

**Revised
DI1.5**

TORONTO ON-STREET BIKEWAY DESIGN GUIDE



Toronto Accessibility Advisory Committee Meeting
April 11th, 2019



Purpose of today's meeting

- Agenda
 - Review of key chapters and content related to accessibility
 - Outline next steps
 - Open discussion of any topics
- Describe key topics in the guide and how accessibility has been integrated into design guidance
- Respond to questions and obtain feedback

Purpose of the guide

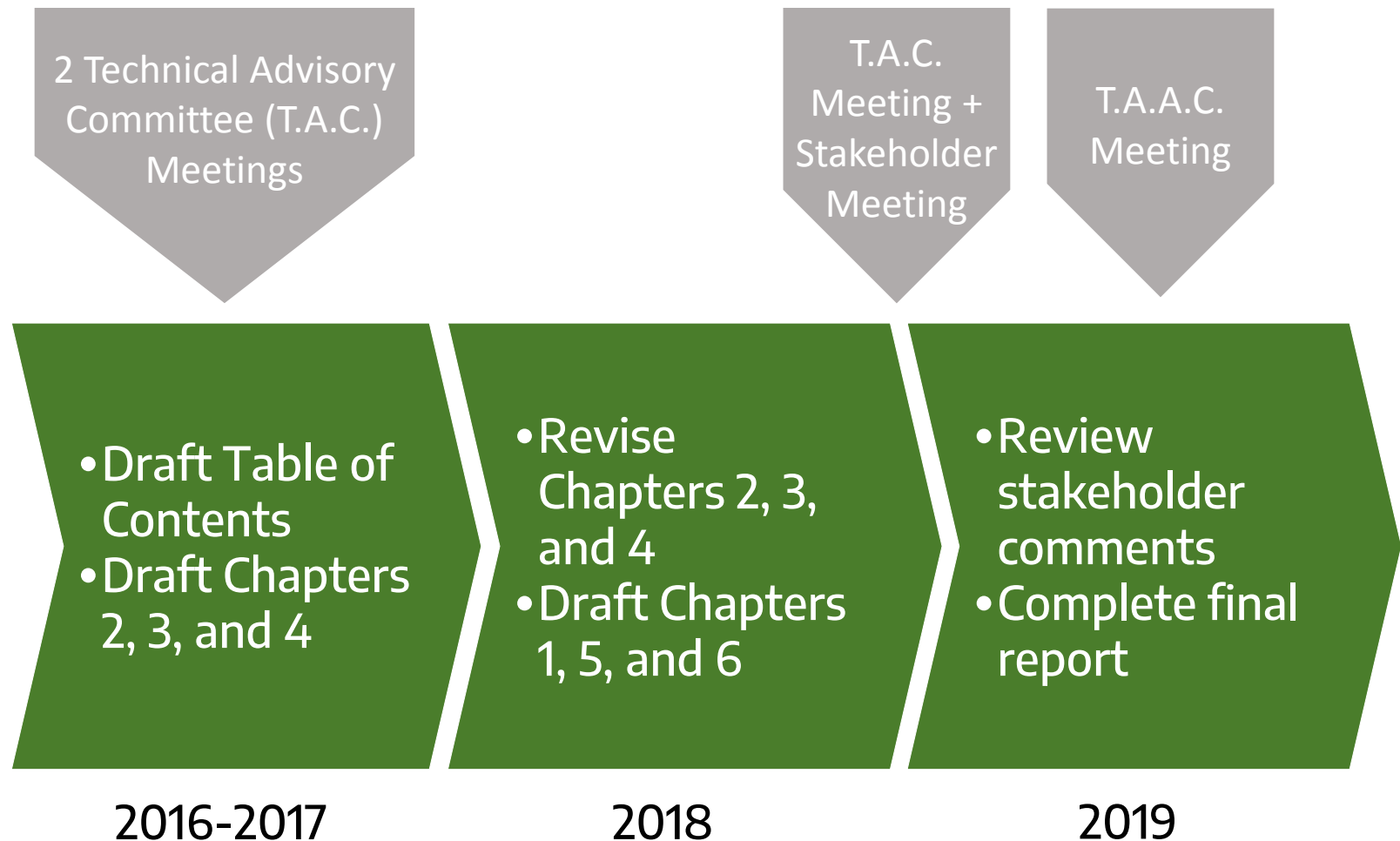
The guide has been written for:

