# Streets for walking & cycling

Designing for safety, accessibility, and comfort in African cities

**UN@HABITAT**
FOR A BETTER URBAN FUTURE

**✷ITDP**

## Acknowledgements

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# Foreword

While increased urbanization brings with it many opportunities, it also tends to be associated with increasing traffic congestion, air pollution, injuries and deaths from road accidents.

UN-Habitat seeks to promote more walkable cities, where better facilities for walking and cycling are integrated with safe, reliable, and affordable public transport. These ingredients contribute to making cities more inclusive and accessible to all. They also contribute to reducing the environmental footprint of growing urban areas.

Road traffic accidents are a major cause of deaths and disabilities, particularly in developing countries. The World Health Organization Global Status report on Road Safety 2015 showed that the Africa region had 26.6 deaths per 100,000 populations—the highest amongst all regions.

UN-Habitat and the Institute for Transportation and Development Policy have collaborated with several cities in Africa in introducing modern forms of public transport such as bus rapid transit and in making cycling and walking, the most common modes of travel, safer and more attractive. We have tried to show that relatively simple and low-cost measures such as reducing vehicle speeds through better design of roads, provision of safe and more convenient pedestrian crossings and separation between high-speed vehicles and people can make walking and cycling safer. While urbanization continues rapidly in Africa, these measures will be even more important.

I hope that *Streets for Walking and Cycling: Designing for Safety, Accessibility, and Comfort in African Cities* will be found useful by city planners, engineers and architects across Africa.

Maimunah Mohd. Sharif
Executive Director, UN-Habitat and
United Nations Under-Secretary-General

# Contents

# Introduction

Walking and cycling are healthy and pollution-free forms of mobility that are fundamental to life. In African cities, many are dependent on these modes as their primary means of transport. Even for those who choose public transport or personal motor vehicles, walking often becomes the dominant mode for short trips during the day. The poor quality of infrastructure for active modes, however, sends a message that pedestrians and cyclists are not welcome in the urban environment.

Fortunately, transport policy in Africa is beginning to recognise the integral role of walking and cycling in any sustainable transport system. Increasingly, African nations and cities are adopting non-motorised transport policies that call for a safe, comfortable, and convenient environment for pedestrians, cyclists, bicycle taxis, and other forms of *active* transport. These policies recognise that active modes are crucial forms of affordable transport that bring significant health benefits. As zero-emission modes, walking and cycling are also critical to efforts to reduce harmful local pollution and greenhouse gas emissions. Building on the policies, cities are investing in better facilities to improve the convenience, comfort, and safety of walking and cycling. These initiatives benefit existing users and also encourage new users to begin walking or cycling in response to improvements.

The United Nations Human Settlements Programme (UN-Habitat) and the Institute for Transportation and Development Policy (ITDP) offer this quick reference guide on the design of street elements that can help create a safe, usable, and accessible environment for pedestrians and cyclists.

The examples and recommendations in this guide are based on field experience of UN-Habitat and ITDP in implementing the Global Environment Facility (GEF)-supported project, "Promoting sustainable transport solutions for East African cities (SUSTRAN)," in Addis Ababa, Kampala, and Nairobi. In addition, examples were drawn from Ruiru, Kenya, during the preparation of a Sustainable Urban Mobility Plan, and from other African cities. The local and international best practices presented in this guide highlight street design techniques that have proven successful across multiple cultures and contexts.

# Designing for safety

Keeping vehicle speeds low is a crucial element of pedestrian safety. People hit by vehicles travelling at higher speeds have a much higher chance of death than those hit by vehicles travelling at lower speeds. At speeds below 30 km/h, it is much easier for drivers to see their surrounding and detect any potential conflicts with pedestrians, cyclists, or other motor vehicles.

In addition to the risks associated with collisions, high speed also reduces the driver's field of view, thus affecting the driver's ability to respond to changing conditions in the roadway. Slower vehicles also create a feeling of safety for pedestrians. Lower vehicle speeds allow for pedestrians to relax as they journey to their destinations.
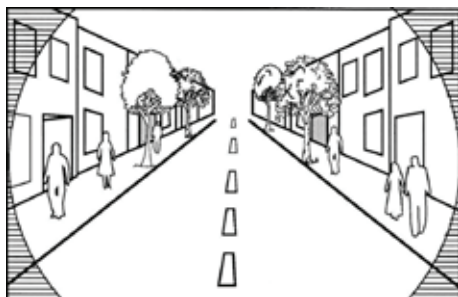


20 km/h
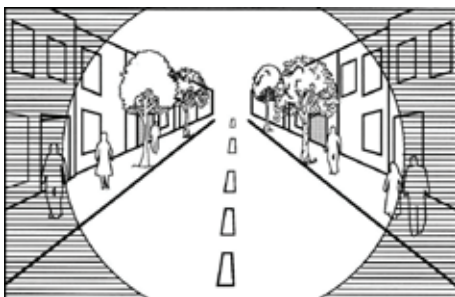
30 km/h

40 km/h

50 km/h

As the speed of a motor vehicle increases, the field of vision narrows, making it harder for the driver to respond to sudden incidents—such as a child running into the street.

Making non-motorised modes of transport viable and convenient requires rebalancing street space so that it caters to all modes of transport. Accommodating pedestrians and cyclists involves two basic techniques:

- **Systematic traffic calming on smaller streets** to provide safe places for the mixing of pedestrians and other modes (e.g., shared lanes).
- **Pedestrian and cycle infrastructure that is physically separated from motor vehicle traffic on larger streets**. Pedestrian footpaths should provide clear space for walking as well as dedicated cycle tracks, separate from the mixed traffic carriageway. Safe crossings should be provided at regular intervals.

The following sections describe these elements in greater detail.
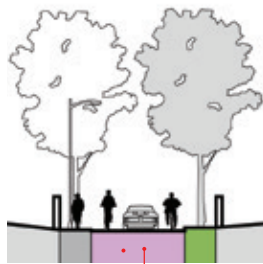
Shared lane

Slow zone

Cross sections incorporating safe spaces for walking and cycling: A 7.5 m street (left) is a shared space where pedestrians mix with slow-speed vehicle movement. A 42 m street (below) separates faster moving vehicles from pedestrians and cyclists through the provision of a slow-speed shared lane, footpaths, and cycle tracks.
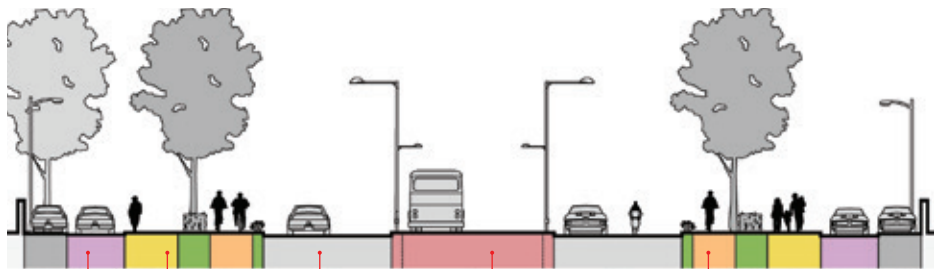
Shared lane   Footpath   Carriageway   Bus rapid transit   Cycle track

