

INFRASTRUCTURE/ **NETWORK LINKS**

**BICYCLE and BUSES**

Overview

Mixing bicycles and buses is a safety issue. Ideally, cycle routes should be created away from bus routes, but this is not always possible in dense urban areas. On 30 km/h roads bicycles and buses can safely mix, at higher speeds they should be separated. Bus/bike lanes can strengthen the network with additional shortcuts, but only at low speeds, on short stretches and with careful design to ensure safety. They should not be used as a way to avoid tough choices.

Background and Objectives

*Function*

Road design must guarantee cyclists' safety on bus routes.

Combined bus/bike lanes have a twofold function:

- Cohesion: allow the cycling network to continue when space is lacking for separate provision;
- Directness: add shortcut links to the cycle network, not accessible to motorized traffic.

*Scope*

**Buses create hazards** for cyclists due to their mass, their speed and their limited capacity for maneuvering. Cyclists' safety must be guaranteed on all public transport routes whatever the level of cycling link and cycling intensity.

**Outside the built-up area**, separating the cyclist from public transport will generally be needed, due to elevated speeds.

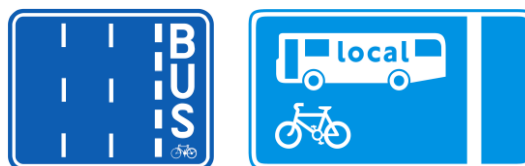
**Inside the built-up area,**

- Buses and cyclists can mix in 30 km/h areas.
- When buses drive faster, cyclists should be on tracks or lanes alongside buses.
- Bus/bike lanes can be considered when space for separate cycling provision is not available. This should be limited to short stretches where buses drives max. 30 km/h.

Implementation

*Definition*

- When buses are on the carriageway, cycling may be **mixed or separated**.
- Cyclists may be allowed to use bus lanes, in one or two directions. In many traffic codes, additional signage is available to exempt cyclists from the traffic restriction on bus lanes, creating a bus/bike lane.



Signaling for a bus/bike lane (BE and UK)



### Buses and cyclists on the carriageway

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Buses on the carriageway are a safety issue for cyclists.

- Objectively, buses, just like lorries, create greater **hazards** for cyclists than passenger cars: larger mass, slower maneuvering, wider turning radius, longer breaking distance, worse cyclist visibility (dead angle).
- Because of this, they may also **frighten cyclists** away, especially the less experienced ones. More experienced cyclists will take into account the difference between car and bus behavior, and will show extra care: overtake less, keep more of a distance. Even so, this implies additional stress and less comfort.

Cyclists need to **be and feel safe and comfortable** on bus routes. However, separating them from buses is not always necessary. Much depends on the **type of road** and the **type of bus link**: fast connector buses or local buses. Ideally, there should be a close fit between road function and bus function. If this is the case, the design solutions for cycling are fairly straightforward.

- For **connector bus links on busy distributor roads** speed is the first service objective. Routes tend to be straight and stops fairly distant from each other. Between stops, buses will accelerate to speeds of 50 km/h or more, just like other traffic on the busy road. In all such cases, **separating cyclists** on a cycle track is recommended. This is true for all levels in the cycle network.
- For **local access bus routes on local access roads** the first requirement is not speed, but territorial coverage. Routes tend to be less straight, and stops more frequent. Speed between stops will remain below 30km/h, driving in mostly quiet residential neighborhoods. In such cases, **mixing cyclists and buses** is possible, within a general mixed traffic design. On main cycling links, a separate cycling track may be provided, as a way to increase cycling comfort and make the route more attractive.

**Bus routes on school cycling routes** may require extra care. School children often ride in groups and may behave unpredictably. Even on a quiet estate access road with only an occasional slow bus, separating cycling school children may be required for safety.

### Bus lanes and bicycles

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Since their first use in Germany in the early sixties, **bus lanes** have become increasingly widespread in cities of all sizes. This is because buses suffer strongly from increasingly congested traffic, more so than rail-bound transport. To **increase the service speed of buses**, dedicated lanes are exclusively reserved for buses.

