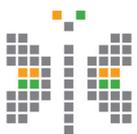


COMPLETE STREETS PLANNING WORKBOOK



Smart City
MISSION TRANSFORM-NATION



Ministry of Housing and Urban Affairs
Government of India



introduction

Under the Smart Cities Mission, many Indian cities have begun to identify and implement street design and junction improvement projects. The projects aim to improve walking and cycling infrastructure ensuring pedestrian and cyclists' mobility and safety. However, most projects are disconnected segments rather than a continuous network. This approach results in standalone interventions instead of creating a usable and connected network for walking and cycling.

The Volume 2: Complete Streets Policy Workbook assists cities in setting a progressive long-term vision and mandate funding for walking and cycling infrastructure. The Volume 3 of the Complete Streets Toolkit, 'Complete Streets Planning Workbook' by the Smart Cities Mission - Ministry of Housing and Urban Affairs provides a step-by-step guidance to city officials, engineers, planners and consultants on creating a city-wide walking and cycling network.

The document is divided into four sections:

- Complete Streets Network Planning
- Gathering Baseline Data
- Creating Complete Streets Masterplan
- Budgeting, Financing & Phasing

The output created through this process includes a long-term masterplan for a Complete Streets network with proposed phasing and estimated investment. These include streets with continuous footpaths, segregated cycle tracks, safe intersections, uniform carriageways and organised parking; as well as greenways, pedestrian-only streets, non-motorised vehicle and public transport priority streets, shared-streets, and junction redesign projects.

Other volumes of this toolkit are

- Complete Streets Policy Framework
- Complete Streets Policy Workbook
- Complete Streets Planning Workbook
- Complete Streets Design Workbook
- Complete Streets Implementation Workbook and
- Complete Streets Evaluation Metrics
- Complete Streets Best Practices

February 2019



The Ministry of Housing and Urban Affairs is the apex authority of Government of India to formulate policies, coordinate the activities of various Central Ministries, State Governments and other nodal authorities and monitor programmes related to issues of housing and urban affairs in the country. The Smart Cities Mission was launched by the Ministry in 2015 to promote sustainable and inclusive cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of 'Smart' Solutions.



The Institute for Transportation and Development Policy works around the world to design and implement high quality transport and urban development systems and policy solutions that make cities more livable, equitable, and sustainable.

This project is part of the International Climate Initiative (IKI)

Supported by:



based on a decision of the German Bundestag

creating complete streets

Complete Street A street designed to cater to the needs of all users and uses, through equitable allocation of road space is referred to as a complete street.

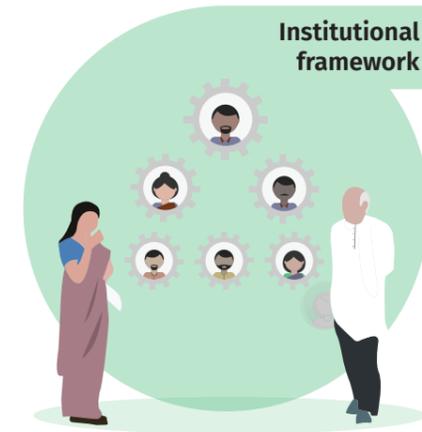
Volume 01 of the Complete Streets Toolkit - Complete Streets Policy Framework - addresses the rationale for making improvements to streets.

Transforming successful pilots into larger city-wide networks of complete streets requires cities to embrace a progressive long-term vision. This can be achieved by adopting a Complete Streets Policy.

Volume 02 of the Complete Streets Toolkit - the Complete Streets Policy Workbook - for Smart Cities across India, provides a step-by-step approach for developing and adopting a Complete Street Policy that is supported by a strong institutional set-up.

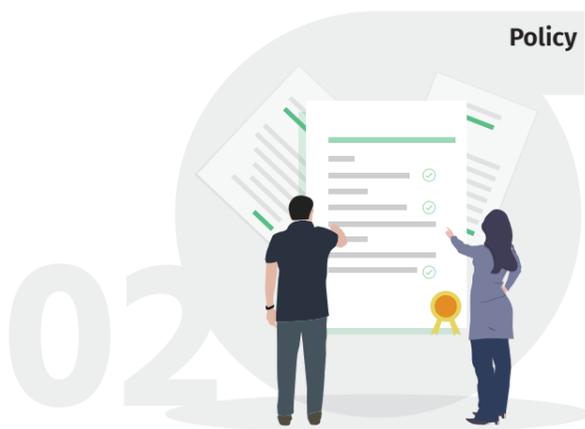
Volume 03 of the Complete Streets Toolkit - Complete Streets Planning Workbook- provides a step-by-step guidance to city officials, engineers, planners and consultants on creating a city-wide walking and cycling networks.

The output created through this process includes a long-term masterplan for a Complete Streets network with proposed phasing and estimated investment. These include streets with continuous footpaths, segregated cycle tracks (where possible), safe intersections, uniform carriageways and organised parking; as well as greenways, pedestrian-only streets, non-motorised vehicle and public transport priority streets, shared-streets, and junction redesign projects.



Creation of complete streets involves cooperation and collaboration between multiple stakeholders (such as urban local bodies, traffic police, planning agencies, consultants, experts, community groups and others) at different stages, at both the city and zonal level. Setting-up a dedicated committee and cell, as elaborated in volume 02, is an essential step to ensure the successful implementation of the complete streets projects.

It is important to obtain the reviews and approval from various stakeholders at each stage of the process of creation of complete streets to ensure that the end product caters to the expectation and needs of all.



More often than not, the process of creating complete streets happens in isolation without involving the end users or the other agencies pivotal to the operation of the street. This leads to a disconnect between the local context and the design, which eventually renders the redesigned street unusable.

A participatory approach to street design involves the stakeholders - government representatives, public, NGOs, etc - in the design process to ensure that the final design caters to the needs of the intended users. The result of such a process is invariably more feasible and also innovative.

Many cities have initiated work on redesigning their streets. However, owing to the lack of a single guiding document for street design, cities are currently following different methods and standards. There is thus an urgent need for a national-level document that serves as guidelines for the design of complete streets.

Volume 04 of the Complete Streets Toolkit - the Complete Streets Design Workbook - for Smart Cities across India, elaborates on the best practice standards and guidelines as well as the process designing complete streets to city officials, engineers, urban designers, and consultants.

Apart from design execution, the mismanagement of the entire construction process can cause delays and inconvenience to residents. The diversion of traffic, dug-up roads with poor attention to on-site safety, obstruction at property entrances, and water logging add to the problems of residents.

Volume 05 of the Complete Streets Toolkit - the Complete Streets Implementation Workbook - for Smart Cities across India, aims to highlight the typical steps of project implementation that can ensure a good final product - a truly Complete Street.

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List of acronyms

BoQ	Bill of Quantities
BRR	Bus Route Roads
BRT	Bus Rapid Transit
CS	Complete Streets
CSMP	Complete Streets Master Plan
DBM	Dense Bitumen Macadam
DIP	Ductile Iron Pipes
DLC	Dry Lean Concrete
DWC	Double wall corrugated
FFL	Finished Floor Level
FRP	Fibre Reinforced Plastic
GIS	Geographic Information System
HDPE	High Density Polyethylene
HRIDAY	Heritage City Development and Augmentation Yojana
IRC	The Indian Road Congress
IPT	Informal Public Transport
MEP	Mechanical, Electrical and Plumbing
MLCP	Multi-Level Car Parking

List of acronyms

MRT	Mass Rapid Transit
MS	Mild Steel
MUZ	Multi-Utility Zone
MoRTH	The Ministry of Road Transport and Highways
NMT	Non-Motorised Transport
PCC	Plain Cement Concrete
PCU	Passenger Car Unit
PMV	Personal Motor Vehicle
PQC	Pavement Quality Concrete
PVC	Polyvinyl Chloride
RCC	Reinforced Cement Concrete
RCC NP3	Reinforced Cement Concrete - Non-Pressurised class 3
RfP	Request for Proposal
RoW	Right-of-Way
ToR	Terms of Reference
ULB	Urban Local Body
WBM	Water Based Macadam
WMM	Wet Mix Macadam

definitions

Accessibility	Facilities offered to people to reach social and economic opportunities, measured in terms of the time, money, comfort, and safety that is associated with reaching such opportunities.
Average trip length	The average distance covered by a transport mode for a trip. This is commonly measured in kilometres.
Bus rapid transit (BRT)	High quality bus-based mass transit system that delivers fast, comfortable, reliable, and cost-effective urban mobility through the provision of segregated right-of-way infrastructure, rapid and frequent operations, and excellence in marketing and customer service.
Bulb-out	Lateral extensions of the footpath into the carriageway to reduce the crossing distance for pedestrians. They reduce vehicle speeds, provide enhanced protection and visibility for pedestrians, and lower the time taken to cross the street.
Complete streets	Streets that are designed to cater to the needs of all users and activities, through equitable allocation of road space. Complete streets provide safe and inclusive environments that support users of all age groups, genders, and physical dispositions. They also guarantee efficient mobility by focusing on moving people, user safety, universal accessibility, vitality and liveability, sensitivity to local context, and environmental sustainability.
Eyes on the street	Informal surveillance of any street by the residents, shopkeepers, and other users of the street.
Greenway	A linear, landscaped pedestrian or bicycle route based on natural passages such as canals, rivers, or other scenic courses. It is typically for recreational use, with an emphasis on conserving and preserving vegetation.
Informal Public Transport (IPT)	This includes vehicles like share autos, vans, minibuses that operate on a shared or per seat basis on specific routes, in an unregulated or semi-regulated environment, and with no government support. The service may or may not have a predefined “fare structure”.
Mass rapid transit (MRT)	A high quality public transport system characterized by high capacity, comfort, overall attractiveness, use of technology in passenger information system, and ensuring reliability using dedicated right of way for transit vehicles (i.e. rail tracks or bus lanes).
Mobility	Conditions under which an individual is capable of traveling in the urban environment.
Mode share	The share of total trips carried out by different modes of urban transport including, but not limited to walking, cycling, bus, rail, share auto-rickshaws, private auto, two wheelers, and cars.
Non-motorized transport (NMT)	All forms of human powered transportation including, but not limited to, walking and cycling.
On-street parking	The space occupied by parked vehicles along the edge of the street or carriageway which otherwise could have been used by motorized or non-motorized traffic.
Off-street parking	The term refers to the dedicated spaces provided for parked vehicles outside the right-of-way. It includes parking lots, multi-level car parking and other off-street facilities.
Public Transport (PT)	Shared passenger vehicle which is publicly available for multiple users.

A mechanism to facilitate efficient use of street space to ensure additional space dedicated for pedestrians, cyclists, public transport, and motorists. In addition, over time, collecting a fee for parking can manage its demand and ensure that personal motor vehicle users compensate the city for the use of valuable land on which they park their vehicles.

Measure of the width of the road taken from compound wall/edge on one side of the street to that on the other side.

A street where formal distinctions between spaces allocated for various users, is removed. The concept of shared streets is to ensure that each street user becomes progressively more aware and considerate of the others in the street. Specific design interventions can be made to force the vehicles to slow down and match the pace of those on foot.

The following modes are categorized as “sustainable modes” of urban transport because, when compared with personal motor vehicles, they consume the least amount of road space and fuel per person-km and also cost much less to build the infrastructure: walking, cycling, and public transport (including a regular bus service as well as MRT systems).

Traffic calming measures ensure pedestrian and vehicle safety by reducing the speed of motor vehicles through vertical and/or horizontal displacements, real/perceived narrowing of carriageways, material/colour changes that signal conflict point, or complete closure of streets for vehicular traffic.

Parking management

Right of Way (RoW)

Shared street

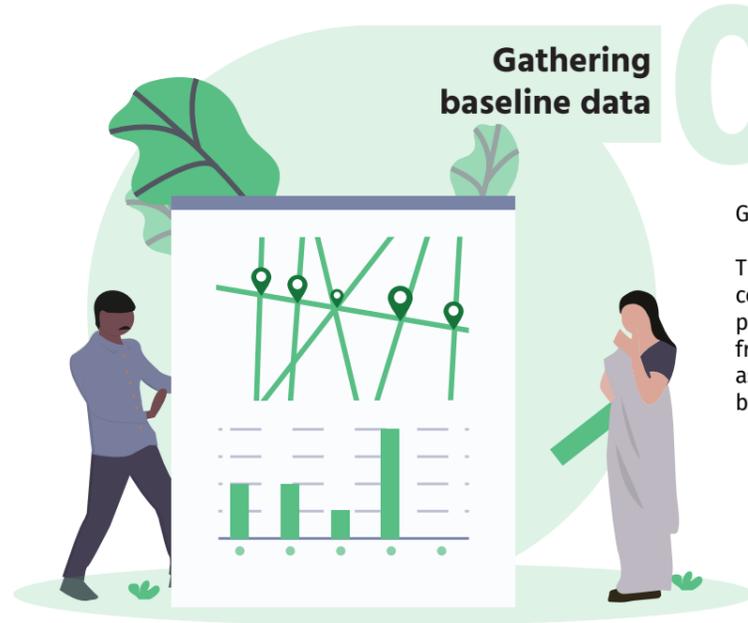
Sustainable transport modes

Traffic calming

planning process

Gathering baseline data

01



Gathering Baseline Data:

This section aims at helping the cities collect and map existing data. It provides the list of data and sources from where the data can be collected, as well as sample representations of base maps

02

Creating CS master plan

Creating CS Master Plan:

Analysing the collected existing data helps the city in preparing the complete streets master plan, defining the different network plans and identifying the projects.



Budgeting, financing and phasing

03



Budgeting, financing & phasing:

The approach to budgeting, based on the master plan and projects identified has been discussed in this section. The projects have to be analysed with respect to existing projects and proposals, before the prioritization of projects and setting the timeline.



COMPLETE STREETS

NETWORK PLANNING

complete streets master plan and planning principles | street typology

1.1 complete streets master plan and planning principles

mixed-use development 02

Many Indian cities are now investing in complete streets design and intersection improvement projects to provide good quality walking and cycling environment. Many of these projects are part of the Smart Cities Mission program. It is a good beginning towards a sustainable transport future, the next step for the cities is to scale up these initiatives all across the city to provide continuous, safe, comfortable and high-quality, walking and cycling experience. This can be only achieved by developing a city-level complete streets master plan. A city-level complete streets master plan gives information on pedestrian and cycling networks across the city. For instance, the city of Pune has identified a network of 100km of streets for complete streets and also has a bicycle plan for the city.

