



Federal Ministry  
for Economic Cooperation  
and Development



# Towards more livable and safer cities

Examples for safe road infrastructure design

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**SUTP.**  
*15 years serving the sustainable  
urban mobility community*

# Towards more livable and safer cities

Examples for safe road infrastructure design

## Authors

### Paul Fremer

Paul Fremer is Civil Engineer specialized on transport planning. He is director of the planning agency RV-K. His main focus lies in road safety and cycling infrastructure. Paul Fremer was lead author of this publication, including developing standards, sourcing images and executing description drawing.

[www.rv-k.de/ueber-uns](http://www.rv-k.de/ueber-uns)

### Michael Stöckert

Michael Stöckert is a transport specialist with RV-K. He joined RV-K after receiving his bachelor degree in transport economics in 2015. He assisted in the development standards, sourcing of images and executing technical drawings.

[www.rv-k.de](http://www.rv-k.de)

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# Preface

Although high levels of road safety are a prerequisite for the attractiveness of cycling, walking and public transport, the lack of road safety remains a major challenge in many urban areas.

The lack of safety refers both to existing infrastructure as well as - unfortunately - often also to newly established infrastructures. Safety issues are often neglected because of perceived additional costs, inadequate norms and regulations and/or limited understanding by planners and decision-makers on new approaches to safety.

In this context, our publication makes a small contribution to raise safety levels by showing selected examples of low-cost, easy to implement solutions. These solutions can be implemented as retrofits for existing infrastructures as well as in plans for new developments.

The description drawings refer to best practises, recommendations, and practical experience in Germany. Many of them are based on the German Road and Transportation Research Associations (FGSV) official recommendations. You will find a lot more descriptions drawings in their publications in the internet at [www.fgsv-verlag.de/catalog/](http://www.fgsv-verlag.de/catalog/).

It is meant as a start, open to integrate additional examples. Please feel free to share your ideas: [transport@giz.de](mailto:transport@giz.de)

## Sustainable Urban Transport Project

SUTP supports decision-makers worldwide to plan and to implement innovative and sustainable mobility solutions. SUTP offers a comprehensive knowledge platform, capacity development, hands-on advice and networking opportunities. Within the past 15 years, more than 5,000 decision-makers, planners and students have benefited from our training offers. We've produced a rich library of Sourcebook Modules, Technical Documents, Case Studies, Factsheets, Policy Briefs and Reading Lists. All documents are accessible through our webpage, along with a comprehensive photo collection and a video channel. Be invited to use and distribute them!

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# 1. Pedestrian curb extensions (bulb outs)

## Setting

- Bulb-outs work particularly well on urban streets with limited heavy goods vehicle traffic as well as on minor streets in residential areas
- Especially important in on-street parking areas with high demand for parking space
- Streets with sidewalk parking problems

## Application

- Low speed level
- Particularly suitable for areas with school children or persons with restricted mobility
- Streets with 200 - 400 vehicles per hour

## Benefits & Considerations

- No restrictions for crossing pedestrians by parked cars
- Free visual fields raise the road safety for all road users
- Gained space can be used for bicycle racks or streetscape elements
- Raises amenity values

