

INFRASTRUCTURE/ **NETWORK LINKS**

## CYCLE TRACKS

### Overview

A cycle track is the highest-quality cycling infrastructure, physically separating cyclists from traffic. It is needed along very busy and fast roads and on highly used cycling routes, as well as in recreative cycling networks, often away from roads. Cycle tracks attract and reassure inexperienced cyclists, but are also space consuming and relatively costly. They are very safe along stretches of road, but particularly dangerous at intersections.

### Background and Objectives

#### Function

Cycle tracks are recommended along busy connecting roads where intensity and speed of motorized traffic make it unsafe to allow cyclists on the carriageway.

#### Scope

**Outside built-up areas**, cycle tracks are recommended along the fastest roads (speeds from 80 km/h upwards). They are also recommended along roads with lower speeds (from 60 to 80 km/h) if traffic intensities are high (over 2000 pcu/day) and especially on main cycling routes.

**Within built-up areas**, cycle tracks are recommended at speeds from 50 km/h upwards. They should also be considered at lower speeds (from 30km/h upwards) when traffic intensity is high (over 4000 EVP/h). They are best restricted to fairly long uninterrupted stretches, with few intersections.

### Implementation

#### Definition

A cycle track is a part of the road exclusively reserved for cyclists. It is compulsory for cyclists. Cars are not allowed to drive or park on it. It runs along a road, but is physically separated from the carriageway, at a horizontal distance or vertically on a higher level. A cycle track can also have its own route, independent of the road network. This called a solitary cycle track.

#### Safe, safer, safest?

Cycle tracks offer a **high degree of safety**, because they physically separate the cyclist from motorized traffic. However, it does not follow that cycle tracks are always the safest solution, that we should create as many cycle tracks as possible, and that more cycle tracks automatically increase overall road safety. Consider the following points.

On a route with many side roads and intersections, **a cycle track at a distance from the road may be less safe than a cycle lane**. This is because the cycle track is safe along road sections, but riskier at intersections. Between intersections, the cyclist and the motorist do not need to take into account each other's presence. But when they meet at an intersection, they suddenly need to mix, pay attention to each other and negotiate potential conflict situations. Multiplying such occasions is dangerous, even with carefully designed intersections.

**More cyclists on the road improve safety**. Accident statistics show that as the number of cyclists on the road increases, the accident rate drops. Even more, as the numbers increase further, the overall accident rates for all traffic modes drop as well. Systematically segregating traffic modes for safety's sake has several counter-productive effects. Car drivers become less accustomed to other road users and give them less attention and consideration when they meet

them. Moreover, segregation is a way to maintain higher speed levels, which are the most important cause of accidents. A policy of mixing traffic, combined with speed reduction and greater visual contact, will be more successful in making traffic safer.

### Design and dimensions

A cycle track is indicated by a road sign, as prescribed by the various national legislations. Specific road signs are needed when they are co-used by mopeds and pedestrians.<sup>1</sup>



D7 – Belgian road sign for a cycle track

The following design principles are recommended.

- **Separate** the cycle track **physically** from the main carriageway, by creating a physical partition or by raising the track on a higher level than the carriageway, or both.
- In case of two-way cycling traffic, **consider centre line marking**. In the case of combined cycling and moped traffic, always apply center line marking.
- Preferably **use closed surface paving** (asphalt or concrete)
- Preferably **use colored paving**, usually red, sometimes blue (may be mandatory)
- **Allow the same right-of-way regime** as for the adjacent carriageway. If the cycle track has right-of-way across a side road, continue the paving of the cycle track across the junction.<sup>2</sup>
- In case of co-use by pedestrians, **add a pedestrian pavement or sidetrack** when there are high numbers of cyclists and pedestrians or both.

A **minimum width of 2 m** is recommended for a one-way cycle track.

- Cyclists should have the possibility to ride side by side. Each cyclist takes up a minimum riding space of 0.9 m. This takes into account zigzagging and distance from edges and obstacles. Because of the physical separation, cyclists absolutely need the room to overtake on the cycle track itself. This means that a minimum distance from the separation must be respected: between 0.25 m from low kerbs and 0.625 m from closed walls.
- A width of 2 m allows for occasional overtaking when there are less than 150 cyclists per hour (at rush hour).
- It is recommended to widen up to 4 m for increasing numbers of cyclists, with frequent overtaking.
- For a two-way track, a minimum width of 2.5 m allows frequent overtaking of cyclists riding at different speed



Well-segregated cycle tracks of different widths (image source: P. Kroeze, T. Asperges)

<sup>1</sup> For pavements co-used by cyclists and pedestrians, see fact sheet on CYCLISTS AND PEDESTRIANS

<sup>2</sup> For the design of side-road crossings, see the fact sheet on RIGHT-OF-WAY INTERSECTIONS

### Types of physical segregation

**The physical segregation** varies in width and design. The farther cyclists are removed from track, the safer they feel. However, space is limited. Even when space is available outside the built-up area, the distance should be small enough to keep the track visible for motorists, for reasons of social safety.

