TAC), there is a hierarchy of urban roads that include local, collectors, arterials and freeways. Each type of street has specific lane requirements in order to meet its vocation.

V3.1 Accommodate local, collector and arterial roads in urban areas according to the following daily traffic volumes:

- Local – between 1,000 and 3,000 vehicles per day
- Collector – between 8,000 and 12,000 vehicles per day
- Arterial (minor) – between 5,000 and 20,000 vehicles per day
- Arterial (major) – between 10,000 and 30,000 vehicles per day

V3.2 Design collector and arterial lane widths as follows:

- General purpose lanes:
  - Curb lanes – 3.5 m
  - Median lanes – 3.25 m
  - Turn lanes – 3.0 to 3.25 m
- Shared-use lanes – 4.0 to 4.5 m



Level of Service Considerations

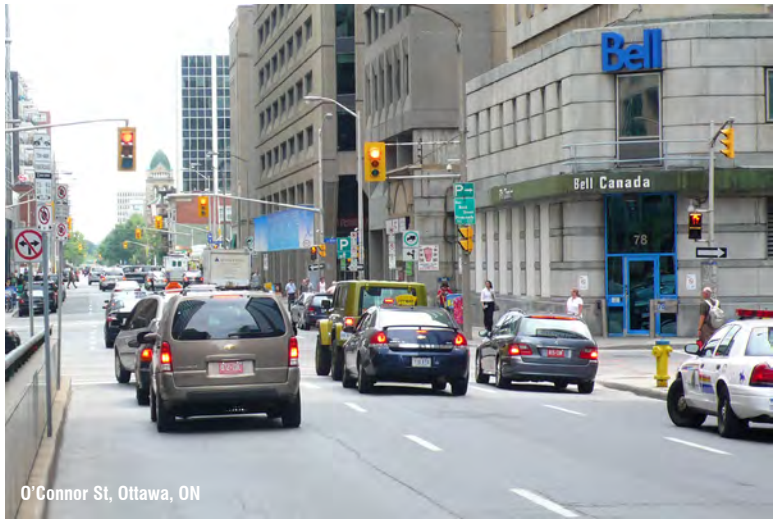
The Level of Service (LOS) of an intersection is a qualitative measure of capacity and operating conditions and is directly related to vehicle delay or volume-to-capacity (v/c) ratio. LOS is given a letter designation from A to F, with LOS A representing very good performance and LOS F representing very poor performance often indicative of extensive queuing and long delays.

V3.3 Maintain a v/c ratio of 1.0, or LOS E, for the Central Area. By accepting a significantly low LOS, other modes of transportation such as walking and cycling are prioritized over driving, and has the effect of reducing automobile dependence (source: City of Ottawa Transportation Master Plan).

Level of Service (LOS)	Volume to Capacity Ratio
A	0 to 0.60
B	0.61 to 0.70
C	0.71 to 0.80
D	0.81 to 0.90
E	0.91 to 1.00
F	> 1.00

V3.4 Outside of the Central Area, endeavor to maintain a maximum v/c ratio of 0.9 for mixed traffic at signalized intersections during weekday peak hours, corresponding to LOS E. This will help to relieve potential traffic congestion (source: City of Ottawa Transportation Master Plan).

V3.5 When calculating vehicle LOS, ensure that the desired pedestrian LOS is met first (refer to P1).



O'Connor St, Ottawa, ON

Turn Lane Considerations

According to the Geometric Design Guide for Canadian Roads, when the number of turning vehicles at an intersection is such that it creates hazards or reduced capacity to the intersection (i.e., queue spill-back), then volume and safety warrants are used to determine if auxiliary turn lanes are appropriate.

V3.6 Consider the interaction of vehicles with pedestrian crossing demands. At intersections with heavy pedestrian crossing, minimize pedestrian crossing distances and auxiliary turn lanes are not recommended. This will enhance safety for pedestrians.

V3.7 Provide a dedicated right turn lane when the right-turning traffic is 10% to 20% of the total approach volume. The potential traffic congestion generated from the lack of turn lanes can increase air and noise pollution and create unfavourable conditions for other street users.

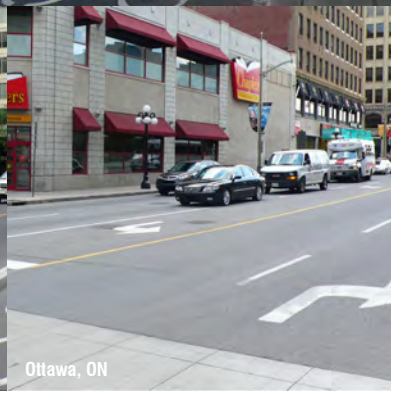
V3.8 Consider implementing a left turn lane when the magnitude of interference is unacceptable with respect to the opposing volume, the advancing volume and the percentage of left turn vehicles.

V3.9 Employ a 38m left turn storage lane at signalized intersections when applicable, but judgement is needed as urban conditions may not provide this space.

V3.10 Where possible, discourage dual turn lanes in order to create a safer and accessible environment for pedestrians.

Ottawa, ON


Ottawa, ON


Ottawa, ON

V4 Balanced Network of One-way & Two-way Streets

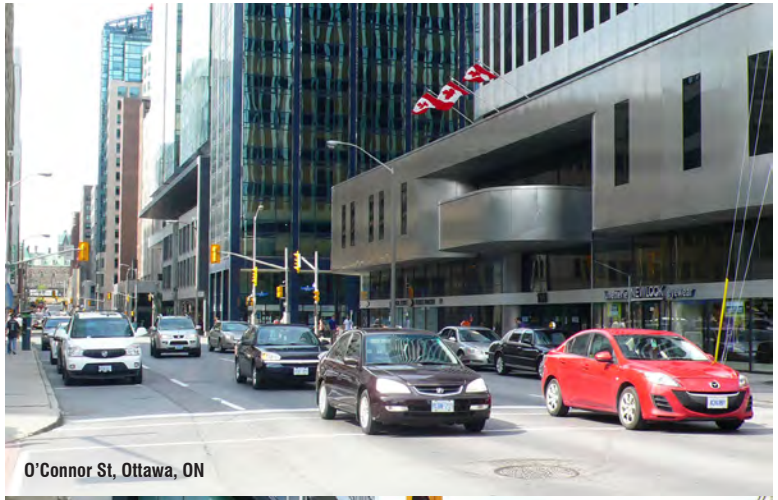
There are no technical guidelines available regarding the provision of one-way versus two-way streets. The literature suggests that there are opportunities and constraints associated with each. The real question as applied to Ottawa is how can the narrow rights-of-way (18m) best be utilized to function as complete streets. The following considerations are appropriate for downtown Ottawa streets:

V4.1 One-way streets generally promote efficient vehicle travel by accommodating heavy traffic volumes and improved opportunity for traffic signal coordination between intersections. They offer an opportunity to reallocate more space towards sidewalks and/or cycling facilities, allowing for development of complete streets.

V4.2 Benefits associated with one-way streets include decreased congestion, associated reduction in air pollution, reduced time delays for all modes, reduced pedestrian/cyclist conflicts with turning vehicles, increased safety at intersection crossings.

V4.3 Two-way streets generally promote increased accessibility to local destinations, desirable slower traffic speeds, and more comfortable street environment for pedestrians and cyclists. They benefit street-oriented land uses at grade level, provide scenic views from both directions and tend to calm down traffic speeds.

V4.4 Evaluate the interaction between the existing one-way street road network in downtown Ottawa with key elements of the regional transportation network, including the Highway 417 on and off ramps, access to the interprovincial Portage and Alexandra bridges and crossings over the Ottawa River.



O'Connor St, Ottawa, ON

Bank St, Ottawa, ON

V5 Safe Interaction Between Vehicle Access Points & Sidewalks

The intersection of a sidewalk with a building/parking garage entrance is a primary point of conflict between pedestrians and delivery trucks, large vehicles or other vehicles trying to access an off-street parking garage entrance or indoor loading area. Provisions to mitigate potential conflict where garage entrances meet sidewalks are essential to the overall safety of the pedestrian and vehicle environments.

V5.1 Emphasize pedestrian safety measures where an access point to a parking garage entrance/off-street loading bay intersects a sidewalk by maintaining the sidewalk at a continuous level and adding a curb-cut to allow vehicular access through the sidewalk.

V5.2 Utilize the same paving materials of the sidewalk across the driveway/access to accentuate pedestrian safety.

V5.3 If necessary, employ curbed planting zones to gently direct pedestrian traffic away from a building's loading area.

V5.4 When possible, restrict the placement of side-by-side parking garage entrances/loading accesses in order to create a safer sidewalk environment for non-motorized street users. Where more than one vehicular access point is required, consider the feasibility of designing a single access point.

V5.5 Consider the interaction between cycling facilities adjacent to off-street parking garage entrances, loading areas or truck access points.

V5.6 Where possible, integrate loading and servicing into the building envelope to minimize impacts on pedestrian areas.