Mixed-use development provide services and amenities within short distance which can be accessed by walking and cycling. It also makes the streets vibrant, active and safe especially for women and children. Mixed-use development combined with small urban block results in walkable neighbourhood.

benefits of complete streets master plan

A city-wide network of continuous, safe and comfortable pedestrian and cycling network combined with efficient public transport increases the mode share of sustainable transport in the city. This decreases the dependence on private motorized vehicles and as a result, reduces congestion and pollution as well. This improves the air quality of the city, leading to good health and improvement of overall urban life. It also offers mobility, accessibility, safety and comfort to women, children, elderly and persons with disabilities.

continuous network 03

Continuous and seamless network of pedestrian and cycle infrastructure encourages walking and cycling. Continuous and well-shaded network of footpaths with frequent crossing opportunities at same level provides pedestrian comfort. Similarly, continuous network of cycle tracks, and related signages and infrastructure provides uninterrupted and safe movement for cyclists. Disconnected network of segregated infrastructure for walking and cycling results in increased risks due to fast moving vehicles. This discourages their movement and leads increased dependence on motorized transport for short travel distances.

urban street network planning principles to encourage walking and cycling

The urban street environment required to encourage walking and cycling differs from that of motorized vehicles with respect to effort, mobility, comfort and safety. Pedestrians and cyclists prefer short travel distances. They prefer paths that are not only short but also the ones that are active, well-lit and shaded for their personal safety and comfort. Apart from short travel distance, availability of services and amenities within walking distance also encourages walking and cycling. The following section will guide on the key urban planning principles that encourage walking and cycling.

complete streets 04

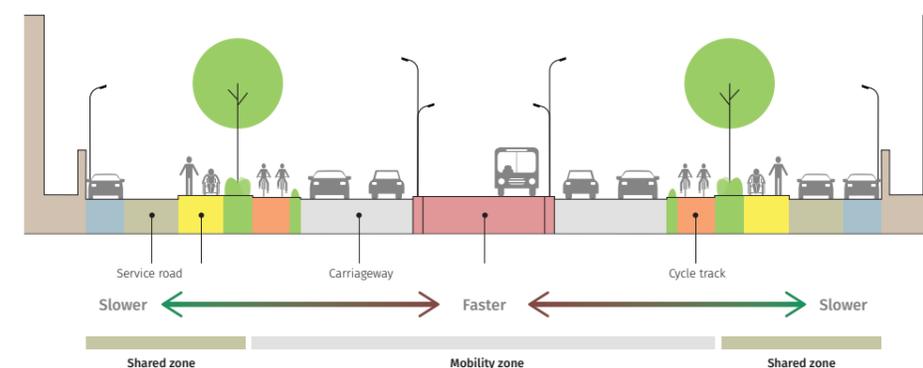
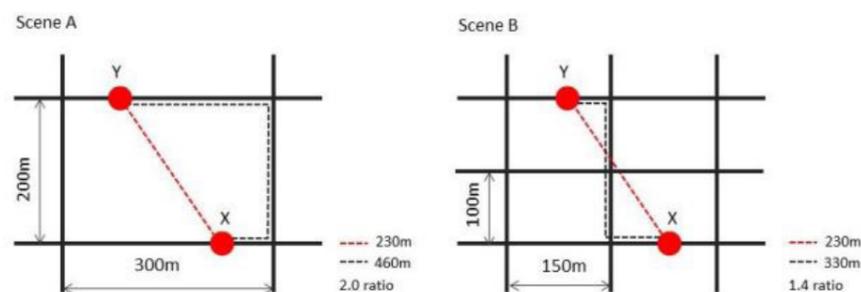
Pedestrians and cyclists are the most vulnerable road users. They are not protected by any external shield which make them highly vulnerable towards injuries and fatalities due to accidents. Hence it is important to design streets that are based on complete streets principles. A complete street caters to all user groups—regardless of their age, gender, ability, or mode of transportation. Complete streets design prioritize walking, cycling and public transport as they are efficient and sustainable modes of transport. Complete streets are designed with wide and continuous footpaths, safe pedestrian crossings, separate cycle tracks (where applicable), bus stops designed to enhance convenience, designated on-street parking, organised street vending, and properly-scaled carriageways.

01 smaller urban block

Pedestrians and cyclists prefer the shortest distance to reach their destinations. An urban block is defined as the developed piece of land surrounded on all sides by publicly accessible streets. Smaller urban blocks provide multiple and direct routes for walking. It is recommended that the urban block length should not exceed beyond 150m. Dense street network not only encourages walking and cycling but also distributes vehicular traffic, thus reducing congestion. In case of large land parcels, pedestrian and cycling only thoroughfares can be planned to improve mobility and accessibility.

Where pedestrians and cyclists have to be in mixed traffic, streets should be traffic calmed to ensure safe mingling. Such streets should ensure that the vehicular speeds do not exceed above 15 kmph. Apart from segregated facilities, streets should be well-shaded, well-lit and active to ensure personal safety.

In figure below, a straight line connecting points X and Y is 230m. In scene A, the actual distance travelled by a person on foot or cycle user will be double the crow fly distance due to unavailability of streets. In scene B, the distance travelled is reduced due to dense street network.



1.2 street typology

The success of any road network system is often attributed to the distinct order or hierarchy of streets. Based on their function and carrying capacities, the permissible speeds, street widths, and physical characteristics are designated and the streets are then classified into Arterial, Collector, and Local streets.

typology

- arterial streets** Arterial roads guarantee a large carrying capacity and transport volumes of traffic across a city at a relatively high speed. While providing reduced access from carriageway to the adjoining properties, these streets encourage through movement.
- collector streets** Collector streets connect local streets with arterial streets and collect traffic with slower speeds from the former and distribute it to the latter. They usually go to or come from a neighbourhood.
- local streets** Majority of trips originate or end in local streets. With the lowest speed limits, local streets carry low volumes of traffic. Their main purpose is to provide access to adjoining properties.

Element	Presence in			
	Arterial streets	Collector street	Local street	
Segregated footpath	✓	✓		Only on streets with RoW ≥ 12m
Segregated cycle track	✓	Cycling in mixed traffic		Cycling in mixed traffic
On-street parking	✗	✓	✓	
Carriageway (*refer street design elements for details)	Not more than 3 lanes per direction	Not more than 2 lanes per direction	Not more than 1 lane per direction	
At-grade crossings	✓	✓	✓	
Public Transport	✓	✓	✗	
Mass Rapid Transport	✓	✗	✗	
Service lane	✓	✗	✗	

Street elements and their presence in arterial, collector and local streets

designing street networks

A network of public streets enabling walking and cycling should be available within a distance not exceeding 150m. An arterial street network should be available at about 1000m, collector street network at about 250m and local street at about 125m. The street network should be designed such that it encourages walking and cycling for short distances and public transport should be available within a 500m distance.

Carriageway including service lanes should not exceed 50% of the total right of way width.

Right of way space should be designed to move people efficiently and not vehicles. Hence focus should be on passenger carrying capacity than passenger car units. Carriageway capacity should be augmented by providing frequent, predictable, comfortable, safe and affordable public transport to attract private motorized vehicle users to use public transport along with high quality walking and cycling environment.

The speed limits (kmph) for each typology as per IRC is as follows:

	Arterial Street	Collector Street	Local Street
Plain	50	30	20
Rolling	40	30	20
Mountainous	30	20	15
Steep	30	20	15

The posted speed is subject to adjoining land-use conditions. Design speeds shall not exceed 15 kmph on road stretches within 100m of land uses with significant pedestrian cross movement. These are educational institutions, hospitals, retail stretches and areas around mass transit stations.

If an at-grade urban expressway or ring road passes through the urban area, it should be designed as an arterial road to ensure safety of pedestrians and cyclists.

Incase of grade separated (flyover or underpass) facilities, passing through the urban areas, frequent opportunities for pedestrians to cross below or above the facility should be provided. However, they should be avoided as they attract more number of private motorized vehicles which leads to congestion in future.

All grade separated pedestrian crossings such as foot-over-bridges or subways are principally constructed to provide mobility for motorized transport. However, it increases travel distance and effort for pedestrians which deters them to use the facility. Hence, it is recommended to provide at-grade pedestrian crossings. However, if grade separated pedestrian crossings are to be provided, they should be universally accessible through escalators and lifts for all regardless of their age, gender or ability, as per IRC:103-2012.

Footpaths as per IRC:103-2012 should be provided on railway over bridges or flyovers if that is the only facility for pedestrians to cross.

In areas with sparse street network, street network consisting of arterial, collector and local streets should be densified and planned as recommended above. Disconnected and nonavailability of both primary and secondary street network results in increased use of private motor vehicles and increased congestion.



GATHERING

BASELINE DATA

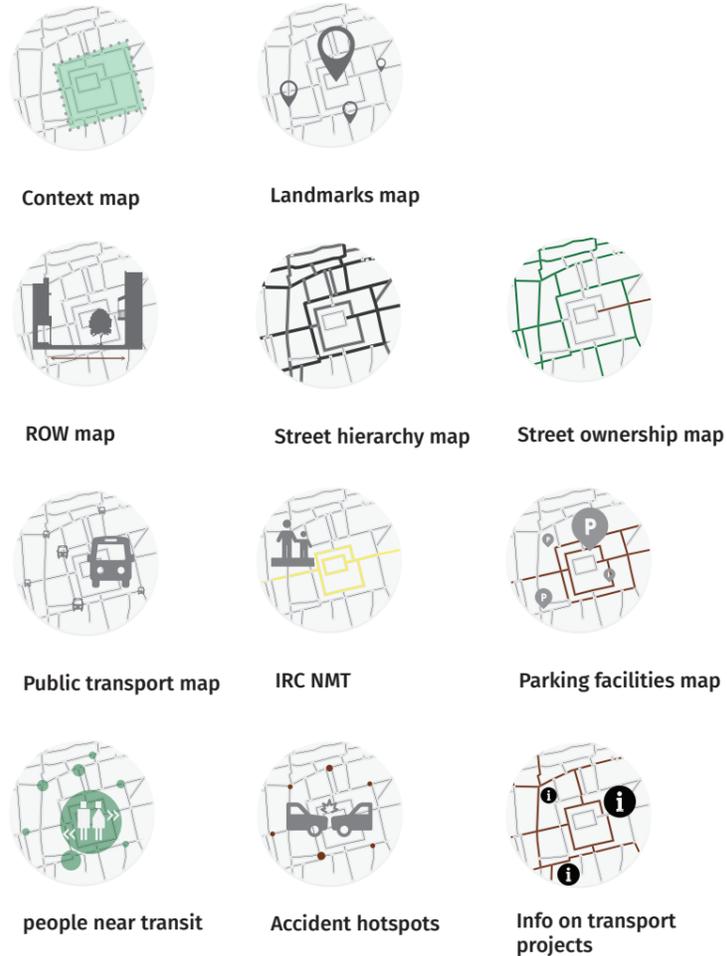
context map | right of way map | street hierarchy map | street ownership map |
road safety map | public transport network map | people near transit map |
pedestrian and cycling infrastructure map | landmark map | parking facilities map |
walkability analysis map | information on transport projects

2.0 gathering baseline data

context map 2.1

It is important for the city to collect baseline information on existing transport infrastructure to be able to develop the CSMP. The baseline data will also help cities to evaluate their progress during and after the implementation of the plan.

data to be collected



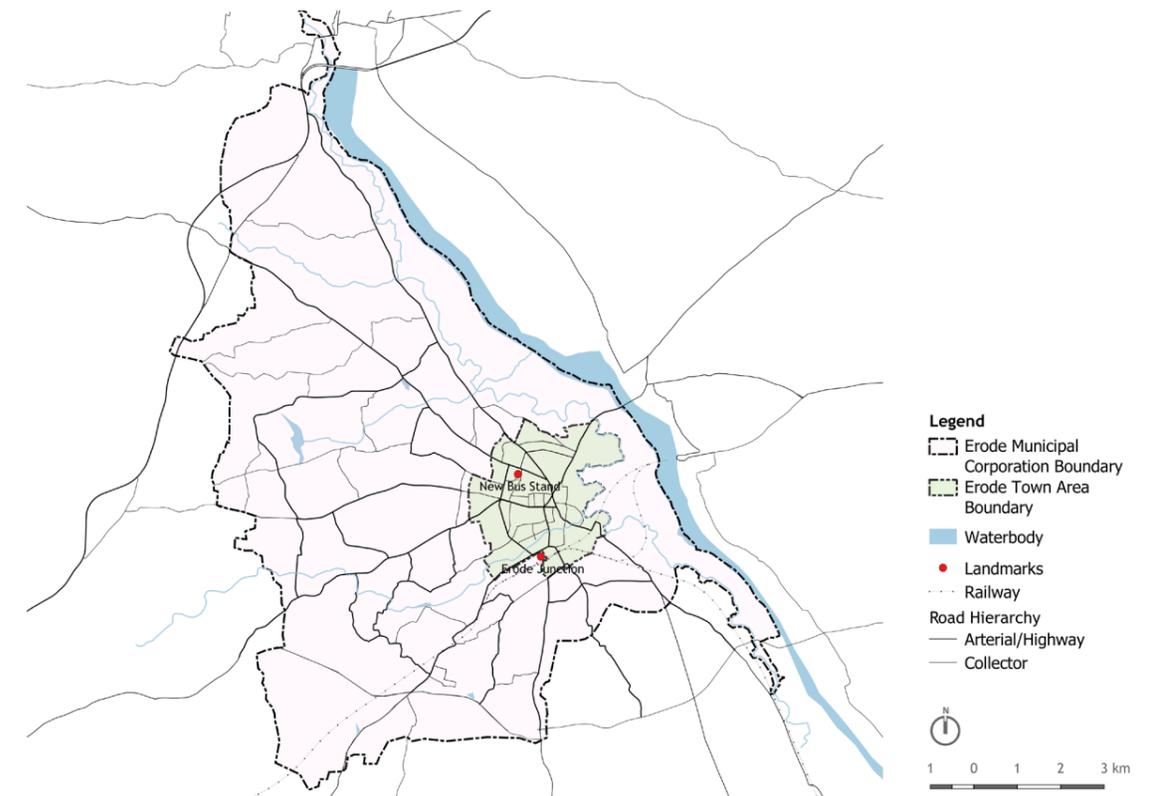
Apart from the above mentioned data,

City Information - City area, population, planning boundary, existing air quality.

