Guidebook
for adoption of
Form Based Codes

SOP-II
Preparation of
Urban Form Regulations

National Institute of Urban Affairs

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National Institute of Urban Affairs

October 2023

Quotes from Honorable Prime Minister's Post Budget-2023 speech

Dated: 02.03.23

"Well-planned cities are going to be the need of the hour in the fast-paced environment of India in the 21st century"

"Development of new cities and the modernization of services in the existing ones are the two main aspects of urban development"

"Urban planning will determine the fate of our cities in Amritkal and it is only well-planned cities that will determine the fate of India"

"India has overtaken several countries in terms of metro network connectivity"

"75 percent of waste is being processed today when compared to only 14-15 percent in 2014"

"Our new cities must be garbage-free, water secure, and climate-resilient"

"The plans and policies that the government is making should not only make life easier for the people of the cities but also help in their own development"

हरदीप एस पुरी
HARDEEP S PURI

आवासन और शहरी कार्य मंत्री
पेट्रोलियम एवं प्राकृतिक गैस मंत्री
भारत सरकार
Minister of
Housing and Urban Affairs; and
Petroleum and Natural Gas
Government of India

Foreword

Urbanisation is a hallmark of development for any nation. The Modi government has leveraged India's rapid urbanisation to propel economic growth and build a path towards meeting the goals of sustainable development. As India undertakes the largest planned urbanisation programmes in the world, the government is also cognisant of its responsibilities of balancing development needs with ecological harmony.

Successful programmes such as the Smart Cities Mission, Pradhan Mantri Awas Yojana – Urban and AMRUT have not only shown the need for in-situ upgradation but demonstrated the preparedness of our city administrators and planners to steer the process. By strengthening area-based planning, improving last-mile access to services, and integrating digital technology, these missions have led to a greater appreciation of sustainable urban form in our cities. The government is further incentivising a shift in our urban morphology by prioritising reforms such as modernisation of building bye-laws, transit-oriented development and adoption of Transferable Development Rights, among other measures.

I am pleased that this 'Guidebook on Form Based Codes' is being released to ensure that this objective is met. Within the ambit of applicable laws and regulations, this Guidebook and its Standard Operating Protocols demonstrate that achieving sustainable urban form is possible through a Form Based Codes approach. Combined with a digital interface, the tools proposed in this guidebook have the potential to increase efficiencies in city planning and management.

I look forward to seeing this guidebook being adopted by city planners and managers across India. It will be a useful resource in improving the urban form of our cities, thereby optimising urban services, streamlining development efforts, and reducing carbon emissions.

(Hardeep S Puri)

New Delhi,
06 October, 2023

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Foreword by Director NIUA

Director, National Institute of Urban Affairs (NIUA)

The rapid and unprecedented growth of Indian cities, characterized by chaotic urbanization, severe congestion, and escalating environmental degradation, has taken urban planners by surprise. Conventional urban planning methods have given rise to a multitude of challenges, including inflexible and unyielding plans, a disconnection from investment planning, resulting in poor implementation, and a failure to comprehensively address the intricate interplay between spatial and functional aspects. It is now imperative that the field of urban planning undergoes a fundamental shift towards a people-centric development paradigm that takes into account the diverse needs of all residents, with a particular focus on the underprivileged segments of society.

In his recent post-budget speech, the Hon'ble Prime Minister not only emphasized the pivotal role of planning and governance in urban development but also stressed the urgent need to direct our efforts towards spatial planning, transport planning, and urban infrastructure. To fulfill the Prime Minister's vision, it is imperative that we foster a climate of innovation, develop a versatile array of planning tools, fortify our human resources with efficiency, and augment the capabilities of urban local bodies to create a plethora of opportunities.

In line with the vision of the Hon’ble Prime Minister, the National Institute of Urban Affairs is nudging the urban eco-system through its seven-pronged approach: (1) Data for Action; (2) Evidence-Based Integrated Planning; (3) Demonstrate to Scale, (4) Equip to Institutionalize and Empower, (5) Innovate and Co-create, (6) Foster Collaborations and Alliances; and (7) Invest in cities of tomorrow; has developed a Guidebooks for the adoption of Form-Based Codes and its Standard Operating Procedures.

These Guidebooks offer practical tools for managing brownfield sites of varying scales at the city level. They outline a step-by-step process to transition towards adopting Form-Based Codes in India, streamlining the development process for all stakeholders and facilitating business operations.

Moreover, in addition to the Guidebooks, the NIUA is poised to launch a comprehensive training program. This program is specifically designed to provide guidance and support to practitioners, professionals, and students, enabling them to embrace and refine this innovative approach. Through these concerted efforts, we are paving the way for a new era of urban development in India, one that is in harmony with the vision of our Hon'ble Prime Minister and focused on sustainable growth and inclusive prosperity.

Hitesh Vaidya

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List of Abbreviations

AAI	Airports Authority of India
ABD	Area Based Development
AF	Active Frontage
AI	Artificial Intelligence
AMRUT	Atal Mission for Rejuvenation and Urban Transformation
AR	Artificial Reality
BBL	Building Bye-Laws
BTL	Build-To-Line
BUA	Built-Up Area
CBALP	Character Based Area Layout Plans
CBP	Community Building Program
DCR	Development Control Regulations
EoDB	Ease of Doing Business
EWS	Economically Weaker Section
FAR	Floor Area Ratio
FBC	Form Based Codes
FC	Facade Controls
FSI	Floor Space Index
GC	Ground Coverage
GDA	Green Development Area
GIS	Geographic Information System
GPR	Ground Penetrating Radar
HRIDAY	Heritage City Development and Augmentation Yojana
IoMT	Internet of Moving Things
IPT	Intermediate Para Transit/ Public Transport
IRP	Interface Regulation Plan
IT	Information Technology
LAP	Local Area Plan
LCMP	Low Carbon Mobility Plan
LDS	Low-Emissions Development Strategy
LP	Layout Plans
MUZ/ MFZ	Multi-Utility Zone
NMT/ NMV	Non-Motorized Transport/ Vehicles
NUTP	National Urban Transport Policy
OSP	Outdoor Space Plan
PDC	Property Development Cards
PDP	Property Development Plan
PHPDT	Peak Hour Peak Direction Traffic
PT	Public Transport
PW	Pedestrian Way
ROP	(Re)generation Opportunity Plan
RoW	Right of Way
SAP	Special Area Plan
SOP	Standard Operating Procedures
TDR	Transferable Development Rights
TOD	Transit Oriented Development
UFR	Urban Form Regulations
UNFCC	United Nations Framework Convention on Climate Change
URA	Urban Redevelopment Authority
URDPFI	Urban and Regional Development Plans Formulation and Implementation Guidelines
VW	Vehicular Way
w.r.t.	with respect to

List of Definitions

Form Based Codes

Form Based Codes (FBC) is an area-based regulatory tool to facilitate incremental development or transformation of Urban Built Form (and Public Realm) to enhance, inherent or acquire a desired character. It is a performance-oriented, bottom-up approach, and applicable to brownfield and greenfield areas.

Character Based Area

An area that is distinct by the virtue of identity defining feature is called a Character Based Area (CBA). The Character thus identified may generate from its functionality, visual quality of built form and/ or landscaping et al enabling the urban realm to impart a collective experience. Such areas are often contiguous to an anchor, like railway, metro or bus stations/ terminals, water bodies, heritage building/ precinct, university, business district, wholesale market, industrial park, etc. Areas without an anchor with a uniform identity defining features like urban villages, plotted residential neighborhoods, farmhouse zones, slums, organically developed areas, etc. can also be referred as CBAs. CBAs are usually bound by physical features like roads, green areas, water bodies, railway lines, etc.

Character Based Area Layout Plan

Each CBA will require a Layout Plan to regulate its urban form. Such Layout Plans will be referred as Character Based Area Layout Plans (CBALP). These will be a set of plans to regulate the development of public realm and its adjoining urban forms.

Urban Form Regulations

Urban Form Regulations (UFR) are tools which originate from CBALPs and can be used to regulate the design of urban form (building and open spaces). These regulate the qualities of public realm created by plot/ building frontages. These, when applied to brownfield sites, may require removal, amendment or at least rationalization of some conventional clauses in Development Control Regulations and Building Bye-Laws.

Property Development Card

Property Development Card (PDC) is defined as a document containing UFR applicable to concerned plots as derived from the approved CBALP and its UFR. PDCs are to be structured as per the requirements of CBAs and will vary from a city to another.

Primary Street

Primary street is one that carries primary movement load in a street network plan.

Secondary street

Secondary street is one that carries secondary movement load in a street network plan.

Tertiary street

Tertiary street is one that carries tertiary movement load in a street network plan.

NMT Only Street

NMT Only Street shall mean a street dedicated to movement load of only pedestrians and Non-Motorized Transport (NMT) .

Footpath

Footpath shall mean that part of the Right of Way (RoW) of the road used for movement of pedestrians alone. It shall include the mandatory pedestrian zone, multi-utility zone and dead width in front of the adjoining Plot within the RoW.

Natural Greens

Natural Green spaces are defined as land, and natural features including wetlands that are mostly undeveloped with limited or no maintenance, that may have vegetation and wildlife. The primary function of natural green spaces is to promote biodiversity and nature conservation, besides environmental education and awareness.

Man-Made Greens

Man-Made Greens shall mean such space with more than 75% of its land developed artificially and maintained as grass-bed, garden, playground with grass-bed, natural earth etc. or its combinations. It may also include pavement, waterfronts and parking space etc. and be classified as per local Master/ Development Plan/ URDPFI Guidelines.

Plaza

Plaza is a paved area, where more than 75% of the area is pedestrianized. It may also include grass and planter beds,natural waterfronts and parking space, designated monetized zones, etc.

Public space within properties

This category would include spaces with buildings above it or within private plots which are accessible to general public 24X7 and provide opportunity to host various activities that are otherwise accommodated in Green Areas.

Build-to-Line

Build-To-Line (BTL) shall mean the line within or overlapping with the edge of the Plot. The BTL may or may not be continuous. Except Permitted Projections which may extend beyond the BTL, it demarcates the edge of the Plot that is mandatory for the facade of the building to be built on.

Active Frontage

Active Frontage (AF) shall refer to any edge of a plot, where it is mandatory to ensure that the facade of buildings touch the BTL where desirably, 80% or a minimum of 50%, where unavoidable of the frontage length at ground floor level, is active. The same treatment may further extend to the first floor as well. Windows of kitchen, living room, drawing room etc of residences that are in active use across the day, should overlook public spaces.

Colour Palette

Colour Palette is a pantone that accentuates the original building. It is generated to complement, and selectively highlight the historic facade. The traditional palette is a function of local climatic and material adaptation.

Material Palette

Material Palette is a set of building material, either identical to the original used in Heritage Asset or substitutes having compatible physico-chemical and visual properties.

Pedestrian Way — Pedestrian Way (PW) shall refer to any Public Passage through a Private Plot and shall be demarcated in the CBALP. PW can have permanent roof or building for climatic proofing and shall provide a common barrier-free movement.

Marker Element — Marker Element is a distinct, prominent architectural feature, distinguishable by the virtue of its height, aesthetic treatment (material/ colour/ design/ illumination), location, frames, or its anchoring of a view corridor or a combination of these design parameters.

Buildable Envelope — Buildable Envelope (BE) defines a three- dimensional space within which any structure is permitted to be built on a Plot. Such a space, excluding permitted projections, is defined by one or a combination of the following:

- The vertical planes binding the BTL of all edges of a plot (part of super structure).
- The horizontal planes offset at the permissible height above normal ground level, and stacked on one above the other (part of super structure).
- The permissible depth of underground structure below normal ground level of a plot (part of underground structure).

Super Structure — Super Structure shall mean all permanent constructions above plinth level.

Underground Structure — Underground Structure shall mean all constructions below plinth level.

Permitted Projection — Permitted Projection are chargeable BUA projecting beyond the BTL of a plot, constructed solely for the purpose of connecting the construction within plot with abutting or adjoining constructions and/or common areas.

View Corridor — View Corridor shall mean the visual axis or passage from which the heritage structure shall be viewed without any obstruction. The alignment of the view corridor is non-negotiable.

Prohibited Area — Prohibited Area is an area encircling a monument or within a heritage precinct, as per law, regulated by mandated agencies and subject to development controls. Construction, retrofitting and repairs in this zone shall be as per applicable norms of the mandated agency(ies).

Regulated Area — Regulated Area is an area beyond Prohibited Area and within the View Cone of the heritage structure or precinct. Here, new construction following responsive architectural language may be permitted.

Vision Cone — Vision Cone shall mean the zone in relation to a heritage structure which is required to be maintained as an open foreground. Vision Cone is non-negotiable for heritage precincts.

Junction — Junction shall mean the intersection of two or more streets.

Multi-Functional Zone (MFZ) / Multi Utility Zone (MUZ) — Multi-Functional Zone (MFZ) shall mean the space within streets reserved for physical elements and infrastructure, like trees, storm water management systems, auto-rickshaw stands, cycle-rickshaw stands, hawking zones, paid car parking, street furniture, bus stops, traffic police booths, communication line feeder boxes, fire hydrants, junction boxes, street lights/ pedestrian lights etc.

Vehicular Way — Vehicular Way (VW) shall refer to any mandatory multi-modal Right of Way (RoW) required through any Plot/ Building, and be demarcated in the CBALP.

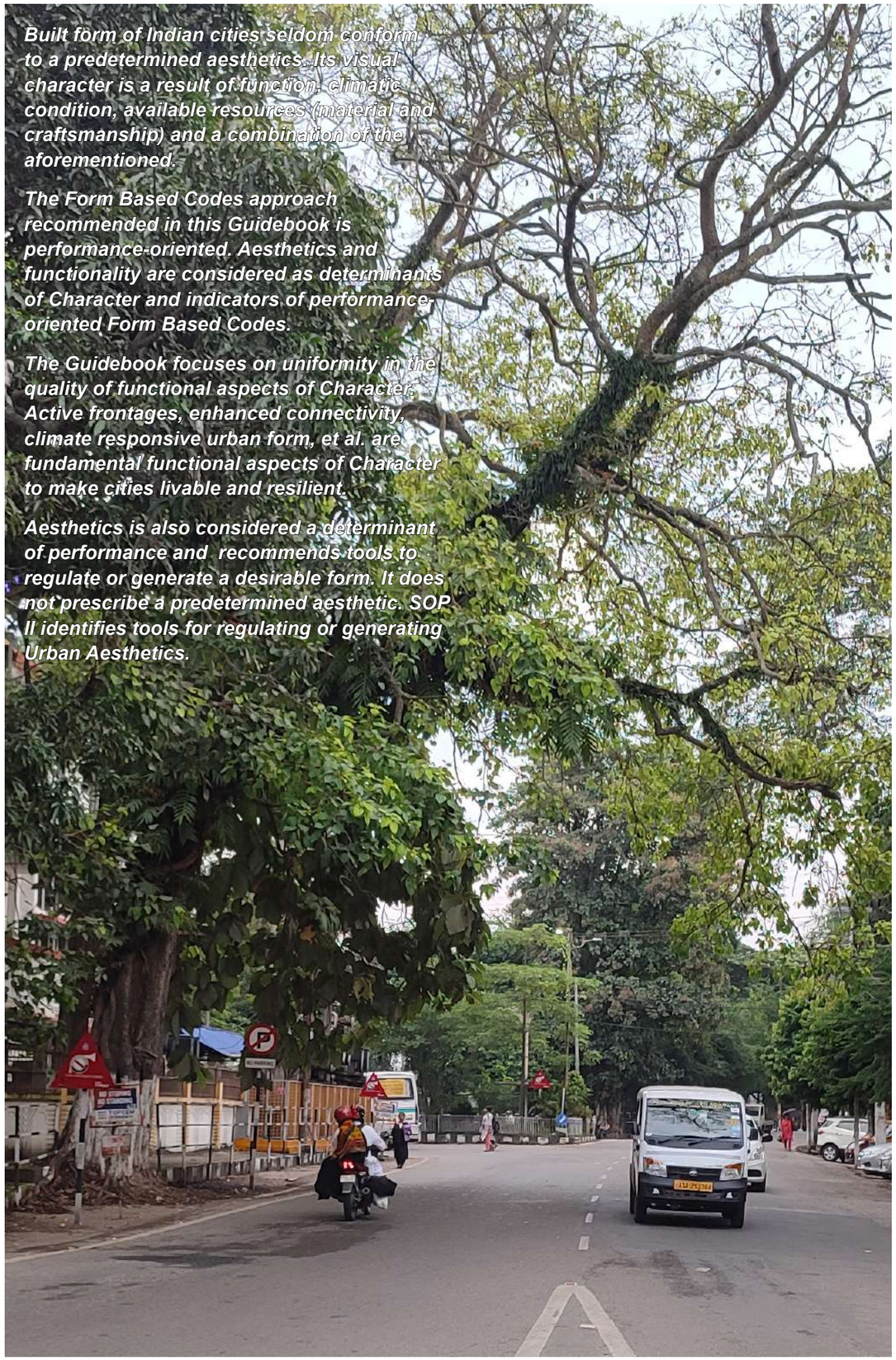
Mid-block crossing — Mid-block crossing shall mean crossing for pedestrians and cyclists between two regular junctions.

Cycle Tracks — Cycle Tracks shall mean the space within Road RoW reserved for movement of NMTs and may be segregated or mixed with carriageway or footpaths. Cycle Tracks shall be planned as part of NMT Master Plans and conform with IRC codes.

Dead Width — Dead Width shall mean the extra space of minimum 1m width, required in addition to footpaths within the Road RoW and demarcated separately, and where doors, windows, spillover etc. of adjoining properties can open onto.

Natural Waterfronts — Natural Waterfront shall mean the edge of a natural water body that were historically present in its original natural state and (may) have transformed over time due to surrounding development.

Man-Made Waterfronts — Man-Made water bodies shall mean those constructed water features for recreation activities, as a part of remediation (constructed wetlands, sponges), transportation (canals) etc. Edges of such water bodies may or may not have natural beds, etc. and changes to these can be done as per local Bye-Laws.



Built form of Indian cities seldom conform to a predetermined aesthetics. Its visual character is a result of function, climatic condition, available resources (material and craftsmanship) and a combination of the aforementioned.

The Form Based Codes approach recommended in this Guidebook is performance-oriented. Aesthetics and functionality are considered as determinants of Character and indicators of performance-oriented Form Based Codes.

The Guidebook focuses on uniformity in the quality of functional aspects of Character. Active frontages, enhanced connectivity, climate responsive urban form, et al. are fundamental functional aspects of Character to make cities livable and resilient.

Aesthetics is also considered a determinant of performance and recommends tools to regulate or generate a desirable form. It does not prescribe a predetermined aesthetic. SOP II identifies tools for regulating or generating Urban Aesthetics.

Executive Summary

This Guidebook is an instrument to achieve the urban transformation agenda initiated by the Government of India. It provides tools to implement the Form Based Codes (FBC) approach for Indian cities - the Character Based Area Layout Plan (CBALP), Urban Form Regulation (UFR) unique to corresponding CBALP and Property Development Cards (PDC) for improving public realm by meeting the demands of live-work-recreate, safety, sustainability and resilience, including brownfield areas.

Urban form in India is heterogeneous, and layered. Its planning is increasingly gravitating to address qualitative aspects of incremental growth, from the earlier quantitative approaches. This is evident in the emergence of approaches like Local Area Planning, Layout Planning, Special Area Planning, Area Based Development, Smart City Project, Transit Oriented Development et al. to upgrade public realm. Addressing this need, Character Based Area (CBA) has been introduced as a physical planning area defined through its existing or desired quality of public realm. Improvements in the latter, boosts outdoor activities that increases social interaction, community building, business potentials and has environmental benefits. And, the resultant incremental improvement of living condition, infrastructure and mobility, makes it a viable format of development.

This Guidebook details out a process to adopt FBC in India. It also comprises the Standard Operating Procedures (SOPs) for preparing CBALP and its corresponding UFRs. The plot specific DCRs and UFRs shall be compiled in PDCs to streamline the development process for all end-users, thereby enabling Ease-of-Doing Business (EoDB).

The CBALP enlists overlays of Layout Plans for (re)generation opportunities, mobility network, outdoor space network, interface regulation and property and community development. This would inform the generation of UFRs (of CBALP) that enable functional design regulations of -

1. Public realm, through organization and utilization of streets, open-spaces, waterfronts
2. Plots, through buildable envelope, pedestrian way, public place within plots, projection across Public Right of Ways, etc
3. Interface of Plots with Public Realm, through Build-to-line, Active Frontages, Colonnades, etc

The Guidebook also provides tools for cities to regulate aesthetics of the facades through establishing proportions, material, colour etc.

The recommended FBC approach is performance-oriented and prioritizes on optimum utilization of resources (trunk infrastructure, road network, environmental assets etc) where the CBALP conforms with the capacity of infrastructure. The emerging UFRs will regulate the design of public realm. Execution of the latter will be contextual, and demand-driven, hence flexible to factor specifics such as land restructuring, use, articulation of frontages, open-spaces, building facades et al.

To leverage from the FBC approach, a dynamic portal with the above outputs is recommended.

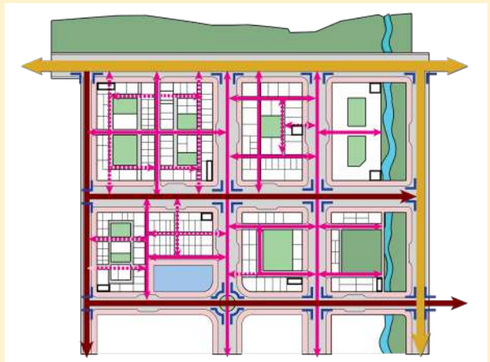
Attributes of Form Based Code Approach

Form Based Codes (FBC) is an area-based regulatory tool to facilitate incremental development or transformation of Urban Built Form (and Public Realm) to enhance inherent or acquire a desired character. It is a performance-oriented, bottom-up approach, and applicable to brown and greenfield areas.

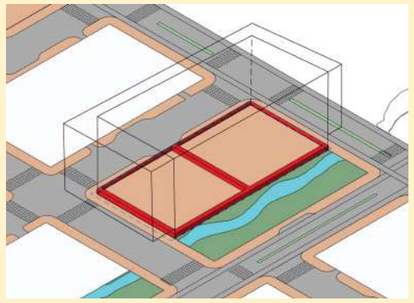
FBC aims to create Urban Realm that is:

1. Climate responsive and resilient.
2. Market responsive development for value maximization.
3. With integrated response to Natural and Built Heritage, and other resources.
4. 24 x 7 Walkable, safe and comfortable Urban Environment.
5. With Ease of Living Environment.