V5.7 Where loading and servicing cannot be integrated into the building, screen the area from view using gates, planting or other architectural elements.

Amsterdam, NL (source: CC Erwyn van der Meer)

This section of the Street Design Toolkit provides a series of cross-sections for complete and inclusive streets that will guide street design decision-making in downtown Ottawa. The designs strive to achieve the Vision and Strategic Directions set out in Section 2, recognizing the potential of the investment in the City's light rail transit project to trigger and enable a transformation of downtown. The design solutions also have regard for the detailed design guidance of the Street Design Toolkit, and the street typology shown on the Plan of Streets (Figure 2-1).

Balancing the competing interests for space is always the number one challenge when designing complete streets. In downtown Ottawa, this competition is fierce, due to the volume of travel in all modes that must be accommodated within municipal street right-of-ways that are extremely narrow. As demonstrated in the detailed right-of-way analysis provided in Appendix D, the predominant right-of-way width is 18.3m. This corresponds to the traditional land survey width of 60 feet. Whereas some streets have wider right-of-ways (such as Laurier, Rideau, Elgin, Wellington), it is sensible to create street design solutions that can fit within the narrow 18.3 right-of-way that cover most of downtown Ottawa.

To address this challenge, the City has placed a high priority on walking, cycling, and transit use downtown. This in turn creates opportunity to reduce the amount of space allocated today for automobile travel. Smart choices can be made to create wider sidewalks and cycling facilities on many downtown streets. In the case of sidewalks, the City will take a contemporary view of the Level Of Service (LOS) requirements of pedestrian movements, and will consider various classes of sidewalks that are calibrated to their capacity requirements. The resulting sidewalk classification system for downtown Ottawa is provided in Figure 3-23 (opposite).

Within this context, the following targets are established for the design of complete streets in downtown Ottawa:

1. Sidewalk Capacity Level of Service: Sidewalks will provide for Level of Service (LOS) C, meaning that pedestrians will need to frequently adjust their path to avoid conflict, but that speed and ability to pass slower pedestrians will not be restricted.

2. Municipal Sidewalk Width: Municipal sidewalks on any downtown street will have minimum width of 3m, which provides adequate space for a utility zone (including street lights, trees, bike racks, fire hydrants, pay/display boxes), a frontage zone, and sufficient space for unencumbered pedestrian travel. [Note that in Downtown Neighbourhood (residential) Streets, sidewalk width may be reduced to 2.0m if the other 1.0m is used for integrating soft landscaping on private land.]

3. Municipal Sidewalk Width at Corner Approaches: Municipal sidewalk width/capacity will either meet the minimum, or ideally increase, at the approaches to crosswalks, to accommodate pedestrian storage requirements and to sustain the Level of Service for through movements where it is needed most.

4. Municipal Sidewalk Maintenance: A minimum clear width of 1.8m shall be provided (between obstacles) for municipal sidewalk maintenance activities, to protect adjacent public and private assets.

5. Private Land Pedestrian Spaces: Opportunities to create pedestrian spaces on adjacent private land, through setbacks or easements, cannot be assumed to exist for adjoining street segments throughout the length of the street since they are acquired incrementally on a development by development basis. Such opportunities are considered as "complementary" to municipal sidewalk requirements.

	Class	Minimum Sidewalk Width	Effective Width (for unencumbered pedestrian travel)	LOS "C" Capacity	Provision of Amenity	Typical Applications
✔	1	5.0 m	3.3 m +	» 2,500 to 4,000 pedestrians per hour	» Ideal for street trees » Ample space for street furniture	» Vicinity of Confederation Line station entrances » Transit interface zones or where downtown bus platforms needed » Main Streets, Ceremonial Streets, Showcase Streets
	2	4.1 m to 5.0 m	2.3 m+	» Pedestrian 1 zones » 2,500 + pedestrians per hour	» Excellent for street trees » Ample space for street furniture	» Transit interface zones or where downtown bus platforms needed » Main Streets, Ceremonial Streets, Showcase Streets
	3	3.4 m to 4.0 m	1.6 m to 2.3 m	» Pedestrian 2 and 3 zones » 1,000 to 2,500 pedestrians per hour	» Sufficient for street trees » Sufficient space for street furniture	» Not in transit interface zones or where downtown bus platforms needed » Main Streets, Ceremonial Streets, Business Streets, Downtown Neighbourhood Streets
	4	3.0 m to 3.3 m	1.3 m to 1.5 m	» Pedestrian 3 and 4 zones » Up to 1,000 pedestrians per hour	» Can accommodate street trees although constrained » Can accommodate limited street furniture	» Not in transit interface zones or where major downtown bus stops are planned » Business Streets, Downtown Neighbourhood Streets
✖	5	Less than 3 m	Less than 1.3 m	» Will fail to provide adequate capacity	» Cannot accommodate street trees » Cannot accommodate street furniture	» Existing conditions along many street segments » Appropriate only under special circumstances, such as when additional lands have been acquired through widening or easements for clear sidewalk width of 3m or greater

Figure 3-23: Municipal Sidewalk Classes for Downtown Ottawa

6. Street Trees: Street trees may be planted within the 1.1m utility zone along the curb edge, and may be planted on adjacent easements or private land. Where wider sidewalks can be provided, greater widths should be provided for the planting zone.

7. Cycling: Every street in downtown Ottawa enables cycling. There is a great diversity of on-street cycling solutions. Solutions will correspond to the planned function of the corridor.

8. Transit: Some streets will provide sidewalk widths that will accommodate a downtown bus platform (6.0m min. if enclosed shelter, 3.5m min. if canopy). Street corner radii to have regard for bus turning movements.

9. Travel Direction: Streets may be two-way or one-way. Contra-flow bike lanes may be considered.

10. Vehicle Lane Capacity: If streets are two-way, typically three lanes are required at intersections, one of which will allow for turning movements (usually left turns). If streets are one-way, a minimum of two lanes are required at intersections, both of which will allow for turning movements.

11. Vehicle Lane Widths: Vehicle lanes (with no cycling facilities) shall be 3.25m, plus 0.25 when adjacent to curb. Lanes that carry high amounts of bus or heavy vehicle traffic may require additional width.

12. On-Street Parking/Loading: Downtown streets will provide for on-street parking and loading on at least one side. Parking and loading bays are to be 2.25 to 2.5m width. On-street parking is encouraged to be located in bays with non-asphalt surface, which may function as shared sidewalk space when not occupied.

Based on the design direction described above, and having regard for these assumptions, a series of eleven (11) basic street design types are appropriate for downtown Ottawa. These street design types are intended to respond to the majority of streets in the study area. They can also be adapted to situations where the available right-of-way is larger than the 18.3m width for which they have been calibrated. The comparative performance characteristics of these street design types are presented on Figures 3-24 and 3-25.

Illustrations of the application of these complete street cross-sections in actual city blocks in downtown Ottawa are provided in the next section.

Type	Pedestrians		Cyclists	Transit Customers	Vehicle Users			
	Sidewalk Class at Corner, Per Side	Sidewalk Class at Mid-Block, Per Side	Cycling	Transit	Direction of Travel	Vehicles	On-Street Parking	Applicability By Street Type
A	3/3	4/4	Narrow Shared Lanes	-	Two-way	2 lanes total	2 sides	Business, Downtown Neighbourhood
B	3/3	3/2	Narrow Shared Lanes or Dedicated Lanes	Provides choice for platforms with shelters	Two-way	2 lanes total	1 side	Business, Ceremonial, Main, Showcase
C	4/4	4/3	Wide Shared Lanes	Provides choice for platforms with shelters	Two-way	2 lanes total	1 side	Business, Downtown Neighbourhood, Main
D	4/1	4/2	Dedicated Lanes or Separated Lane	Provides choice for platforms with shelters	One-way	2 or 3 lanes total	1 side, either in bay or as off-peak parking	Business, Downtown Neighbourhood
E	4/1	4/4	Bi-Directional, As Two-way Street	-	Two-way	2 lanes total	1 side	Business, Downtown Neighbourhood
F	4/1	4/4	Bi-Directional, Alternating	-	Alternating	2 lanes total	1 side	Business, Downtown Neighbourhood

Note: The classes, as indicated under "Sidewalk Class at corner" and at "Sidewalk Class at Mid-Block", refer to the class (column 1) on Table 3-23, page 107.