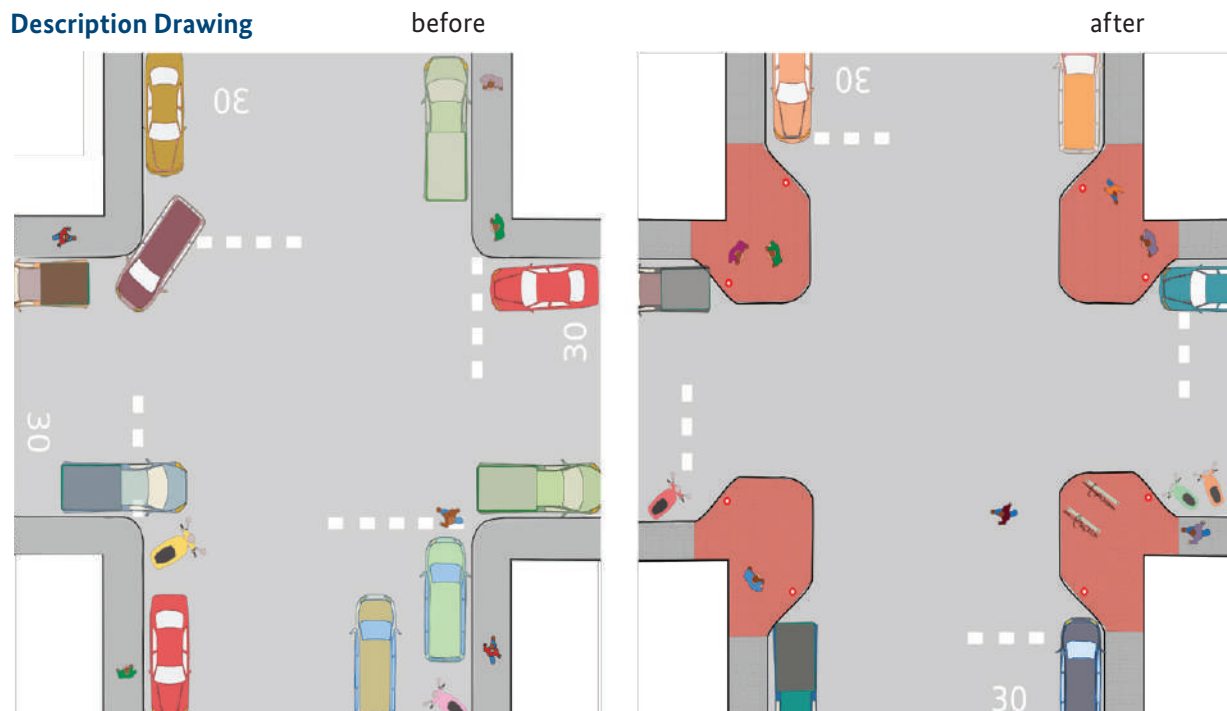


Frankfurt am Main (Germany)



Stuttgart (Germany)

## Description Drawing



## 2. Crosswalks (pedestrian crossings)



Filderstadt (Germany)



Filderstadt (Germany)



Kirchheim (Germany)

### Setting

- Pedestrian traffic concentrated in certain places
- At schools, parks, senior centres, transit stops, hospitals and major public buildings, crosswalks may be beneficial

### Application

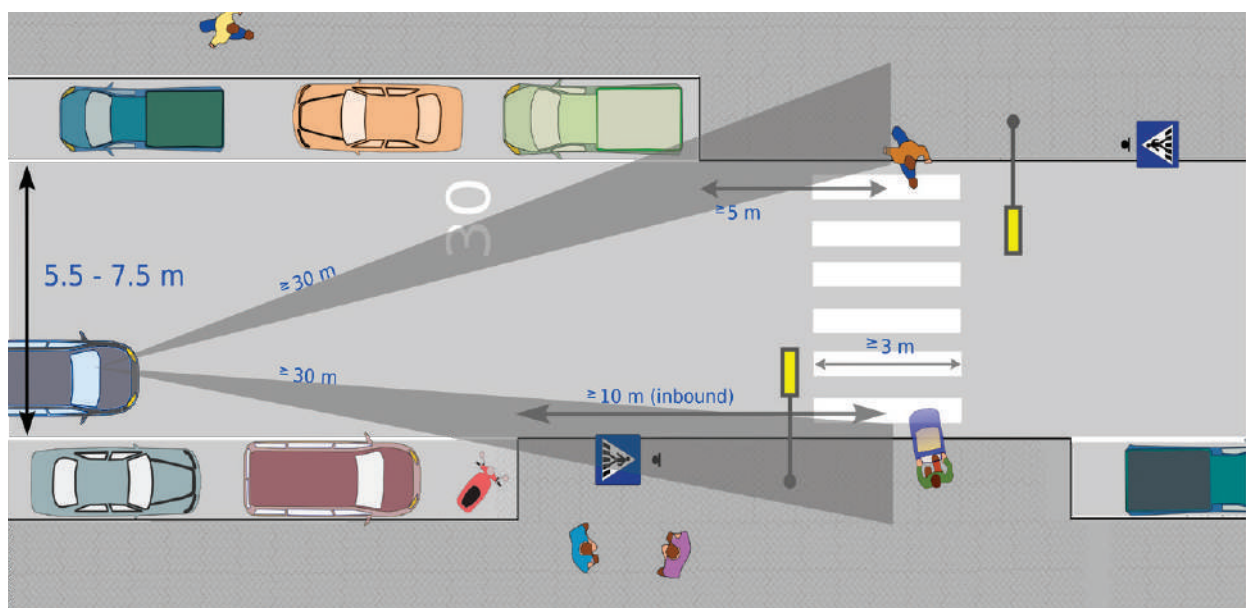
- Only within urban areas
- Only when crossing one lane per direction
- Boardwalks on both sides of the crosswalk necessary
- Maximum speed 50 km/h
- Advisable for 200-750 vehicles per hour in one direction
- Good visibility during daytime and nighttime (illumination)
- Free range 30 km/h: - 10 m for inbound vehicles

