

This document is part of a series of briefing notes documenting innovative municipal norms that have the potential to help create environments promoting safe active transportation by changing the design or organization of public roadway networks.

Here, “municipal norms” refers to public policies that are adopted or endorsed by elected municipal officials. The technical planning and execution of the work associated with these norms is done by authorized professionals. Nothing in this document should be construed as a recommendation or opinion requiring the professional judgment of engineers, urban planners, architects or any other professional.

This briefing note focuses on a norm that gives pedestrians priority in road crossing. The norm underlies a variety of road layout concepts. We present two related versions. First, we present a version that gives explicit regulatory priority to pedestrians, as in “meeting zones,” for example.

This norm underlies the “model wording” provided below. Next, we present a version granting implicit pedestrian priority, as in “shared streets.” This version of the pedestrian priority norm can be found in the “alternate wording” below.¹

Model formulation for this norm

On X street or a section thereof, pedestrians shall have priority over all other users (except for drivers of emergency vehicles and trams). They are permitted to cross anywhere. Drivers must travel at a maximum speed of 20 km/h [or a lower speed].

¹ The expression “shared street” (“rue partagée”) is most commonly used in jurisdictions in which pedestrian priority is implicit; it is this term that Québec’s department of transportation uses. The terms “woonerf” (Netherlands), “home zone” (United Kingdom) and “zone de rencontre” (meeting zone) (Belgium, France and Switzerland) are part of the nomenclature in jurisdictions that have granted regulatory priority to pedestrians.



Figure 1 Meeting zone in Marseille, France

The meeting zone is one of the types of streets with explicit regulatory pedestrian priority. Vehicles must travel at a maximum speed of 20 km/h and drivers must yield to pedestrians who are crossing, or face fines.

Source: Flickr.com

Photograph: Jean-Louis Zimmerman.



Figure 2 A shared street in Boston

On a shared street, pedestrian priority is implicit. It is suggested by layout or signage (where authorities have developed it), but it is not explicitly sanctioned by provincial or state (in the United States) highway safety codes. Authorities that develop them usually draw on their ability to control traffic speeds on their road networks and regulatory provisions covering users’ movements on public ways to do so.

Source: Flickr.com

Photograph: National Association of City Transportation Officials (NACTO).



Alternate formulation for this norm

On X street or a section thereof, pedestrians can cross anywhere. Drivers must travel at a maximum speed of 20 km/h [or a lower speed] and share the space with pedestrians, i.e., drive in a manner that does not endanger them.

Normative context

50 km/h has been the most widespread default speed limit on streets in Canadian municipalities since provincial highway safety codes were adopted in the mid-20th century. This high speed limit made it necessary to segregate the different types of users. Pedestrian use of streets was generally reduced to crossing; in general, the attempt has been to confine crossing to identified crosswalks or “controlled intersections.” Where they are not prohibited outright, nearly all other pedestrian uses of the street have been framed in such a way as to give priority to motor vehicles.

For many years, there was only one other design option: the pedestrian street, a design that almost completely excludes motor vehicles. Emergency vehicles and delivery vehicles (which are often allowed access at specific times) are the exception. People are usually asked to walk beside their bikes when they use one. Although pedestrian streets met with some success in the middle of the last century, they are clearly exceptions in the contemporary landscape of Canadian public ways. They are not the focus of this briefing note.

Desired benefits

Giving pedestrians priority and restricting vehicle speed are the two key action mechanisms. However, in a number of one-way meeting zones, bike circulation is also facilitated by introducing two-way cycling. New pedestrian priority-oriented norms frequently involve new public street design principles, such as breaking up a street’s rectilinearity; these principles thus become action mechanisms themselves by calming traffic, for example.

Reducing vehicle speed should make it possible to lower the noise level and improve the perception of safety in pedestrian priority zones. Reduced speeds are also a prerequisite for the civic regulation of

travel priority in the public way, as they are the key to fostering pedestrians’ willingness to venture into the streets and to allowing eye contact between drivers and pedestrians. Civic regulation (as opposed to mechanical regulation) would make it possible to streamline pedestrian and vehicle travel and, in some cases, improve the safety and perception of safety of those on foot. Pedestrian priority, the addition of contraflow cycling, and limiting vehicle parking would make the space more enjoyable for walkers and cyclists.