Form Based Codes comprise of:



1. Character Based Area Layout Plans



2. Urban Form Regulations

PROPERTY DEVELOPMENT CARDS NO. [CITY/PLOT UID/YEAR]			
Plot Area			_____ sq.m.
VP	Volumetric Parameters		Applicable Regulations/ Measurements (Development Control Norms/ Local Bye-Laws)
VP.1.	Applicable F.A.R./ F.S.I.		_____ m
VP.2.	Applicable Ground Coverage		_____ %
VP.3.	Use Premise as LP/ CBALP		Residential/ Commercial/ Public-Semipublic/ Industrial/ Transportation/ Social Infrastructure (Educational/ Hospitals) etc
VP.4.	Permissible mix of use	_____ % Residential _____ % Commercial _____ % Social Infrastructure	**All use premises to have atleast-** 20% residential 20% commercial or social infrastructure or both
VP.5.	Mandatory Setbacks		Frontage adjoining open spaces- _____ m, to be maintained as public space without boundary wall.
			Frontage abutting another plot- _____ m.
VP.6.	Maximum permissible height of Superstructure		h= _____m, above natural ground level
VP.7.	Maximum permissible Depth of underground structure		d= _____m, below natural ground level
			UNDERGROUND PORTION N.G.L. (NATURAL GROUND LEVEL) PROPERTY LINE BUILD-TO- LINE Built to Line Property Line Setback

Fig. A: Indicative Volumetric Parameters

3. Property Development Card

Fig. 1: Tools of Form Based Codes

Integration of Form Based Codes in Planning Process

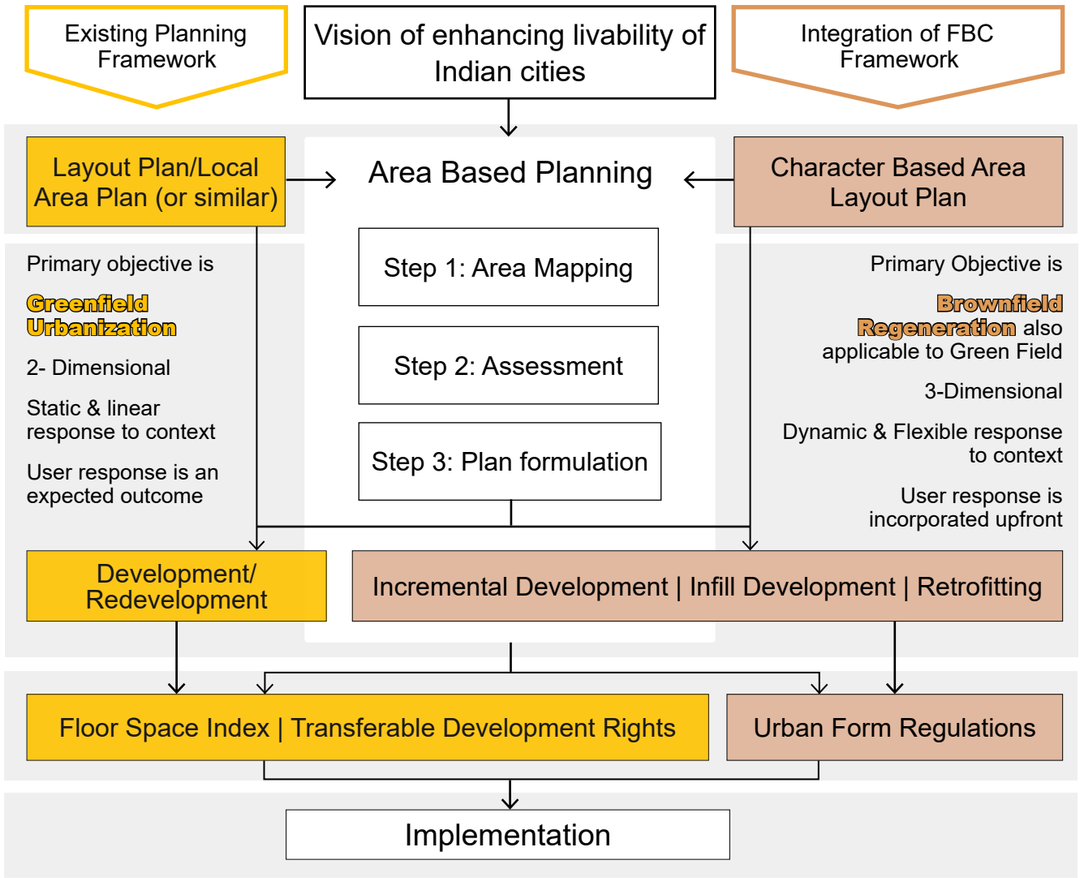


Fig. 2: Integration of Form Based Codes with planning processes

NOTE:

- The response to character defining features are included into the FBC framework. Heritage, environment, climate, user requirements etc are examples of character defining features
- FBC preparation and implementation is a consultative process.

Development Control Norms are 'volumetric parameters' of Urban form.

Form Based Codes integrate 'qualitative parameters' of Urban form with development regulations.

Character Based Area Layout Planning[1] subsumes the Layout Planning process.

Urban Form Regulations add value to Development Control Regulations.

[1] Chapter 2 defines Character Based Area Plans

01 Introduction

This chapter introduces the three categories of Urban Form Regulations (UFR) and are detailed in subsequent chapters.

1.1 Categories of Urban Form Regulations

Cities have three components that contribute towards building its character. The category of physical components are:

Category A: Public Open Space

- A1a: Streets
- A1b: Streets in dense areas
- A2: Waterfronts
- A3: Green Areas, Plazas and Public Spaces within plots.

Category B: Interface of plots and open spaces

- B1: Interface of Plots/Buildings with Open Space in Non-Dense areas
- B2: Interface of Plots/Buildings with Public Open Space in Dense areas

Category C: Plots/Buildings

The Components of UFRs can be in proposed level of importance:

1. Components with suffix 'MR' in the title denote **M**andatory **R**egulations.

2. Components with suffix 'MR(H)' in the title denote **M**andatory **R**egulations in the vicinity of **H**eritage Assets. These may also be applied to areas to generate desired character adopted through approved CBALP.

3. Components with suffix 'OR' in the title denote **O**ptional **R**egulations that may enhance the character as defined in the approved CBALP.

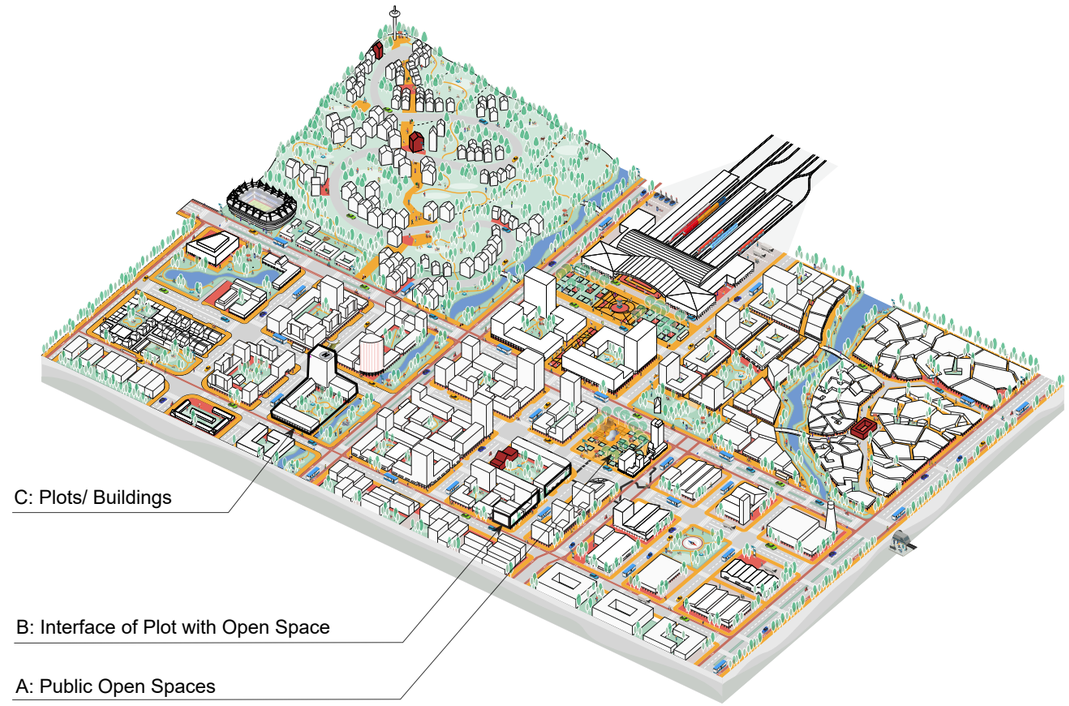


Fig. 3: Building blocks of Form Based Codes

Definition

"Urban Form Regulations (UFR)" are tools which originate from Character Based Area Plans and can be used to regulate the design of Urban Form (building and open spaces).

UFRs regulate the qualities of Public Realm created by plot/ building frontages. These, when applied to brownfield sites may require removal, amendment or at least rationalization of some conventional clauses in Development Control Regulations (DCR) and Building Bye-Laws.

SOP II of this Guidebook provides an ideal palette of components to form UFR for concerned CBA. Over time, cities may introduce new components of UFR to enhance the palette.

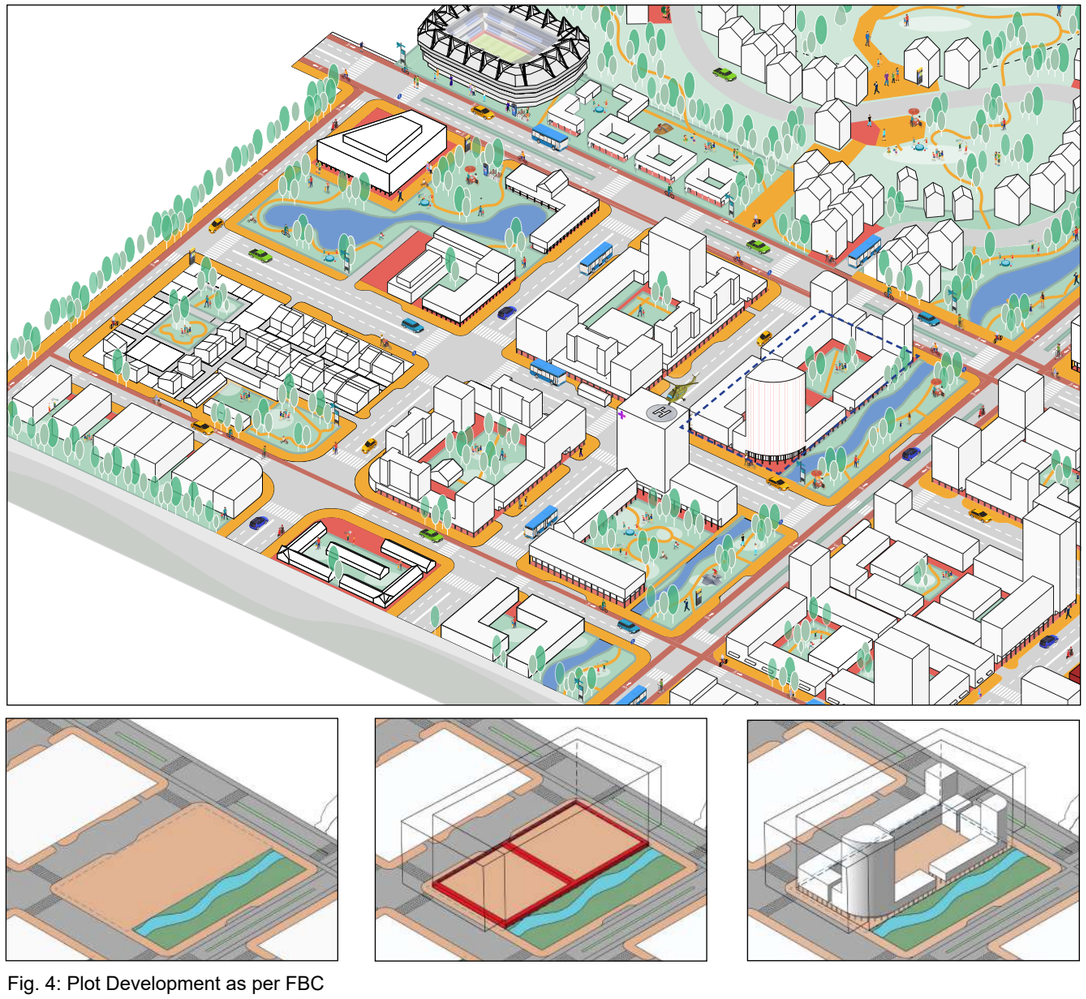


Fig. 4: Plot Development as per FBC

1.2 Process of preparation of Form Regulations

01 **Selection of a CBA with a CBA Plan**

02 **Formulation of a flowchart with Layout Plan regulation, implementation and building sanction**

03 **Selection of a suitable category of UFR applicable to-**

i. Open spaces,
ii. Plots/ Buildings
iii. Interface with plots and open spaces

04 **Identification of types of plots in different context and drafting typical Property Development Cards (PDCs). These typical samples may evolve across time before finalization**

05 **Consult and process**

i. Organize public consultation to seek feedback for the FBC.
ii. On the basis of feedback, a committee of experts constituted by the Competent Authority may revise/ amend CBA Layout Plan.

06 **Process and notify CBALP and UFR together under the provisions of rules, regulation/ Acts.**

Publishing of typical PDCs.

07 **Create a digital dynamic portal for FBC and integrate it with the relevant Building Sanction and EoDB portal.**

Create review and monitoring framework for periodic update.

1.3 Hybrid Urban Form Regulations

The recommended Hybrid UFRs emphasize on regulating the functional elements of Urban Form.

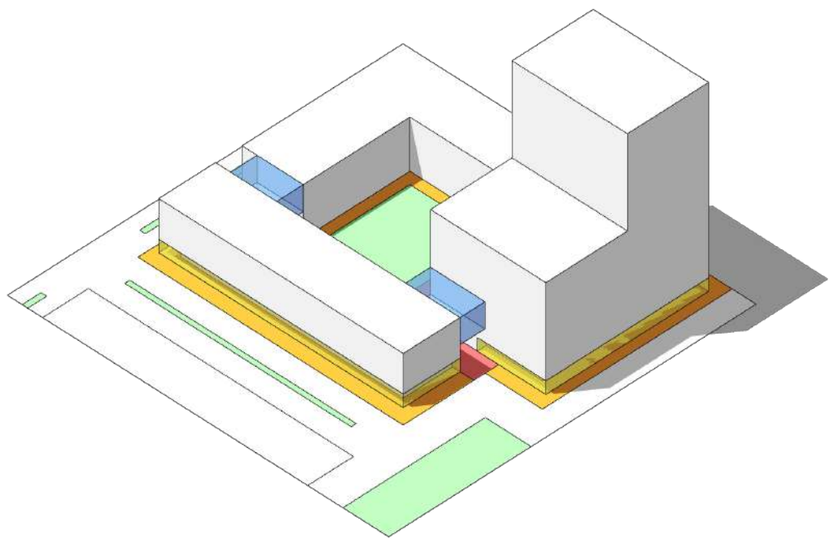


Fig.5: Hybrid UFR

To include codes for Public Spaces, Interface and Plots like active frontage, Build-To-Line, Colonnade etc.

Fig.6: Example of urban form as a result of architectural liberty in Gangtok

1.4 Advanced Urban Form Regulations

Advanced UFRs emphasize on regulations of Interface (applicable to facade) in addition to the elements of Hybrid UFRs. These may be adopted for Historic Precincts or areas with identifiable visuals like Fort Kochi, Jaipur, Srinagar, Chandigarh, Lutyen's Delhi etc.

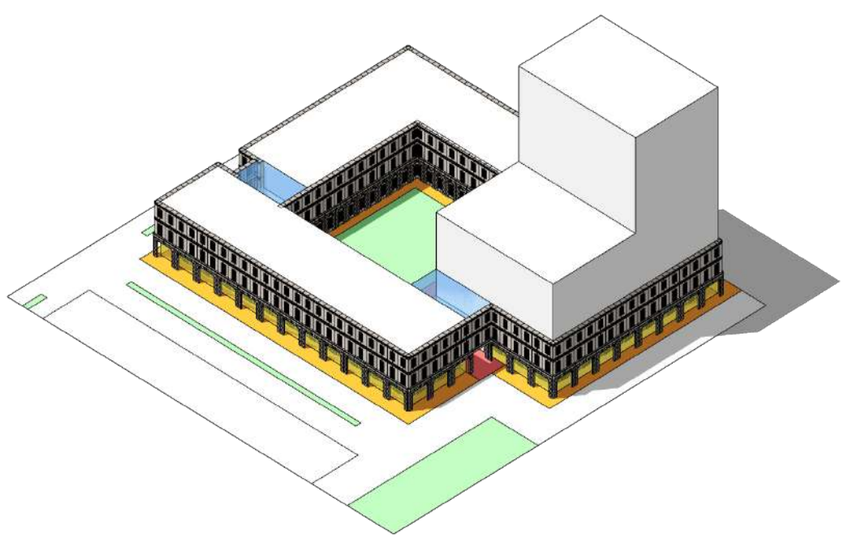


Fig.7: Advanced UFR

To include codes for Interface (applicable to facade) like facade proportions, material and colour palette, etc.

Fig.8: Example of urban and architectural form responding to climatic conditions and contiguous features, Srinagar

02 Open Space Regulations

This chapter contains the UFRs applicable to open spaces i.e., streets, waterfronts, green areas, plazas and public spaces within plots.

Fig. 9: Open street in Gangtok

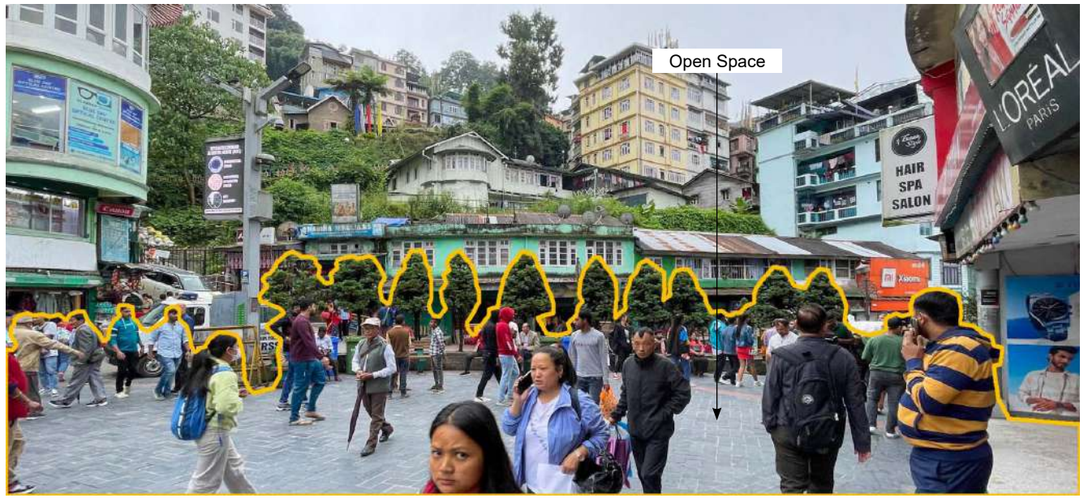


Fig. 10: Open space Plaza in Gangtok

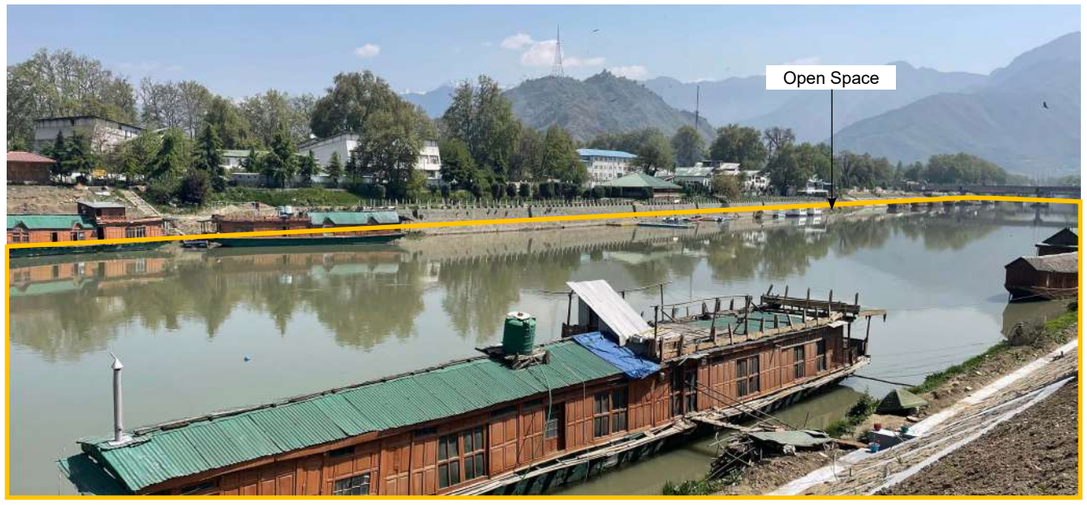


Fig. 11: Open space along Water body in Srinagar

2.1 Intent

- Encourage co-creation of open spaces.
- Enhance quality of life, asset values and potentials for return of revenues by improving the quality of open spaces.
- Evolve context- specific regulations to create new types of open spaces in dense brownfield areas.

Open Spaces in Urban Areas are broadly in the form of-

A1: Streets in less dense areas
A2: Streets in dense areas
A3: Green Areas (including Plazas) and Public spaces within plots
A4: Water bodies and Waterfronts

Allocation, design and construction of open spaces have so far been the responsibility of Public Agencies. Today, besides Public, several Private agencies also design and manage such open spaces either within land owned by them or adjoining it or standalone ones.
With the spirit of co-creation, Open Space Regulations will encourage-

a. Private participation in design of conventional open spaces;
b. Creative solutions for creating new types of open spaces.