Existing travel patterns - Modal split, average trip length, vehicle ownership data.

Land use map - existing and proposed should be collected as well.

It is advisable that all the maps be prepared in GIS. If GIS specialist is not available, maps should be prepared on AutoCAD. The map will be created by the Urban Local Body/Street design cell/Consultant. All the maps shown in this section are for reference and indicative.



Urban local body/Open street maps/Google Earth Pro for street network and landmarks, Bus transport/Mass rapid transit agency and auto rickshaw union for bus route roads, streets with Mass rapid transit and shared auto routes respectively.

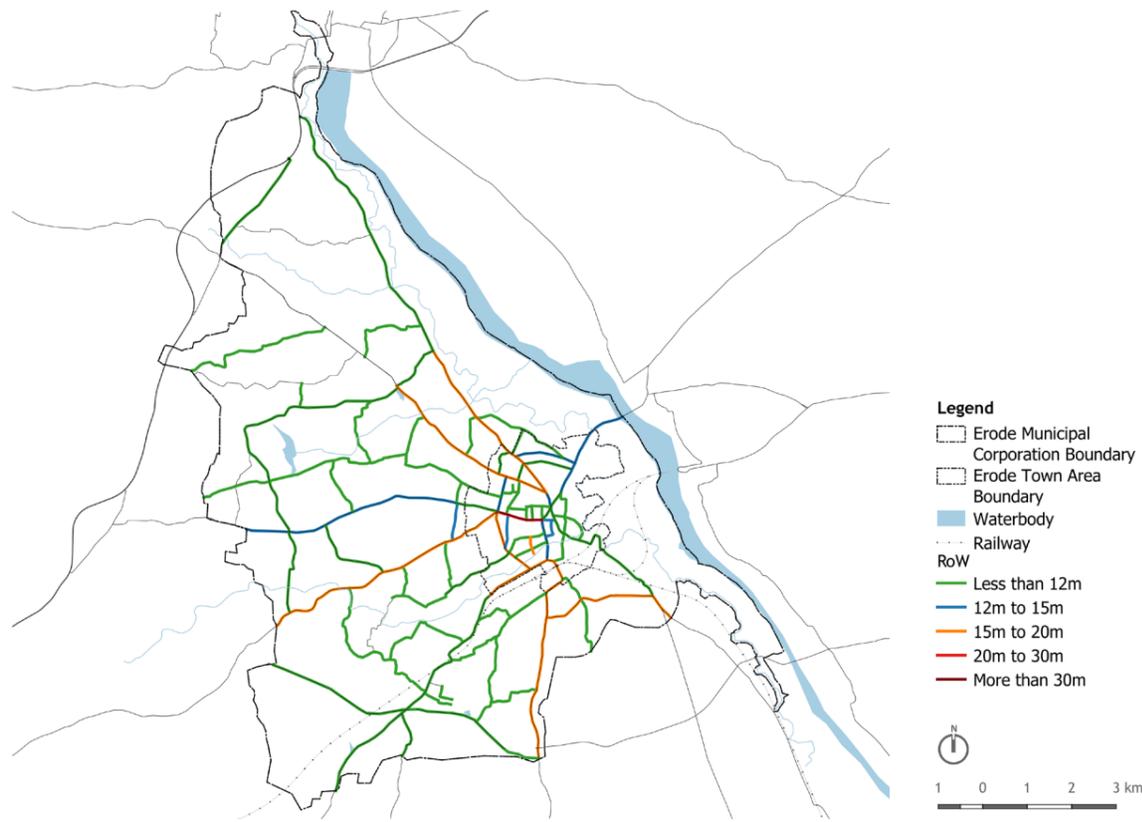
source of data

Context map is required to establish the existing street network, natural features and city level landmarks within the planning area considered by the urban local body. The context map will be of help to identify pedestrian, cycling and public transport networks based on the existing street network.

purpose

The Complete Street Master Plan is a city-wide street network plan. Hence, the base map should map all the streets within the planning area identified by the city. The map should clearly indicate the planning boundary limits. Further details of municipal corporation limit, cantonment limit (if any) should be added. Natural features such as water bodies (river, lake, canal), green zones, forest reserves, no development zone, mangrove zone etc. should also be shown in the context map.

2.2 right of way map



source of data Google Earth Pro/Urban local body/On-field survey

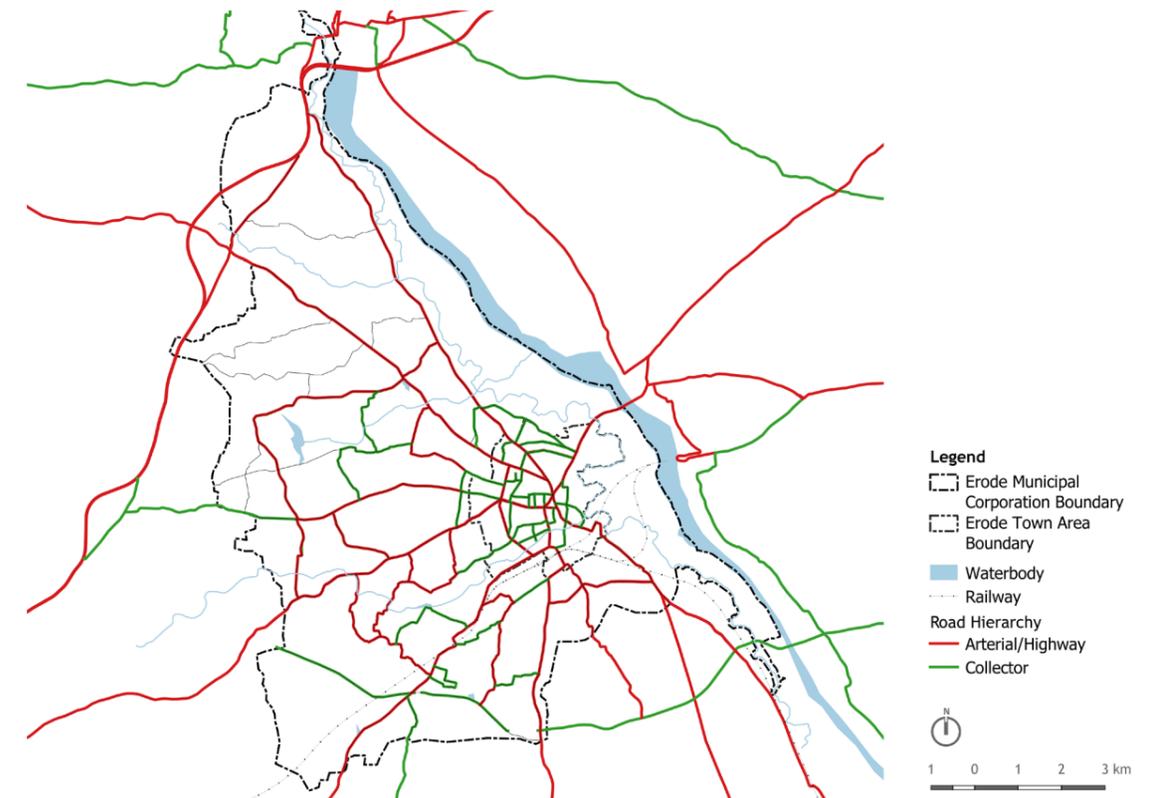
purpose Right of Way of a street refers to the clear street width between the property edges (private or public) on both sides of the street. It is the space available for various road users to commute. Streets will be designed based on the available RoW width. The RoW map will guide city to develop pedestrian, cycling and public transport network, detailed street design and estimate budget based on the available right of way.

The map should be made as shown in the example above. Different right of way widths should be grouped as follows – RoW<12m, 12-16m, 16-24m, 24-30m, 30-36m, RoW>36m. The right of way width ranges can be altered depending on the existing right of way widths in the city.

It is observed that cities in India have inconsistent right of ways for a street. In case of varying right of ways on a particular street, indicate the predominant right of way width. For instance, if the existing right of way of street varies between 18-25m and the predominant right of way width is 18m throughout the length, then consider the right of way as 18m.

Existing one-way streets along with key intersections - Location and type (signalized/unsignalized) should be mapped.

street hierarchy map 2.3



Urban local body/On-field survey/road owning agencies such as state highways and national highways departments.

source of data

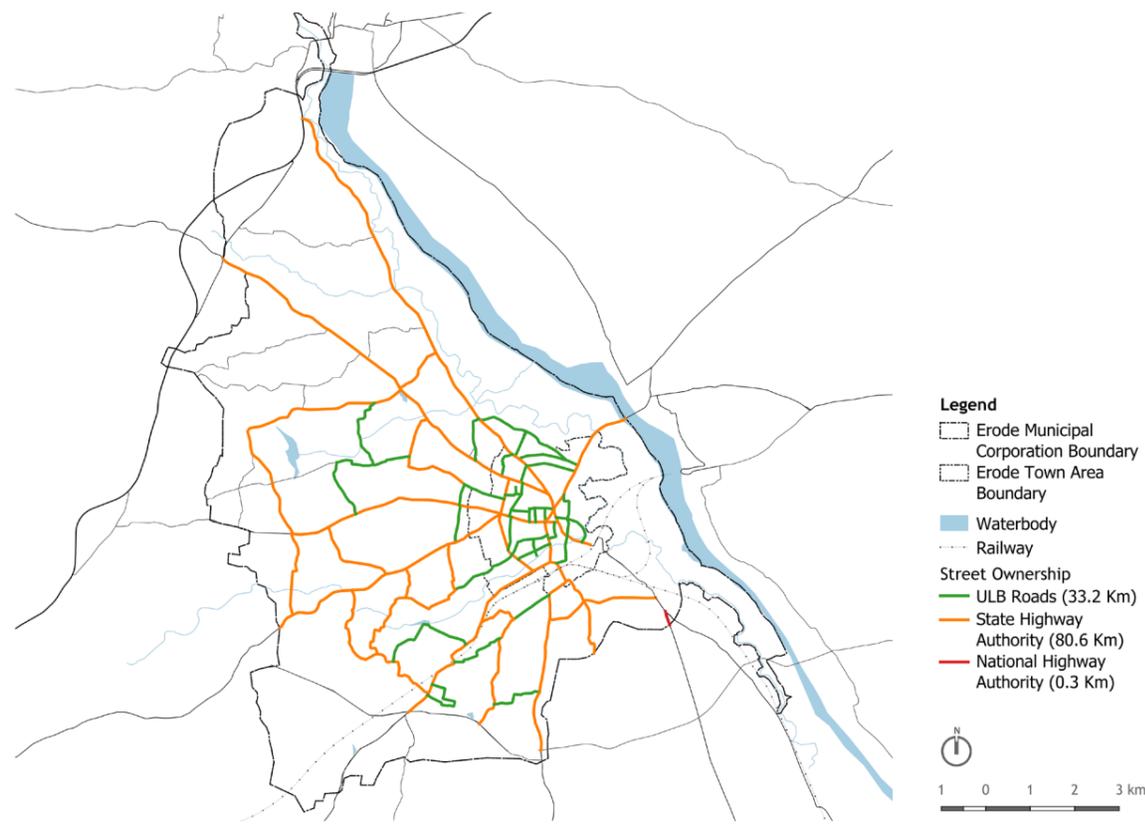
It will help the city to develop pedestrian and cycling networks along the major street networks and provide detailed street design depending on the street typology.

purpose

Streets will be categorized under three typologies – arterial, collector and local streets depending on the level of mobility provided by the street, with respect to the overall street network. Further description of street typologies and their characteristics are given in chapter 1.2.

For a city-wide Complete Streets Master Plan, it is important to map the local streets for neighbourhood level cycling network plan, which is explained in chapter 3.2.

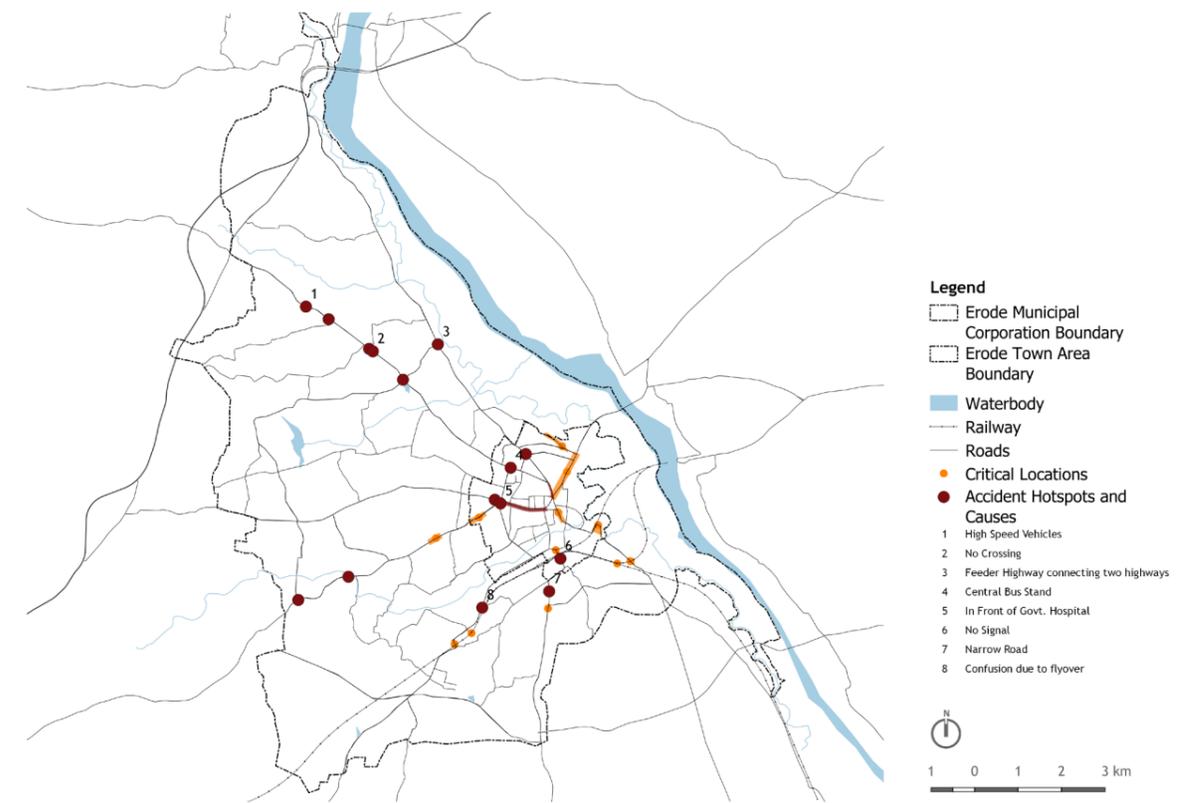
2.4 street ownership map



source of data Urban local body/state run road owning agencies such as state highways and national highways departments/port trusts/special economic zones

purpose This map will show which agency owns and maintains the streets. This will ensure participation, clear coordination and necessary approvals are obtained on time, while implementing the complete streets master plan and detailed street design.