- Free range 50 km/h: - 20 m for inbound vehicles
- Minimal recommended field of vision on waiting area:
  - 30 m at 30 km/h
  - 50 m at 50 km/h
- The street width should be limited to 7.5 meters, crossing distance should be kept as short as possible
- In streets wider than 8.5 meters a combination with raised intersections or refuge islands is suggested
- Combination with curb extensions are recommended

### Benefits & Considerations

- Raise pedestrian safety
- Reduce traffic speed
- Alert drivers to pedestrian presence
- Improve walkable environment

### Description Drawing



# 3. On-street parking

## Setting

- Residential street with a high probability for through traffic
- Areas with a high demand for parking space
- Streets with sidewalk parking problems
- Not suitable for streets with heavy duty transport or public bus transport

## Application

- Alternating parking spaces marked on street
- Curbs separate parking from sidewalk / cycle path

## Benefits & Considerations

- Decrease in traffic speed
- Reduction of traffic volume / Prohibition of rat-run
- Combination with a one-way street is recommended to prevent noise and traffic jams
- No sidewalk parking
- Narrows the street width and calms traffic

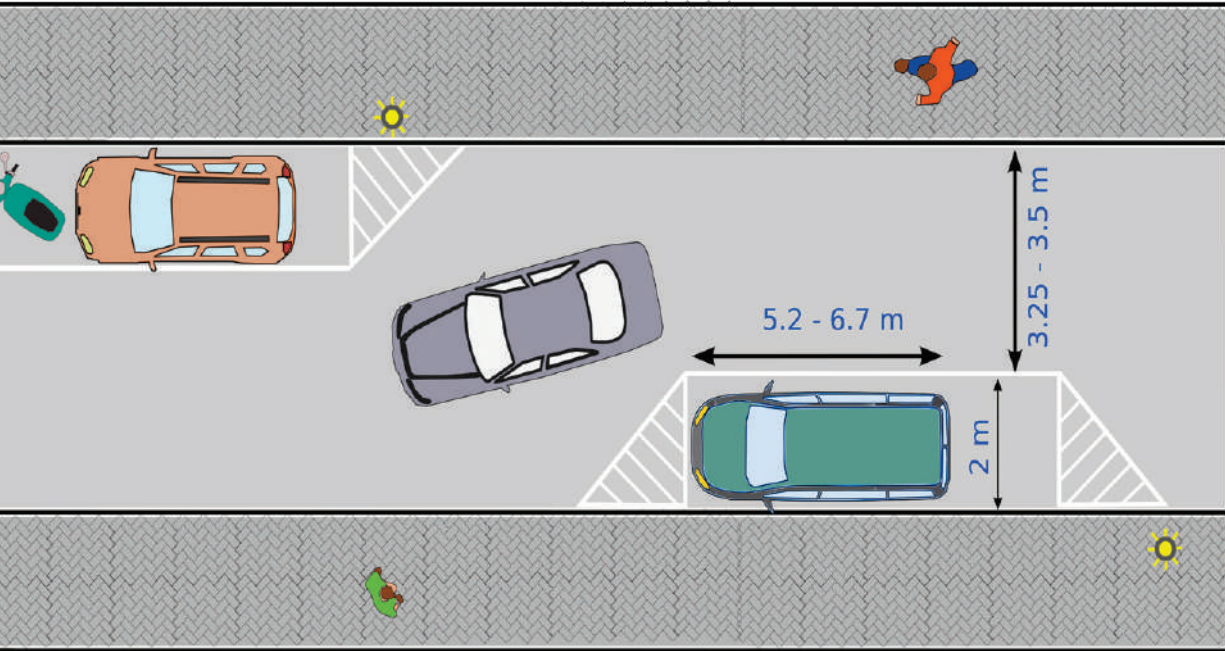


Mainz (Germany)



Heidelberg (Germany)

