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A REVIEW OF PUBLIC RIGHT-OF-WAY ACCESSIBILITY EXPERIENCES IN CANADA

Technical Liaison Committee
Canadian Institute of Transportation Engineers

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A Review of Public Right-of-way Accessibility Experiences

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PREFACE AND ACKNOWLEDGEMENTS

A Review of Public Right-of-way Accessibility Experiences was developed, compiled, drafted and reviewed by a Technical Liaison Committee, a multidisciplinary steering committee of Active Members and Advisors.

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1.0 Introduction

1.1 Background

Presently there are no Canadian accessibility design guidelines that transportation/traffic engineers, road designers, planners and practitioners can reference when designing accessible public transportation infrastructure. Numerous municipal and provincial government organizations across Canada have been developing their own set of accessible standards and guidelines for pedestrian facilities in the public right-of-way. As a result, there is a need to review the standards and guidelines currently being used by Canadian municipalities and ministries with respect to accessible road infrastructure, and to determine whether there is an opportunity to develop uniform Canadian guidelines and standards.

A committee of professional individuals with transportation and traffic engineering backgrounds was formed to review the existing transportation accessibility design standards. This committee developed and distributed a survey to collect data and capture feedback from both municipal and provincial organizations and people with disabilities in Canada.

The committee compiled the collected data and information, and through careful review and analyses of survey results and research on transportation infrastructure accessibility facilities, the committee members were able to highlight commonalities and differences between accessibility design guidelines and standards between municipalities and jurisdictions in Canada.

1.2 Study Objectives

This report describes the study undertaken by the committee to analyze public right-of-way accessibility design guidelines and standards used throughout Canada. The study objectives were to:

- Provide a clear understanding of the various provincial and federal accessibility regulations/legislations currently in place in Canada.
- Provide a synthesis of the experience to-date in Canada related to the design of pedestrian facilities that optimizes accessibility for people with disabilities.
- Identify accessible design elements for which there are discrepancies in their usage and that would benefit from standardization.

- Use the results of this study to provide recommendations as to whether there is an opportunity for the development of Canadian national guidelines.

1.3 Organization of the Report

The report was organized in chronological order to describe the following key items completed by the committee:

- Review of accessibility legislation/regulation: this review provided an overview of the accessibility legislation/regulation currently in place on the provincial and federal level.
- Review of design guidelines/policies/standards: the type of guideline/manual and standard documents developed and used within each province and territory were researched to determine the facilities prescribed when designing accessible pedestrian facilities in the public right-of-way. The committee also determined whether there is uniformity or consensus throughout the guidelines.
- Accessibility experience in Canada: response and feedback obtained through surveys, distributed to municipalities and people with disabilities were analyzed to gain an understanding of the guidelines/standards used across the country. Experiences related to those guidelines were collected to obtain an understanding of the ease in which people with disabilities use public infrastructure.

2.0 Review of Accessibility Legislation/Regulation

2.1 Overview of the Practices in Canada

There is currently no federal legislation that regulates the standards for designing accessible pedestrian facilities within the public right-of-way. Some provinces have decided to adopt an accessibility act, similar to the Americans with Disabilities Act implemented in the United States, which provides a legal framework that establishes the accessibility standards that public and private sector organizations must comply with when constructing or altering facilities intended to be used by individuals with disabilities.

Table 1 below provides a summary of accessibility legislation/regulation that has been adopted by each province and territory, the year of adoption, and whether the legislation/regulation includes standards for the design of pedestrian facilities in the public right-of-way. Legislation-specific standards for the design of accessible pedestrian facilities in the public right-of-way have been adopted by four provinces in Canada.

Table 1: Accessibility Legislation/Regulation: Canadian Provinces and Territories

Province	Legislation/Regulation in Place	Year of Adoption	Standards for the design of pedestrian facilities in the public right-of-way
Alberta	No legislation in place	n/a	No
British Columbia	Legislation in place	2014	No
Manitoba	Legislation in place	2013	No
New Brunswick	No legislation in place	n/a	No
Newfoundland and Labrador	No legislation in place	n/a	No
Northwest Territories	No legislation in place	n/a	No
Nova Scotia	Legislation in place	2017	No
Nunavut	No legislation in place	n/a	No
Ontario	Legislation in place	2005	Yes
Prince Edward Island	No legislation in place	n/a	No

Province	Legislation/Regulation in Place	Year of Adoption	Standards for the design of pedestrian facilities in the public right-of-way
Quebec	No legislation in place	n/a	No
Saskatchewan	No legislation in place	n/a	No
Yukon	No legislation in place	n/a	No

As displayed in the above table, nine (9) out of the 13 province and territories have not adopted any accessibility legislation/regulation, four (4) provinces have adopted accessibility legislation/regulation, and Ontario is the only province that currently has a legal and regulatory framework in-place which outlines the minimum standards for the design of pedestrian facilities in the public right-of-way.

An overview of the accessibility legislation/regulations that have been adopted by the four provinces is provided in the sections below.

2.2 Provincial Practices

2.2.1 British Columbia

In June 2014, the Provincial Government of British Columbia launched Accessibility 2024, a 10-year action plan that provides the framework for the implementation of transportation infrastructure that is accessible to all British Columbians [1]. The provincial government supports initiatives that improve accessibility for seniors and people with disabilities. No provincial legislation had been adopted at the time this report was written which outlines the minimum standards for the design of accessible pedestrian facilities in the public right-of-way.

2.2.2 Manitoba

The Accessibility for Manitobans Act (AMA) became law when it was passed by the Provincial Government of Manitoba on December 2013. Manitoba is committed to develop mandatory accessibility standards under this legislation. Similar to the Accessibility for Ontarians with Disabilities Act (AODA), the standards focus on five key areas including customer service, information and communication, transportation, employment, and the built environment. Manitoba has committed to achieve significant progress in developing design standards for accessible transportation infrastructure by 2023 [2].

2.2.3 Nova Scotia

The Accessibility Act of the Province of Nova Scotia, known as Bill 59, passed third reading in the Nova Scotia Legislature on April 27th, 2017 and received Royal Assent on April 28th, 2017. This Act provides the framework for creating guidelines, policies and standards for designing an accessible built-environment [3].

The Accessibility Act was created to achieve accessibility in the Province of Nova Scotia by removing barriers to ensure that all people have the ability to participate fully in their communities.

The Nova Scotia Department of Justice finalized the province's first Accessibility Act within one year of the act being implemented. The Department of Justice intends to adopt an implementation strategy to achieve the goal of an accessible Nova Scotia by 2030 [4].

2.2.4 Ontario

The Ontario Government adopted the Accessibility for Ontarians with Disabilities Act (AODA) in 2005 with the objective to make the province accessible by 2025 [5]. Five accessibility standards are identified in the AODA that business, organizations, and municipalities are required to follow:

- Customer service standard,
- Information and communication standard,
- Employment standard,
- Transportation standard, and
- Design of public spaces standard.

The above standards have been consolidated into the Integrated Accessibility Standards Regulation (IASR) under Ontario Regulation 191/11¹: Integrated Accessibility Standards. Design standards for pedestrian facilities in the public right-of-way are included in the Design of Public Spaces Standard (Accessibility standards for the built environment), under the Exterior Paths of Travel section of Ontario Regulation 191/11. The release of the Design of Public Spaces (DOPS) Standard was issued in 2012. The requirements under the Exterior Paths of Travel do not apply to barrier-free design requirements within buildings as they have been regulated through Ontario's Building Code since 1975. Rather, they apply to newly constructed and redeveloped exterior paths of travel that are outdoor sidewalks or walkways designed and constructed for pedestrian travel

¹ Note that the latest amendment of the Integrated Accessibility Standards is Ontario Regulations 165/16

and are intended to serve a functional purpose and not to provide a recreational experience [6].

The accessibility features covered by the AODA for the design of pedestrian facilities in the public right-of-way are for elements including sidewalks, walkways, ramps, stairs and curb ramps and depressed curbs. For each accessibility element, the minimum width, slope and head clearance that must be met are provided. Requirements for accessible pedestrian signals are also provided, which include locator tone, proximity to edge of curb, tactile push-button arrows, mounting height distance, capacity for both manual and automatic activation, and audible and vibro-tactile walk indicators.

3.0 Review of Design Guidelines/Policies/Standards

In this chapter, Section 3.1 provides an overview of the guidelines and standards, if any, used and developed within each province and territory when designing accessible pedestrian facilities in the public right-of-way.

Section 3.2 provides a summary and comparison of specifications for key design elements including curb ramps, exterior paths of travel, and accessible pedestrian signals (APS) from the various guidelines and standards.

3.1 Overview of the Practices in Canada

3.1.1 Alberta

The Province of Alberta has not adopted accessible standards for pedestrian facilities in the public right-of-way. Based on our research, only the City of Calgary appears to have adopted accessibility design standards specifically for pedestrian design elements located in the public realm. In 2015, the City of Calgary produced the *Access Design Standards*, which are intended to be a complement to the Alberta Building Code [7]. These standards must be incorporated into the design and construction of all new buildings constructed on City-owned land, as well as on City renovation projects.

In Edmonton, standards for accessibility are included in the *Barrier-Free Design Guide*. The *Barrier-Free Design Guide* provides a minimum standard for accessibility [8]. To further promote the concepts of Universal Design in City projects, the City of Edmonton, through their Accessibility Advisory Committee, recently developed the *Checklist for Accessibility & Universal Design*, which primarily focuses on the design of interior building elements and spaces immediately adjacent to buildings [9].

3.1.2 British Columbia

In 2014, the Province of British Columbia adopted Accessibility 2024, a 10-year action plan to incorporate accessible infrastructure into new and existing public facilities. As of yet no provincial standards for design have been adopted [1].

All municipalities in British Columbia must adhere to design standards outlined in the *Master Municipal Construction Documents* (MMCD) [10]. As such, design guidelines for public facilities developed by a municipality would act as a supplement to the MMCD. It does not appear that many municipalities in British Columbia have developed their own accessibility design guidelines. The guidelines that do exist provide limited details and often contain no recommendations for key accessibility design features. The Ministry of Transportation and Infrastructure of British Columbia (MoTI) recently published

an updated Standard Specifications for Highway Construction which provides standards for several accessibility design elements. Table 2 provides a list of guidelines produced by municipalities in British Columbia that were found and reviewed as part of this project.

Table 2: List of Reviewed Municipal Accessibility Guidelines – Province of British Columbia

Road Authority	Document Name	Date of Issue
City of Kelowna	Guidelines for Accessibility in Outdoor Spaces [11]	2003
City of Vancouver	Accessible Street Design [12]	n/a
MoTI SSHC	2016 Standard Specifications for Highway Construction [13]	2016

3.1.3 Manitoba

While the Province of Manitoba adopted the Accessibility for Manitobans Act (AMA) in 2013, actual standards are still under development. Few municipalities within the province have existing policies regarding the accessibility of public facilities. A search of available documents yielded the *Accessibility Design Standard*, which was published by the City of Winnipeg in 2015 [14]. The guideline includes standards for both the design of buildings as well as the design of pedestrian facilities in the public right-of-way.

