Guidebook
for adoption of
Form Based Codes

Background Studies

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

Table of Contents

List of Figures

List of Tables

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.

(Re)generation Opportunity Plan

(Re)generation Opportunity Plan (ROP) provides assessment of areas where:

1. Market demand and Infrastructure capacities are suitable for mix of uses and growth
2. Infrastructure augmentation is required for future growth
3. Introduction of design measures and activities can induce market demand.

Low Carbon Mobility Plan (LCMP)

Low Carbon Mobility Plan (LCMP) would consider existing transport network, augmentation required to sustain future growth and also provide the street widths, location of shared parking and interchange facilities.

Outdoor Space Plan (OSP)

Outdoor Space Plan (OSP) proposes the Blue and Green infrastructure network by augmenting and adding to existing types of spaces like:

1. Natural green space
2. Natural water body and its Right of Way
3. Man-made green spaces (Private, Public, Paid, Unpaid)
4. Man-made water bodies and their Right of Way (Private, Public, Paid, Unpaid)
5. Plazas and Terraces (Private, Public, Paid, Unpaid)

The above spaces shall also include private properties, plazas and public terraces.

Property Development Plan

Property Development Plan (PDP) governs development of plot and its resultant form through below-mentioned components:

- Size and shape of plot
- Character of development
- Suitable approach of Heritage Response
- Public Passages through plots
- Public spaces within plots
- Plots with marker elements
- Prohibited and regulated areas of protected monuments

Interface Regulation Plan

Interface Regulation Plan (IRP) provides various types of interfaces (i.e., Build-To-Line) including response to heritage.

Community Building Program

Community Building Program (CBP) is a plan with all existing and future activities, spillover that defines the Character and function of an area.

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.

01 Introduction

This chapter explains the background of preparation of the Guidebook for adoption of Form Based Codes and the methodology adopted.

1.1 Study Background

The Indian Railway Stations Development Corporation Limited (IRSDC), the nodal agency for the redevelopment of railway stations in India, has developed the Manual for Station Redevelopment including Commercial Development—that adopts a Form Based Codes approach, a first-of-its-kind in India, equivalent to Building Bye-Laws in a city. Form Based Code (FBC) is a tool to regulate building forms and mix of uses, by regulating the interface between buildings, streets, frontages and public spaces. This approach aims to conserve energy by using land efficiently and creating a built environment that encourages the use of Non-Motorized Transport (NMT), improves access to public transit, and promotes resource-efficient infrastructural growth.

Conventional planning emphasizes plotting of land through segregation of land uses. Zoning is considered as the means to isolate the incompatible and integrate compatible land uses, so as to create a healthy built-up environment. In conventional planning, function distribution on a land parcel is governed by local land use regulations - and permissible parameters like Floor Area Ratio (FAR), Ground Coverage (GC), Height restrictions, Setbacks and Parking. Over a period of time, the conventional planning techniques have evolved with introduction of contemporary tools like Town Planning Schemes, Local Area Planning, Land Pooling, etc. At the same time plot-level regulations have remained static with limited or no updates. Additionally, during the preparation of IRSDC's manuals it was felt that the planning documents like Layout Plans and the regulatory tools like FAR, GC, Height etc. are generally disconnected and required an intermediate regulatory tool to ensure sustainable urban development.

In IRSDC's manuals, the above gap was bridged through further detailing of Layout Planning stages, introduction of Property Development Cards and creating Plot Level design regulations. These codes were developed over a period of more than two years culminating with a National Webinar to collect feedback from experts across the country and abroad.

During the webinars, town planners and administrators from various cities across the country emphasized on a wider application of these codes to address the following gaps in city planning, which could be bridged through a Form Based Codes approach -

1. Cities working on adopting Transit Oriented Development (TOD) can benefit through the Form Based Codes approach in regulating TOD based Urban Development. To achieve this, it was recommended that the IRSDC's codes be further expanded for application across cities.

