

The logo for the Transportation Research and Injury Prevention Programme (TRIPP) is located on the left side of the slide. It consists of a vertical blue bar with the word "TRIPP" written in white, bold, capital letters. Above the bar, there is a stylized graphic of a road or path leading upwards, and a small circle above that.

NMT Safety by design: Street DESIGN GUIDELINES FOR SMALL CITIES

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The transportation system and the way road spaces are allocated in the cities, is a clear indication of a societal attitude and mind-set.

**CITY
FOR
ALL**



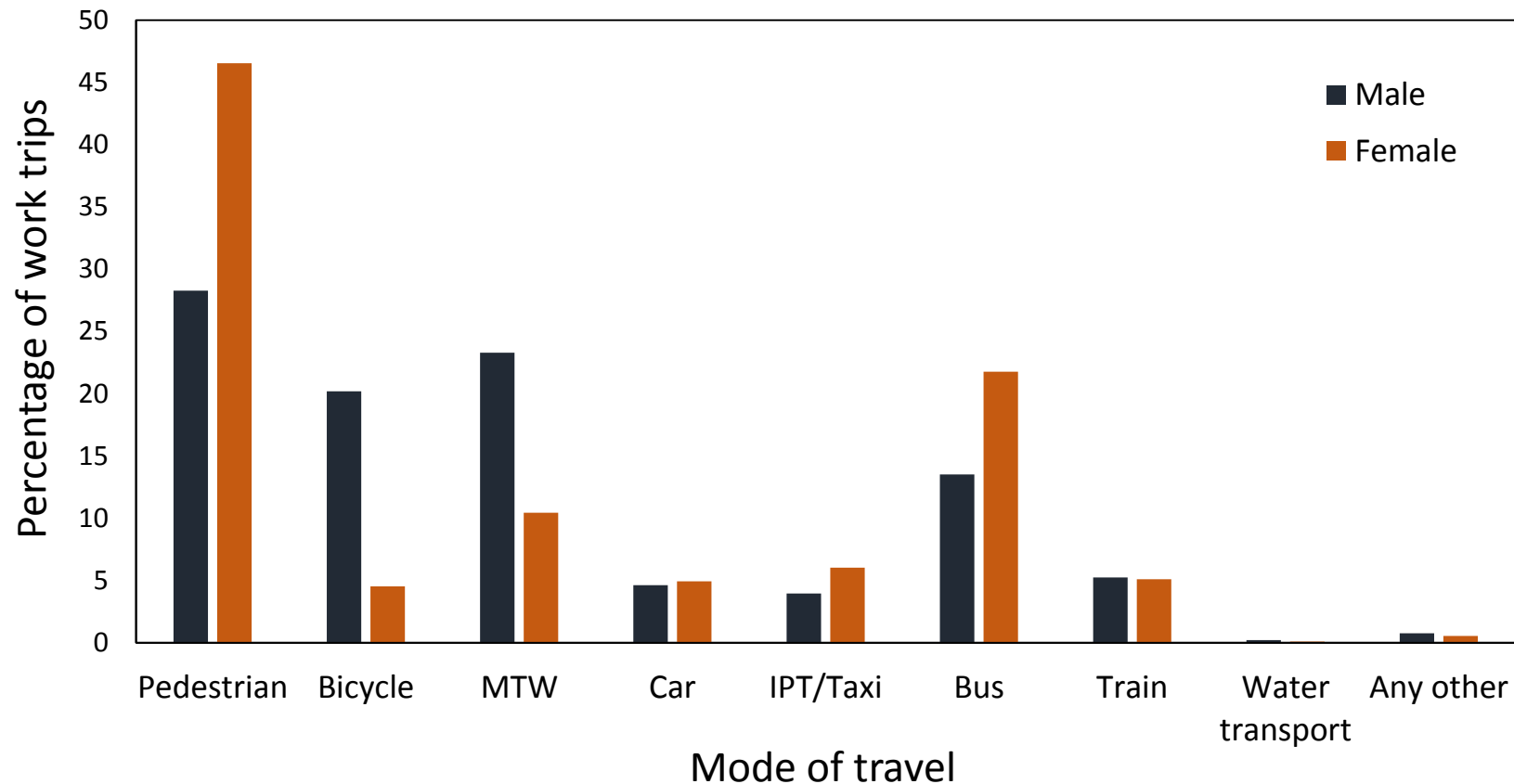
**no one and no
place are left
behind** in the
development of a
more sustainable
future

A well functioning road infrastructure must fulfill the requirements of **all road users**.