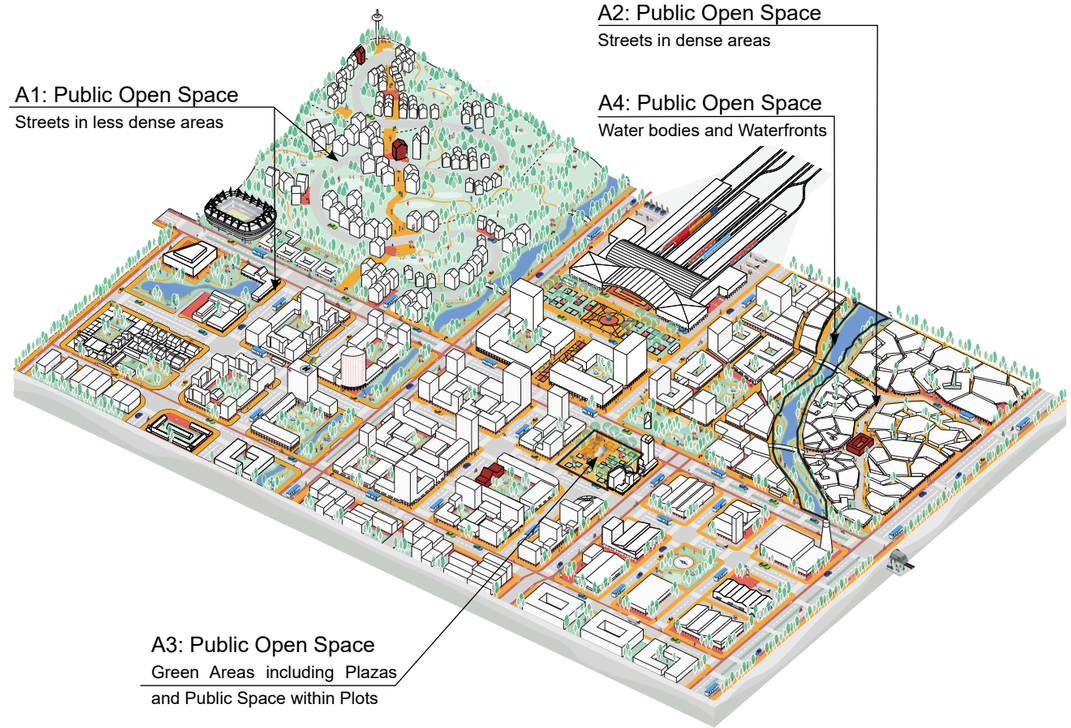


Fig. 12: Types of open spaces

Customizations needed for Dense Areas

- Contextual solutions to create open space for pedestrians, utilities etc.
- Shared streets with traffic calming.
- Pedestrian connections within buildings/ plots at multiple levels to enhance connectivity.

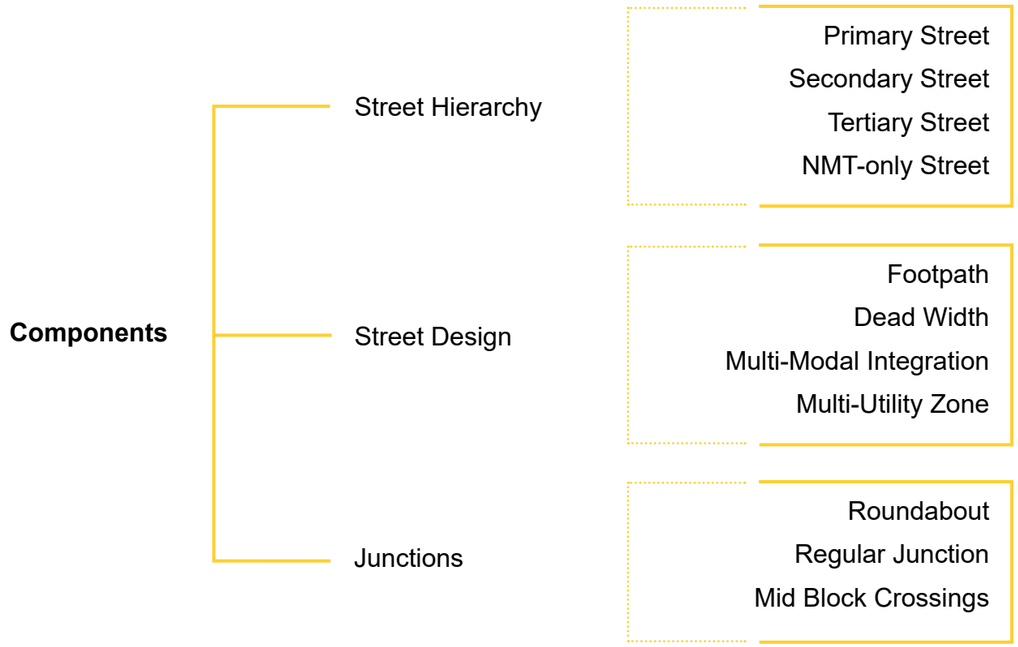
Fig. 13: Setbacks used as Footpaths, Navi Mumbai

Fig. 14: Shared Streets with traffic calming measures, Gangtok

Fig. 15: Pedestrian Connection at upper levels along vertical slopes, Gangtok

2.2 Street Design Regulations

These are regulations for streets within a CBA, and its application would establish a coherent mobility network. Some mandatory parameters and corresponding requirements are specified in this section.



Application

- CBALP for Road Network contains the components of Street design mentioned in this section.
- Incorporation of inputs from plot owners and developers within the ambit of regulation(s).

General Areas

1. Likely of low density or are greenfield areas.
2. Part or whole Right of Way (RoW) may be reallocated as dedicated space for pedestrians, cyclists, public transport users.

Dense Areas

1. Likely brownfield or developed area with limited road space.
2. Retrieve and redistribute space from plots for pedestrians and cyclists, in lieu of FAR, TDR and other incentives.

Street Heirarchy ‘MR’

- CBALP shall assign / identify street hierarchy and junction types.
- Design regulations shall respond to the street hierarchy and junction types mentioned in CBALP.
- Cities may prepare street design regulation mentioning the following information in Tables 1 and 2.

Street Hierarchy	Lanes	Vehicular Car capacity	PHPDT ‘MR’
Primary street	4-Lane & above	>3,600 PCU	40,000 Trips
Secondary street	3-Lane & above	>2,900 PCU	20,000 Trips
Tertiary street	<3-Lane	>2,200 PCU	10,000 Trips

Table 1: Street Hierarchy, Lane Division and Vehicular/ Passenger Capacity

Hierarchy	Definition	Dedicated space required for atleaast-
Primary street	It is a street meant for taking the primary movement load of a CBA	Public Transport, Intermediate Para Transit, Bicycles and Sharing Schemes, Pedestrians
Secondary street	It is a street meant for taking the secondary movement load of a CBA	Public Transport, Intermediate Para Transit, Bicycles and Sharing Schemes, Pedestrians
Tertiary street	It is a street meant for taking the tertiary movement load of a CBA	Intermediate Para Transit, Bicycles and Sharing Schemes, Pedestrians
NMT only street	It is a street which is meant for taking the movement load of only pedestrians and Non-Motorized Transport (NMT) like bicycles, cycle rickshaws, wheelchairs etc.	Bicycles and Sharing Schemes, Pedestrians

Table 2: Street type definition and essential uses

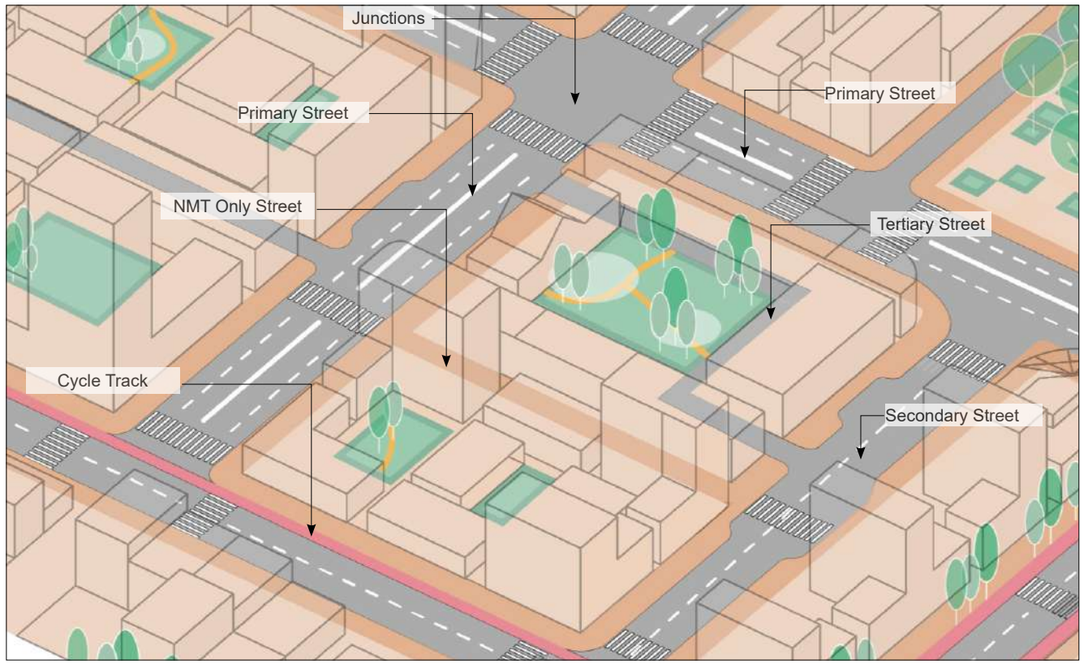


Fig. 16: Street Hierarchy

Explanation and Examples

Hierarchical Street Network

Planned dense street network is essential for safe and easy movement. It establishes and regulates mobility of pedestrians, Non-Motorized Transport (NMT) and vehicular traffic. It also connects land/ area uses efficiently with and through areas by creating a network of linkage along the shortest route. NMT network makes streets safer by ensuring walkable conditions and reduces congestion and pollution of an area. (Fig. 17 and 18)

Fig. 17: Primary street, Pune

The Street Network enables maximizing on value of developable parcels in the CBAs by enhancing access, visibility, safety, vitality and reach of amenities.

Fig. 18: NMT lane and walkways in Pune provides safe movement and accessibility for pedestrians.

Street Design ‘MR’

The essential requirement for all streets include and not be limited to Universal Accessibility, Climate Control, Landscaping, Illumination, Orientation and Way Finding, Storm Water Management. The typical organization of street space is shown in Figure 19.

Fig. 19: Organization of space in street

Footpath ‘MR’ shall mean that part of the Road Right of Way (RoW) designated for movement of pedestrians alone. It includes the mandatory Pedestrian Zone, Multi-Utility Zone and Dead Width in front of the adjoining plot within the RoW. (Fig. 19)

Minimum Footpath widths

1. Retail frontage- 4.5m
2. Other frontage- 2.4m
3. Bare-minimum- 1.8m
4. Dead width- 1m
5. Multi Functional Zone (MFZ)-
   - without parking bays- 0.9m
   - with parking bays- 3m

Walking Space ‘MR’ shall mean a clear space of minimum 1.80 X 2.40 m (horizontally and vertically) within the footpath between dead width and MUZ zone (if any) exclusively for through pedestrian movement. (Fig. 19)

Based on abutting and adjoining land uses, standards for clear walking space are:

- Commercial/ Mixed Use - 2m
- Retail/ Shopping - 2.5m
- Bus Stop - 3 m
- High Intensity Commercial Areas - 4m

Material Palette

1. Heritage Areas - Natural Stone (Granite, cobble or Engineered stone replicating natural ones)
2. Modern buildings and other - Cobble stone in natural color and texture
3. Utility Areas- Cement Concrete Pavers
4. Tactile Paving (Natural Stone or of similar appearance) - sample size of tiles measuring 300 x 300 mm of 5 mm thickness

Surface material of space for walking shall be planer, free of undulations beyond 3-4 mm for natural stone finish. It shall be non-slippery, shot blasted, river-washed and rough polished where edge treatment is done up to standards.

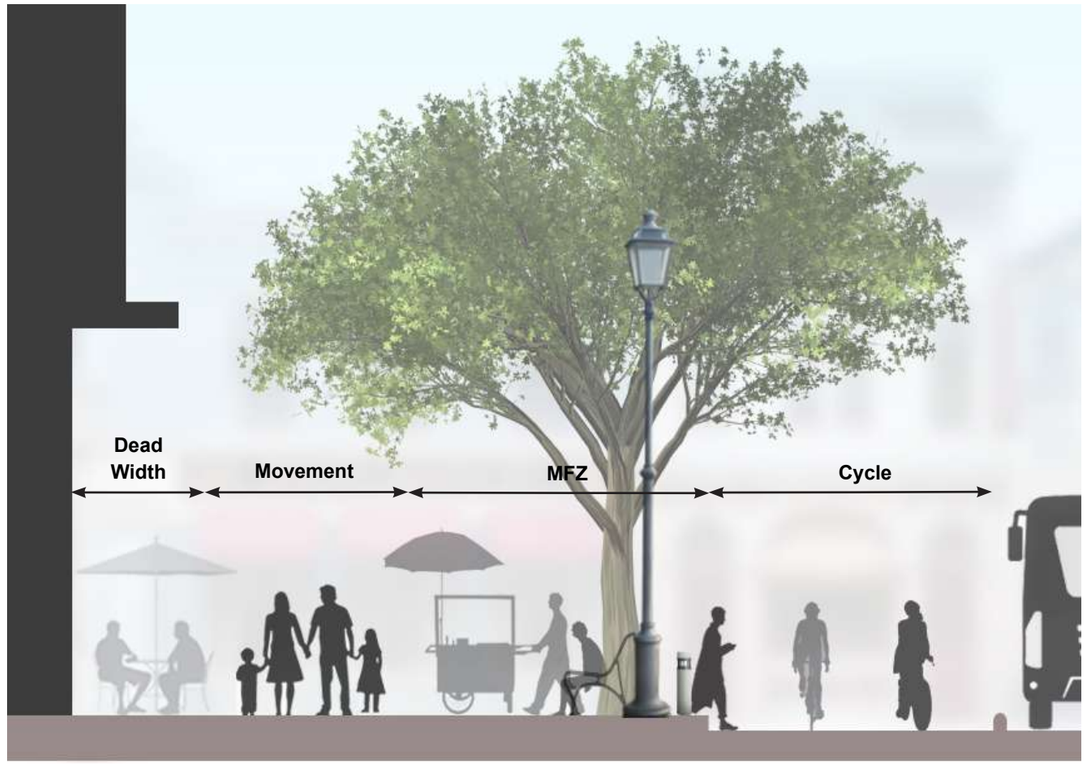


Fig. 20: Division of NMT Zone

Multi-Functional Zone (MFZ) / Multi Utility Zone (MUZ) / ‘MR’

Multi-Functional Zone (MFZ) shall mean the space within streets reserved for physical elements and infrastructure, like trees, storm water management systems, auto-rickshaw stands, cycle-rickshaw stands, hawking zones, paid car parking, street furniture, bus stops, traffic police booths, communication line feeder boxes, fire hydrants, junction boxes, street lights/ pedestrian lights etc.

MFZ is mandatory along all streets based on its type and character. It shall be designed after leaving atleast 1.8m of walking space. Any space in MFZ left after the street design, and along pedestrian zones, shall be constructed and maintained as a part of the Footpath. (Fig. 20)

Features of MFZ

- Bus Stops, IPT Stops
- On-street Parking
- Cycle Stand/ PBS station
- Street Furniture
- Vending Zones
- Landscape
- Underground Utilities
- Lighting
- Signage

MFZs of 2m or more width shall accommodate all features listed above. All utility ducts, and duct banks shall be allocated along with plantation. Shared parking for 2W and 4W shall be planned while designing MFZ.

Material Palette

Hard Pavers, bitumen, concrete to be used for MFZ. It shall have a dismantleable pavement or green cover for maintenance.

Explanation and Examples

Footpaths ensure smooth, comfortable, safe, obstruction-free and continuous walking zones.

Dead Width accommodates spillovers in shopping streets and allows facilitates unobstructed through movement in footpaths. (Fig. 20)

Fig. 21: Walkways with Multi-Functional / Multi-Utility Zone in Pune

MFZ accommodates multiple functions that prevent encroachments on pedestrian, NMV or carriageway space. MFZ with tree plantation provides shade and climatic comfort. Planting zone can double up as natural storm water catchments and filtration zones aiding in ground water recharge, preventing seasonal flooding and reducing pressure on piped storm water. (Fig. 20)

Fig. 22: Cycle Track along Ring Road in Delhi.

Dead Width 'MR' shall mean an extra space allocated at the frontage area of buildings, required in addition to the space designated within footpaths for movement of pedestrians alone. It measures a minimum of 1m width in shopping areas and 0.5m in others, where the footpath abuts buildings or fences. It shall be demarcated separately where doors, windows of abutting properties are opening. (Fig. 20)

Cycle Tracks 'MR' shall mean the space within Road RoW reserved for movement of Non Motorized Transport Vehicles and may be segregated or mixed with carriageway or footpaths. Cycle Tracks shall be planned as part of NMT Master Plans and conform with the IRC Codes. (Fig. 20)

Material Palette

The surface of cycle track should be of 100mm thick cement concrete, having 150mm PCC base and M40 grade concrete.
Colored asphalt or epoxy or other synthetic finish can be used and should be reapplied regularly as required (usually every 6 to 12 months as per performance monitoring).
Paver blocks shall not be used to lay cycle tracks.

Minimum Cycle Track widths and height

- One way Cycle Track - 2m
- Two way Cycle Track - 3m
- Additional lane - 1m
- Green Verge to separate cycle track from carriageway -1m
- Vertical Clearance - 2.25m

Carriageway 'MR' shall mean the space within Road RoW between edge of footpath/ kerb on one side to the edge on the other. It is usually provided for dedicated movement of all classes motorized vehicles and excludes the width of the footpath, MFZ, Green Verges and cycle tracks.

Width of the carriageway depends on three factors:

- Road classification
- Speed limit
- Travel lane (including PHPDT, traffic flow, public transport and NMT lanes etc.)

Minimum carriageway width

For slow speed local street:

- One way lane- 3m
- Two way lane- 4.5m
- Two way with bus and truck movement -Two lanes (total 6 to 6.5m)
- Collector Street - 3.5m per direction
- Arterial Road - Two to three lanes in one direction (total 6 to 8.5m)

Material Palette

- Carriageway shall be a plain surface (with longitudinal and transverse slopes) with traffic calming measures as per standard.
- As far as possible, utility services shall not be laid under carriageways but be included in MFZ or shoulder.
- Carriageways shall have lane markings as per IRC codes.
- Cobbled stone/ paver block surfaces can be used where utility services cross the carriageways or to ensure traffic calming at pedestrian crossings.
- For shared streets, the complete length of street, including the carriageway can be made in cobbled stone or paver blocks.

Junction ‘MR’

Junction shall mean the junction of two or more streets. (Fig. 23)

Design benchmarks

- Optimum distance between two junctions within high density areas should be 250-300m
- All junctions shall have barrier free crossing facility for pedestrians and cyclists with table tops or kerb ramps etc.
- All junctions and crossings shall be signalized.
- Roundabout can be planned in low density areas. In areas with high traffic volumes, roundabouts add to congestion.

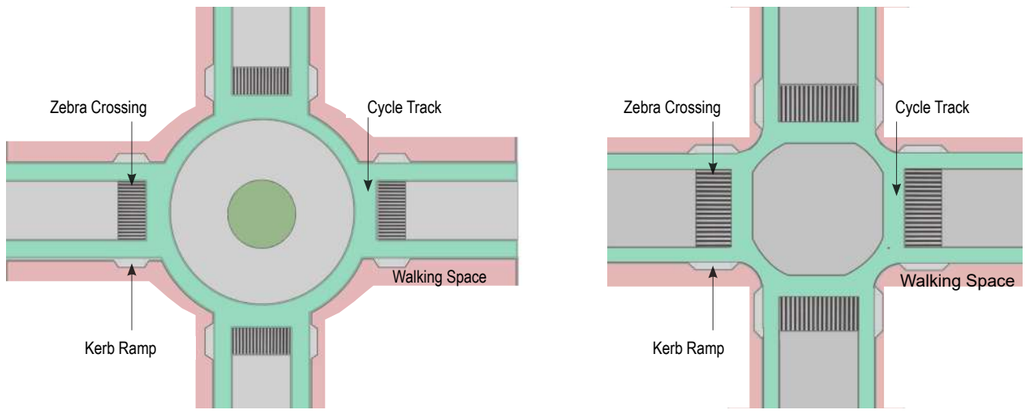


Fig. 23: Types of Junctions

Explanation and Examples

Density of junctions is a performance indicator to establish higher degree of accessibility and mobility. Areas with high junction density provide multiple options to connect with different areas through public transport, walking and cycling. Such areas are capable of handling high traffic volumes.

Regular signalized junctions reduce pedestrian and vehicle conflicts and are apt for high-footfall zones. (Fig. 24)

Roundabouts are only ideal for areas with very low pedestrian and cyclists footfall. (Fig. 25)

Fig. 24: Regular Junction, Pune

Fig. 25: Round-about Junction, Pune

Mid-Block Crossing ‘MR’

Mid-block crossing shall mean crossing for pedestrians and cyclists between two regular junctions. (Fig. 27)

Design benchmarks

- Mid-block crossings for pedestrians and cyclists to be provided at every 100-150 m.
- Traffic calming, traffic signals, median cuts, zebra crossings, kerb ramps/ tabletops, signage etc. as per the IRC codes to be provided at all mid-block crossings.

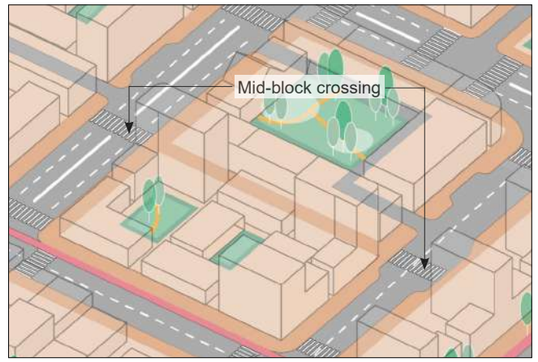


Fig. 26: Mid-Block crossings

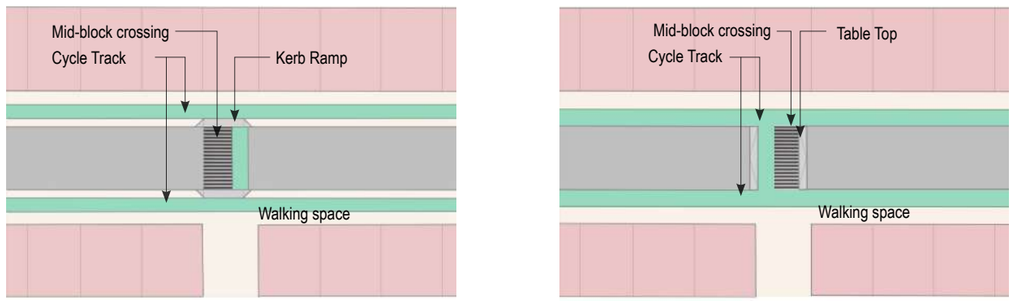


Fig. 27: Types of Mid-Block crossings

Explanation and Examples

Mid-Block Crossing shall be aligned with the Pedestrian Ways (PWs) through plots to enhance pedestrian connectivity, footfall, and therefore commercial value. Mid-Block Crossings are to be provided where Pedestrian Ways (PWs) do not join vehicular crossings. (Fig. 28)

Fig. 28: Mid-Block crossing, Pune

2.3 Waterfront Design Regulations

Application

- CBALP for outdoor spaces provide location and use of waterfronts.
- These regulations are for edges of water bodies like lakes, ponds, rivers, streams, sea side, ocean side, spring, wetland, waterfall, historic step well et al.
- Inputs and improvements suggested by plot owners may be incorporated within the ambit of regulations.