Slower  ←——→  Faster  ←——→  Slower

Slow zone   Mobility zone   Slow zone

**FOOTPATHS**

# Footpath elements

Well planned footpaths provide continuous space for walking. They also support other activities such as street vending and waiting at bus stops without compromising pedestrian mobility. The success of a footpath depends on the integration of multiple elements in a coherent design.
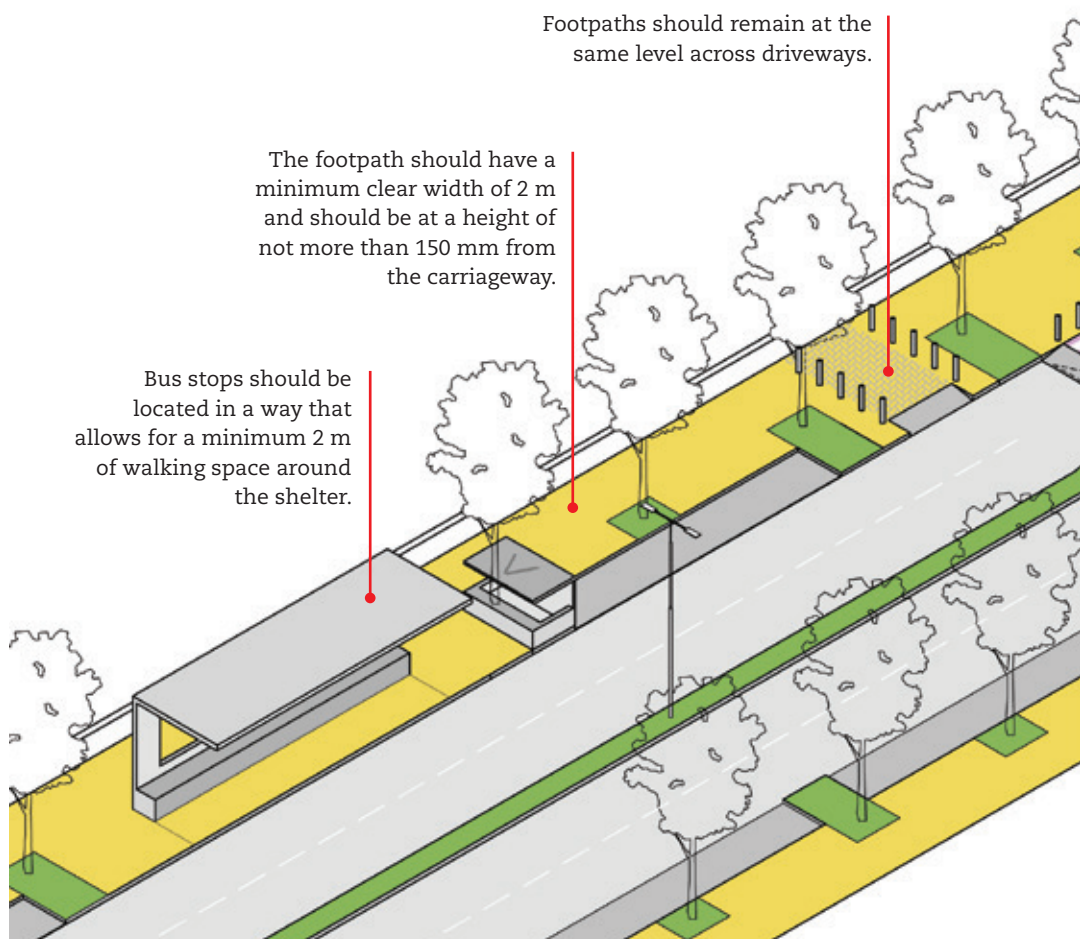
Footpaths should remain at the same level across driveways.

The footpath should have a minimum clear width of 2 m and should be at a height of not more than 150 mm from the carriageway.

Bus stops should be located in a way that allows for a minimum 2 m of walking space around the shelter.

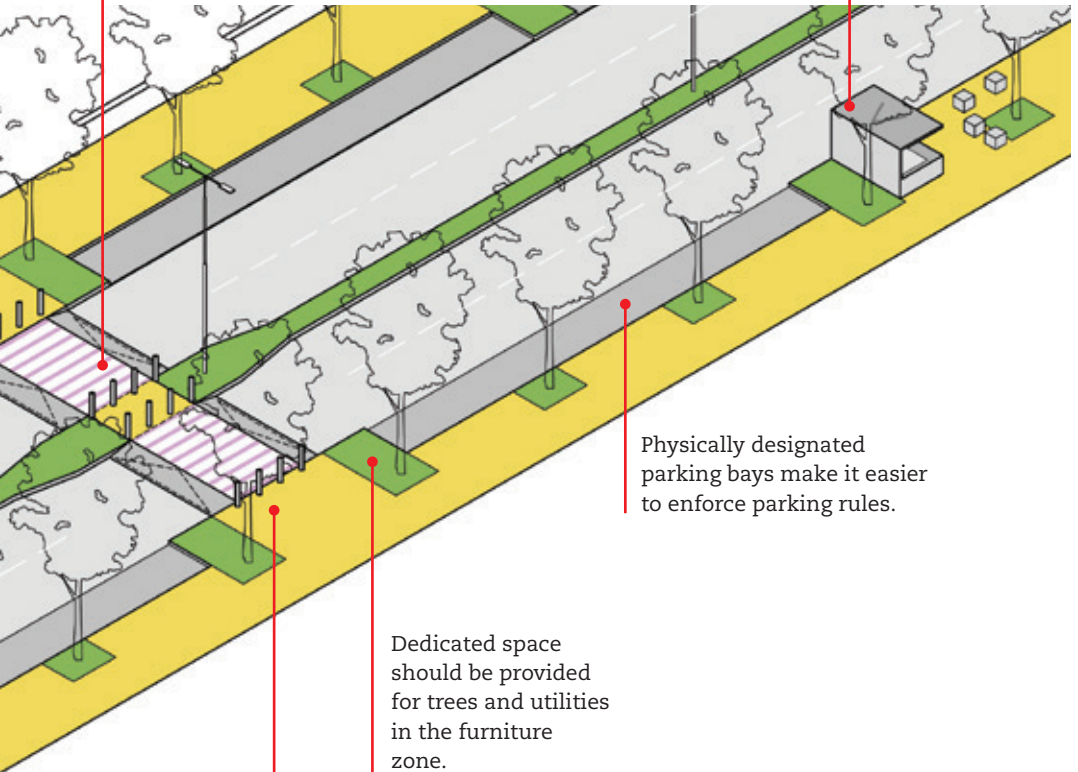Pedestrian crossings should be located wherever there is a concentrated need for people to cross the street (e.g., at a bus stop, at an entrance to a shopping mall, or where a path intersects the street). In dense areas, crossings can be spaced at regular intervals (i.e., 50-100 m). A raised crossing (at least 100 mm above the road surface) is ideal.

Space for vendors can be given in the furniture zone or on bulbouts in the parking lane.



Physically designated parking bays make it easier to enforce parking rules.

Dedicated space should be provided for trees and utilities in the furniture zone.

Bulbouts at pedestrian crossings reduce the walking distance across the carriageway.

# Zoning system

Comfort, continuity, and safety are the governing criteria for the design and construction of pedestrian facilities. For this reason, the footpaths are divided into three main zones: the frontage zone, the pedestrian zone, and the furniture zone. Each of these zones plays an important role in a well-functioning footpath.
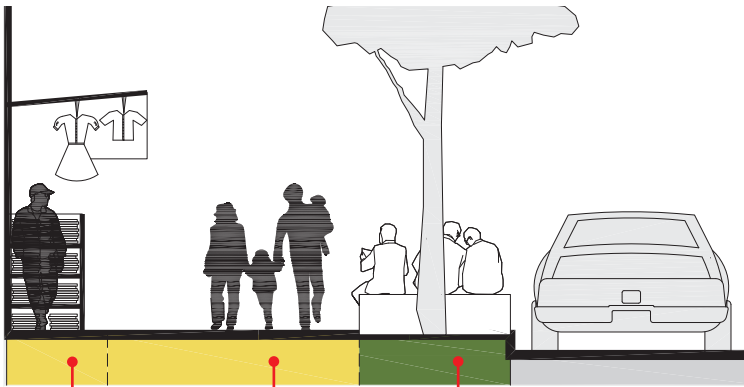


**Frontage zone**
The frontage zone can vary from a minimum width of 0.5 m along a compound wall to 1.0 m or more in commercial zones.