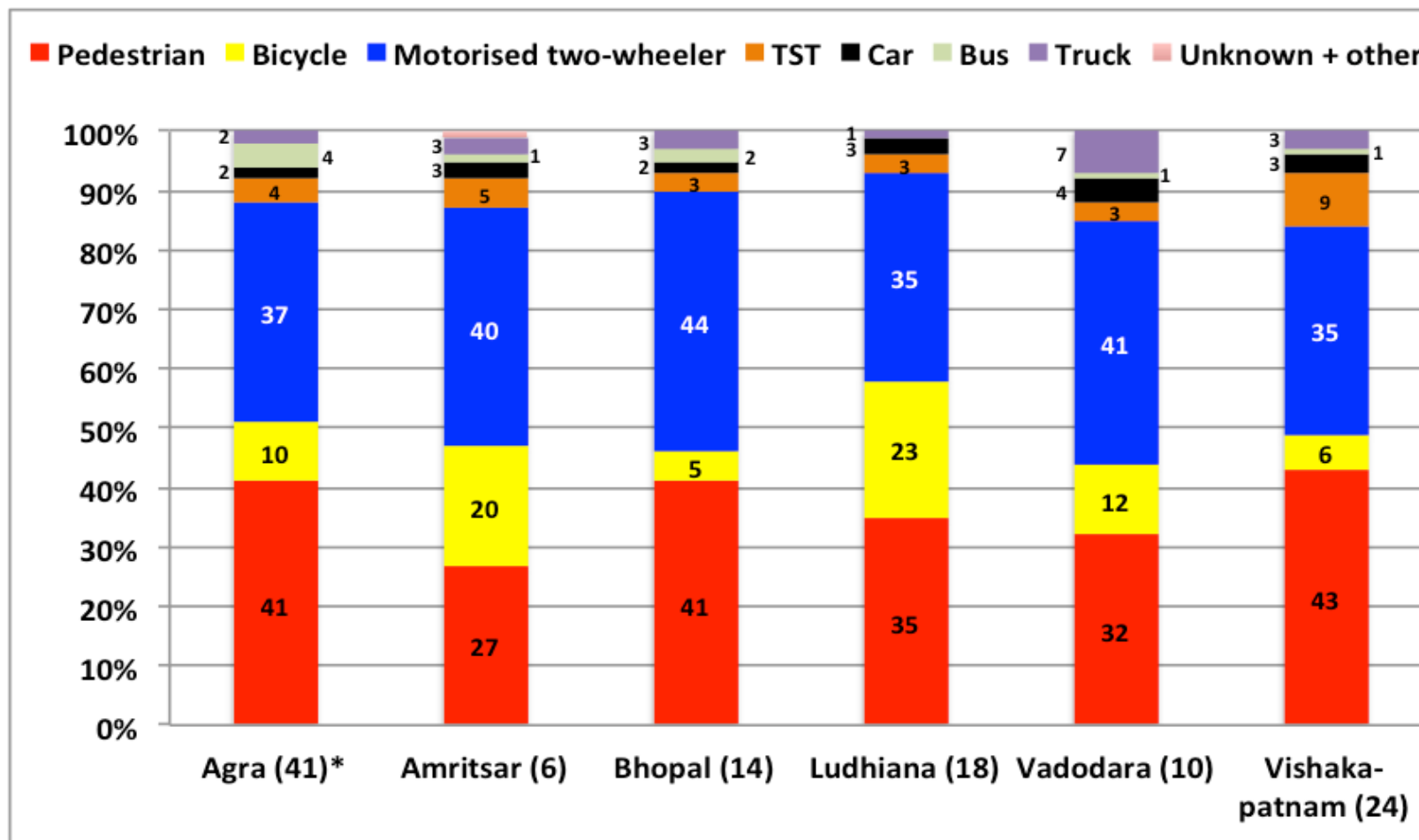
If the infrastructure design does not meet the requirements of these elements **all modes of transport operate in sub-optimal conditions**.