3.1.4 Nova Scotia

The Provincial Government of Nova Scotia is working towards developing formal guidelines, policies and standards for designing a built environment that is accessible to each person in the province since the passing and adoption of the Nova Scotia Accessibility Act in April 2017. There are currently no formal provincial-level accessibility design standards or guidelines.

Design staff of the Provincial Government of Nova Scotia have consulted with representatives from the Canadian National Institute for the Blind in regard to the design of sidewalk ramps at intersections and roundabouts. Staff reference La Route Verte documents with respect to active trails, utilize the Canadian Standards Association Technical Standard Accessible Design for the Built Environment (CAN/CSA B651-04) with respect to buildings, and refer to the Transportation Association of Canada Design Guidelines with respect to the design of pedestrian facilities in the public right-of-way.

In early 2016, the Regional Municipality of Halifax had mandated within their Municipal Design Guidelines the width of the travelled portion of walkways and details regarding the installation of pedestrian ramps. Also in 2016 Halifax had established an Accessible Pedestrian Signal program and a municipal Accessibility Advisory Committee, whose role is to advise Halifax Regional Council on matters regarding accessibility [15].

3.1.5 Ontario

Through the AODA, Ontario has developed provincial accessibility design standards for pedestrian facilities in the public right-of-way. These standards are included in the *Integrated Accessibility Standards* (Regulation 191/11) [6]. While the AODA was enacted in 2005, the IASR was not enacted until 2011. Our review of the various accessibility guidelines indicates that the standards developed on the municipal level tend to be more stringent and to exceed the minimum standards of the provincial regulation. However, it is important to mention that some guidelines developed prior to the release of the IASR do not meet IASR requirements. It is anticipated that these municipalities will work towards updating their guidelines or standards to meet or exceed requirements in the IASR.

Although not an exhaustive list of Ontario municipalities that may have developed accessibility guidelines, Table 3 provides a list of guidelines that were found and reviewed as part of this project.

Table 3: List of Reviewed Municipal Accessibility Guidelines – Province of Ontario

Road Authority	Document Name	Date of Issue
Town of Ajax	Facility Accessibility Design Standards [16]	2007
City of Brampton	Accessibility Technical Standards [17]	2005
City of Brantford	2010 Facility Accessibility Design Standards [18]	2010
City of Guelph	Facility Accessibility Design Manual [19]	2015
City of Kingston	Facility Accessibility Design Standards [20]	2009
City of Kitchener	Accessibility Standards for the Built Environment [21]	2017

Road Authority	Document Name	Date of Issue
Town of Oakville	Oakville Universal Design Standards [22]	2015
City of Ottawa	Accessibility Design Standards [23]	2012
City of Peterborough	Final Proposed Accessible Built Environment Standard [24]	2010
City of Toronto	Accessibility Design Guidelines [25]	2016 (Draft)
City of Waterloo	City of Waterloo Accessibility Standards [26]	2016

3.1.6 Quebec

In Quebec, accessibility standards on a provincial-level have been developed strictly to govern the use of Accessibility Pedestrian Signals. For other pedestrian design elements, accessibility guidelines can be found either in documents produced by municipalities or local organizations/associations.

Our research and review of municipal guidelines indicates that large municipalities have developed their own guidelines on universal accessibility. No guidelines were retrieved for small- to medium-sized municipalities. The guidelines include concepts and standards related to the design of buildings as well as standards related to the design of pedestrian facilities in the public right-of-way. The amount of guidance included in the municipal guidelines varies substantially among municipalities. Some manuals provide guidance only for a limited number of accessibility design elements. In some cases, there are no recommendations related to key accessibility design elements such as tactile indicators.

With regards to accessibility guidelines produced by local organizations/associations, some documents such as the one developed by the *Institut Nazareth et Louis-Braille* provides guidance specifically for the design of accessible pedestrian facilities in the public right-of-way, including sidewalks, walkways, bike lanes, and curb ramps.

Table 4 provides a list of the guidelines produced by municipalities and local organizations in Quebec that were found and reviewed as part of this project.

Table 4: List of the Reviewed Accessibility Guidelines – Province of Quebec

Road Authority / Organizations	Document Name	Date of Issue
Gatineau	Fiches-Conseils Accessibilité Universelle [27]	n/a
Laval	Guide normatif d'accessibilité universelle [28]	2013
Quebec City	Guide pratique d'accessibilité universelle [29]	2010
Institut Nazareth et Louis-Braille	Critères d'accessibilité universelle déficience visuelle – Aménagements extérieurs [30]	2014

3.1.7 Provinces without Guidelines/Policies/Standards (Newfoundland and Labrador/NB/PEI)

It does not appear that municipalities in the provinces of New Brunswick, Newfoundland and Labrador, or Prince Edward Island have developed their own standards/policies/guidelines. Municipalities are referring to barrier free regulation and the National Building Code (NBC). While these regulations and standards may provide requirements for some pedestrian treatments (i.e. walkways, ramps, etc.), the standards apply to elements within a site, and not within the public right-of-way.

3.1.8 National Guidelines

National-level guidance for accessibility design elements is included in the Canadian Standards Association Standard B651-12, *Accessible Design for the Built Environment* (CSA B651-12) [31]. Currently the CSA B651-12 is recognized as a voluntary national built environment standard for Canada. Although this document contains requirements for exterior pedestrian facilities such as curb ramps and walkways, the requirements for some treatments (i.e. accessible pedestrian signals, signage, and wayfinding) that transportation practitioners could rely upon when designing accessible road infrastructure are not explicitly presented. Note that most design guidelines developed by various municipalities across Canada reference the CSA B651-12.

The Transportation Association of Canada Design Guidelines - Chapter 6 – Pedestrian Integrated Design provides updated design guidelines for pedestrian facilities, including guidelines for accessible pedestrian facilities such as

clearance distances, cross slopes, and curb let-downs [32]. Vertical alignment guidelines for accessibility are not given.

3.1.9 Findings

The current accessible guidelines being used by Canadian jurisdictions reveal that the types of guidelines and manuals on accessibility available to jurisdictions greatly vary among provinces and territories. While some municipalities and provinces have guidelines and standards to which local practitioners have access, the majority of provinces, territories and municipalities have not yet developed their own accessibility guidelines or standards.

3.2 Accessibility Design Elements

3.2.1 Overview

Using the various guidelines identified in the previous section, a comparison of the accessibility standards for key design elements was conducted. The key design elements selected for this comparison analysis were curb ramps, exterior path of travels (walkway/sidewalk), and accessible pedestrian signals. The brief comparison analysis of the accessibility standards used in each province is provided below. Note that for the provinces for which one accessibility design document was retrieved, they were grouped together (i.e. Alberta, Manitoba, and national level guidelines).

3.2.2 Curb Ramps

British Columbia

Limited guidance on the design of curb ramps is provided in the accessibility guidelines produced by municipalities in British Columbia. Note that in the two documents reviewed there was no guidance for tactile walking surface indicators (i.e., truncated domes), which are becoming common practice in the provinces of Manitoba, Ontario, and Quebec.

Table 5 provides a summary of the design guidance for curb ramps from various accessibility guidelines developed by municipalities in British Columbia.

Table 5: Summary of Design Guidelines for Curb Ramps – British Columbia

Road Authority	Clear width	Running slope	Cross slope	Slope of the flared side	Tactile features
City of Kelowna [11]	Minimum clear width of 1,200 mm	Maximum 1:10	N/A	N/A	<ul style="list-style-type: none"> Series of parallel grooves 610 mm long, perpendicular to roadway 1.5 m wide color/brightness contrasted 1.5 m strip along curb
City of Vancouver [12]	N/A	Maximum 8%	N/A	N/A	N/A
MoTI SSHC [13]	1,800mm (or as directed) 1,200mm minimum	Maximum 1:12 (8.33%)	2%	1:10 (10%) for diagonal and perpendicular ramps; 1:12 to 1:20 for parallel ramps.	Score lines in concrete (surface markings) or detectable warning mats

Ontario

In reviewing accessibility guidelines that were issued after the release of the Design of Public Spaces (DOPS) Standard in 2012, the design elements for curb ramps generally meet or exceed those stated in the DOPS Standard. However, there continues to be variation in terms of the requirements; for example, the requirements for running slope vary from 1:8 maximum to 1:10 maximum. Some guidelines are also much more prescriptive with their requirements, such as differentiation between requirements for paved surfaces versus unpaved surfaces.

There also continues to be confusion in terms of the placement for tactile walking surface indicators. The DOPS Standard requires that the tactile walking surface indicators (TWSI) be placed 150 mm to 200 mm from the curb edge [6]. Some municipalities have interpreted "curb edge" to mean the face of curb, whereas other municipalities have interpreted the same phrase to mean back of curb. These two different interpretations result in TWSI's either being installed with a 150 mm to 200 mm gap between the back of curb and the front edge of the TWSI, or being installed with the front edge of the TWSI directly abutting the back of curb. Table 6 provides a summary of the design guidance for curb ramps from various accessibility guidelines developed by the Province of Ontario and Ontarian municipalities.

Table 6: Summary of Design Guidelines for Curb Ramps - Ontario

Road Authority	Clear width	Running slope	Cross slope	Slope of the flared side	Tactile features
IASR [6]	Minimum clear width of 1,200 mm exclusive of any flared sides	<ul style="list-style-type: none"> • Maximum of 1:8, where elevation is less than 75 mm • Maximum of 1:10, where elevation is 75 mm or greater and 200 mm or less 	Not steeper than 1:50	Not steeper than 1:10	<ul style="list-style-type: none"> • Have raised tactile profiles • Have high tonal contrast with the adjacent surface • Located at the bottom of the curb ramp • Set back between 150 mm and 200 mm from the curb edge • Extend the full width of the curb ramp • Are a minimum of 610 mm in depth.
City of Kitchener [21]	Minimum clear width of 1.2 m, exclusive of flared sides	• N/A	• N/A	N/A	<ul style="list-style-type: none"> • Have raised tactile profiles • Have high tonal contrast with the adjacent surface • Located at the bottom portion of the depressed curb that is flush with the roadway • Are set back between 150 mm and 200 mm from the curb edge • Are a minimum 610 mm in depth
Town of Oakville [22]	1500 mm (minimum) exclusive of return curbs	<ul style="list-style-type: none"> • Maximum of 1:10 (10%) • Counter slope of gutters and road surfaces immediately adjacent to the bottom of the curb ramp max 1:20 (5%) 	<ul style="list-style-type: none"> • 1:50 (2%) on paved surface • 1:20 (5%) on unpaved surface • Maximum difference between curb ramp and all surrounding surfaces must not be more than 10% 	1:10	<ul style="list-style-type: none"> • TWSI must meet requirements ion ISO 23599:2012 • Have colour / tonal contrast from adjoining surfaces • Be detectable when walked upon by being difference in texture from adjoining surfaces • Extend the entire width of the curb ramp • Be set back between 150 mm and 200 mm from back of curb • Be a minimum 600 mm in depth
City of Ottawa [23]	1500 mm (minimum) with minimum transition area of 1,500 mm in diameter at the top and bottom of the curb ramp	<ul style="list-style-type: none"> • 1:20 (5%) preferred or 1:12 (8% maximum) • For blended transitions provide 1:20 (5%) maximum 	<ul style="list-style-type: none"> • 1:50 (2%) maximum at intersections and 1:20 (5%) at mid-block crossings 	Maximum 1:20 (5%) Provide width of 1000 mm minimum	<ul style="list-style-type: none"> • Provide TWSI on all curb ramps and blended transitions; • Install 150 to 200 mm back from the front edge of the curb ramp • Ensure surface depth of 600 - 650 mm, extending full width of curb ramp or transition area
City of Toronto [25]	1500 mm minimum, exclusive of flared sides	<ul style="list-style-type: none"> • Max slope of 1:8, for elevation change <75 mm • Max slope of 1:10, for elevation change between 75 and 200 mm 	• No more than 1:50	No steeper than 1:10	<ul style="list-style-type: none"> • Located at the bottom of depressed curb, that's flush with vehicle pathway • Setback 150-200 mm from curb edge • Min. depth of 610 mm and extend for full width of curb • Colour/tonal contrast

Quebec

The level of guidance included in the accessibility guidelines produced by municipalities in Quebec for the design of curb ramps varies significantly among municipalities. For example, the City of Gatineau and Quebec manuals provide guidance for only one design element, while the City of Laval provides guidance on clear width, running slope and slope of the flared side.