**Pedestrian zone**
The pedestrian zone provides continuous clear space for walking. The clear width must be at least 2 m in order to accommodate two wheelchair users at the same time and must be entirely free of obstructions.

**Furniture zone**
Manholes, trees, benches, utility boxes, and other potential obstructions should be placed outside the path of travel along a continuous line.

✗ The absence of a pedestrian zone forces people to walk in the carriageway. Light poles, trees, and other elements should be placed in the furniture zone.
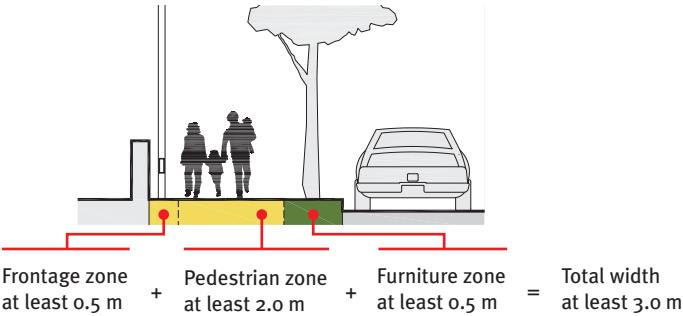


Frontage zone

Pedestrian zone

Furniture zone

✔ Footpaths designed per the zoning system provide uninterrupted walking space for pedestrians. The pedestrian zone should have at least 2 m of clear space.

# Width

The width of the of the footpath can vary as per the adjacent land use.
Footpaths in residential areas require a minimum clear width of 2 m, which is
enough space for two wheelchairs to pass each other. For commercial areas, the
clear width should be at least 2.5 m.

**Residential zone**

Frontage zone at least 0.5 m + Pedestrian zone at least 2.0 m + Furniture zone at least 0.5 m = Total width at least 3.0 m

**Commercial zone**

Frontage zone at least 1.0 m + Pedestrian zone at least 2.5 m + Furniture zone at least 0.5 m = Total width at least 4.0 m
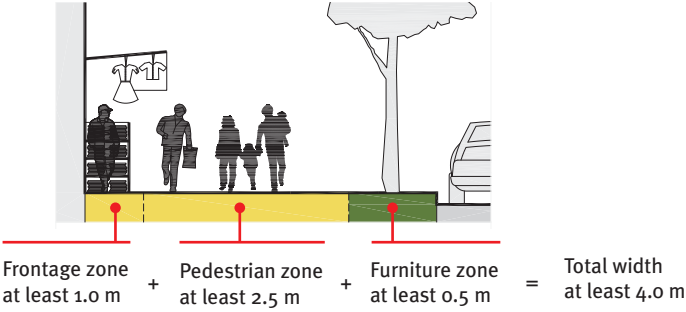
**High-intensity commercial zone**

Frontage zone at least 1.5 m + Pedestrian zone at least 4.0 m + Furniture zone at least 1.5 m = Total width at least 7.0 m
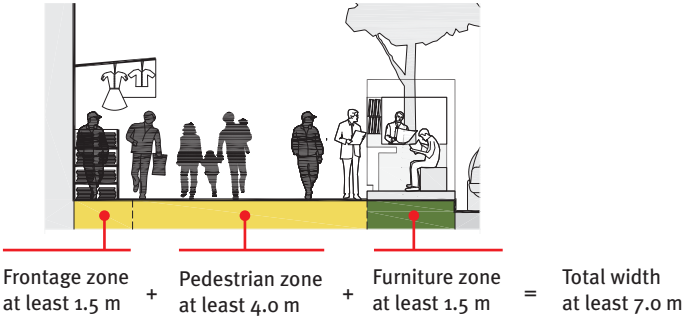
# Height

Footpaths should be elevated above the carriageway, with a kerb height of no more than 150 mm.



✘ Footpaths constructed at the same level as the carriageway are prone to waterlogging and accumulation of dirt.



✔ Footpaths should be elevated 150 mm above the carriageway.

# Surface

Footpaths should have flat walking surfaces, allowing for proper drainage and preventing puddles from forming. Guide tiles should be laid along the length of the footpath to assist persons with vision impairments.



✘ An uneven surface can make a footpath difficult to use.



✔ Footpaths with proper surfacing can be used by pedestrians.

# Property entrances

Footpaths must be continuous at property entrances for uninterrupted pedestrian movement. The height of the footpath should remain the same, with ramps for vehicles. Bollards should be installed to prevent vehicles from parking on footpaths, with spacing of 1.2 m between at least one set of bollards to allow wheelchairs to pass. Since cars are heavier than people, the pavement at property entrances should be more robust than other sections of the footpath.
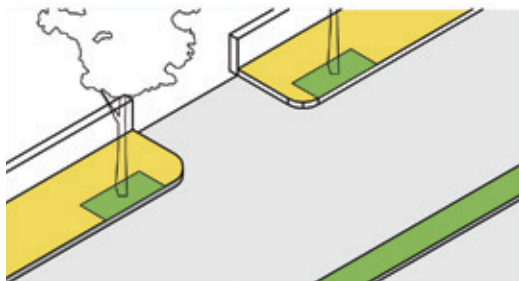


✖ Ending the footpath with abrupt curbs renders the footpath inaccessible for many pedestrians.
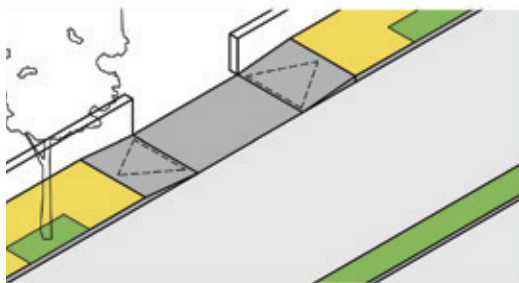


✖ Lowering the entire footpath to the level of the carriageway is unacceptable as property entrances may become waterlogged.
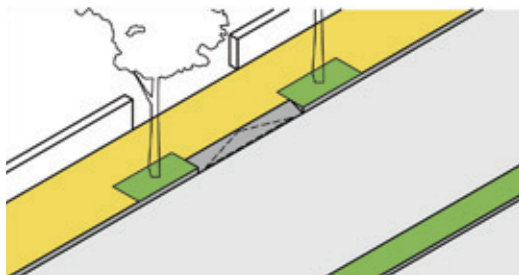


✔ Where required to provide the access to private properties, vehicle ramps should be provided in the furniture zone.

✗ Steps or steep ramps at property entrances make footpaths difficult to use, and driveways that are not elevated to the level of the footpath become waterlogged.



Slope = 1:5

≥ 1.2 m clear width

✔ Footpaths that maintain a constant level through property entrances are convenient for pedestrians to use. Vehicles use a ramp, helping to reduce speeds.

# Shade

Continuous shade from street trees reduces the street temperature, making it comfortable for people to walk, cycle, or gather for social activities, even during summer afternoons. This is especially important in cities with a humid climate or harsh daytime sun.



✘ A lack of shade contributes to a poor quality walking environment, particularly in cities with hot climates.



✔ Shade enhances the walking environment. Street designs should take into account the position of existing trees so that they can be retained during construction.

# Lighting

Adequate lighting helps to reduce the perceived and actual threat of harassment and criminal activity, thereby encouraging walking trips.