2. The introduction of Layout Regulating Plans and Property Development Cards were appreciated. However, to make the IRSDC's codes useful for city wide application, following aspects could also be integrated -
   a. Urban Design Vision and Regulation
   b. Environment and Disaster Mitigation Plans
   c. Sustainable Infrastructure Strategy
   d. Social (demographic) Development Cards
   e. Facade and Public Space Regulation Guidelines and Cards

3. Representatives from cities like Mumbai, Kolkata, Bengaluru, Chennai etc. also showed interest in jointly developing such codes thereby learning from IRSDC's experience. Additionally, the head of the institutions at NITI Aayog, Ministry of Housing and Urban Affairs and Ministry of Railways, also emphasized on the need for building a mechanism of handholding and capacity building of city planning and administrative agencies.

4. Identified areas of Gap - The following areas of gap had been identified in the conventional planning and regulatory processes, which have been addressed through this Guidebook for adoption of Form Based Codes and SOPs.

   a. Gaps in legal frameworks - It has been found that the existing legal framework for city planning is restrictive towards adoption of Form Based Codes approach. The Development Acts of most cities emphasize on Planning tools and thereafter jump to the plot level building regulations. The tools necessary for regulating Urban Built Environment, like regulating plans, facade controls etc are not acknowledged in the Development Acts. Most Development Acts, assume that the Planning Regulations published as an Addendum to Master Plans would address these requirements. However, even the Planning Regulations do not touch upon these critical aspects.

   b. Gaps in planning processes - Indian metropolitan cities like Delhi, Mumbai, etc. follow the hierarchical system of planning comprising of regional plans, master plans, development plans, zonal plans, layout plans, sector plans, etc. The smaller cities have lesser overlays, yet follow the same principles. The hierarchical system of planning is a top down approach with no possibility of incorporating bottom-up planning requirements. As a result, the hierarchical system of planning has led to shifting of focus from building quality urban environment to ensuring suitable allocation of resources starting from city planning to local area planning. The approaches for sustainable urban development, like TOD, Compact Cities etc. emphasize on integrated-comprehensive planning of all stages of the planning hierarchy, while ensuring bottom-up planning of urban areas. This is a gap identified by various planning agencies in the conventional planning processes. Some Indian agencies, like IRSDC, DDA, MMRDA, Bengaluru-DULT have now started addressing these gaps in their planning processes through introducing new planning tools and processes.

   c. Gaps in the Development Control Regulations - The Development Control Regulations for most cities use conventional tools like FAR, Ground Coverage, Setbacks and ECS based parking norms. Most sustainable planning techniques have emphasized on principles like '0-setbacks', 'Demand Management based parking provisions', 'relaxed Ground Coverage' and flexible FAR norms. The same can be achieved by rearticulating the application of conventional tools through adoption of Form Based regulations, like Build-to-line, Active Frontage, Buildable Volumes etc.

   d. Gaps in the Building Bye-Laws - The updates in the Development Control Norms need to be reflected in Building Bye-Laws. Additionally, norms for mixed use, mode-wise parking, green building requirements for mixed use etc. need to be reflected in Building Bye-Laws.

In the context of the above, the need for formulating a set of model codes applicable for cities across India based on joint exercises with some sample city planning agencies, emanated.

The recommended Form Based Codes approach tries to address all the aforementioned gaps and start from preparation of Character Based Area Layout Plans (CBALP), Urban Form Regulations (UFR) and lead up to plot specific Property Development Cards (PDC) which forms the bridge between UFRs and Building Bye-Laws.

The guidebooks and the SOPs are intended to cater to the following -

Document	Application
Guidebook for adoption of Form Based Codes	Useful for all readers, especially for administrators deciding to adopt Form Based Codes (FBC) approach. It gives a complete overview of alWWI stages of adoption of the FBC approach.
SOP-I: Preparation of Character Based Area Layout Plan	Useful for planning agencies and experts preparing to institutionalize and prepare CBALPs.
SOP-II: Preparation of Urban Form Regulations	Useful for planning agencies and experts preparing to institutionalize and prepare Urban Form Regulations and Property Development Plans.
All documents are explained in simple terms such that even readers with moderate language and technical skills can understand.	

Table 1: Application of Guidebook and SOPs

1.2 Note on Response to Heritage

Indian cities have three types of architecture. Type 1 are the prominent structures that are built assuming an eternal presence. These are ceremonious, high in visibility and style, made at a high cost and its scale overrides functions. Protected Monuments are also a part of the Type 1 and so are buildings like the Taj Lands' End Hotel and Sensex building in Mumbai, the Howrah Station of West Bengal, or the India Gate of Delhi.