However, the range of implementation environments and designs means that the specific desired benefits vary. In residential neighbourhoods, for example, the goal may be to create the opportunity to use the public space for play or socializing; around public transit stations or businesses, it may be to improve design usability to promote travel on foot, and so forth. Even though, in general, it is streets or street sections with a low incidence of collisions resulting in injury that are turned into pedestrian priority streets, one can see the creation of pedestrian priority streets is sometimes justified by pointing to a perceived improvement in road safety. This can be seen to fall within the logic of improving conviviality. In terms of road safety, the aim is most often to keep an already fairly good situation from worsening even though, in some cases, proponents claim they want to reduce the number of collisions and resulting injuries.

The table in the Appendix below contains a summary of the results of evaluations of the conviviality and safety of pedestrian priority streets.²

A limited number of evaluations matched our selection criteria. There are eleven of them, nine of which were reviewed in a summary document of the same number of United Kingdom pilot projects. Still, overall we can conclude that these evaluations in general show positive or neutral results for the selected health indicators, or their social or environmental determinants. For example, they show that creating pedestrian priority streets generally tends to lead to a reduction in vehicle speeds. For noise and the quality of the ambient air, the effects

² To be included, the evaluations had to use a reproducible methodology about which a judgment could be made. They also had to consider designs with explicit or implicit pedestrian priority. Two studies on “shared street” redevelopments in New Zealand were therefore included. The evaluations also had to deal with interventions whose aims included achieving average speeds of about 20 km/h or more and whose results showed post-intervention averages of at most 25 km/h.

are fairly neutral. They also show that the number of collisions causing injury tends to drop following the interventions, even though the methodology used and the small number of incidents both before and after the interventions call for great caution in interpreting the results in this area. As for the economic indicators selected for pedestrian priority streets in commercial areas, the evaluations show some positive effects, in terms of both sales figures and street traffic. It also seems that re-appropriation of the public ways for uses other than vehicle traffic (street use for social activities, play, etc.) is generally verified, but not as systematically or extensively as could have been expected, given how central this objective was to this type of intervention.

Overall, the results seem largely dependent on the scope of the change produced by the intervention and the context in which it was carried out. For example, apparently, in interventions on a street or section of a street that had relatively few “speed” problems, speed dropped less substantially than it did in other interventions. To maximize benefits, it might be useful, when selecting which interventions to perform, to first consider streets or street sections that are particularly problematic and for which the potential for benefits is especially strong.

Potential drawbacks

This intervention can lengthen the time it takes to drive down a given street or section of street. However, this type of zone is generally created in streets or sections of streets that have low speed limits at the outset, and where the accessibility of surrounding functions and the calm of the setting are more valued than the flow of vehicle traffic.

Developing pedestrian priority streets also frequently involves getting rid of some or all (in residential areas) of the features that segregate street users. For example, some or all crosswalks and sidewalks are frequently eliminated, creating an almost level surface across the entire public way. Although, for pedestrians and users of mobility devices, these modifications make trips shorter and more enjoyable, the changes can hamper the circulation of visually impaired people. For the visually impaired, sidewalks and the associated changes in level act as guides. The visually impaired also can't establish eye contact with drivers; the assumption is that eye contact is how civic regulation will be established for the cohabitation among public way users.

In zones with fairly heavy vehicle traffic, development has begun on designs that retain exclusive pedestrian zones, for example, by maintaining a change in level between these areas and areas in which vehicles can circulate. These zones allow pedestrians to walk or to stand still, to socialize and rest, for example. It is hard to pinpoint a very specific or uniform norm in current guides to design practices. It should be noted that a group of visually impaired people commissioned and published a report recommending that curbs measure at least 60 mm. The report notes that curbs of less than 40 mm are hard to detect, that further studies should be done to test 50 mm curbs, and that the curb's precise configuration (rounded or bevelled border) does not seem to matter, except for the fact that it must be “approximately vertical” (Childs et al., 2009, 30). In a French-language technical presentation, the illustrations of curbs characterized as detectable show a measurement of 4 cm (Peleter, 2014, 19).³