## Description Drawing



# 4. Pedestrian refuge islands

## Setting

- Busy roads / dense traffic
- Fast flowing traffic
- Wide road cross section
- High pedestrian traffic volume

## Application

- At least 2 meters wide and 4 meters long
- Streetscape elements and signage must not influence the islands visibility
- Good illumination
- Particularly helpful for seniors, disabled people and children
- Combination with crosswalks and raised intersections where possible
- Parking is prohibited in the area

## Benefits & Considerations

- Shortens distance to cross, lessens time loss for pedestrians, particularly in dense traffic
- Concentration on only one oncoming lane of traffic
- Reduces traffic speed
- Raises drivers' attention
- Enhances amenity values

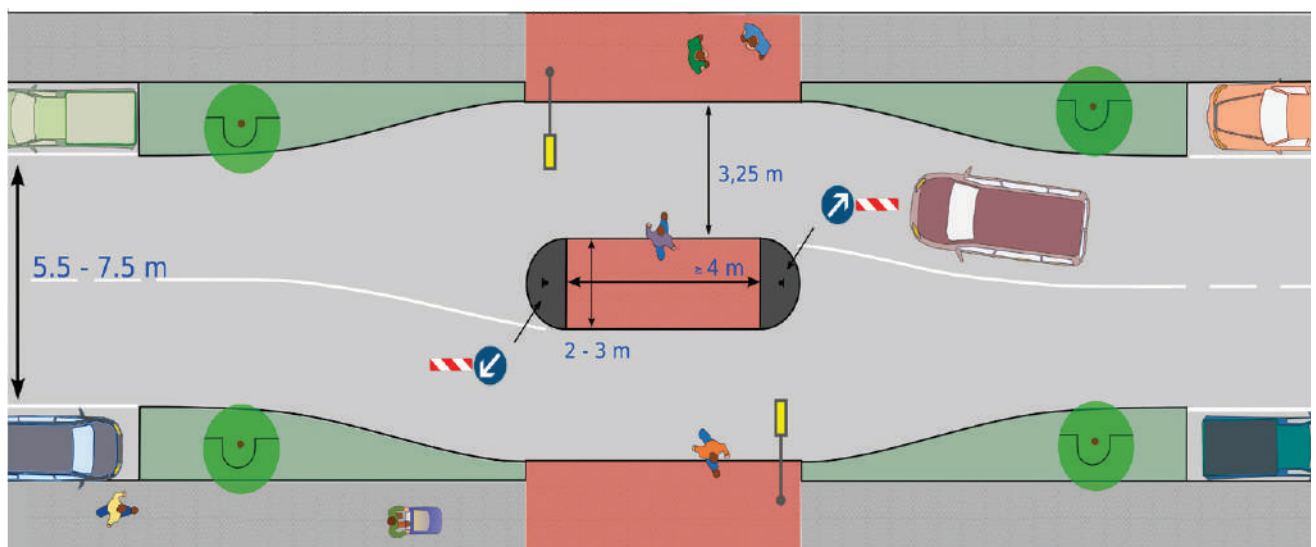


Frankfurt am Main (Germany)



Stuttgart (Germany)

## Description Drawing





# 5. Raised sidewalks at driveway intersections



Eberswalde (Germany)



Frankfurt am Main (Germany)



Stuttgart (Germany)

## Setting

- Infrastructural measure for pedestrians crossing at intersections
- Follows main direction of pedestrian and bike flow to and from public buildings, schools, stations etc.
- Not advisory in areas with higher probability of ambulance usage
- At priority to right intersections within a residential area