Two basic design solutions can be distinguished: a wide partition verge when space is available, if not a narrower partition kerb.

	Partition verge <sup>3</sup>	Partition kerb <sup>4</sup>	Elevation <sup>5</sup>
<b>Application</b>	Outside and within the built-up area	Inside the built-up area, if there is insufficient room for a partition verge	Outside and within the built-up area
<b>Description</b>	Paved or unpaved, possibly raised kerb, fence or barrier	Concrete kerb or ridge, angular or semi-round (possibly a double kerb with paving in between, possibly a raised asphalt ridge)	Cycle track raised above level of carriageway, with a straight kerb
<b>Variations</b>	May accommodate street furniture (lamp posts), low vegetation or trees	May be painted white	Possibly adjacent to pedestrian pavement (on the same level or raised one more level)
<b>Recommended dimensions</b>	0.35 m wide at least 0.70 m with fence 1.00 m with lamp-posts 1.10 m with barrier 2.35 m at least with vegetation or parking Outside the built-up area, width must vary with traffic speed as a safety buffer: from 1.5 m (60km/h) up to 10 m (100 km/h or more)	Width varies Height on track side: 0.05 m to 0.07 m (choose profile that prevents pedals from striking the partition) Height on road side: 0.10 m to 0.12 m	Kerb height of cycle track: 8 to 10 cm Progressive lowering towards major intersections Width of cycle track: min. 1.7 m (for safe overtaking)



Cycle paths with verge partition, kerb partition and behind a parking lane (image source: T. Aspergers, P. Kroeze, D. Dufour)

<sup>3</sup> Certu – 2008: *Recommandations pour les aménagements cyclables*.

<sup>4</sup> Certu – 2008: *Recommandations pour les aménagements cyclables*.

<sup>5</sup> Copenhagen principles, as described in Certu – 2008: *Recommandations pour les aménagements cyclables*. Flemish Region, Vademecum fietsvoorzieningen – 2005

### One-way and two-way cycle tracks

A cycle track along a road is **preferably one-way**. Two one-way tracks on both sides of the road are the clearest and safest solution. At intersections, this situation is easy to understand: all road-users can intuitively predict and manage potential conflicts. A two-way cycle track on one side of the road makes intersections difficult to understand, because cyclists surge from unexpected directions.

Exceptionally, **two-way tracks can be justified**. To cross a street with cycle tracks, the cyclist has to make a detour via an intersection. Cyclists may even attempt to cross illegally and dangerously. In such cases, a two-way track can eliminate the need for crossing maneuvers by cyclists. It can also make the network more direct and attractive. Intersections must then be carefully designed in order to present conflicts clearly and unambiguously. Here are some key reasons for two-way cycle tracks.

- Very large roads (2x2 or dual carriageway) are difficult to cross and junctions are few and far between. With a two-way track, the cyclist can avoid significant detours.
- Sometimes, a number of major destinations are concentrated on the same side of the road. A two-way track allows cyclists to move between them more conveniently.
- In some cases, two main routes intersect with a road on the same side. A two-way track allows the cyclist to connect these two routes more easily.
- In some cases, the spatial configuration may only allow a two-way track along one side of the road.



Two-way cycle tracks, on one side of a major road (image source: P. Kroeze)

### Solitary cycle tracks

A **solitary cycle track**<sup>6</sup> is a cycle track that follows its own path, away from the road network. In addition to being safe for inexperienced cyclists, solitary tracks are also highly attractive for recreational cycling.

- In built-up areas, a stretch of solitary track can be a **functional shortcut** through a park or residential neighborhood, reducing the mesh width of the network.
- Especially in the countryside, canal verges and disused railway lines offer opportunities for attractive bicycle-only **recreative links** away from motorized traffic and over long distances. These can often be co-financed as tourist infrastructure. Urban routes along canals, railway tracks or through parks also have a recreational potential.
- Recreative routes are often circuitous and less direct. Still, they can be **functional alternatives for shorter routes**, for instance because they are flatter (avoiding gradients) or run through a more attractive environment (avoiding traffic noise and pollution).