Types of Waterfronts

For applications of these regulations, waterfronts may be categorized as:

Natural Waterfronts:
- Natural edges of natural water bodies
- Man- made edges of natural water bodies

Man-Made Waterfronts:
- Natural edges of man-made water bodies
- Man- made edges of man-made water bodies

Components

- Design Response
  - Man-Made edge
  - Natural edge
  - Street/ walkway
- Permissible Activities
  - Environment mitigation
  - Active Recreation
  - Transportation

Fig. 29: Heritage River bank along River Yamuna, Vrindavan

Natural Waterfront 'MR(H)'

Definition

Natural Waterfront shall mean the edge of a River, Stream, Lake, Sea, Ocean, Spring (Aquifer inlets), Waterfalls or Wetland, that were historically present in its natural state and (may) have transformed over time due to surrounding development.

Natural Waterfronts are of two types

1. With Natural Edge
2. With Man-Made edge

Permissible Activities within Natural Waterfronts

Activities that do not adversely affect the waterfront's ecosystem are as follows:

- Water transport
- Non-polluting recreation and social functions (on edge and in it)
- Viewing deck/ ghats
- Floating gardens

Design Response for Natural edges

- Preserve the natural edges and flood plains.
- Prioritize Nature based solutions.
- Adopt sponge-city approach.

Common Design Response for Natural and Man-Made edges

- Introduce activities that do not pollute water system or its biodiversity.
- Allow non-polluting spillover of abutting and adjoining properties without obstructing public access.
- Except under unavoidable circumstances, waterfronts shall be barrier free and allow public access.

Design Response for Street/ Walkway along waterfronts

- These are essential to provide access.
- Preferred widths are-
  - 6m minimum - Only for movement
  - 12m minimum - Movement and recreation

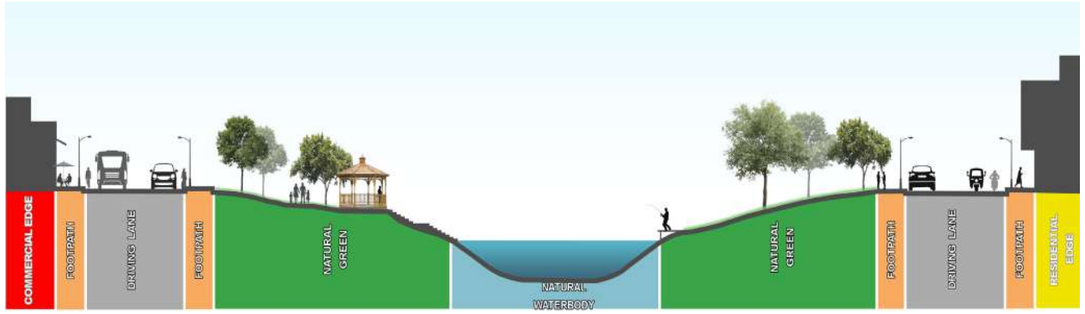


Fig 30:Typical section across Natural Waterfront with Natural Edge

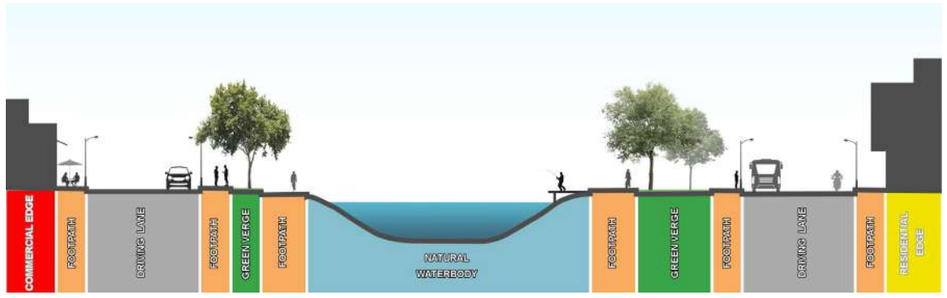


Fig 31:Typical section across Natural Waterfront with Man-Made Edge

Explanation and Examples

Natural Waterfronts with Natural Edge shall be preserved and be accessible to public. The natural edge act as a sponge for water recharge and flood mitigation. (Fig. 32)

Fig. 32: Natural Waterfront with Natural Edge, Pune

Natural Waterfronts with Man-Made Edge shall be preserved and be maintained active by allowing public activities. The type of activities could be planned as per the character and feasibility of the surrounding land use(s). (Fig. 33)

Fig. 33: Natural Waterfront with Man-Made Edge, Srinagar

Man-Made Waterfront

Definition

Man-made Water bodies shall mean those constructed water features for recreation activities, as a part of remediation (constructed wetlands, sponges), transportation (canals) etc. Edges of such water bodies may or may not have natural beds, etc. and changes to these can be done as per local Bye-Laws. Lakes, canals, fountains, swimming pools etc. are types of man-made water bodies.

Man-Made Waterfronts are of two types

1. Natural edge of man-made water body
2. Man-Made edge of man-made water body

Permissible Activities within Man-Made Waterfronts

Permitted uses that promote activities and improve the quality of life in the surroundings include:

- Water Transport
- Non-polluting Recreation and social functions (on edge and in it)
- Viewing deck
- Floating Gardens

Design Response for Natural edges only

- Preserve natural edges and flood plains.
- Adopt sponge city approach.

Common Design Response for Natural and Man-Made edges

- Introduce non-polluting activities.
- Except under unavoidable circumstances, Waterfronts shall be barrier free and allow public access.
- Allow non-polluting spillover of abutting and adjoining properties without obstructing public access.
- Used for inducing micro-climatic comfort in the vicinity.
- Fountains and aquatic species to be added to still waterbodies to maintain water quality.

Design Response for Street/ walkway along waterfronts

- Streets and walkways along waterfront are essential to provide access.
- Preferred walkway widths are-
  - 6m minimum - Only for movement
  - 12m minimum - Movement and recreation

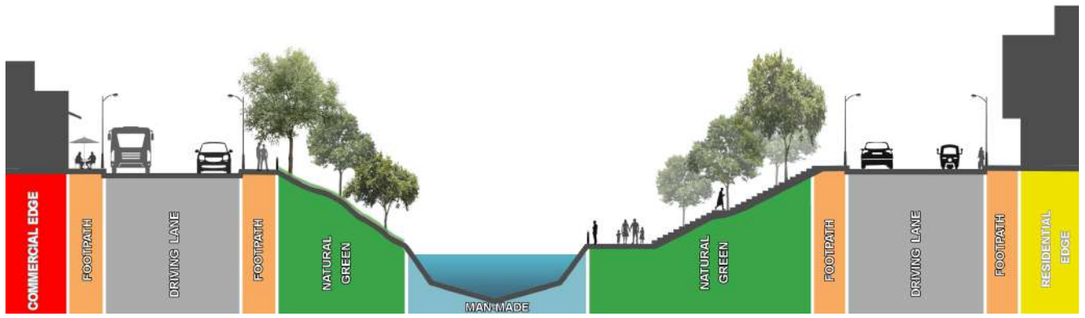


Fig. 34: Typical section across Man-Made Water body with Natural Edge

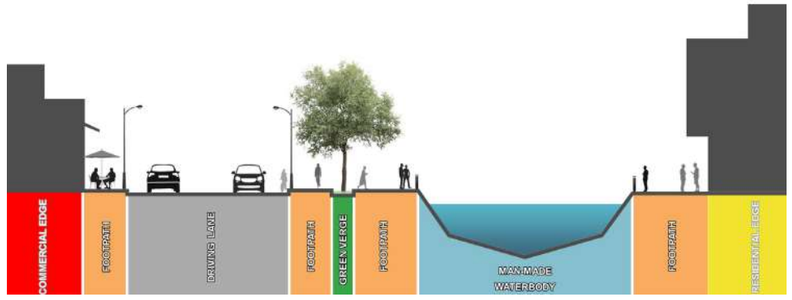


Fig. 35: Typical section across Man-Made Water body with Man-Made Edge

Explanation and Examples

Man-Made Water bodies with Natural Edge shall be accessible to public, be barrier free while maintaining its character, biodiversity and sustainability. Its use for micro-climatic comfort, water filtration (through artificial wetlands) etc. is recommended. (Fig. 36)

Fig. 36: Man-Made Waterfront with Natural Edge, Sukhna Lake, Chandigarh

Man-Made Waterfronts with Man-Made Edge shall be active and accessible to public, barrier free, while retaining its character, function and sustainability. It may also be designed with local climatological measures to reduce heat island effect by maintaining natural micro-climatic condition. (Fig. 37)

Fig. 37: Man-Made Waterfront with Man-Made Edge, Kochi Backwaters, Kerala

Fig. 38: Play area on the terrace of a school in Pune

Fig. 39: Leh Main Market pedestrianized street Plaza

2.4 Green and Recreational Areas

The CBALP for outdoor spaces provide the location and use (tentative) of open spaces and green areas.

These regulations are for natural and man-made green areas like Urban Forests, Reserves, Playgrounds, Multi-use greens, tot-lots etc.

Inputs and suggestions from plot owners may be incorporated into CBALP within the ambit of regulations.

For applications of these regulations, Green Areas are classified into:

- **Natural Greens** like Urban Forests and Reserves.
- **Man-made Green and recreational areas** like Sports Facilities, Multi- activity Greens, Recreational Greens, Greens for community use, tot-lots and children's park, garden, jogger's park, plazas et al.
- Within dense areas, plot owners may provide **public open spaces/ green areas within private plots** to fulfill requirements of public space/ public realm for various users. Such spaces could be green or paved; at ground, within floors or at terrace level.

Components

- Design Response
  - Natural greens
  - Man-Made Greens
  - Public open spaces within plots
- Permissible Activities
  - Environment mitigation
  - Active Recreation
  - Transportation

Customizations needed for Dense Areas

- Pedestrianized streets can also function as plazas.
- Building's ground floor and terraces may be allowed as public open spaces in lieu of FSI/ TDR incentives.

Natural Green ‘OR’

Definition

Natural Green spaces are defined as land, and natural features including wetlands that are mostly undeveloped with limited or no maintenance, that may have vegetation and wildlife. The primary function of natural green spaces is to promote biodiversity and nature conservation, besides environmental education and awareness.

Ex: Reserve Forest, Wetland, Meadow, Flood plains, etc.

Design Response

- Preserve natural character of green areas.
- Design its edges to ensure its preservation.
- Manage cultural landscape as traditional settlements and communities dependent on natural greens.

Permissible activities

- Allow public access without compromising need for preservation of ecosystem.
- Encourage walks and activities within the natural greens to sensitize people.
- Allow only controlled tourism.

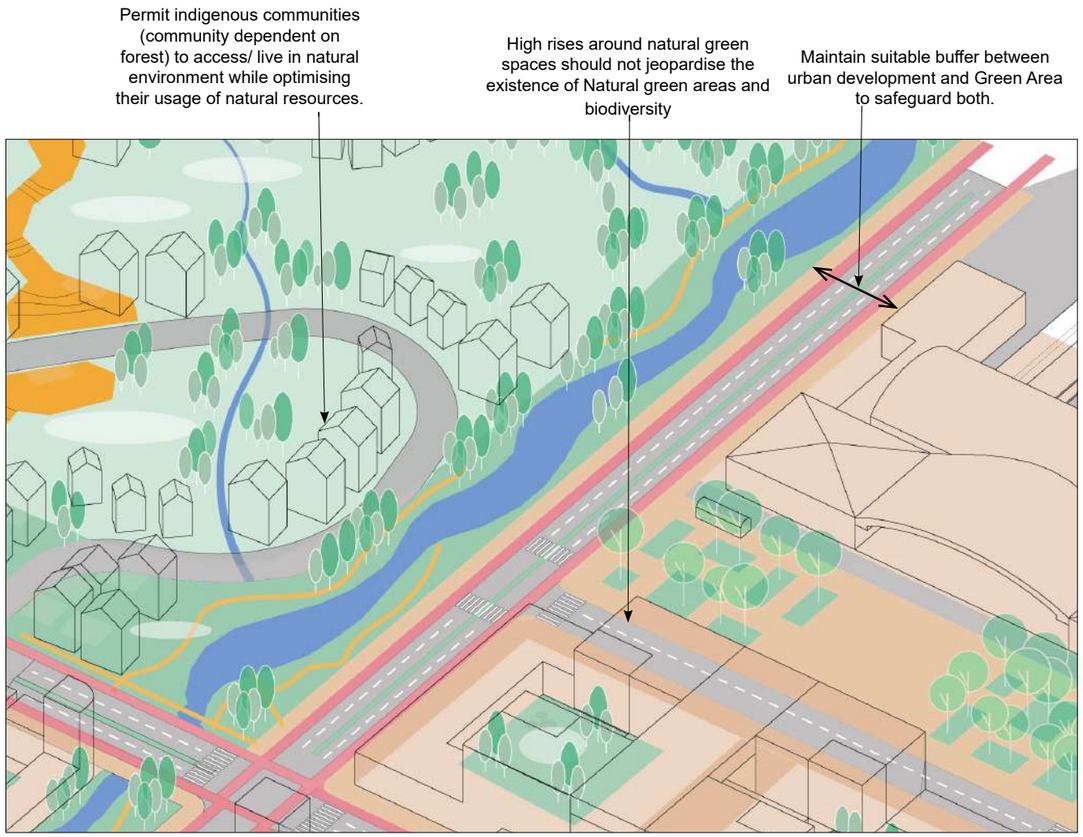


Fig. 40: Provisions for Natural Green

Man-Made Greens ‘OR’

Definition

Man-Made Green shall mean such space with more than 75% of its land developed artificially and maintained as grass-bed, garden, playground with grass-bed, natural earth etc. or its combinations. It may also include pavement, waterfronts and parking space etc. and be classified as per local Master/ Development Plan/ URDPFI Guidelines.

Example: Sports facilities, Multi-Activity, Recreation, Assembly/Community, Tot-Lots and Children's Park, Gardens, Jogger's Park, etc.

Man-Made public spaces which provide opportunity for active recreation vending etc. similar to green spaces yet have more than 50% of its land development as pavement will be referred as Plazas. Except for rain water recharge, and bio-swales all other design responses applicable for Man-Made Greens shall apply to Plazas too.

Design Response

- It shall comply with standard design criteria of applicable legal documents.
- All Green and Recreational areas shall be barrier free and without boundary walls.
- Plants may be used for ensuring safety.
- Such greens can be used for rain water recharge. (Not Applicable to Plazas)
- Bio-swales could be planned in these. (Not Applicable to Plazas)
- Green TDR may be used to incentivize reclaiming such green spaces.

Permissible activities

- Diverse activities should be encouraged; from festivals, weekly markets, community functions, plays to recreations.
- Spaces for revenue generation, like vending spaces near entry/ exit to be planned. Alternatively mechanism of revenue sharing be devised for partaking in management of the space.
- The primary function of public recreation shall not be impeded if the same space is used for public utility services.

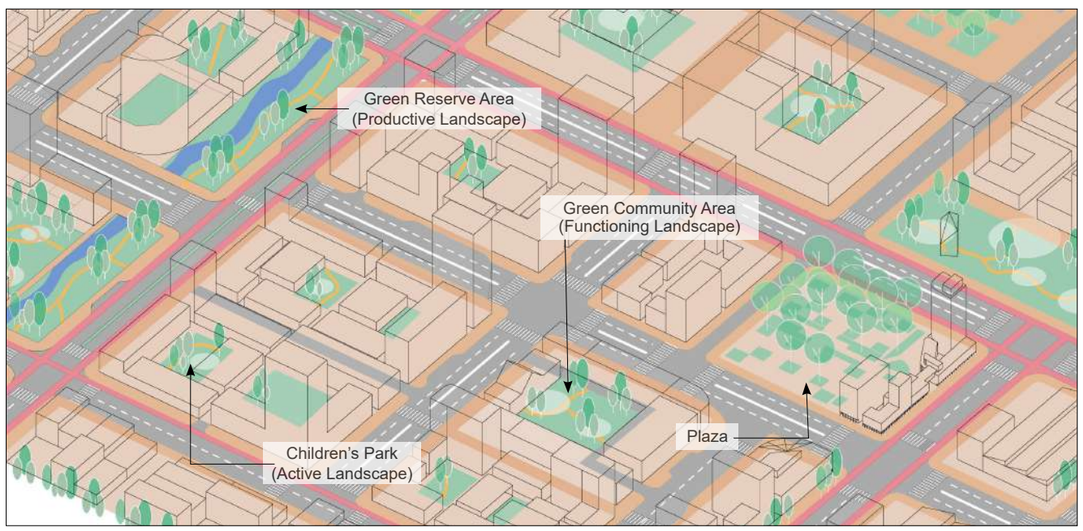


Fig. 41: Green area samples

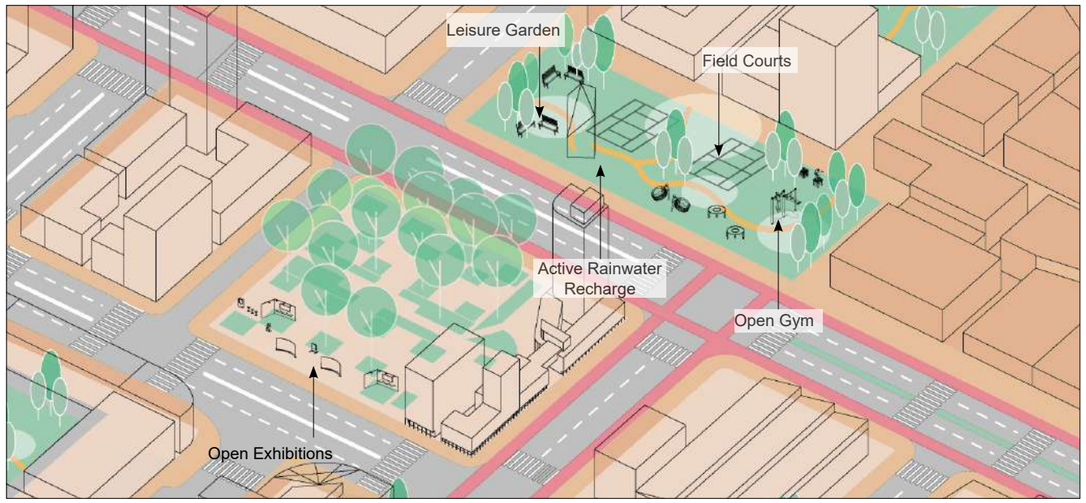


Fig. 42: Samples of Man-Made Green Spaces

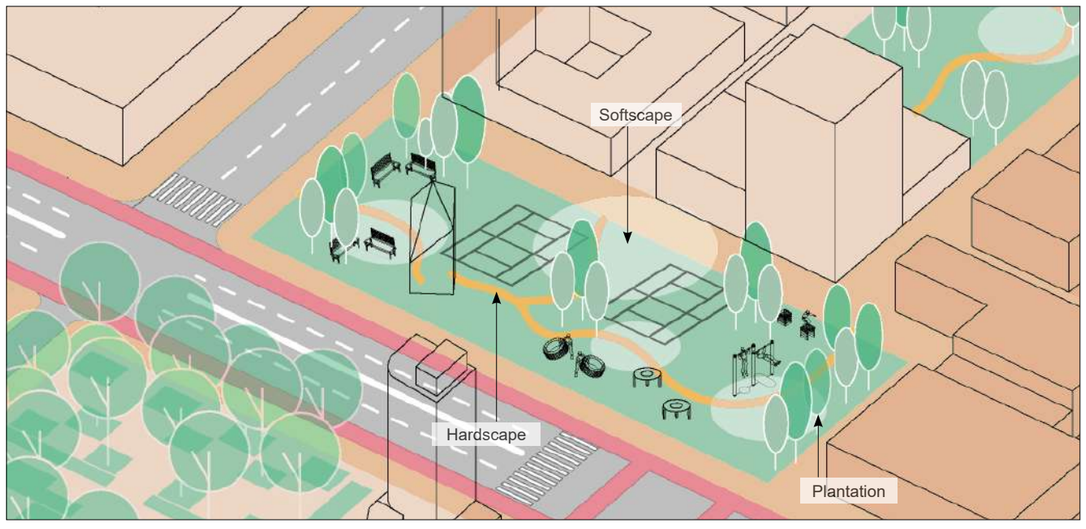


Fig. 43: Treatment (softscape and hardscape) of Man-Made Green Space

Explanation and Examples

Common areas like Green spaces, parks, plazas etc. are recreational spaces that promote high quality of life in urban environment. Open Green Areas improve the vitality of the area, and contributes to improved health significantly. (Fig. 44)

Fig. 44: Central Park, Connaught Place, Delhi

Amenities such as seating, lighting, public facilities etc. impart a sense of sociability and enhances the quality of life within the surrounding areas. (Fig. 45)

Fig. 45: Tot-Lot, Ghaziabad

Public Space within Plot 'OR'

Definition

Public Space within Plot is defined as open space, either at ground or at a suitable level, maintained barrier free and accessible 24X7. While it is essential in dense areas, it can also be provided in greenfield ones to encourage creativity in design. Parks, plazas or public terraces are examples of such spaces.

Study of traditional Indian settlements show *otlahs, chowks, chabootras*, etc. have been traditionally provided as public spaces within plots or along plot-street interface.