Urban Travel to work (Census, 2011)

- The largest proportion of workers travel on foot or by bicycle
- 49% do not use motorized transport
- 20% use Motorized Two-Wheelers; only 5% use car



Proportion of road traffic fatalities by road user type (vehicle occupants, bicyclists and pedestrians) in 6 Indian cities (IITD study)



The logo for TRIPP (Traffic and Roadway Planning and Design) is located on the left side of the slide. It features a vertical blue bar with the word "TRIPP" written in white, bold, capital letters. Above the bar, there is a stylized graphic of a road or path leading upwards, and a small circle at the top.

Guiding Principles

- Space Allocation for different road users (pedestrians, bicycles, public transport, cars)
 - Separation vs integration
 - Crossing /intersections
- Speed management by design
 - Traffic calming (IRC 99, 2018)

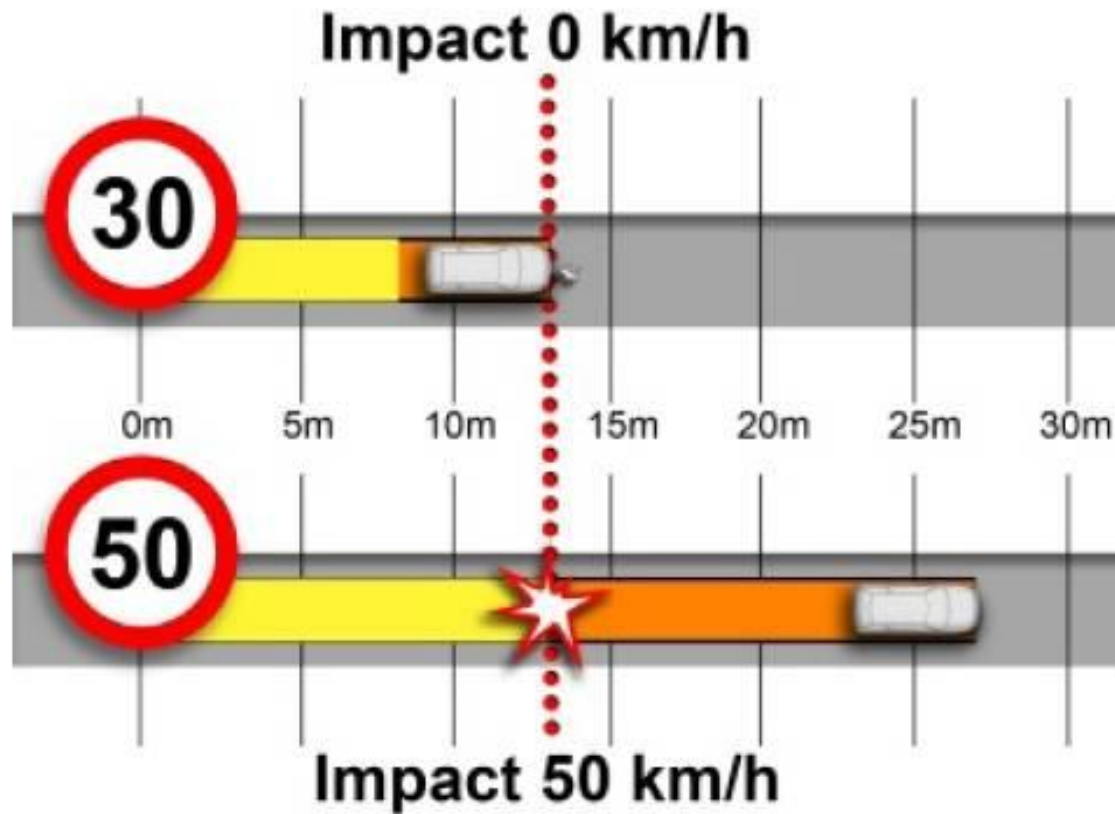
Traffic safety principles / the corner stones for developing safe streets in LMICs.



- Principle 1 Recognition of human frailty
- Principle 2 Acceptance of human error
- Principle 3 Creation of a forgiving environment and appropriate crash energy management.

Principle 3 becomes the operational principle for setting appropriate speed limits for ensuring a forgiving environment for all road users.

Pedestrians will make mistakes in judging the possible risk in the system whereas, drivers can make mistakes in adopting an appropriate speed.