Figure 3-24: Street Design Typology For Downtown Ottawa

Type	Pedestrians	Cyclists	Transit Customers	Vehicle Users
A	Sufficient for moderate volumes. Opportunities for flexible use of curb spaces.	Narrow shared lane with cyclists in line with vehicles.	Space for shelters on both sides.	Opportunities for parking and laybys on both sides.
B	Sufficient for moderate to high volumes.	Narrow shared lane with cyclists in-line with vehicles, or dedicated facility.	Space for shelters on both sides.	Opportunities for parking and laybys on one side.
C	Sufficient for lower to moderate volumes.	Wide shared lane with opportunity for cyclist to travel besides vehicles.	Space for shelters on one side.	Opportunities for parking and laybys on one side.
D	Sufficient for high volumes at one corner and sufficient for moderate volumes in mid-block.	Dedicated or separated lanes.	Space for shelters on one side.	Opportunities for parking and laybys on one side (except for Type D5).
E	Sufficient for high volumes at one corner and sufficient for moderate volumes in mid-block.	Separated bi-directional lanes.	Space for shelter on one side.	Opportunities for parking and laybys on one side.
F	Sufficient for high volumes at one corner and sufficient for moderate volumes in mid-block.	Separated bi-directional lanes.	Space for shelter on one side.	Opportunities for parking and laybys on one side.

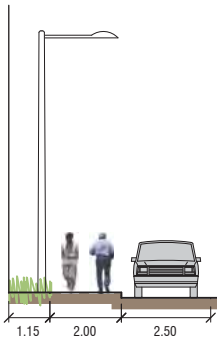
Note: The types, as indicated under the first column, correspond to the complete street design types as described in Figure 3-24 above.

Figure 3-25: Implications of Cross-Section on Types of Users

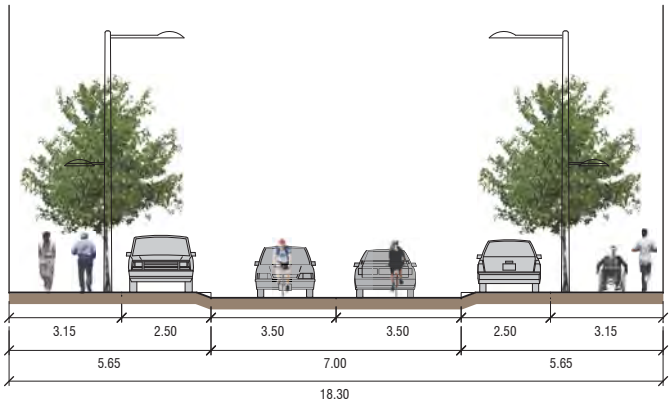
Type A

Two-Way
Narrow Shared Lanes (2)
Parking Both Sides

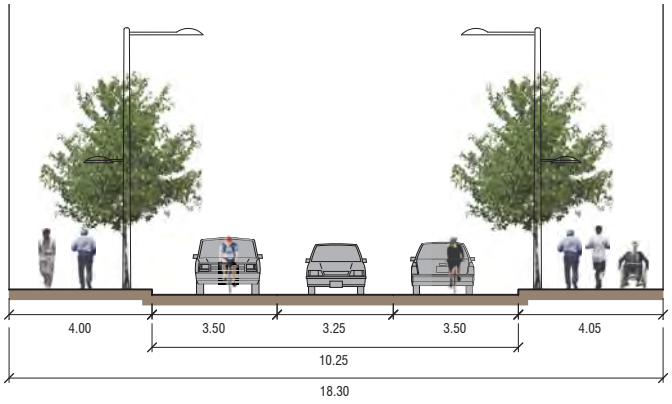
Optional Solution for Downtown Neighbourhood Applications