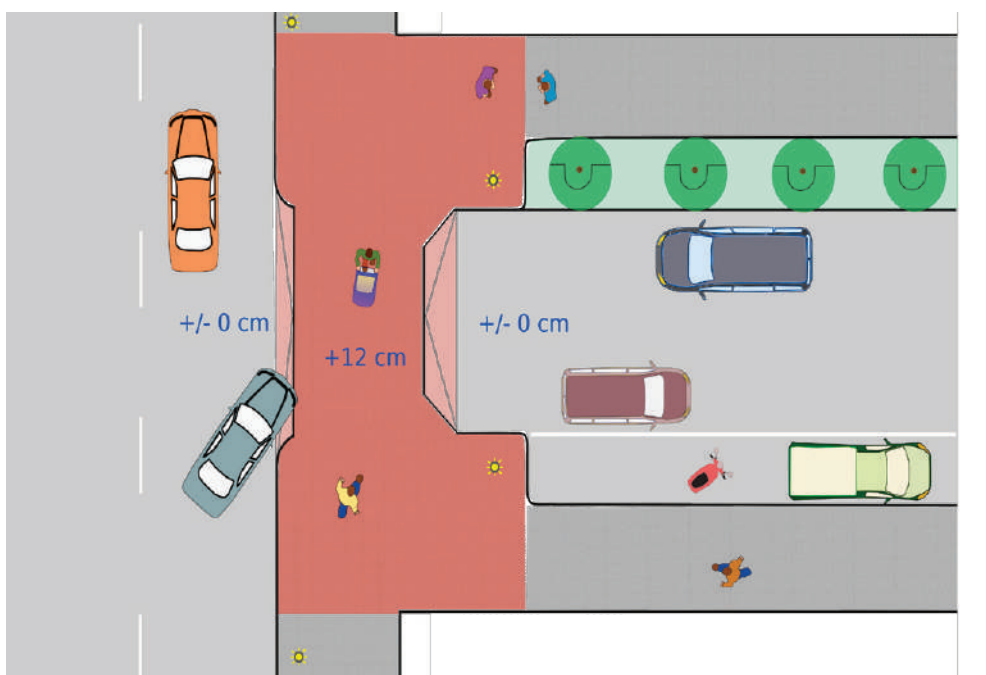
## Application

- Speed bumps in direction of pedestrian flow
- At least the width of the sidewalk
- Ramp inclination angle within ratios of 1:10 to 1:15
- Different pavement appearance to roadway and sidewalk important

## Benefits & Considerations

- Raises pedestrian safety
- Opportunity for pedestrians to move on one level
- Vehicles need to pass an obstacle - raises concentration
- Emphasizes pedestrian right-of-way
- Calms traffic

## Description Drawing



# 6. Road narrowing

## Setting

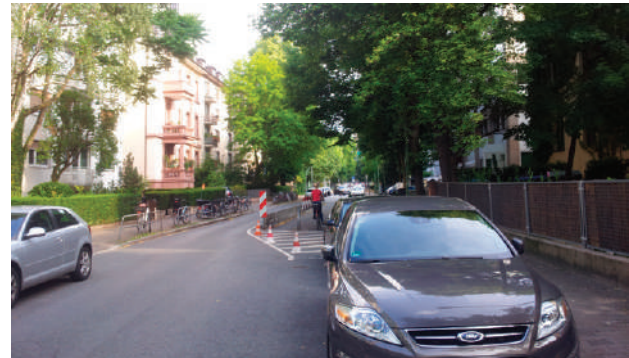
- In secondary and tertiary roads
- In residential streets in combination with crosswalks

## Application

- At least 5 meters long
- Curb of sidewalk 0.3 - 0.7 meters beyond parked cars
- At main roads standard width should be met
- Good visibility: stationary lighting system, white curbstones
- Plantation and signage must not influence the field of vision

## Benefits & Considerations

- Higher comfort and acceptance for pedestrians
- Decreases risk of blocked field of vision caused by parked cars
- Especially effective in combination with speed tables or other traffic calming measures
- Raises amenity values
- Narrows the roadway, resulting in a calming effect