Precedents

The first experiments were carried out in Europe in the early 1970s. Developed in the Netherlands, the “woonerf,” which translates literally as “living space,” is probably the first manifestation of the “new” direction.⁴ The woonerf was developed in local residential streets under pressure from residents. Many other European countries adopted the concept, with varying speed limits.⁵ In the Netherlands, the law simply requires vehicles to travel at walking speed (and the signs do not indicate a speed). In Belgium, the speed limit in “residential zones” is 15 km/h. There does not appear to be an official speed limit in the United Kingdom, but one document asserts that, in a “home zone,” the speed limit is “well below 32 km/h.”⁶ A limit of 10 km/h is apparently stipulated in Austria and Germany.⁷

³ This presentation tackles numerous other facets of pedestrian priority street accessibility.

⁴ In fact, pedestrian priority in the public way seems to have been the uncontested state of affairs until the 1910s. It was then that, in the United States, an effort to redefine the legitimate uses of the streets in favour of motor vehicle traffic began to develop (Norton, 2010). The term “jaywalking” (which originally referred to a “country” person's hesitant behaviour in the city) started to be used in the United States at the end of the 1910s in the framework of one such effort (Norton, 2010).

⁵ Municipal initiatives are sometimes ahead of state regulation.

⁶ See: <http://www.rudi.net/files/homezones.pdf> (retrieved February 11, 2016).

⁷ See: <http://www.woonerfgoed.nl/int/Introduction.html> (retrieved March 13, 2015).

Since the early 1980s, the contexts in which pedestrian priority streets or street sections have been developed have become more diverse (Centre d'études techniques de l'équipement de l'Est [CETE], 2009). Aside from the woonerf and its counterparts in residential neighbourhoods, pedestrian priority streets are often designed in areas where civic, public or commercial functions dominate, and that therefore have much more pedestrian traffic than local streets that are predominantly residential.

RUE DES REMPARTS



Figure 3 Rue des Remparts, Sion, Switzerland

Rue des Remparts, Sion, Switzerland, before and after it was converted into a meeting zone. The street is lined with civic and commercial functions.

Source: http://www.rue-avenir.ch/fileadmin/user_upload/resources/Sion-Remparts.png

Photograph: Rue de l'Avenir.

For example, streets surrounding subway, tram or bus stations – even multimodal stations – or surrounding or crossing public spaces are often redeveloped into pedestrian priority streets. There are other examples of such developments, including sections of streets that act as links between different destinations, streets on which walking for pleasure is important (streets along lakes or rivers), and streets close to schools. There are also through streets—the main streets in villages that are also transit ways (Blanchard, 2013).

In these cases, travel speeds have generally been restricted to 20 km/h, a little higher than is generally the case in zones located in residential areas.

North America has no streets in which pedestrian priority is explicitly established by regulation. In other

words, this continent only has shared streets, i.e., streets with implicit pedestrian priority.⁸

In Canada, Québec City recently innovated by creating the first two officially sanctioned shared streets in Canada.⁹ The first is located in a commercial area in an important tourism sector. The second is a residential street in an old part of Québec City. Here, these projects were developed as part of a pilot project carried out with the Ministère des Transports du Québec [ministry of transport], which also developed the sign used to mark the entrance to pedestrian priority zones. A project has also just been developed in Halifax, Nova Scotia. It is located on a commercial street in downtown.

