



28 August 2019

Traffic Safety Committee
 Burnaby City Hall
 4949 Canada Way
 Burnaby, BC V5G 1M2

RE: Protected Intersections for Town Centre Streets

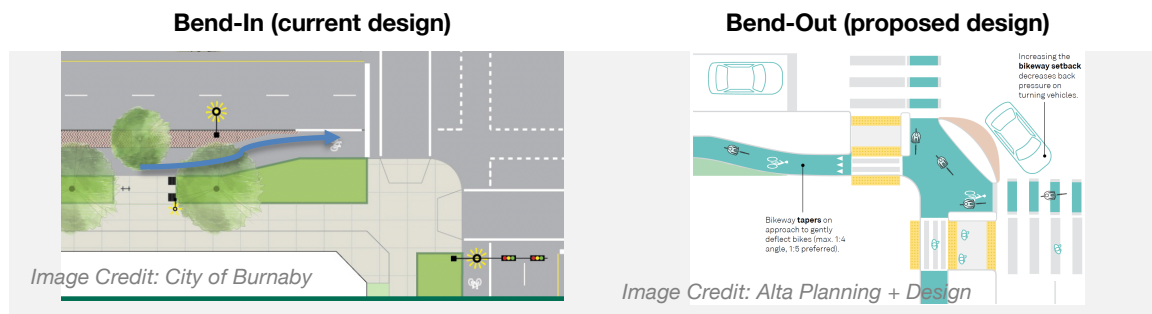
Dear Chair and Members of the Traffic Safety Committee,

The City of Burnaby has developed design standards to enhance the quality of the public realm and advance the goals of Burnaby's social, environmental, and economic sustainability. These design standards are being applied to new and existing streets in the City's four Town Centres (Brentwood, Metrotown, Lougheed, and Edmonds). The standards include the provision of cycle tracks: bicycle only lanes physically separated from motor vehicle and pedestrian traffic.

The inclusion of space for cycling on Town Centre streets is an important step to increasing the safety and comfort for people travelling by bicycle. Recognising that intersections are collision hot-spots, improving intersection safety and comfort is of highest priority. **To support improved intersection safety and comfort, we recommend the City adopt the protected intersection geometry in the design standards for Town Centre streets** (*Public Realm Design Standards for Town Centre Streets* [PL 37500-01; 2015 January 14]).¹

Background

Currently, the Town Centre standards use a 'bend-in' design that truncates the street buffer and positions people cycling back on the roadway next to motor vehicles; an approach suited to constrained corridors not applicable to the Burnaby context (Figures 1 and 2).¹² This lack of protection approaching the intersection exposes people to stressful interactions with turning motor vehicles and leaves cyclist turning movements unsupported. The protected intersection (using a 'bend-out' intersection approach) separates vulnerable road users from motor vehicles and provides queueing spaces that accommodates bicycle turning movements.



Figures 1 and 2: Two cycle track intersection approach design options.

Protected Intersection Design & Operations

While cycle tracks improve intersection safety for cyclists,² intersections remain overrepresented in Cyclist-Motor Vehicle (C-MV) collision statistics and innovative design solutions are needed to protect people on bicycles at these locations.^{3,4} Preliminary evidence suggests protected (recessed) intersections coupled with operational changes, such as separate bicycle signal phasing and prohibiting right-turns on red⁵, can reduce or eliminate conflicts between people cycling and driving (Figure 3).^{6,7} In addition to minimising conflicts between road users, the design improves safety by reducing motor vehicle speeds at conflict points, clarifying right-of-way, and improving motorists' visibility of cyclists and pedestrians.⁸ The protected intersection geometry can also improve safety by making the intersection *feel* safer which supports higher bicycle volumes leading to a decrease in bicycle crash risk via the safety-in-numbers effect.⁹ Pedestrians also benefit as the design supports very high motorist yielding rates (by reducing turning speed) and a reduced crossing distance.^{10,11}

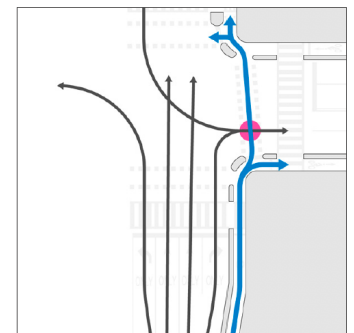


Figure 3. Protected intersections reduce conflicts to at most a single point.



The City of Burnaby has an opportunity to create protected intersections along most Town Centre streets by using the right of way from adjacent land parcels during redevelopment. This approach is being used in Surrey, where in 2017, the City adopted design standards for City Centre streets that included cycle tracks and protected intersections.¹³

Protected Intersections bring the physical protection of cycle tracks to the intersection crossing (Figure 4). A collection of design elements makes two-stage left-turns simple and low-stress, right-turns protected and fast, and straight through movements that minimise or eliminate conflicts from turning cars.^{3,11} The protected intersections is the preferred design treatment for All Ages and Abilities (AAA) cycling infrastructure at the junction of major streets.⁸

The protected intersection geometry features four key design elements that improves the safety and comfort of people cycling and walking.¹⁴

