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Road Safety Design Guidelines for Afghan Cities

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People Friendly Streets in Afghanistan

United Nations Human Settlements Programme (UN-Habitat)

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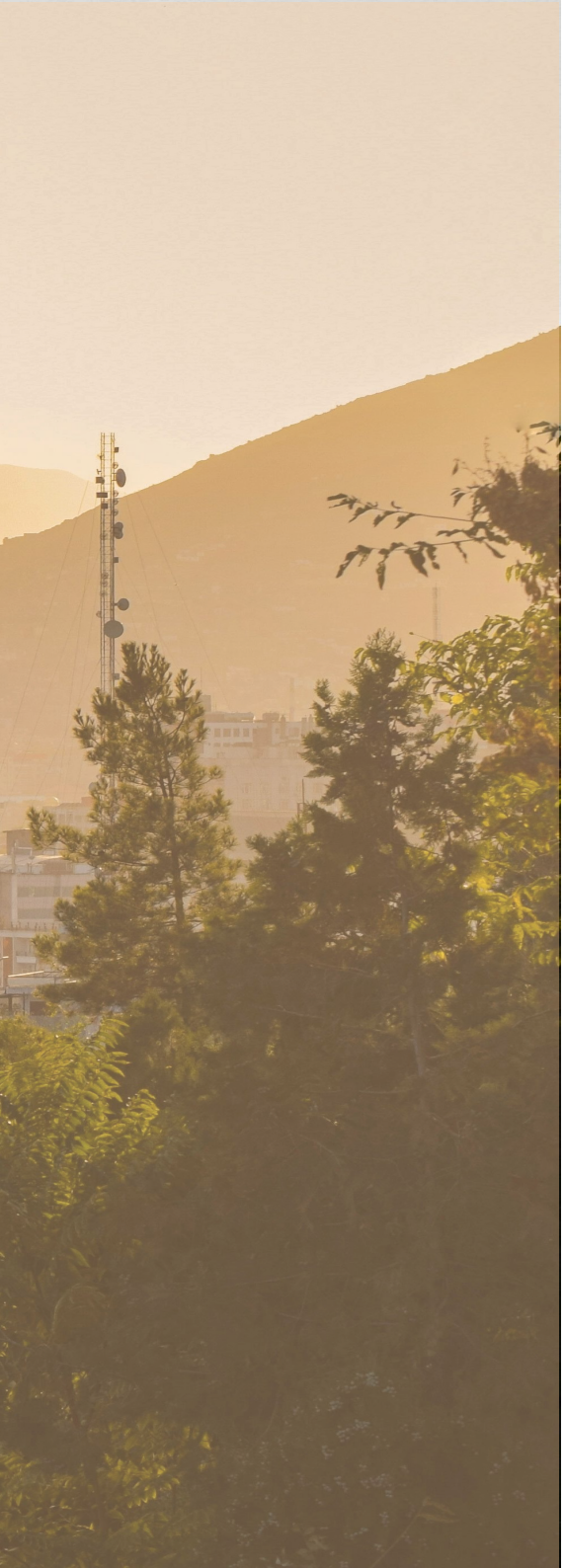

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01

Purpose and Scope

This publication provides comprehensive recommendations for designing safer urban streets tailored to the context of Afghan cities. It outlines essential principles that can be adapted to enhance road safety and support sustainable mobility in the urban context. Drawing from both international best practices and a thorough analysis of local urban conditions, this publication aims to address current safety challenges while promoting safer, more accessible, and vibrant streetscapes. This publication is not a technical document for dimensioning and construction. International organisations have already elaborated these guides, such as the Urban Street Design Guide developed by NACTO. This publication is constrained to the Afghan context will serve as a resource for Afghan city planners, engineers, and policymakers guiding the development of resilient and inclusive urban environments throughout Afghanistan. The recommendations made in this document build upon the already existing documents developed by MUHD and Sasaki (2022) for various Afghan cities.

Figure 1. Kabul, Afghanistan. Abdul Naser Sahebzada, 2024.

02

Road Safety for an Urban Future

Streets are among the most valuable assets in cities, serving not only as corridors for movement but as vibrant spaces for social interaction, commerce, and leisure. They are fundamental to the urban experience, influencing the quality of life and shaping how residents connect, conduct business, and engage with their communities. Unlike intercity roads, which focus on speed and efficiency, urban streets require a balanced approach to ensure safety and accessibility for all users and activities.

In Afghanistan, rapid urbanization, inadequate infrastructure, and insufficient enforcement exacerbate road safety issues, and the economic implications are significant. They impose heavy burdens on the healthcare system, lead to substantial property damage, and result in productivity losses due to disability or loss of life. The estimated economic cost of road crashes in the country is, according to WHO, around 5% of its GDP. This underscores the need for effective road safety measures, not only as a health and safety priority but as a crucial element of economic development.

Effective urban street design must prioritize the protection of pedestrians and cyclists, improve the efficiency of public transport, and optimize road space use. This comprehensive approach not only enhances safety but also drives economic growth, making urban environments more resilient and vibrant. Addressing road safety is essential for the future sustainability and prosperity of Afghan cities.

03

Designing for Safety

As Afghan cities continue to expand, the only way to accommodate always a higher demand for mobility, without increasing the traffic volumes and congestion, is to change the car-centric approach into a more sustainable system. At city level, street networks must be planned for pedestrians and cyclists, and public transport, instead of the private vehicles, as the backbone for an efficient and resilient transport system. Streets should be designed to serve all users, with speed limits and safety measures in place to protect the most vulnerable. By prioritising public transit, enhancing walkability, and promoting alternative forms of transport, Afghan cities can accommodate growth while fostering safer and more sustainable urban environments. The recommendations of this publication are guided by four key principles that form the foundation of safer street design.

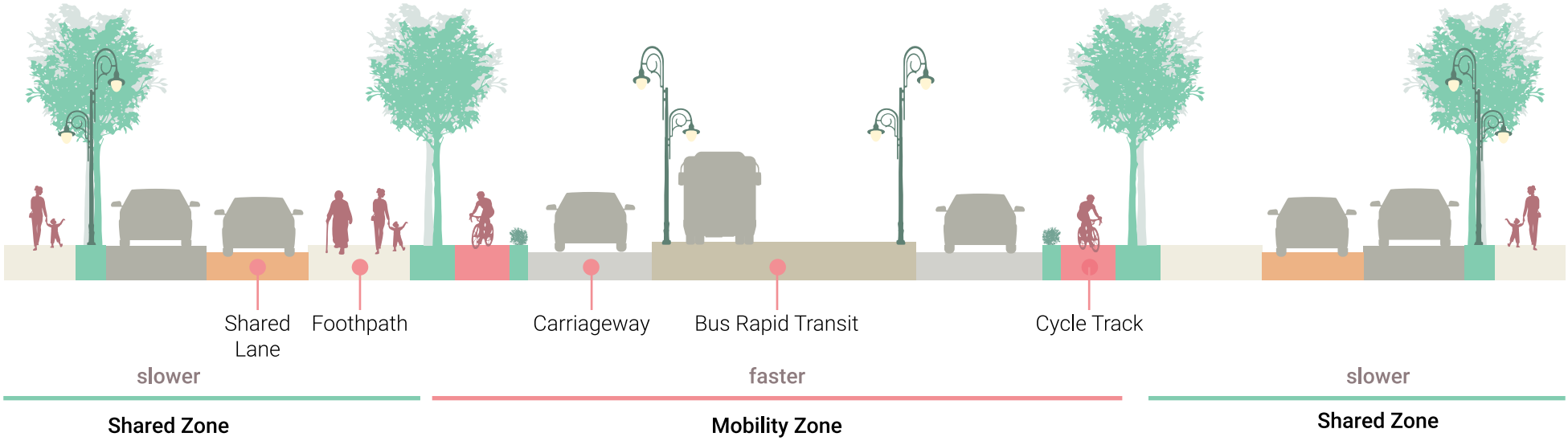


Figure 2. Cross Section of a complete street. Adapted from ITDP, 2022.

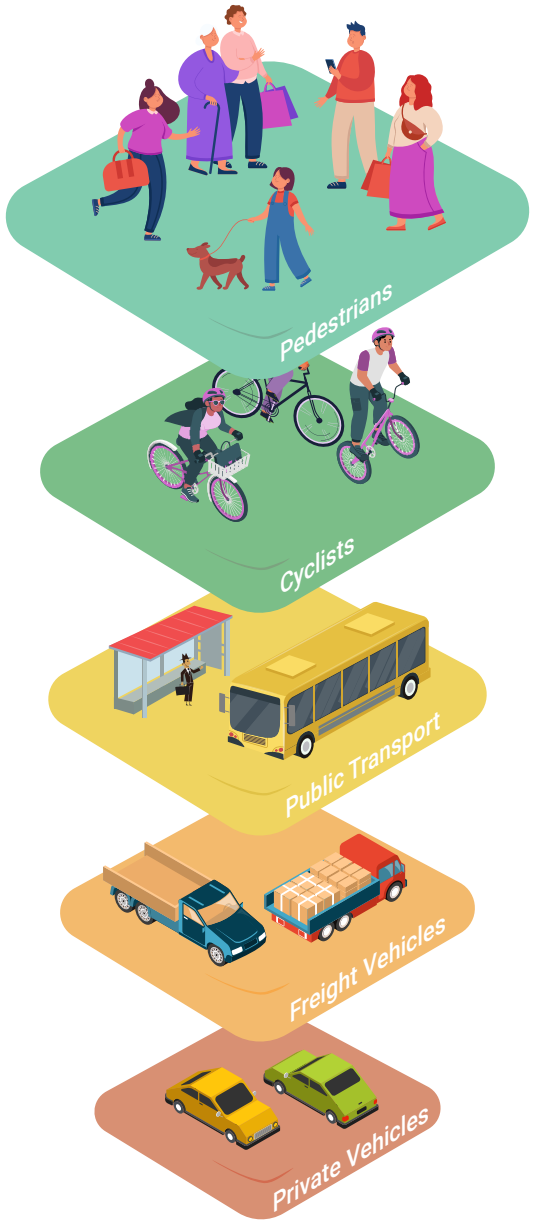


Figure 3. New Modal Hierarchy for Design. Adapted from ITDP, 2022.

Environmental Sustainability

With walking, cycling and public transport comes road safety. In cities where these modal shares are high, data shows that traffic fatalities are low. These modes also contribute to reducing GHG emissions and traffic congestion. Street designs that encourage the use of sustainable modes of transport enable a shift away from private vehicles. Additionally,improved public space have a positive impact on economic activities and increase property values, generating long-term benefits for the city.

Human-Centred Design

As shown in Figure 3 the new modal hierarchy for design must put pedestrians at the top, followed by cyclists, public transport, freight and, finally, private vehicle. People's needs must be at the center of the urban development plan to create safer cities for everyone.

Speed Limits

Safe urban street design must encourage human-friendly vehicle speeds. The likelihood of fatal consequences for pedestrians increases dramatically when vehicle speeds rise above 30 km/h. Furthermore, the higher the speed, the more limited is the field of vision, reducing the driver's ability to perceive the environment and respond to unexpected circumstances. Liveable streets are slow streets.

Complete Streets

Streets must serve as transport corridors but also as social spaces, where commercial and leisure activities are possible. They must be planned, designed and used for everyone and the safety of its most vulnerable users must not be jeopardized by the others. All streets, regardless of their category, must include high-quality public spaces with slow zones for social interaction. Complete streets, as can be seen in Figure 1, strengthen social communities and have a huge impact on access to opportunities, services and the overall quality of life of a city.