In the United States, a number of projects have been completed recently. There are “officially shared” streets in Santa Monica and San Francisco, California, in Minneapolis, Minnesota, in Cambridge, Massachusetts, and a few other towns. These precedents were developed in both residential¹⁰ and commercial areas.¹¹ San Francisco has also developed guidelines for shared streets.¹²

Application environment

The U.S. National Association of City Transportation Officials (NACTO) has developed a guide that sets out a few relevant criteria for developing such streets. The criteria are very congruent with those of other authorities that have developed pedestrian

⁸ In Montréal, Québec, a section of Notre-Dame Street (on the perimeter of Place d'Armes, see <http://montrealinpictures.com/blog/2012/11/02/project-365-day-307-place-darmes-at-dusk/>) and a section of Duluth Street (see <http://media-files.gather.com/images/d997/d334/d744/d224/d96/f3/full.jpg>) are not officially shared, but their design and uses are essentially what can be expected from shared and pedestrian priority streets in general. There are some examples of unofficial shared streets across the country, such as Broad Street (see http://www.islandnet.com/~jar/streetscapes/graphic/s/110_streetscape_19K.jpg) in Victoria, British Columbia.

⁹ See: http://www.lapresse.ca/le-soleil/actualites/transports/201306/11/01-4660269-la-priorite-aux-pietons-sur-les-rues-sainte-claire-et-sault-au-matlot.php?utm_categorieinterne=trafficdrivers&utm_contenuinterne=cyberpresse_vous_suggere_836420_article_POS1 (retrieved March 13, 2015).

¹⁰ See: <http://nacto.org/publication/urban-street-design-guide/streets/residential-shared-street/> (retrieved March 13, 2015).

¹¹ See: <http://nacto.org/publication/urban-street-design-guide/streets/commercial-shared-street/> (retrieved March 13, 2015).

¹² See: <http://www.sfbetterstreets.org/design-guidelines/street-types/shared-public-ways/> (retrieved February 11, 2016).

priority streets. For example, the guide stresses that residential streets that have low motor vehicle traffic, or for which there is a desire to reduce vehicle traffic, are interesting potential candidates (NACTO 2013, 26). It also stresses that commercial streets with a high volume of pedestrians and relatively limited volume of motor vehicles are good candidates as well. In addition, it states that this type of street may be especially attractive for commercial arteries that act as neighbourhood “main streets” or “retail corridors” in downtowns hurt by competition from malls since the early 1960s (NACTO, 2013, 28).

Obstacles

Provincial highway safety codes (or “motor vehicle codes” in some provinces) do not explicitly sanction pedestrian priority streets. In general, we can say that provincial codes prohibit pedestrian usage of the streets except at perpendicular crossings (although some codes anticipate the possibility of permitting such crossings by specifying that they are prohibited “unless otherwise indicated”), and state the rights and obligations of pedestrians at intersections controlled by traffic lights or stop signs. Moreover, although some municipal regulatory frameworks say nothing about the matter, some prohibit playing and selling in the streets¹³ or state that pedestrians must cross at controlled intersections or crosswalks.¹⁴ In some cases, pedestrians are allowed to cross the street elsewhere than at the intersection, but this is generally conditional on pedestrian behaviour not impeding vehicle traffic.¹⁵

The current state of Canadian regulations makes it impossible for municipalities to explicitly decree pedestrian priority on a street or street section where regular vehicle traffic is authorized – as suggested by the above model wording for the norm. The implicit norm, expressed in the “alternate wording,” does not a priori face that obstacle.

That said, a specific analysis would be needed for each province and municipality, as the codes governing relations between pedestrians and vehicles in the street vary from province to province

and municipality to municipality. Still, with respect to drivers, a number of Canadian provincial codes contain provisions requiring them to drive cautiously and to travel at speeds that do not endanger anyone else’s life or safety.¹⁶

Facilitators

As the examples that are developing here and there show, there seems to be a demand in Canada to place a lot more value on pedestrian traffic and neighbouring activities and functions on some streets or street sections. However, even in cases in which they are open to and proactive about supporting walking, elected municipal officials and authorities are relatively reticent about making these streets and street sections fully pedestrian. In fact, completely (or almost completely) prohibiting vehicle circulation on a street can have a major impact on retail traffic at adjacent businesses, on the routes and schedules of public transit vehicles, and so forth.

Pedestrian priority streets are an option that avoids the potential pitfalls of pedestrian streets while making it possible to substantially improve (based on the development effort invested) the walking environment, and even the adjacent residential, commercial or civic areas.