Public terrace within plot is a part of a constructed floor of a building that is open to sky and accessible to public 24X7. Such spaces can be encouraged in high density areas or where it is difficult to reclaim land to provide green spaces or plazas.

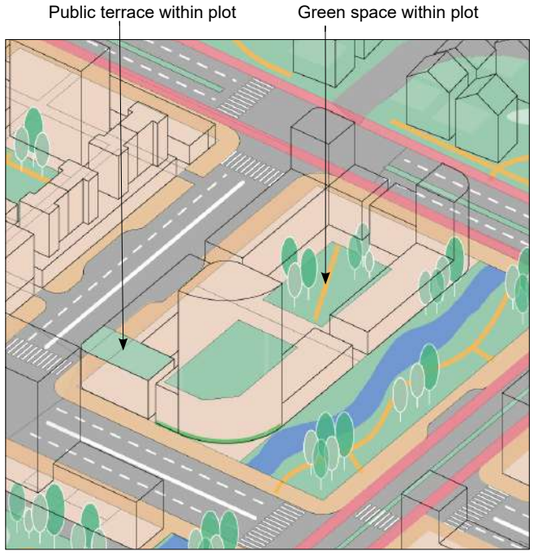


Fig. 46: Sample of green space and public terrace within plot

Design Response

- Shall comply with standard design criteria established in applicable documents.
- All public Green spaces, Plazas and Terraces within Plots shall be barrier free and without boundary walls.
- Fences/ handrail/ plantation can be used to ensure safety.
- Green TDR may be used in reclaiming space in dense areas.

Permissible Activities

- It should allow non-polluting public activities that are safe for users.
- It may have vending stalls/ shops around it.

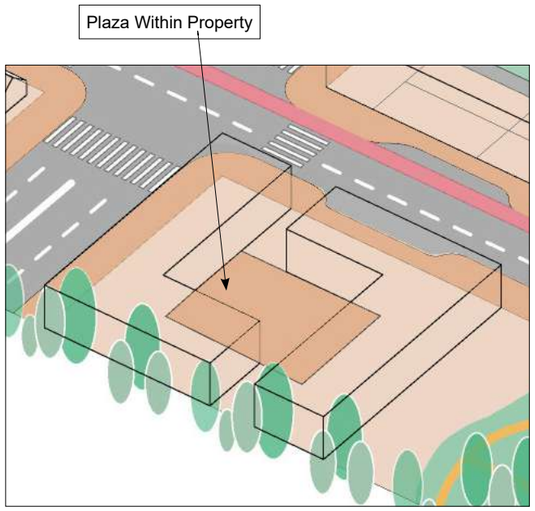


Fig. 47: Sample of plaza within plots

Explanation and Examples

Chabootra is at an extension of plinth on the exterior surface of a building that is a socially accepted space for public to sit or rest. (Fig. 48)

Fig. 48: Chabootra outside buildings, Bohra Wad, Sidhpur
Source: Gujarat Tourism

Green space within plots have been a part of traditional Havelis and now also included in housing complexes, commercial developments, (malls and shopping complexes) etc. (Fig. 49)

Fig. 49: Green space within plot, Rajbari, Kolkata
Source: Kolkata Tourism

Plazas are common in office complexes and can be a value addition to residential complexes too. (Fig. 50)

Fig. 50: Common areas, Public Plaza, Vatika Business Park, Gurugram
Source: Studio u+a

Public terrace within plot are being used as food courts in shopping malls and can be a value addition to residential complexes. (Fig. 51)

Fig. 51: Public Terrace within Plot, City Center Mall, Salt Lake, Kolkata
Source: Charles Chorea Foundation

03 Plot / Building Regulations

This chapter details out regulations applicable to plots and buildings.

Fig. 52: Plots/ Buildings along Street in Gangtok

Fig. 53: Plots/ Buildings along Plaza in Gangtok

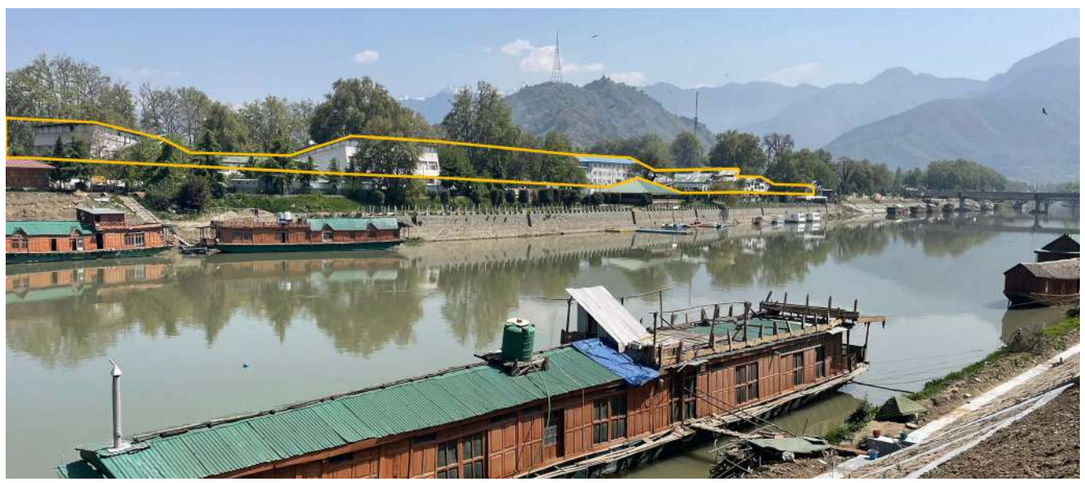


Fig. 54: Plots/Buildings along Water body in Srinagar

3.1 Intent

Plot and Building regulations are intended to regulate development of a cluster of plots to create a coherent urban character while enhancing its functionality. It would encourage the co-creation of elements of urban form which are shared between plots and ensure seamless connectivity and distribution of utility services. By regulating these parameters, the gross value of the area increases and reflects as enhanced value of individual plots. Such regulations also encourage design innovation by architects and engineers further boosting gross value and its trickle-down effect.

The design of buildings in plots contributes to the quality of Urban Environment through the following design components -

a. Pedestrian and Vehicular Ways through plots and buildings
b. Marker Elements
c. Buildable Envelope
d. Super Structure and Underground Structure
e. Permitted projections outside Buildable Envelope
f. Prohibited and Regulated areas of protected monuments
g. View Corridor and Vision Cone

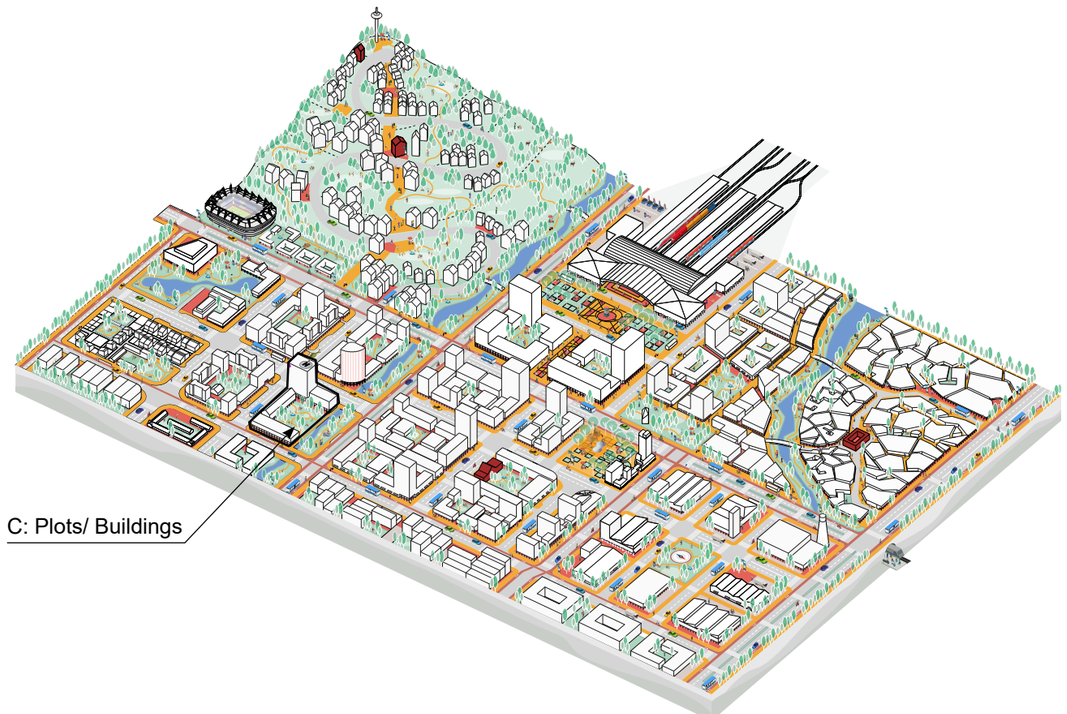


Fig. 55: Plots/ Buildings

3.2 Types of Plot / Building Regulations

Pedestrian Way (PW) 'OR'

Pedestrian Way (PW) shall refer to any Public Passage through a private plot and shall be demarcated in the CBALP. PW can have permanent roof or building for climatic proofing and shall provide a common barrier-free movement. (Fig. 56)

Minimum clear height and width of a PW, inclusive of structural elements and encumbrances shall be 4m and 4.5m respectively. (Fig. 57)

The PW shall align with the pedestrian movement paths outside the plots providing a continuous network demarcated in the CBA Plan. All PWs shall and preferably be lined with Active Frontages and Mid-Block crossings. (Fig. 58)

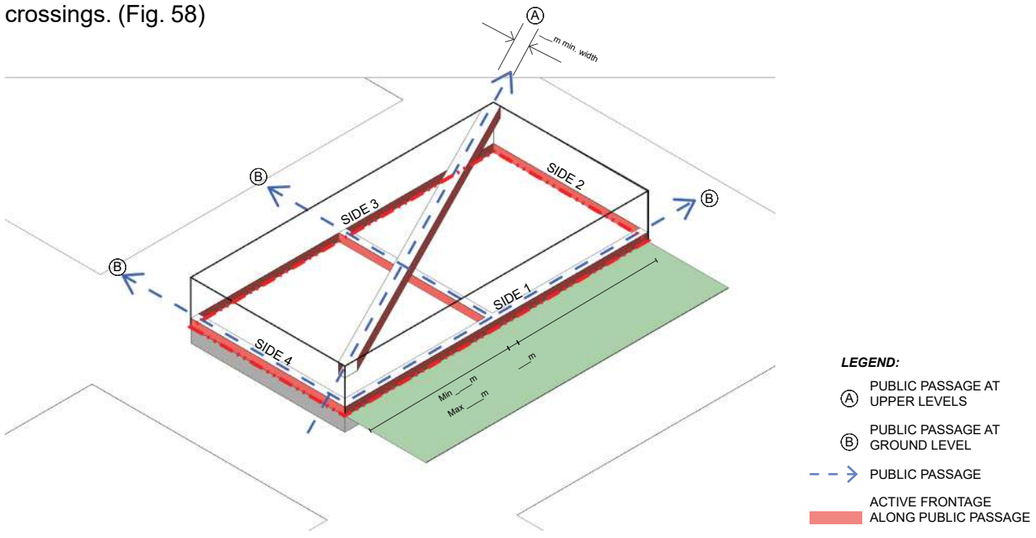


Fig. 56: Pedestrian Way (PW) through Plot/ Building

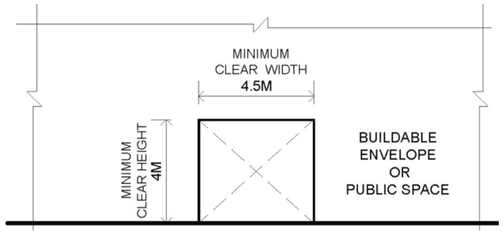


Fig. 57: Typical cross-section of a Pedestrian Way (PW) through Plot/ Building

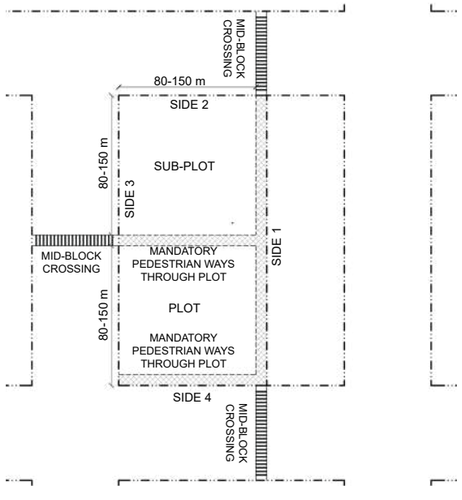


Fig. 58: Pedestrian Way (PW) through Plot/ Building shall align with Mid-Block Crossings

Explanation and Examples

Pedestrian Way ensures increased walkability that reinforces safety and health. Besides providing amenities at hand, PW protects pedestrians against accidents and pollution, along with providing shortest access across the CBA. These benefits boost economic vitality of the area and brings social benefits.

PWs along with Active Frontages increase property values by providing vibrant environment and become recreational spaces. (Fig. 59)

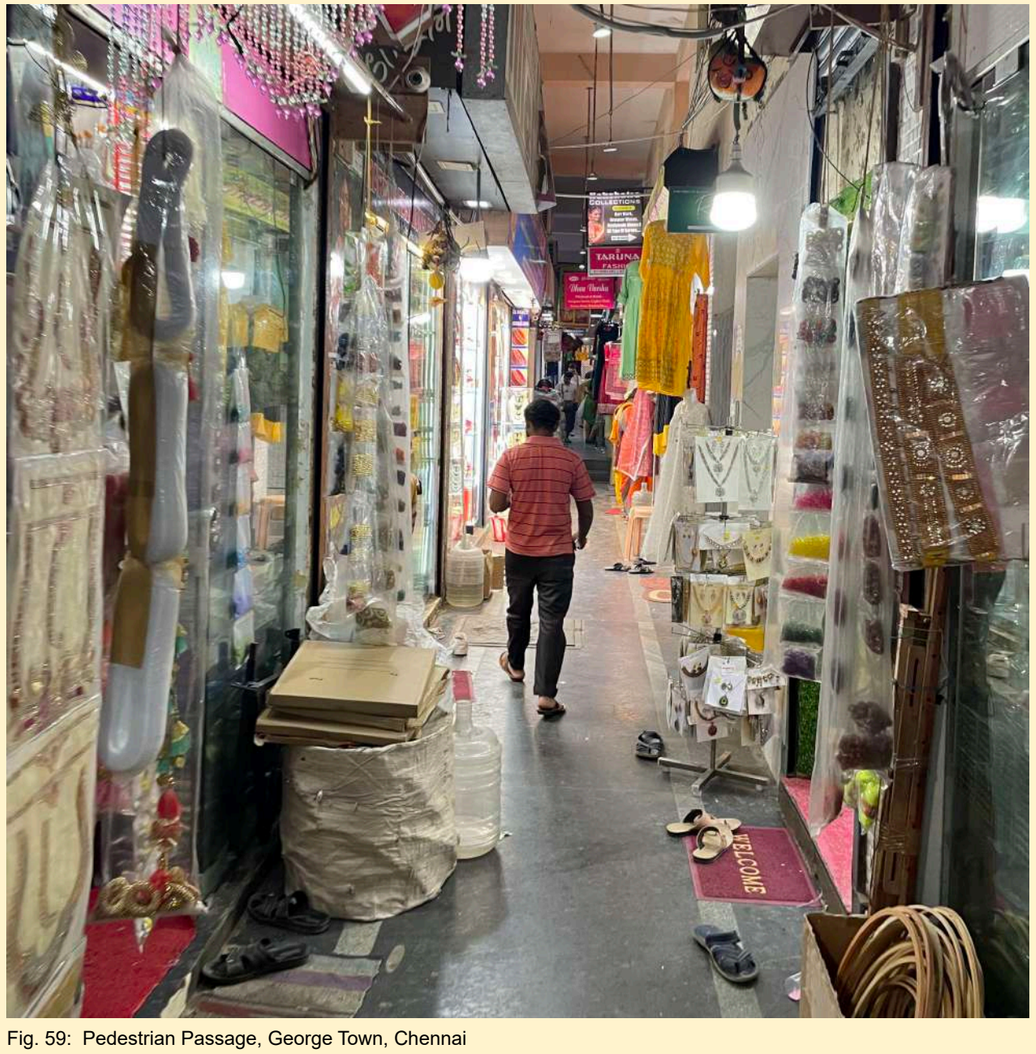


Fig. 59: Pedestrian Passage, George Town, Chennai

Pedestrian Colonnade (PC)

Where Pedestrian Way touches the Build-To-Line of a plot, and requires climate controlled pedestrian zone, Colonnades shall be made mandatory. Such a Pedestrian Way may also be referred to as a **Pedestrian Colonnade**. (Fig. 60)

Provision of mandatory Pedestrian Colonnades shall depend on the climatic condition of the region where CBA is located and the orientation of the plot.
For example, plot edges facing the southern and western sun in hot and humid regions should be provided with mandatory Pedestrian Colonnades.

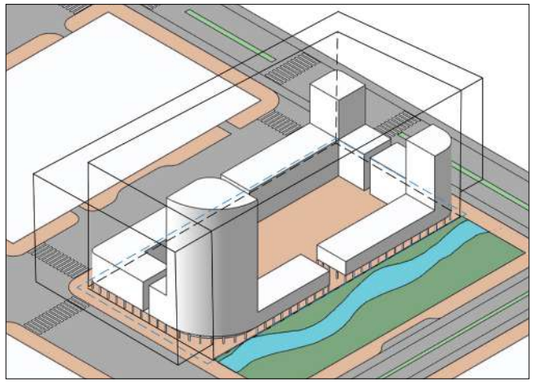


Fig. 60: Typical Pedestrian Colonnade along edge of a Plot

Explanation and Examples

Pedestrian Way along the edge of Plots shall be treated as Pedestrian Colonnade to provide Active Frontage with climate control for passage and comfort of pedestrians. (Fig. 61)

Cities like Delhi, Mumbai, Kolkata, Gurugram etc. show that building frontages with Colonnades, along predominant pedestrian movement corridors, have higher commercial rates.

Fig. 61: Pedestrian Colonnade, D. N. Road, Mumbai

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Vehicular Way (VW) ‘OR’

Vehicular Way (VW) shall refer to any mandatory multi-modal Right of Way (RoW) required through any Plot/ Building, and be demarcated in the CBALP. (Fig. 62)

VW may have a permanent roof or building above it and shall be a common access to provide free movement of emergency vehicles. Minimum clear height and width of the VW, exclusive of structural elements and encumbrances, shall be 5.5m and 6m respectively. (Fig. 63)

The VW shall align with junctions and road networks outside the Plots/ Buildings to maintain continuity and preferably be lined with Active Frontages.(Fig. 64)

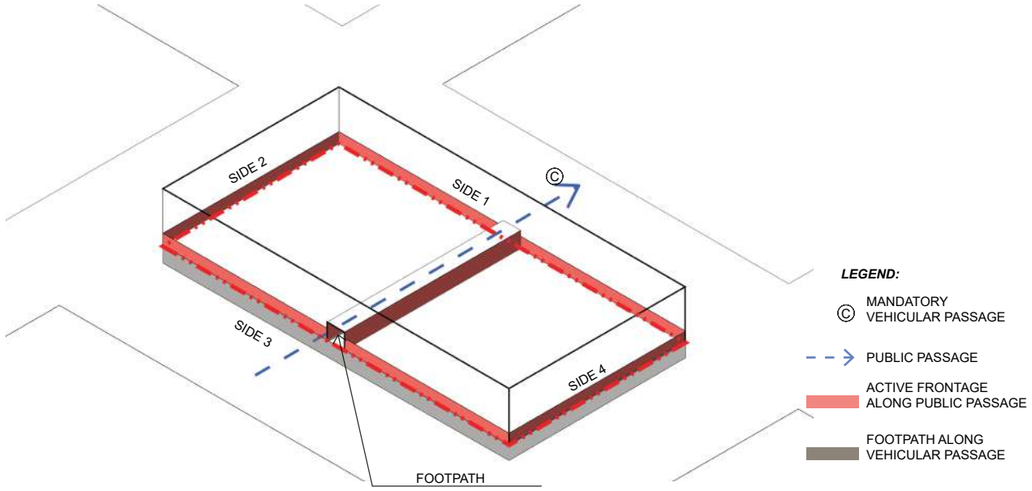

Fig. 62: Vehicular Way (VW) through a Plot/ Building

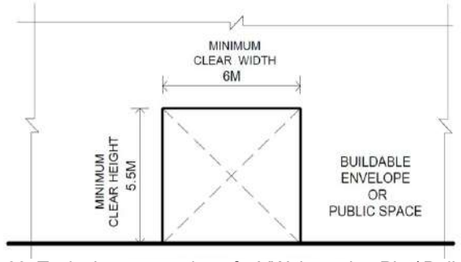

Fig. 63: Typical cross-section of a VW through a Plot/ Building

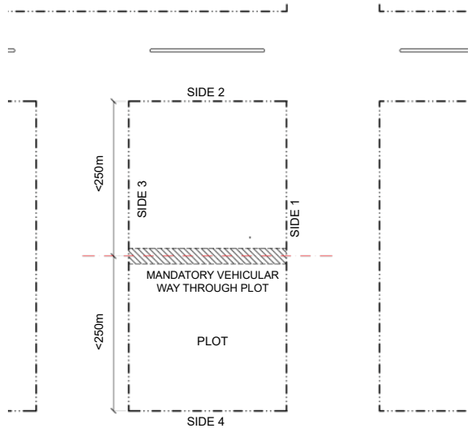

Fig. 64: VW through Plot

Explanation and Examples

Vehicular Ways (VW) at regular intervals increase the effective carrying capacity of the transport network. In cases, where plot/ building size is larger than the maximum distance between two vehicular ways, a **VW** through Plots/ Buildings shall be provided by the owner/ developer of the Plot/ Building. (Fig. 65)

While the owner/ developer is required to provide and maintain the VW as a barrier free public passage, the space above and below it can be designed and developed as per site requirements. (Fig. 65)

The provision of VW shall increase access and visibility of the frontage and benefit the owner/ developer and the end users. (Fig. 65)

Fig. 65: Vehicular Way, Pune

Marker Element (ME) 'MR'

Marker Element is a distinct, prominent architectural feature, distinguishable by the virtue of its height, aesthetic treatment (material/ colour/ design/ illumination), location, frames, or its anchoring of a view corridor or a combination of these design parameters (Fig. 66).