04

Network Design Principles

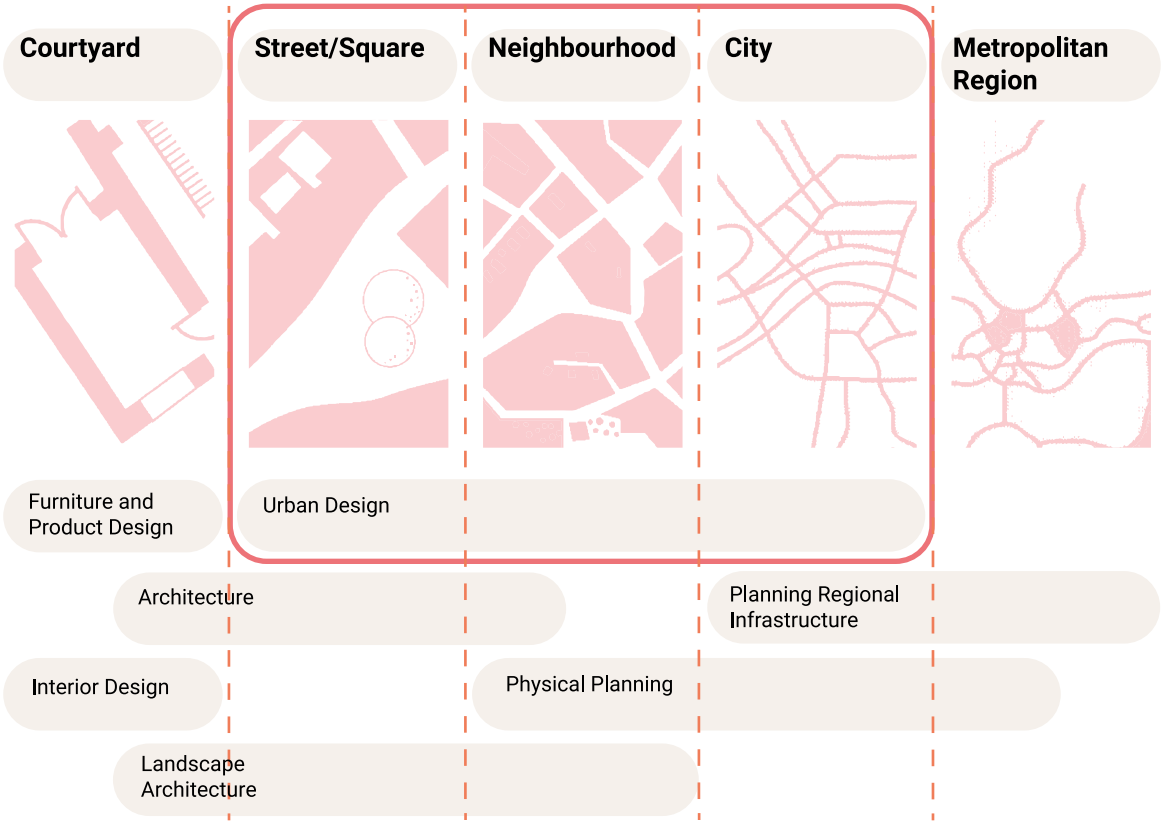


Figure 4. Scale at which activities take place in the built environment. Adapted from Erickson and Lloyd-Jones, 2017.

City streets shouldn't be treated in isolation, as they are part of a street network. Many road safety issues, like other issues related to traffic such as traffic congestion or pollution, originate from failures of the street network. Street networks have been largely planned with a car-centric mentality for efficient movement in private vehicles. This approach has proved detrimental for the safety of all others road users and even tends to hinder at long term the efficiency of motorised transport, as roads eventually become congested. As visible in Figure 4, this responsibly is shared and can only be accomplished by involving urban planners, architects, infrastructural engineers and landscapists. This section takes a holistic approach and focuses on the big picture of a street network, setting the fundamentals for the detailed analysis of safer street designs of chapter 6.

City Level

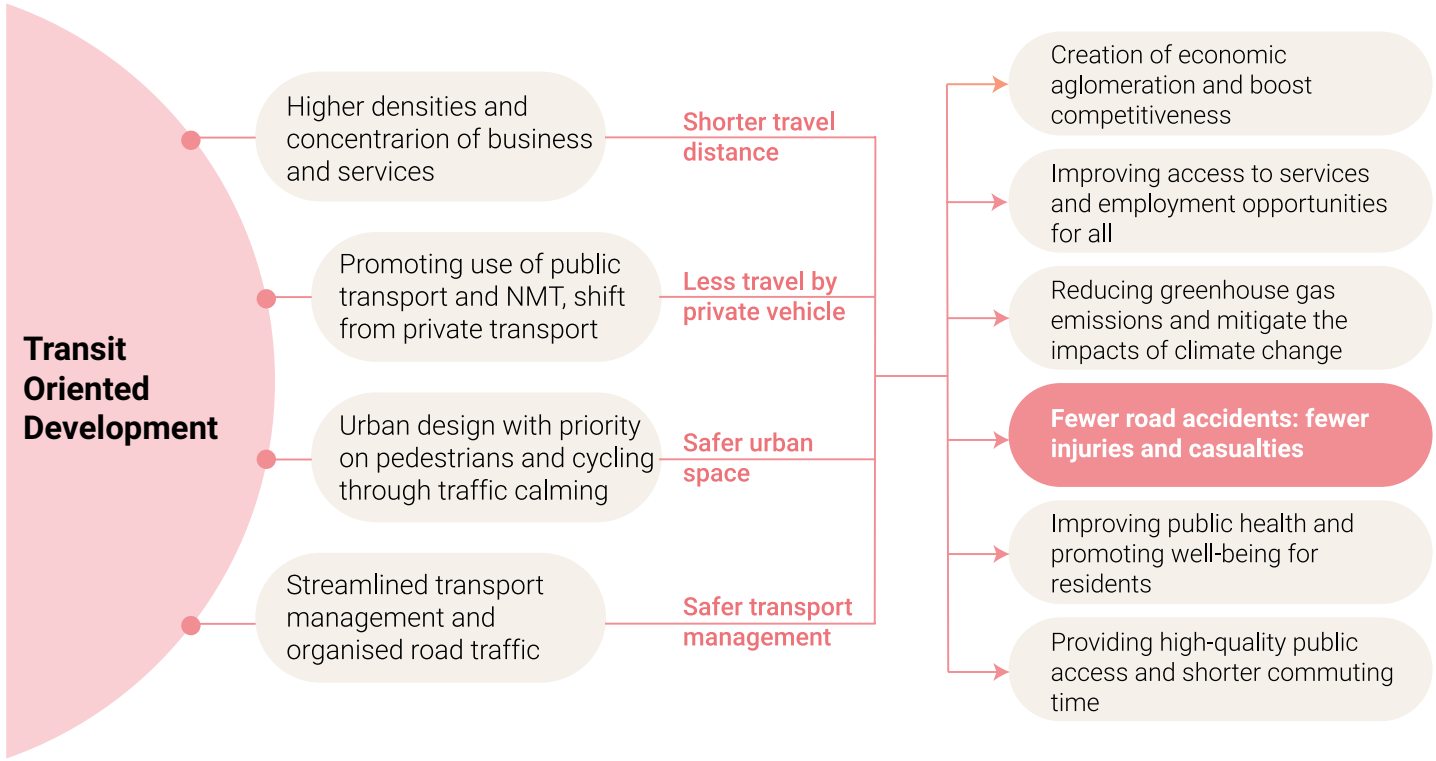


Figure 5. Transit Oriented Development (TOD) relation with road safety. UN-Habitat, 2024.

Car-centric planning has turned cities into constant traffic jumps. Bigger streets encourage more cars, turning the traffic situation into a vicious cycle. But there is an alternative. As mentioned in the previous section, car- centric planning can change into a mobility-oriented approach if people are put at the center, introducing speed limits and complete streets designs. This approach is called Transit-Oriented Development (TOD) and it creates safer streets with fewer road accidents. TOD (see Figure 5) aims to increase the density of the city with multiple land-use, shortening the travel distance between homes, business and services. There is currently no BRT or similar public transportation in Afghan cities, but plans for implementation have already been proposed by Sasaki. A quick review on how to plan successful TOD implementation is provided in this chapter to serve as a reference for future consultations.

This encourages economic agglomeration and improves access to services and opportunities for all. At the same time, TOD promotes the use of public transport and sustainable modes of transport, reducing the need of travel by private car and mitigating greenhouse gas emissions and improving air quality. Through traffic calming measures, urban spaces are safer for pedestrians and cyclists, which improves public health and well-being for residents. Regardless of the city characteristics, TOD principles should be considered for a safer city.

For a successful TOD implementation, streets must be classified by their function and size. Universal guidelines typically categorize streets into three main types: arterial, collector, and local. Arterial streets connect major areas within a city and carry high traffic volumes, designed to prioritize long-distance travel efficiency over accessibility for all users. Within neighborhoods, arterial streets branch into collectors, which link to key local corridors. Collectors are generally smaller than arterials and accommodate lower traffic volumes but still prioritize efficient movement. These, in turn, feed into local streets, which provide direct access to businesses and residences and are typically characterized by a more community-oriented scale. This generic classification can be adapted to the Afghan cities as exemplified in Figure 5. Building on references taken from the street in the city of Herat, arterial roads connect the gozars, collectors link the CDCs, and local streets serve the blocks or clusters. Additionally, Afghan cities may incorporate alleys—smaller, intra-block streets that are omnipresent in Afghan cities and have a shared, informal character that support mixed uses, including pedestrian and vehicle access.