Implications for practice

The state of the literature does not allow for a comparison between the benefits of streets with implicit versus explicit pedestrian priority. The sample wording for the explicit priority norm has not yet been validated by evidence. We therefore do not have the scientific evidence to show that explicit priority streets would be better for public health or safety, or have a greater propensity to promote surrounding or street activities (play, street crossing, traffic at stores, socializing, etc.). Actors who privilege an explicit norm will probably do so to see the situation normalized for the benefit of both the street users and the public authorities who, by developing this type of street, incur liability. Here, regulatory clarity may seem a better solution than development that capitalizes on ambivalence and a lack of prohibition in regulatory provisions.

¹³ See: <http://reglements.ville.quebec.qc.ca/fr/showdoc/an/R.V.Q.1091> (retrieved March 13, 2015, only available in French).

¹⁴ See: webdocs.edmonton.ca/bylaws/C5590.doc (retrieved March 13, 2015).

¹⁵ See: <http://www.mississauga.ca/file/COM/trafficdefinitionsandindex.pdf> (retrieved March 13, 2015).

¹⁶ See for example sections 100 and 101 of Nova Scotia’s *Motor Vehicle Act*: <http://nslegislature.ca/legc/statutes/motor%20vehicle.pdf> (retrieved March 13, 2015).

But, as mentioned earlier, if public health actors want to see pedestrian streets developed on which the priority is explicit, they will have to propose changes to existing provincial regulatory frameworks, which do not currently allow it. As for shared streets – streets with implicit pedestrian priority – Québec authorities seem to be somewhat ahead of the game in Canada, in that the department of transportation has developed signage which visually gives pedestrians clear priority, signalling the underlying intention to prioritize pedestrians among the users of the streets involved. To our knowledge, no other provincial body has developed such signage. Although its absence has not stopped shared streets from being developed elsewhere in Canada, as we saw earlier, demanding

such signage may be an interim step in normalizing this type of street for public health actors who do not work in contexts that are ready to change existing regulations. That will certainly require a study of each province's regulations, given how much the codes vary from province to province.

On another note, public health actors could probably also participate in discussions taking place concerning these kinds of streets in the municipalities they are responsible for. They can certainly draw attention to the potential benefits and to the specific issues that should be tackled in planning such streets (for example, designs that reduce traffic speed to levels compatible with pedestrian activity in the street).

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Appendix 1 Summary table of evaluations of pedestrian priority streets

Reference, intervention and evaluation	Indicator	Speed, volume and flow of motor vehicles	Other dimensions of security or conviviality	Pedestrian activity	Other activities on or along streets
<p>Carmine, N. & Williamson, J. (2012)</p> <p>Some sections of streets in the central business area transformed into shared space in Auckland, New Zealand. First of three phases completed in September 2011 – this one being the subject of the evaluation. Pedestrian priority, speed limit speed of 50 km/h.</p> <p>Before (2008 or 2009) /after (end October 2011) comparisons for several indicators. Speed and volume controls at several points. Combination of subjectivist and objectivist analyses.</p> <p>A before/after comparison of a section of a transformed street can be seen here: http://www.urb-i.com/#!Fort%20Street/zoom/cvk7/i1d9q</p>	<p>Depending on the point of control, reduction in AADT of between 14% and 54% between 2009 and 2011.</p> <p>Depending on the point of control, reduction of between 15% and 29% in average speed (actual practised speed of 14 to 16 km/h after the intervention).</p> <p>Depending on the point of control, reduction of between 10% and 28% of V85 (from 18 to 24 km/h after).</p> <p>Even though the speed limit is officially 50 km/h, 47% think it is 20 km/h or less.</p> <p>Even though parking is prohibited in the area (except for emergency services and delivery vehicles, at certain hours) it was found that a few cars parked there every day.</p>	<p>Increase of 10% in the number of people who consider the zone safe during the day.</p> <p>42% consider the speeds at which motor vehicles travel to be safe for walking or cycling (57% believe the contrary*).</p> <p>*In the document, the figure given is 67%, but this appears to be an error.</p> <p>Area accessible for pedestrian use increased by 32%.</p> <p>Increase of 2% in the area reserved for tables and chairs for restaurant activities.</p> <p>Increase in positive perception of the area's conviviality - from 15% in 2008 to 91% in 2011.</p> <p>No CI was recorded in 2010 and 2011, but before/after comparison is unreliable (too little time after the intervention)</p>	<p>Increase of 35% in the volume of pedestrians during peak periods (4806 in 2009 and 7397 in 2011). The authors note that a construction site may have reduced the volume measured initially, in 2009.</p> <p>Confusion concerning pedestrian priority (between 40% and 80% of respondents in two different surveys knew that pedestrians have priority).</p> <p>Increase in positive perception of the ease of street crossing (60% good or excellent in 2011 vs. 35% in 2009; 4% bad in 2011 vs. 11% in 2009).</p> <p>45% of people said they disagree or strongly disagree with the statement that they feel safe sharing the highway with different types of vehicles (44% agree or strongly agree).</p>	<p>Compared with the pre-intervention survey, 40% more respondents reported using the area as a haven and 12% less as a travel "shortcut."</p> <p>On average, 790 people used the street furniture made available for sitting (there was previously no place to sit down).</p> <p>The sales volumes of merchants in the zone increased significantly. The authors believe that this is an encouraging sign, but specify that it is difficult to directly attribute the increase to the upgrade.</p>	