accident hotspots map 2.5

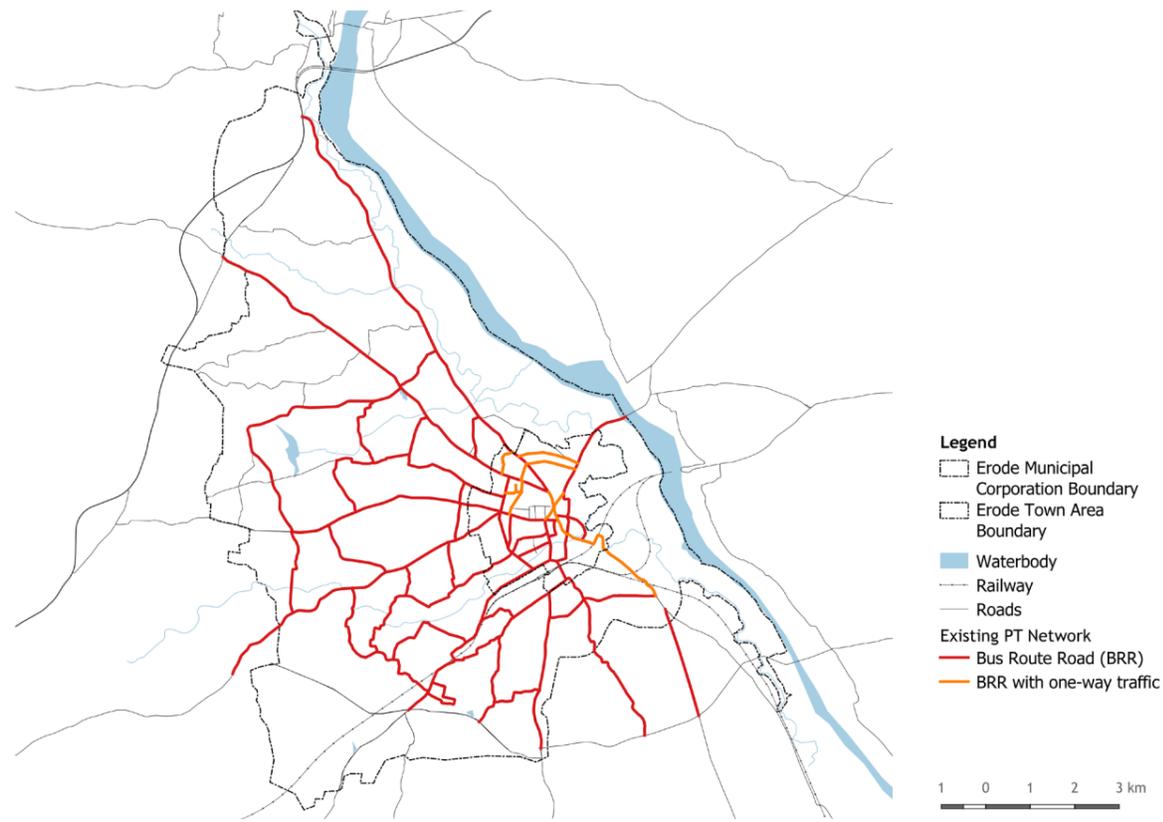


Urban local body/Traffic police **source of data**

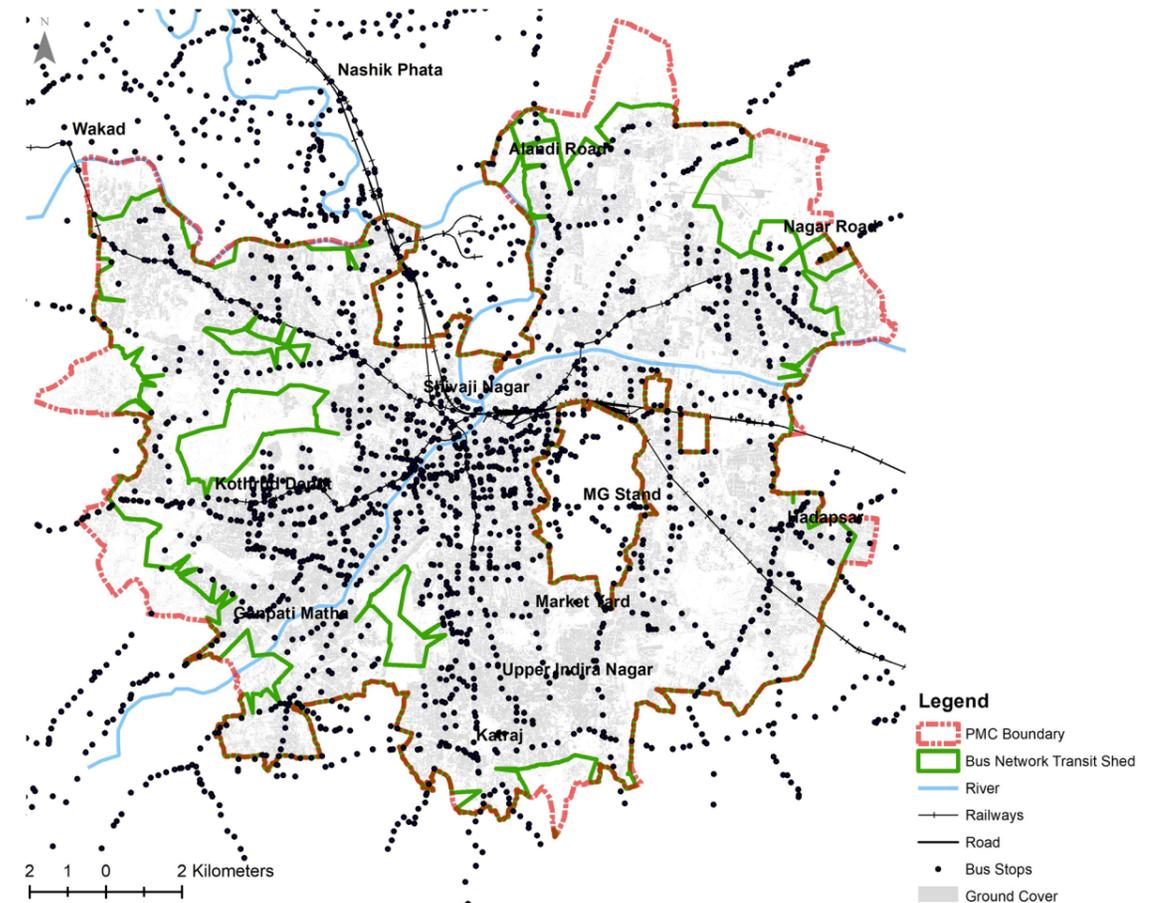
The map will help to prioritize implementation of necessary road safety measures on streets and intersections through engineering, awareness and traffic management measures. This will ensure safety of all road users especially pedestrians and cyclists.

purpose

2.6 public transport map



public transport coverage map 2.7



source of data Urban local body, Mass rapid transit/Bus transport agency, interview with auto rickshaw drivers/union for shared auto routes

purpose The map will guide the city to address the planning and design of complete streets with respect to access to public transport and area around stations

All the existing and proposed public transport routes (both at-grade and grade separated) - bus transport routes along with bus stop locations, mass rapid transit (metro, bus rapid transit, monorail, suburban rail) routes and shared auto rickshaw routes should be mapped. Major bus terminals/stands and railway stations should also be mapped.

Mass Rapid transit/Bus transport agency, Urban local body

The map will show the coverage of public transport in the city within 500m distance of the network. This will inform city to identify or expand additional public transport network to ensure city is well-connected by public transport within a walking distance of 7 minutes (500m)

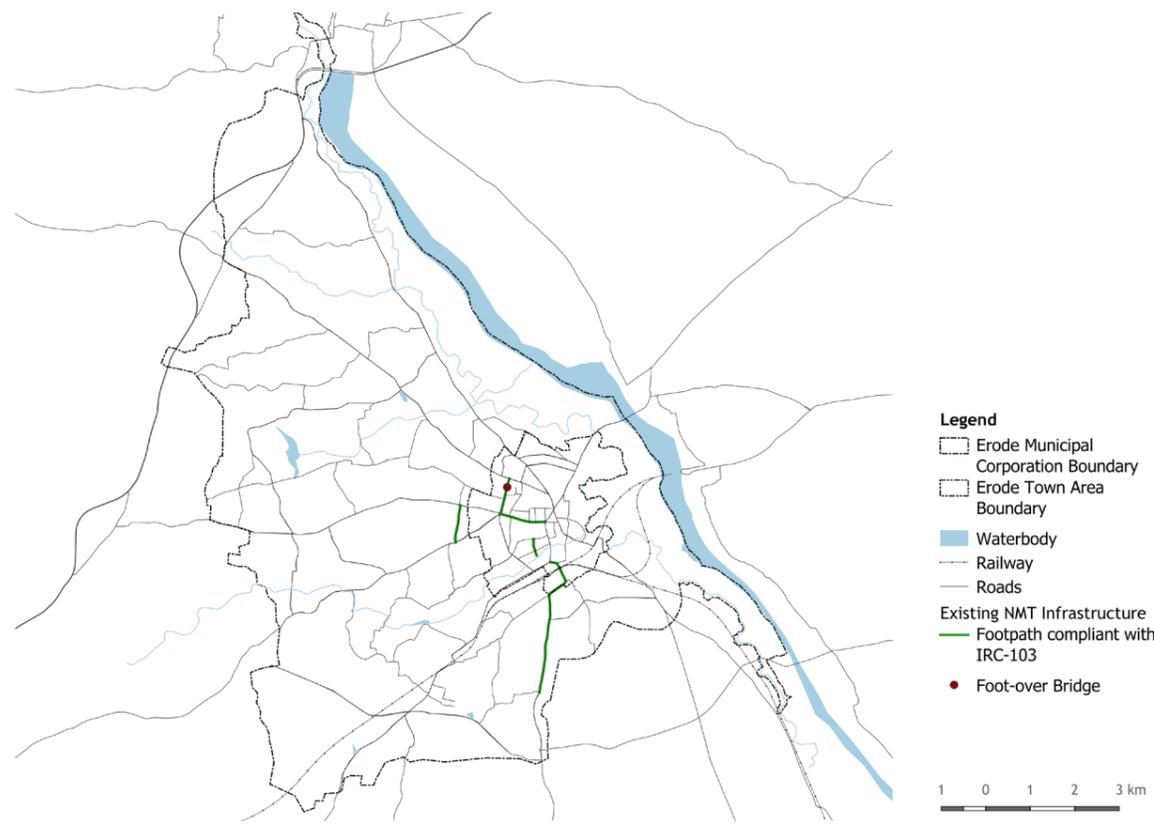
source of data

purpose

All the public transport stations/stops - bus stops, railway/metro/BRT stations, Intermediate Public Transport stands should be mapped along with routes. Accessibility to the stops/stations within a distance of 500m should be analysed in GIS.

The map should also have built-up ground cover to inform city to provide or extend public transport service. Built-up ground cover can be obtained through satellite image classification method in GIS.

2.8 NMT infrastructure map



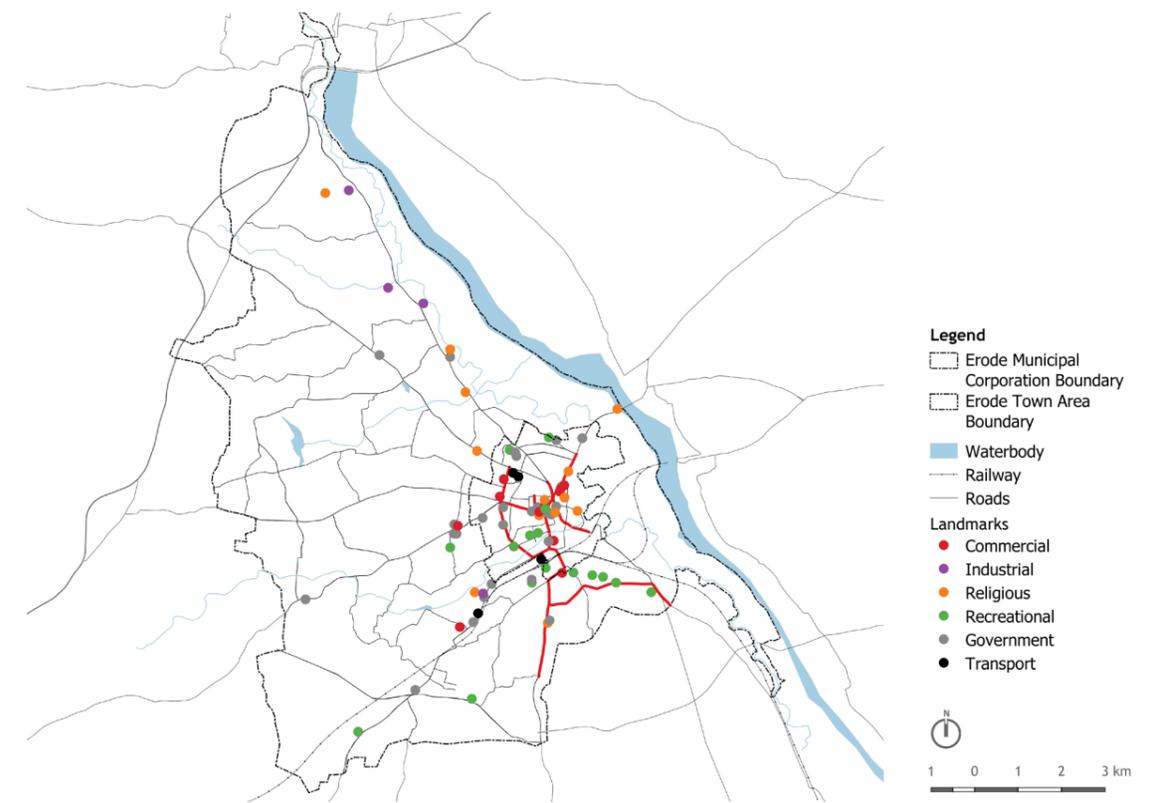
source of data Urban local body/Road owning agency/On-field survey

purpose Existing, ongoing and proposed streets with IRC compliant footpaths, cycle tracks and other pedestrian and cycling projects should be mapped. They should be considered in the complete streets master plan as they offer continuous, comfortable and safe walking and cycling experience. However, they should be excluded while making the budget plan. This will help city to direct its investments in pedestrian and cycling infrastructure in areas where it is required.