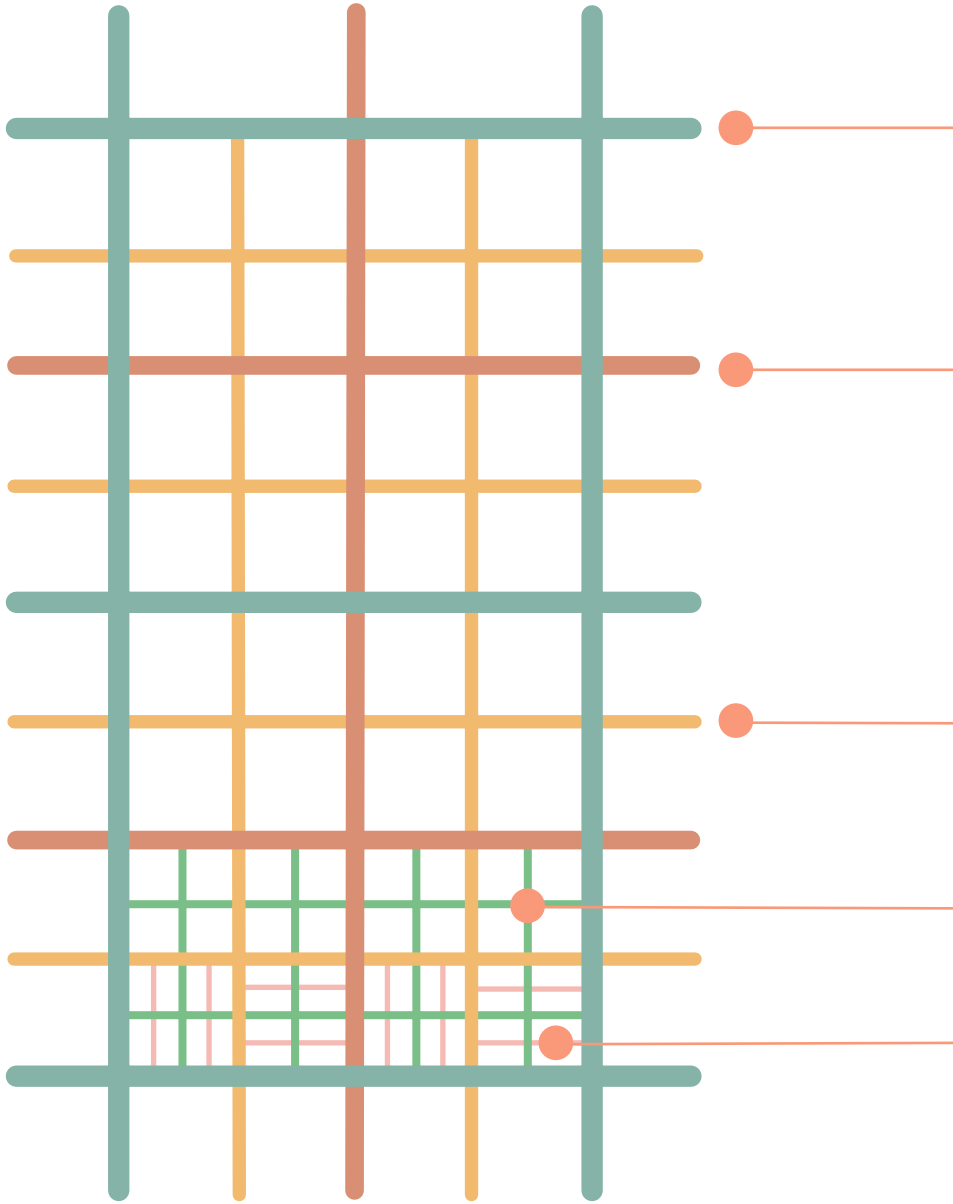
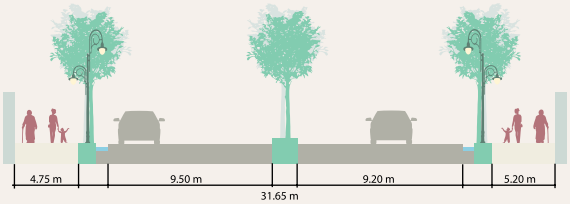
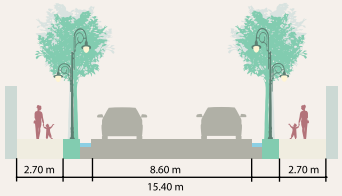


Figure 6. Street Network Hierarchy. Adapted from ITDP, 2022.

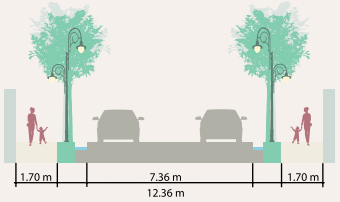
Arterial



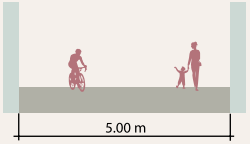
Collector



Local



Open Alley



Closed Alley

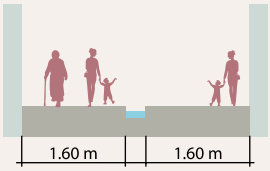
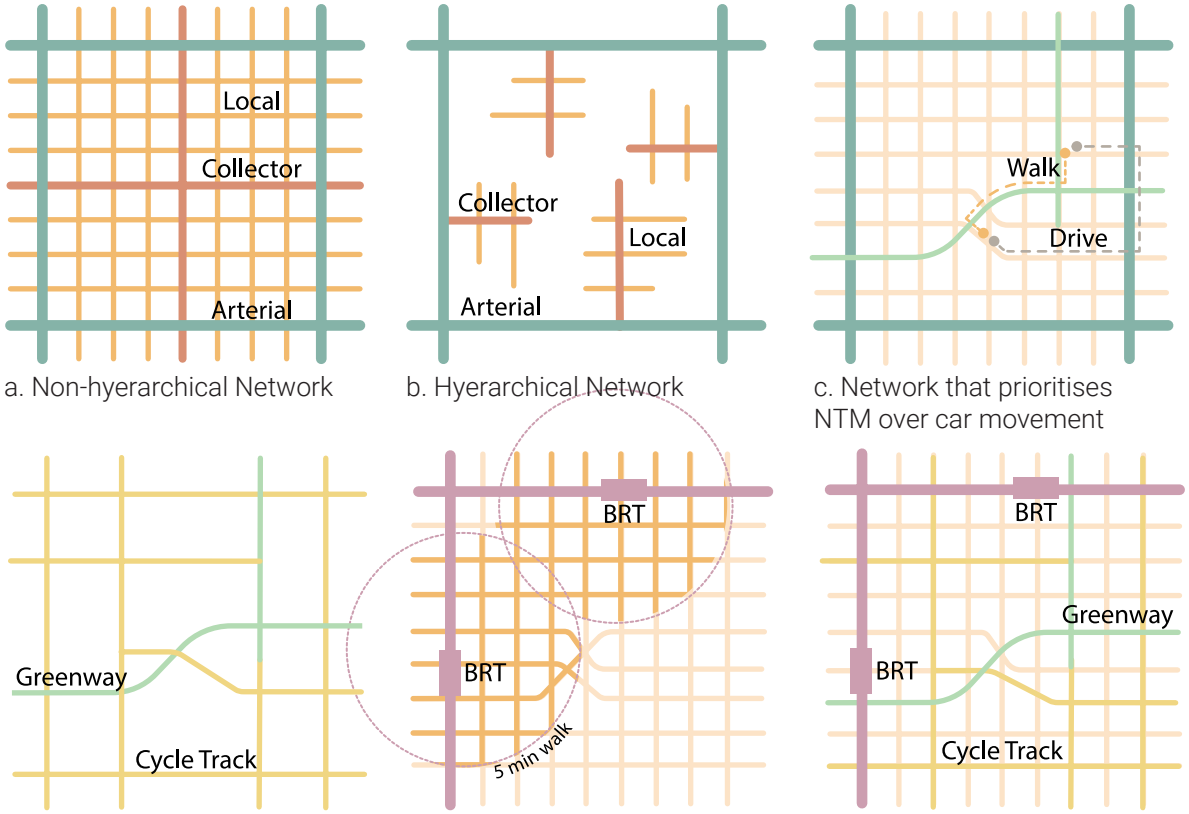


Figure 7. Typical Street Secction in Herat by cathegory.

Neighbourhood Level

Complete street networks within TOD contexts enable safe and sustainable walkable communities. Traditional car-centric grids, whether hierarchical or non-hierarchical, often prioritize vehicle movement over pedestrian and cyclist safety. Non-hierarchical designs, as seen in Figure 8a, allow unrestricted traffic flow but neglect pedestrian, cycling, and public transport needs. Figure 8b shows instead an example of how hierarchical networks channel traffic from local streets to arterials, minimizing through-traffic on smaller streets and improving pedestrian and cyclist safety.

A complete network should prioritize public transport and walking. Public transit efficiently moves large numbers of people, and a well-connected street network ensures walking access to transit for all residents. Figure 8e gives an example of BRT lines incorporated in high-demand corridors to enhance transit flow in dense areas. Arterials, which are often well-suited for BRT lines, should include appropriate stops, signage, and safe crossings for convenient public transport access.



a. Non-hyerarchical Network

b. Hyerarchical Network

c. Network that prioritises NTM over car movement

d. Main greenways and cycle paths

e. BRT lines along the main corridors

d. Complete TOD street network

Figure 8. Cross Section of a . Adapted from ITDP, 2022.

Non-motorized facilities, such as cycle tracks and greenways, are essential in complete networks. Cycling provides affordable, pollution-free mobility. Cities should create cycle networks with slow-speed neighborhood streets, separated cycle tracks, and greenway paths. These networks should connect with public transit and pedestrian zones, with secure cycle parking at key destinations. Walking and cycling paths may diverge from the street network, utilizing riversides, railways, or parks for direct routes. Figure XX gives an example of a greenway not following the street network.

While complete networks accommodate motor vehicles, they prioritize public transport, cycling, and walking. Strategies such as reducing free parking or eliminating through-traffic encourage alternative modes of transport. Streets should maintain access across the city but prioritizing safety and efficient movement for pedestrians, cyclists, and transit. Figure XX shows how the network prioritizes NMT modes over cars, allowing a shorter distance between point two points by food or bicycle, and forcing the cars to drive around the block. Vehicle speeds should be managed through traffic calming, safe intersection designs, and enforcement, while short block lengths offer pedestrians and cyclists more direct routes.

TOD's core focus is transit access, with principal walkways and greenways radiating from transit stations to support active transport modes. Cyclists benefit from direct, comfortable cycleways, while vehicles are directed around the district's perimeter. Green, pedestrian-oriented centers enhance access for residents of all incomes, genders, and abilities, creating equitable, transit-oriented communities that support public health and well-being. Figure XX shows a complete TOD street network that will minimize road traffic incidents and encourage sustainable urban mobility and development throughout the street network.

Figure 9. Kabul current Street Network.

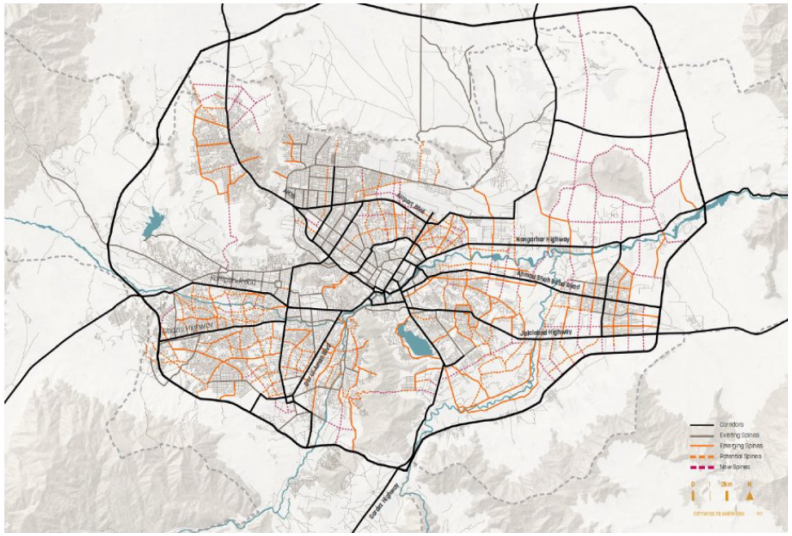


Figure 10. Proposed network for Kabul. Source: Sasaki, 2018.

Street Level

Having reviewed the requirements for a safe and sustainable street network at the city and the neighbourhood levels, it remains to look at the various architectural elements of streets that contribute to road safety for all users.

A safe street design begins with a prioritisation of pedestrians over vehicles. This approach requires careful planning and management of vehicle speed, visibility, and accessibility to ensure the safety of all users. Maintaining low vehicle speeds is crucial, as it significantly reduces both the likelihood and severity of crashes. This can be achieved through measures such as narrowing vehicle lanes, reducing corner radii, or implementing other traffic-calming strategies, which will be discussed separately in the chapter. Streets should also accommodate frequent and safe pedestrian crossings, which are visible and short in distance, and should include signals where appropriate.

Safe street design emphasises accessibility for the most vulnerable users—children, the elderly, and people with disabilities—by providing wide, unobstructed pathways with ramps, tactile paving, and sufficient lighting. Continuous sidewalks, dedicated spaces for public transport stops, cycle paths, and seating areas collectively enhance comfort and encourage multimodal use. Integrating green infrastructure, such as street trees or green medians, not only provides shade but also improves the microclimate, creating a more pleasant environment for everyone.

Chapter 5 will analyse each element of a safe street through a road safety lens to offer optimal conditions for all road users. However, it is essential to acknowledge that successful street safety also depends on high levels of adherence to road rules by all users. Even the most thoughtfully designed streets will not ensure safety without adequate enforcement.