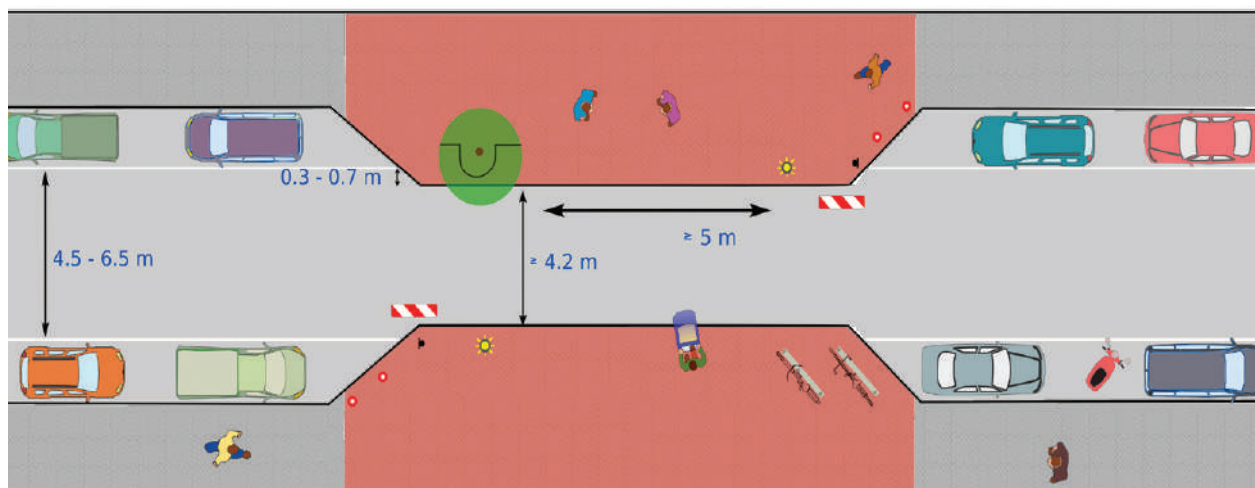


Frankfurt am Main (Germany)



Oberboihingen (Germany)

## Description Drawing



# 7. Small roundabouts

## Setting

- At intersections with high accident rates, insufficient capacity or speeding problems
- Insufficient space for a satisfactory intersection solution

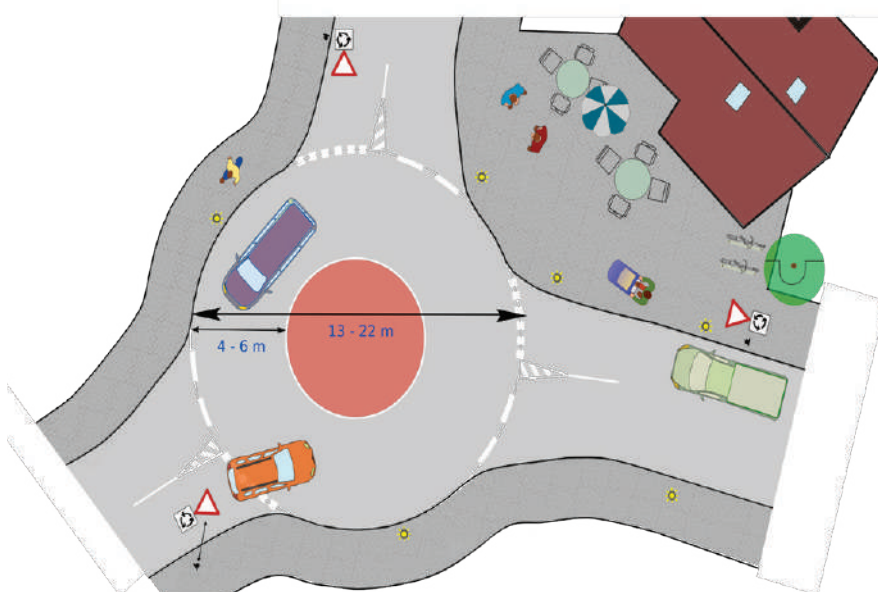
## Application

- Less than 17,000 vehicles per day
- Within 30 km/h areas
- Speed limit 50km/h
- Good visibility for approaching vehicles
- Outside diameter 13 - 22 meters
- Width of circular ring 4 - 6 meters
- Straight access roads to roundabouts advised
- Cyclists ride within the roundabout
- Not advisory in areas with high bus or heavy load traffic

## Benefits & Considerations

- More cost effective than traffic lights in construction as well as in operation
- High security level
- Combination with pedestrian islands or crosswalks at certain pedestrian volume

## Description Drawing



Frankfurt am Main (Germany)



Frankfurt am Main (Germany)



Frankfurt am Main (Germany)

# 8. Traffic diverter



Frankfurt am Main (Germany)



Frankfurt am Main (Germany)



Stuttgart (Germany)