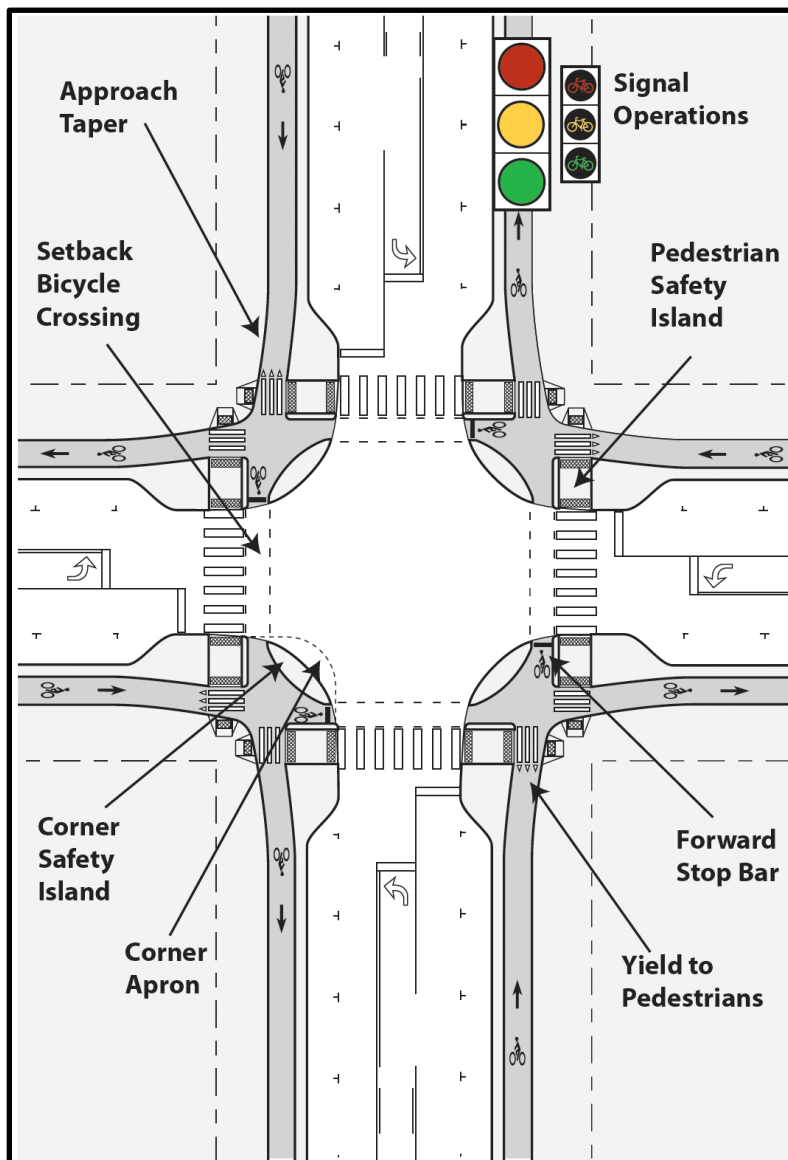


Figure 4. A protected intersection geometry with key elements highlighted. Image credit Alta Planning & Design.³

1. Corner Safety Island

A corner island physically separates people cycling from the roadway; providing a safe and comfortable refuge area for cyclists to queue. The corner islands also help to slow right-turning cars; important for safety with permissive right-turns signalisation.

2. Forward Stop Bar

A stop location for cyclists advanced 10 to 15 metres ahead of the stop location for cars puts people ahead of and in clear view of drivers. The forward queuing area shortens the crossing distance and when coupled with a right-turn on red restriction, allows queued cyclists to clear the intersection before interacting with right-turning motor vehicles.

3. Setback Crossings & Tapered Intersection Approach

A setback crossing of 5-6 m provides space for a driver to queue outside of their travel lane and before the bicycle crossing. The setback improves motorist sightlines of cyclists with an approach angle closer to 90 degrees. The bend-out (tapered) approach laterally shifts cyclists to align with the setback and provides generous space for pedestrians to queue before crossing the road.¹¹

4. Protected Bicycle Signal Phasing

Finally, protected (and concurrent) bicycle signal phasing, a Leading Bicycle Interval (LBI), or All Directions Green signal phasing can minimise or eliminate conflicts and stress between people cycling and turning motor vehicles.¹¹



Conclusions

Cycling collisions frequently occur at intersections where turning vehicles strike cyclists with right-of-way.

Protected intersections can reduce or eliminate conflicts between turning vehicles and people walking and cycling. The geometry facilitates protected right-turns and easy two-stage left turns.

Town Centre streets are being rebuilt through the rezoning process where space is available for cycle tracks and protected intersection treatments. New re-zonings at major street intersections that fail to include protected intersections will cause decades of additional delay to the creation of a continuous and cohesive cycle network suitable for people of all ages and abilities.

Incorporating the protected intersection design in the City of Burnaby's Town Centre Design Standards will ensure this treatment is consistently applied at the intersection of major streets in Burnaby's four Town Centres.

We look forward to the opportunity to collaborate with the City's transportation planning and engineering teams to fully realise Burnaby's investments in our cycling network.

Sincerely,

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