Before jumping into the different elements of street design, a summary of traffic-calming technics is provided to give the reader the logic behind the street designs.

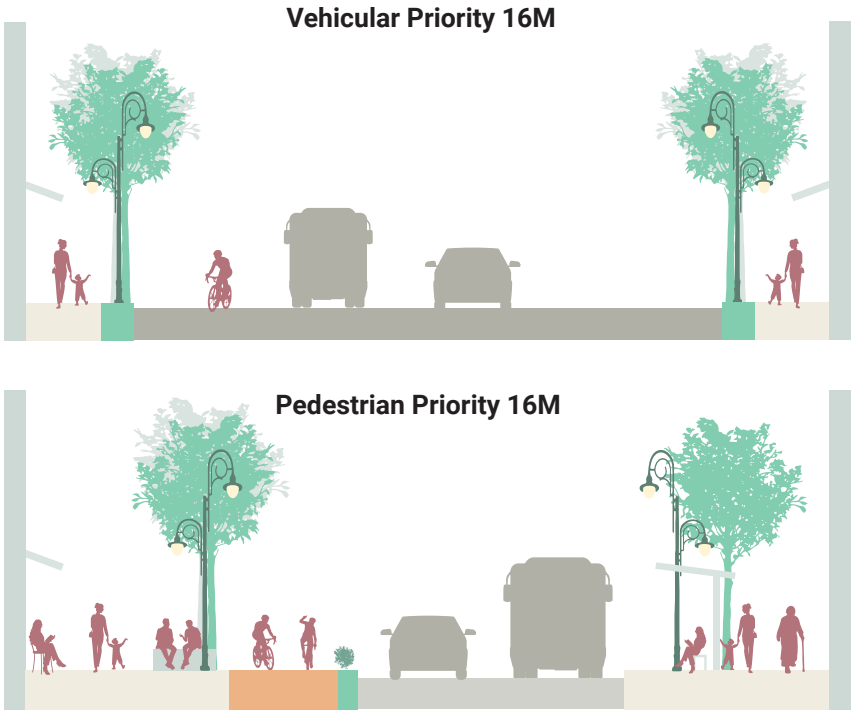


Figure 11. Cross section of a 16m street design: vehicle priority design vs. pedestrian priority street.

05

Traffic Calming Measures

This chapter summarises a list of international traffic-calming technics than could be effectively implemented in Afghan cities to reduce the street speeds and increase the overall safety of the streets.

1. Speed humps and speed cushions: Speed humps are raised areas on the road that span its entire width, while speed cushions are smaller, rectangular humps that can be placed in a series, allowing emergency vehicles to pass with minimal impact. Both slow vehicles by creating a noticeable bump when driven over at higher speeds. These are ideal for residential streets, school zones and other areas where there is a high volume of pedestrians. Implementation costs: Low

Figure 12. Speedhump. Durham, 2017.

2. Chicanes: Chicanes are a series of curb extensions or landscaped areas that stagger along a roadway, creating a serpentine path. This layout forces drivers to slow down and navigate carefully. Chicanes are most effective on long, straight residential streets prone to speeding. Implementation costs: High

Figure 13. Chicane. Durham, 2017.

3. Road Narrowing and Lane Reductions: Road narrowing involves reducing the width of lanes by adding features like bike lanes, on-street parking, or medians, which create a narrower driving area. This measure is suitable for urban and suburban streets where traffic speeds are too high. It can be applied in areas with moderate vehicle and pedestrian activity, helping to improve overall safety and create additional space for cyclists or pedestrians. Implementation costs: Low/Medium

Figure 14. Road Narrowing. Nottinghamshire County Council, 2004.

4. Raised crosswalks and raised intersections: These are speed humps that have a flat top and are placed in crossing points or intersections. They are elevated to sidewalk level, which naturally slows vehicles and improves pedestrian visibility. They work well at mid-block crossings and intersections where drivers need to be particularly aware of pedestrians. Implementation costs: Medium/ High

Figure 15. Raised crosswalk. City of Durnham, 2017.

5. Pedestrian refuge islands: Small, central medians located at crossings, providing a safe waiting space for pedestrians in the middle of the road. These are best used on wide, multi-lane roads, where pedestrians would otherwise need to cross several lanes of traffic. Implementation costs: Medium

Figure 16. Pedestrian refugee island. NJDOT, 2018.

6. Curb extensions: Curb extensions widen the sidewalk at intersections or mid-block crossings, narrowing the street width and reducing the crossing distance for pedestrians. They are useful in areas with high pedestrian volumes, at intersections where turning speeds need to be reduced, as well as in areas with on-street parking, enhancing the visibility for both drivers and pedestrians. Implementation costs: Medium

Figure 17. Curb extensions. City of Durnham, 2017.

7. Mini roundabouts: Mini roundabouts are small circular islands at intersections that require drivers to yield to traffic already within the circle and navigate around it. They are effective in reducing speed at intersections and improving safety, particularly where traditional four-way stops or signals are less efficient. Implementation costs: Medium

Figure 18. Mini roundabouts. City of Durnham, 2017.

8. Rumble strips: Rumble strips are grooved patterns on the roadway that produce sound and vibration, alerting drivers to slow down or be cautious. Often placed on the approach to pedestrian crossings, curves, or areas where speed needs to be reduced suddenly. Implementation costs: Low.

Figure 19. Rumble strips. NJDOT, 2018.

9. Texture of coloured pavement: These are special paving materials, such as coloured or textured asphalt, brick, or concrete, that visually distinguish pedestrian areas or signal to drivers that they are in a pedestrian-priority zone. Effective in areas where it's essential to visually emphasize pedestrian priority. Implementation costs: Medium.

Figure 20. Coloured pavement. City of Nashua, 2008.

10. Gateway treatments: Gateways use visual elements like signage, landscaping, coloured pavement or a combination of measure such as road narrowing and curb extensions to signify a transition into a different traffic environment, such as a residential or commercial area. They are effective at the entrances to neighbourhoods, or other areas where a considerable increase of pedestrians and cyclists is expected. Implementation costs: Low/ Medium.

Figure 21. Speedhump. NJDOT, 2018.

11. Speed Feedback Signs: These electronic signs display a vehicle's speed, often flashing when the driver exceeds the posted limit, which serves as an immediate reminder to slow down. These signs work well where physical traffic calming isn't feasible, such as near intersections or on main roads with higher traffic volumes. Implementation costs: Medium

Figure 22. Speedhump. NJDOT, 2018.

Figure 23. Kabul, Afghanistan. Qasim Mirzaie, 2023.

06

Street Elements for Safety

Creating safe streets is a fundamental aspect of urban design, ensuring that all users—pedestrians, cyclists, and drivers—can navigate the urban environment without undue risk. This chapter focuses on the key street elements that enhance safety in public spaces, including dedicated infrastructure for vulnerable road users, clear traffic signals, well-designed crosswalks, and lighting systems. By integrating these elements, cities can reduce accidents, improve walkability, and foster a more inclusive, accessible urban environment where safety is prioritized for everyone, especially in high-traffic areas.

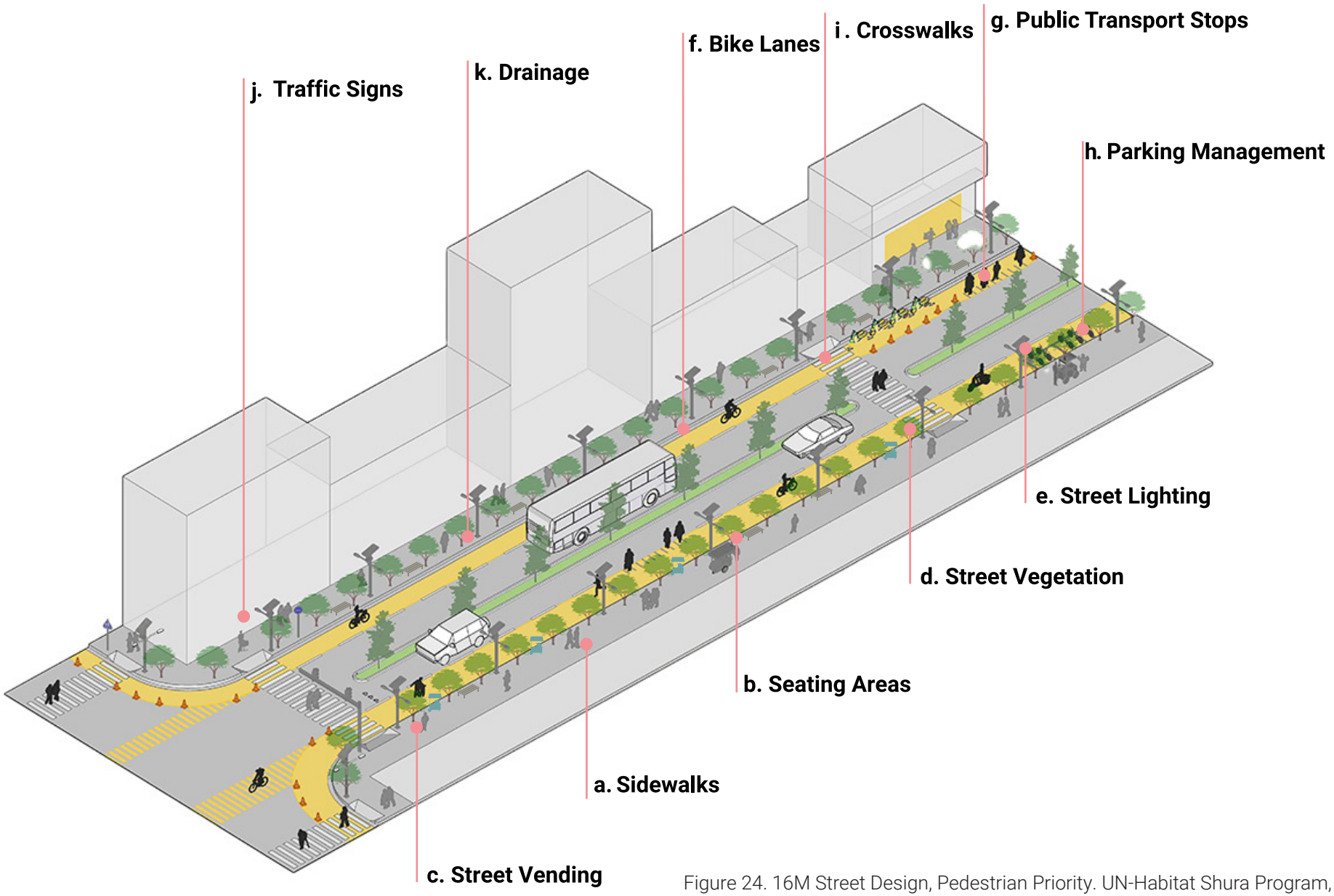


Figure 24. 16M Street Design, Pedestrian Priority. UN-Habitat Shura Program, 2021.

Figure 25. Shah Du Shamshira Mosque in Kabul, Afghanistan. Qasim Mirzaie, 2023.

a. Sidewalks

Pedestrian-friendly sidewalks are wide, obstacle-free pathways designed to accommodate foot traffic comfortably, featuring elements like tactile paving and ramps to ensure accessibility for all, including people with disabilities.