When comparing specific design elements, substantial inconsistencies can be observed. The City of Gatineau recommends a minimum clear width of 1,500 mm and the City of Laval a minimum clear width of 1,100 mm. Similar observations can be made with the slope of the flared side, where Quebec City allows for a steeper slope for flared sides than Laval, 12.5% and 8% respectively. With regards to tactile features, only the most recent manual, published by the Institut Nazareth et Louis-Braille, contains any guidance on this element.

Table 7 provides a summary of the design guidance for curb ramps included in the accessibility design manuals produced by municipalities in the province of Quebec.

Table 7: Summary of the Design Guidelines for Curb Ramps – Province of Quebec

Road Authority	Clear width	Running slope	Cross slope	Slope of the flared side	Tactile features
Gatineau [27]	1,500 mm minimum	N/A	N/A	N/A	N/A
Laval [28]	1,100 mm	1:12 (8%) maximum	N/A	1:12 (8%) maximum	N/A
Quebec City [29]	N/A	N/A	N/A	1:8 (12.5%) maximum	N/A
Institut Nazareth et Louis-Braille [30]	1,200 mm at the top of the ramp and 1,800 mm at the bottom of the ramp	1:12 (8%) maximum	2% maximum	1:10 (10%) maximum	<ul style="list-style-type: none"> • Have raised tactile profiles • Have high tonal contrast with the adjacent surface • Located at the bottom of the curb ramp and extend until its height is 13 mm above the road surface • 600 mm width • Install 150 mm back from the front edge of the curb ramp

Other Provinces and National Guidelines

The main differences between the accessibility standards related to curb ramps published by the City of Winnipeg and the City of Calgary are as follows:

- Running slope requirements: the City of Winnipeg allows for a maximum running slope of 2 to 5% for curb ramps while the City of Calgary allows for a running slope that does not exceed 8% [14] [7].
- Type of tactile features to be installed at curb ramps: the City of Winnipeg indicates that truncated domes are to be installed at curb ramps, while the City of Calgary indicates that a series of tooled grooves be installed [14] [7].

When comparing the accessibility standards developed by municipalities to the CSA B651-12, the standards for clear width and slopes typically exceed the standards of CSA B651-12. With regards to tactile features, the City of Winnipeg is generally consistent with the standards of CSA B651-12. Note that for the placement for tactile walking surface indicators, CSA B651-12 recommends that they be installed 150 to 200 mm from the front edge of the curb, which is consistent with what most Ontarian municipalities have been implementing. No guidelines related to the placement for tactile walking surface indicators were found in the City of Winnipeg accessibility standards.

Another interesting design concept included in CSA B651-12 is that curb ramps should not be continuous around a corner. According to CSA B651-12, these types of curb ramps are “unsafe” for pedestrians, since they lead pedestrians directly into the centre of a vehicular intersection. It also indicates that, where possible, a curb ramp shall be aligned with the curb ramp at the opposite side of the crossing [31].

The new TAC guidelines provide the option of curb ramps that are continuous around a corner or perpendicular to the direction of travel at corners (two curb ramps at each corner) [32].

Table 8 provides a summary of the design guidance for curb ramps included in the accessibility design manuals produced by other provinces and National guidelines.

Table 8: Summary of the Design Guidelines for Curb Ramps – Other Provinces and National Guidelines

Road Authority	Clear width	Running slope	Cross slope	Slope of the flared side	Tactile features
City of Winnipeg [14]	<ul style="list-style-type: none"> Minimum clear width of 1,500 mm, exclusive of flared side Alternate curb ramp may have a reduced sidewalk width at the top of the curb ramp of 1220mm for level maneuvering/turning space 	The ramp slope shall be between 1:50 and 1:20 (2%-5%)	N/A	N/A	<ul style="list-style-type: none"> Truncated dome detectable warning surface, yellow in color, and shall be orientated perpendicular to the direction of the pedestrian crossing At intersections, detectable warning surface shall align directionally with the warning surface and curb ramp across the street to signify the start and end point of a crossing
City of Calgary ² [7]	Minimum clear width of 1,500 mm, exclusive of flared side	1:12 (8%) maximum	N/A	1:12 (8%) maximum	Series of tooled grooves 5 mm wide by 10 mm deep at spacing of 150 mm
CSA B651-12 [31]	Minimum width between 1,200 mm and 1,500 mm	Slope between 1:15 (6.66%) and 1:10 (10%)		Slope between 1:15 (6.66%) and 1:10 (10%)	<ul style="list-style-type: none"> Truncated domes with a height of 5 ± 0.5 mm, a base diameter of 23 ± 2 mm and organized in a regular pattern with spacing of 60 ± 5 mm Be slip resistant Have colour that contrasts at least 70% with the surrounding surface or if yellow 40% Be installed 150 to 200 mm from the back edge of the curb
TAC GDGCR (2017)	Recommended minimum 1,500mm with 900mm as absolute minimum for one-direction wheelchair	Ramp: 1:12 (8.3%) for new, 1:10 (10%) for rehabilitation of existing	2% or less at intersections and 5% or less at midblock crossings	Up to 10%	<ul style="list-style-type: none"> Refers to CSA for examples of tactile walking surface indicators.

² For the design of curb ramps the City of Calgary Design Standards document reference the City Roads Construction Standards Specifications. As a result, the standards included in this table for the City of Calgary were obtained from the 2012 City of Calgary Roads Construction Standards Specifications document.

3.2.3 Exterior Path of Travel (Walkway/Sidewalk)

British Columbia

The level of details provided in the two accessibility guidelines vary substantially. Standards for only the width and the cross-slope of walkways/sidewalks are provided in the City of Vancouver guidelines, while standards for all of the identified design elements related to sidewalks/walkways, except for opening, are provided in the City of Kelowna guidelines. Variation can also be observed when reviewing the standards of specific design elements. For example, the City of Kelowna recommends a minimum clear width of 1,220 mm while the City of Vancouver recommends a minimum clear width of 1,500 mm.

The Ministry of Transportation and Infrastructure of British Columbia sidewalk ramp standard drawings provided in the Standard Specifications for Highway Construction document provides indication of minimum sidewalk dimensions, however; standard design practice is to refer to the TAC Geometric Design Guide for Canadian Roads. Table 9 provides a summary of the design guidance for exterior pathways from various accessibility guidelines developed by municipalities in British Columbia.

Table 9: Summary of Design Guidelines for Exterior Path of Travel – British Columbia

Road Authority	Clear width	Headroom Clearance	Opening	Running Slope	Cross-slope
City of Kelowna [11]	Minimum 1,220 mm	Minimum 2,500 mm	N/A	<ul style="list-style-type: none"> • Less than 1:20 (5%) • Where slope is between 3% to 5% benches and wheelchair resting areas should be provided every 30 m 	Optimum 2%
City of Vancouver [12]	Minimum 1,500 mm	N/A	N/A	N/A	2%
MoTI SSHC [13]	1,800mm (or as directed) 1,200mm minimum	N/A	N/A	N/A	2%

Ontario

When undertaking a comparison of design elements for exterior paths of travel in more recent accessibility guidelines, there is consensus on some design elements but variability on other elements. For example, the guidelines note 5% as the maximum running slope and 2.1 m as the minimum head room clearance. However, the minimum clear width ranges from 1.5 m to 2.1 m; under some circumstances, the IASR and some guidelines allow the clear width to be reduced to 1.2 m. Table 10 provides a summary of the design guidance for exterior paths of travel from various Ontario accessibility guidelines.

Table 10 provides a summary of the design guidance for exterior pathway from various accessibility guidelines developed by municipalities in Ontario.

Table 10: Summary of Design Guidelines for Exterior Path of Travel - Ontario

Road Authority	Clear width	Head room clearance	Opening	Running Slope	Cross-slope
IASR [6]	<ul style="list-style-type: none"> • Minimum clear width of 1,500 mm • Can be reduced to 1,200 mm where there is a curb ramp on the sidewalk 	<ul style="list-style-type: none"> • Optimal clearance is 2,100 mm and a barrier should be placed when the 2,100 mm clearance cannot be achieved 	<ul style="list-style-type: none"> • Maximum of 20 mm • Lengths should be placed at a right angle to the direction of travel 	Less than 5%	<ul style="list-style-type: none"> • Not steeper than 1:20 on paved surfaces • Not steeper than 1:10 on unpaved surfaces
City of Kitchener [20]	<ul style="list-style-type: none"> • Minimum width of 1.5 m • Where there is a curb ramp on the path of travel, the minimum clear width may be reduced to 1.2 m to accommodate the flared sides 	Head room clearance should be a minimum of 2.1 m	<ul style="list-style-type: none"> • The openings shall not have a diameter of more than 13 mm 	Running slope shall be a maximum of 5%	Cross slopes shall be a maximum of 5% where the surface is asphalt, concrete or another hard surface, or no more than 10% in all other cases
Town of Oakville [22]	<ul style="list-style-type: none"> • Min 1500 mm • Where path of travel is less than 1800 mm provide passing areas minimum 1800 mm x 1800 mm, located every 30 m on an accessible path 	<ul style="list-style-type: none"> • Min 2100 mm clear height • Be cane-detectable at or below 680 mm where headroom is less than 2100 mm 	<ul style="list-style-type: none"> • Max 13 mm wide • Longer dimension perpendicular to the dominant direction of travel 	Max 1:20 (5%)	Min 1:50 (2%) but need not exceed the running slope
City of Ottawa [23]	<ul style="list-style-type: none"> • Minimum clear width of 1,800 mm • May be reduced to 1,200 mm with passing spaces of 1,800 mm wide by 2,000 mm long at intervals of 30 metres or less 	Ensure headroom clearance is not less than 2,100 mm	N/A	<ul style="list-style-type: none"> • Maximum 1:20 (5%) or minimum permitted by terrain, unless criteria for exception applies • Where running slope exceeds 1:20 (5%) provide a level rest area at 30 metres for people with limited stamina 	<ul style="list-style-type: none"> • Cross slope of 1:50 (2%) maximum • Where one or more exceptions occur a cross slope of 1:10 (10%) maximum is permitted
City of Toronto [25]	Minimum of 2100 mm	Minimum of 2100 mm for accessible paths of travel	Gratings should be no wider than 13 mm and be perpendicular to the path of travel	Max 1:20 (5%)	Max 1:25 (4%)

Quebec

Except for the design guidelines produced by the City of Laval, there appears to be consistency among municipalities in Quebec with the design guidelines for exterior paths of travel (walkways/sidewalks). Identical guidance is provided by both Quebec City and the City of Gatineau for the various design elements related to exterior paths of travel.