Stopping distances at different travel speeds



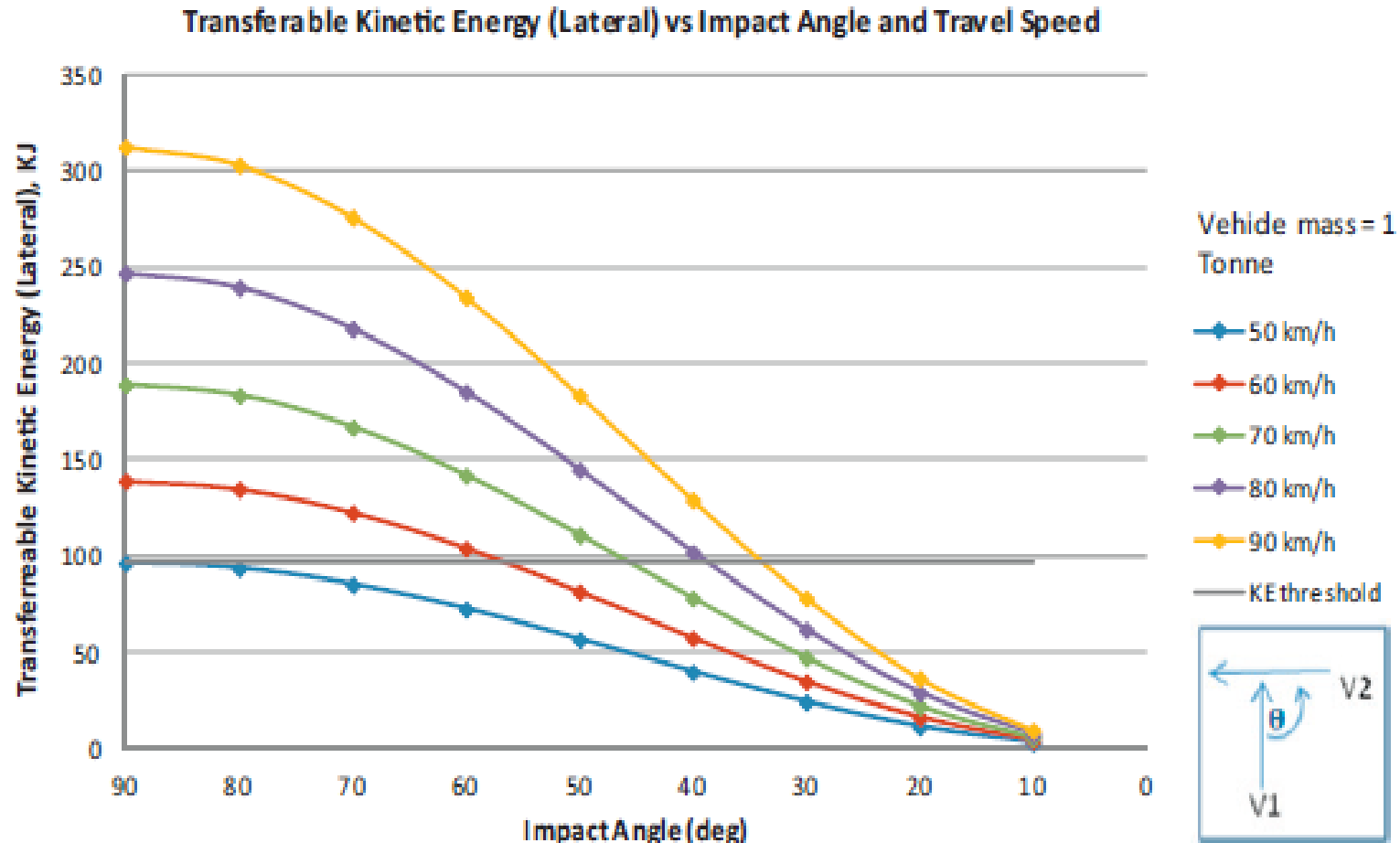
-  Distance covered during reaction time (1 second)
-  Braking distance

Intersection Design

- ❑ Intersection control conflicting and merging traffic.
- ❑ Three main types – signalized , unsignalized and roundabouts.
- ❑ Grade separated facilities are not desirable within urban limits and accessibility due to their adverse impact on accidents, pollution etc.
- ❑ Grade separated facilities divide urban landscape into separate zones, making pedestrians and cyclists extremely vulnerable.