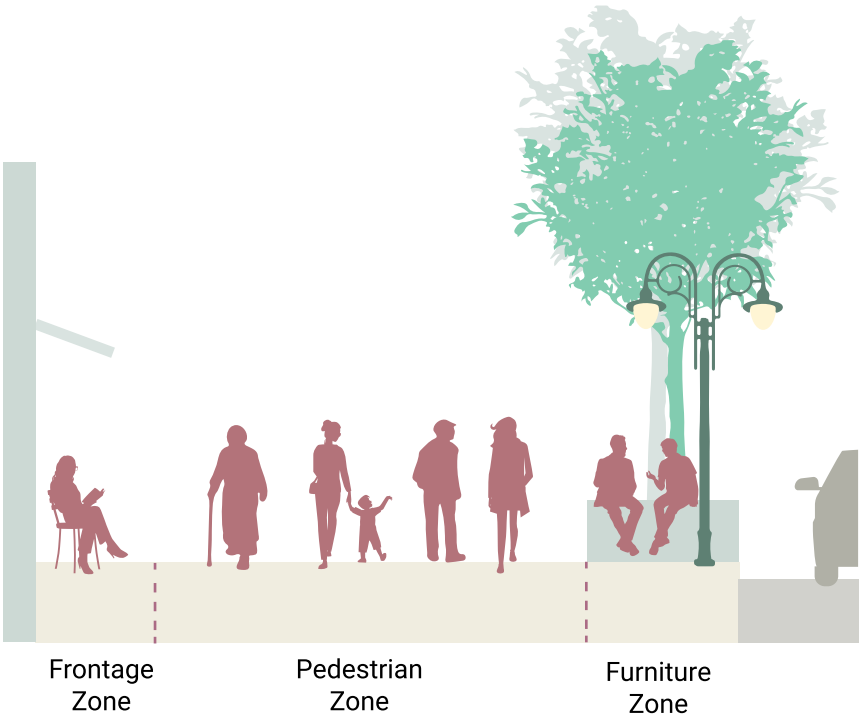


Figure 26. Street Zones. Adapted from ITDP, 2022.

Frontage Zone: This is the area closest to buildings or property lines, where pedestrians can pause or where small activities like window shopping often occur. It serves as a buffer between private spaces and the public sidewalk.

Pedestrian Zone: Located in the middle of the sidewalk, this clear, unobstructed path is dedicated to pedestrian movement. It should be wide enough to allow comfortable, continuous walking without barriers.

Furniture Zone: Situated along the curb, this zone hosts street furniture like benches, light poles, and trash bins, along with trees or bike racks. It creates a buffer between pedestrians and the street, enhancing both comfort and safety.

Traffic Calming
Considerations

Traffic calming for sidewalks can be achieved by adding bulb-outs or curb extensions, which narrow the street at pedestrian crossings, reducing crossing distance and slowing vehicles. Raised pedestrian crossings at intersections also slow down traffic and prioritize pedestrian safety.

Design Criteria

- The minimum clear width for sidewalks should be at least 2 meters, with wider paths for areas with heavy pedestrian traffic.
- The sidewalks should be raised 150 mm above the road surface.
- Ramp slopes should not exceed 1:10, though 1:12 is preferable.
- Continuous shading from tree cover is recommended for pedestrian comfort.
- The footpath should maintain a constant height at property entrances, with vehicle ramps provided at a slope of 1:6 to 1:12, and no steeper than 1:4.
- Tactile paving should be incorporated to assist visually impaired individuals.

Key Features

Figure 27. Sidewalk and property entreis. ITDP, 2023.

b. Seating Areas

Seating areas are designated spaces along streets with benches or other seating options where pedestrians can rest. These areas are essential for creating comfortable, people-friendly streets, encouraging longer stays and social interactions in public spaces.

Figure 28. Seating Areas. GoI, 2024.

Design Criteria

- **Street furniture and amenities** should be installed in areas where they are most needed, such as commercial centers, markets, crossroads, bus stops, BRT stations, and near public buildings.
- Items like benches and tables should be placed in **shaded areas** for greater comfort.
- The furniture should be positioned so that it does not block pedestrian movement.
- On streets with high pedestrian traffic and commercial activity, particularly near eateries, trash bins should be placed at regular intervals, ideally every 20 meters.

Traffic Calming Considerations

Seating areas can serve as part of widened sidewalks or plazas, which narrow adjacent lanes and encourage drivers to reduce speed. Parklets (small seating areas converted from parking spaces) can also reduce road width, further calming traffic in busy areas.

Key Features

Rest & Relaxation: Provides places for pedestrians to rest, socialize, or enjoy the surroundings, particularly important in long streets or public squares.

Strategic Placement: Seating is often located near parks, bus stops, pedestrian plazas, or shopping areas to maximize convenience and usage.
Comfort: Seating areas are more inviting when designed with ergonomic features and placed under shade or next to greenery, improving the user experience.

Accessibility: Inclusive design ensures seating is available for people of all ages and abilities, particularly the elderly or those with mobility issues.

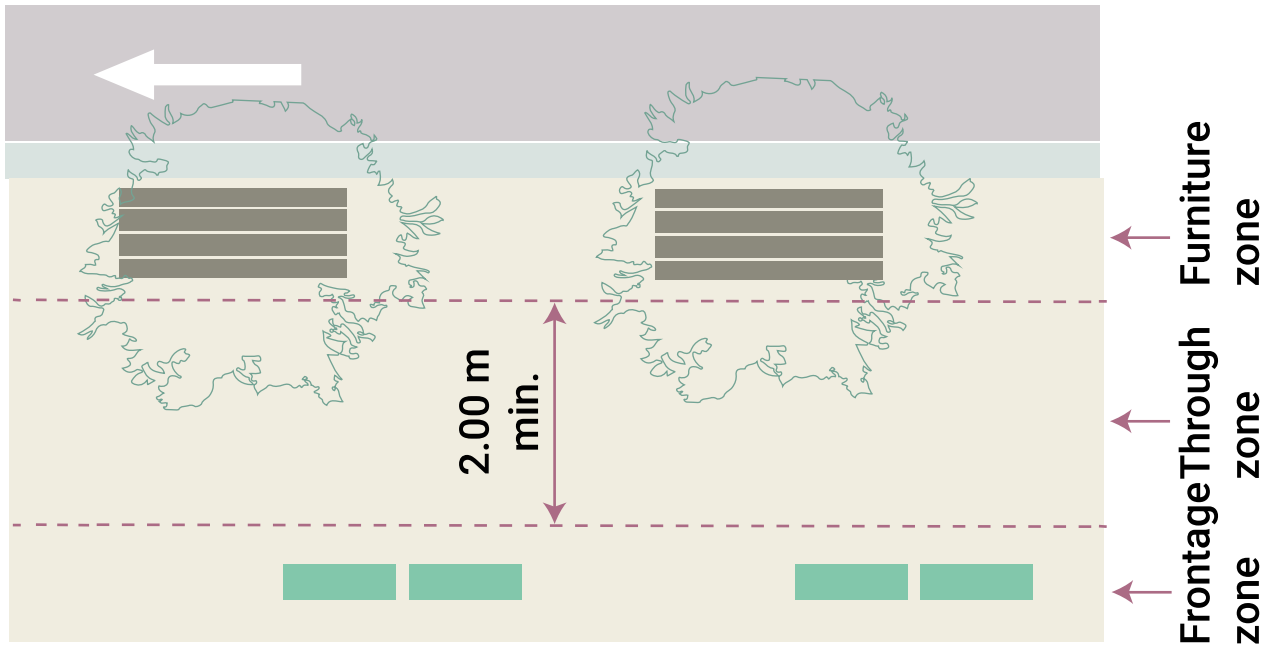


Figure 29. Furniture Placement. ITDP, 2022.

c. Street Vending

Street vending refers to temporary or semi-permanent stalls set up by vendors to sell goods, such as food, drinks, or handmade crafts, along urban streets. Street vending plays a vital role in the informal economy, providing affordable goods and services to pedestrians while adding vibrancy to public spaces.

Key Features

Economic Activity: Supports small entrepreneurs, providing a livelihood for local vendors while offering pedestrians convenient access to goods and services.

Vibrant Public Spaces: Street vending creates lively, active streets, fostering social interactions and contributing to the urban culture.

Accessibility: Makes goods and services more easily available for pedestrians, especially in busy areas such as markets or transit stops.

Regulation & Safety: Requires careful management to ensure vendors don't obstruct pedestrian pathways and that hygiene and safety standards are maintained.

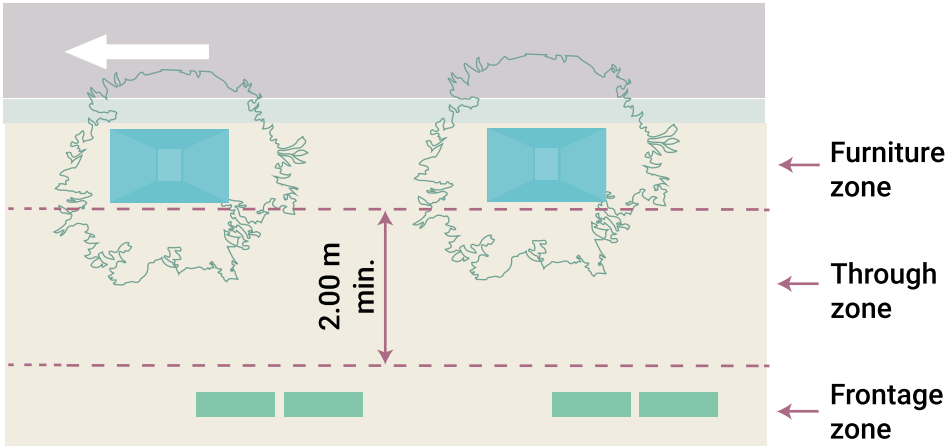


Figure 30. Street vending karts distribution. ITDP, 2022.

Design Criteria

- **Street vendors** should be located in areas where there is a clear demand for their goods and services, such as near major intersections, public transport stops, parks, and other high-traffic areas.
- They should be supported with **infrastructure** like shared water taps, electricity points, trash bins, and public toilets. **Vending areas** should be placed in a way that maintains the continuity of cycle tracks and footpaths.
- The **furniture zone of the footpath** or a bulb-out in the parking lane are ideal spots for vendors, ensuring they don't disrupt pedestrian or cyclist flow.

Traffic Calming Considerations

Street vending naturally slows down traffic by increasing pedestrian activity and creating a more vibrant street environment. Vendors can be placed strategically near narrowed lanes or shared spaces, where the presence of pedestrians encourages slower driving.

Figure 31. Street Market in Afghanistan.Mohammad Husaini, 2021.

d. Street Vegetation

Street vegetation includes trees, shrubs, and plants integrated into urban streetscapes to provide aesthetic, environmental, and social benefits. This greenery helps in improving air quality, reducing urban heat, and enhancing the livability of streets. Street vegetation can range from small flower beds to large trees that line the roads, creating green corridors in cities.

Figure 32. Street Vegetation. Saudi Arabia, 2022.

Key Features

Environmental Benefits: Street trees and plants absorb pollutants, improve air quality, and reduce the urban heat island effect by cooling the environment.

Aesthetic Appeal: Adds natural beauty to urban settings, making streets more attractive and inviting for pedestrians.

Wellbeing: Green spaces along streets to provide a refreshing natural element in urban settings can reduce stress and improve mental well-being.

Shading: Large trees provide natural shade, offering relief from the sun and making streets more comfortable for walking during hot weather.

Biodiversity: Supports local wildlife, such as birds and insects, contributing to ecological health even in densely populated areas.

Traffic Calming
Considerations

Street trees and vegetation help calm traffic by creating a visual narrowing of the road, giving drivers the impression that the street is more confined. Green medians and planter strips along the roadside can also visually break up long stretches of road, encouraging slower driving.

e. Street Lighting

Street lighting consists of lamp posts and light fixtures installed along streets to provide visibility and safety during the night. Well-designed street lighting is essential for traffic safety, pedestrian security, and overall urban ambiance, and can also include energy-efficient solutions like LED or solar-powered lights.