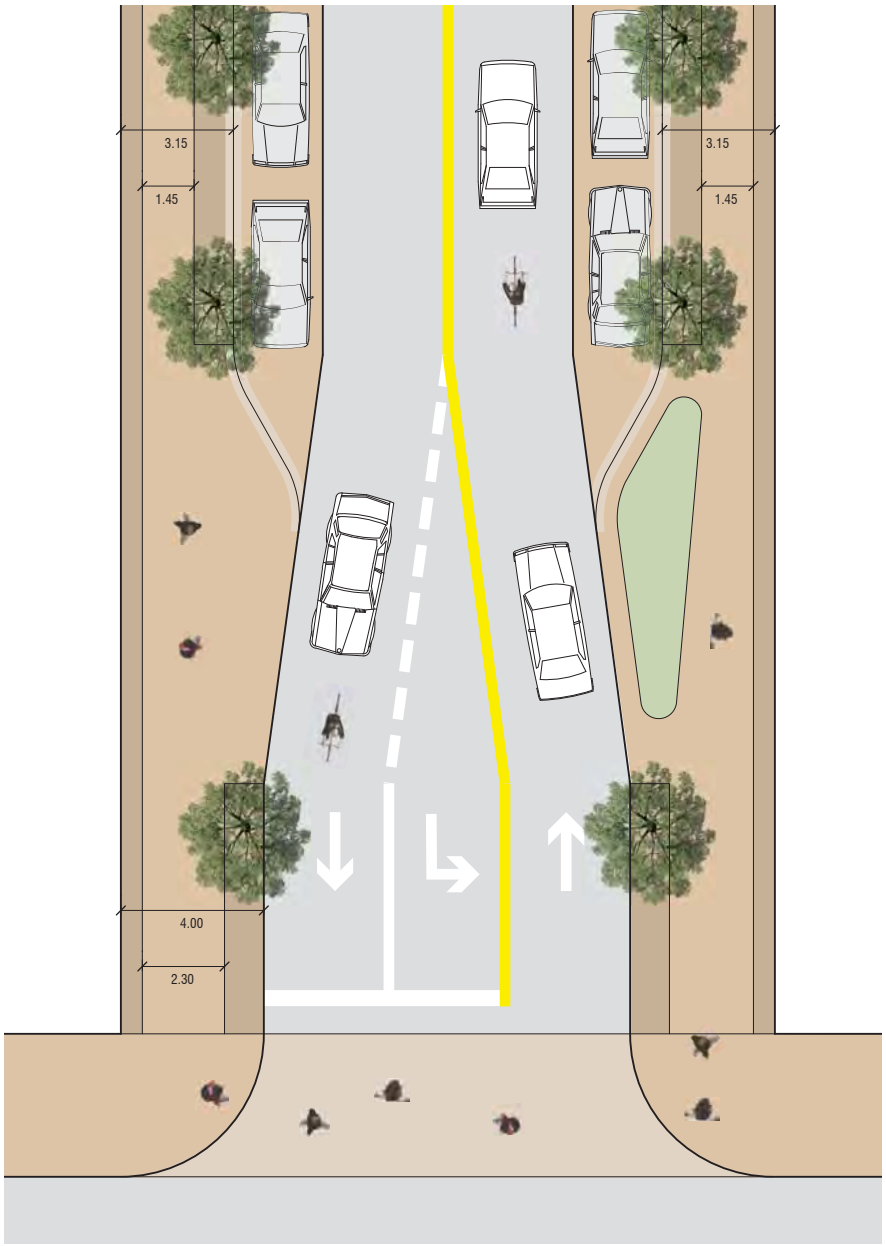


Mid-Block



At Corner

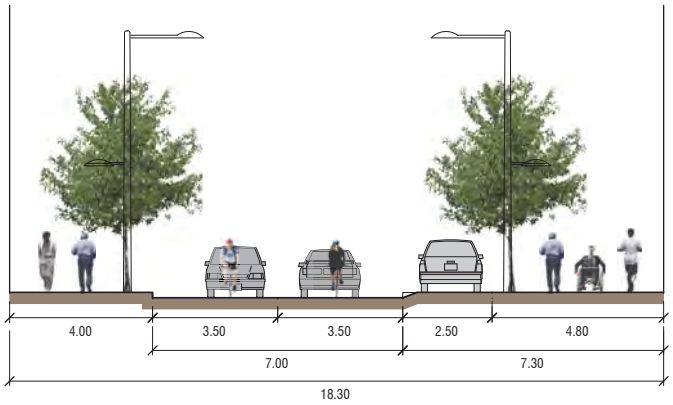


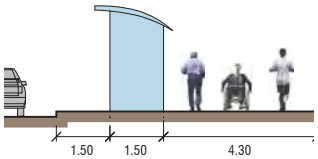


Type B1

Two-Way
Narrow Shared Lanes (2)
Parking One Side

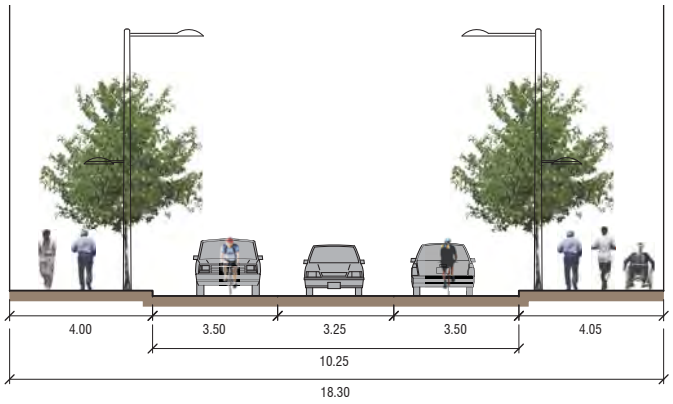
Mid-Block

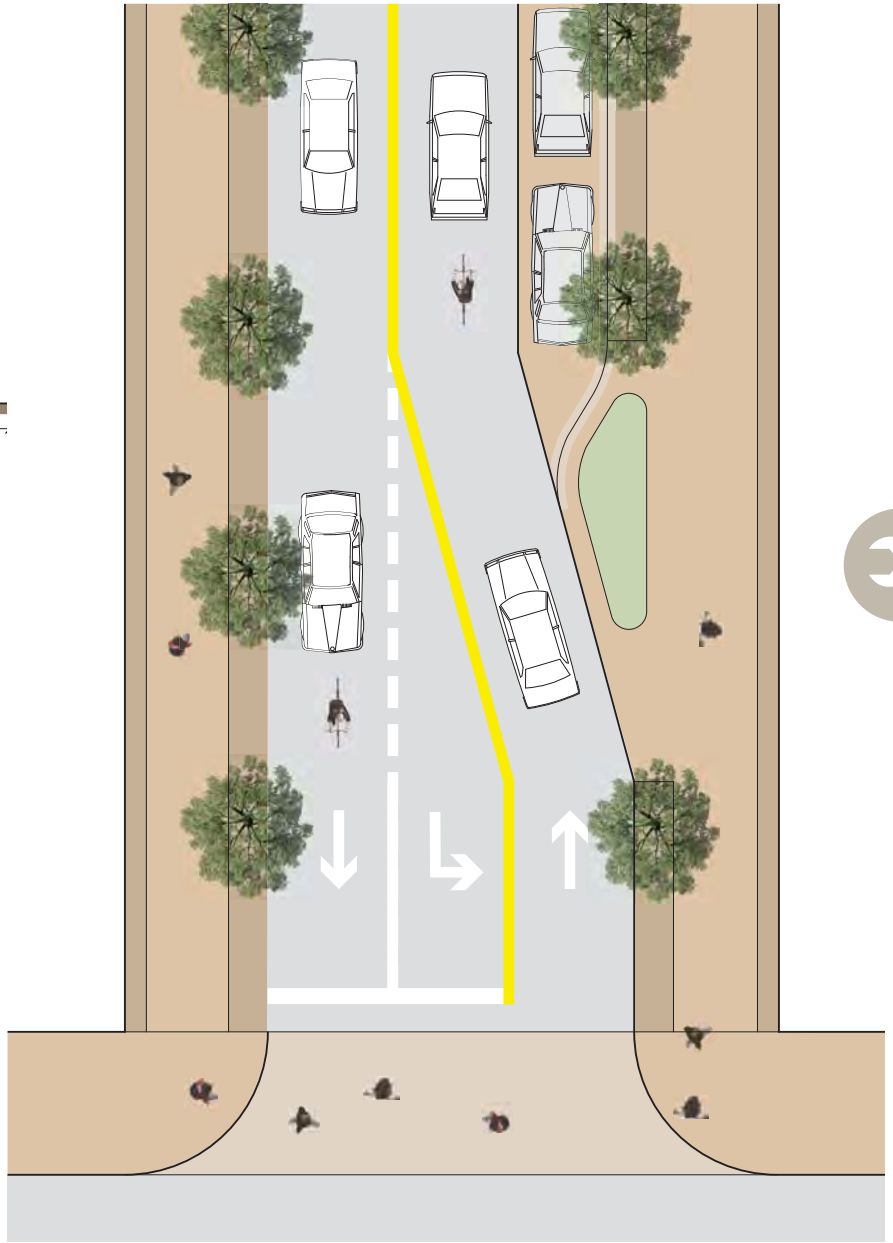




Optional Solution for Downtown Bus Platforms

At Corner

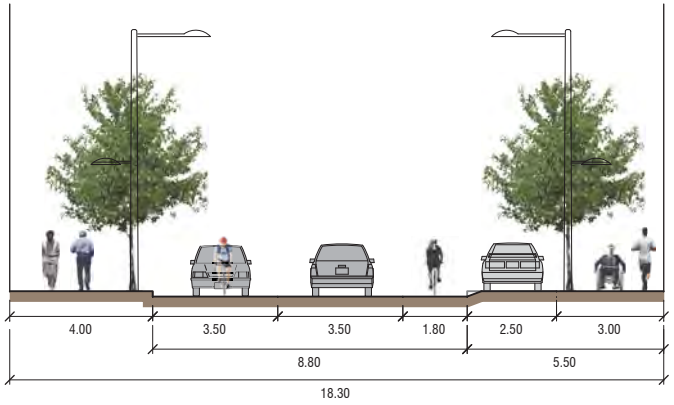




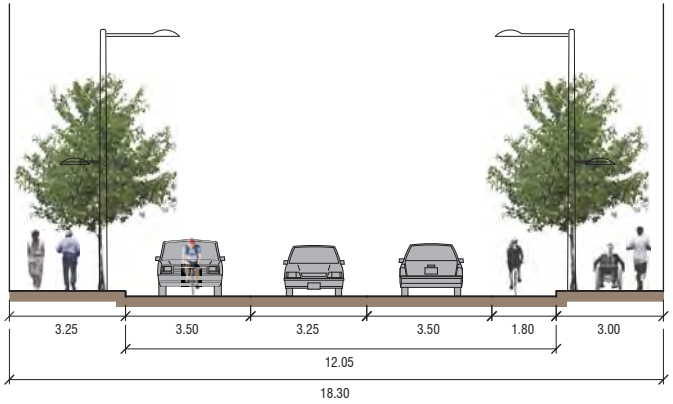
Type B2

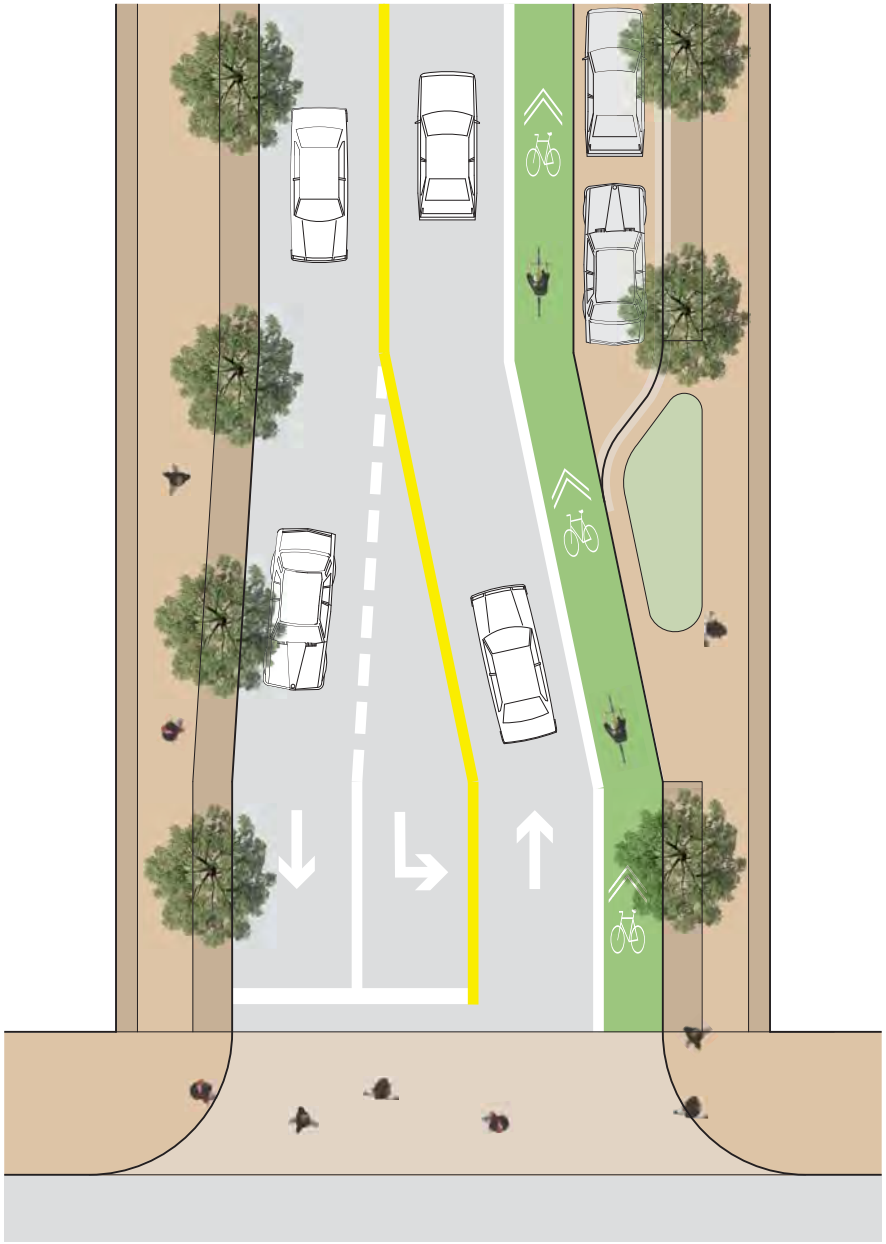
Two-Way
Narrow Shared Lanes (2), One-direction Cycling Lane
Parking One Side