<sup>6</sup> Solitary tracks are sometimes called cycle trails or cycle paths. Because these terms remain ambiguous, we propose the Dutch usage of "solitary tracks".

Design recommendations for a solitary cycle track.

- Allow **two-way traffic**
- Consider **co-use by mopeds** (use should be properly signaled).
- Allow a width **from 2m** (less than 50 bicycles/hour at rush hour) and 3.5 m (more than 150 bicycles/hour at rush hour) and **up to 4 m** when co-used by mopeds.
- For narrow tracks (below 2.5 m), make sure there is a **verge** on both sides that can be used by cyclists for evasive maneuvers.
- Consider adding a **centre line marking** if the track is intensively used, and always in case of co-use by mopeds.
- If it is co-used by pedestrians, consider providing a **separate side path** to avoid irritation, especially when use is intensive.
- Use **closed paving** (asphalt or concrete) for greater comfort.
- Provide **lighting** for social safety, especially on functional links in built-up areas that are used or meant to be used after dark.

Solitary cycle tracks are a key tool in **permeable urban design and planning of new developments**. New large-scale developments offer unique opportunities to create solitary track shortcuts for cyclists and enhance the quality of the network in terms of cohesion and directness. This is true for any kind of development: residential, shopping, employment, leisure, parks, green space and mixed development. The objective is twofold. On the one hand, these functions should be easily accessible for cyclists. On the other hand, they should not form a barrier for passing cyclists. Shortcuts and bypasses for cyclists should be put in wherever they add a useful link to the cycling network. They should be planned in conjunction with pedestrian shortcuts.

The most radical example is the Dutch town of Houten. When the town extension was planned, first a network of segregated solitary tracks was designed. Only then was the network of slow access roads for cars designed around it.



*Solitary cycle tracks (image source: P. Kroeze)*

## Considerations

### Strengths

**Highest safety and comfort on stretches.** Because of the separation from motorized traffic, a cycle track offers the highest degree of safety along stretches of road (between intersections). Zigzagging or unstable driving do not create important risks. A cycle track requires less concentration and mental strain from the cyclist, who can ride in a relaxed manner.

**Strong incentive to cycling.** A cycle track induces a strong perception of traffic safety. Long stretches of cycle track are therefore attractive to less experienced cyclists, as well as the elderly, children and recreative cyclists. Major stretches of cycle track can make a network significantly more attractive to new cyclists.

### Weaknesses

**Inflexible crossing.** The physical separation allows cyclists only to cross at intersections, side roads, or interruptions in the verge or partition.

**Risky at junctions.** Cyclists on a cycle track are outside the immediate field of vision of motorists. This is mainly a problem at intersections, where movements of cyclists and traffic conflict. The issue is not just bad visibility, but also the behavior of the cyclist, who needs to switch from relaxed driving between junctions to careful concentration at junctions. For all these reasons, junctions with cycle tracks need to be carefully designed to reestablish visibility, clearly present conflicts and allow for eye contact in order to induce safe behavior in all users<sup>7</sup>;

**Network fragmentation.** Within urban areas, extensive cycle track networks are often not feasible, essentially because space is restricted. Sometimes, designers like to create brief stretches of high-quality cycle track whenever the space is available, even if it is only over a short distance. Such dispersed fragments of cycle track, however, reduce the cohesion and clarity of the network. The cyclist has to adapt frequently between different types of facilities, which is stressful and frustrating. Cycle tracks are thus best restricted to fairly long network links between key urban destinations, where they can play a strong **structuring role in the network** as a major route. Wide urban boulevards or canals offer typical opportunities.

**Space consuming.** Although ideally, most cyclists would prefer cycle tracks on most of the network, space is the strongest constraint, together with the construction cost of adapting existing roads.

- In ambitious cycling-oriented urban extensions it is feasible to separate an entire network of cycle tracks from the road network (see the case of Houten).
- In existing urban areas, often when the context in principle requires a cycle track, space and cost restrictions may make this not feasible. There are two ways of dealing with this. If possible, change the context: traffic calming, adapting the traffic plan for motorized traffic, reallocate road space (such as narrowing to create room for tracks). Alternatively, resort to the more flexible alternative of cycle lanes (not separated, only road markings), taking every possible measure to reduce risk.

### Alternative options

- TRAFFIC CALMING, to eliminate the need for cycle tracks and allow mixed traffic.
- A CYCLE STREET, on major routes through residential areas.
- A CYCLE LANE, when space for tracks is unavailable and traffic intensities and speed make this possible.

<sup>7</sup> See also the fact sheets on JUNCTIONS