Traffic Calming
Considerations

Street lighting can act as a traffic-calming measure when combined with pedestrian-scale lighting that draws attention to crossing areas. Adequate lighting, especially around crosswalks and intersections, increases visibility and encourages slower, more cautious driving.

Key Features

Safety: Enhances visibility for drivers and pedestrians, reducing accidents and making streets safer after dark.

Crime Prevention: Well-lit streets deter criminal activity, improving the overall sense of security in urban areas.

Energy Efficiency: Modern street lighting often includes energy-efficient technologies like LED bulbs or solar panels, reducing the environmental impact.

Aesthetic Enhancement: Thoughtfully designed lighting can create an inviting atmosphere at night, making public spaces more attractive for evening activities.

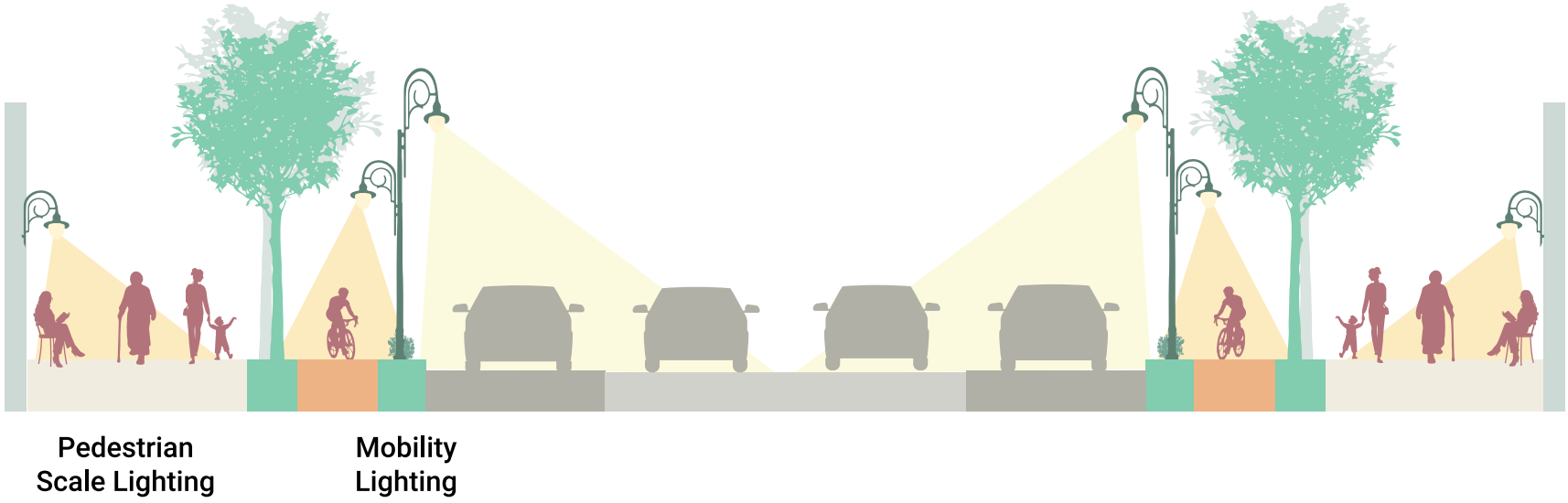


Figure 33. Complete Streets illumination. Adapted from Saudi Arabia, 2022.

f. Bike Lanes

Dedicated bike lanes are specifically designated lanes on a street that are reserved exclusively for cyclists, physically separating them from motorized traffic and pedestrians to enhance safety and encourage cycling.

Design Criteria

- Cycle tracks should be **physically separated from the road**, unlike painted lanes which provide minimal protection for cyclists.
- The track should have a **clear width of at least 2 meters** for one-way traffic, with **3 meters** required for two-way movement. This width must be free of any obstructions like utility poles or vegetation. The surface should be **smooth, using materials like asphalt or concrete**, while paver blocks should be avoided.
- The track should be **elevated 150 mm above the road** and placed between the footpath and the carriageway, with a **buffer of at least 0.5 meters** separating it from the road.
- If next to a parking lane, the buffer should be paved, and if near buildings or walls, the buffer should be increased to 0.75 meters.
- Bollards should be installed to prevent vehicle encroachment, with one bollard placed in the center of the track, allowing cyclists to pass on either side, and spaced 1.2 meters apart.

Facility Selection

Bicycle Facility	Motor Vehicle Speed	Motor Vehicle Volumen Daily, Both Directions
Shared Street	≤ 15 km/h	Shared Street
Bicycle Boulevard	≥ 1500 ≤ 40 km/h	< 2000 and under 50 motor vehicles per hour, peak hour, peak direction < 1500 and under 50 motor vehicles per hour, peak hour, peak direction
Cycle Track or Protected Bike Lane	≤ 40 km/h > 40 km/h	≥ 1500 ≥ 1500

One-way volume (bicycles/hr)	Bidirectional Volume (bicycles/hr)	Effective Width (m)*
< 150	N/A	2.00
150 - 750	< 100	3.00
> 750	> 100	4.00

*Add 0.5 m where there are 10% or more tricycles or cargo bicycles.

Table 1. Facility Selection. Adapted from ITDP, 2022.

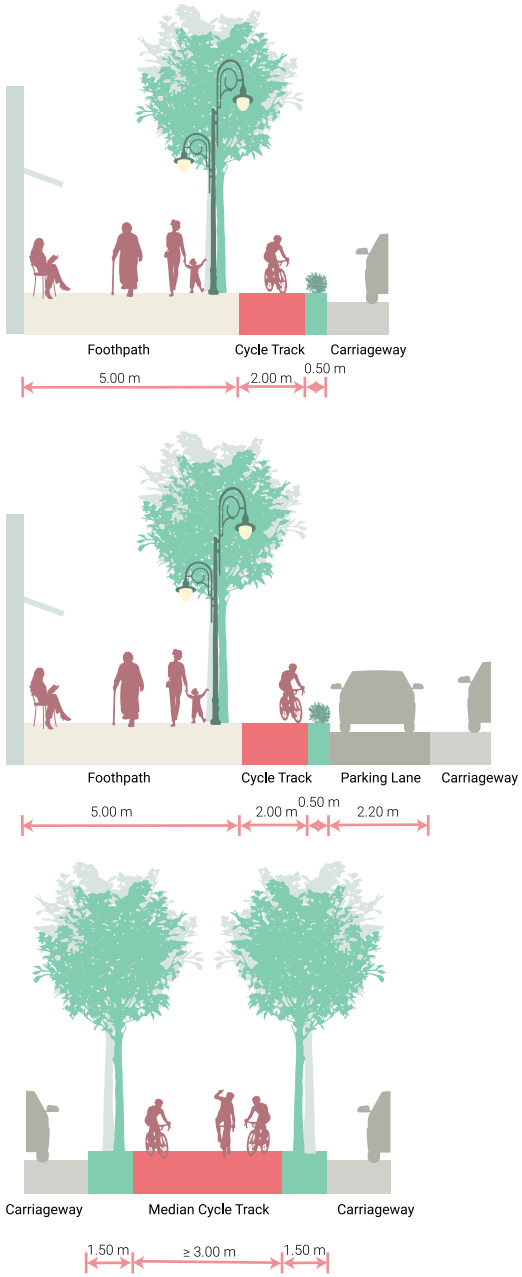


Figure 34. Cycle Track Cross Section. Adapted from ITDP, 2022.

Traffic Calming
Considerations

Traffic calming in bike lanes can involve buffered lanes with physical barriers (like bollards) to separate cyclists from motorized traffic. Painted lanes with clear markings help visually reduce road space for vehicles, encouraging drivers to slow down.

Figure 35. Cycle Track. GoI, 2024.

Key Features

Universal access: Ramps, lack of obstacles, bike parking facility

Capacity: Sufficient width for two ways, sufficient space for parking

Connectivity and Proximity: Ensure that bike lanes connect key areas such as residential neighborhoods, commercial districts, and transit hubs, making cycling a viable option for daily commutes.

Safety: Dedicated bike lanes physically separate cyclists from motorized traffic and pedestrians, significantly reducing the risk of accidents.

Visibility: Clearly marked lanes with distinct color coding or signage increase visibility, helping both cyclists and drivers understand their boundaries.

Encouraging Cycling: By providing a safe and clear space for cyclists, bike lanes promote cycling as a sustainable and healthy mode of transportation.

g. Public Transport Stops

Public transport stops are designated areas where buses or other public transport vehicles pick up and drop off passengers. They are equipped with seating, shelters, and signage to provide comfort and accessibility, encouraging public transit use.

Key Features

Universal access: Enough space for seating areas and for wheelchairs.

Shelter and Seating: Design bus stops with comfortable seating and protective shelters to shield passengers from the elements while they wait.

Clear signage: Include clear and visible signage that displays route information, schedules, and connections to other transport modes, making public transport more accessible and user-friendly.

Proximity to key areas: Strategically locate stops near high-density areas like markets, schools, and residential zones to maximize accessibility and convenience.

Encouraging use: By improving the comfort and accessibility of public transport stops, residents are being encouraged to opt for public transit over private vehicles.

Traffic Calming Considerations

Integrating bus bulbs, which extend the sidewalk at bus stops, can serve as a traffic-calming measure by narrowing the street, reducing vehicle speed, and preventing the need for buses to merge in and out of traffic.

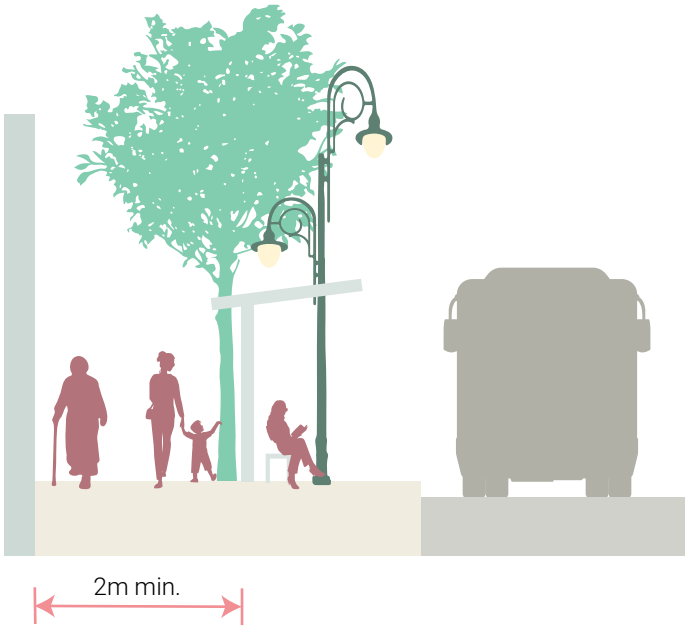


Figure 36. Bus Stop Design. Adapted from ITDP, 2022.

Design Criteria

- On streets with **two or more lanes** in each direction, bus stops should be positioned directly along the bus's path, so the bus doesn't need to pull over.
- On streets with only **one lane per direction** or at terminal points, a **bus bay** can be incorporated, provided there is enough clear walking space behind the shelter. The bus bay should be no wider than 2.5 meters.
- Bus shelters should offer adequate lighting, protection from the weather, and clear customer information.
- **Cycle tracks should pass behind the bus shelters** to avoid conflicts with buses. Bus stops should be placed at 200-400 meter intervals, based on demand.

Key Features

Space Efficiency: Properly designated parking spaces ensure efficient use of limited urban space, minimizing traffic congestion and vehicle clutter.