For pedestrian and cycling infrastructure, IRC:103-2012 and IRC:70-2017 should be referred respectively.

Existing percentage of municipal budget for walking and cycling. Pedestrian and cyclist midblock counts on arterial and collector streets should be mapped as well.

landmark map 2.9



Urban local body

The map will show the key hot spots in the city that attract people for work, recreation, shopping, education, social, health and cultural opportunities. It generates vehicular activity, pedestrian activity and parking demand. This will inform the development of non-motorised transport network around it

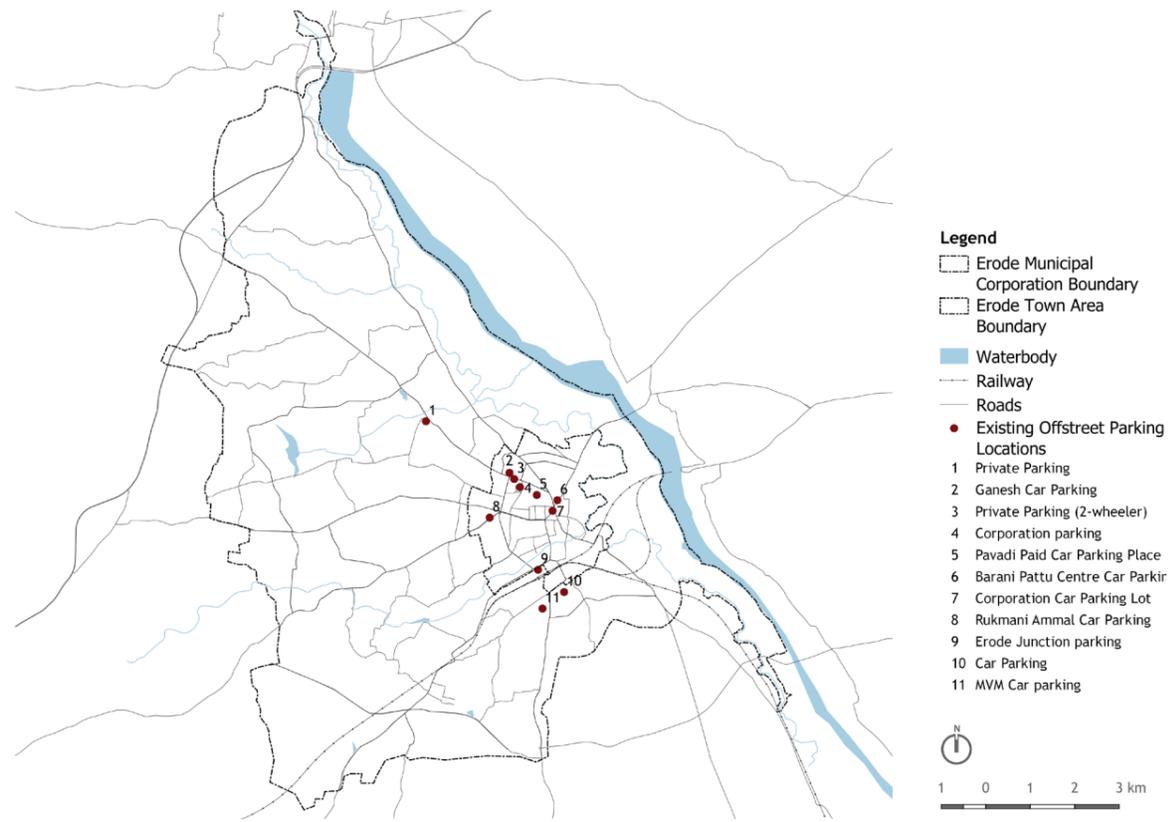
source of data

purpose

Landmarks could be categorized in two – city-level and neighbourhood level. City level landmarks include major railway stations, bus stands/terminals, public open space, public hospital, shopping mall, public buildings, museum, markets, business districts, industries, institutions etc. Neighbourhood level landmarks include local market, schools, hospitals, public open spaces, places of worship, bus stops etc.

For the complete streets master plan, only city-level landmarks should be mapped. Neighbourhood-level landmarks will be helpful in developing neighbourhood cycling network plan.

2.10 existing parking location map

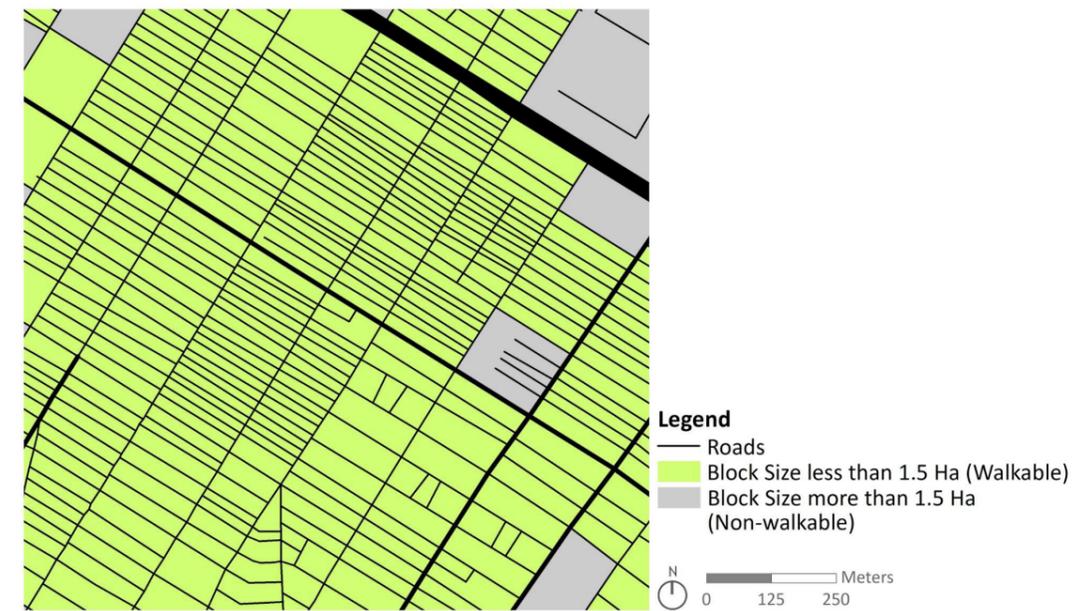
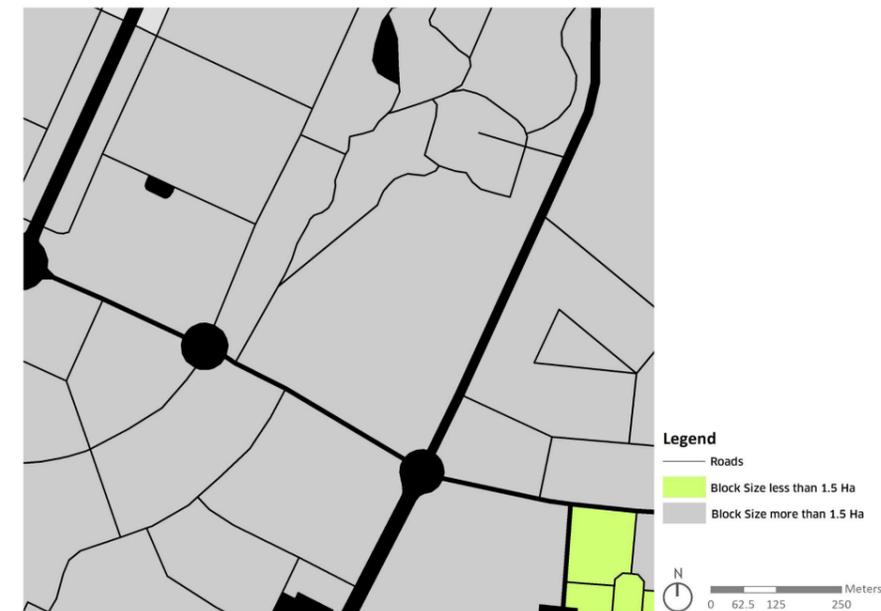


source of data Urban local body

purpose Existing parking locations both on-street and off-street locations will help the city to plan its parking management.

Other parking related information such as locations with high parking demand, existing managed on-street and off-street parking locations, ECS (equivalent car space) provided and parking revenue from paid parking provided in the city should be collected as well.

walkability analysis map 2.10



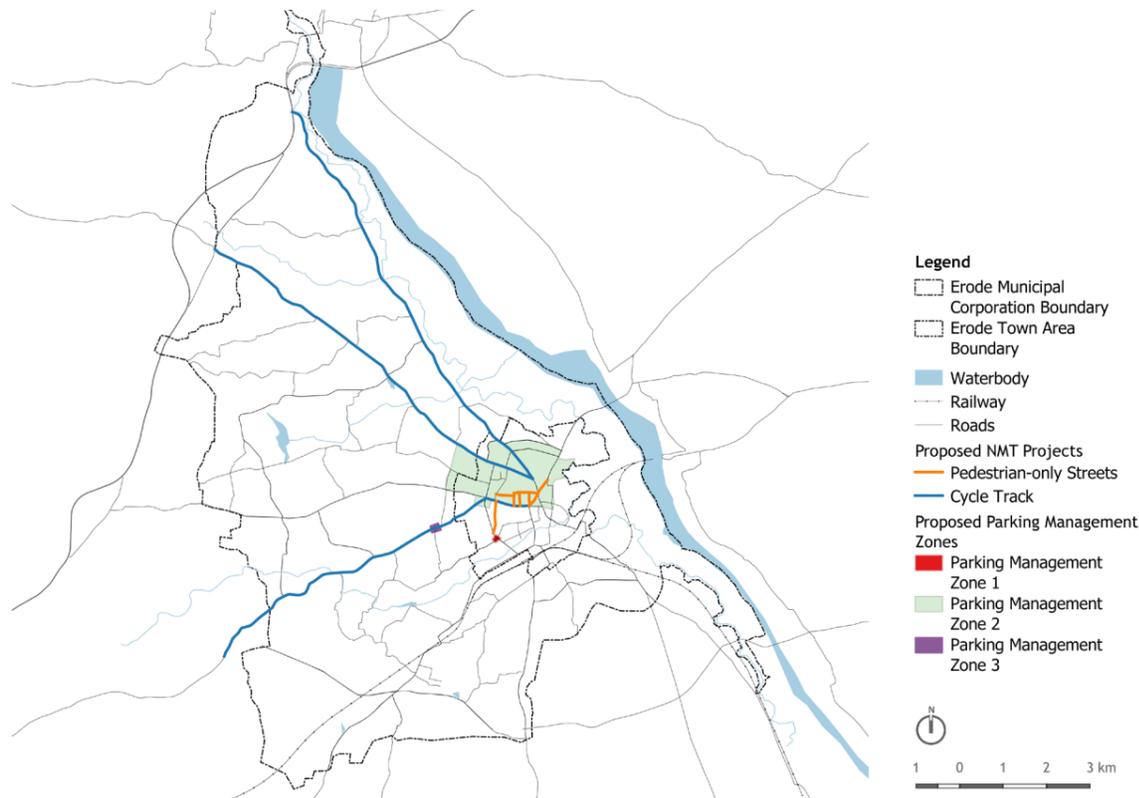
Urban local body

This map will enable the city to know which areas are walkable (highlighted in green). The areas with sparse street network are highlighted in grey and discourage walking and cycling. Hence based on the above analysis city can further provide additional streets. Alleys and lanes for walking and cycling only can be planned with no vehicular access. This can be obtained from the setbacks of the building.

source of data

purpose

2.11 information on CS projects



source of data Urban local body, Road owning agencies, Development Authority

purpose Information on urban transport projects will help the city to integrate the Complete Street Master Plan. It will help city to evaluate the need of these projects based on the sustainable transport principles adopted in Complete Streets policy adopted by the city

Information of both ongoing and proposed urban transport projects should be collected. It includes but is not limited to construction of footpaths, cycle tracks, foot-over bridges, under pass, subways, skywalks, flyover, rail over bridges, road widening projects, new road development, multi-level car parking, mass rapid transit and other urban transport projects.

The information need not be a map, it can be list of projects. The information should be recorded in the following format:

No.	Project name	Concerned authority	Total cost (Rs)	Status (Ongoing/Proposed)
1	Construction of 'x' km of footpath on Road ABC	Public Works Department	Rs. 'x'	Ongoing (Specify the stage) – Planning/Detail design/ Tender/Construction/Finishing stage.

Fig. (facing page) Tabletop crossing across DP Road, a sub-arterial street in Pune that receives high pedestrian footfall





3

DEVELOPING COMPLETE STREETS MASTER PLAN

pedestrian network plan | cycling network plan | greenways network plan | summary of complete streets projects

3.0 developing CS master plan

The following section will give a step by step guidance on developing Complete Street Master Plan. The Complete Street Master Plan includes following plans to be developed at a city-wide scale in the order suggested below:

- a. Pedestrian network plan
- b. Cycling network plan
- c. Greenways network plan

The following data (prepared in chapter 2) will be required before developing any of the above network plans:

1. Establish existing city street network as the base map along with other natural features such as waterbodies, green and open spaces. The information is mapped in context map.
2. Street hierarchy map.
3. Right of way map.
4. Existing and proposed public transport network map.
5. Landmark map.
6. Accident prone location map prepared.
7. IRC compliant walking and cycling infrastructure map.