Table 11 provides a summary of the design guidance for exterior paths of travel included in the accessibility design manuals produced by municipalities in the province of Quebec.

Table 11: Summary of Design Guidelines for Exterior Path of Travel – Province of Quebec

Document	Clear width	Head room clearance	Opening	Running Slope	Cross-slope
Gatineau [27]	1,750 mm minimum	1,980 mm minimum	Maximum joint width of 10 mm	1:16 (6%) maximum	2.5% maximum
Laval [28]	1,500 mm minimum	N/A	N/A	Not provided	Not provided
Quebec City [29]	1,750 mm minimum	1,980 mm minimum	Maximum joint width of 10 mm	1:16 (6%) maximum	2.5% maximum
Institut Nazareth et Louis-Braille [30]	1,500 mm minimum	2,030 mm minimum	Maximum joint width of 13 mm	N/A	N/A

Other Provinces and National Guidelines

The minimum clear width of exterior pathways is consistent at 1,500 mm among the City of Winnipeg, City of Calgary and CSA B651-12 guidelines. Consistency among the various accessibility guidelines can be observed with the other design elements, except for head room clearance. For head room clearance, the City of Calgary indicates that overhead design elements shall not extend below 1,980 mm, while the head room clearance requirement of the City of Winnipeg ranges from 2,100 mm to 2,400 mm. CSA B651-12 does not make a distinction between indoor and outdoor head room clearance; the standard notes that the clear head room in pedestrian areas shall be at least 2,050 mm from the floor.

Table 12 provides a summary of the design guidance for exterior paths of travel included in the accessibility design manuals produced by other provinces and National guidelines.

Table 12: Summary of Design Guidelines for Exterior Path of Travel – Other Provinces and National Guidelines

Road Authority	Clear width	Head room clearance	Opening	Running Slope	Cross-slope
City of Winnipeg [13]	Minimum outdoor clear width is 1,500 mm	<ul style="list-style-type: none"> • 2,400mm for traffic signal heads • 2,100mm for transit and traffic control signs 	<ul style="list-style-type: none"> • Maximum clear opening of 10 mm • Grate and inlet cover shall be placed so that the long dimension is perpendicular to the direction of travel 	Longitudinal grade not steeper than 1:20 (5%)	<ul style="list-style-type: none"> • Never steeper than 1:50 (2%) • Where technically not feasible maximum shall never exceed 1:25 (4%)
City of Calgary [7]	Minimum clear width of 1,500 mm	Tree branches and any overhead design elements shall not extend below 1,980 mm above the barrier-free path of travel.	Maximum clear opening of 13 mm	• N/A	• N/A
CSA B651-12 [31]	Minimum clear width of 1,500 mm	Minimum 2,050 mm	Not greater than 13 mm in one direction and be placed so that the long dimension of the opening is perpendicular to the primary direction of travel	Slope with the ratio of 1:12 (8.33%) to 1:20 (5%)	Not steeper than 2%
TAC GDGCR [32]	Minimum clear width of 1,800mm for two-directional pedestrian traffic including wheelchair users; Minimum 1,200mm clear for single direction pedestrian travel including persons using assistive devices.	Minimum 2,100mm	Maximum 10mm for lip of curb on ramps.	N/A	Not steeper than 2%

3.2.4 Accessible Pedestrian Signals

British Columbia

Only the City of Kelowna provides design guidelines for accessible pedestrian signals. Table 13 provides a summary of the design guidance for accessible pedestrian signals from various accessibility guidelines in British Columbia.

Table 13: Summary of Design Guidelines for Accessible Pedestrian Signals – British Columbia

Road Authority	Proximity to curb edge	Mounting Height	Tactile Arrow	Activation	Indicators
City of Kelowna [11]	Within a few meters of the curb	0.8 m above ground	Should be provided	Pedestrian activated push button	10-15 decibels above background noise of crosswalk area
City of Vancouver [12]	N/A	N/A	N/A	N/A	N/A
MoTI SSHC [13]	N/A	1.0 m above ground	Standard sign is tactile	High-visibility, easy-to-push yellow button.	'Chirp-chirp' or 'Cuckoo' audible signals.

Ontario

Some Ontario accessibility guidelines do not touch on accessible pedestrian signals; others are generally in line with the IASR or refer to the Transportation Association of Canada's "*Guideline for Understanding, Use and Implementation of Accessible Pedestrian Signals*".

Table 14 provides a summary of the design guidance for accessible pedestrian signals from various accessibility guidelines in Ontario.

Table 14: Summary of Design Guidelines for Accessible Pedestrian Signals - Ontario

Road Authority	Proximity to curb edge	Mounting height	Tactile Arrow	Activation	Indicators
IASR [6]	1,500 mm	1,100 mm above ground level	Align with the direction of crossing	Manual and automatic activation features	Audible and vibro-tactile walk indicators
City of Kitchener [20]	N/A	N/A	N/A	N/A	N/A
Town of Oakville [22]	N/A	N/A	N/A	N/A	N/A
City of Ottawa ³ [23]	1 m to 3 m	1,100 mm above ground level	Point in a direction parallel to the crosswalk that is controlled by the associated pushbutton	Pushbutton locating tone should operate at all times, except when the APS indications for the associated crosswalk are active	APS (audible and vibrotactile) is to be used as an indication of start of "walk"
City of Toronto [25]	1500 mm max. from back of curb line	Max. height of 1,050 mm	Arrow pointing in direction of travel	Vibro-tactile features should be provided on pushbuttons	Two different audible pedestrian signals, identifying when it is safe to cross either direction, as indicated by a separate tone, should be provided.

Quebec

Limited guidance on the design of APS is provided in the accessibility guidelines produced by municipalities in Quebec. In Quebec, to determine the intersection where accessible pedestrian signals are warranted, practitioners must refer to the Ministry of Transportation design manual⁴.

Table 15 provides a summary of the design guidance for APS included in the accessibility design manuals produced by municipalities in the province of Quebec.

³ Transportation Association of Canada's (TAC) "Guideline for Understanding, Use and Implementation of Accessible Pedestrian Signals"

⁴ Tome 1: Conception routière, 2013, Ministère des Transports, de la mobilité durable et de l'électrification des transports

Table 15: Summary of the Design Guidelines for Accessible Pedestrian Signals – Province of Quebec

Road Authority	Proximity to curb edge	Mounting height	Tactile Arrow	Activation	Indicators
Gatineau [27]	N/A	Button mounted at a height ranging from 1.0 and 1.25 m	N/A	Use of optical button for pedestrians	N/A
Laval [28]	N/A	N/A	N/A	N/A	N/A
Quebec City [29]	Not specified	Button mounted at a height ranging from 1.0 and 1.25 m	N/A	Use of optical button for pedestrians	N/A
Institut Nazareth et Louis-Braille [30]	Within 3,000 mm of the curb edge	Button mounted at a height ranging from 1,070 mm	Arrow pointing in direction of travel may be used	Pushbutton locating tone should operate at all times and the sound intensity must exceed the ambient noise by 2 to 5 dB.	<ul style="list-style-type: none"> • Audible and vibro-tactile walk indicators • Multiple audible pedestrian signals

Other Provinces and National Guidelines

Only the City of Calgary guidelines provide detailed design guidance related to accessible pedestrian signals. The CSA B651-12 reference the Transportation Association of Canada *Guidelines for Understanding, Use and Implementation of Accessible Pedestrian Signals* for guidelines on accessible pedestrian signals.

Table 16 provides a summary of the design guidance for accessible pedestrian signals included in the accessibility design manuals produced by other provinces and National guidelines.

Table 16: Summary of the Design Guidelines for Accessible Pedestrian Signals – Other Provinces and National Guidelines

Road Authority	Proximity to curb edge	Mounting height	Tactile Arrow	Activation	Indicators
City of Winnipeg [13]	<ul style="list-style-type: none"> • 300-500mm from ledge of curb ramp • 800-1500mm from back of curb 	Button mounted at 915mm +/- 25mm above sidewalk grade for approach	N/A	Pedestrian activated push button	N/A
City of Calgary [7]	N/A	1,000 mm to 1,100 mm above the ground	Tactile directional arrows shall be provided near push buttons and located in a standardized location	Push buttons shall have the ability to be activated using any part of the arm or hand	Audible signal posts shall constantly emit a slow, intermittent temporal pattern of sound
CSA B651-12 [31]	N/A	N/A	N/A	N/A	N/A
TAC GDGCR [32]	N/A	N/A	N/A	N/A	N/A

4.0 Jurisdictional Survey

4.1 Overview

For this study, an online survey was developed and distributed across Canada to two main groups, including people with disabilities and transportation practitioners involved in the design, construction, operations and/or maintenance of accessible pedestrian facilities in the public right-of-way. The intention was to gain a better understanding of the following:

- the ease in which people with disabilities use the public infrastructure; and
- the guidelines and standards currently used by transportation practitioners that address the provision of accessible public infrastructure in the public right-of-way; and
- the level of satisfaction with regards to the existing accessibility guidelines and standards that transportation practitioners currently use in their practice.

4.2 Survey Process

4.2.1 Development of Survey

The survey contained two independent sections. The intent was for the first section to be completed by people with reduced mobility. In this section, respondents were asked for their opinion on the challenges they have been experiencing as a person with reduced mobility navigating through the public roadway system. This section contained a total of eleven questions.

The second section of the survey was intended to be completed by transportation practitioners involved in the design, construction, maintenance and/or operations of accessible pedestrian facilities in the public right-of-way. The respondents were asked about the type of accessibility guidelines and standards they use (if any) and whether they provided adequate guidance for the road infrastructure they were required to design, construct, maintain and/or operate.

The survey was developed in both French and English. An initial email was circulated by CITE on January 24, 2016 to all its members. This email included the link to the English survey. To ensure respondents from both official languages were received, a distribution list of municipalities in Quebec was developed, and individual emails were sent to municipalities. The survey was also circulated to various accessibility advisory committees and working groups across the country. Responses were received over a 6-week period spanning from January 24, 2016 to March 7, 2016.