✘ A lack of public street lighting contributes to an unsafe walking environment.



✔ Continuous lighting improves safety and personal security.

# Vending

Street vending provides essential goods and services to a wide range of population groups. It also makes public space safer by contributing "eyes on the street," particularly on streets lined with compound walls. If designed properly, vending can be accommodated in the streetscape without interfering with other uses. The furniture zone of the footpath or a bulbout in the parking lane are ideal locations for vending. The material used for the vending area should facilitate good drainage.
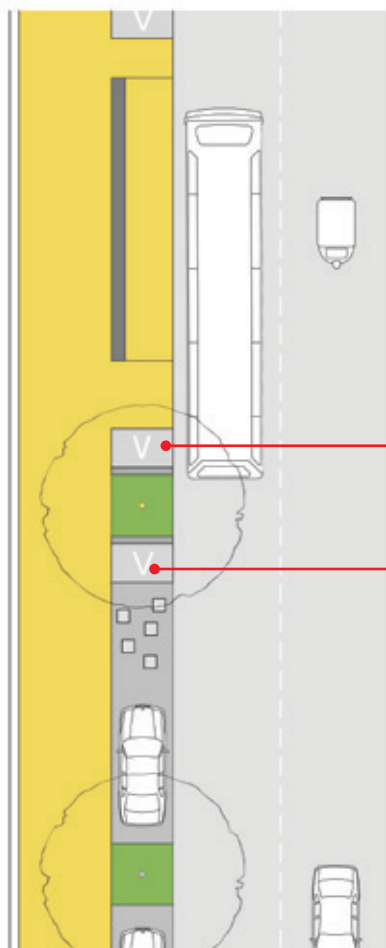


Vending spaces should be placed in a bulbout in the parking lane (as pictured here) or in the furniture zone, leaving clear space for pedestrian movement.

Vendors tend to be attracted to spaces under trees or close to bus stops. Vendors also prefer spots that are visible to passersby.

✖ If streets do not provide designated zones for vending, these activities can become obstructions, forcing pedestrians to walk in the carriageway.



✔ Footpaths should be designed such that there is sufficient space for vending outside of the pedestrian zone.

# Bus stops

Well-designed bus stops offer a comfortable, weather-protected waiting area for public transport passengers while leaving clear space for pedestrian movement behind the shelter. Bus bays should be avoided because they increase travel times for bus users and result in commuters standing in the street while waiting for the bus. Bus stops should be placed adjacent to the bus' line of travel so that the bus does not need to pull over. Bus bays are only necessary where there is high-speed and high-volume traffic.

## Streets without on-street parking
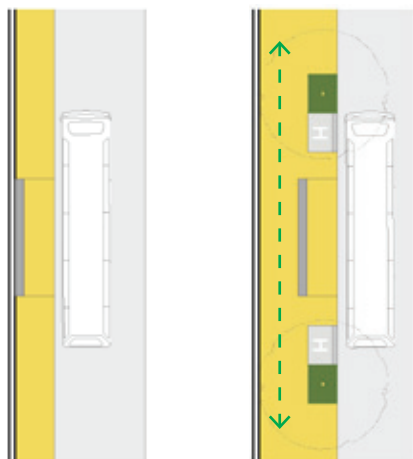


In places where the bus stop interferes with the movement of pedestrians, the footpath should be redesigned to avoid conflict.

Where a larger width is available, the bus stop should be placed in the furniture zone, leaving at least 2.0 m of clear width on the footpath.

## Streets with on-street parking
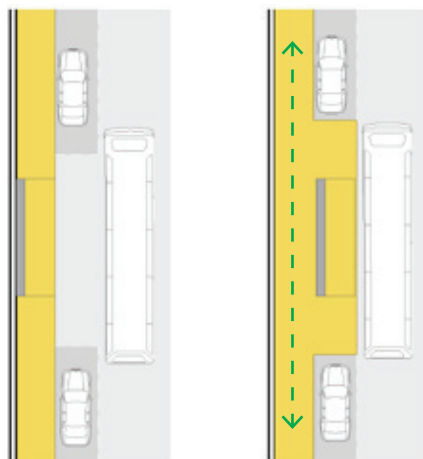


If there is a parking lane between the footpath and the carriageway, the bus stop must be placed on a bulbout in the parking lane, giving passengers direct access to the bus and pedestrians a clear width of at least 2.0 m on the footpath.

✖ The bus shelter occupies almost the entire width of the footpath, leaving little space for pedestrian through movement.



✔ This bus stop is located on a bulbout in the parking lane. Passengers can board directly from the curb rather than stepping into the street. Clear space for pedestrian movement is provided behind the bus stop.

# Parking bays

On-street parking should be discouraged as it is often abused. Instead, valuable street space should be used for wider walkways, trees, cycle tracks, cycle parking, vending, and social gathering space.

On-street parking may be allowed on streets where all the other requirements for public transport and non-motorised travel have been met. The material for the parking areas should be different from that of the carriage way to help define where parking is permitted.
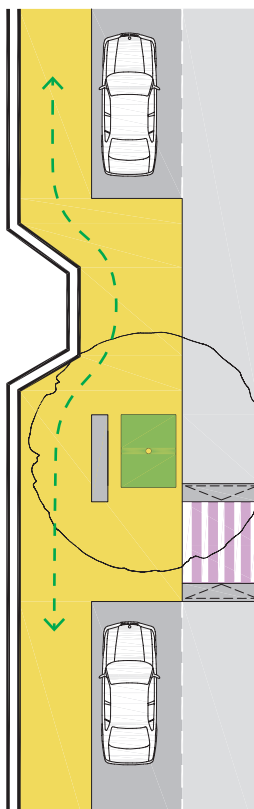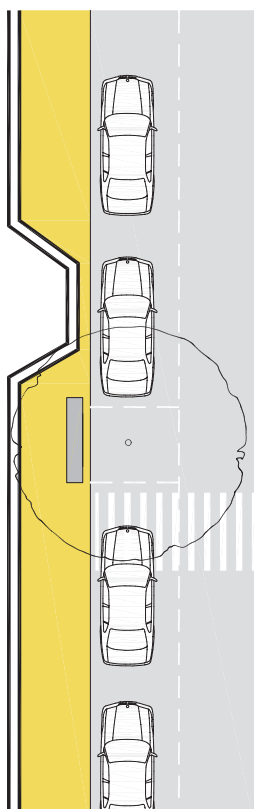


Parking bays should be avoided at intersections, bus stops, mid-block crossings, or locations with unavoidable changes in the right-of-way that would compromise the width of the footpath.

Where there is insufficient space for tree pits, utility boxes, street furniture, or vending on the footpath, the footpath should be extended through a bulbout in the parking lane.

✖ Angular and perpendicular parking occupy a large portion of the right-of-way. Exiting the parking bay can be dangerous because drivers have limited visibility.

The standard width for a parallel parking lane is 2 m. Parking stalls need not be delineated. Larger parking slots can be provided for persons with disabilities.
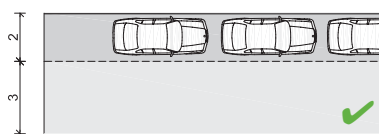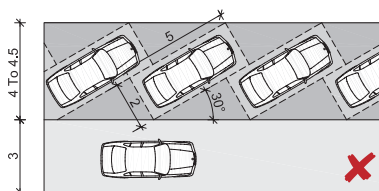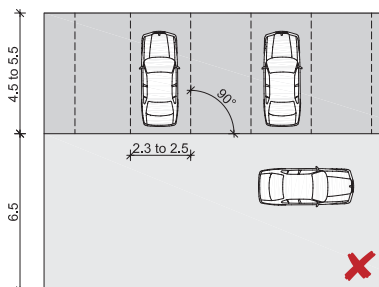


✔ Parallel parking for cars is preferred over angular or perpendicular parking because it saves space and is safer while exiting the parking bay. Parallel parking also doubles as perpendicular parking for cycles and two wheelers.