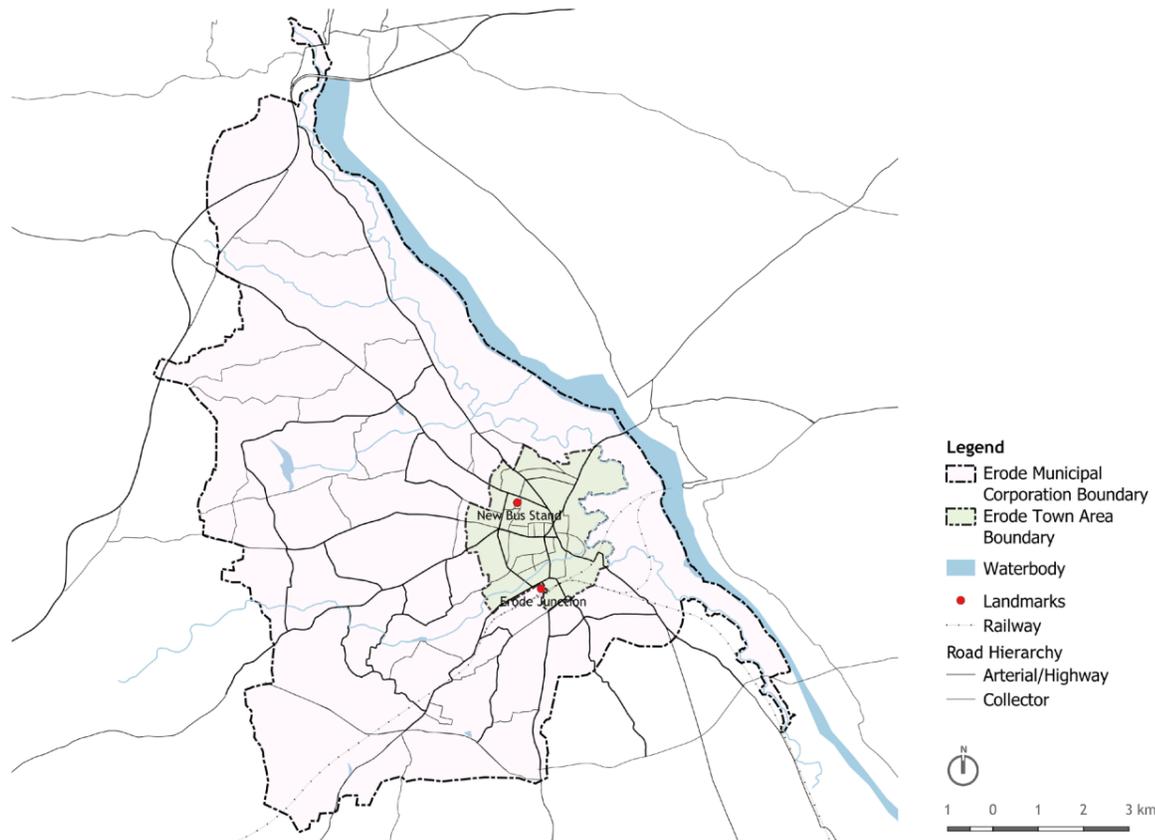
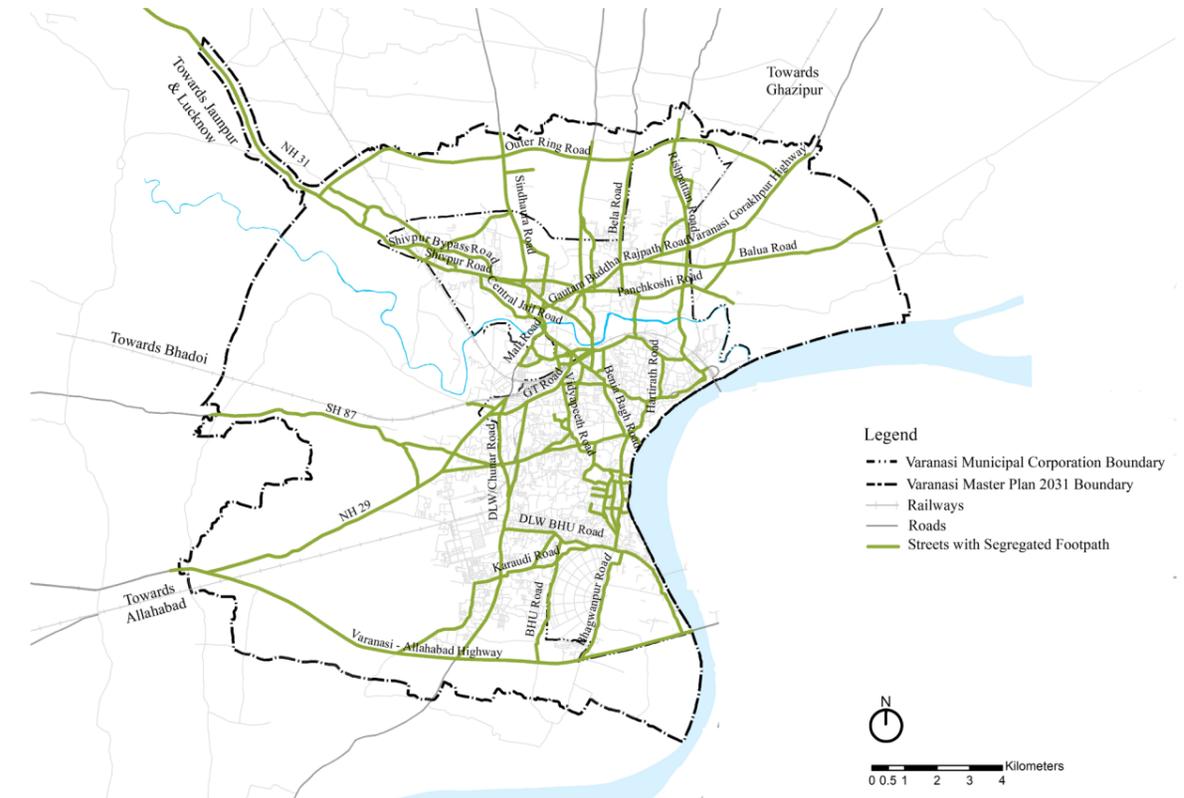


Fig. context map of Erode city, Tamil Nadu.

pedestrian network plan 3.1

Pedestrian network plan is a city-wide network plan that will guide the city to identify and invest in pedestrian infrastructure in the form of segregated footpaths, shared streets and pedestrianization.



step 1
Segregated footpaths should be provided on streets with vehicular speeds above 15kmph. The footpath width will be as per IRC:103-2012. Shared streets should ensure that the vehicular speeds do not exceed 15kmph by providing traffic calming elements. Volume IV – Complete Street Design Workbook should be referred for detailed street design. All arterial and collector streets should have segregated footpaths.

Streets that have RoW < 12M and are local streets, may be shared streets. They may not have segregated footpaths. Necessary traffic calming measures should be incorporated to ensure NMT safety and vehicle speeds are not exceeding 15kmph. One-side footpath can also be considered on such streets.

step 2
Streets and intersections that are prone to accidents/crashes (especially locations where pedestrian, cyclists and two-wheeler fatalities are caused) should be included in the master plan.

cycling network plan 3.2

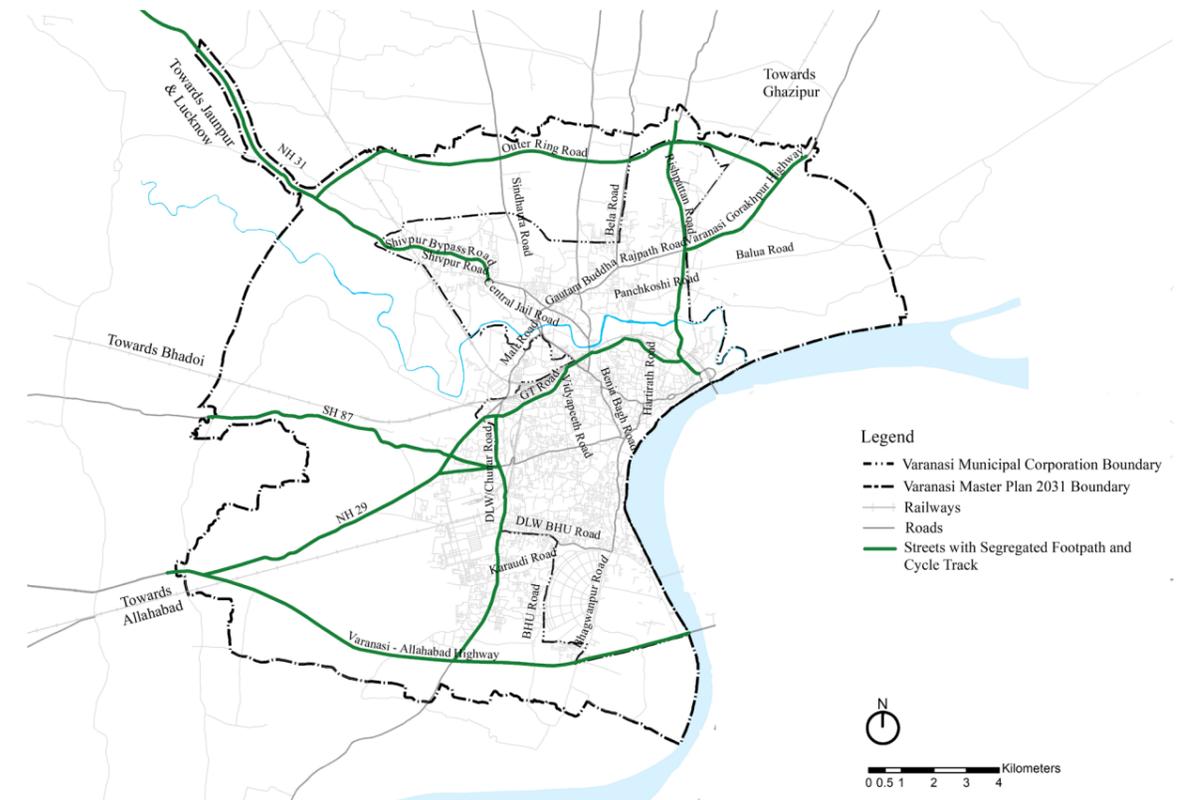
step 3 Identify streets/zones, irrespective of RoW and hierarchy, for city/neighbourhood level projects such as pedestrianization, NMT-PT priority street or 30kmph zone. Such street/zone¹ can be identified based on following parameters:

- Street/zone with large number of pedestrians and high congestion. Walking infrastructure is barely provided or insufficient.
- Street/zone with high visitor intensity for work, education or recreation trips. For instance zones around railway station, MRT station, bus terminal/stand, markets, institution, public spaces, schools, central business district, etc can be considered.
- Zones where children, women, elderly and persons with disabilities are present due to presence of schools, colleges, markets, hospital etc.
- If the street/zone is surrounded by prominent city landmarks or connects important landmarks. It is an important heritage zone or a tourist destination.
- Street/zone that have the potential to transform the image of the city at a national/international level because of its character, location, and association with citizens. This will also attract large tourists.
- Street/zone identified in Smart City Proposal or HRIDAY plan for pro walking, cycling and public transport development,

The above parameters are suggestive. Cities can include other parameters based on the context.

step 4 Streets that have existing pedestrian infrastructure as per IRC:103-2012 should be included in the pedestrian network plan but should not be reconstructed as they provide continuous and comfortable walking experience.

Cycling network plan is a city-wide network plan that will guide the city to identify and invest in cycling infrastructure in the form of cycle tracks, cycle lanes, shared streets, public bicycle sharing etc.



Cycling network plan will be developed at two scales – city-wide and neighbourhood level. The city wide cycling network plan will provide greater mobility across the city whereas the local trips will be catered at the neighbourhood level. The cycling network can be identified across arterial, collector and local streets. Apart from showing cycling network, the plan will provide information on streets with segregated cycle tracks and cycling in mixed traffic.

city-wide cycling network plan

Traffic counts at various midblock locations on arterial and key collector streets throughout the city should be collected. For a city with about one-million population, around 15 locations can be identified. The traffic counts will include pedestrian and cyclist counts along with vehicle counts. The counts will be done for morning and evening peak hour for 15 minutes in both directions. This will give an overview of number of cyclists at that location. Cyclist counts should also be disaggregated under men, women and children (school going).

¹ A zone may be defined as a precinct/neighbourhood with an area ranging between 0.3 to 6 sq.km. The areas are suggestive, the city can define as per their context.

greenways network plan 3.3

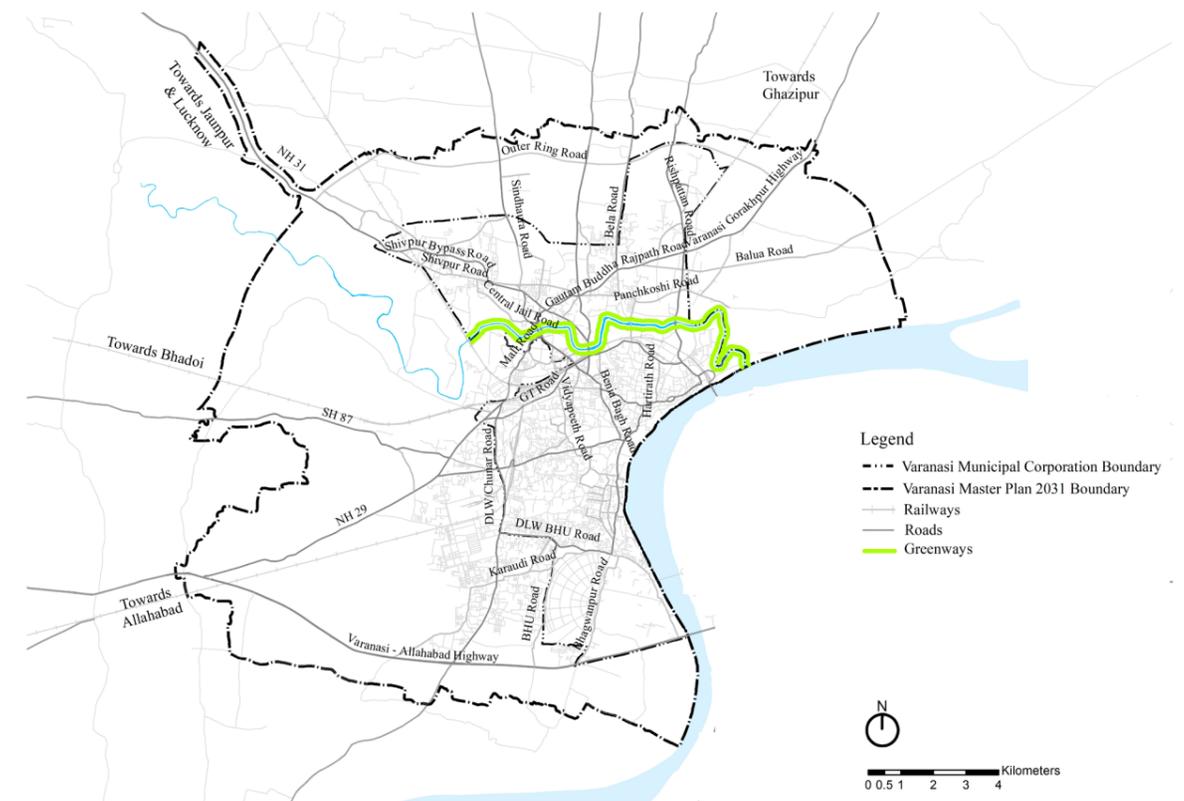
- step 1** Conduct interviews with cyclists to understand their place of origin and destination along with the preferred route, preferred time of travel, travel distance and purpose. The sample space of interviews should be large enough to be meaningful.
- step 2** Map the location of the origin and destinations along with other city-level landmarks identified in section 4 on an existing street network.
- step 3** Connect the origin/destination locations mapped in Step 2 with a straight line indicating the shortest travel distance. It is also called crow fly distance. Overlay the crow fly distance and the existing street network to derive cycling routes in the city. Additional thoroughfares through private/government properties should be planned, if the urban block length exceeds beyond 150m to encourage walking and cycling. Such thoroughfares can be limited to only walking and cycling and not allow motorized transport movement. A cycling network can be planned along any street typology provided it ensures mobility and safety to cyclists.
- step 4** A city-wide cycle highway cutting across east-west and north-south can be developed for larger mobility. This can be planned as a separate network or integrate with existing street network or a combination of both.
- It is recommended to provide segregated cycle tracks on streets where vehicular speeds are above 30kmph. Streets where cyclists are in mixed traffic, appropriate traffic calming measures should be provided to ensure safe mingling of cyclists and motorized traffic. In such streets, speeds should not exceed 30kmph.