The survey was created and hosted online. It was recorded who completed the survey and the survey results were concisely summarized question by question. The full survey can be found in Appendix A.

4.2.2 Survey Response Summary

In total, 210 responses were received from the survey. Of these completed surveys, 109 people responded to the survey for people with a physical, cognitive or sensory disability, and 91 people responded to the survey of transportation practitioners. Figure 1 provides the distribution by province of the people who responded to the survey. From this Figure, the following can be identified:

- The responses received provided a relatively good representation of the country, where responses from eight of the ten provinces were received. Note that no responses from any of the territories were received.
- Most of the responses (90%) to the survey of people with a physical, cognitive or sensory disability were received from people in three provinces including Ontario (42%), British Columbia (30%) and Quebec (17%).
- The responses to the survey of transportation practitioners were better distributed among provinces, with the top four provinces being Ontario (27%), British Columbia (24%), Quebec (20%) and Alberta (14%).

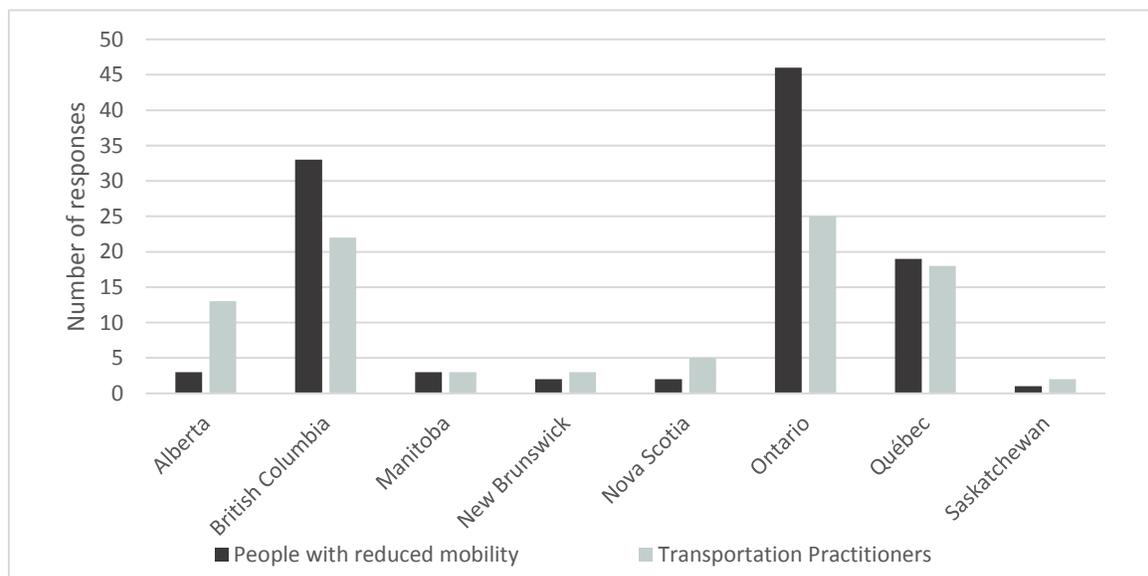


Figure 1: Distribution of responses by Province

4.3 Survey Summary – Survey of people with a physical, cognitive or sensory disability

Each question posed to the respondents is listed below, along with a summary of the responses received.

Question 1 - Are you a person with a physical, cognitive or sensory disability, or are you responding on behalf of a person with a physical, cognitive or sensory disability?

A total of 109 respondents indicated that they were a person with a physical, cognitive or sensory disability, or that they were responding on behalf of a person with a physical, cognitive or sensory disability.

Question 2 - How satisfied do you feel while using the public roadway system moving around as a pedestrian/scooter user/physically challenged individual?

Fifteen respondents (less than 20%) indicated that they were either “*very satisfied*” or “*satisfied*” about using the public roadway system moving around as a pedestrian/scooter user/physically challenged individual (see Figure 2). Almost half (43%) indicated that they were “neutral”.

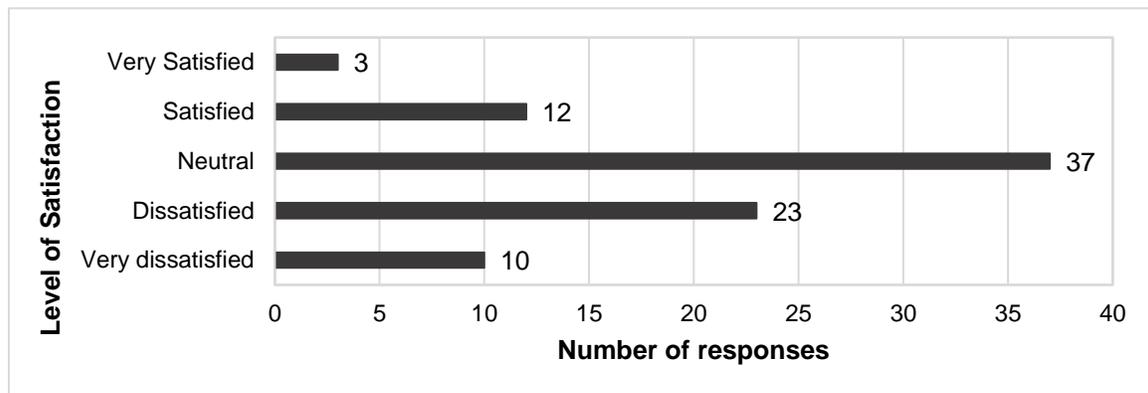


Figure 2: Level of satisfaction with regards to public roadway system to move around as a pedestrian/scooter users/physically challenged individual

Question 3 - From a scale of 1-5, please indicate the level of risk that you are likely to encounter while using a mechanical mobile device to access public space, where 1 would indicate no risk and 5 would indicate an extreme level of risk.

A relatively large proportion of the respondents (35%) indicated that when using a mechanical device to access public space they are likely to encounter either a high or extreme level of risk (see Figure 3).

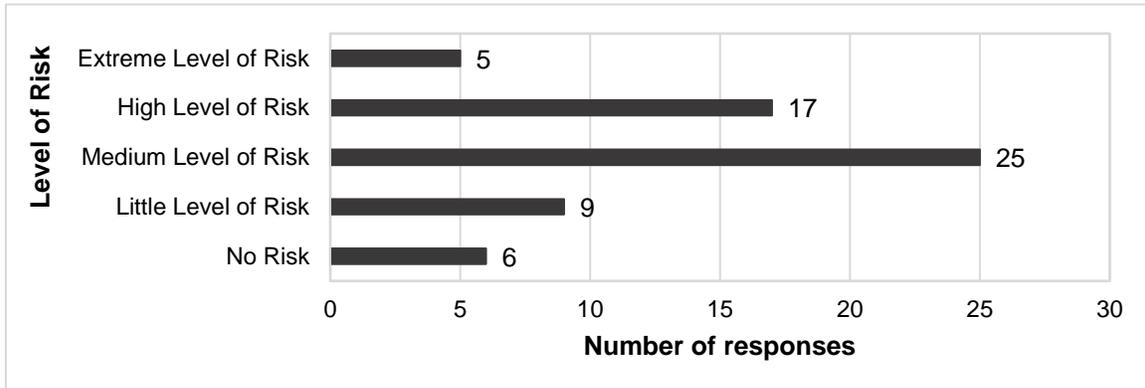


Figure 3: Level of satisfaction with regards to public roadway system to move around as a pedestrian/scooter users/physically challenged individual

Question 4 - What are your transportation utility preferences if you were to choose from private car, bus, cycling, walking, mechanical device/scooter or none?

For this question, respondents had the possibility to select multiple choices from the list of transportation utility. More than one third (37%) of the respondents indicated that “*Bus*” was their preferred mode of transportation utility. Figure 4 shows the transportation utility preference of people with reduced mobility.

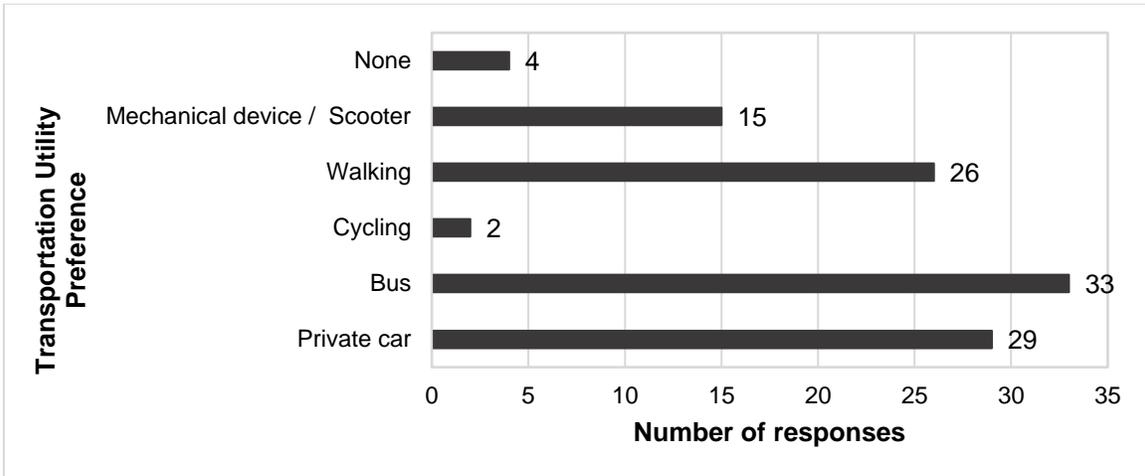


Figure 4: Transportation utility preference

Question 5 - Which of these factors are the most important to you with respect to your chosen method of travel: comfort, safety, travel time, and cost?

For this question, respondents had the possibility to select multiple choices from the list of factors they may consider when choosing a method of travel. The vast majority (74 out of 92) of respondents indicated that safety was the most important factor they consider when choosing their method of travel. Travel time was identified by the respondents as the second most important factor (65 out of 92) when choosing their method of travel. Figure 5 shows the factors that are the most important to people with disability when choosing their method of travel.

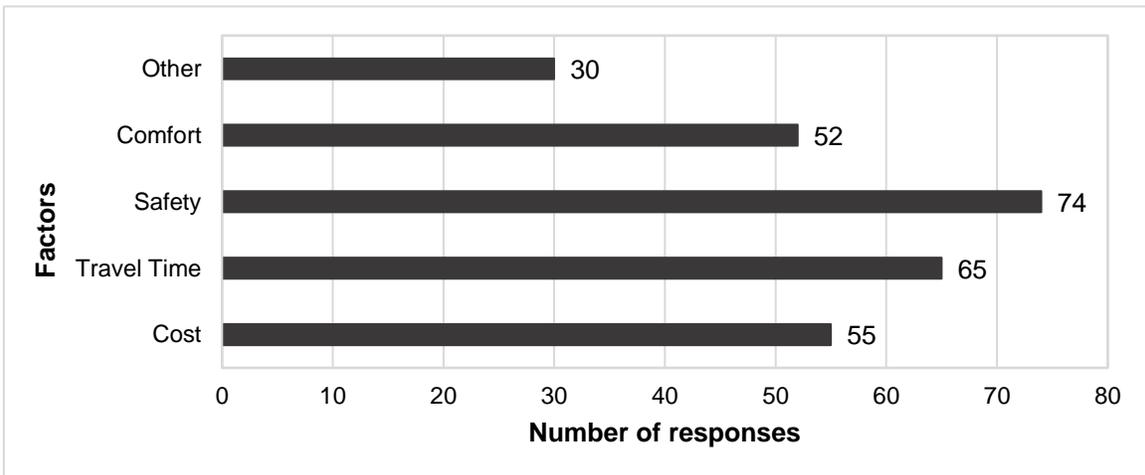


Figure 5: Factors considered when choosing a method of travel

Question 6 - How safe do you feel while using public right-of-way infrastructures from a scale of 1 to 5, where 1 would indicate not safe at all, and 5 would indicate completely safe?