- Designers, planners, engineers, and other practitioners, who may be involved in the development of cycling infrastructure in the City of Toronto
- Interested stakeholders
- Designing and delivering projects included within the 2016 Council approved 10-Year Cycling Network Plan

This guide is intended to lead to:

- Better design outcomes
- Consistency in design
- More efficiency in facility selection and design implementation

Project history



Internal City/agency engagement

- 3rd Technical Advisory Committee (T.A.C.) meeting was held on December 13th, 2018
- City of Toronto divisions and agencies in T.A.C.:
 - Transportation Services (Road Operations, Traffic Operations, Signal Operations, & Public Realm)
 - Solid Waste Management Services
 - Toronto Transit Commission / WheelTrans
 - Engineering and Construction Services
 - City Planning (Transportation Planning & Urban Design)
 - City Managers/Accessibility Office
 - Emergency Medical Services
 - Toronto Fire

Key themes from T.A.C.:

- Street cleaning and snow clearing for different curb types
- WheelTrans midblock pick-up and drop-off points along cycle tracks
- Effects to signal timing at intersections with setback crossings
- Effects to sightlines and blindspots for bus operators at intersections with setback crossings

Accessibility recommendations from external stakeholders

- Accessibility considerations for cyclists of All Ages and Abilities (A.A.A.) need to be intuitive and strongly supported throughout the Guide.
 - Update the “Design Cyclist” to include persons with physical disabilities or impairment that operate a non-standard cycle
 - Diagrams should include additional accessibility features
- Cycling facilities must not inhibit pedestrians, including those with visual impairments from safely navigating:
 - The sidewalk
 - Transit stops
 - Pick-up and drop-off locations
 - Intersection and midblock crossings



1.0 INTRODUCTION

TORONTO ON-STREET BIKEWAY DESIGN GUIDE

1.0

Introduction

Chapter contents

1.1 How to use this guide

1.2 What informed this guide

1.1

How to use this guide

- Chapter 1 provides background information
- Chapter 2 outlines key principles on design and informs practitioners on how to select an appropriate facility
- Chapter 3 and 4 provide design guidance on mid-block facilities and intersections
- Chapter 5 provides guidance on the design and operation of bicycle signals
- Chapter 6 outlines the planning and design process



2.0 PRINCIPLES OF FACILITY SELECTION AND DESIGN

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2.0 Principles of facility selection and design

Chapter contents

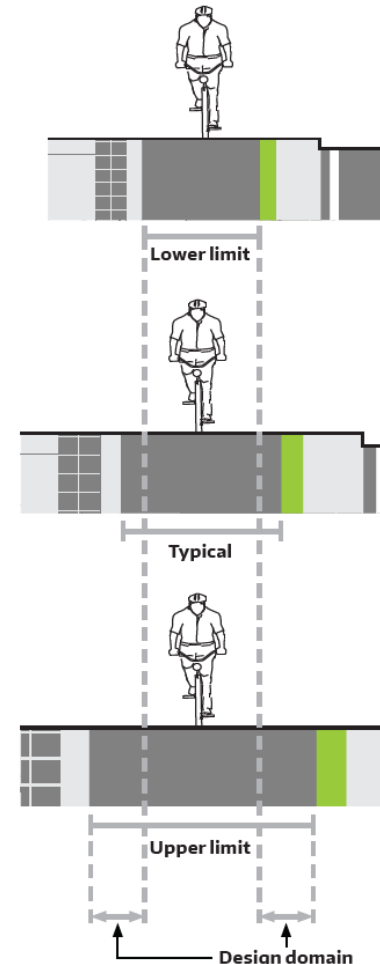
- 2.1 Design principles (related to accessibility)
- 2.2 The “design cyclist” (related to accessibility)
- 2.3 Design domain
- 2.4 Facility selection

2.1

Design principles and design domain

Principles for well-designed facilities:

- Prioritize safety
- Make cycling a comfortable experience
- Build complete streets
- Consider road operations and City services
- Use funding efficiently