neighbourhood cycling network plan

- step 1** Develop a base map for the neighbourhood cycling network plan. It should have all streets marked. Similar to city-wide cycling network plan, various maps on street hierarchy, right of way, existing and proposed public transport and both city-level and neighbourhood level landmarks should be mapped.
- step 2** Focused group discussions with local schools, resident welfare associations, civil society organisations, institutes, local business association, traffic police, ward engineers etc. should be conducted. This will help in understanding the important landmarks within the neighbourhood which residents travel often. The discussion will also help know challenges and possible solutions involved to implement the cycling network plan.
- step 3** With the above information, cycling network to be derived within the neighbourhood. A cycling network can be planned along local / collector streets, where cycling can be in mixed traffic but vehicular speeds should not exceed 30kmph. A few local streets can be planned to only provide through movement of cyclists but restricts through movement of vehicular traffic.

Neighbourhood cycling network plan should be integrated together with city-wide cycling network plan. Apart from shortest route distance, cycling network should provide personal safety, comfort and shade.

Greenways are a network of exclusive facilities for walking and cycling only, with a variety of public spaces along natural features such as river, canal, lakes, marshes, and parks. Motor vehicle traffic will be prohibited on this network. Such greenways shall have a minimum clear width of 7.5m to accommodate two-way movement of cyclists and pedestrians.



A city-wide cycle highway cutting across east-west and north-south can be developed for larger mobility. This can be planned as a separate network or integrate with existing street network or a combination of both.

With the help of context map, identify key natural features such as water bodies and green zones in the city.

Establish a greenway network along/around these natural features.

Integrate the greenway network with the pedestrian and cycling network of the city. Greenways can also be part of cycle highway.

step 1

step 2

step 3

3.4 summary of CS projects

With the help of the above plans prepared in the Complete Streets Master Plan, the city will be able to clearly identify the projects, quantify it and get an approximate estimate that the city will have to invest on pedestrian and cycling infrastructure over a period of time as mentioned in the Complete Streets Policy Workbook.

No.	Project	Unit	Per Unit Capital Cost (Rs)	Total Capital Cost (Rs)	Operation & Maintenance Cost (annual) = 10% of total capital cost
1	Complete streets with only segregated footpaths (Km.)				
2	Complete streets with both segregated footpaths and segregated cycle tracks (Km.)				
3	Complete streets with traffic calming measures (Km.)				
4	Greenways (Km.)				
5	Pedestrian only street (Km.)				
6	Intersection redevelopment (Nos.)				

note The Non-Motorized plan for the city should be supported by efficient public transport network. It is desired that any form of public transport should be accessible within a distance of 500m or 7-minute walking distance. Public transport network should be further expanded or provided in areas that lack public transport access. Cities can first invest in bus transport and then as the demand increases can invest in mass rapid transit. A detailed public transport plan will have to be developed separately to improve public transport availability. It does not form the scope of Complete streets master plan.

All arterial and collector streets should be considered for public transport network. Some of these streets can also be considered for NMT-PT priority streets, not allowing personal motorized vehicles completely or allowing on certain hours. However, this should be done in consultation with residents, shopkeepers and traffic police to address issue of property access and deliveries. Additional arterial and collector streets should be provided in case of sparse street network to ensure public transport availability and encourage walking and cycling.





4

BUDGETING, FINANCING AND PHASING

budgeting | financing | phasing

4.1 budgeting and financing

Once the Complete Street Master Plan is prepared and the projects are identified, the budget plan has to be prepared. Following 3 steps should be followed while making the budget plan:

- Reassess the future of existing and proposed urban transport projects based on sustainable transport principles adopted in Complete Streets Policy.
- Prepare budget plan
- Identify sources of finance

Reassessing existing and proposed transport projects

The list of existing and proposed urban transport projects gathered in section 4 should be assessed critically with respect to the sustainable transport goals adopted by the city in the Complete Streets Policy. The projects that promote non-motorized transport use should be continued, whereas the ones which promote private motorized vehicles use should be reconsidered and its impacts should be evaluated before continuing. Similarly, high capital intensive mass rapid transit systems should be reconsidered for alternate mass rapid transit systems such as bus rapid transit. Evaluation of projects will direct city to reconsider its existing budget investments towards providing pedestrian, cycling and public transport facilities. However, decisions should be made by stakeholder consultation in apex committee. Below table can be used to assess the future of the existing and proposed road projects.

No.	Project	Supports sustainable mode?	Suggested precaution/ intervention
1	Construction of Multi-level car parking (MLCP)	no	First implement on-street parking management and then assess the demand. Even if an MLCP is found necessary thereafter, on-street parking must be charged heavily to ensure that the MLCP is occupied first.
2	Street design of 'ABC' road (10km) based on complete streets design principles	yes	Continue with the project.

Below is the list of projects that support sustainable transport, and projects that do not support sustainable mode. This will help the city to make informed decision.

sustainable transport projects

Projects that ensure safety of pedestrians, cyclists and other road users, provide equal mobility and accessibility, and benefit environment support sustainable transport mode. Providing footpaths (as per IRC:103-2012), cycle tracks (as per IRC:70-2017), on-street parking management, intersection redevelopment, greenways, public transport, bus stops, IPT stands, traffic calming measures and pedestrianization.

unsustainable transport projects

Encourages the use of private motor vehicles, increase environmental risks through pollution and affects city's quality of life in a negative way. It also creates congestion. The projects that do not support sustainable transport projects are providing more road space for PMV, building flyover, multi-level car parking, grade separated pedestrian crossings (should be only considered on urban expressways).

The above list is not exhaustive and cities can evaluate other transport projects based on the above mentioned two categories.

preparing budget plan

Once the city administration has evaluated the future of existing and proposed transport projects, the city will get a clear understanding of the revised budget that can be directed towards sustainable transport. The capital expenditure (capex) should be planned for short term (5 year), medium term (10 year) and long term (15 year) horizons depending on projects.

Milestone	Total capital expenditure (Rs in crores)
Short term (up to 5 year)	xx
Medium term (up to 10 year)	xx
Long term (up to 15 year)	xx
Total capital expenditure	xxx

In addition to the above, funds would be needed for the following:

Maintenance of implemented infrastructure may be estimated at 10% of all capital expenditure spent up to a given year.

However, parking management has a potential of earning revenue to the city every year.

sources of finance

The existing sources of financing transportation projects use funds from municipal corporation, state government and central government. It is generally estimated that sustainable transportation projects need fewer funds when compared with personal motor vehicles-oriented projects. In addition, the city should explore additional sources of funds, which may include the following:

- Capture real estate appreciation along corridors with better mobility.
- Funds generated by dis-incentivising personal motor vehicles or by managing their use, e.g., parking fees, registration and taxation, congestion charges etc.
- Replacing flat, one-time road tax by more frequent and usage-based road tax.
- The above list is only indicative and not exhaustive. It is envisaged that sustainable transportation may reduce the city's expenditure not only on building roads, but also on providing healthcare (because of improved air quality). Some of those savings can be diverted to the sustainable transport projects.
- The city should also ensure that at least 90% of the annual capital expense budget identified for mobility projects is allocated for sustainable transport projects and not used in an ad-hoc manner for projects outside of the sustainable transport principles.

4.2 project packages and timeline

Once the city has finalized the Complete Streets Master Plan, packages should be developed for detailed street design. Total kilometers of complete streets identified in the Complete Streets Master Plan are divided into packages along with intersection redevelopment to ensure integrated street design.

Each package will be then given to one consultant for detailed street design. Following points should be considered while developing packages:

Each package should include minimum 15-25 km depending on the total street network identified in CSMP. This will help city to get good quality consultants. For instance, if the city has identified 100 kms of complete streets design projects in the CSMP, 4 packages of 25 kms each can be prepared. Each package will be then given to one consultant for detailed street design.

Consultants should be mainly hired for detail street design of arterial and collector streets. Local streets may be managed by the Complete streets cell.

The streets in each package should be combined such that they form a network. Streets falling in one neighbourhood of the city should be combined together. This will ensure continuity in street design by a consultant. City should adopt street design guidelines to ensure continuity of principles in all complete streets projects by different consultants.

If an arterial street that cuts across the city to provide city level mobility, it is recommended that the entire length be given to one consultant to ensure design continuity and avoid design conflicts between different consultants. However, they can be divided in sections and given to different consultants if there is drastic change in the character.

*City may add other parameters to achieve packages depending on the context.

timeline and prioritization of projects

Once the packages are formed, city has to decide the timeline of projects in a phased manner. The implementation timeline of Complete Streets Master Plan will be spanned over a horizon period as established in the Complete Streets Policy adopted by the city. The table in the adjacent page is a representative project timeline for implementation of the Complete Streets Maser Plan by the city. The timeline shows the time taken for design which is highlighted in dark shade and implementation period highlighted in light shade.

The list of projects mentioned in the table, phasing and timeline are indicative; the CS projects list will be as per the city's Complete Streets Master Plan.

Prioritization of projects can be considered in following order, however the below is suggestive, city can prioritize differently:

- Streets and intersections which are accident prone spots.
- All arterial and collector streets.
- All streets with bus routes.
- Streets where predominant mode share is walking and cycling.

It is not necessary that city starts with Package 1 and then moves to another. Cities can also start all packages together and within packages implementation can be phased

Project	Years								
	1	2	3	4	5	6	7	8	9
Street Design: Phase 1	Dark	Light	Light	Light	Light				
Street Design: Phase 2		Dark	Light	Light	Light	Light			
Street Design: Phase 3			Dark	Light	Light	Light	Light		
Greenways: Phase 1				Dark	Light	Light	Light		
Greenways: Phase 2					Dark	Light	Light	Light	Light
Intersection redevelopment: Phase 1	Dark	Light	Light	Light					
Intersection redevelopment: Phase 2		Dark	Light	Light	Light				
Parking management: Phase 1	Dark	Light	Light	Light					
Parking management: Phase 2			Dark	Light	Light	Light	Light		

stakeholder consultation

Once the draft CSMP is prepared along with projects, budget, packages and timeline, it should be presented to the apex committee. The comments from the apex committee should be incorporated in the plan and later presented to representatives of resident groups and elected representatives in a public meeting.

The meeting should ensure presence of CS cell team, consultants, city administration officials, representation from Traffic Police to ensure all citizen queries are addressed. City should also conduct an active outreach plan to educate citizens on the implementation of CSMP through exhibition, newspaper etc. It will be the responsibility of the CS cell to conduct public meetings and exhibitions.

Positive communication to the citizens and the immediate stakeholders will help accelerate the implementation. Trials, car free days and other street events should be organized to involve citizens in the process.

identifying consultants

Cities must hire qualified professionals to develop detailed street designs to implement the projects identified. Consultants should be hired for the development of streets identified in the CSMP and the local streets can be developed by the CS cell. However, detailed street design by consultants will be reviewed by the CS cell and other experts of Apex committee.

Consultants should have proven excellence in urban design and must be familiar with NMT user needs and street design principles and standards. Cities must ensure that consultants carry out the tasks involved in the preparation of detailed street designs and project implementation. Template for request for proposal for hiring a design consultant for the detailed street design can be found in Volume III document - Urban Street Design Guidelines.

The entire process to develop Complete Streets Master Plan should take about 4-5 months.

way ahead

Once the CSMP is developed, the next milestone for the city is to develop detailed street design. The guidelines on the design of urban streets is given in Volume IV Complete Streets Design Workbook. Volume IV includes guidelines and design standards on various elements of complete streets. Adoption of these guidelines will ensure all streets that are redesigned or developed follow the complete streets principles. Both complete streets cell and consultants should adhere to the design standards in Volume IV.



Fig. (facing page)
St. Marks Road, Bangalore

ANNEXURES

list of references

list of references

Following are some of the acts, laws and initiatives undertaken until now by Central, State Governments and other organizations in the road and transportation sector prominently related to vehicles, road construction, road users. The Complete Streets framework toolkit has taken into consideration the information and suggestions as mentioned in these studies.

Indian Road Congress Guidelines

The Indian Roads Congress (IRC) was set up by the Government of India in consultation with the State Governments in December, 1934 and is a registered society under the Registration of Society Act. It is the premier body of Highways Engineers in India. The Principal objectives of the India Roads Congress are to provide a national forum for regular pooling of experience and ideas on all matters concerned with the construction and maintenance of highways, to recommend standard specifications and to provide a platform for the expression of professional opinion on matters relating to roads and road transport including those of organizations and administration. It also publishes Journals, monthly magazines and research bulletins.