The participants of the study were asked to rank the level of safety of the current road network. Figure 6 shows that almost forty percent (36 out of 93) of respondents indicated that felt either “Not safe at all” or “Not Safe” while using the public right-of-way infrastructures.

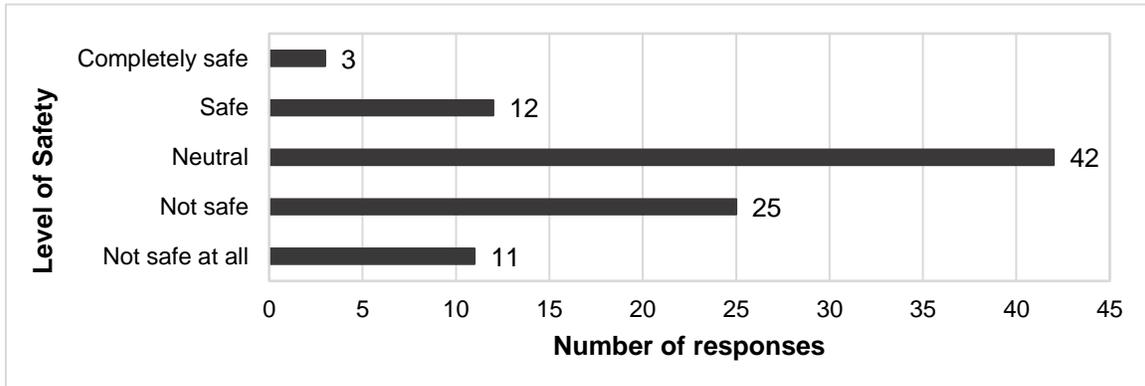


Figure 6: Level of safety felt while using public right-of-way infrastructures

Questions 7 to 11 – Challenges Encountered

The respondents were asked a series of questions about the type of challenges they encounter when travelling on different types of transportation infrastructures present on the public right-of-way including the following:

- Bus stops, bus terminals or elevated platforms (Question 7)
- Curb Ramps (Question 8)
- Sidewalks (Question 9)
- Accessible Pedestrian Signals (Question 10)
- Traffic Island on the Public Right of Way (Question 11)

The respondents also had the possibility to comment on the additional challenges they have experienced while using the public right-of-way.

The key findings from these questions are the following:

- The most frequent challenge encountered while using accesses to bus stops, bus terminals or elevated platforms with twenty-four responses (approximately 15%) is “difficulties in entering the bus” followed by “difficulties waiting for bus arrivals while standing” with 20 responses.

- Almost half (47%) of respondents identified “*The orientation of the curb ramps is not providing adequate guidance*” as the main challenge they experience at curb ramps.
- The two most common challenges identified at sidewalks were “*The width is not appropriate*” and “*The devices used to warn us of street crossings and hazardous drop-offs are not appropriate*”, with 42% and 38% respectively.
- More than half of respondent identified “*The proximity of the signals to the curb is not adequate*” as a key challenge with accessible pedestrian signals.
- Of the proposed challenges at traffic islands on the public right-of-way, almost all answers received the same number of responses. The most comment challenge at traffic island is “*The island width is not adequate to provide protection for waiting pedestrians*”

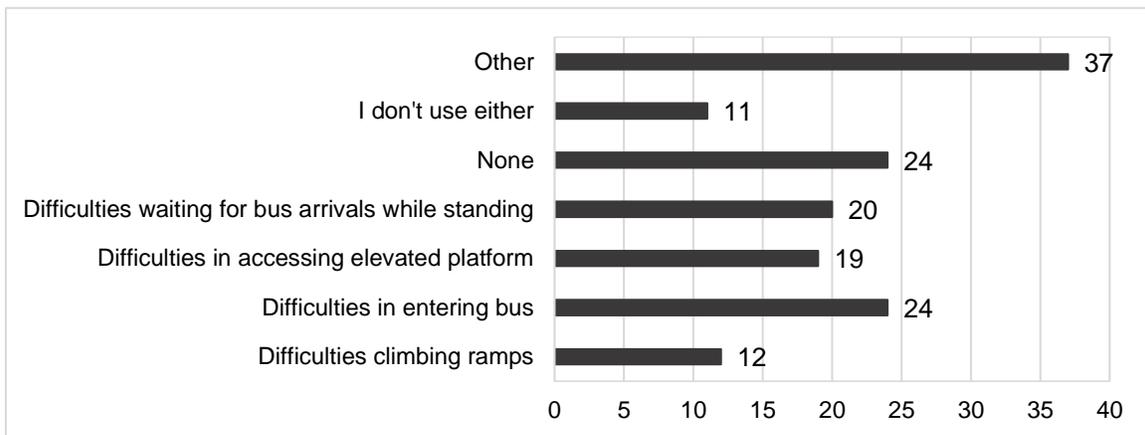


Figure 7: Challenges encountered while using accesses to bus stops, bus terminals or elevated platforms

