Transportation Association of Canada

EMERGING PRACTICE BRIEFING

Continuous Sidewalks and Bike Paths

This briefing does not represent technical guidance. Rather, it describes an emerging practice that is not used widely across Canada and is not addressed in TAC's technical publications, but that has been applied sufficiently in Canadian contexts to assess its general applicability and effectiveness.

This briefing is intended both to acknowledge the emerging practice and to help qualified practitioners conduct further testing and evaluation. It may be updated or withdrawn as more information becomes available.

Introduction

Continuous sidewalks and bike paths prioritize pedestrians and cyclists over turning motor vehicles at crossings of local streets. They are best known from the Netherlands (see Figure 1), and contrast with typical North American designs (see Figure 2). The first known uses of this treatment in Canada were in the Town of Canmore, Alberta in 2016 and the City of Vancouver in 2018. The City of Nanaimo, BC took the concept further in 2020 by adopting continuous sidewalks and bike paths as a standard design for local street intersections and building several in the Metral Drive corridor (a project that won a 2020 TAC Technical Achievement Award[1]). Several other Canadian communities are either considering or implementing this design treatment.

The designs of continuous sidewalk and bike path treatments in Canada have varied, and this briefing provides a synthesis of the techniques used and lessons learned. It also identifies several examples and references. It is important to note that continuous sidewalks and bike paths are already used widely at residential and commercial driveway crossings and laneways. However, the purpose of this document is to specifically address their use at the intersection of two public rights-of way, where at least one is a local street.

Figure 1: Continuous sidewalk and bike path in Rotterdam, Netherlands

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[1] See http://library.tac-atc.ca/publications/Awards/CA6ARH3352020N15.pdf

Figure 2: Typical pedestrian crossing at a local street intersection in North America

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Description

Continuous sidewalk and bike path designs communicate to people walking and cycling that they have an uninterrupted travel path, while also communicating to drivers that they are crossing a space for walking and cycling. This is the reverse of a conventional local street intersection, where the sidewalk and in-boulevard bike path terminate and pedestrians and cyclists must cross the paved roadway. Figure 3 highlights some basic features of continuous sidewalks and bike paths.

Figure 4 visually contrasts a conventional crosswalk with a raised crosswalk, a continuous sidewalk, and a continuous sidewalk and bike path, while Table 1 highlights key differences between conventional, raised and continuous sidewalks. It is worth noting that raised crosswalks and continuous sidewalks share several aspects and thus may confuse some stakeholders; the key distinguishing feature of a continuous sidewalk is that the major street curb and sidewalk material remain uninterrupted through the crossing.

Continuous sidewalk and bike path treatments are intended to improve the safety and comfort of people walking or riding bicycles. They can also have a traffic calming effect by transferring the mental workload of watching for conflicts from pedestrians and cyclists to motorists**. For this reason, they are only appropriate in situations where crossing pedestrians and cyclists have the right-of-way over turning vehicles at all** times (see more information under Applicability).

Figure 3: Basic features of a continuous sidewalk and bike path (Nanaimo, BC)

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Figure 4: Conventional crosswalk, raised crosswalk, continuous sidewalk and continuous sidewalk and bike path

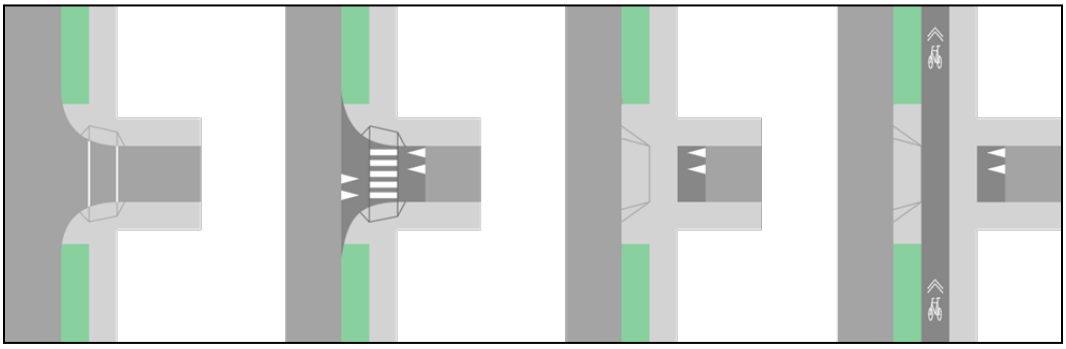

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Table 1: Typical differences between conventional, raised and continuous sidewalks