Such elements could also include a monument, landscaped area, signage, locational/ directional light, etc that have captured public interest and adds to collective experience (Fig. 66)

The width, height and location of the element need to be suitably adjusted to a view cone of 15°, depending on the specified viewing distance of the **ME**. As such marker elements are designed to be visible from a distance and orient movement towards it or a facility or service.

ME generates interest, enhances footfall, and hence the commercial potential, by offering a visual contrast to the general urban form.

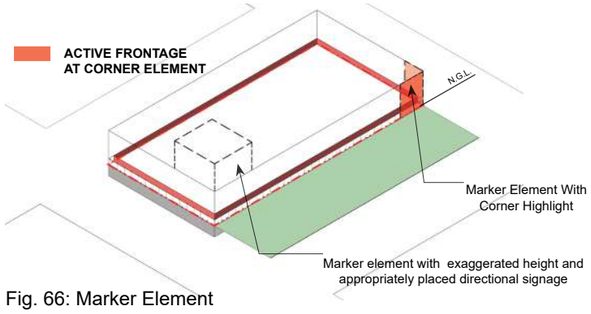

Fig. 66: Marker Element

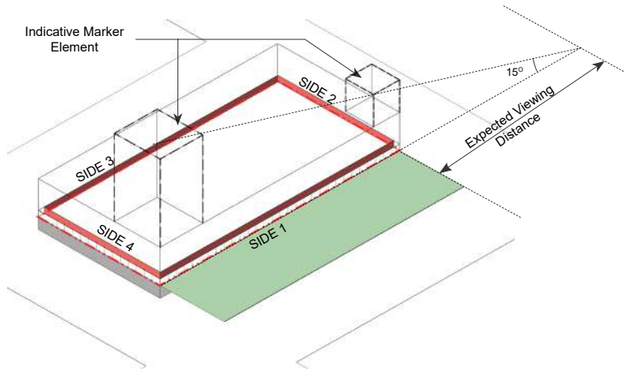

Fig. 67: View cone of Marker Element

Buildable Envelope (BE) 'MR'

Buildable Envelope (BE) defines a three-dimensional space within which any structure is permitted to be built on a plot. Such a space, excluding permitted projections, is defined by one or a combination of the following (Fig. 68):

- The vertical planes binding the BTL of all edges of a plot (part of super structure).
- The horizontal planes offset at the permissible height above normal ground level, and stacked on one above the other (part of Super Structure).
- The permissible depth of underground structure below normal ground level of a plot (part of Underground Structure).

BE simplifies the application of Development Control Norms specifying the effective envelope within which building construction is permitted. This envelope shall be graphically depicted in the Property Development Card (PDC) which streamline the application of building Bye-Laws.

All buildings shall be constructed within BE.

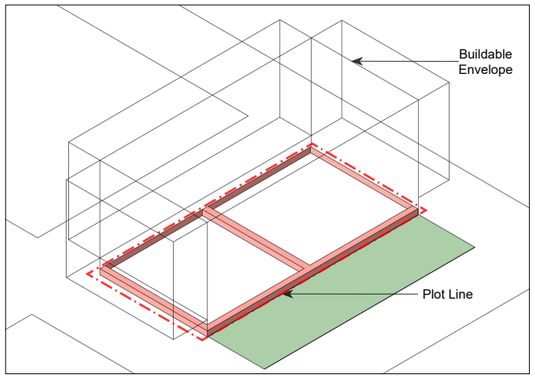

Fig. 68: Buildable Envelope on plot

Super Structure

Super Structure shall mean all permanent constructions above Plinth Level. (Fig. 69)

Underground Structure

Underground Structure shall mean all constructions below Plinth Level. (Fig. 69)

Principally, maximum utilization of land, on ground surface, in air-rights and below ground surface shall be encouraged, subject to adherence to all safety compliance, and within infrastructure capacity in order to ensure-

- Optimum 'Land Value Capture'
- Minimum wastage of land and city resources
- Encourage architectural design innovation

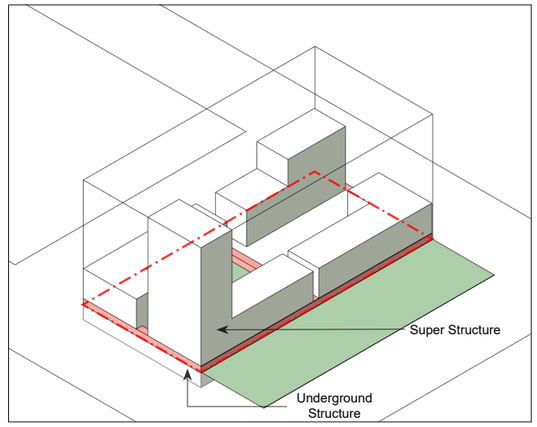

Fig. 69: Super Structure and Underground Structure

Permitted Projection 'OR'

Permitted Projections are chargeable BUA projecting beyond the BTL of a plot, constructed solely for the purpose of connecting the construction within plot with abutting or adjoining constructions and/or common areas.

It shall be subjected to necessary clearances over the adjoining Public Open Space, have prior Fire Clearance, and No Objection Certificate from the owners of adjoining plots. (Fig. 70)

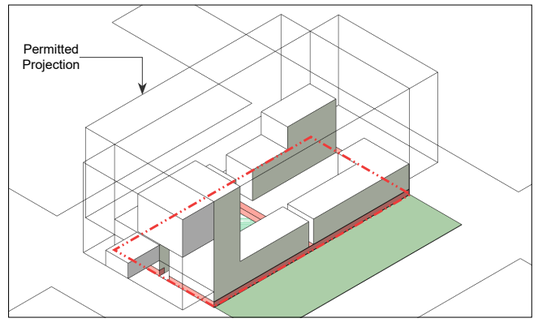

Fig. 70: Permitted Projection over the adjoining Public Open Space

Explanation and Examples

Permitted Projections would allow plot developers/ lessees to connect buildings and parts, across a Public road RoW. This would enhance connectivity, usability and architectural innovation within plots, while ensuring safety, comfort and enhanced performance. (Fig. 71)

Fig. 71: Permitted Projections, Connection above RoW, Indore

3.3 Additional Plot/ Building Design Codes for Heritage Areas

Prohibited Area (PA) 'MR(H)'

Prohibited area is an area around a heritage monument or within a heritage precinct, which is protected by mandated agencies subject to development controls. Construction, retrofitting and repairs in this zone can be allowed as per applicable norms of mandated agencies like National Monument Authority.

Regulations

- Limited addition, beyond permitted maintenance, repair and management of existing structures, infrastructure, public facilities, amenity and services may be undertaken subject to relevant permits.
- Introduction of critical infrastructure with view of facilitating public life and safety can be implemented subject to sector specific studies and relevant permits.
- Changes in BE and BTL that impact the visual and functional quality of the historic precinct shall not be permitted.
- Adaptive Reuse shall be allowed without changing the facade, BE, BTL, pollution and traffic levels within the prohibited area.
- Land Use changes shall be allowed such that the resultant traffic volume and pollution (because of its operation) does not burden the existing condition of roads, air, water and noise in the precinct.
- Public functions shall be allowed within the prohibited area.

Regulated Area (RA) 'MR(H)'

Regulated area is an area beyond Prohibited area and within the view cone of the heritage structure or precinct. Here new construction following responsive architectural language may be permitted. (Fig. 72)

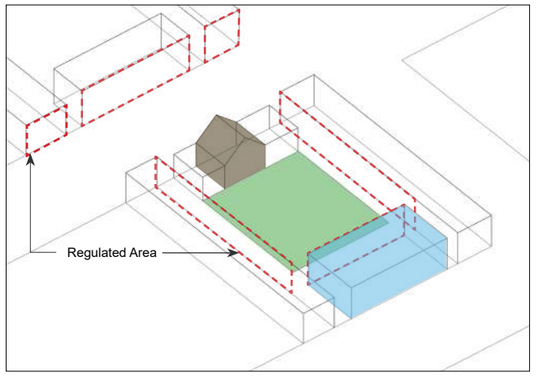

Fig. 72: Regulated Area around Heritage Asset

Regulations

- In **Regulated area,** Land Use Changes subject to retention of original street network, historic features and physical infrastructure may be permitted.
- No development that leads to pollution and disproportionately increases traffic, or threaten or undermine the historic asset, shall be permitted.
- New construction, whether through infill, extension or redevelopment or landscaping shall not block the vision cone, view corridor or access of sunlight of the monument or historic building.
- Connections above RoW shall not hinder the View Corridor.

View Corridor 'OR'

View Corridor shall mean the visual axis or passage from which the heritage structure shall be viewed without any obstruction. The alignment of the View Corridor is non-negotiable. (Fig. 73)

In case of redevelopment of the heritage precinct, View Corridor shall be retained, improved or recreated.

View Corridor will enable users to appreciate monuments, heritage buildings and features from a distance within the 'Heritage Precincts'. Such corridors can connect important landmarks, and/or contain commercial thoroughfare.

Such View Corridors are a value addition for plots and may benefit plot owners/ developers along it.

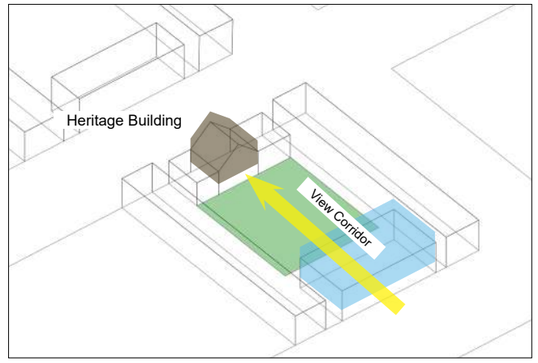

Fig. 73: View Corridor for plots in vicinity of Heritage Assets

Vision Cone 'OR'

Vision Cone shall mean the Zone in relation to a heritage structure which is required to be maintained as an open foreground. Vision Cone is non-negotiable for heritage precincts. (Fig.74)

Land area bound by the Vision Cone, Prohibited Area and Plot Boundary of the Heritage Asset shall be treated as the Regulated Area.

In case of redevelopment of the heritage precinct, Vision Cone shall be retained, improved or recreated.

Protecting the Vision Cone enables all visitors to be able to see the frontage (facade) and enjoy the Public Space.

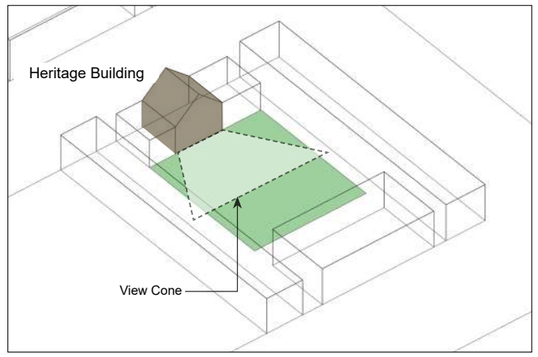

Fig. 74: Vision Cone for Sub Plots in the vicinity of Heritage Assets

04 Interface Regulations

This chapter details the components of interface regulations.

Fig. 75: Interface along street in Gangtok

Fig. 76: Interface along Plaza in Gangtok

Fig. 77: Interface along Water body in Srinagar

4.1 Intent

Private plots meet Public Spaces at an “Interface”.

As per Building Bye-Laws, interfaces in cities are conventionally designed as boundary walls. Such interfaces are inactive, unsafe and undermine the quality of outdoor spaces, Urban Environment and value of private plot.

Active frontage, space for pedestrian movement etc. evident in traditional settlements, respond to local needs and have enhanced the quality of outdoor environment and value of private plot.

Regulations for interface of plots with open spaces intends to-

- Determine the quality of Urban Environment through Interface design
- Make safe Urban Environment by removing boundary walls and reducing distance between adjacent development through active frontage.
- Enhance quality of life and increases asset values by increasing length of Active Frontage in the form of public fascia of office or residences, like living/ dining/ kitchen overlooking public spaces.

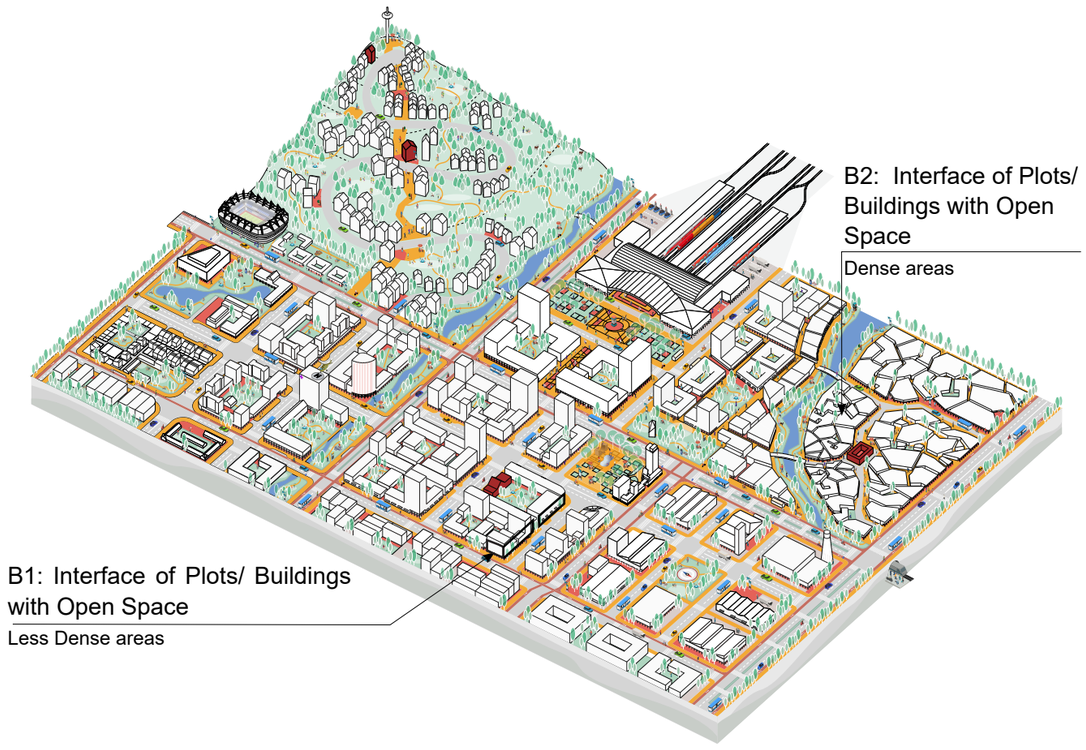

Fig. 78: Interface of Plots/ Property

4.2 Types of Interface

Build-To-Line (BTL) 'MR'

Build-To-Line (BTL) shall mean the line within or overlapping with the edge of the plot. The BTL may or may not be continuous.
Except Permitted Projections which may extend beyond the BTL, it demarcates the edge of the plot that is mandatory for the facade of the building to be built on. (Fig. 79)

The nature of the line represents the alignment of the front face of the building in relation to a street or public space. The nature of this line and the position in relation to the street contributes to the character and identity of the place.

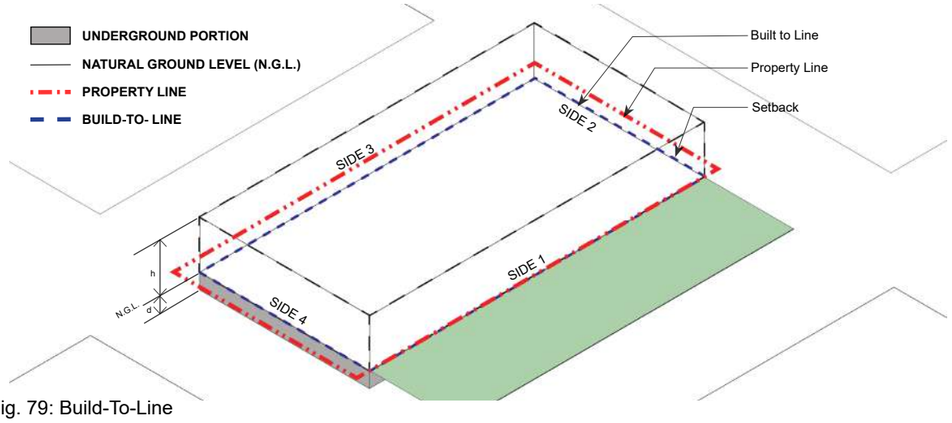

Fig. 79: Build-To-Line

Explanation and Examples

Build-to-Line is the plot line beyond which no part of a building are permitted to project on a plot, except Permitted Projections.(Fig. 80 and 81)

Fig. 80 George Town, Chennai

Fig. 81: Nayapura Road, Indore

Active Frontage (AF) 'MR'

Active Frontage (AF) shall refer to any edge of a plot, where it is mandatory to ensure that the facade of buildings touch the BTL where desirably, 80% or a minimum of 50%, where unavoidable of the frontage length at ground floor level is active (Fig. 82). The same treatment may further extend to the first floor as well.
Windows of kitchen, living room, drawing room etc of residences that are in active use across the day, should overlook public spaces.

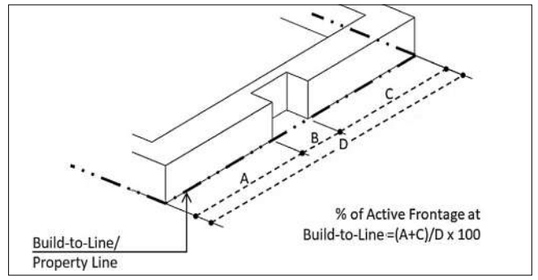

Fig. 82: Active Frontage along Build-To-Line, and the Formula for its computation

The methodology for computing the percentage of **Active Frontage** is shown in Fig. 82 and it may have any of the following features:

- Shop-fronts, arcades/ colonnades, doorways, entry/exit/ direct access points, transparent windows, verandas/ balconies providing direct visual connection with the adjoining street.
- The desired wall-to-window ratio shall be maintained at 15-35%.
- Commercial frontages shall be considered as Active Frontage only if these have minimum 50% transparency, untinted and direct access at Ground Floor level along the street of higher hierarchy. There may be relaxation for historic buildings and building with special requirement (like hospital, fire station, banks et al).
- No boundary walls, fences, access barrier, steps, stoops, outdoor units, chimneys shall be permitted between the Active Frontage and Property Line.
- Doors/ Gates, spillovers, monetized units (like standees) of buildings/ shops/ plots shall open within Buildable Envelopes.
- Construction of Active Frontages: Wherever Active Frontages are provided, higher plinth levels and 50% opacity may be used to ensure privacy for ground floor occupants. This is because since main entry(ies) of buildings need to be from the main streets. Further, it shall be ensured that steps, stoops, etc. at Ground Level do not encroach upon footpaths or any part of public RoW.

The building along a BTL may be discontinuous. However, the total proportionate length of Active Plot Frontage cannot be less than the prescribed length i.e.,Minimum Mandatory Active Plot Frontage.

Explanation and Examples

Active Frontages contribute to social and economic benefits. Good quality Active Frontages impart a sense of comfort, safety and vitality, making streets efficient public spaces. It provides for safe pedestrian access and increases property value. (Fig. 83 and 84)

Fig. 83: Karve Road, Pune. Such streets have created welcome public spaces with high and active visitors' footfall, and have commercially viable frontages

Fig. 84: Captain Shankar Rao Chafekar Road, Pune

4.3 Additional Interface Design Codes for Heritage Areas

Facade proportions and offset 'MR(H)'

1. Proportion of a building is derived by studying the relation between contrasting parts, for example mass to volume, width to height, size of opening (void) to wall (solid) et al.
2. This is based on the inherent modularity of original design, structural grid, material, ornamentation et al. (Fig. 85)

As it determines the visual quality, it is a tool to facilitate design in the Regulated Area of Heritage Buildings.
Extensions and new constructions within Regulated Areas of Heritage Buildings shall follow the proportion derived from the architectural form and properties (like material, colour, texture etc) evolved from the existing heritage building.
These factors are the design parameters that shall be assessed where construction within Regulated area is applicable.

Guidelines for Facade in Heritage precincts 'MR(H)'

- Original proportion of opening to wall ratios, projection (sight) lines and orientation of entry and exit to be maintained.
- Following styles to be preserved:
  - Signage
  - Door-Window Frame/ Design
  - Colour, Material and Texture
  - Fitting and Fixtures like rain water pipes, illumination fixtures etc.
- Anchor institution/ establishment to be continued. Where the same use is redundant, a similar genre or upgraded use can be opted and information of the original to be displayed.
- Infill development to maintain the same BTL, Wall to Window ratio, and projections and offsets.
- Density and design foliage and landscape design of historic area, precinct and street, to be preserved.

Fig. 85: Sample of Facade Proportion and Offsets

Facade proportions and offsets can be regulated by (Fig. 85) -

Divide-Width is defined as the width of the facade that is repeated and subdivided into proportions, like a module.

Facade Offset is defined as projections and recesses from the facade, as measured from BTL.

Vertical Massing is defined as the general vertical form of the built enclosure. It is usually a factor of the number and manner of stacking of floors.

Openings are the voids on the building facade in the form of doors, windows, skylights or glazing et al. These may or may not be openable and generate the characteristic visual proportion of a build facade by influencing wall-to-window ratio, sight-lines et al.

Vertical Proportion is defined as the proportion of repetitive features, stacked vertically and repeated along the length of the facade.

Explanation and Examples

Facade proportions and offsets imparts the architectural character of a Heritage Precinct. Prohibited and Regulated Areas of monuments may have retained the character owing to legal compliances. Such proportions are evident in historic cities like Srinagar, Ahmedabad, Kochi Fort Precinct, Mumbai Fort Precinct etc. (Fig. 86)

Fig. 86: The streets in older parts of Pune near Shaniwar Wada show adaptation of facade proportion and distribution of use, continuing its traditions

Colour Palette 'MR(H)'

Colour Palette is a pantone that accentuates the original building. It is generated to complement, and selectively highlight the historic facade. The traditional palette is a function of local climatic and material adaptation.

Performance Indicators

1. Colour Palette imparts a visual identity, sense of purpose/ function and help eyes focus on design features as intended in the original architectural and ornamentation design.
2. Colour Palette must be generated by identifying original pigment, shade and hue. Colour palette shall be based on research and be limited to laboratory analysis, and archival research
3. The infill/ new development shall be a tone lower or less brighter than the original Historic Asset

Material Palette 'MR(H)'

Material Palette is a set of building material, either identical to the original used in Heritage Asset or substitutes having compatible physico-chemical and visual properties.

Use of authentic traditional materials protects the Integrity (primarily structural safety), extends longevity and safeguards health of users.

Incompatible material, by the virtue of its physical and chemical properties (like hygroscopic properties, density, etc.) impact historic material, structural members and user health negatively.