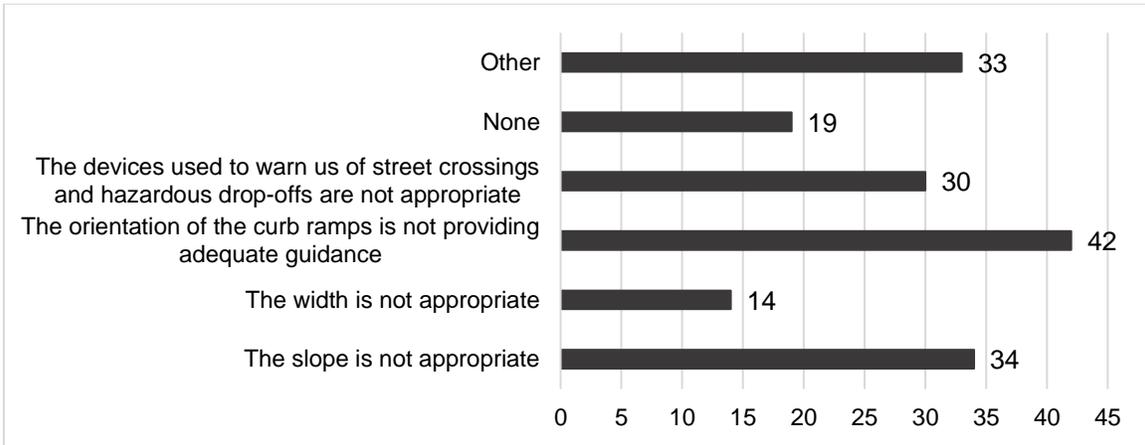


Figure 8: Challenges/issues encountered at curb ramps

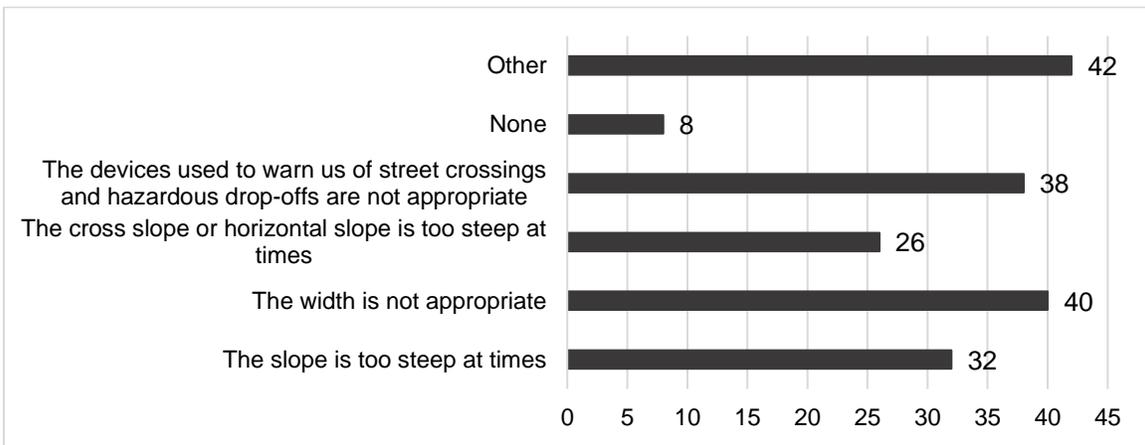


Figure 9: Challenges encountered when using sidewalks

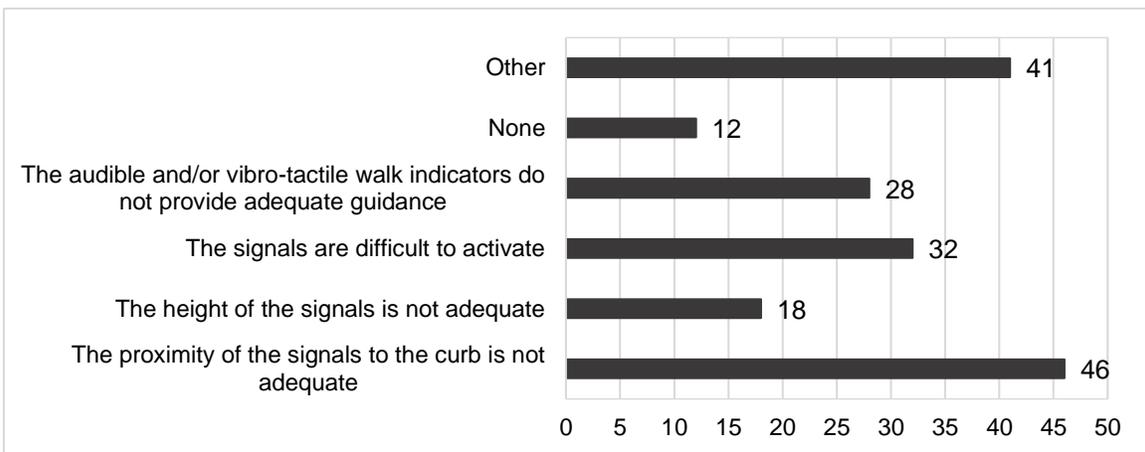


Figure 10: Challenges encountered when using Accessible Pedestrian Signals

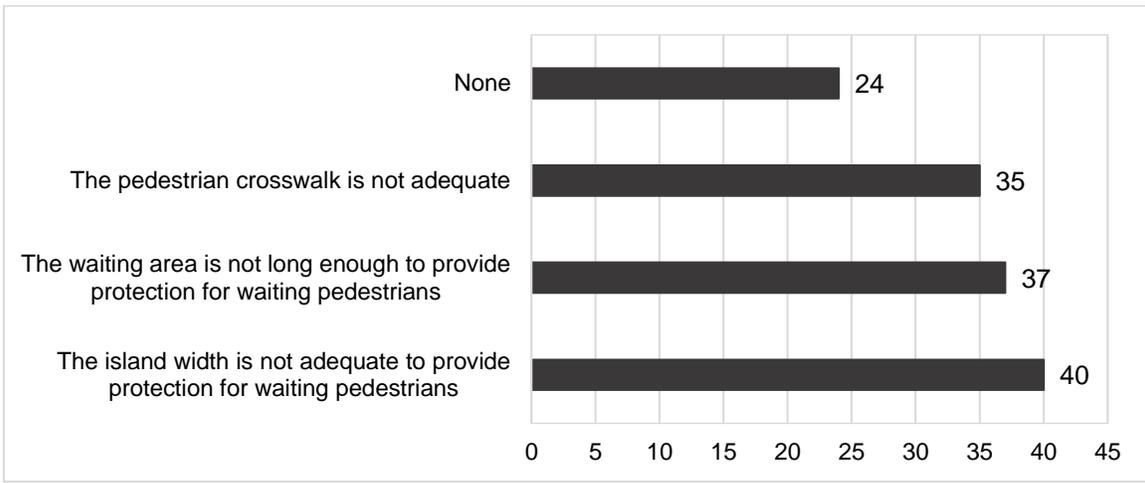


Figure 11: Challenges encountered while using a Traffic Island on the Public Right of Way

4.4 Survey Summary – Survey of transportation practitioners

Question 1 - Are you involved in the design, construction, maintenance and/or operations of accessible pedestrian facilities in the public right-of-way?

A total of 91 respondents indicated that they were involved in the design, construction, maintenance and/or operations of accessible pedestrian facilities in the public right-of-way.

Question 2 - Does your road authority currently have any published guidelines or has set in place any standards that address the provision of accessible public infrastructure, such as pedestrian facilities, in the public right-of-way?

Three quarters of the respondents indicated that their road authority has published guidelines or standards that address the provision of accessible public infrastructure. 5% of the transportation practitioners who responded did not know if their road authority had accessibility standards in place.

Question 3- What is your level of satisfaction with the accessibility guidelines used by your municipality?

Almost half (49%) of the respondents indicated that they were either “satisfied” or “very satisfied” with the accessibility standards used by their road authority.

Question 4 - Is accessibility for people with disabilities being incorporated into the design phase of projects within your road authority?

All respondents (59 out of 60) except for one indicated that accessibility concepts are being incorporated into the design phase of projects within their road authority.

Question 5 - What experience does your road authority have with designing pedestrian facilities to optimize accessibility? Please briefly explain the standards used and treatments installed.

Most respondents indicated that their experience was either related to accessible pedestrian signals, curb ramps, tactile warning systems, and sidewalks. Other responses included the following:

- Installation of urban braille;
- Municipal bylaws and site plan review;
- Pedestrian countdown timers; and

- Accessible parking space.

Question 6 - What treatments are currently being or have been implemented by your road authority through accessible guidelines/standards to address the needs of people with disabilities?

Eight treatments were available to be selected by the respondents. The respondents indicated that the two most common implemented treatments are “Curb ramps with specific dimensions i.e. width, slope, etc.” (92%) and “Accessible pedestrian signals” (87%). The third most common treatment used by road authorities is “Tactile walking surface indicators”, which was selected by more than two third (69%) of the respondents. The frequency of each treatment is presented in Figure 12.

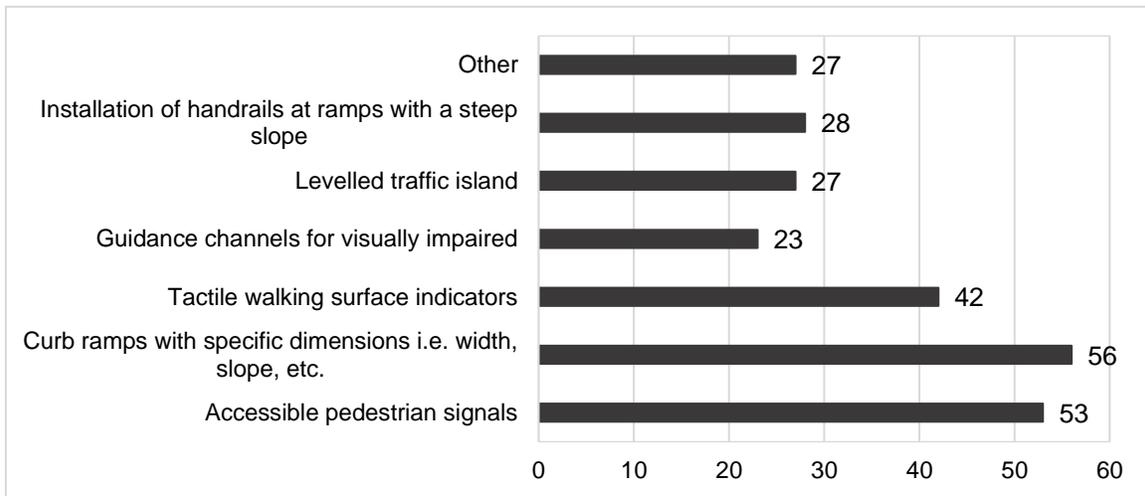


Figure 12: Accessible treatments currently being or have been implemented by your road authority

Respondents also had the opportunity to specify other treatments that they have been using within their road authority to address the needs of people with disabilities. Some of the additional treatments identified by respondents included the following:

- Transit stops;
- Crossrides;
- Countdown timers;
- Placement of tactile plate;
- Colour contrast on stairs;
- Tactile warning on handrails;

- Mixed use facilities for pedestrians and cyclists;
- Snow clearing priority at bus stops;
- Repairs at intersections with poor curb cuts;
- Alternate accessible pathways near construction sites;
- Way-finding signage for accessible routes (i.e. elevator access); and
- Raised crosswalks.

Question 7 - How difficult have implementing and maintaining the following treatments been for your road authority on a scale of 1 to 5, where 1 would indicate Very easy, and 5 would indicate Very difficult?

The respondents were asked to rate the level of difficulty of implementing and maintaining the following six treatments:

- Accessible pedestrian signals
- Curb ramps with specific dimensions i.e. width, slope, etc.
- Tactile walking surface indicators
- Guidance channels for visually impaired
- Levelled traffic island
- Installation of handrails at ramps with a steep slope

The respondents indicated that the most challenging treatments to implement and maintain are “*Tactile walking surface indicators*” and “*Guidance channels for visually impaired*”, while the treatment that respondents have found the easiest to implement and maintain is “*Curb ramps with specific dimensions i.e. width, slope, etc.*”. The frequency in terms of level of difficulty for each of the six treatments is illustrated in Figure 13.

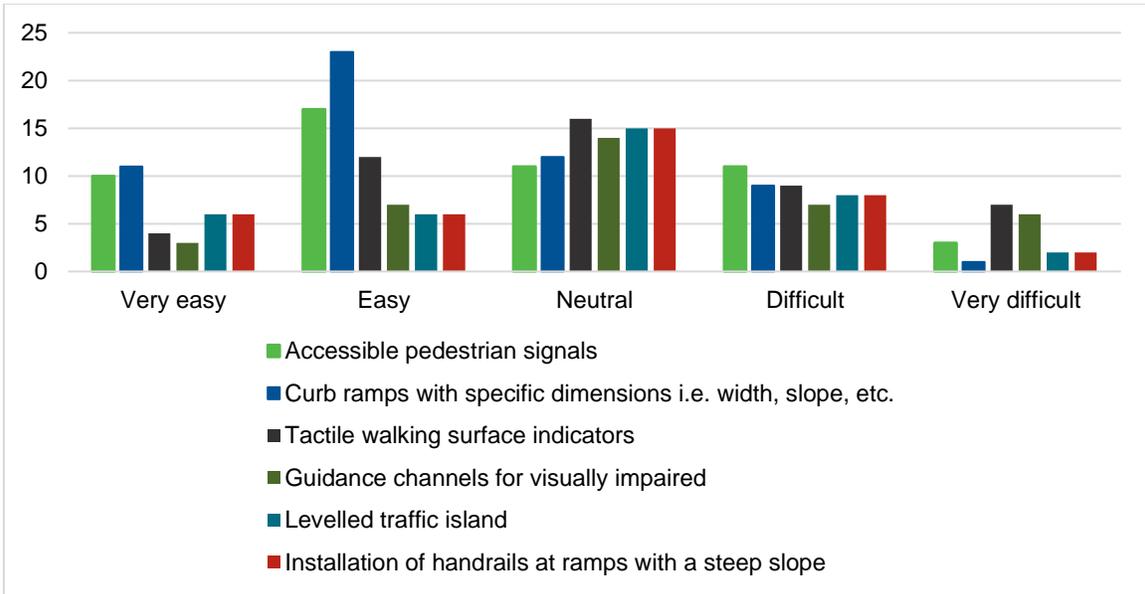


Figure 13: Level of difficulty associated with the installation and maintenance of each treatment

Question 8 - What treatments would you appreciate obtaining more guidance as to how to design and implement them?

Receiving almost the same number of responses, the two treatments that transportation practitioners identified the most often as a treatment they would appreciate receiving more guidance are “*Guidance channels for visually impaired*” and “*Tactile walking surface indicators*” (see Figure 14).

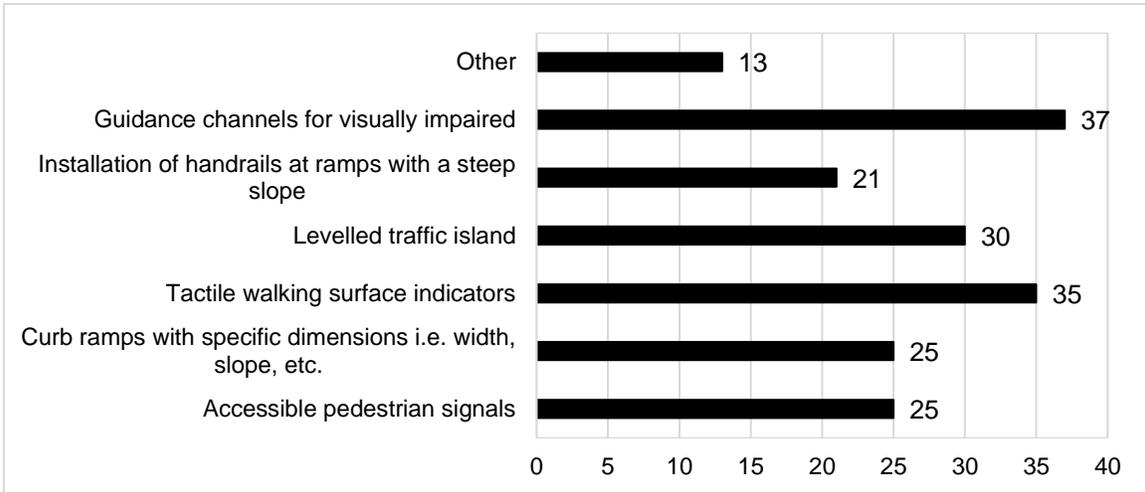


Figure 14: Accessible treatments for which more guidance would be appreciated

Respondents also had the opportunity to specify other treatments that they would appreciate obtaining more guidance as to how to design and implement them. Some of the additional treatments identified by respondents include the following:

- Multi-use facilities;
- Roundabouts;
- Raised intersections;
- Tactile walking surface indicator with the bicycle signals⁵; and
- Placement of tactile plates when curb cuts extend to cover the crosswalks for two opposite direction and without high curb in between the two curb ramps.