Key: AADT = annual average daily traffic. Vh/h — vehicle per hour. V85 = speed at or below which 85% of motor vehicles are observed to travel. CI — collision with injury. CMI — collision with minor injury. CSMI — collision with serious or minor injury. dB(A) = decibels weighted with a type A filter. LA10 = noise level exceeded 10% of the time (the time of measurement is specified after a comma, for example LA10, 18H).

Appendix 1 Summary table of evaluations of pedestrian priority streets (cont'd)

Reference, intervention and evaluation	Indicator	Speed, volume and flow of motor vehicles	Other dimensions of security or conviviality	Pedestrian activity	Other activities on or along streets
Roberston, J. (2013) Section of a commercial street in the central business district transformed into a <i>shared space</i> in Wellington, New Zealand. Pedestrian priority, posted speed limit of 10 km/h. No two-way for cyclists. Bus re-routed to an adjacent street. Upgrade completed in October 2011. Combination of subjectivist and objectivist analyses. Before/after comparison for some indicators.		83% of motor vehicles appear to have adopted a “reasonable” speed and 17% at an “excessive” speed (at lunchtime during a period of high pedestrian volume). Speed was “far” below the former limit of 50 km/h.	At the end of 2012, 70% of participants considered the street to be “better than it used to be.” 62% said that overall appeal was improved, 34% also specifically mentioned the pedestrian amenities, 20% said the public space had improved, and 14% mentioned safety. 5% considered that an opportunity had been missed (to create a pedestrian street). 96% considered it easy to get to and around in; 86% considered it a good place for pedestrians; 85% considered it safe. 7% more pedestrians said they used the space weekly.	The great majority of users used the street like a “normal” street (circulating in the space reserved for pedestrians only, using the area where cars can circulate only to cross the street, and minimizing their crossing time). 8% reduction in overall pedestrian activity between September 2010 and October 2012. 5% increase during the morning period; 26% reduction in night time activity; 8% reduction for Saturday morning; 6% increase on the west side of the street; 15% reduction on the east side.* * The authors point to the re-routing of the bus and emphasize the significantly different weather conditions (much more inclement in 2012) in their analysis.	A certain amount of use of the street furniture for sitting and socializing was noted as well as some improvements which could be made to increase use. Absence of prior data makes it impossible to measure effect. In constant dollars, the retail sales volume was 1.4% higher in 2012 for merchants in the pedestrian priority zone as compared to 2010, and 5.9% higher than a sample from the city’s central business district, where the zone is located. However, it should be noted that the re-routing of the bus and the construction period caused a significant reduction in volume, before volume reached the levels observed in December 2012. There seems to have been a change in the mix of businesses on the street (toward an increase in higher-end retailers).