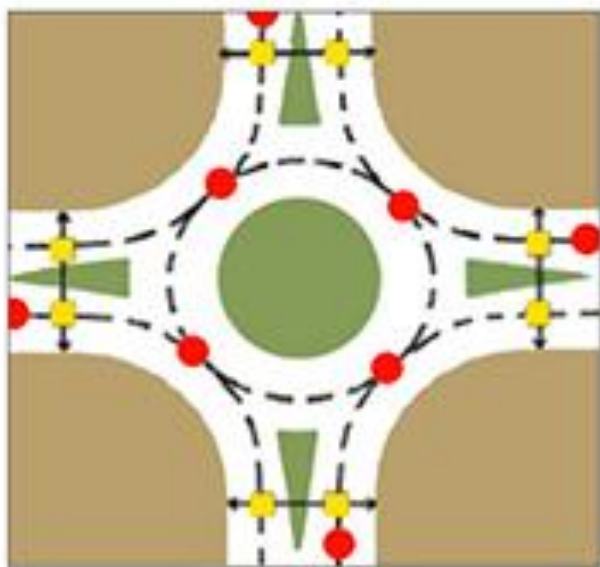


Impact angle, Kinetic energy and travel speed



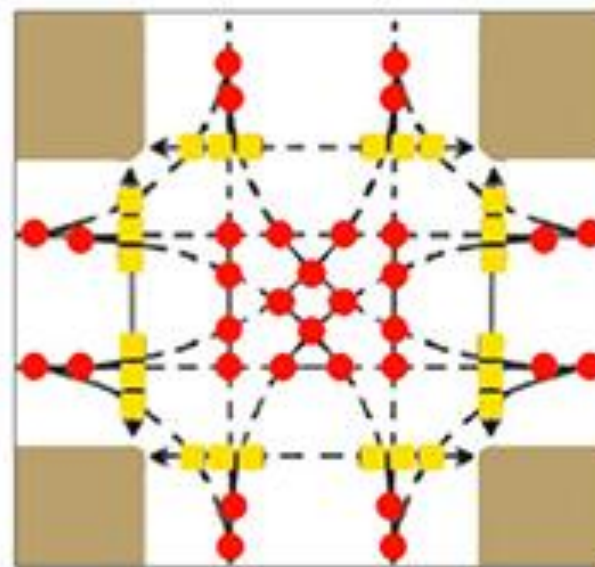
Roundabout safety

Roundabout



- 8 Vehicle conflicts
- 8 Pedestrian conflicts

Intersection



- 32 Vehicle conflicts
- 24 Pedestrian conflicts

Safe Roundabout Design



PATIALA



Street Typology

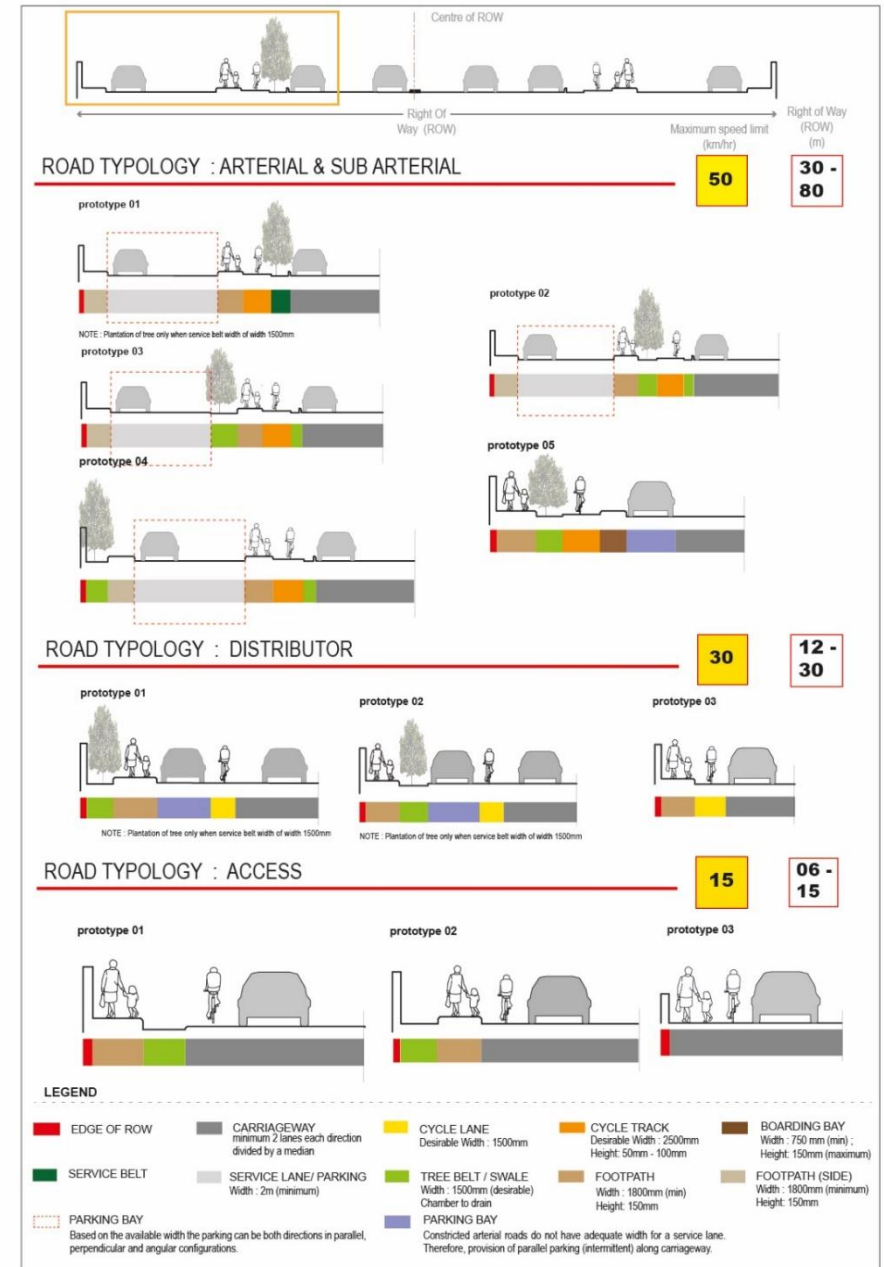
Street Typology	Right of Way-ROW (m)	Design speed (km/hr)
Arterial Streets	50-80	50
Sub Arterial Streets	30-50	50
Collector Streets	12 - 30	30
Access Streets	6 - 15	15