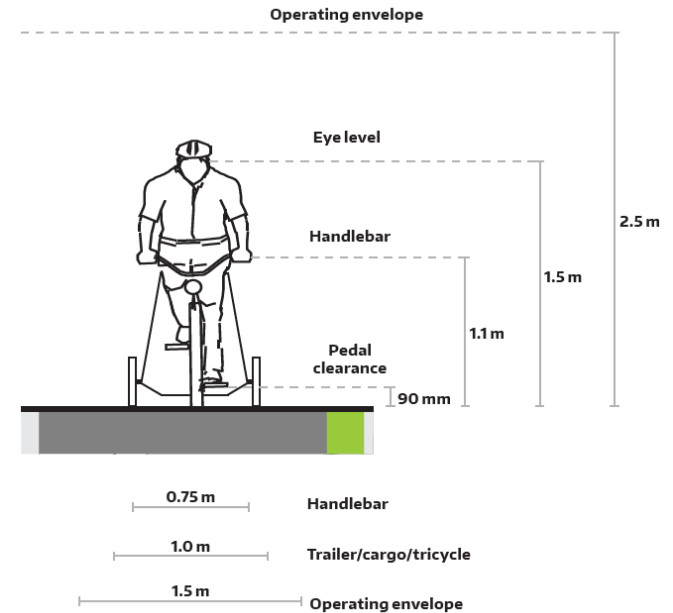


Design Domain Concept

2.2

Design cyclist

- Cycling facilities in Toronto should be designed for:
 - A child cyclist
 - A senior citizen
 - An individual who is learning to cycle
 - An individual riding a loaded cargo bike
 - A recreational cyclist
 - A cyclist who relies on a bicycle as their primary mode of transportation
 - A visitor or newcomer to Toronto
 - An individual with physical impairments or disabilities who operates a non-standard cycle



Cyclist Operating Envelope



Tricyclist on Hoskin Ave Bike Lane



3.0 FACILITY DESIGN

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3.0

Facility design

Chapter contents

3.1 Cycle tracks: one-way / two-way operation, separation techniques, curbside activity (related to accessibility)

3.2 Designated bicycle lanes: conventional design, buffered design, contraflow operation, curbside activity (related to accessibility)

3.3 Shared streets: advisory bicycle lanes, neighbourhood greenways, speed and volume management

3.4 Cycling-friendly streets



Wheel-Trans Rider Crossing Bloor Cycle Track to Reach Vehicle

Cycle tracks: bicycle/pedestrian separation techniques

Pedestrian considerations informed by Accessibility for Ontarians with Disabilities Act (A.O.D.A.) Build Environmental Standard and the City of Toronto Accessibility Design Guidelines.

Separation techniques:

- Semi-mountable and barrier curbs where cycle track is different elevation from sidewalk
- 600 mm of visually contrasting and cane detectable unit pavers where cycle track is same elevation as sidewalk
- Green lines on cycle track edge
- Street trees, street furniture, planting strips, bicycle parking, and bike share
- Railings where cyclist encroachment is probable



Cane detectable unit pavers between sidewalk and sidewalk-level cycle track



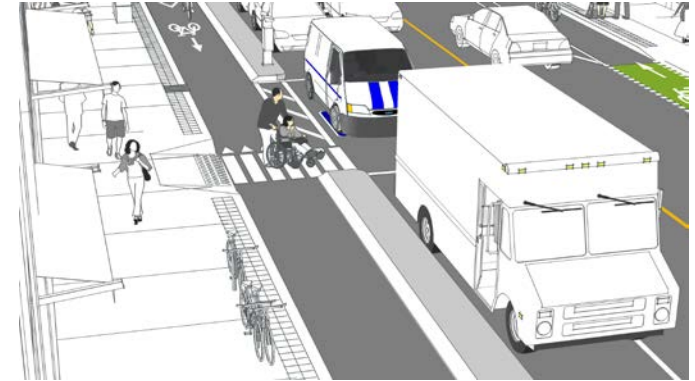
Planted median as separation technique between sidewalk and cycle track