# CROSSINGS

# Mid-block pedestrian crossings

A formal pedestrian crossing should be located wherever there is a concentrated need for people to cross the street (e.g., at a bus stop, at an entrance to a shopping mall, or where a path intersects the street). In dense areas, the crossings can be spaced at regular intervals (i.e., 50-100 m).

To ensure safety, formal crossings should be signalised or should be constructed as tabletop crossings with ramps for vehicles. The purpose of a tabletop crossing is to reduce vehicle speeds and also emphasise the presence of the pedestrian crossing. Warning tiles should be laid wherever there is a pedestrian crossing.

At-grade crossings are superior to pedestrian foot overbridges or tunnels. Pedestrians dislike having to climb a stairway in order to cross the street, so they are likely to avoid it and will cross at-grade as they please. This preference makes costly overbridges and tunnels an unwise use of limited resources.
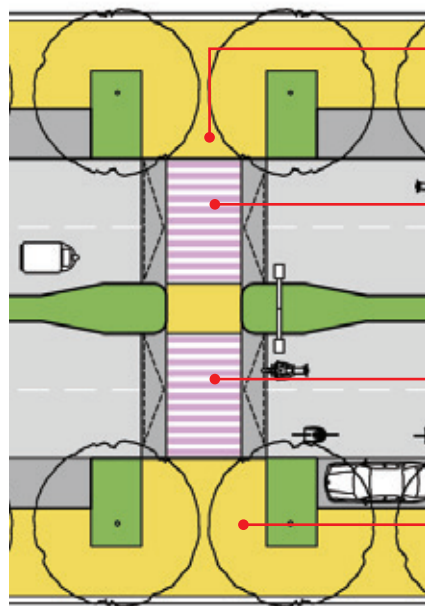


**Accessibility.** Warning tiles should be placed at the edge of the footpath to warn those with visual impairments about the carriageway.

**Height**. Crosswalks should be elevated to or just below the level of the adjacent footpath (at least 100 mm above the road surface) with ramps for motor vehicles with a slope of 1:10.

**Width**. Crossings should be as wide as the adjacent footpath and never narrower than 3 m.

**Crossing distance**. Pedestrians must be given the shortest possible direct route to cross the street. The bulbout into the parking lane helps reduce the crossing distance.

❌ The absence of raised a traffic-calmed crossing allows for vehicles to drive at high speeds, making it dangerous for the girls to cross the road.



✔ Raised crossings compel vehicles to reduce their speed, thereby increasing pedestrian safety.

# Best to avoid:
# Footbridges & subways

In an attempt to increase motor vehicle speeds, at-grade pedestrian crossings are frequently replaced by foot overbridges or subways. Since these facilities are inaccessible to many people, they should be avoided as much as possible. Grade-separated pedestrian crossings have numerous drawbacks:

- **Increase in travel time**. Footbridges lead to circuitous walking routes that typically increase travel distances and times, thereby discouraging walking. Pedestrians typically seek out short, direct routes to their destinations.
- **Lack of universal access**. Footbridges are often inaccessible and increase barriers to persons with disabilities, people carrying luggage, and parents with strollers. Extensive ramping may be installed to accommodate wheelchairs and bicyclists, but long crossing distances and steep slopes still discourage use.
- **Obstructions on footpaths**. Due to land constraints, footbridges can sometimes block footpaths. In order to accommodate both footbridges and footpaths, there might be need to acquire land outside the public right-of-way (ROW), which can be expensive.
- **Prohibitive cost**. Footbridges cost upwards of twenty times as much as at-grade crossings.
- **Harassment and other crimes**. The walking environment in grade separated facilities is generally poor and potentially unsafe with regard to sexual assault and other crimes, especially during night-time hours, since the facilities are by definition removed from street-level activity and the security it provides.
- **Increased vehicle speeds**. Grade separation also tends to increase motor vehicle speeds, further degrading the overall walking environment in the vicinity of the footbridge, especially for those who cross at grade.

❌ Foot overbridges often obstruct footpaths and cycle tracks, making them completely inaccessible.



❌ Footbridges often represent a wasted investment. When presented with a choice, pedestrians prefer to cross at street level.
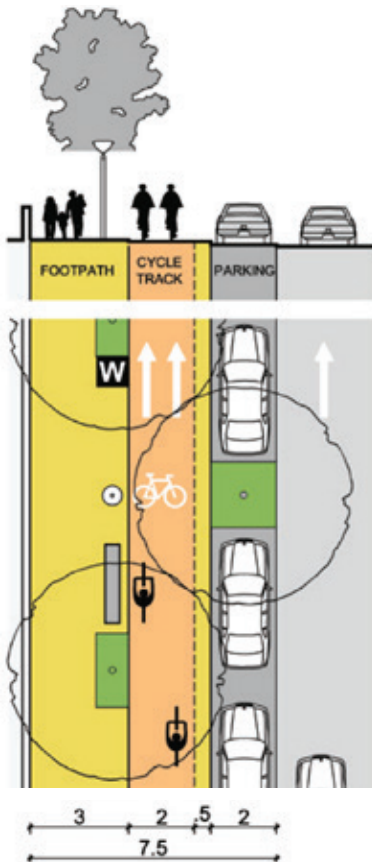
# CYCLE TRACKS

# Alignment & width

On streets with faster speeds, cycle tracks can reduce conflicts between cycles and motor vehicles. Cycle tracks make it possible for even novice users to opt for cycling. Efficient cycle tracks are safe, convenient, continuous, and direct.

Cycle tracks should be positioned between the footpath and carriageway to minimise conflicts with pedestrians. Cycle tracks are physically separated from the carriageway—as distinguished from painted cycle lanes, which offer little protection to cyclists. A minimum width of 2 m is required for one-way movement, and 3 m for two-way movement. Bollards should be incorporated to prevent encroachments by motor vehicles, with at least 1.5 m of clear width between bollards.



FOOTPATH | CYCLE TRACK | PARKING

W

3    2  .5  2
7.5

Cycle tracks require a clear width of 2 m for one-way movement. Cycle tracks should be raised above the carriageway.

✖ Painted cycle lanes are not clearly visible in the streetscape and do not offer a safe riding environment.



✔ This cycle track is physically separated from the carriageway and is wide enough for cyclists to overtake one another.

# Height

Cycle tracks should be constructed above the carriageway (at least 100 mm) to allow for storm water runoff. At property access points, the cycle track remains at the same level and vehicle access is provided by a ramp in the buffer.



✗ Cycle tracks constructed at the same level as the carriageway are prone to the accumulation of dirt, sand, and debris.



✔ Cycle tracks constructed above the carriageway are less prone to water logging and accumulation of debris.

# Surface

For a comfortable riding surface, cycle tracks require a smooth material—asphalt or concrete, but not paver blocks.



✗ Paver blocks create an uneven riding surface.



✔ Asphalt and concrete offer a smooth riding surface for cyclists.