Traffic Flow: Well-planned parking arrangements help maintain smooth traffic flow and reduce the likelihood of illegal parking that could obstruct sidewalks or bike lanes.

Pedestrian Safety: Parking spaces should be designed to avoid encroaching on pedestrian walkways, ensuring clear, accessible paths for walking.

Sustainable Solutions: Promote the use of shared parking, electric vehicle charging stations, or park-and-ride options to reduce congestion and support greener transport choices.

Traffic Calming
Considerations

On-street parking narrows available driving lanes and can be used as a traffic-calming tool, particularly if designed with protected parking lanes that create a buffer between pedestrians and moving vehicles, thus encouraging slower driving.

h. Parking Management

Parking refers to designated areas along streets or in nearby lots where vehicles can be parked temporarily. Effective parking management is critical for urban areas to ensure that streets remain functional, safe, and accessible for all users, including pedestrians, cyclists, and public transit.

Design Criteria

- **Parking areas** should only be allocated once sufficient space has been provided for pedestrians, cyclists, trees, and street vendors.
- For **taxi stands**, the parking bay should be 2.0 meters wide, and 2.2 meters wide in commercial zones.
- Tree pits can be incorporated into parking areas to offer **shade**; otherwise, footpaths and shaded areas may be encroached by parked vehicles.
- **Parking lanes** should end at least 10 meters from intersections to reduce conflicts and provide extra space for vehicle queuing.
- In commercial areas, dedicated **cycle parking** should be placed at regular intervals, with racks that support the bike frame and allow securing both the frame and one wheel with a U-lock. These racks should be located in the furniture zone of the footpath to keep pedestrian pathways clear.
- Additionally, there should be designated parking spaces for **motorbikes** at established staging points.

i. Crosswalks

Crosswalks are designated paths across streets that provide safe crossing points for pedestrians. They are typically marked with painted lines, raised surfaces, or special materials and are often accompanied by traffic signals to control the flow of both pedestrians and vehicles. Crosswalks play a crucial role in ensuring pedestrian safety in busy urban environments.

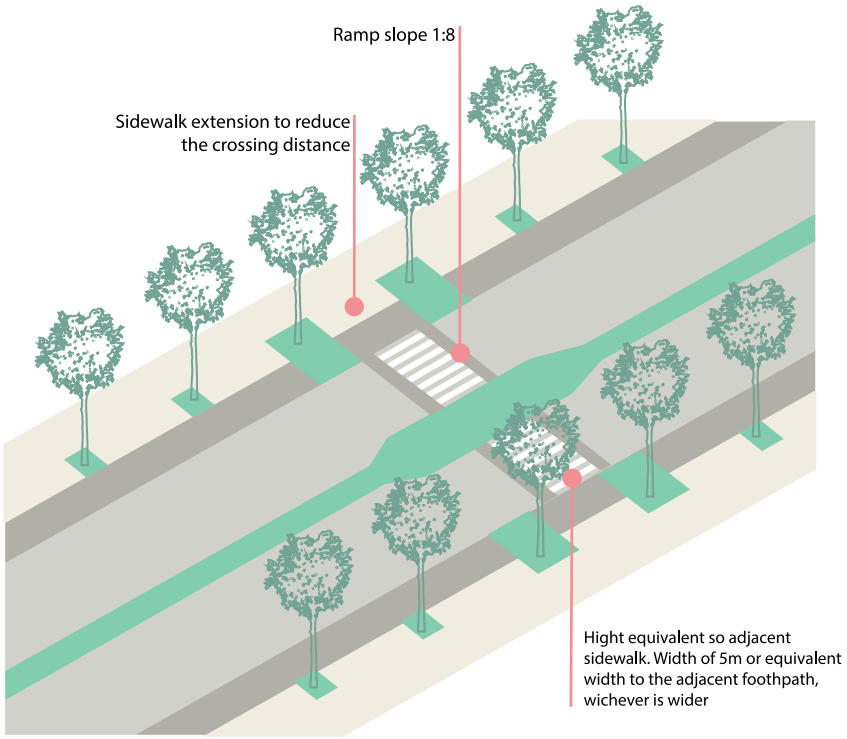


Figure 37. Crosswalk Design. Adapted from ITDP, 2022.

Key Features

Safety: Clearly marked crosswalks alert drivers to the presence of pedestrians, reducing the risk of accidents. In high-traffic areas, they are vital for pedestrian safety.

Strategic Placement: Positioned at key intersections, near schools, transport hubs, and commercial areas to facilitate safe pedestrian movement.

Accessibility: Designed to be accessible for all users, including those with disabilities, by integrating features like curb ramps and tactile paving.

Traffic Calming: Crosswalks, especially those with speed bumps or raised platforms, can help slow down vehicles, improving safety in pedestrian-heavy areas.

Traffic Calming
Considerations

Raised crosswalks slow down approaching vehicles by creating a slight bump, which improves pedestrian safety. Pedestrian refuge islands in the middle of wide streets provide a safe space for pedestrians, while also narrowing traffic lanes, causing drivers to reduce speed.

Design Criteria

- Pedestrian crossings should be placed **along natural pedestrian desire lines**. They should be either signalized or raised to the level of the footpath for universal access and traffic calming.
- Pedestrians can cross streets with up to two lanes, low traffic volumes, and speeds of 30 km/h or below.
- For streets with two or more lanes in each direction, higher traffic volumes, or faster speeds, crossings are made safer with **median refuge islands,** combined with **traffic calming measures** or signal controls.
- For tabletop crossings, the height should align with the adjacent footpath, with a preferred **ramp slope of 1:8.**
- If using a speed hump, it should be positioned 5 meters before the crossing.
- Drainage inlets should be installed upstream to prevent water accumulation.
- Pedestrian crossings should be 5 meters wide or as wide as the adjacent footpath, whichever is larger.
- Bulb-outs should be added to parking lanes to reduce the distance pedestrians need to cross.

Figure 38. Crosswalk. ITDP, 2023

j. Traffic Signs

Traffic signals are electronic devices placed at intersections or pedestrian crossings that regulate the movement of vehicles and pedestrians. These signals alternate between green, yellow, and red lights to manage traffic flow, prevent accidents, and ensure safe crossing for pedestrians. In modern systems, smart traffic signals adjust based on real-time traffic conditions.

Figure 39. Traffic Light. Elmir Jafarov, 2024.

Key Features

Safety & Control: Traffic signals maintain order by directing the flow of vehicles and pedestrians, preventing collisions and congestion.

Efficiency: Help manage high-traffic areas by coordinating the timing of lights to improve traffic flow, particularly during peak hours.

Pedestrian Signals: Include dedicated pedestrian phases, ensuring safe crossing times that are well-timed with vehicle traffic.

Smart Technology: Modern signals can adapt to traffic patterns and reduce waiting times, leading to smoother and more efficient traffic management.

Traffic Calming
Considerations

Traffic signals can integrate pedestrian priority phases, which hold vehicle traffic longer, allowing pedestrians more time to cross. The use of timed lights or signals that adapt to traffic flow can reduce vehicle speed and improve the flow for both vehicles and pedestrians.

Figure 40. Horizontal Traffic Signs. Gilherme Rossi, 2018.

k. Drainage

Drainage systems manage stormwater on streets, ensuring that water from rain or melting snow is efficiently channeled away from roads and sidewalks to prevent flooding and water damage. Effective drainage systems are essential for urban infrastructure, helping to keep streets safe and functional during wet weather.

Key Features

Flood Prevention: Well-designed drainage systems divert rainwater away from streets and public spaces, reducing the risk of waterlogging and erosion.

Public Safety: Prevents slippery surfaces, pooling water, and other hazards that can cause accidents for pedestrians and vehicles.

Sustainability: Green infrastructure, such as permeable pavements or bioswales, can be incorporated to naturally filter and manage stormwater.

Regular Maintenance: Drainage systems require consistent cleaning and maintenance to prevent blockages, especially in areas prone to heavy rainfall or debris.

Figure 41. Kabul, Afghanistan. Mohammad Husaini, 2021.

07

Current Road Safety Situation in Afghan Cities

Afghan cities face significant road safety challenges driven by rapid urban growth, limited infrastructure, and unregulated traffic flows. The People-Friendly Streets in Afghan Cities project, funded by the UN Road Safety Fund (UNRSF) and implemented by UN-Habitat, has assessed road safety conditions in Kabul, Jalalabad, and Mazar, identifying critical hotspots and proposing pilot solutions to reduce traffic incidents in these areas. This section presents three examples from these cities, illustrating common challenges and highlighting how targeted, low-cost interventions, rather than extensive street redesigns, can effectively address many road safety issues in Afghan urban environments.

Figure 42. Current state of street in Kabul.

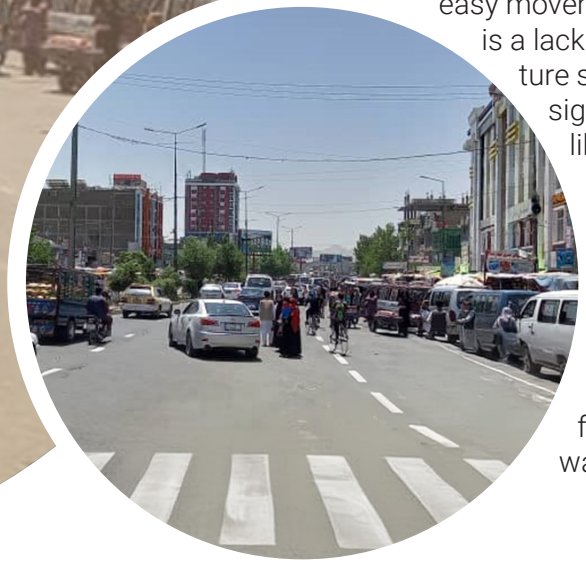


Figure 43. Proposed interventions. Computer generated.

Kabul

The Kabul street showed in the image reveals several critical safety issues related to street design. There is a clear lack of road markings, and potholes present in the carriage way, making it difficult for drivers, cyclists, and pedestrians to navigate safely. Bicycles are present, showing a demand for dedicated bike lanes and informal parking is present. Pedestrian pathways are noncontinuous, disrupting safe and easy movement for walkers. Additionally, there is a lack of essential pedestrian infrastructure such as crosswalks, traffic lights, signage, and traffic calming measures like refuge islands. The proposed solution, as seen in the smaller circle, is a computer generated image where low-cost interventions have been implemented to improve the overall safety conditions of the road, by providing a designated safe crossing point for pedestrians, fixing the surface of the carriage way and adding proper signalization.

Jalalabad

The Jalalabad street image highlights several urban design challenges. Numerous three-wheelers are present, but they are unorganized, with no dedicated dropping zones, contributing to traffic congestion. This unaligment is risky for the present bicycles and pedestrians that are present in the road. Additionally, in the background there is the entry of a school with no designated safe zones, forcing children and parents to wait among informally parked and moving vehicles.

This situation generates an evident traffic jam, further complicating movement for all road users. The presence of bicycles suggests a need for dedicated bike lanes and parking areas, but this infrastructure is lacking. Pedestrians also lack essential safety features, as there are no crosswalks, traffic lights, pedestrian pathways, or traffic calming measures. Road markings are insufficient, and the demand for curbside parking or drop-off zones is apparent but unmet. A low-cost solution would be a dedicated lane for bicycles and indicated signalization for the rest of the traffic. The area in front of the school must remain free of parking and with safer areas for children and parents to meet.

Figure 44. Proposed interventions. Computer Generated

Figure 45. Current state of street in Jalalabad.