The Type 2 form an integral part of a city`s general character and the image of the city. Architecturally, these are often slightly muted forms of Type 1s, a high architecture of a certain period of time. These lend a sense of place and are the springboard of collective memory and receptacle for the lifestyle which establishes the past-future continuum. The bulk of these are residences, usually privately owned or even may be factory workers' housing and are often unprotected. These are vulnerable to demolition to give way to 'development', making the Type 1s increasingly more valuable than it is. This form of rarity (stemming from an irreversible loss) is counterproductive as artificial uniqueness, limits participation offering any substantive reason. For example, a certain type of Zaminari estate (Type 1) was prevalent among rich Bengalis across the State. The architecture of these were a queer hybrid of proto-modern, late Mughal and few local Sultanate features, few hyperlocal features unique to Bengal while incorporating few British ones. Valorizing the feudal lord`s taste, their retinue built respective residential clusters across older neighbourhoods of Kolkata. While individually these buildings may merit a Grade III or lower, as a cluster, these impart an urban form (form of based codes) characteristic of Calcutta between late 1800`s to early 1960`s. Now that older residential quarters comprising Type 2s and few Type 1s have undergone demolition, there is an increased interest in 'saving' Type 1s and reusing the same to project a certain life and lifestyle. The projection is often not to taste and nor is it completely truthful.

The Type 3s are the utility architecture. Their utility overrides all other criteria determining form. These are flexible, spatially efficient and adaptive across time, usually non-influential in terms of architecture and visibility. Shops, bazaars, utility units around offices, et al – that fulfill everyday functions and indelibly implanted in our cognitive maps but whose architecture is rarely a point of discussion – form the Type 3's.

To form a way forward, the spectrum of transformation evident in our historic environs and the reasons that cause the transformation was closely observed during our project period. If we put the state of conservation in a graded spectrum, ie from the most to least desired state; the most desired shall be continuity of historic structures through extension of its life. The least desired is its demotion and the intermediate is a vandalized state. The latter state extends nearly the normal lifespan of the building material and construction quality, indicating its potential to be adapted for the future.

When buildings are upgraded and its lifespan is intentionally extended by users, it boosts innovation in technology, improves quality of work and reinforces sense of belonging among user-groups who may or may not be the local community. The continued need negotiation stems from users attributing values such as age-bias (reflecting the sense of ownership and legacy), cost-effectiveness (where continuity or swapping use and choosing to upgrade infrastructure to continue function, is preferred as a pragmatic approach), physical appearance (recognition of artistic features or collective remembrance or a cultural tribute) – were noted as reasons that garnered support for conservation of historic buildings. When city managers expend efforts to embed such values among user groups, simple conservation and maintenance efforts may prevent wastage on infrastructure, lower cost of living and lower emission.

The least desired response is demolition and substituted by new building that may disregard the architectural features of that replaced. The further the new building is from the existing or traditional architectural form, more likely it is instigated from a change in political ideology (vindictive or malicious vandalism), a lack of imagination and a disinterest in need-negotiation. The credibility of reasons like lack of fund; difficulty in maintenance, lack of availability of material and/or workmanship, stated to justify demolition is seldom credible. In terms of economics, the state reasons is but a broken-window-syndrome.

The intermediatory stage, when degeneration of historic buildings is at the onset, is a vulnerable state. Usually, the state of disrepair invites further degeneration, than the otherwise (also explained through a broken-window-syndrome as used in Behavioral Studies). When degeneration is not prevented or allowed to foster, these conditions can be explained through acquisitional, tactical and play vandalism. It may also stem from a reason finding base in slow violence where past or remnants of the past is deemed unacceptable due to change in ideology or association with tragedy. Sometimes the reasons combine a lack of imagination, intent and obsolescence.

There is a spectrum within which the above parameters can be applied to generate an aesthetic. This spectrum relates to the intent behind the aesthetics of the built form. At the most conservative or self-limiting approach to generate an aesthetics form is Patishe or an imitation ie, when architects literally recreates the same architectural and ornamental feature of the erstwhile traditional form. While this may be a valid approach for monuments, or for historic houses that are rare or one of a kind, or even when cost or availability of material and craftsmanship are accessible, it may not under circumstances discussed as follows. When the knowledge system is compromised or when a traditional feature is reduced to a 'look', kitsh of sorts et al. This form of mimicking is an ethical issue which robs the craft and the creator its dignity.