3.1.6

Cycle tracks: curbside activity

Designed to follow City's Curbside Management Strategy

- Parking/loading laybys
- 1.0 m door zone
- 1.5 m marked pedestrian crossings across cycle tracks for accessibility at loading/unloading (includes signage and yield pavement markings)
- 1.0 m buffer widths for snow storage
- Not compatible with automated collection arms



A wheel-trans rider crossing a cycle track at an access aisle to align a wheel trans vehicle parked at the curb



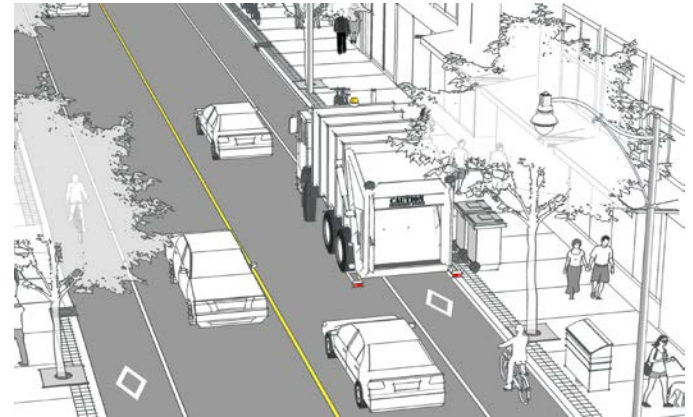
A delivery truck using a layby

3.1.6

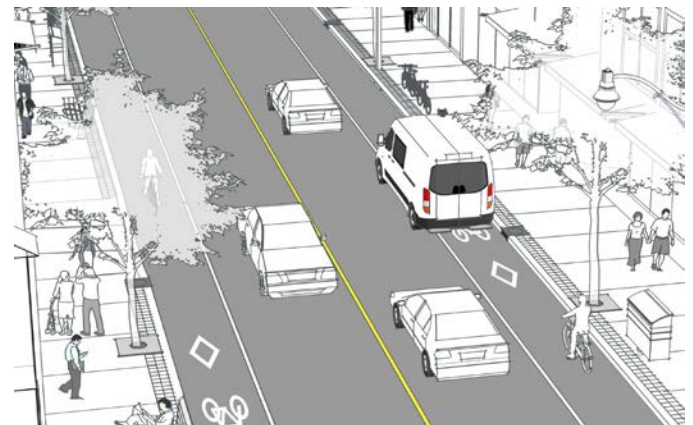
Bicycle lanes: curbside activity

Generally more flexible than for cycle tracks because there is no physical separation

- Compatible with collection trucks
- Snow clearing pushed to sidewalk
- Commercial loading, stopping, and parking are restricted in bike lanes
- Taxi and accessible vehicle pick-up/drop-off allowed
- Authorized vehicle stopping allowed
- Enforcement is required



A waste collection truck operating in the bicycle lane



An accessible taxi stopped in a bicycle lane to allow passengers to board/alight



4.0 INTERSECTIONS, BARRIERS, AND TRANSITIONS

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4.0 Intersections, barriers, and transitions

Chapter contents

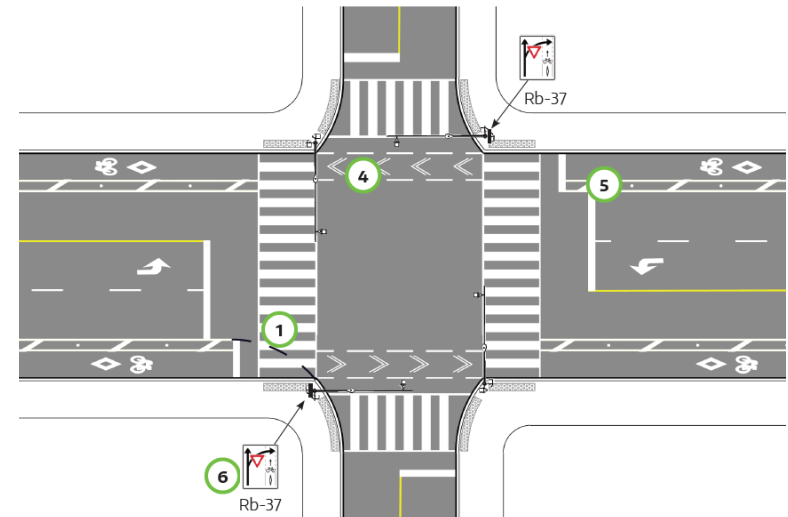
- 4.1 Intersection design principles
- 4.2 Intersection design concepts (related to accessibility)
- 4.3 Intersections for in-boulevard facilities (related to accessibility)
- 4.4 Bicycle left turns
- 4.5 Transit stops (related to accessibility)
- 4.6 Crossings of major streets
- 4.7 Offset intersections
- 4.8 Driveways and side streets
- 4.9 Transitioning between facility types
- 4.10 Facility introduction and discontinuation
- 4.11 Streetcar tracks
- 4.12 Rail crossings
- 4.13 Highway interchanges
- 4.14 Overpasses and underpasses