Mazar

The Mazar street shows an unorganized presence of numerous taxis, with no dedicated drop-off zones, leading to disorganized traffic flow. Curbside parking or drop-off zones are likely in demand but are not available. The road markings are insufficient, contributing to the overall lack of order. Pedestrian infrastructure is missing, with no crosswalks, traffic lights, or traffic calming measures to ensure safety.

Additionally, the presence of bicycles suggests a need for bike lanes and parking areas, which are currently absent, further complicating the use of the road for all users. As proposed in the generated image, the parking situation must be addressed, to free the carriageway and allow safer flow of cars. Proper signalization for parking must be signalized and an study of crossing demand should be done to understand which is the right way to integrate a crossing point for pedestrians.

Figure 46. Current state of street in Mazar.

Figure 47. Proposed interventions. Computer Generated.

Figure 48. Kabul, Afghanistan. Qasim Mirzaie, 2022.

08

National Case Studies

The following chapter displays practical cases in cities in Afghanistan where interventions were implemented focused in improving the mobility of everyone, prioritising the safety of pedestrians.

Redisigning an unorganised street junction on a main road

Location: Mazar-e-Sharif
Years of implementation: 2023-2024

Description

The Mazar pilot project focused on several key locations in Mazar-e-Sharif, where road safety was neglected during the design phase, leading to operational inefficiencies. These areas are situated in densely populated parts of the city, characterized by significant daily traffic and heavy pedestrian movement. The lack of road safety measures posed risks to both drivers and pedestrians. By targeting these high-risk zones, the project aimed to improve overall safety, traffic flow, and pedestrian accessibility, addressing critical urban mobility challenges.

Situation Analysis

A comprehensive desk study was conducted on the entire road network in Mazar-e-Sharif focusing both the physical environment and the social values of the community. Need assessment was carried out through a social landscape workshop, where residents actively participated in discussing their needs and daily interactions within the neighborhood. It also included direct observations, community feedback, as well as input from municipal authorities and traffic officers.

The pressing safety issues observed in targeted locations were frequent traffic congestions, a high number of traffic incidents, and unsafe pedestrian crossings.

The assessment emphasized the need to respond quickly to urgent safety needs where daily traffic safety issues threaten safety of the users. By leveraging local expertise and onsite observations, the project team was able to prioritize areas where interventions could have the most immediate impact.

The priorities were identified as physical barriers for safe walking, highlighting the poor infrastructure, such as inadequate pedestrian crossings, insufficient sight angles and the insufficient enforcement of traffic rules and regulations.

Before

Figure 49. Previous state of intervened area in Mazar.

After

Figure 50. Area after intervention.

Intervention

• Elevated tabletops with a width of 3 m to maintain the same level of sidewalk while crossing the street.
• Re-designing a three-leg “Y” junction to introduce safe crossing corridors, implement refuge island and safe right turning.
• Road markings applied on the road to guide vehicular movement and help the pedestrians notice traffic turnings.
• Re-designing the central road median with sufficient line of sight for pedestrian and safe islands/ pause area for pedestrians

Outcome

The project aimed to improve road safety in key locations across Mazar-e-Sharif, and the transformation after the project implementation has been very positive. As a result of targeted interventions, 96% of the respondents are satisfied with the interventions. Pedestrian crossings were made safer, leading to 85% increase in pedestrian use. Additionally, community awareness campaigns resulted in heightened understanding of road safety and its application.

Since the locations of the projects were situated on major main roads unlike other interventions that were in smaller neighborhoods, the post implementation survey still depicts the need for more safety intervention and measures. Some of the bigger concerns like traffic lights and streetlights were not implemented during this pilot. However, the municipality will be implementing through regular street improvements and traffic safety measures.

Traffic calming measures

in a new street widening project to enhance pedestrian safety

Location: PD 5, Kabul, Afghanistan
Years of implementation: 2023-2024

Description

Since 2022, the Kabul municipality and transportation department are carrying out several road widening projects. Most of these roads are situated amongst dense urban settlements with narrow roads and network of pedestrian routes. A sudden incursion of road widening measures enables an environment with faster vehicles, blind spots and dangerous environment for pedestrians. The project implemented several strategic interventions focused on improving road safety for pedestrians including traffic calming measures and awareness for drivers.

Situation Analysis

A comprehensive study was conducted on the entire residential neighborhood, mapping both the physical environment and the social values of the community. This included a social landscape workshop, where residents actively participated in discussing their needs and daily interactions within the neighborhood. The study identified key physical barriers, highlighting the poor infrastructure, such as blocked or absent sidewalks, the lack of safe pedestrian crossings, and the insufficient enforcement of traffic rules and regulations. The study also showed 52% are motorized vehicle users and 34% are daily pedestrians while 13% are non-motorized mode users. The study illustrated the diversity in mobility and transportation modes. A significant portion being vulnerable road users like pedestrians and cyclists. The findings also suggested unsafe crossings, lack of traffic related information, inadequate traffic signages, speeding and running redlights contribute to 30% of traffic related violations. In response to these findings, a series of traffic safety measures were implemented to address the identified challenges.

Before

Figure 51. Previous state of intervened area in Kabul.

After

Figure 52. Area after intervention.

Intervention

• Elevated Tabletop crossings with a width of three meters maintaining same level as sidewalks. The intervention not only slows down the vehicles but also increases the visibility of the pedestrians while crossing the street.

• Reflective traffic sign boards and information along the streets and zebra crossings and other strategic locations.

• Road markings to guide vehicular movement and help the pedestrians notice traffic turnings and intersections.

• Reflector studs are installed ahead crossing corridors (speed table and zebra crossing) to reflect during the night and increase road safety.

• Solar streetlights to increase the visibility of the area and pedestrians during the night.

Outcome

The implemented interventions have improved road safety and gained overall positive feedback from the community. The selected stretch of road has considerable decrease in traffic incidents and fatalities as the vehicles are forced to slow down at three key locations, especially at school crossings routes, mosques etc. Protective barrier in traffic islands increase the safety of pedestrians while crossing the street even if the cars are speeding and provides a sense of security.

As the outcome of the intervention, it was found that increased percentage of respondents reported to being safer than before while using the road. The measures have significantly enhanced the safety of all commuters in the area, improving conditions for pedestrians and non-motorized users while regulating vehicle traffic. These efforts were critical in creating a safer, more accessible environment for the neighborhood's diverse population.

09

International Best Practices

Intervention

WRI India employed “tactical urbanism,” using simple tools like paint and cones to temporarily redesign the space. The intervention added narrower turn radii, expanded sidewalks, and designated pedestrian refuge areas. This approach allowed for community feedback and refinement before making permanent changes.

Outcome

The redesign saw significant improvements in safety and traffic efficiency, with a reported 30% reduction in pedestrian crossing distance. Since the changes were made permanent, no major crashes have occurred at the HP Intersection. The success of this project has encouraged similar redesigns at other high-risk intersections in Mumbai and across India.

Before

Figure 53. Previous state of intervened area in Mumbai.

After

Figure 54. Area after intervention.

Intersection Redesign

Location: Mumbai, India
Year of implementation: 2017 - 2018

Description

The HP Intersection was redesigned to improve safety for pedestrians and streamline traffic flow. This busy, high-risk junction connects key roads, including the heavily trafficked Linking Road, and previously lacked pedestrian infrastructure. The redesign introduced dedicated pedestrian pathways, refuge islands, and reduced pedestrian crossing distances by 50%, aiming to balance safety for all users.

Situation Analysis

Mumbai's intersections have historically prioritized motor vehicle capacity, leading to increased pedestrian vulnerability. Before intervention, this intersection saw frequent conflicts between vehicles and pedestrians. With around 5,000 pedestrians crossing daily, the absence of pedestrian-specific infrastructure led to chaotic, unsafe conditions. The HP Junction was identified by WRI India and local authorities as a critical point for implementing safer street design as part of a city-wide initiative to reduce road fatalities, 30% of which occur at intersections.

Safe Junctions Programme

Location: Fortaleza, Brazil
Year of implementation: 2017

Description

Fortaleza City Hall in Brazil launched a Safe Junctions Programme aimed at quick implementation and rapid results. Through a sustainable approach to mobility policies that prioritize public transport, traffic safety measures, and infrastructure for walking and cycling, the city made substantial improvements. By 2016, the annual traffic accident monitoring system recorded the lowest number of road traffic fatalities in 15 years.

Situation Analysis

Fortaleza City Hall in Brazil launched a Safe Junctions Programme aimed at quick implementation and rapid results. Through a sustainable approach to mobility policies that prioritize public transport, traffic safety measures, and infrastructure for walking and cycling, the city made substantial improvements. By 2016, the annual traffic accident monitoring system recorded the lowest number of road traffic fatalities in 15 years.

Intervention

The modifications at junctions primarily involved using highly visible paint markings to direct traffic, shorten pedestrian crossing distances, and widen pavements with light protection. Additionally, existing road markings were refreshed, and signs were installed to remind motorists of the parking prohibitions near junctions. These interventions were complemented by a realignment of communication and enforcement efforts.

Outcome

The capital of Ceará, where Fortaleza is located, has experienced a 15-year low in traffic fatalities following the implementation of a mobility strategy that includes speed reduction measures, dedicated bus lanes, and cycling infrastructure. The key findings revealed a 53% reduction in the total number of crashes, along with a 60% decrease in injury-related crashes and a 48% decrease in crashes resulting in property damage. A cost-benefit analysis based on these results—assuming regular annual engineering maintenance at the treated intersections—estimated a return of USD 103 for every dollar invested. To date, improvements have been made at 450 intersections using these treatments.

Before

Figure 55. Previous state of intervened area in Fortaleza, Brazil.

After

Figure 56. Area after intervention.

Bicycle Programme Launch and Street Activation

Location: Nairobi, Kenya
Year of implementation: 2022-2023

Description

The primary objective of this project was to transform streets into vibrant public spaces for families by incorporating activities such as skating, cycling, and jumping castles. This transformation aimed to create a healthier, more resilient neighborhood and enhance the quality of life for residents. Key goals included improving safety, boosting livelihood opportunities, strengthening relationships with authorities, upgrading play areas for children, and enhancing drainage and environmental quality.

Situation Analysis

Dandora, a neighborhood in Nairobi's Eastlands, Kenya, was historically associated with violence, waste, and poor living conditions, largely due to its proximity to one of the city's largest landfills.

The area's reputation was compounded by neglected residential streets, inadequate waste management services, and poor air quality. Additionally, the drainage infrastructure, including bridges and systems, was severely lacking, contributing to stagnant water, which posed significant health risks and disease proliferation. Residents identified the need for improved drainage systems and the repair of potholes as critical steps towards enhancing street conditions and overall public health.

Before

Figure 57. Previous state of intervened area in Nairobi, Kenya.

After

Figure 58. Area after intervention.

Intervention

Low-cost infrastructure improvements have been implemented, focusing on essential tasks such as repairing potholes and reconstructing the drainage system to enhance road safety and water management.

The neighbourhood received 10 bicycles from UN-Habitat, which will be used to train young cyclists and promote cycling as a sustainable mode of transportation.

The initiative also included organizing open street events to encourage community engagement and active lifestyles. Efforts were also made to clean up local courtyards and streets by removing old rubbish, including broken furniture, contributing to a cleaner and more inviting environment for residents.

Outcome

The initiative continues to have significant impacts. The transformation of community spaces in Dandora has led to cleaner, safer environments with improved air quality and designated community areas.

This success in addressing road safety, crime, youth unemployment, urban decay, and waste management has inspired further community empowerment projects. Residents have experienced enhanced accessibility and safety, while hoping for increased job opportunities through ongoing activities.

The initiative's positive effects on urban health and well-being are ongoing, with plans to further support community development and job creation.

10

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