Few of such journals regarding design of urban roads have been considered in the study for the framework documents. The documents recommend to follow the given IRC for the technical specifications and details for construction of street elements:

1. IRC: 35-2015 Code of Practice for Road Markings
2. IRC: 36-2010 Recommended Practice for Construction of Earth Embankments and Subgrade for Road Works
3. IRC: 37-2012 Guidelines for the Design of Flexible pavements
4. IRC: 67-2012 Code of practice for Road Signs
5. IRC: 70-2017 Guidelines on Regulation and Control of Mixed Traffic in Urban Areas
6. IRC: 98-2011 Guidelines on Accommodation of Utility Services on Roads in Urban Areas
7. IRC: 99-2018 Guidelines for Traffic Calming Measures in Urban and Rural Areas
8. IRC: 103-2012 Guidelines for Pedestrian Facilities
9. IRC:SP: 50-2013 Guidelines on Urban Drainage
10. IRC:SP: 055 Guidelines on Traffic Management in Work Zones
11. IRC:SP: 057 Guidelines for Quality Systems for Road Construction
12. IRC:SP: 112-2017 Manual for Quality Control in Road and Bridge Works
13. IRC:SP: 117-2018 Manual on Universal Accessibility for Urban Roads and Streets
14. IRC:SP:119-2018 Manual of Planting and Landscaping of Urban Roads

MoRTH Specifications

The Ministry of Road Transport and Highways is a ministry of the Government of India, is the apex body for formulation and administration of the rules, regulations and laws relating to road transport, and transport research in India. Some of the MoRTH regulations and specifications referred in the Complete Streets framework documents have been listed below:

1. MoRTH Section 300: Earthwork, Erosion Control and Drainage
2. MoRTH Section 400: Sub-Base, Bases Not-Bituminous and Shoulders
3. MoRTH Section 500: Base and Surface Courses (Bituminous)
4. MoRTH Section 800: Traffic Signs, Markings and Other Road Appurtenances

Design of Urban Roads-Code of Practice, 2012¹

The code of practice for designing of urban roads has been prepared by the Transportation Research and Injury Prevention Programme (TRIPP) for the Institute of Urban Transport (IUT), Ministry of Urban Development. The primary purpose of this document is to provide a code of practice for various Urban Road Components. It has been developed in five parts:

- Part I : Urban road cross section design
- Part II : Intersection design
- Part III: Road markings
- Part IV : Signages
- Part V : Traffic Calming methods

Among other recommended codes, the document has two major variations from IRC codes in terms of road design for intended speed limit and linking of lane width with speed limit.

Motor vehicles Act²

The Motor Vehicles Act, 1988 is an Act of the Parliament of India which regulates all aspects of road transport vehicles. The Act came into force from 1 July 1989. It replaced Motor Vehicles Act, 1939 which earlier replaced the first such enactment Motor Vehicles Act, 1914. The Act provides in detail the legislative provisions regarding licensing of drivers/ conductors, registration of motor vehicles, control of motor vehicles through permits, special provisions relating to state transport undertakings, traffic regulation, insurance, liability, offences and penalties, etc.

Disabilities Act³

The Rights of Persons with Disabilities act replaces the Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995. It fulfills the obligations to the United National Convention on the Rights of Persons with Disabilities (UNCRPD), to which India is a signatory. The Act came into force during December 2016.

Accessibility is one of the rights that is given importance under this act which makes it mandatory to provide for disabled friendly design of public places including roads and streets. The Rules under this Act have specified the Standards for Accessibility through Harmonised Guidelines and Space Standards for Barrier Free Built Environment for Persons With Disabilities and Elderly Persons.⁴ The guidelines prepared by Ministry of Urban Development are comprehensive guidelines inclusive of all provisions updated and harmonized to act as an easy reference Practitioner's Guide for Barrier Free Designs with universal access, responding to the varying needs of the persons with disabilities.

The Guidelines and Toolkits for Urban Transport Development

The Guidelines and Toolkits for Urban Transport Development were prepared by a Technical Assistance on Urban Transport Strategy (TA 4836-IND) funded by the Asian Development Bank for the Ministry of Urban Development (MoUD), Government of India.

¹ <http://mohua.gov.in/cms/Design-of-Urban.php>

² <http://www.tn.gov.in/ta/mvact1988.pdf>

³ http://164.100.47.4/BillsTexts/LSBillTexts/PassedLoksabha/214C_2016_LS_Eng.pdf

⁴ <http://disabilityaffairs.gov.in/upload/uploadfiles/files/RPWD%20ACT%202016.pdf>

⁴ <https://cpwd.gov.in/Publication/Harmonisedguidelinesreleasedon23rdMarch2016.pdf>

These documents are designed to help decision makers and practitioners in states and municipal governments who are concerned with urban transport development in medium-sized cities in India.

It consists of 5 modules addressing topics like -

- Comprehensive mobility plans⁵
- Bus Rapid Transit Systems (BRTS)
- Guidelines for Bus service improvement
- Guidelines for parking measure
- Guidelines for NMT measures.

The National Urban Transport Policy (April 2006)⁶

It was approved by GOI to tackle urban mobility issues to ensure a safe and sustainable urban mobility in the coming decades. It provides for integrated land use and transport plans in cities, coordinated planning for urban transport, people oriented equitable allocation of road space, capital support in the form of equity participation and or viability gap funding, innovative financing, dedicated urban transport funds, non-motorised transport, car restraint measures, clean fuel and vehicle technology, private sector participation and pilot projects in cities to establish models of best practices.

Recommendations of working group on 12th FYP⁷

The Working Group on Urban Transport for the 12th Five Year Plan has made recommendations on investments and plans on 9 broad themes in urban transport which were identified in line with the National Urban Transport Policy (NUTP) developed by the Government of India.

Study on traffic and transportation policies and strategies in Urban Areas in India, MOUD, 2008⁸

The study aimed at updating the transportation information and projections made from the previous study 'Traffic and transportation policies and strategies in Urban Areas in India 1994' in order to review the National Urban Transport Policy in light of the new and comprehensive data provided within this report.

Service Level Benchmarking, 2009⁹

Since 2009, the Ministry of Housing and Urban Affairs (then titled Ministry of Urban Development) has adopted the practice of service level benchmarking. Through the SLB initiative, the Ministry hoped to create a robust set of indicators across sectors for which data would be collected at the city levels and collated and published at the National level. This would then help create a ranking for cities, aided by a positive competitive spirit. At the same time, cities were also expected to set targets for themselves and better their performances over time.

⁵ https://smartnet.niua.org/sites/default/files/resources/file_1016201405372097.pdf

⁶ <http://www.iutindia.org/downloads/Documents.aspx>

⁷ http://planningcommission.gov.in/aboutus/committee/wrkgrp12/hud/wg_%20urban%20Transport.pdf

⁸ http://mohua.gov.in/upload/uploadfiles/files/final_Report.pdf

⁹ http://mohua.gov.in/upload/uploadfiles/files/Service_level.pdf

Within urban transport, pedestrian and non-motorized transport facilities were assigned indicators -such as the share of city roads with footpaths and the coverage and efficiency of street lighting etc.

National Mission on sustainable habitats: Report of the Sub-Committee on Urban Transport

Under the National Action Plan for Climate Change, the National Mission on Sustainable Habitat has been launched to cover various aspects which include better urban planning and modal shift to public transport. Regarding Urban Transport, the objectives of the National Mission on Sustainable Habitat (NMSH) are "To address the issue of mitigating climate change by taking appropriate action with respect to the transport sector such as evolving integrated land use and transportation plans, achieving a modal shift from private to public mode of transportation, encouraging the use of non-motorised transport, improving fuel efficiency, and encouraging use of alternative fuels etc.

UTTIPEC Guidelines for street design¹⁰

As per the recommendations of National Urban Transport Policy, DDA, Delhi has notified Unified Traffic and Transportation Infrastructure (Plg. & Engg.) Centre (UTTIPEC) to enhance mobility, reduce congestion and to promote traffic safety by adopting standard transport planning practices.

Recently UTTIPEC has published street design guidelines to promote sustainable transportation system in the city of Delhi.

The Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act, 2014¹¹

Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act, 2014 is an Act of the Parliament of India. This Act was drafted with the legislative intent of protecting the livelihood rights of street vendors as well as regulating street vending through demarcation of vending zones, conditions for and restrictions on street vending. The Act now governs over all matters in regards to the rights and duties of the street vendors in India.

Chennai Non-Motorised Transport Policy, 2014¹²

The Chennai Municipal Corporation adopted a progressive non-motorised policy in October 2014 to make walking and cycling its priority. The policy aims to arrest the current decline in walking and cycling in the city by creating safe and pleasant network of footpaths, cycle tracks, greenways and other NMT facilities.

¹⁰ http://smartcities.gov.in/upload/uploadfiles/files/StreetGuidelines_DDA.pdf

¹¹ <http://legislative.gov.in/sites/default/files/A2014-7.pdf>

¹² <https://www.itdp.in/wp-content/uploads/2014/10/NMT-Policy.pdf>

Urban Street Design Guidelines, Pune 2016¹³

In accordance with the key principles of moving people before vehicles in National urban Transport Policy, the Municipal Corporation of Pune adopted the 'Urban Street Design Guidelines' as a new policy document aimed at 'equitable allocation of street space'. The guidelines give an overview of various elements that go into designing streets, making them universally accessible and also provide standard templates for different sizes and uses of streets.

Policy for Pedestrian Facilities and Safety, Pune 2016¹⁴

The Municipal Corporation of Pune, in 2016 adopted a Pedestrian Facilities and Safety Policy, keeping in view the focus set in NUTP and CMP for Pune. The Policy establishes good quality public transport system as well as safe, adequate and usable facilities for pedestrians and cyclists as the solutions to city's traffic problems and aims at providing consistent, high quality pedestrian infrastructure with equitable allocation of road space.

Public Parking Policy, Pune 2016¹⁵

The policy on Public Parking adopted by Pune Municipal Corporation in 2016, is expected to help the city in becoming more 'people friendly' than 'vehicle friendly'. The Policy aspires to discourage usage of private modes, encourages efficient use of available parking spaces, aids in evolving a better transportation system, builds a strategy to reduce congestion, pollution, and also helps the public transport system to grow.

NMT Guidance document, 2016¹⁶

The Guidance Documents for preparing Non-Motorised Transport (NMT) plans has been undertaken by the Sustainable Urban Transport Project, Ministry of Urban Development (MoUD), Government of India (GOI) with support from Global Environment Facility (GEF), UNDP and World Bank. The focus of the Guidance Document is to establish a systematic process for plan preparation, serving more as an implementation manual with checklists of potential alternatives, rather than providing technical standards for development of detailed specifications.

Coimbatore Street Design & Management Policy, 2017¹⁷

Keeping with the approach set-out in NUTP-2006, the Coimbatore City Municipal Corporation (CCMC) adopted a Street Design & Management Policy to ensure the implementation of high-quality transport systems. The Policy seeks to achieve an environment that supports more equitable allocation of road space by incorporating a focus on non-motorised transport (NMT) and public transport (PT) in the planning, design, managing, and budgeting stages.

¹³ https://pmc.gov.in/sites/default/files/road_img/USDG_Final_July2016.pdf

¹⁴ <http://smartcities.gov.in/upload/development/5a9009c9843cdPolicy%20for%20Pedestrian%20Facilities%20and%20Safety%20in%20Pune%20City.pdf>

¹⁵ <https://pmc.gov.in/sites/default/files/project-glimpses/PMC-public-parking-policy-English-revised-March2016-Final.pdf>

¹⁶ <https://smarnet.niua.org/sites/default/files/resources/nmtguidancefinal.pdf>

¹⁷ https://www.itdp.in/wp-content/uploads/2018/01/CoimbatoreStreetDesignandManagementPolicy_ITDP_170218.pdf

Ease of Living Index, 2018¹⁸

The SLB initiative has been reimagined and expanded into the Ease of Living Index, covering more sectors and aspects of citizen lives. Within transport however, the larger set of indicators remain largely similar to the earlier SLBs.

Specifications for Urban Road Execution, Tender SURE

Bangalore City Connect Foundation (BCCF) in conjunction with Indian Urban Space Foundation (IUSF) approached the state government of Karnataka to build an Urban road and tender manual in 2010. The publication contains guidelines on designs, specification and procurement of contract for urban roads execution with the priority on the comfort and safety of pedestrians and cyclists, as well as recognizing the needs of street vendors and hawkers.

Urban Street Design Guide, NACTO

NACTO's (a non-profit organization) 'Urban Street Design Guide' gives guidance through toolbox and tactics that cities can use to make streets safer, more liveable, and more economically vibrant. The Guide outlines both a clear vision for complete streets and a basic road map for how to bring them to fruition.

Better Streets, Better Cities, ITDP¹⁹

A street design manual for Indian cities prepared by ITDP, (a not for profit organization) that discusses design details of various street elements and street sections on 'complete streets' principle.

Parking Basics, ITDP²⁰

Parking Basics a guiding document by ITDP, outlines the key principles and steps involved in managing on-street parking and regulating off-street parking.

Footpath Design: A guide to creating footpaths, ITDP²¹

The footpath design guide prepared by ITDP is a quick reference guide which highlights key concepts from the IRC Guidelines, including footpath design standards. The guide also draws from local and international best practice for some themes not covered in the IRC publication.

¹⁸ <https://easeofliving.niua.org/assets/upload/pdfs/ease-of-living-national-report.pdf>

¹⁹ <https://www.itdp.org/wp-content/uploads/2011/12/Better-Streets-Better-Cities-ITDP-2011.pdf>

²⁰ <https://www.itdp.org/wp-content/uploads/2015/10/Parking-Basics.pdf>

²¹ https://www.itdp.in/wp-content/uploads/2014/04/05-Footpath-Design_Handout.pdf

Footpath Fix, ITDP²²

Footpath Fix the second volume after Footpath Design is a step-by-step guide on footpath construction detailing for urban designers, municipal engineers, and contractors. The guide aims to highlight the steps of footpath construction in a chronological order, from pre-excavation to above-ground construction. It also features necessary precautions, drawing from experience on-ground, that must be taken into consideration at each stage of construction.

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²² <https://www.itdp.in/wp-content/uploads/2018/07/Footpath-Fix.pdf>

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