4.2

Intersection design concepts

Option A: Separation with adjacent crossing

- Cycling facility crosses through intersection adjacent to the nearest travel lane
- Physical separation up to where corner radius begins is preferred



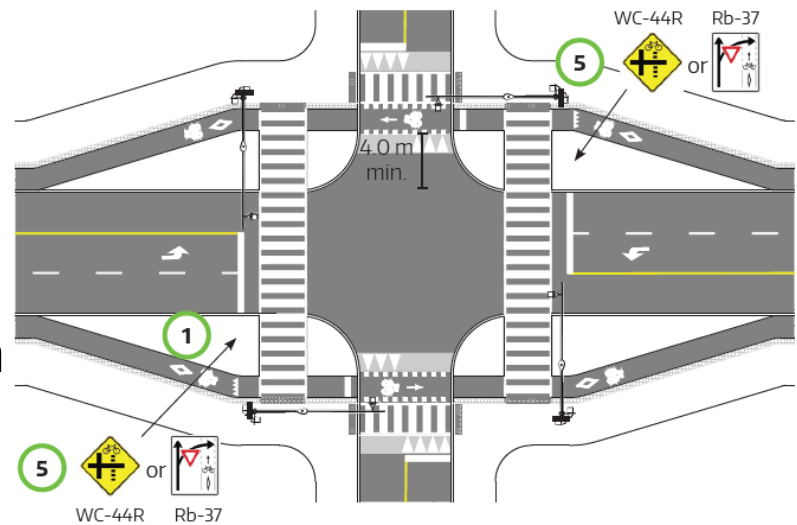
Bicycle crossing adjacent to motor vehicle travel lane

4.2

Intersection design concepts

Option B: Separation with setback crossing

- Cycling facility crosses through intersection at location set at least 4.0 m back from the adjacent parallel travel lane
- Results in setback pedestrian crossing
- Requires significantly more space than other options
- Often requires construction
- Accessible Pedestrian Signals (A.P.S.) located on sidewalk
- Pedestrian signal timing based on sidewalk to sidewalk crossing distance