Key: AADT = annual average daily traffic. Vh/h — vehicle per hour. V85 = speed at or below which 85% of motor vehicles are observed to travel. CI — collision with injury. CMI — collision with minor injury. CSMI — collision with serious or minor injury. dB(A) = decibels weighted with a type A filter. LA10 = noise level exceeded 10% of the time (the time of measurement is specified after a comma, for example LA10, 18H).

Appendix 1 Summary table of evaluations of pedestrian priority streets (cont'd)

Reference, intervention and evaluation	Indicator	Speed, volume and flow of motor vehicles	Other dimensions of security or conviviality	Pedestrian activity	Other activities on or along streets
<p>Webster, D. et al. (2006)</p> <p>Summary of evaluations of seven home zone pilot projects implemented between 2000 and 2004 in various municipalities in the United Kingdom. The installations are in residential areas and vary in scale and type. Pedestrian priority in all cases. Posted speed limits appear to range from 16 to 32 km/h, but it seems that, during the design phase, speeds were set lower in most cases.</p> <p>The evaluations have similarities and differences. Several before/after comparisons (in two cases, there was no “after” follow-up because the projects were completed after the end of the evaluation period). Before measurements were collected in 2000, after measurements were collected between 2002 and 2004. Combination of subjectivist and objectivist approaches.</p>	<p>24% average reduction in AADT before and after interventions (from 919 before to 695 after). AADT ranges from 452 to 1400 before and from 323 to 1008 after. The authors note that at two sites volumes above the “recommended maximum” of 100 vh/h were recorded.</p> <p>32% average reduction in vehicle volumes (vh/h) during evening peak period (average of 129 before and 88 after). Vh/h volumes range from 60 to 240 before and from 35 to 130 after.</p> <p>24% average reduction in speed (from 31 to 23 km/h). Speeds range from 24 to 36 km/h before and 18 to 30 km/h after.</p> <p>25% average reduction in V85 (from 39 km/h before to 30 km/h after). V85 ranges from 31 to 46 km/h before and from 24 to 38 km/h after.</p> <p>30% reduction in the number of vehicles exceeding 32 km/h (from 42% before to 12% after). Percentages range from 11 to 65 before and from 1 to 37 after.</p>	<p>Reduction in CSMI from 2.7 to 1.7 per year for the whole set of zones.*</p> <p>73% of respondents said they found the street more attractive.</p> <p>Divergent but overall positive effects with regard to the perception of safety of the streets.</p> <p>Confusion surrounding pedestrian priority on the street.</p> <p>Limited effect on ambient noise (-1dB(A) for LA10, 18h) and on ambient levels of benzene and nitrogen dioxide. Residents’ perception: neutral effect or reduction.</p> <p>*The “before” period (60 months for each of the zones - or 720 months total) is not equivalent to the “after” period (49 months for the whole set of zones). Consequently, even though these results are consistent with the observed speed reductions and the state of knowledge on traffic calming, one should view the validity of this data with caution.</p>	<p>No change in the percentage of pedestrians regularly performing errands.</p> <p>44% of respondents reported that the experience of walking had become “more pleasant” since the redevelopment. The reasons given by respondents were greening (22%), cleanliness (13%), “surface quality” (6%), reduction in the volume of motorized traffic (4%) and its speed (2%), improved paving (2%), and the absence of sidewalks (2%).</p>	<p>No changes relating to the use of bicycles reported by respondents.</p> <p>30% of cyclists reported finding it more pleasant to travel by bicycle, 60% said the situation was unchanged, and 10% felt it was less agreeable.</p> <p>Divergent responses can be observed (for each zone and between zones), but overall respondents did not report using the street more for various activities.</p> <p>When interviewed following the redevelopment, 44% of adult respondents thought children could play in the street after the redevelopment. 36% though this would be unsafe because of the volume and speed of motorized traffic.</p>	

Key: AADT = annual average daily traffic. Vh/h — vehicle per hour. V85 = speed at or below which 85% of motor vehicles are observed to travel. CI — collision with injury. CMI — collision with minor injury. CSMI — collision with serious or minor injury. dB(A) = decibels weighted with a type A filter. LA10 = noise level exceeded 10% of the time (the time of measurement is specified after a comma, for example LA10, 18H).

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