## Setting

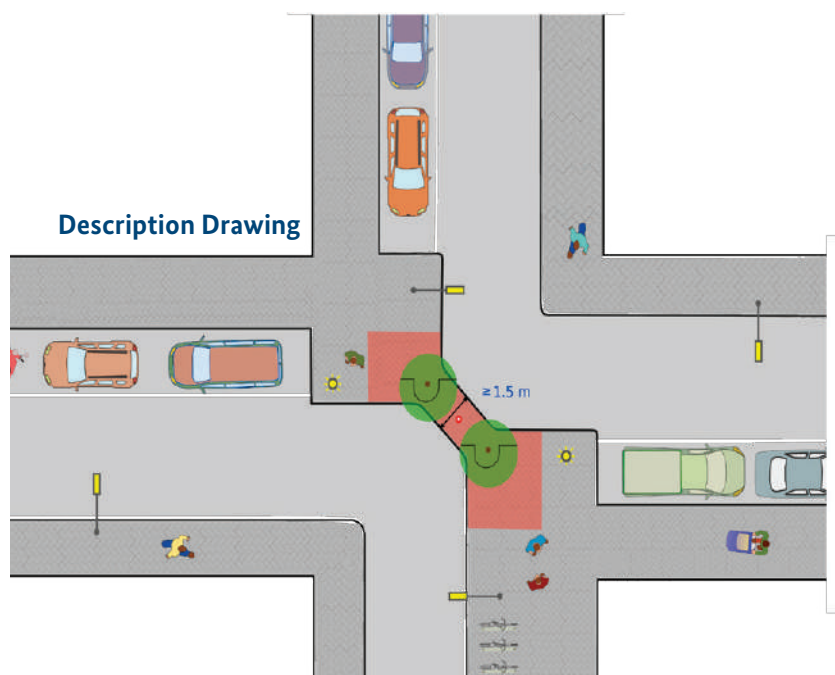
- Residential street parallel to a primary road with a high probability for transit and rat-run traffic
- In residential areas, where other traffic calming measures have only moderate success

## Application

- Intended to provide a possibility for pedestrians and cyclists to pass the barrier
- Prevent access for cars by installing curbs, posts or plantation
- Visibility during daytime and night-time
- Diagonal plateau wider than 1.5 meters for plantation and crossing

## Benefits & Considerations

- Reduction of through traffic volume
- Decrease in traffic speed
- Combination with raised intersection possible
- Increase of detours
- Lowers attractiveness of car use compared to biking or walking



# 9. Traffic calming

## Setting

- Residential streets with high traffic speed
- At intersection of main roads and residential streets
- In the main direction of pedestrian and bike flows
- At the transition to a slower speed street

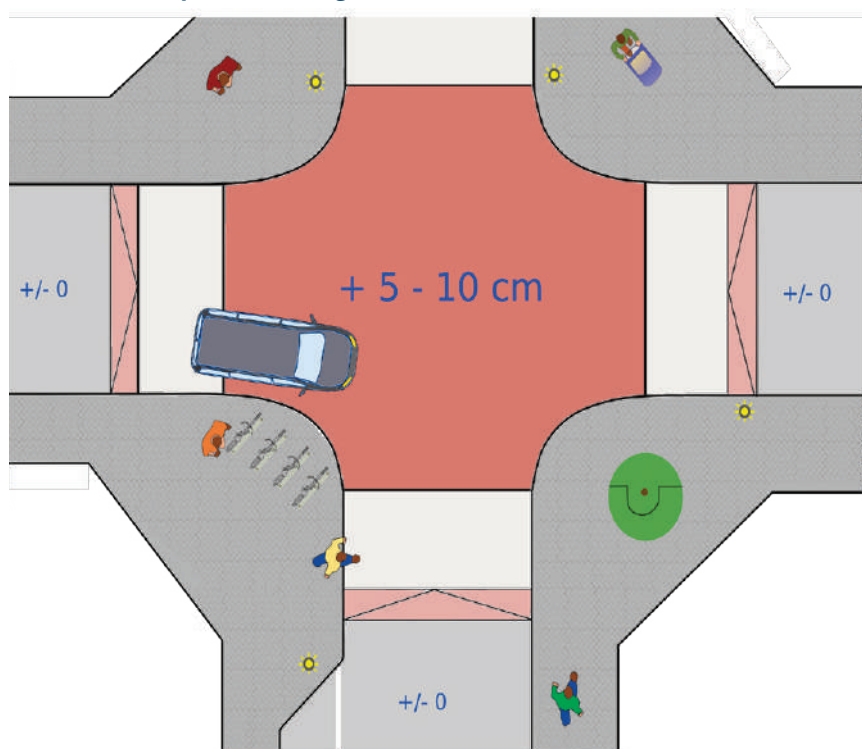
## Application

- Consist of plateau and ramp
- Ramp inclination angle within ratios of 1:25 to 1:7
- Speed table should be longer than the typical vehicle using this road
- Recommended distance between elements less than 50 meters
- Different pavement appearance compared to roadway and sidewalk