90% of overall road network of Patiala city comprised of Collector roads, Lower distributary roads and Local street having ROW between 6-30m and Speed limit below 30km/hr.

PATIALA

91% of overall road network of Bulandshahr city comprises of Collector streets, Lower distributary streets and Local street having ROW between 6-30m and Speed limit below 30km/hr.

BULANDSHAHR



Main Arterial Roads

30m and above ROW



Existing Cross section - MG Road

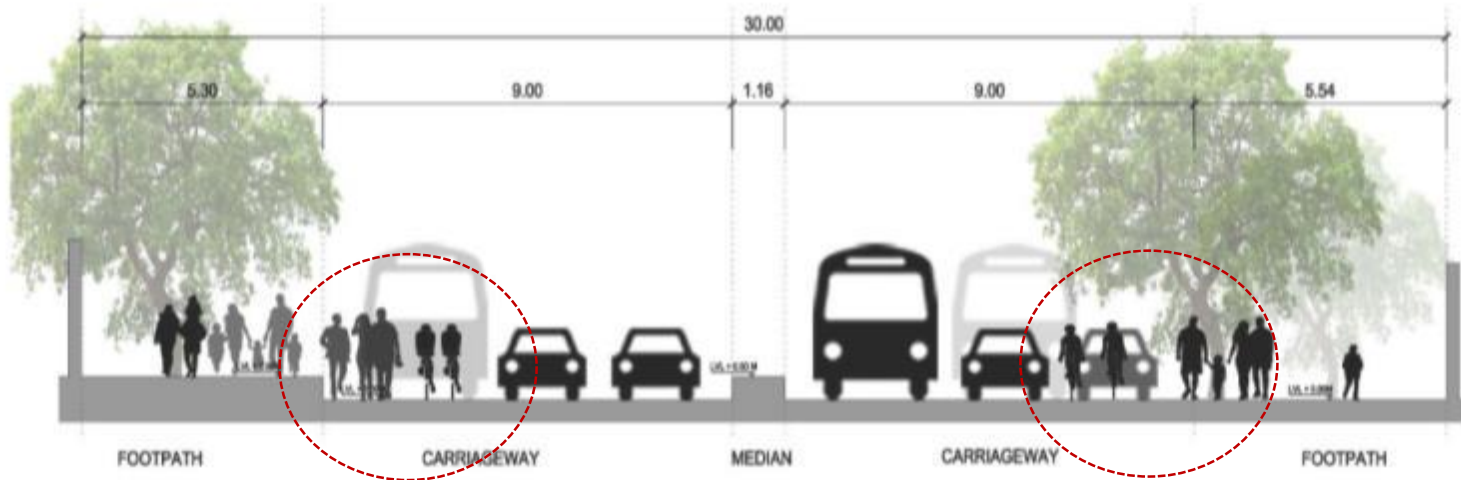
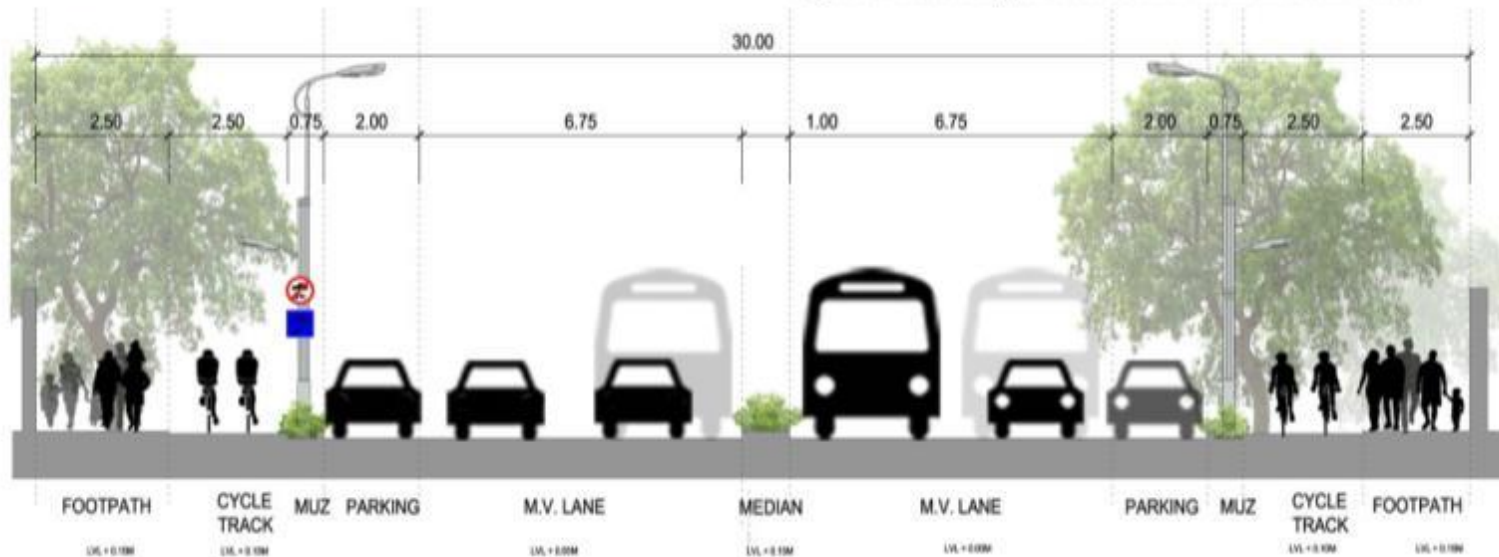


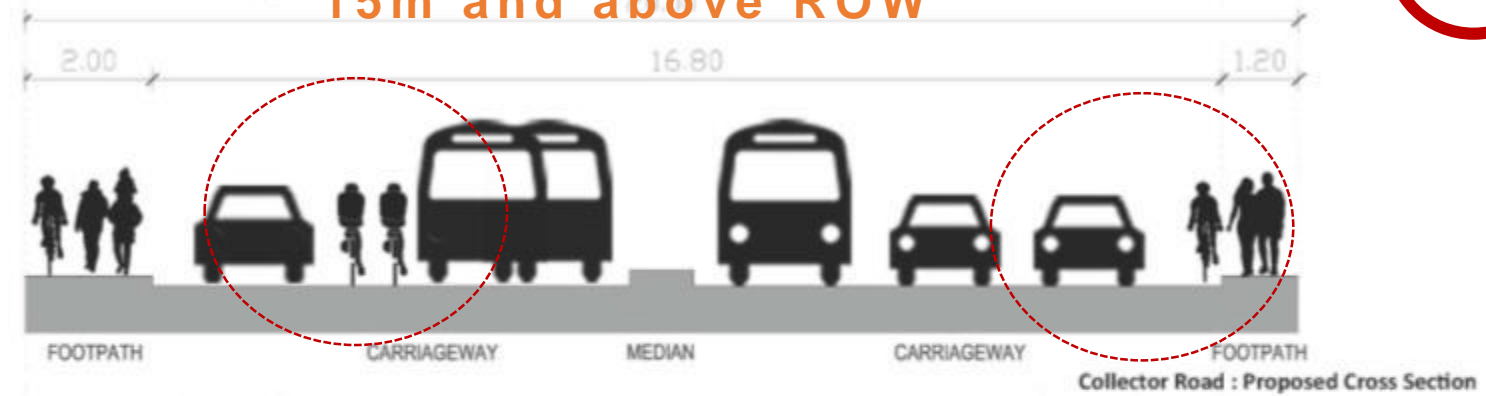
Figure 48: Proposed Typical Cross Section - Mahatma Gandhi Road