# Cycle tracks & bus stops

A cycle track should be routed around the back of a bus stop to reduce the chances of pedestrian encroachment. A 50 mm grade difference helps define the boundary between the cycle track and footpath. The bus stop is at the same level as the cycle track, but tree pits, vending stalls, and bollards can also help demarcate the boundary of the passenger waiting area.
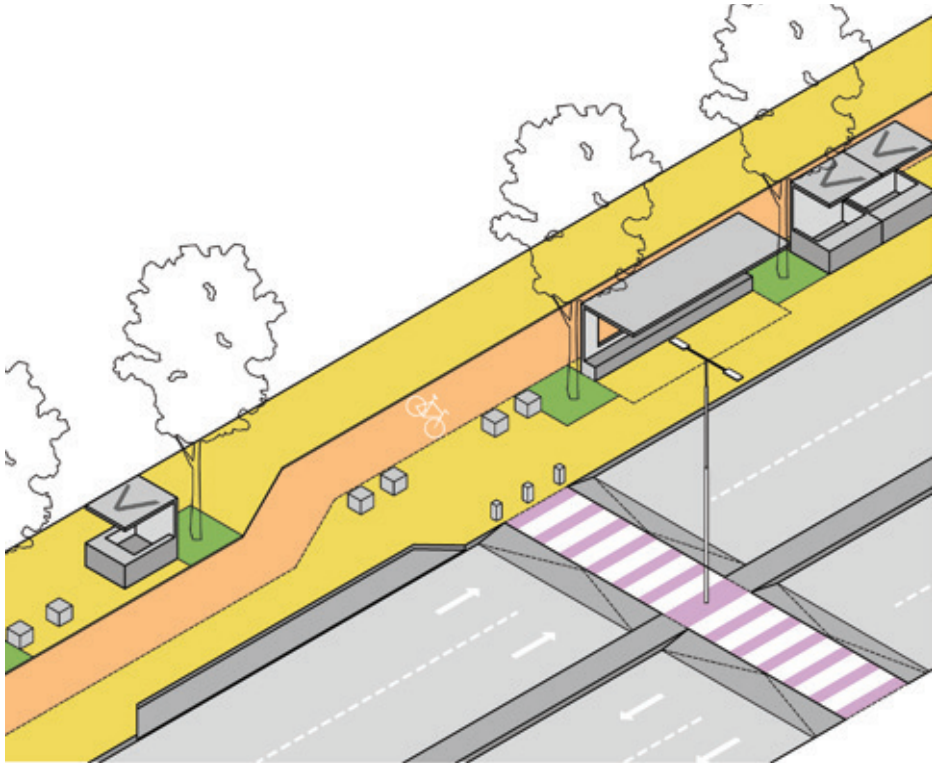


Cycle tracks should be shifted behind bus stops to create sufficient waiting area for passengers.

✘ The lack of a waiting area at the bus stop results in the use of the cycle track by public transport passengers.



✔ Placement of bus shelters should allow for continuous cycle movement behind the passenger waiting area.
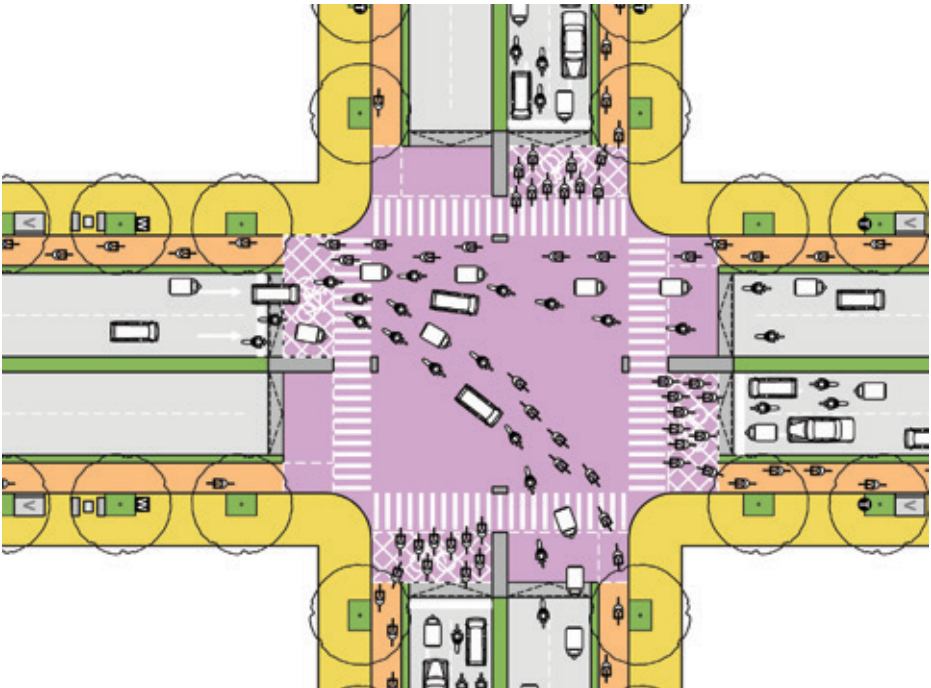
INTERSECTIONS

# Intersection geometry

Intersections must provide direct, intuitive pedestrian crossings. Designated crossings should reflect pedestrian desire lines, avoiding detours. Crossing distances should be minimised, and pedestrian refuges are required to give pedestrians a safe space to wait before crossing successive streams of traffic.

Wherever slip roads or turn pockets are present, raised table top crossings must be provided between the footpath and the triangular pedestrian refuge for safer crossing. Slip roads or turn pockets should be avoided at intersections for streets with rights-of-way of 30 m or less. Pedestrian refuge islands must also be provided in medians. The refuges should be large enough to handle observed pedestrian volumes.



An intersection should be sized to minimize crossing distances for pedestrians and cyclists while accommodating left turns of a design vehicle (e.g., a 12 m bus).

✘ Large turning radii, poorly aligned crossings, and the lack of a crossing on the slip lane make it difficult for pedestrians and cyclists to navigate the intersection.
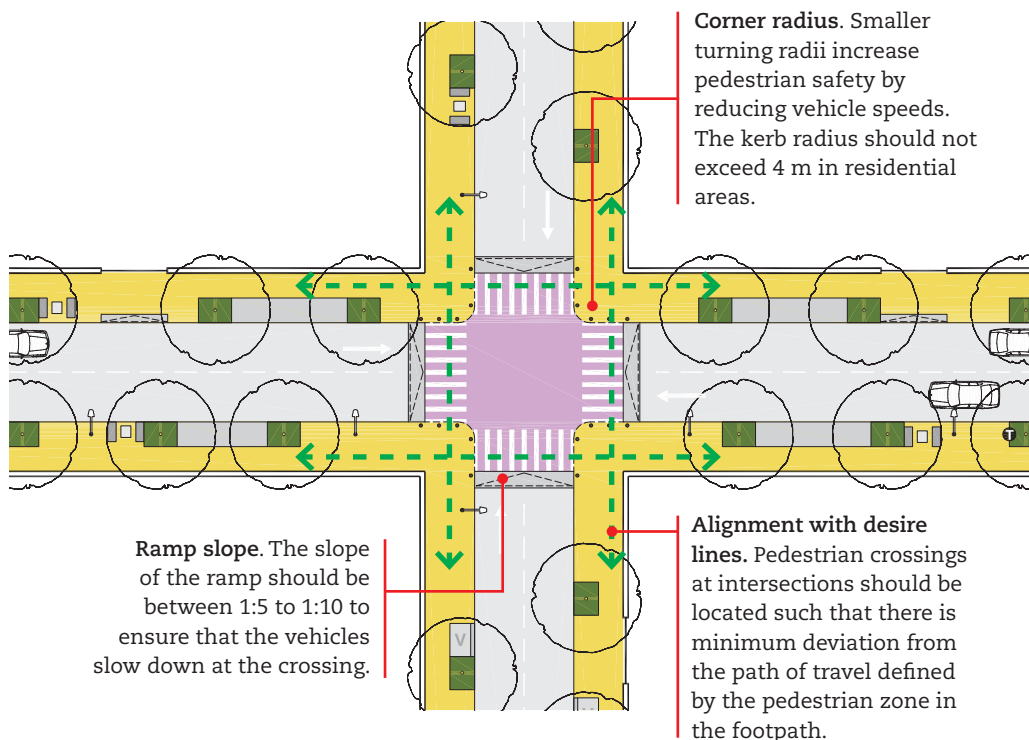


✔ Refuge islands offer a safe place for pedestrians to wait for a green signal and reduce the crossing distance. The placement of crossings should reflect pedestrian desire lines.