Mid-Block



At Corner



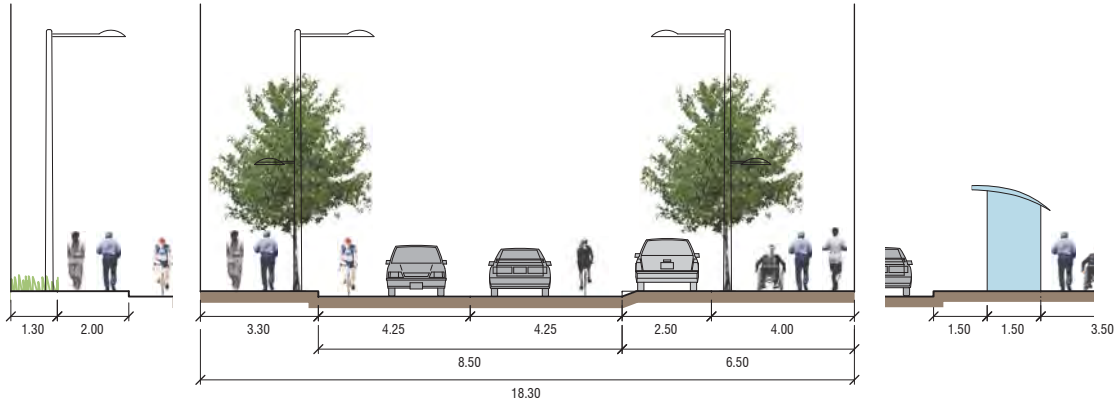


Type C

Two-Way
Wide Shared Lanes (2)
Parking One Side

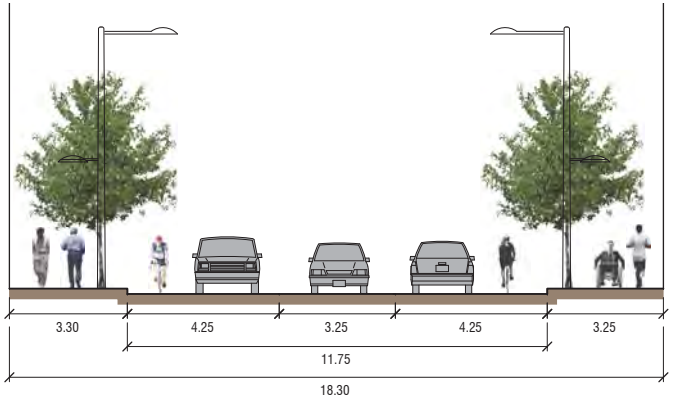
Optional Solution for Downtown Neighbourhood Applications