Conventional crosswalk	Raised crosswalk	Continuous sidewalk
Pedestrians feel they are crossing a vehicle space. They are encouraged to take responsibility for their own safety.	Pedestrians feel they are crossing a vehicle space. Traffic calming provides some assurance that motorists will yield.	Pedestrians feel motorists are crossing a pedestrian space. They feel they have an uninterrupted route.
Sidewalk ramps down to roadway before crossing.	Sidewalk remains raised or may lower to an intermediate height (e.g., 100 mm).	Sidewalk remains raised at full height through crossing.
Major street curb is interrupted.	Major street curb is interrupted.	Major street curb is continuous, as at driveways.
Curb radii are used to define the turning path for vehicles.	Curb radii are used to define the turning path for vehicles.	Curb radii are not provided, creating an intentionally ambiguous turn path for vehicles.
Entering/exiting vehicles travel on a flat grade.	Entering/exiting vehicles encounter ramps on both sides of the crossing.	Entering/exiting vehicles encounter ramps on both sides of the crossing, possibly in advance of the crossing.
Surface is the same as the roadway (e.g., asphalt).	Surface is often the same as the roadway but may be concrete.	Surface is the same as the sidewalk (e.g., concrete).
Pavement markings may define the crossing.	“Zebra” crosswalk markings are typically provided.	No pavement markings are typically provided on the crossing itself.

Outcomes

There is a need for more field studies to assess the outcomes of continuous sidewalk and bike path treatments that have been implemented in North America. However, several positive outcomes can be reasonably anticipated, largely based on experience with similar treatments such as raised crosswalks.

Comfort for pedestrians and cyclists. Pedestrians and cyclists are anticipated to perceive a less stressful walking environment due in part to improved motor vehicle yielding. Continuous bike paths also increase comfort for cyclists by eliminating vertical deflections at curb returns, and the continuous surface eliminates roadway ponding at pedestrian crossing points.

Accessibility. Continuous sidewalks remove the requirement for pedestrians and people using mobility devices to navigate two points of elevation change (typically, curb ramps). Pedestrians with sight loss no longer need to negotiate a crossing; that task is transferred to drivers.

Safety. Continuous sidewalks effectively create a speed hump effect that is anticipated to reduce the speed of crossing motor vehicles and increase rates of yielding to pedestrians and cyclists; initial observations on Metral Drive in Nanaimo showed a considerable drop in vehicle turning speeds (from about 22 km/h at crossings with a curb return to about 10 km/h at crossings with a continuous sidewalk and bike path treatment). Other features that are anticipated to slow motor vehicles and increase driver awareness of pedestrians and cyclists include the visual impact of removing or reducing curb radii and the use of materials other than asphalt for continuous sidewalks and bike paths.

The accelerating use of continuous sidewalks and bike paths in Canada could soon provide more directly measured outcomes including impacts on legibility for users, vehicle turn speeds and yielding rates, near misses and crashes. Future evaluations could also engage different user groups in site visits and usability testing to understand how continuous sidewalks and bike paths can impact accessibility.

Applicability

Continuous sidewalks and bike paths are intended to reinforce the priority of pedestrian and cyclist movements in locations where it already exists in law. In Canada, continuous sidewalks and bike paths have been considered appropriate for the following locations:

- To reinforce yield or stop controls at minor or local street intersections along roads with a design speed of 50 km/h or less
- At laneway or alley intersections, where legislation already requires exiting drivers to yield or stop
- At setback crossings, to manage turning conflicts

Some locations may require careful consideration to determine appropriateness, such as:

- Along a bus route, or a designated truck or emergency response route
- On two perpendicular legs of an intersection
- On more than two legs of an intersection
- In combination with a roundabout or traffic circle
- Where the minor street is multi-lane and/or arterial

Finally, the following locations have thus far been considered not appropriate:

- Where the sidewalk is also a signal-controlled crosswalk
- Across uncontrolled approaches to an intersection
- Where equal right-of-way is intended, such as at intersections that are fully signalized or have all-way stop or yield controls

These conditions distinguish continuous sidewalks from raised crosswalks (which can be used, for example, at mid-block locations or across uncontrolled legs of an intersection) and raised intersections (which can be used, for example, at all-way stop locations).

Implementation issues

The following paragraphs identify several issues that could contribute to the suitability and successful design of continuous sidewalk and bike path treatments.

Effective curb radius. A straight flared design, as implemented by the City of Nanaimo, is likely more effective than curb returns. Spring Creek Drive in Canmore provides an effective curb radius of 8.5 m, while Nanaimo provides an effective radius of around 3 m.

Design and control vehicle. Tighter effective curb radii may require large vehicles (e.g., garbage or fire trucks) to cross the centre line when turning. Vehicles that cut a tight corner could impact the boulevard (e.g., damage landscaping elements).

Emergency access. It is important to consult with emergency responders, particularly along primary response routes. Jurisdictions may retain the safety benefits of continuous sidewalks and bike paths by permitting emergency vehicles to use the entire roadway width.

Accessibility. Pedestrians with sight loss use changes in sidewalk level (e.g., curb ramps) to identify the location of crossings (and potential conflicts) on both minor and major streets. Because continuous sidewalks eliminate such cues, Dutch design guidance recommends the use of directional tactile warning surface indicators (TWSIs) leading up to the minor street crossing. Additional cues may also be needed to indicate the location

of a perpendicular crossing of the major street. It is not yet clear that TWSIs provide sufficient warning of a crossing in the absence of a change in sidewalk level.