# Pedestrian crossings

Intersection design should manage conflict in a way that enhances safety for pedestrians. The preferred design is to raise the intersection to the level of the footpath. Vehicles slow down when crossing over the ramp, and a material difference emphasises that they are entering a shared space. Ramps should be provided at all intersections that are not signalised to ensure that pedestrians can cross safely.

Where raised crossings are not provided (i.e., at intersections that are signalised), the footpath should be ramped down to the level of the carriageway. The ramp should not be steeper than 1:12.



**Corner radius**. Smaller turning radii increase pedestrian safety by reducing vehicle speeds. The kerb radius should not exceed 4 m in residential areas.

**Ramp slope**. The slope of the ramp should be between 1:5 to 1:10 to ensure that the vehicles slow down at the crossing.

**Alignment with desire lines.** Pedestrian crossings at intersections should be located such that there is minimum deviation from the path of travel defined by the pedestrian zone in the footpath.

✔ **Preferred design**. The entire intersection is raised to the level of the footpath, compelling motor vehicles to slow down. The material difference alerts vehicle users that they are entering a shared space.



✔ **Acceptable design for minor intersections**. If the intersection is not signalised, it is acceptable to raise the crossings that are perpendicular to the minor arms while the crossing on the major arm is provided at grade.



✔ **Acceptable design for signalised intersections**. If the crossing is at the level of the carriageway, each corner must be ramped. The width of the ramp should be at least 1.5 m, and the slope no steeper than 1:12.
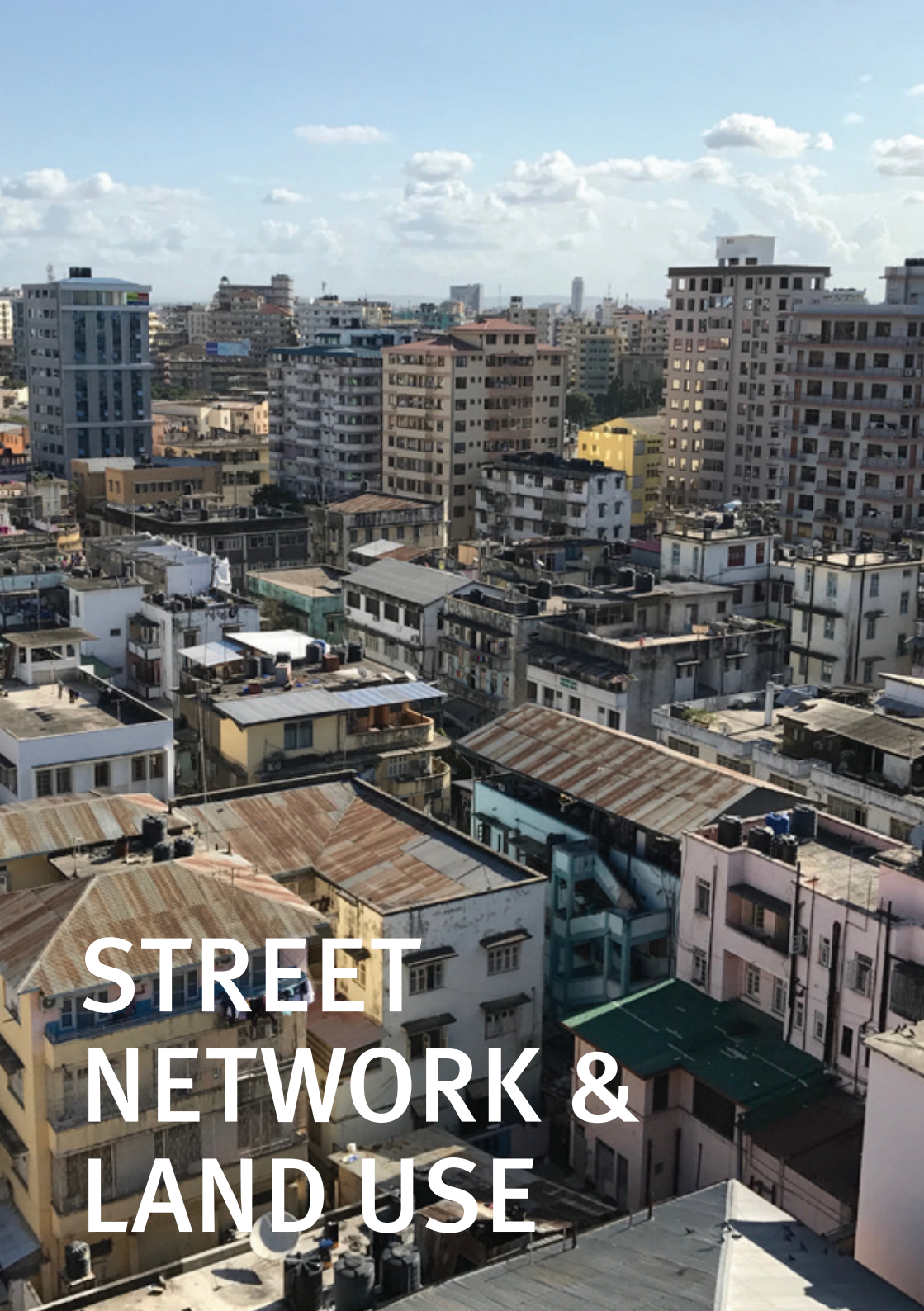
# STREET
# NETWORK &
# LAND USE

# Street network

Interconnected walking and cycling networks with short block lengths allow for short and direct routes through neighbourhoods. In general, blocks should be no larger than 100 m on a side. Such networks offer multiple routes to various destinations and make it convenient to walk and cycle to complete one's daily commute and other errands. Frequent intersections contribute to slower vehicles speeds and greater pedestrian safety.

In areas where large blocks exist, redevelopment provides an opportunity to correct past mistakes. Large blocks can be broken up to create a finer grained pedestrian grid. Prioritised connectivity creates finer grained networks for walking, including pedestrian-only streets.



A fine-grained network of streets improves access for pedestrians and cyclists. The blue lines indicate the network for pedestrians and/or cyclists, providing direct access to the core of each block. The orange lines indicate streets with vehicle access.

# Land use

A mix of complementary land uses—such as residences, workplaces, and shops—reduces trip distances, thereby making it possible to complete trips by foot or bicycle. Different uses have different peak hours so a variety of activities keeps local streets active at various times of the day. This is vital in ensuring personal safety.



✘ Single-use developments limit pedestrian activity and increase the distances that people need to travel to reach shops and places of employment.



✔ A mix of land uses contributes to an active walking and cycling environment at all times of the day.

# Building design

Active frontages contribute to a safe walking and cycling environment by creating an eyes-on-the-street effect where shop owners and residents keep watch over the street environment. Development control regulations should demand buildings with active frontages built out to the lot line.



✘ Streets lined with compound walls, security gates, and large setbacks have little interaction between people inside buildings and people walking on the street.



✔ Buildings with activities on the ground floor that directly face and engage people walking on the street contribute to a safe, vibrant walking environment.