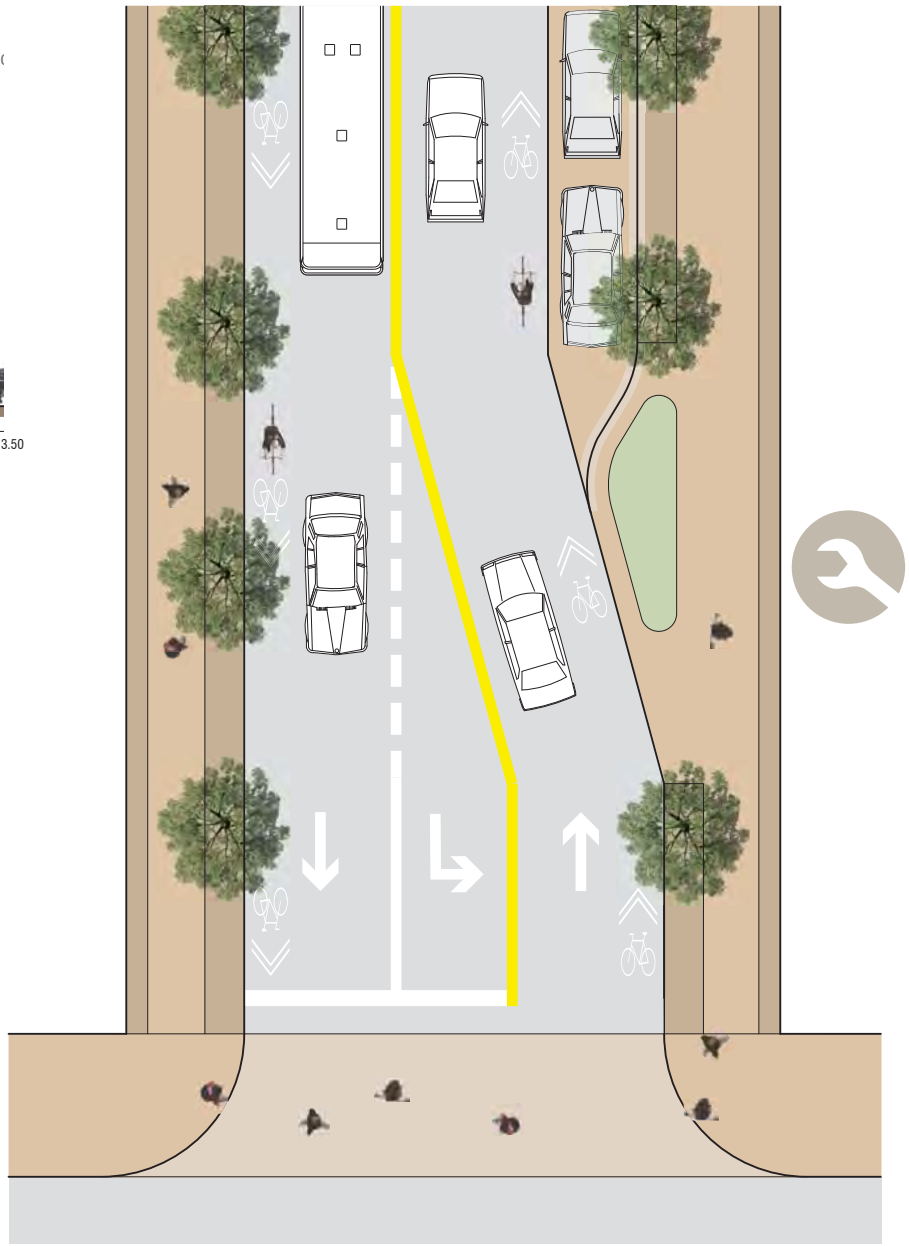
Mid-Block



Optional Solution for D(Bus Platforms

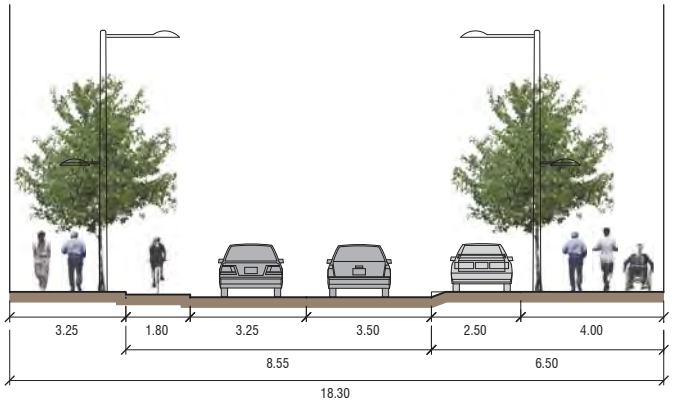
At Corner



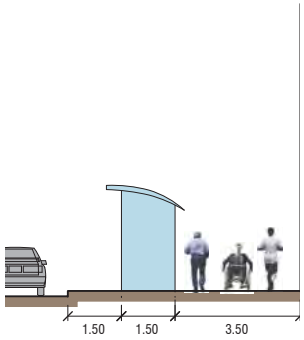


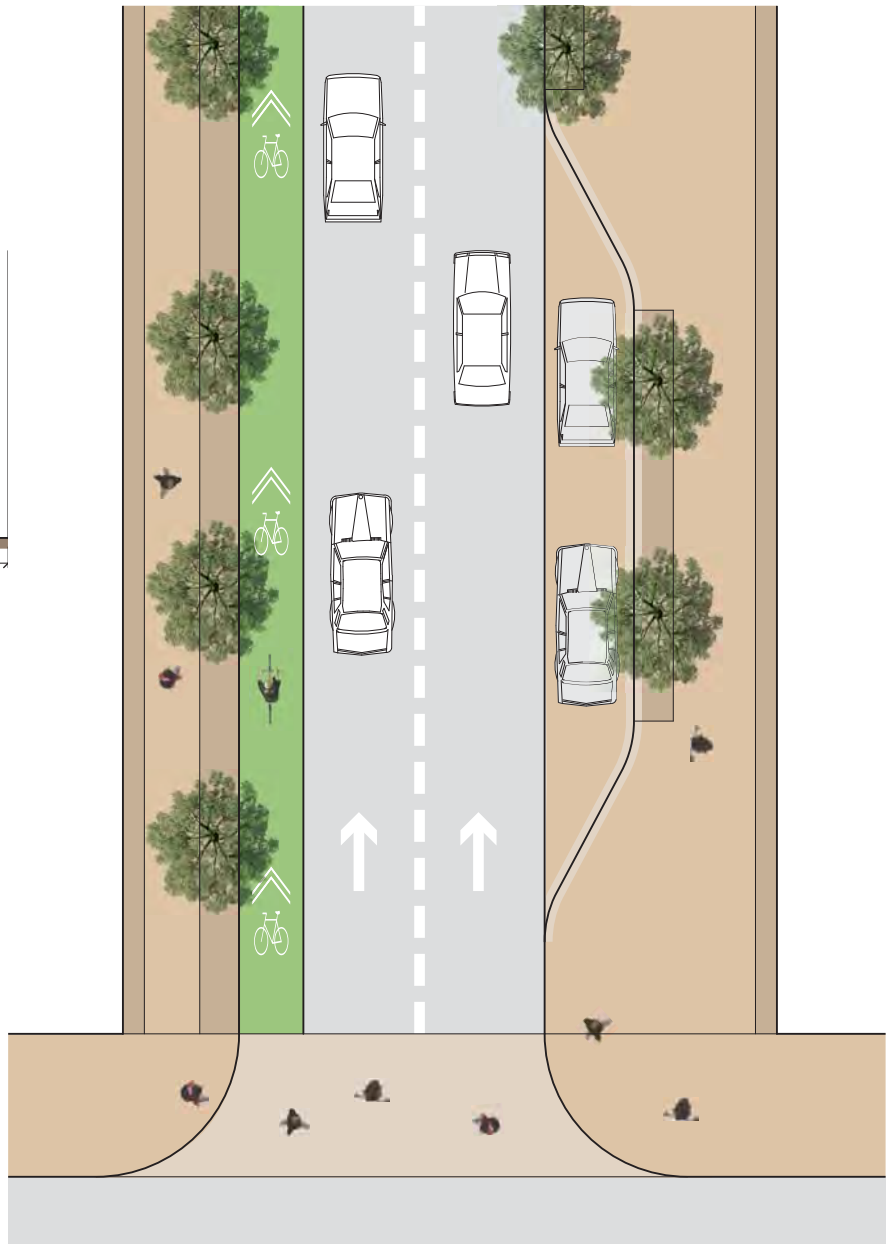
Type D1

One-Way
Two Vehicle Lanes, One Cycling Lane
Parking One Side



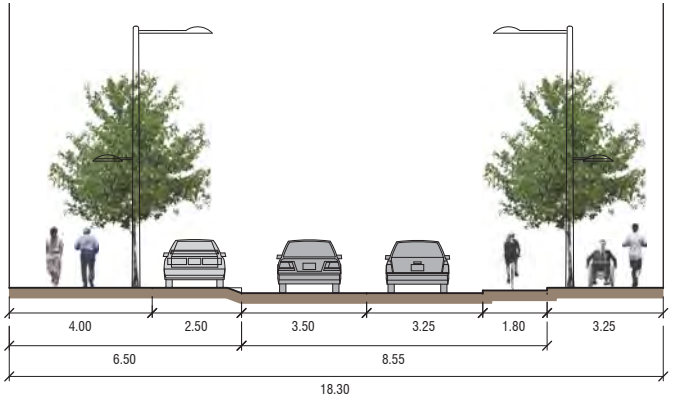
Optional Solution for Downtown
Bus Platforms