New constructions in the Regulated Buffer of Heritage Asset and in historic precincts shall be compatible with the original material palette to prevent adverse alteration of the micro-climate and pollute levels.

Material palette shall be based on research and be limited to laboratory analysis, and archival research.

NOTE: It is desirable that identical material be used to replace/ repair original one. However, where this proves to be unachievable because (say where the source is exhausted or its repeated wear-and-tear reduces safety, alternative material that match colour, texture, and physical-chemical properties of the original one) may be considered.

Explanation and Examples

The colour pantone may match that of the existing heritage buildings or the surrounding as seen in case of Vrindavan. (Fig. 87)

Fig. 87: Buildings of similar colour pantone in Vrindavan

The colour pantone in Old City of Udaipur reflects most of the sunlight, keeping the area cool. (Fig. 88)

Fig. 88: Buildings in Old city Udaipur

Leh Old Town continues to use sun dried adobe bricks for building construction. Settlements outside Leh use local building materials and technique (Fig. 89).

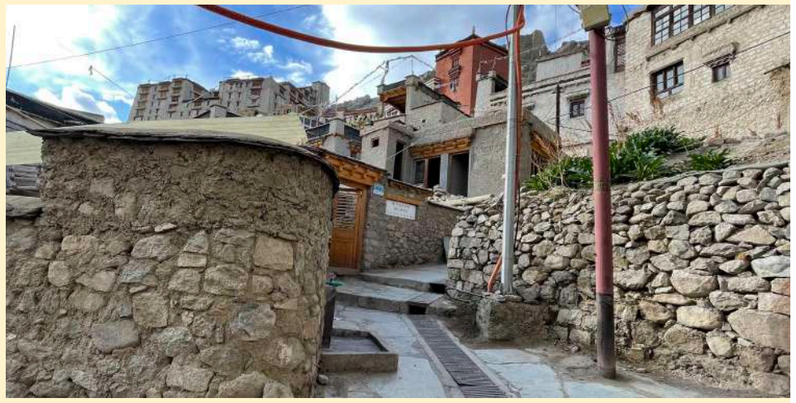

Fig. 89: Mud brick being used in Leh

Srinagar used to construct in Dhajji-Diwari (brickwork with wooden framing) technique. Contemporary buildings still prefer to continue similar materials and at times, technique (Fig. 90).

Fig. 90: Dhajji-Diwari work of Srinagar

05 Climate Resilience Regulations

This chapter details the guidelines for green building and sustainable infrastructure applicable to construction, repair, retrofitting and maintenance of plots.

5.1 Guidelines for Water Quality monitoring and preservation

- The natural drain system should be maintained for ensuring unrestricted flow of water. No construction shall be allowed that obstructs natural drainage through the site, on wetland and water bodies. Check dams, bio-swales, landscape, and other Sustainable urban Drainage Systems (SuDS) are allowed for maintaining the drainage pattern and to harvest rainwater.
- Buildings shall be designed to follow the natural topography as much as possible. Minimum cutting and filling shall be allowed.
- The quantity of freshwater usage, water recycling and rainwater harvesting shall be measured and recorded to monitor the water balance as projected by the plot developer.
- At least 20% of the open spaces as required by the local Building Bye-Laws shall be pervious. Use of grass pavers, paver blocks worth at least 50% opening, landscape etc. would be considered as pervious surface.
- Installation of dual pipe plumbing for supplying fresh water for drinking, cooking, and bathing etc. and other for supplying recycled water for flushing, landscape irrigation, car washing, thermal cooling, conditioning etc. shall be done.
- Use of water saving devices/ fixtures (viz. low flow flushing systems; use of low flow faucets tap aerators etc.) for water conservation shall be incorporated in the building plan.
- Separation of grey and black water should be done by the use of dual plumbing system.
- Water demand during construction should be reduced by use of pre-mixed concrete, curing agents and other best practices referred.
- The local Bye-Law provisions on rainwater harvesting should be followed. If local Bye-Law provision is not available, adequate provision for storage and recharge should be followed as per the Ministry of Urban Development Model Building Bye-Laws, 2016. Rain water harvesting recharge pits/storage tanks shall be provided for ground water recharging as per the CGWB norms.
- For plots more than 500 Sq.m. in size, a rainwater harvesting plan needs to be designed where the recharge bores of minimum one recharge bore per 5,000 sq m of built-up area and storage capacity of minimum one day of total freshwater requirement shall be provided. In areas where ground water recharge is not feasible, the rainwater should be harvested, and stored to reuse. The groundwater shall not be withdrawn without approval from the competent authority.
- All recharges should be limited to shallow aquifers.
- No ground water shall be used during construction phase of the project.
- Any ground water dewatering should be properly managed and shall conform to the approvals and the guidelines of the CGWA in the matter. Formal approval shall be taken from the CGWA for any ground water abstraction or dewatering.
- No sewage or untreated effluent water would be discharged through storm water drains.
- For plots more than 500 Sq.m. in size, onsite sewage treatment of capacity of treating 100% wastewater to be installed. The installation of the Sewage Treatment Plant (STP) shall be certified by an independent expert and a report in this regard shall be submitted to the SPCB before the project commences its operation. Treated wastewater shall be reused on site for landscape, flushing, cooling tower and other end-uses. Excess treated water shall be discharged as per statutory norms notified by MoEF&CC. Natural treatment systems shall be promoted.
- Periodical monitoring of water quality of treated sewage shall be conducted. Necessary measures shall be made to mitigate the odour problem from STP.
- Sludge from onsite sewage treatment including septic tanks, shall be collected, conveyed, and disposed as per the Ministry of Urban Development, Central Public Health and Environmental Engineering Organization (CPHEEO) Manual on Sewerage and Sewage Treatment Systems, 2013.

5.2 Guidelines for Green Cover

- No tree can be felled/ transplanted unless exigencies demand. Where absolutely necessary, tree felling shall be with prior permission from the concerned regulatory authority. Old trees should be retained based on girth and age regulations, as may be prescribed by the Forest Department.
- A minimum of 1 tree for every 80 sq m of land should be planted and maintained. The existing trees will be counted for this purpose. The landscape planning should include plantation of native species. The species with heavy foliage, broad leaves and wide canopy cover are desirable. Water intensive and/or invasive species should not be used for landscaping.
- Where the trees need to be cut with prior permission from the concerned local authority, compensatory plantation in the ratio of 1:10 (i.e. planting of 10 trees for every 1 tree that is cut) shall be done and maintained. Plantations to be ensured species (cut) to species (planted).
- Top soil should be stripped to a depth of 20 cm from the areas proposed for building, roads, paved areas and external services. It should be stockpiled appropriately in designated areas and reapplied during plantation of the proposed vegetation on site.

5.3 Guidelines to mitigate human health issues

- Applicable Central and/or State Labour laws, along with all its provisions, have to be implemented for the benefit of all workers working at the construction site and involved in loading, unloading, carriage of construction material and debris or working in any area.
- All workers working at the construction site and involved in loading, unloading, carriage of construction material and debris or working in any area with dust pollution shall be provided with dust mask.
- Emergency preparedness plan based on the Hazard Identification and Risk Assessment (HIRA) and Disaster Management Plan shall be implemented.
- For plots more than 500 sq m in size, provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, creche etc. The housing may be in the form of temporary structures to be removed after completion of the project.
- Occupational health surveillance of the workers shall be done on a regular basis.
- A First Aid Room shall be provided in the project, both during construction and operations of the project.
- Disposal of e-waste shall be as per applicable Government of India Guidelines.

5.4 Guidelines for Energy Conservation measures

- Compliance with the Energy Conservation Building Code (ECBC) of Bureau of Energy Efficiency shall be ensured. Buildings in the States, which have notified their own ECBC, shall comply with the State ECBC.
- Outdoor and common area lighting shall be LED or an improved version developed compatible to the purpose.
- Concept of passive solar design that minimize energy consumption in buildings by using design elements, such as building orientation, landscaping, efficient building envelope, appropriate fenestration, increased day lighting design and thermal mass etc. shall be incorporated in the building design. Wall, window, and roof U-values shall be as per ECBC specifications.
- Energy conservation measures like installation of CFLs/ LED for illuminating the area outside the building should be an integral part of the project design and should be in place before project commissioning.
- Solar, wind or other renewable energy shall be installed to meet electricity generation equivalent to 1% of the demand load or as per the state level/ local Building Bye-Laws requirement, whichever is higher.
- Solar power shall be used for lighting in the apartment to reduce the power load on grid. Separate electric meter shall be installed for solar power. Solar water heating shall be provided to meet 20% of the hot water demand of the commercial and institutional building or as per the requirement of the local Building Bye-Laws whichever is higher. Residential buildings are also recommended to meet its hot water demand from solar water heaters, as far as possible.

5.5 Guidelines for Air Quality monitoring and preservation

- Notification GSR 94(E) dated 25.01.2018 of MoEF&CC regarding Mandatory Implementation of Dust Mitigation Measures for Construction and Demolition Activities for projects requiring Environmental Clearance shall be complied with.
- Diesel power generating sets proposed as source of backup power should be of enclosed type. The diesel generator sets to be used shall be low Sulphur diesel type and shall conform to rules made under the Environment (Protection) Act, 1986.
- The height of stack of DG sets should be equal to the height needed for the combined capacity of all proposed DG sets. The location of the DG sets to be as per rules issued by State Pollution Control Board. The gaseous emissions from DG set shall be dispersed through adequate stack height as per CPCB standards. Acoustic enclosure shall be provided to the DG sets to mitigate the noise pollution.
- Construction site shall be adequately barricaded before the construction begins. Dust smoke and other air pollution prevention measures shall be provided for the building as well as the site. These measures shall include screens for the building under construction, continuous dust/ wind breaking walls all around the site (at least 3 m height). Plastic/ tarpaulin sheet covers shall be provided for vehicles bringing in sand, cement, murram and other construction materials prone to causing dust pollution at the site as well as taking out debris from the site.
- Sand, murram, loose soil and cement stored on site shall be covered adequately to prevent dust pollution.
- Wet jet shall be provided for grinding and stone cutting.
- Unpaved surfaces and loose soil shall be adequately sprinkled with water to suppress dust.
- All construction and demolition debris shall be stored at the site (and not dumped on the roads or open spaces outside) before they are properly disposed. All demolition and construction shall be managed as per the provisions of the Construction and Demolition Waste Management Rules, 2016.
- For indoor air quality, ventilation shall be ensured as per provisions of National Building Code of India.

5.6 Guidelines for Noise monitoring and prevention

- Ambient noise levels shall conform to standards for residential area/ commercial area/ industrial area/ silence zone during day and night, as per Noise Pollution (Control and Regulation) Rules, 2000. Incremental pollution loads on the ambient air and noise quality shall be closely monitored during construction phase. Adequate measures shall be made to reduce ambient air and noise level during construction phase so as to conform to the stipulated standards by CPCB / SPCB.
- For all plots more than 500 sq m in size, noise level survey shall be carried as per the prescribed guidelines and report in this regard shall be submitted to SPCB as a part of six-monthly compliance report.
- Acoustic enclosures for DG sets, noise barriers for ground-run bays, ear plugs for operating personnel shall be implemented as mitigation measures for noise impact due to ground sources during construction.

5.7 Guidelines for Waste Management

- For plots more than 3 acres in size, a certificate from the Competent Authority handling municipal solid wastes, indicating the existing civic capacities of handling and their adequacy to cater to the MSW generated from project, shall be obtained.
- Disposal of construction waste (and/ or malba) during construction phase shall not create any adverse effect on the neighboring communities and be disposed taking the necessary precautions for general safety and health aspects of people, only in approved sites with the approval of Competent Authority.
- Separate wet and dry bins must be provided in each unit and at the ground level for facilitating segregation of waste. Solid waste shall be segregated into wet garbage and inert materials.
- Organic waste compost/ vermiculture pit/ organic waste converter within the premises with a minimum capacity of 0.3 kg /person/day shall be installed.
- All non-biodegradable waste shall be handed over to authorized recyclers. Recyclers shall be appointed before project commences operation.
- Any hazardous waste generated during construction phase shall be disposed-off as per applicable rules and norms with necessary approvals of the State Pollution Control Board.
- Use of environment friendly materials in bricks, blocks and other construction materials, shall be required for at least 20% of the construction material quantity. These include Fly Ash bricks, hollow bricks, AACs. Fly Ash Lime Gypsum blocks, compressed earth blocks and other environment friendly materials.
- Fly Ash should be used as building material in the construction as per the provision of Fly Ash Notification of September, 1999 and amended as on 27 August, 2003 and 25 January 2016. Ready mixed concrete must be used in building construction.
- Any waste from construction and demolition activities related thereto shall be managed so as to strictly conform to the Construction and Demolition Waste Management Rules, 2016.
- Used CFLs and TFLs should be properly collected and disposed off/sent for recycling as per the prevailing guidelines/ rules of the regulatory authority to avoid mercury contamination.

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06 Property Development Cards

This chapter contains the definition, application and sample of property development cards

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6.1 Definition

Property Development Card (PDC) is defined as a document containing UFR applicable to concerned plots as derived from the approved CBALP and its UFR.

Parts of Property Development Card are to be structured as per the requirements of Character Based Areas. The structure may vary from city to city. An indicative structure has been shown in this section.

Application

1. After the approval of CBALP and its UFR, a set of typical Property Development Cards unique to typical types of plot development would have to be issued by the planning authority.
2. The typical Property Development Cards would contain components of UFR applicable to plots. The plot developer would have freedom to decide the architectural design of each component while adhering to its functionality.
3. The planning authority can add/ remove/ modify the typical Property Development Cards from time to time.
4. Plot developers would be given option to apply for new typical Property Development Cards on a self preparation basis, which will be immediately approved through the Building Sanction (EoDB) portal, supervised by the planning and regulatory authorities.
5. Based on the typical Property Development Cards, plot developers can get unique Property Development Cards for their plots approved.
6. The building sanction authority would take into consideration the unique Property Development Card at the stage of issuing construction permits.
7. The whole process mentioned above can be automated through the integrated CBALP and EoDB portal.

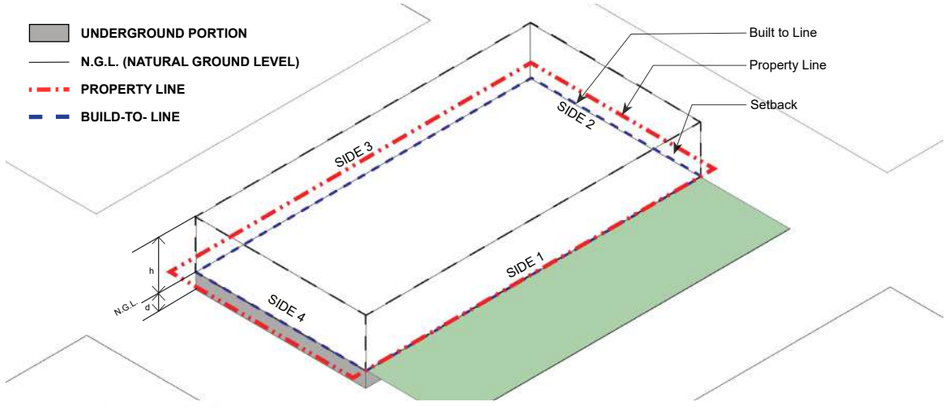
Property Development Card shall uphold the spirit of **Form Based Codes** and outline Plot specific requirements of built-form.

- that ensures **creation of safe, vibrant, people-centric and transit -friendly built environment.**

6.2 Types of Property Development Cards

Parts of Property Development Card are to be structured as per the requirements of Character Based Areas. The structure may vary from city to city. An indicative structure has been shown in this section.

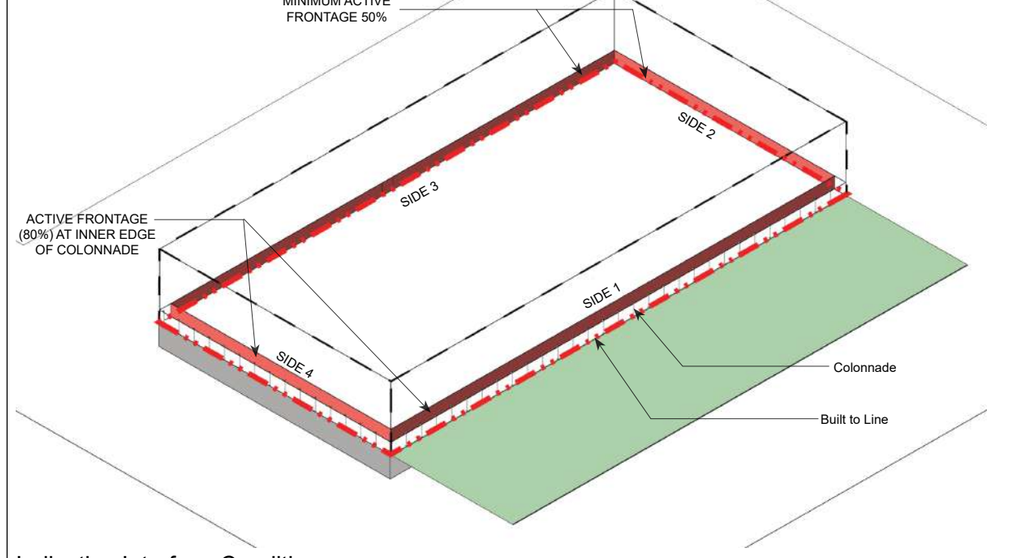
PROPERTY DEVELOPMENT CARDS NO. [CITY/PLOT UID/YEAR]				
Plot Area			**_____ sq.m.**	
VP	**Volumetric Parameters**		**Applicable Regulations/ Measurements (**Development Control Norms/ Local Bye-Laws)	
	VP.1.	Applicable F.A.R./ F.S.I.	_____ m	
	VP.2.	Applicable Ground Coverage	_____ %	
	VP.3.	Use Premise as LP/ CBALP	Residential/ Commercial/ Public-Semipublic/ Industrial/ Transportation/ Social Infrastructure (Educational/ Hospitals) etc	
	VP.4.	Permissible mix of use	_____ % Residential _____ % Commercial _____ % Social Infrastructure	**All use premises to have atleast-** 20% residential 20% commercial or social infrastructure or both
	VP.5.	Mandatory Setbacks	Frontage adjoining open spaces- _____ m, to be maintained as public space without boundary wall,	
			Frontage abutting another plot- _____ m,	
	VP.6.	Maximum permissible height of superstructure	h= _____m, above natural ground level	
	VP.7.	Maximum permissible depth of underground structure	d= _____m, below natural ground level	



Indicative Volumetric Parameters

Table 3: Property Development Card (Volumetric Parameters)

IR	**Interface Regulations**		**Applicable Regulations/ Measurements** (As per CBALP- Interface Regulation Plan and applicable UFRs)			
	IR.1.	Build-to-Line Distance from Plot Boundary	**Side 1**	**Side 2**	**Side 3**	**Side 4**
			_____ m	_____ m	_____ m	_____ m
	IR.2.	Active Frontage	Y	Y	--	--
	IR.3.	Colonnade	Y	--	--	--
	IR.4. (H)	Facade Control- 1. Proportions and offsets 2. Colour 3. Material Palette	--	--	--	--

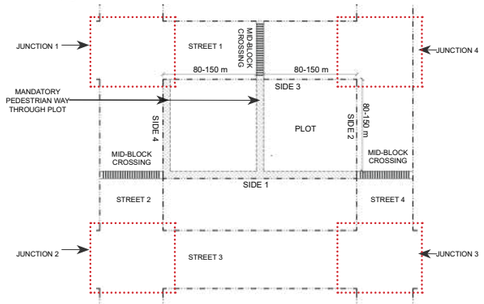


Indicative Interface Conditions

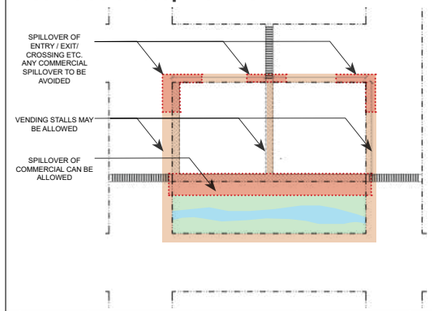
Table 4: Property Development Card (Interface Conditions)

OS -S	Street Regulations	**Applicable Regulations/ Measurements** (As per CBALP- Outdoor Space Regulation Plan, Community Building Program and applicable UFRs)

Street, junction and Mid-block identification

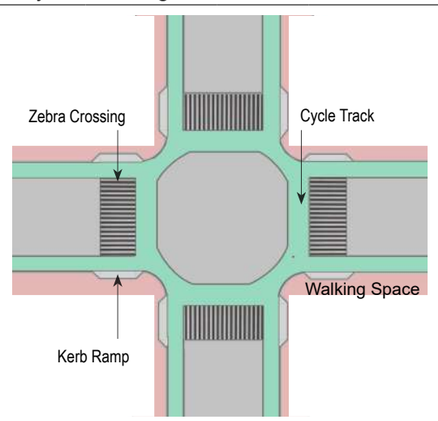


Activities and spillovers



Name	Hierarchy	R.O.W.	Adjoining Landuse	Footpath Width	Dead Width	Multi-Utility Zone	Walkable Space	Cycle Track
Side 1	Primary	.....m	Residential	.....m	.....m		.....m	
L.H.S.				.....m	.....m		.....m	
R.H.S.				.....m	.....m		.....m	
Side 2	Secondary	.....m	Commercial	.....m	.....m		.....m	
L.H.S.				.....m	.....m		.....m	
R.H.S.				.....m	.....m		.....m	

Type of Junction: ..... arm, regular, pedestrian and cyclist crossing	**Mid-block crossing:** at grade, with footpath kerb ramps, pedestrian and cyclist crossing



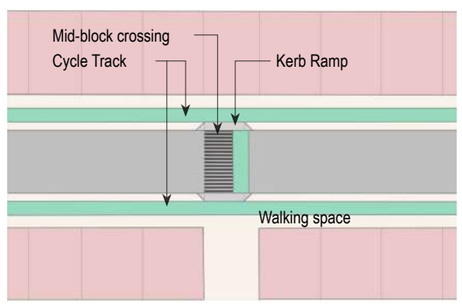


Table 5: Property Development Card (Street Regulations)

OS -W	Waterfront Regulations	**Applicable Regulations/ Measurements** (As per CBALP- Outdoor Space Regulation Plan, Community Building Program and applicable UFRs)	
	Name	**Waterbody**	**Waterfront**
	W.D.1. Side 1	Man-Made	Man-Made Green
	W.D.2. Activities Permitted	• Water Transport • Recreation • Aeration of still water • Aquatic Species Viewing Deck • Floating Gardens • ..... •	Non-Polluting and Barrier-Free activities like: • Spillover of adjacent properties Public Plaza • Pedestrian Ways • ..... • .....