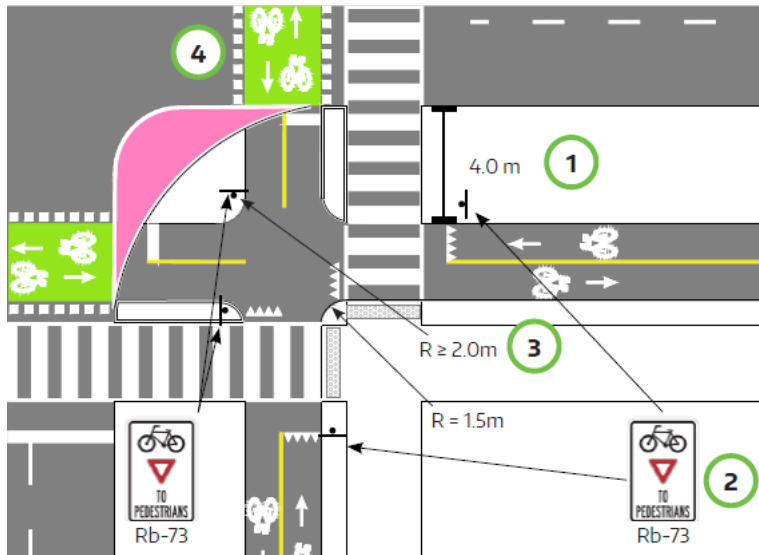


Bicycle crossing setback from motor vehicle travel lane

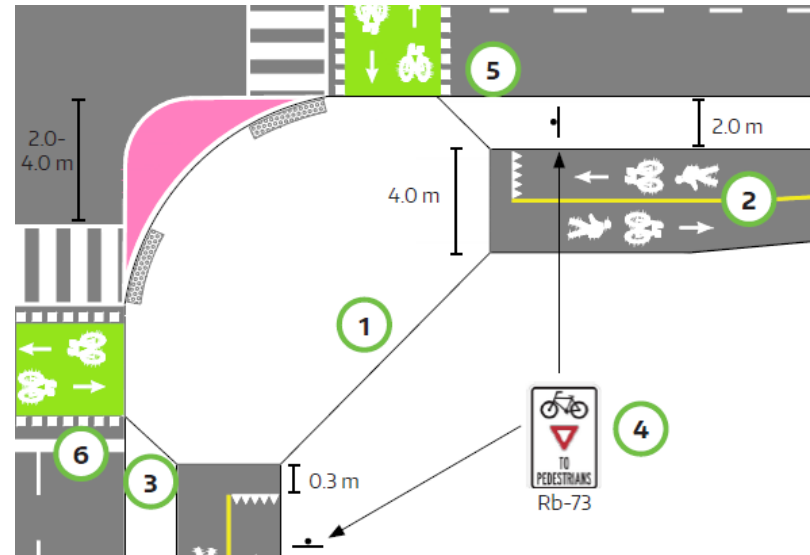
4.3 Intersections for in-boulevard facilities

Intersecting multi-use trails or in-boulevard facilities that are more than 1.0 m from the adjacent travel or parking lane.

Separated space



Shared space



4.5

Transit stops

Curbside Transit Option A:
Boulevard island stop



Curbside Transit Option B:
Integrated cycle track platform



Curbside Transit Option C:
Shared space stop



Curbside Transit Option D:
Bus bay stop



Centre-Running Transit Option E:
Centre median stop



Centre-Running Transit Option F:
In-road streetcar





5.0 BICYCLE SIGNALS

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5.0

Bicycle signals

Chapter contents

5.1 Regulation and planning

5.2 Signal operation (related to accessibility)

5.3 Signal heads

5.4 Detection and actuation

5.5 Special applications

5.2 Signal operation: protected phasing



Left: Hornby St at Georgia St (Vancouver, BC)



Top Right: Cherry St at Eastern Ave (Toronto)



Bottom Right: Hoskin Ave at Queen's Park Cres (Toronto)