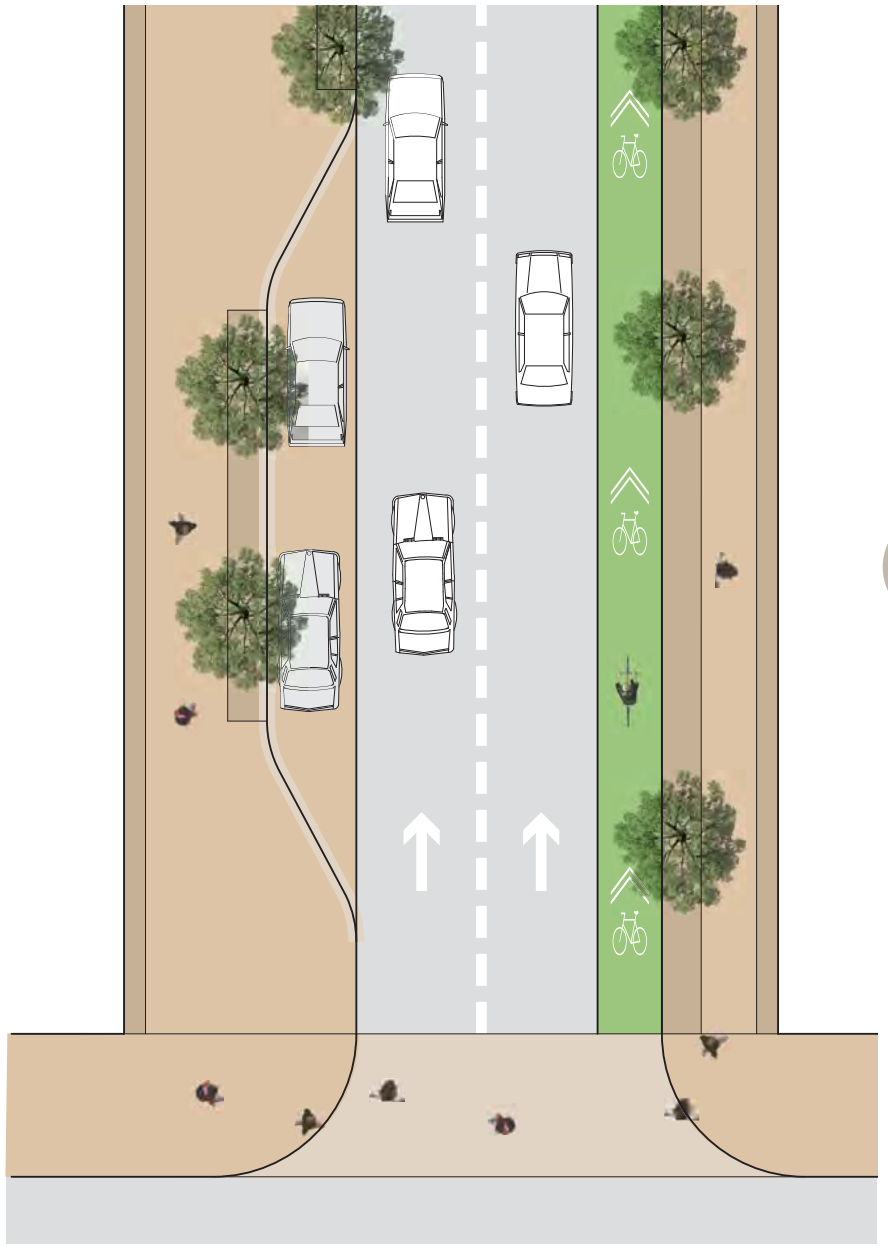




Type D2

One-Way
Two Vehicle Lanes, One Cycling Lane
Parking One Side

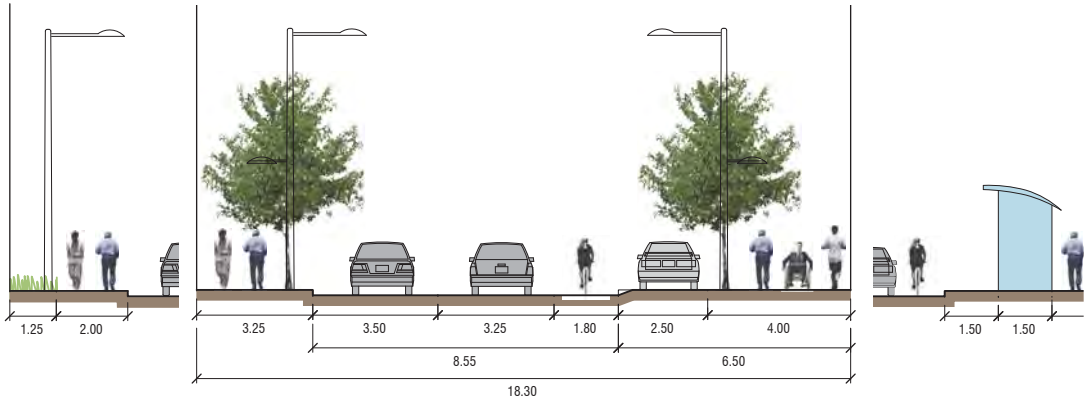




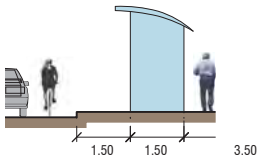
Type D3

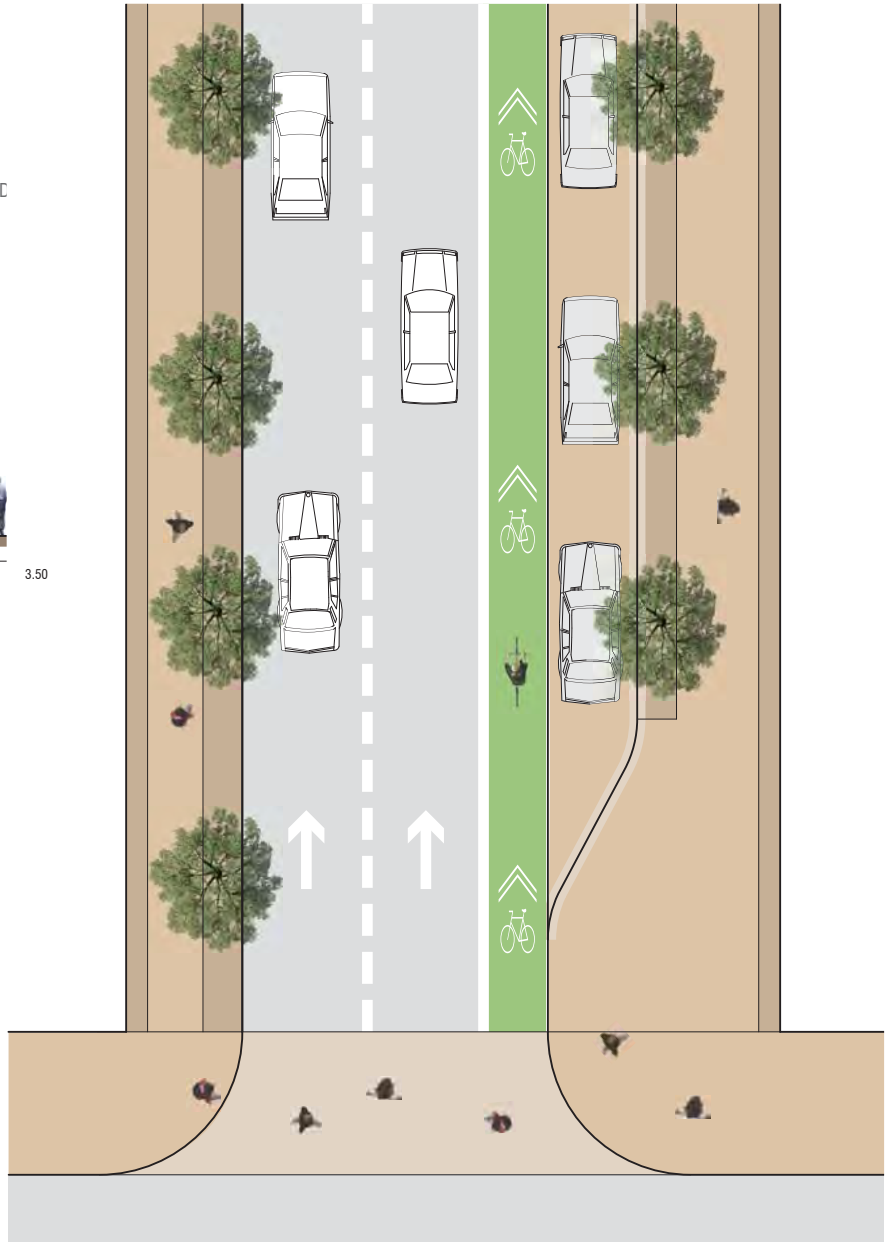
One-Way
Two Vehicle Lanes, One Cycling Lane
Parking One Side

Optional Solution for Downtown Neighbourhood Applications



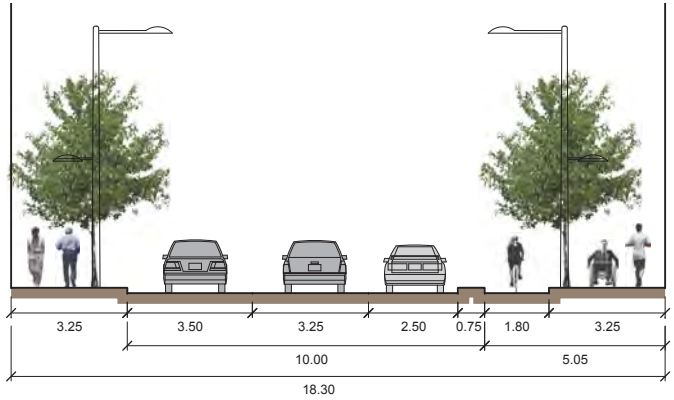
Optional Solution for D Bus Platforms

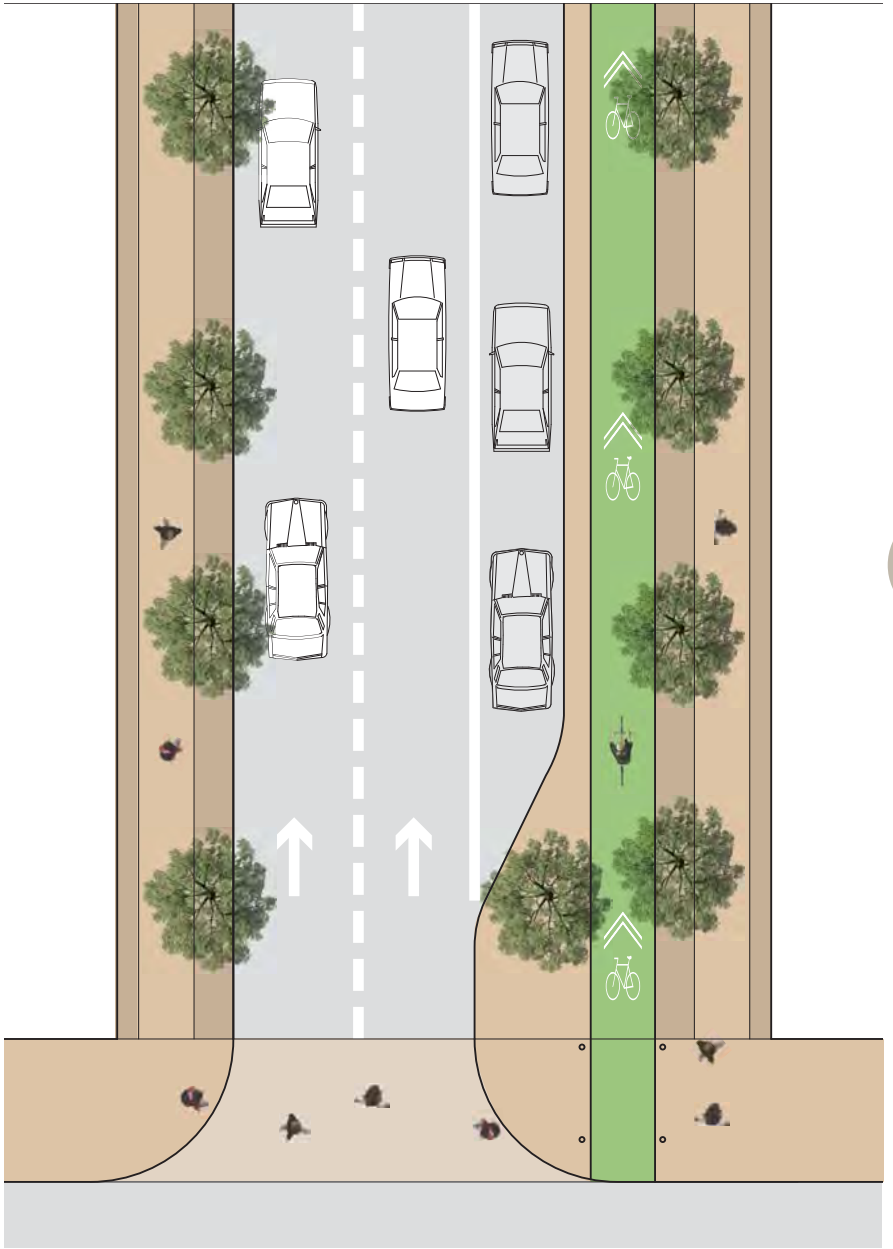




Type D4

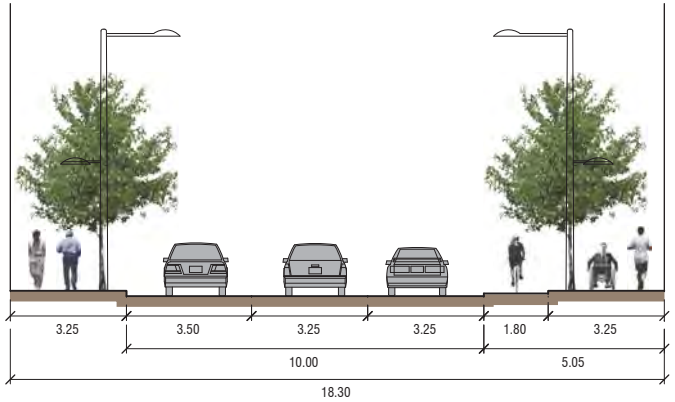
One-Way
Two Vehicle Lanes, One Cycling Lane
Parking One Side