Departure sight lines. Locating the minor road stop bar behind the continuous sidewalk, bike path and ramp may make typical sight triangles infeasible. In a given situation, it may be permissible to assume that drivers pull forward after the stop bar to gain sufficient sight distance; ideally, this would be in combination with a bend-in/out configuration that reduces conflicts with pedestrians and cyclists.

Bend-in and bend-out offset width. Continuous sidewalks and bike paths may benefit from an offset distance from the major road (i.e., greater than that simply required to accommodate the vehicle ramp) to prevent temporarily stopped turning vehicles from blocking the continuous crossing.

Roadway ramp grade. Ramps on either side of the crossing should be designed to avoid vehicles bottoming out.

Drainage. Stormwater on the major roadway is conveyed along the straight curb and gutter, but the minor roadway may require catch basins on each side of the ramps leading up to the sidewalk.

Winter maintenance. Jurisdictions where snow is a typical design condition should consider snow clearing equipment and maintenance procedures. One benefit of continuous sidewalk and bike path treatments is that they eliminate the potential for icy curb ramps and roadway ponding at pedestrian crossing points.

Legislation. Provincial or territorial legislation may not align with continuous sidewalk and bike path treatments. Practitioners should review relevant laws to confirm that continuous sidewalks and bike paths are legal in their jurisdiction; if not, enabling local bylaws may required.

Examples of use

Three examples of continuous sidewalks and bike paths in Canada (Canmore, AB; Nanaimo, BC; and Edmonton, AB) are discussed briefly in this section. The TAC volunteer project report "Synthesis of Emerging Practice: Continuous Sidewalks and Bike Paths"[2] contains more details on these and other Canadian applications, including jurisdictions that are working on projects in the planning or design phases (Vancouver, BC; Medicine Hat, AB; Kitchener, ON; Halifax, NS).

[2] See http://library.tac-atc.ca/librarysearch/en/catalogue/permalink/27255/

Canmore, AB – Spring Creek Drive

The continuous sidewalk and bike path at the intersection of 8 Street and Spring Creek Drive, constructed in 2016, is believed to be the first application of this approach in Canada (see Figure 5). Both streets are collector roads. The continuous sidewalk and bike path acts as a gateway feature to lead people to commercial and residential development south of the intersection. The design featured:

- A cycle track bend-out to improve sight lines between drivers and cyclists
- Yield sign on Spring Creek Drive leading to the continuous sidewalk and bike path
- Bollards to protect cyclists and prevent vehicles from making wide turns in or out

Figure 5: Example in Canmore, AB

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Nanaimo, BC – Metral Drive

The City of Nanaimo recently updated its *Manual of Engineering Standards and Specifications* to include continuous sidewalks and bike paths at local street intersections where drivers do not need to enter or exit the local street at speed. At about the same time, the Metral Drive Complete Street Project became a local showcase for the new standard (see Figure 6). Local street intersections along that project featured:

- Stop control on the local street and speed hump markings on the ramp up to the sidewalk
- Flared driveway ramps located in the boulevard
- TWSIs for pedestrians with sight loss, indicating the presence of a local street crossing or high-volume commercial driveway
- A stamped, textured concrete buffer between the sidewalk and bike path, providing a "shoreline" for pedestrians with sight loss

Figure 6: Example in Nanaimo, BC

City of Nanaimo

Edmonton, AB – 112 Avenue NW and 65 St NW

A continuous sidewalk was built in the Highlands neighbourhood, along 112 Avenue NW (an arterial road) at 65 St NW (a local street) to enhance pedestrian priority between businesses and to delineate a new plaza space (see Figure 7). The design was challenging due to the existing local street grade of about 5% and the need to match grading of the recently re-built arterial road. The project has been embraced by the community and businesses, and observations have shown a positive impact on yielding behaviour, particularly on vehicles turning off the arterial road.

Figure 7: Example in Edmonton, AB

City of Edmonton (Maggie Boeske)

Resources

The following technical resources provide technical guidance relevant to continuous sidewalk and bike path design treatments:

- City of Nanaimo. 2022. Manual of Engineering Standards and Specifications, Edition 14.
- CROW (Netherlands). Design Manual for Bicycle Traffic.
- Ministry of Transportation, Ontario. 2021. Ontario Traffic Manual – Book 18 – Cycling Facilities. (See page 199, "Continuous Cycle Track")
- Province of British Columbia. 2017. B.C. Community Road Safety Toolkit, Module 1: Protecting People Walking and Cycling. (See page 26, "Raised Crossings")
- H. Solomon, B. Malone, J. Garcia et al. 2017. Canadian Guide to Traffic Calming, Second Edition. Ottawa, ON: Transportation Association of Canada.

The following editorial resources provide additional context for continuous sidewalk and bike path treatments:

- A. Fipke and R. Symons. "Nanaimo Goes Dutch: Adopting Raised Local Intersections within the City's Engineering Standards". Article in *Transportation Talk*, Volume 43, Number 4, Winter 2021-2022. ITE Canada.
- R. Weetman. 2018. "Nicer Cities, Liveable Places – Design Details 1" (blog post)
- Not Just Bikes. 2020. "The Dutch Solution for Safer Sidewalks – Continuous Sidewalks" (video)

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