6.0 PROCESS

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6.0

Process

Chapter contents

6.1 Implementation approaches

6.2 Planning process (related to accessibility)

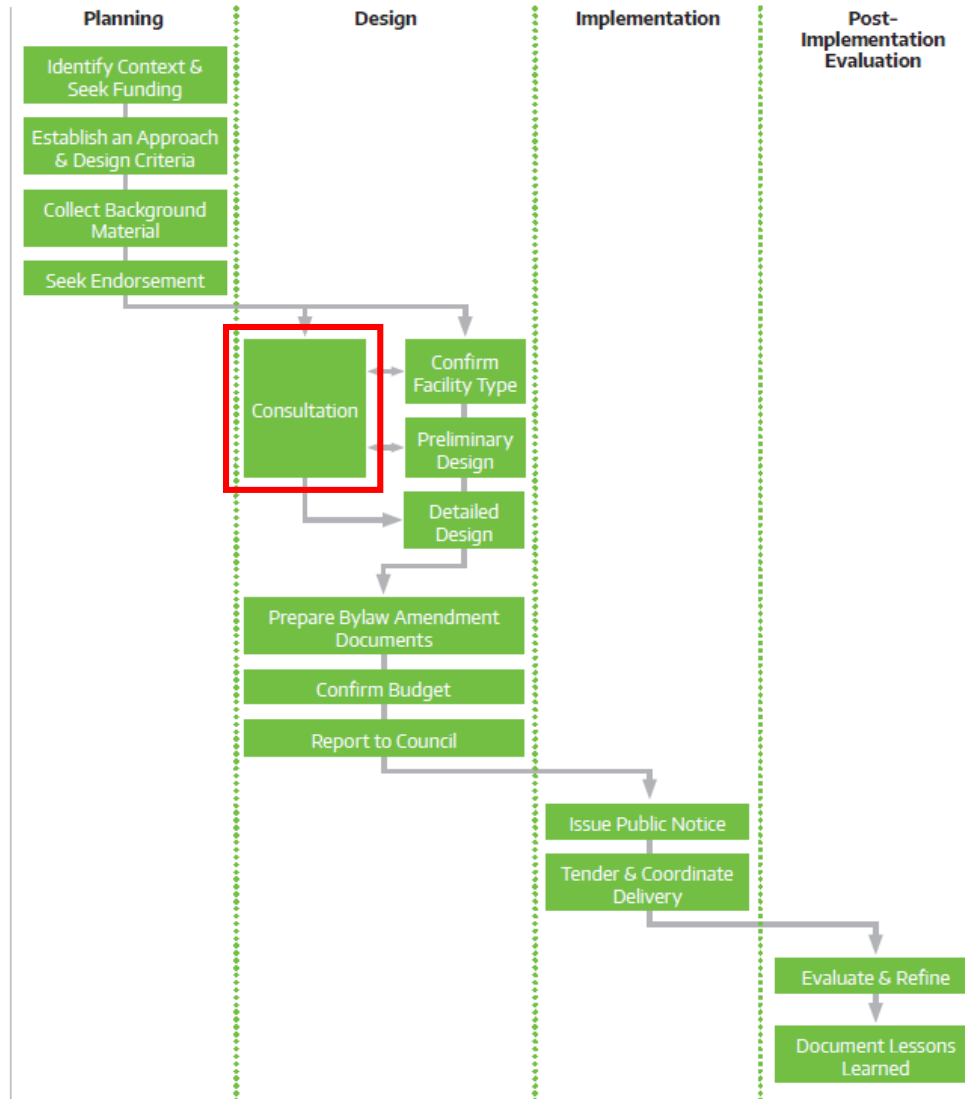
6.3 Design process

6.4 Implementation process

6.5 Post implementation evaluation process

6.2

Planning process



The typical cycling facility planning, design, implementation and evaluation process

6.2

Planning process

City departments and external stakeholders	Typical trigger for involvement	Typical project role
Engineering & Construction Services (E.C.S.)	Project is tendered through E.C.S.	Design input, cost estimates, and delivery
Emergency Services	Project affects motor vehicle clearway width and curbside management	Design input and drawing review
Operations & Maintenance – Transportation Services	Project affects roadway signage, road operations, or road maintenance	Design input and drawing review
Parks, Forestry, & Recreation (P.F.&R.)	Project is tendered through P.F.&R. or involves land operated and managed by P.F.&R or connects to a multi-use trail	Design input and delivery
Project Design & Development – Transportation Services	Project affects pedestrian clearway	Design input, drawing review, and delivery
Toronto Transit Commission (T.T.C.)	Project is on T.T.C. route, detour route, or adjacent to T.T.C. station	Design input, drawing review, and delivery
Traffic Management – Transportation Services	Project affects traffic operations	Traffic operation design input and approval
Toronto Parking Authority (T.P.A.)	Project affects permit or paid on-street parking or affects the operation of T.P.A.-owned property	Parking audit and design input
Toronto Accessibility Advisory Committee	Project affects pedestrian accessibility	Design input and drawing review on larger scope projects (such as corridor reviews and where necessary)



DISCUSSION AND QUESTIONS

TORONTO ON-STREET BIKEWAY DESIGN GUIDE



Questions

- What are the greatest challenges with cycling facilities today that committee members are aware of?
- What are some of the most effective design treatments that have been used to mitigate these concerns elsewhere?

Next steps

- Prepare appendices
- Integrate input from T.A.C., external stakeholders, Accessibility Advisory Committee, and project team into the guide
- Follow-up on key topics as needed
- Finalize (Spring 2019)