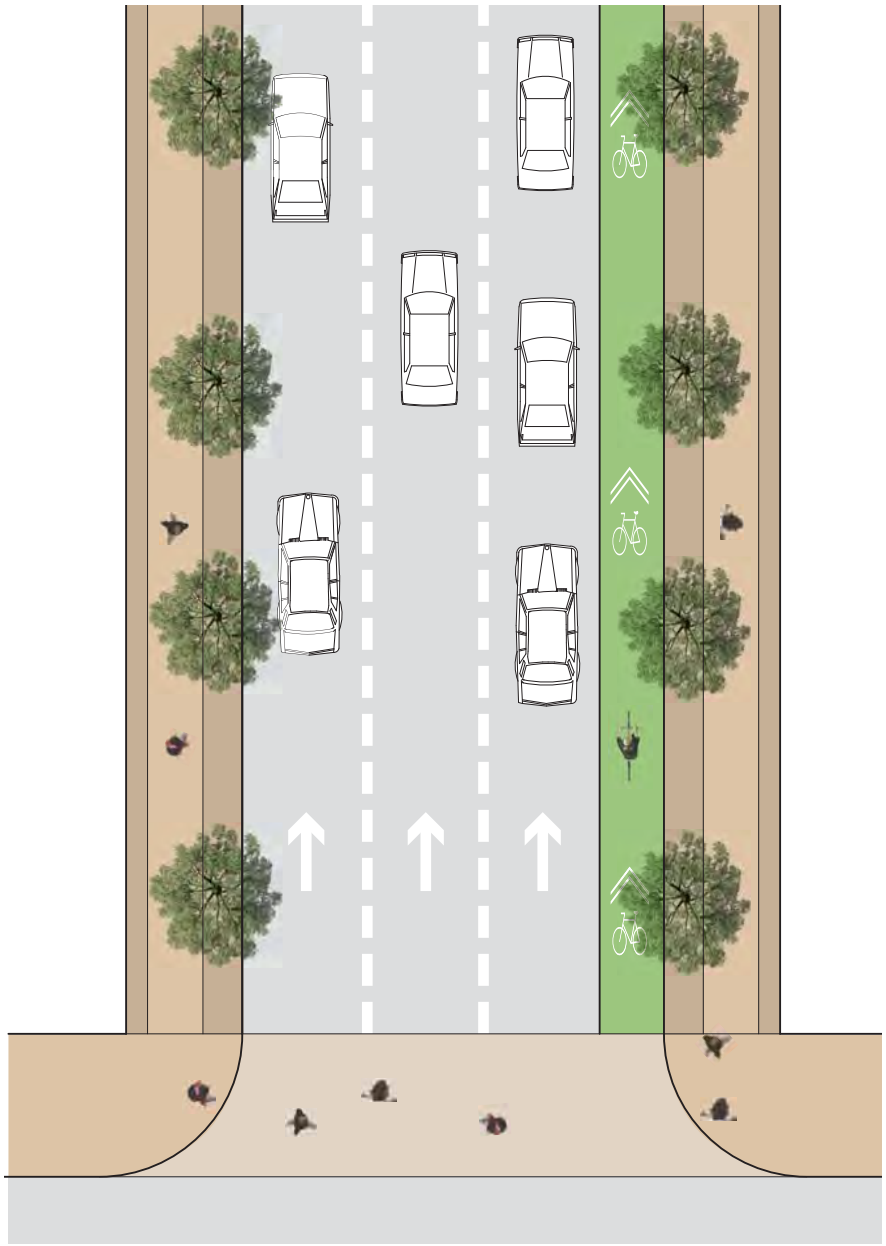




Type D5

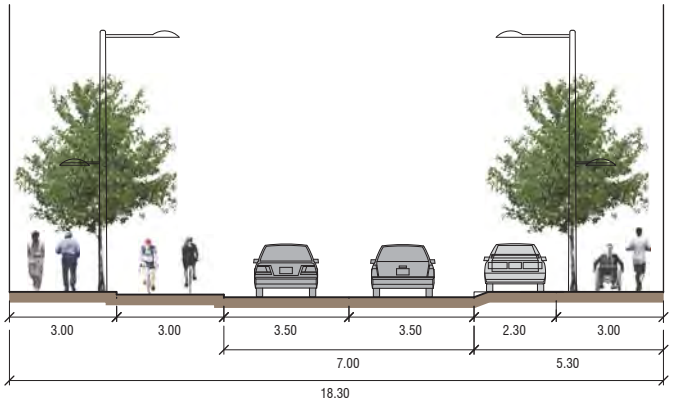
One-Way
Three Vehicle Lanes, One Cycling Lane
Off-Peak Period Parking One Side



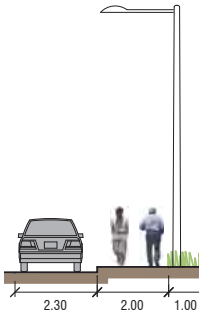


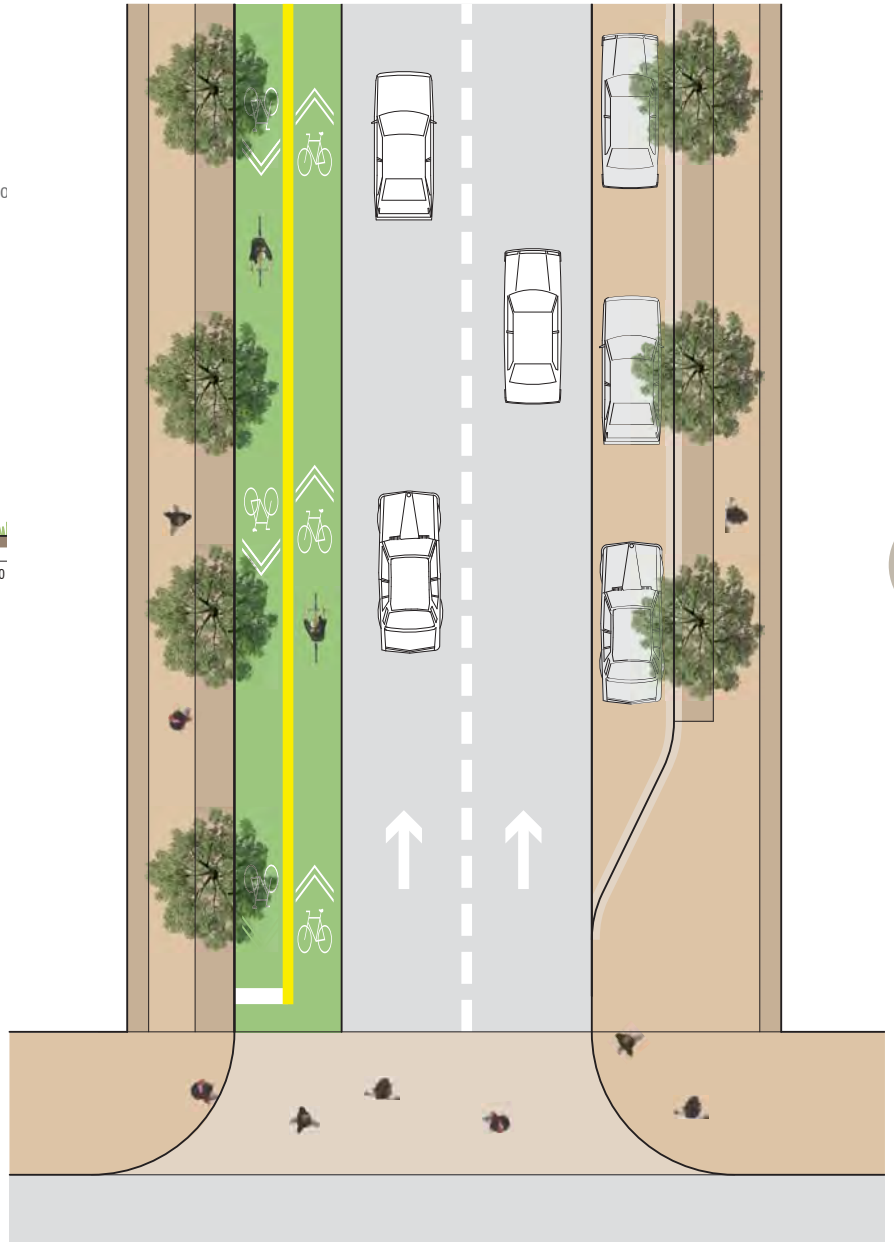
Type E

Two-Way
Two Vehicle Lanes, Bi-Directional Cycling Lane
Parking One Side



Optional Solution for
Downtown Neighbourho
Applications





Type F

Alternating
Two Vehicle Lanes, Bi-Directional Cycling Lane
Parking One Side

Optional Solution for Downtown Neighbourhood Applications