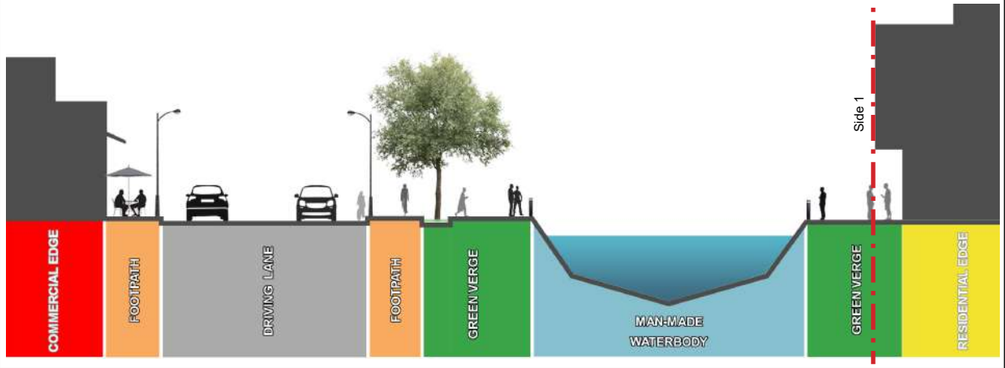
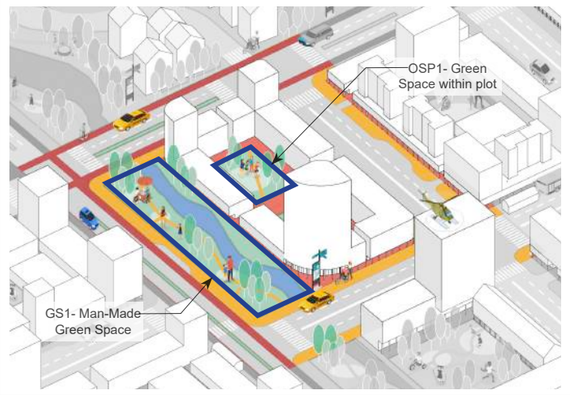


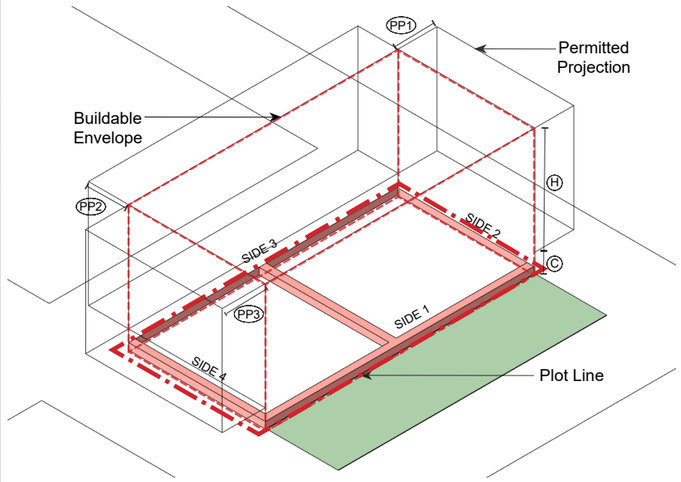
Table 6: Property Development Card (Waterfront Regulations)

Table 7: Property Development Card (Green Space Regulations)

OS -G	Green Space Regulations	**Applicable Regulations/ Measurements** (As per CBALP- Outdoor Space Regulation Plan, Community Building Program and applicable UFRs)	
	Name- GS1- Side 1	**Types of Green-** Man-Made	
	Activities Permitted- • Spaces for revenue generation • Recreation • Festivals • Community Functions/ Events • Vending Spaces near entry/ exit • Public Utilities • Sports facilities • Multi-Activity Recreation • ..... • ..... •		
	Name- OSP1	**Types of Green-** Green Space within Plot	**Instructions:** • All activities are permitted. • If the green space is maintained as a public space which is barrier free, unpaid and allows 24 hour access, TDR/ FSI benefits may be allowed. • If the green space is fully permeable to rain water, it will be considered as "green", else it will be considered as "plaza" • ..... • .....

PR	Plot/ Building Regulation	**Applicable Regulations/ Measurements** (As per CBALP- (Re)generation Opportunity Plan, Property Development Plan and applicable UFRs)

Buildable Envelope



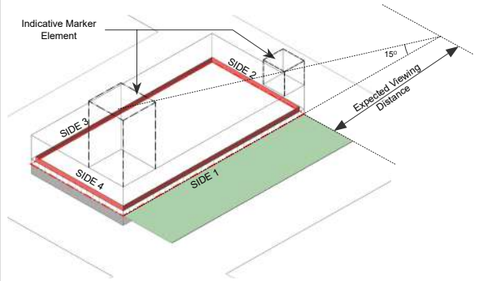
Buildable Envelope on Plot

Component	Regulation
C	Min. .....m
C+H	Max. .....m
PP1	Max. .....m
PP2	Max. .....m
PP3	Max. .....m

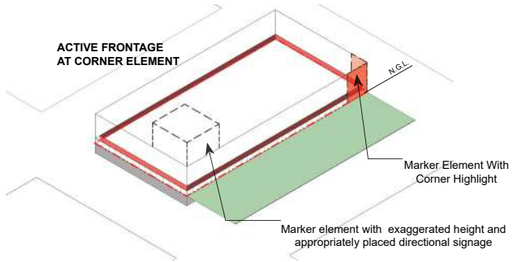
LEGEND:

- Ⓒ MINIMUM MANDATORY CLEARENCE UNDER PERMITTED PROJECTION
- Ⓗ MAXIMUM HEIGHT OF PERMITTED PROJECTION
- (PP..) PERMITTED PROJECTION
- ACTIVE FRONTAGE ALONG PEDESTRIAN WAY

Marker Element



View cone of Marker Element

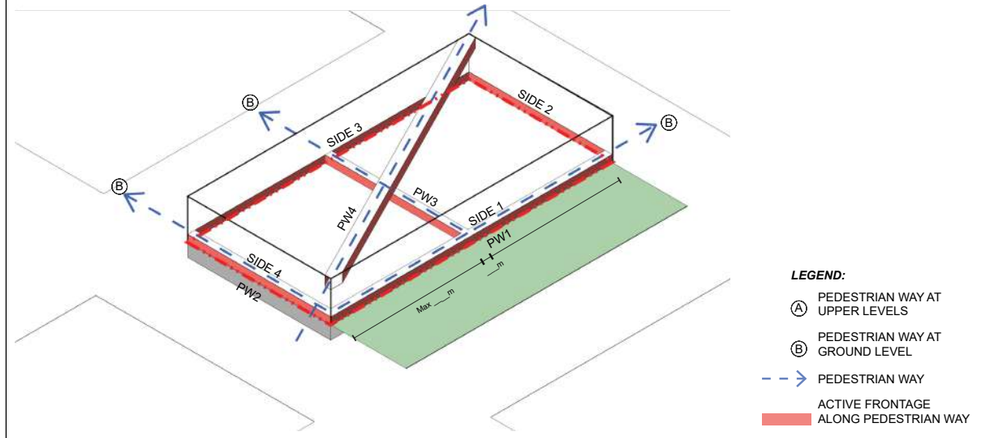


Marker Element

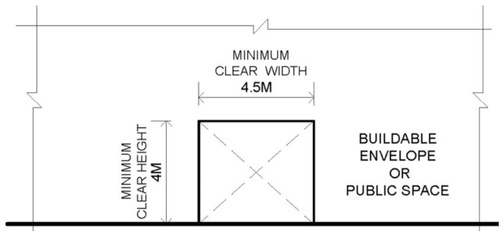
Table 8: Property Development Card (Plot/ Building Regulations)

PR	Plot/ Building Regulation	**Applicable Regulations/ Measurements** (As per CBALP- (Re)generation Opportunity Plan, Property Development Plan and applicable UFRs)

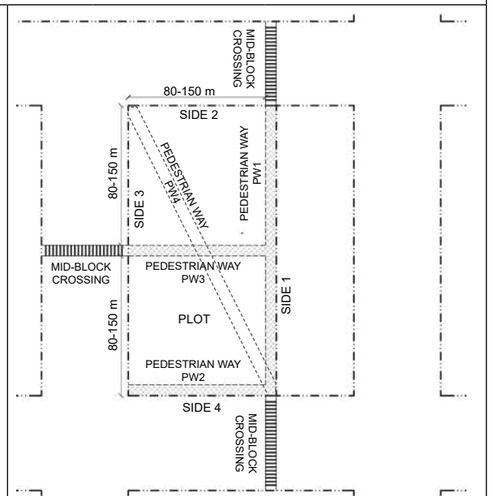
Name	Description	Colonnade	Any other control
PW1	Pedestrian Way along Side 1	Y	Facade Controls
PW2	Pedestrian Way along Side 4	Y	--
PW3	Pedestrian Way connecting Side 1 and 3 aligned with mid-block crossings	--	--
PW4	Pedestrian Way at upper level	--	--



Pedestrian Way (PW) through Plot/ Building



Typical cross-section of a Pedestrian Way (PW) through Plot/ Building



Pedestrian Way (PW) through Plot/ Building shall align with Mid-Block Crossings

Table 9: Property Development Card (Plot/ Building Regulations)

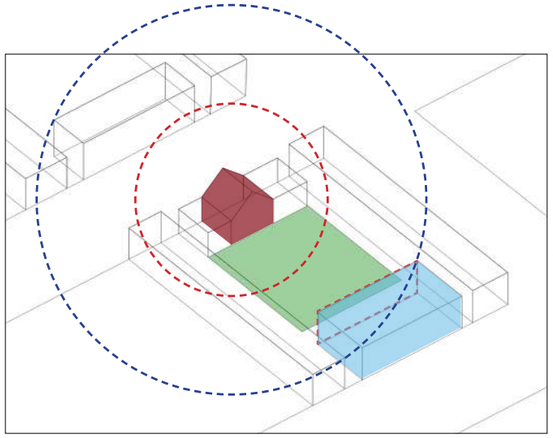
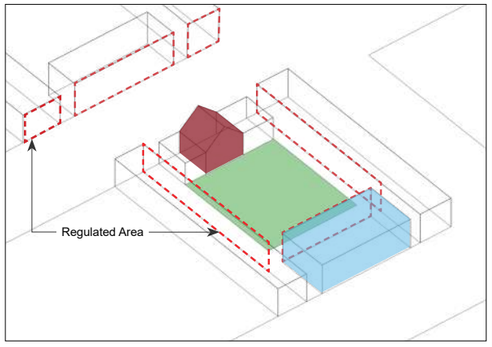
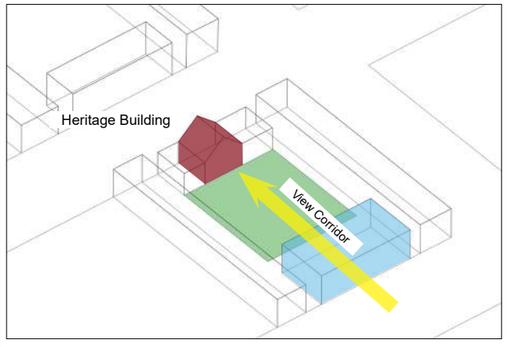
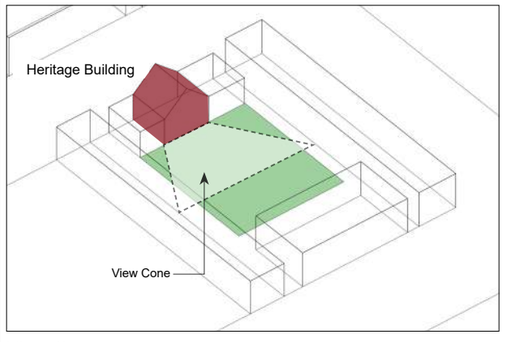
PR	Plot/ Building Regulation	**Applicable Regulations/ Measurements** (As per CBALP- (Re)generation Opportunity Plan, Property Development Plan and applicable UFRs)		
	Applicable Heritage regulations		**Zone**	**Demarcation**
	 Prohibited and Regulated Area Buffer		Protected	..... m as mandated by ASI/ NMA/ concerned agency
			Regulated	..... m as mandated by ASI/ NMA/ concerned agency
				Following to apply- 1. Facade proportions and offsets 2. Colour Palette 3. Material Palette
				
	 Facade Control for Regulated Area	 View Corridor		
		 View Cone		

Table 10: Property Development Card (Heritage Regulations)

PR	Plot/ Building Regulation	**Applicable Regulations/ Measurements** (As per CBALP- (Re)generation Opportunity Plan, Property Development Plan and applicable UFRs)	
		 Typical Facade Control	**Component** / **Measure** Divide Width — .....m Vertical Massing — .....m x .....m Vertical Opening — .....m x .....m Facade Offset — .....m Vertical Propotions — .....m x .....m
		 Reference image for colour and material palette	**Colour Palette:** 
			Material Palette: Permissible Exterior wall surfaces- Yellow sandstone, plaster and paint, wood, MS, ceramic tiles, etc. Not Permissible Exterior wall surfaces- Aluco Panel, Full glass cladding

Table 11: Property Development Card (Facade Control)

GR	Green Building Regulation	**Applicable Regulations/ Measurements** (As per applicable Green Building UFRs)
		Guidelines for Air Quality monitoring and preservation: ....
		Guidelines for Noise monitoring and prevention: ....
		Guidelines for Water quality monitoring and preservation: ....
		Guidelines for Energy Conservation measures: ....
		Guidelines for Waste Conservation: ....
		Guidelines for Green Cover: ....
		Guidelines to mitigate Human health issues: ....

Table 12: Property Development Card (Green Building Regulations)

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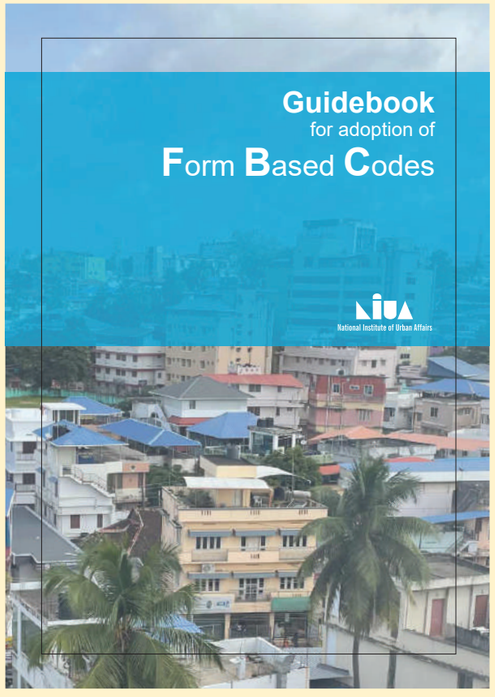
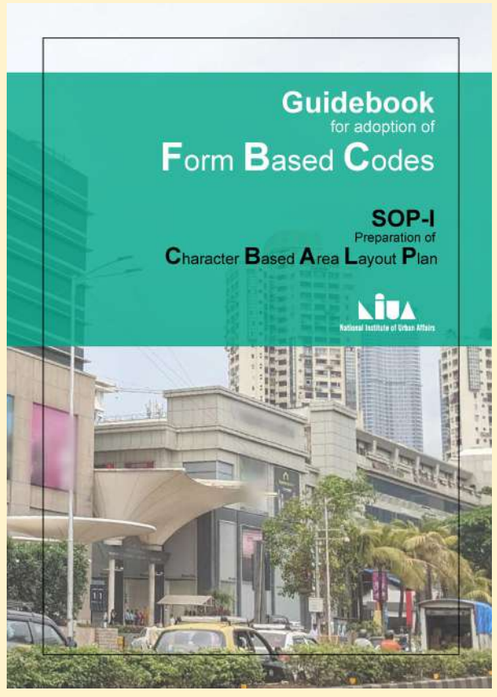
Other Documents

Guidebook



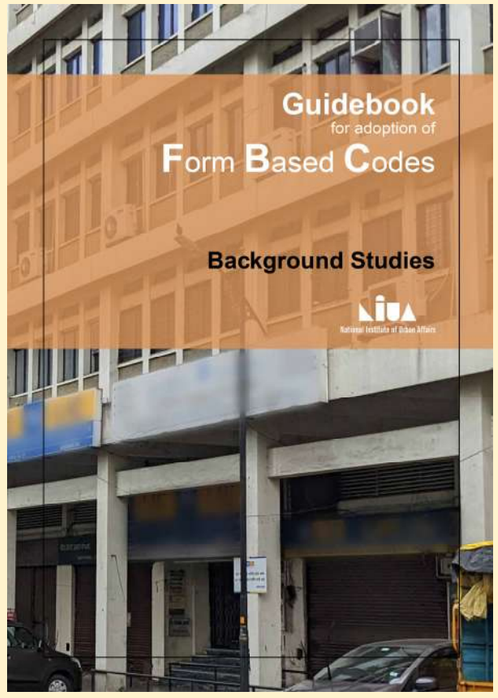
This guidebook explains all tools and processes to adopt Form Based Codes and its component parts, like CBALP, UFR, PDC.

SOP I



SOP-I provides tools and processes for creating Character Based Areas layout Plans.

Background studies



This document contains all background studies and references for Form Based Codes.

Manuals for Station Redevelopment including Commercial Development

These Manuals and Guidebooks were prepared by IRSDC Ltd. through testing on on-going projects and adopted in 2021 after an India-wide consultative process involving key sector experts. The manuals have been applied to plan for Indian station redevelopment projects at Nagpur, Bijwasan (New Delhi), Chandigarh, Amritsar, etc.

Source:
https://smartnet.niua.org/content/ce38f242-d616-454f-83f6-6e9c4d7b4443

https://shaktifoundation.in/impact-stories/indian-railways-adopts-form-based-codes-for-station-redevelopment/

Testimonials

"The Standard Operating Procedures I and II viz., Preparation of Character Based Area Layout Plan and Preparation of Urban Form Regulations along with Guidebook for adoption of Form Based Codes -Case Studies have assumed much significance especially as Ministry of housing and Urban Affairs have been advocating area based strategies through Special Assistance to States to implement Urban Planning Reforms as formulation of Local Area Plans and Town Planning Scheme have been identified as one of the reforms. Both the SOPs and Guidebook are comprehensible and Town Planners working in State Town and Country Planning Department, Urban Development Authorities and Urban Local Bodies can use these documents while taking up area based strategies."

R.Srinivas,

Consultant (Urban Planner) M/o Housing and Urban Affairs, Govt. of India.
Former Town and Country Planner, TCPO, MoHUA ,
Director (Ahmedabad Smart City Development Limited)

" The effort put in to develop the FBC Guidebook and the SOPs is commendable, the documents are well written and illustrated with simple graphics. Integration of FBCs in the Planning Process is indicated clearly, and as understood from the guidebook, its implementation may be done in a phased manner over a period of time. Using performance oriented and area based approach for FBCs with a dynamic portal offering flexibility is good and will ensure that the regulations are neither too prescriptive nor rigid. FBCs lays emphasis on climate responsiveness and addresses resilience while integrating natural and built resources, which is good. PDCs are in an easy to understand format, which may make it useful for wide range of users. Additional regulations for heritage and high density areas is much needed and is welcomed."

Dr. Sujata Govada

Founding and Managing Director, UDP International
Adjunct Associate Professor at CUHK
Vice President (International Relations) and Founding Member of Hong Kong Institute of Urban Design (HKIUD)
Vice President of AIA HK
Global Trustee of the Urban Land Institute and ExCo member of ULI North Asia

"The proposition in the documents (Form Based Codes) – i.e. to streamline the process of transformation of brownfield sites can be a useful tool for upgrading areas in and around monuments and historic cities in general. As the regulations are contextually driven, the layers in historic towns, which impart its characteristics can be included and responded suitably. Which means, one evolves a format of development where heritage is synonymous to upgradation/ better quality of development. The Property Development Card – is of great help to those with property in Prohibited and Regulated Areas. As the PDCs are applicable even at plot level, it will very clearly articulate options of development at the very onset. This will prevent the issues arising from ambiguity and tentativeness due to complications in the norms and even how monuments were notified originally. In fact – this is the essence of EoDB. As a reviewer, I have understood the immense value of these regulations and guidelines, and I would look forward to further Consultation and adoption processes."

Prof. Ajay Khare,

Professor (HAG) and Dean Research & Head CHCR
School of Planning and Architecture, Bhopal, India. (M/o Education, Govt. of India)
Former Member, National Monuments Authority, (M/o Culture, Govt. of India),
Former Director, (Founder) SPA Bhopal, (2009-2014)

"Very good piece of work done and relevant considering. This is a non-prescriptive and handholding tool to streamline the processes for brownfield transformation and aligns with the new vision for Indian cities, being promoted by the Government of India, MoHUA and other allied bodies/ missions like NIUA, GATI and JAL Shakti. While individual agency/ Mission focus on isolated mandates, the Guidebook and SOPs are providing an integrated framework and have enlisted actions to achieve necessary outcomes.

The idea of Property Development Cards and dynamic portal would facilitate implementation of Real estate bonds, green bonds and even carbon markets. With this we can also imagine exploring tools like these to increase participation/ interest of participants in improving the public and green spaces when you are sequestering carbon. Improving the quality of life for people in the urban spaces if made tradeable, benefits real estate development and boosts revenue capture. When quality and feasibility is converted into real estate shareable bonds, it becomes easier to incentivise everyone to participate."

Dr. Sumana Bhattacharya

Senior Advisor, Climate Change at Iora Ecological Solutions
Expert in review, development, management and implementation of programmes and projects in the areas of Climate Change, GHG inventorisation, Ecosystem Assessment, and Low Carbon Development.
She is a key member for engagements on climate change policy development, finance and governance issues at a national and state level.

"It is good to note that the Guidebook and SOPs integrate Green Building parameters as part of area planning and regulation. The integration of Green Building Guidelines into Property Development Cards lay the ground for cities to adopt Green Building Passports."

SMH Adil

Built Environment Simulation Specialist, CEO, GEED
Licensed ECBC Master Trainer,
Certified Energy Manager, Bureau of Energy Efficiency, M/o Power Govt. of India

Notes:

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