# DESIGN
# PROCESS

# Participation

Participation of local residents, businesses, and other stakeholders in the planning and design of streets can help improve transparency and foster the community's active use and sense of ownership of public spaces. The planning process should ensure broad and economically diverse citizen participation at all stages of planning and implementation, considering the views of women, children, the elderly, and persons with disabilities, as well as local stakeholders such as businesses, shop owners, and transport service providers.

Experience has shown that consultations can result in a more constructive engagement between government authorities and local stakeholders, such as small and informal businesses that operate on streets. For example, the planning process may help street vendors appreciate the need to carry out their business without hindrance to pedestrian and bicycle movement. At the same time, regulated vending may improve security in streets and public spaces while also contributing to the local economy.



As part of the sustainable mobility planning process in Kiambu, Kenya, government officials and community members take part in a pedestrian access audit.

Pedestrians walk on a freshly painted pedestrian crossing in Maputo, Mozambique.

An innovative participatory approach is tactical urbanism, in which temporary installations are used to test out new street designs before they are fully implemented. After trials using traffic cones and barriers, semi-permanent pedestrian islands can be created using bollards, planter boxes, benches and other types of street furniture. Once the success of the intervention is demonstrated, the new design can be implemented permanently by shifting kerb stones and constructing new footpaths and refuge islands. Tactical interventions can be enhanced through sustainable mobility events that close streets to motor vehicles and create space for activities such as street painting and cycling events.

To introduce scale up sustainable transport interventions, UN-Habitat and ITDP have promoted a participatory process of developing sustainable urban mobility plans for cities and towns. Through an interactive process, stakeholders note key challenges; formulate a common vision; develop measurable, time-bound goals (e.g, percentage of street length with footpaths); and identify solutions. Stakeholders then develop a plan for financing the improvements, including innovative sources of funding such as parking fees and congestion charges. Over time, local authorities can track success in achieving the aims of the mobility plan by collecting regular data on travel behaviour, road safety, and air quality.
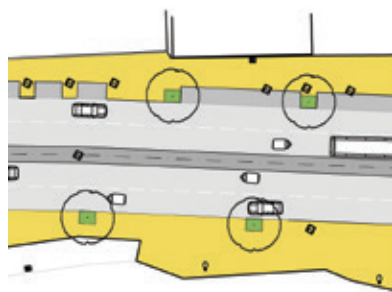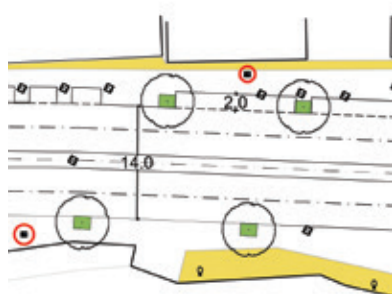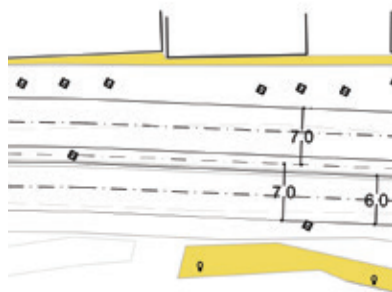
# Design sequence

### Step 1

The designer begins by drawing the new centreline within the available right-of-way. Next, the designer can demarcate the space required for footpaths, cycle tracks, and public transport (if applicable). The carriageway kerb line should be set to ensure that the number of traffic lanes remains constant and that the clear space available on the footpath never falls below the minimum parameters specified in this guide.
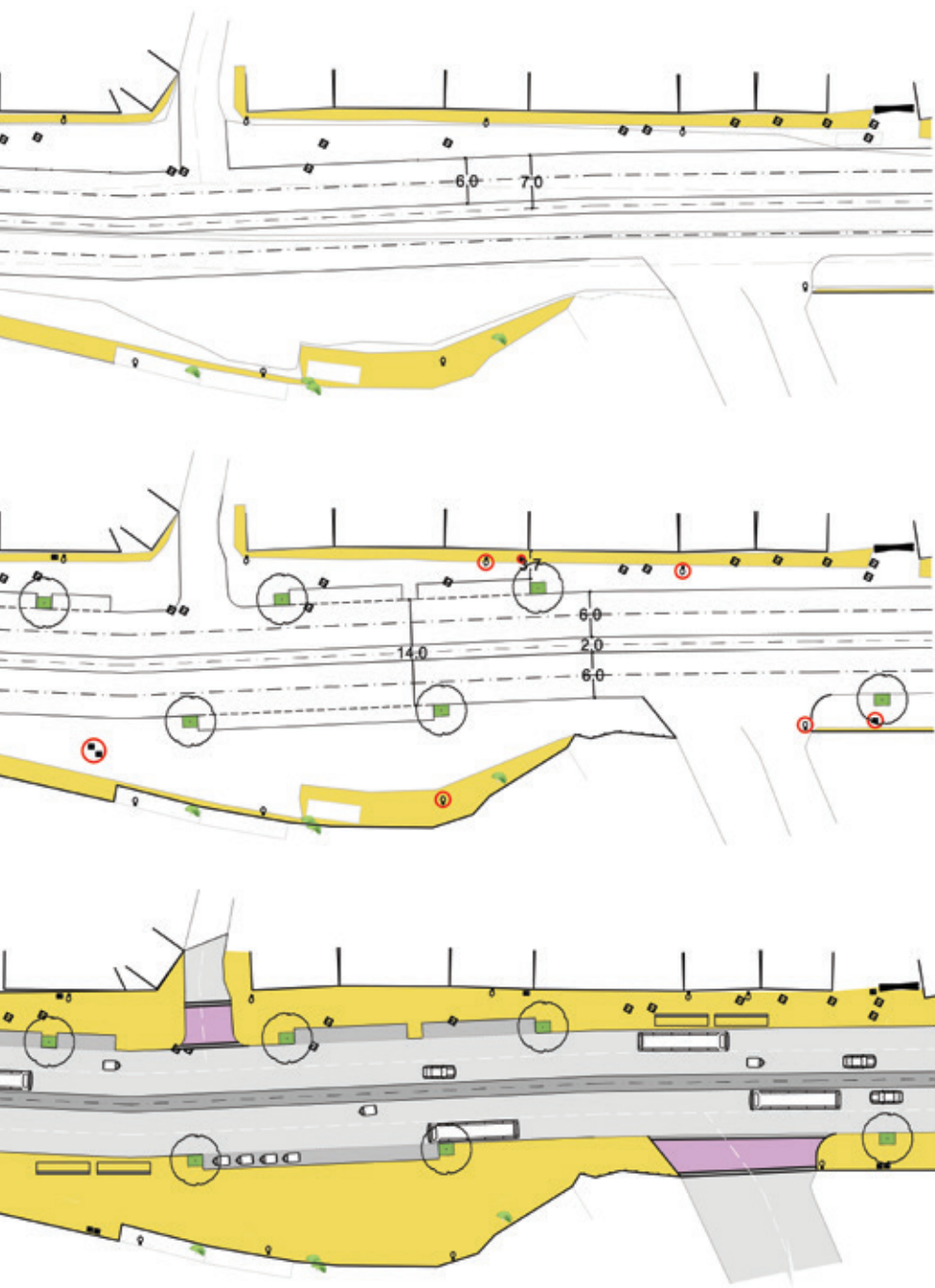


### Step 2

Once the overall centreline and curb alignment are fixed, the specific position of elements such as parking bays, trees, and turning lanes can be determined. The designer must ensure that none of these elements reduce the clear width of the footpath below the minimum requirement.



### Step 3

Finally, the detailed design is completed, including the placement of street furniture and utility boxes. These elements should reflect the needs of pedestrians in the surrounding area. The position of the elements should follow the zoning system, leaving adequate clear space for pedestrian movement.

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