## Benefits & Considerations

- Lowers speed at about 25 - 35 km/h
- Higher comfort for crossing pedestrians
- Raises drivers' attention
- Could increase noise
- Raises amenity values

## Description Drawing



Frankfurt am Main (Germany)



Mainz (Germany)



Mainz (Germany)



Frankfurt am Main (Germany)

# 10. Plantation



Hanau (Germany)



Mainz (Germany)



Mainz (Germany)

## Setting

- In secondary and tertiary roads
- In residential streets in combination with parking space markings
- In transition to a slower speed street

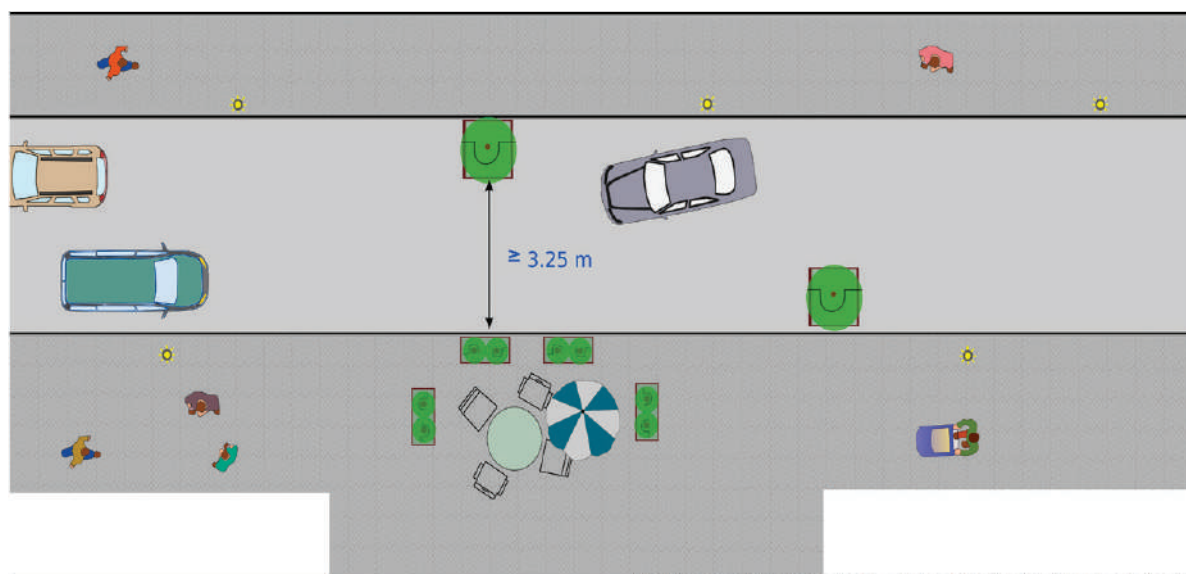
## Application

- Marking with vehicle reflective signs or similar
- Low-maintenance and local plants recommended
- Consider impacts on field of vision

## Benefits & Considerations

- Improves street safety
- Raises amenity values
- Improves streetscape design
- Enhances air quality
- Especially effective in combination with speed tables or other traffic calming measures
- Identifies street as a slower speed area

## Description Drawing



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Registered offices

GIZ Bonn and Eschborn, Germany

Sector Project 'Transport Policy Advisory Services'

Dag-Hammarskjöld-Weg 1-5

65760 Eschborn, Germany

Tel. +49 (0) 6196 79-2650

Fax +49 (0) 6196 79-80 2650

transport@giz.de

www.giz.de/transport

Authors

Paul Fremer, Michael Stöckert

Managers

Armin Wagner, Michel Arnd

Design and layout

Joan-Carolin Paetz

Photo credits

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Division Water; Urban development; Transport

Addresses of the BMZ offices

BMZ Bonn

Dahlmannstraße 4

53113 Bonn, Germany

Tel. +49 (0) 228 99 535 – 0

Fax +49 (0) 228 99 535 – 3500

poststelle@bmz.bund.de – www.bmz.de

BMZ Berlin

Stresemannstraße 94

10963 Berlin, Germany

Tel. +49 (0) 30 18 535 – 0

Fax +49 (0) 30 18 535 – 2501