Collector Roads

15m and above ROW

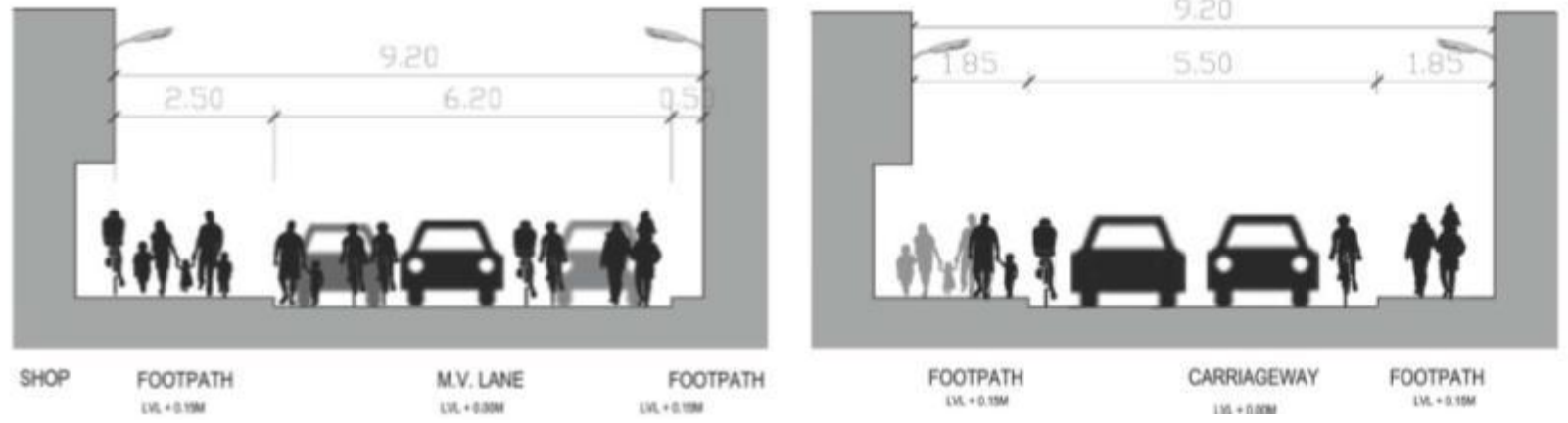
30



Access Roads

15m and above ROW

15



Recommendations

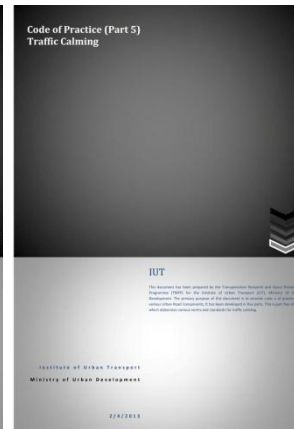
- Pedestrian safety to be ensured by system design
- Active speed control measures(rumble strips, speed humps) most effective in managing speeds and reducing fatalities
- Modern roundabouts are effective for speed management and desired flow



CODE OF PRACTICE FOR URBAN ROADS

Institute of Urban Transport, Delhi

WWW.IUTINDIA.ORG



Non Motorised Transport Planning and Design Guideline



www.cylos.in/report

URSA

Development of Toolkit
under "Sustainable
Urban Transport Project"



Urban Road Safety Audit
(URSA) Toolkit

MINISTRY OF URBAN DEVELOPMENT



PTA

Development of Toolkit
under "Sustainable
Urban Transport Project"



Public Transport Accessibility
Toolkit

MINISTRY OF URBAN DEVELOPMENT



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Thank You