Question 9 - Would your road authority benefit from national accessibility guidelines that road designers, planners, and transportation practitioners could rely upon when designing road infrastructure?

All respondents, except for two people, (54 out of 56) indicated that their road authority would benefit from national accessibility guidelines that road designers, planners, and transportation practitioners could rely upon when design road infrastructure.

Respondents also had the opportunity to provide additional comments on this topic. Some of the comments provided by respondents included the following:

- *“Must adapt to local needs.”*
- *“Would ensure consistency in design for in-house design consultants.”*
- *“National standards would be extremely helpful so that municipalities could have consistent standards and not have to develop their own standards.”*
- *“There would be benefits, but would also have to make them specific to our region, weather, budget, etc.”*
- *“Ideally try to reference existing standards (US etc.) instead of re-inventing the wheel.”*
- *“It is useful to have national guidelines for transportation practitioners to follow.”*
- *“I recently relocated from the US and the federal ADA guidelines there make implementing solutions much easier.”*
- *“National consistency would be useful. Often refer to US ADA.”*

⁵ Bicycle signals are signals with specific bicycle heads

- *“You're a little late. Since there were no national guidelines, we had to create our own based on the AODA. We shared our experience with other Regional municipalities to hopefully ensure some level of consistency.”*

Question 10 - Please indicate what additional information / guidance you would like to see beyond the guidelines contained in the Canadian Standards Association's B651-12 – Accessible Design for the Built Environment.

With this question, respondents had the opportunity to specify the additional information / guidance they would like to see in national accessibility guidelines beyond the guidelines contained in the CSA B651-12. Some of the comments provided by respondents include the following:

- Guidance for accessibility at roundabouts
- Truncated dome - colour, materials and design guidance, standard drawings, standard specifications”
- *“Webinars or training on how to implement them.”*
- *“Comprehensive analysis of curb ramps and explanation on how to problem solve unusual scenarios.”*
- *“Accessible bus stop design, accessibility considerations for protected bike lanes and off-street pathways”*
- The CSA B651-12 provides guidance mainly for residential building and is not well adapted to public right-of-way and challenges experienced on a road network

4.5 Findings Summary

Key findings identified from the surveys are the following:

- A small proportion of people with reduced mobility (less than 20%) indicated the level of safety provided on public right-of-way road infrastructures is adequate.
- The three most common challenges identified by people with reduced mobility when travelling on different types of transportation infrastructures present on the public right-of-way were the following:
 - The orientation of the curb ramps that are not providing adequate guidance
 - The proximity of the accessible pedestrian signals to the curb that is not adequate
 - The width of sidewalk that is not adequate

- Transportation practitioners indicated that the most challenging treatment to implement and maintain, and the treatments they would appreciate obtaining more guidance on are “*Tactile walking surface indicators*”.
- A significant proportion of transportation practitioners indicated that they would appreciate obtaining more guidance on the implementation of accessible pedestrian facilities at roundabouts, multi-use facilities and bike lanes.
- Most transportation practitioners agree that there would be benefits to the development of national accessibility standards.
- Some of the suggestions with regards to the development of national accessibility standards are that:
 - They have to adapt to local needs and context.
 - They should include examples of specific design elements.
 - They should be similar to American Disabilities Act (ADA). Most comments provided indicated that the ADA is clear and simple to use.

5.0 Synthesis of Practices

There is currently no federal legislation that regulates the standards for designing accessible pedestrian facilities within the public right-of-way. While four provinces (British Columbia, Manitoba, Nova Scotia and Ontario) have recently decided to adopt an accessibility act, it is only in Ontario that a legal framework exists to regulate the standards for designing accessible pedestrian facilities within the public right-of-way. Both Manitoba and Nova Scotia have committed to developing design standards for accessible infrastructure by 2023 and 2030, respectively.

National-level guidance for accessibility design elements is currently available and included in the Canadian Standards Association's *Accessible Design for the Built Environment*. Although this document contains requirements for exterior pedestrian facilities such as curb ramps and walkways, the requirements for some treatments (i.e. accessible pedestrian signals, signage, wayfinding, roundabouts, multi-use trails, etc.) that transportation practitioners could rely upon when designing accessible road infrastructure are not explicitly presented. However, it is expected that the new edition of the CSA B651 to be published in 2018 will provide refinements on some of these treatments.

On the provincial level, a few provinces have developed, often through their Ministry of Transportation, provincial standards for specific accessibility design elements. For example, in Quebec, provincial standards with regards to accessible pedestrian signals are included in the Ministry of Transportation design manual. However, except in Ontario with the *Integrated Accessibility Standards* (Regulation 191/11), no provincial government has developed reference documents dedicated to the design of accessible pedestrian facilities.

With regards to municipal design guidelines, the following key findings were identified from the literature review and the survey:

- While some large-sized municipalities (i.e. Calgary, Winnipeg, Toronto, Ottawa, and Quebec City) have developed accessibility guidelines, most municipalities across Canada have not yet developed their own accessibility guidelines or standards.
- The level of guidance provided in the municipal accessibility design guidelines vary significantly among municipalities. For instance, many of the reviewed municipal accessibility design guidelines did not provide any guidance on the use of tactile walking surface indicators at curb ramps or the slope and cross-slope of exterior path of travel (walkways/sidewalks).
- Even in a province where accessible standards are legislated and regulated, confusion was noted with some design elements, such as the placement for tactile walking surface indicators. Some municipalities

require the tactile walking surface indicators to be placed 150 mm to 200 mm from the face of curb, while others recommend the tactile walking surface indicators to be placed 150 mm to 200 mm from the back of the curb.

- The current guidelines provide limited guidance on the design of accessible pedestrian facilities of specific transportation infrastructures such as roundabout, bike lanes, multi-use trails, and others.
- Many of transportation practitioners who responded to the survey recommended the adoption of national accessibility standards like those included in the American Disabilities Act (ADA), but that is sufficiently flexible to adapt to local needs.

In general, it appears that there is a lack of uniformity and consensus in the practice related to accessible standards/guidelines. There is ambiguity as to what design guidelines transportation practitioners should reference when designing accessible public infrastructure. The development of national accessibility guidance specifically for pedestrian facilities in the public right-of-way would provide a more uniform and cohesive practice and provide transportation practitioners across Canada with access to a reference document that includes the most current accessible guidelines. However, for the development of national guidance to result in a more accessible transportation network, it will be crucial for both people with disabilities and transportation practitioners to be involved in this process so that the challenges of both parties are considered and reflected in the accessibility standards.

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APPENDIX A – List of survey questions

Survey of people with a physical, cognitive or sensory disability

Question 1 - Are you a person with a physical, cognitive or sensory disability, or are you responding on behalf of a person with a physical, cognitive or sensory disability?

Question 2 - How satisfied do you feel while using the public roadway system moving around as a pedestrian/scooter user/physically challenged individual?

Question 3 - From a scale of 1-5, please indicate the level of risk that you are likely to encounter while using a mechanical mobile device to access public space, where 1 would indicate no risk and 5 would indicate an extreme level of risk.

Question 4 - What are your transportation utility preferences if you were to choose from private car, bus, cycling, walking, mechanical device/scooter or none?

Question 5 - Which of these factors are the most important to you with respect to your chosen method of travel: comfort, safety, travel time, and cost?

Question 6 - How safe do you feel while using public right-of-way infrastructures from a scale of 1 to 5, where 1 would indicate not safe at all, and 5 would indicate completely safe?

Question 7 - Which of the following challenges do you encounter while using accesses to bus stop, bus terminus or elevated platforms:

- Difficulties climbing ramps
- Difficulties in entering bus
- Difficulties in accessing elevated platform
- None
- I don't use either
- Other

Question 8 - Which of the following challenges do you encounter at curb ramps:

- The slope is not appropriate
- The width is not appropriate
- The orientation of the curb ramps is not providing adequate guidance
- The devices used to warn us of street crossings and hazardous drop-offs are not appropriate

- None
- Other

Question 9: Which of the following challenges do you encounter when using sidewalks?

- The slope is too steep at times
- The width is not appropriate
- The cross slope or horizontal slope is too steep at times
- The devices used to warn us of street crossings and hazardous drop-offs are not appropriate
- None
- Other

Question 10: Which of the following challenges do you encounter when using Accessible Pedestrian Signals?

- The proximity of the signals to the curb is not adequate
- The height of the signals is not adequate
- The signals are difficult to activate
- The audible and/or vibro-tactile walk indicators do not provide adequate guidance
- None
- Other

Question 11: Which of the following challenges do you encounter while using a Traffic Island on the Public Right of Way?

- The island width is not adequate to provide protection for waiting pedestrians
- The waiting area is not long enough to provide protection for waiting pedestrians
- The pedestrian crosswalk is not adequate
- None

Survey of transportation practitioners

Question 1 - Are you involved in the design, construction, maintenance and/or operations of accessible pedestrian facilities in the public right-of-way?

Question 2 - Does your road authority currently have any published guidelines or has set in place any standards that address the provision of accessible public infrastructure, such as pedestrian facilities, in the public right-of-way?

Question 3- What is your level of satisfaction with the accessibility guidelines used by your municipality?

Question 4 - Is accessibility for people with disabilities being incorporated into the design phase of projects within your road authority?

Question 5 - What experience does your road authority have with designing pedestrian facilities to optimize accessibility? Please briefly explain the standards used and treatments installed.

Question 6 - What treatments are currently being or have been implemented by your road authority through accessible guidelines/standards to address the needs of people with disabilities?

Question 7 - How difficult have implementing and maintaining the following treatments been for your road authority from a scale of 1 to 5, where 1 would indicate Very easy, and 5 would indicate Very difficult?

Question 8 - What treatments would you appreciate obtaining more guidance as to how to design and implement them?

Question 9 - Would your road authority benefit from national accessibility guidelines that road designers, planners, and transportation practitioners could rely upon when designing road infrastructure?

Question 10 - Please indicate what additional information / guidance you would like to see beyond the guidelines contained in the Canadian Standards Association's B651-12 – Accessible Design for the Built Environment.