- In most countries, there is a **legal framework** for bus lanes, indicated by signage and road markings. They may have an open profile (flush or elevated) or be physically separated (closed profile). The latter makes the lane better respected, but is less flexible: the bus cannot leave the lane to avoid delivery vans, movers' trucks or illegally parked cars). The physically required width is about 3.2 m in one direction, and 6.1 m in two directions.
- **Outside built-up areas**, bus lanes are mostly used over **long stretches** of **connecting links** on major roads (similar to HOV-lanes on motorways) where buses can drive faster and stops can be safely removed from traffic.
- **Inside the built-up area**, they are typically used over **short stretches**, allowing buses to **bypass local congestion points**. There, buses usually drive at **relatively low speeds**, even on 50 km/h roads on these short stretches.
- Bus lanes are often **combined with bus-friendly traffic light regulation**. The bus lane serves as a buses-only stacking lane. This may for instance allow the bus to approach the traffic light, which then turns green first to give the bus a head start. Another example is when a bus lane provides a right-turn bypass.
- Bus lanes are also installed **in contra-flow direction** of general traffic. The advantage is that this reduces the risk of cars using the bus lane.
- Sometimes, bus lanes are **restricted to time-windows**. They may be limited to peak hours, to allow parking outside of peak hours, or their direction may be inverted at morning and evening peak times. The disadvantage is that this creates changing and less predictable situations, and cannot easily be designed at entry and exit points for shifting usage.



- Increasingly, bus lanes are **open to taxi cabs**, in effort to promote taxis as a flexible form of public transport.
- Bus lanes may take the form of **bus gates**. These are places where only buses are allowed to pass. Often access to vehicles is physically restricted by means of retractable bollards or gaps in the road surface that only buses can drive over.

The impact on cycling depends on the available space.

- With sufficient space, the bus lane can act as a **buffer zone between cyclists and general traffic**. A cycle lane can be inserted between the pavement and the bus lane, for instance a 3 m wide bus lane and a 1.5 m cycle lane, for a total width of 4.5 m. This way, the cyclist is kept farther away from traffic. Buses are much less frequent than traffic and approaching bus drivers have a clear view of cyclists. However, the cycle lane should never be between the bus lane and traffic: this way the cyclist is squeezed between traffic and buses.
- **When space is restricted**, bus lanes and leave **less space for cycling provision**. This is regrettable, since bus routes often run along interesting cycling connections, serving key urban destinations. If these are congested, the cyclist will have less room for maneuvering with a bus lane than without.

### Bus/bike lanes

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For safety's sake, **cyclists should be separated from buses**, except on the slowest roads. Ideally, cycle routes are created away from bus routes. If they are on the same roads, then cyclists should be on their own cycle lane or track. This may need taking out a traffic lane or a parking lane, or reducing pavement width. Cyclists should be allowed to use shortcuts or contra-flow stretches reserved for buses only, but again ideally on a separate lane or track. This is standard practice in CHAMPION CYCLE CITIES, assuring maximum safety and comfort.

However, many STARTER CYCLING CITIES have to deal with narrow streets and dense bus networks, especially in their central city areas. They increasingly use **bus/bike lanes as a compromise solution**, allowing cyclists to ride on bus lanes.

Apart from the **safety risk** for the cyclist, there is also the issue of **delay for buses**. If buses are slowed down by cyclists, this defeats the purpose of the bus lane to some extent. It also means that the benefits for cyclists are limited: they have to wait behind buses at stops, or step aside to let a bus take over. However, on balance, buses and cyclists may be better off than being stuck in traffic without any provision at all.

In practice, experiences are mainly positive. Most try-out schemes are continued and multiplied. Initially stringent width requirements are progressively relaxed or abandoned. Recent UK research<sup>1</sup> has concluded that **delays and risks seem minimal**. Delay mostly took the form of a bus briefly slowing down behind a cyclist on approaching a bus stop. Slower cyclists avoid delaying buses, by accelerating or stepping aside to allow buses to pass. With an open profile, buses overtake by moving out of the lane on to the carriageway.

However, we have to realize that bus/bike lanes have a **limited appeal**. Fairly experienced cyclists will appreciate the improvement and be happy to use them, for instance to jump the traffic queue. But less experienced cyclists are likely to feel uncomfortable or stressed sharing space with buses, and feel the need to step down when a bus overtakes. Parents will probably hesitate to allow small children unaccompanied on bus/bike lanes. This means that bus/bike lanes are a step forward from no cycling provision at all, but are unlikely to appeal to significant numbers of new cyclists.

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<sup>1</sup> TRL Report 610, 2004: *Cycling in bus lanes*, quoted in Cycling England design guidelines 2007: *A.10 Bus Lanes and Bus Stops* and in 2007, *Fietsvademeccum Brussels Hoofdstedelijk Gewest*.



*Bus/bike lane as a traffic light bypass for a right turn, with a closed profile and cycle road symbols (D. Dufour)*



*A tight bus/bike lane helps to bypass a congestion point, with an open profile and cycle symbols (D. Dufour)*

Here are some recommendations to ensure safety<sup>2</sup>.

- Use bus/bike lanes **on short stretches only** (less than 200 m) or with short distances between stops, so that buses' cruising speed is generally below 30 km/h. On longer stretches, buses will tend to speed up and the difference with cycling speed will become dangerous.
- Consider a **bus/bike lane at widths of 3 m to 3.25 m**. Bus lanes need a minimum width of 3m and there is no room for a cycle lane (min. 1m). Up to 3.25 m, buses and cyclists cannot overtake without leaving the bus/bike lane, which causes occasional delay to both. Buses will keep behind cyclists, briefly slowing down until the next stop or the end of the bus lane. Or the cyclist will step down to the side, for instance on a parking lane, to let the bus pass. With an open profile, both can move onto the carriageway to overtake, but this is a hazardous maneuver and it will generally not be possible if there is a traffic queue.
- **Avoid critical widths from 3.25 m to 4 m**. This is an ambiguous and dangerous situation. Bus drivers and cyclists may have the impression that overtaking is possible, although it is not. Buses may squeeze cyclists to the side or move on to the carriageway without realizing it.
- **From 4 m wide provide a separate bus lane and bike lane**. With this much space, buses and cyclists can of course easily overtake on a bus/bike lane. But there is also sufficient space for a 3 m bus lane and a 1m cycle lane. Providing separate spaces is the safer and more comfortable option.
- Apply **appropriate signaling**. Often this is a bus lane sign, with an additional cycle exemption sign. Alternatively, a single panel for bus/bike lane may exist. In several countries (BE, UK) allowing cyclists on bus lanes is the default option for road managers, and banning requires an explicitly justified decision.
- Apply **suggestion lane road markings** to draw bus drivers' attention to the presence of cyclists: cycle symbols and arrows at entry and exit and at regular intervals.
- In one-way streets reserved for buses, allow **contra-flow cycling on bus-bike lanes**. In this case, there must be sufficient width to cross (at least 4.5 m). This can be combined with cyclists driving with the bus flow, with or without a lane. This needs careful design at entry and exit points for cyclists.

Bus/bike lanes require **cooperation with the public transport operator**.

- **Good practices and research results** will be needed to overcome their understandable reluctance.
- It is crucial to set out **consistent city-wide design guidelines**, so that all road users meet familiar and predictable situations.
- Extra **driver training** is recommended. Especially in starter countries, with relatively few cyclists on the road, public transport drivers need to become aware of the presence of cyclists, respect them, understand their riding behavior and follow a code of conduct for a number of specific conflict situations.

<sup>2</sup> Adapted from: Dupriez, Benoît et Vertriest Miguel, IBSR / BIVV – 2009: *Cyclistes et transport en commun*.



## Considerations

### Strengths

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Bus/bike lanes can **strengthen a cycle network** that is still limited when space is restricted.

- Running cycle links along public transport routes often creates strong links to urban destinations.
- Bus/bike lanes are easy and inexpensive to implement. They are also a highly visible way of giving cyclists privileges over other traffic.

### Weaknesses

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There is a real risk that bus/bike lanes are **overused as a quick fix** to avoid difficult choices about space allocation. The default option should be to separate cyclists and buses: this is always safer and more comfortable, and will attract more cyclists. But this may require taking out a traffic lane or a parking lane or reducing the pavement width.

### Alternative options

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- Providing a cycle route away from bus routes is always safer, but may be less direct.
- Create space for a CYCLE LANE or track next to the BUS LANE, by taking out a traffic lane or a parking lane or reducing pavement width. Space can be saved by creating a cycle lane on the pavement, shared with pedestrians (see fact sheet on CYCLISTS AND PEDESTRIANS).