The other end of the spectrum is an arrogant or a contrast, which bears no semblance with the context and is inserted with the sole purpose of 'upsetting' to the point of denigrating the traditional form. While some may argue that insertion of new is not necessarily to denigrate, but rather legitimize contemporary taste – this fact is insubstantial. The CABE report have amply demonstrated the high and long-term loss due to bad design. Such studies are needed and yet to be conducted for India. An arrogant design would literally use a contrast to create a visual tension and detract attention away from the historic buildings in a cluster.

Depending on the skill of the designer, a contrasting (not arrogant) insertion could also be a value addition. Imagine a condition where at edge of a historic city, a plot that had a landmark is being redeveloped. Such plots could offer an opportunity to insert a contemporary form that offer a cross-fading of aesthetics (a restrained form visible from the historic city and a more modern one towards the urban extension) by considering vision-cones. Afterall, with the development in digital surfaces, the possibilities of experimenting with facia design is endless.

Between the two extremes ie Pastiche and Arrogant, exists three graded choices – Traditional Reference, Contemporary Reference and Modern. A Traditional Reference would imply that dominant features of the older or existing form remain unchanged and contemporary insertions are subtly woven into it. This is, for the want of a better expression, a path of least resistance, usually preferred by local authorities and sanctioning agencies. Much of its form, details and material are borrowed from the existing local forms but may have been 'watered-down components lifted from the past' to show modernity. It takes little

imagination (and skill) to produce such solutions but when handled sensitively it could produce some visually appealing results, especially in cases of extension or addition of a new block in the fore and backgrounds of a historic building or complex.

The Contemporary Reference is comparatively bold and subtle simultaneously. It is possibly the most accepted in historic environs today where, save the basic proportions and unifying features taken from traditional mass-void correlation, colour and proportions, the detailing is contemporary. Such buildings have a visual identity but without detracting the eye from the historic environs completely. As the idea is mutual respect, it complements historic environments and are made with good quality material. While this is an ideal solution, Contemporary Reference requires significant practice and to be involved with the local community, and their aspirations.

The ‘Modern Traditional’ is an unambiguous derivative and is expected to be a result of a Form Based Codes Approach. Here, there is a subtle and functional inclusion of traditional features, for example, projection lines in the form of shading devises, or building orientation to minimize absorption of sun-rays or perhaps placement of trees which is a part of an overall landscaping theme. This requires a skilful hand and a good understanding of its historical surroundings as it runs the risk of monotony or encouraging arrogant designs.

02 Demonstration of application of Guidebook

This chapter contains a sample demonstration of application of the Guidebook and SOPs. The case considered is hypothetical.

2.1 Demonstration of application

A hypothetical case has been considered to test the application of the Guidebook and the SOPs.

Following context has been assumed for the case-

1. Test Case is a Township located in a dense part of a city and is along a Sea Front.
2. It shall house employees from a Port and allied facilities.
3. It is designed with wide roads, green open spaces and support facilities.
4. It has two entries and is accessible through an arterial road.
5. The township is planned with amenities like commercial plaza, parks, auditorium, hospital, schools, etc.

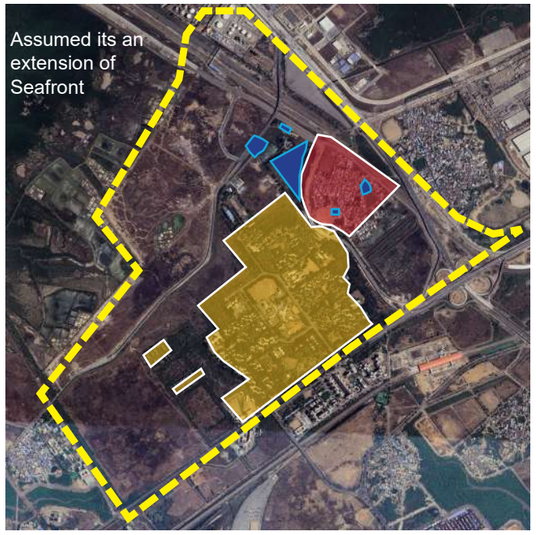

Fig. 1: Satellite image of the location inspiring the hypothetical test case

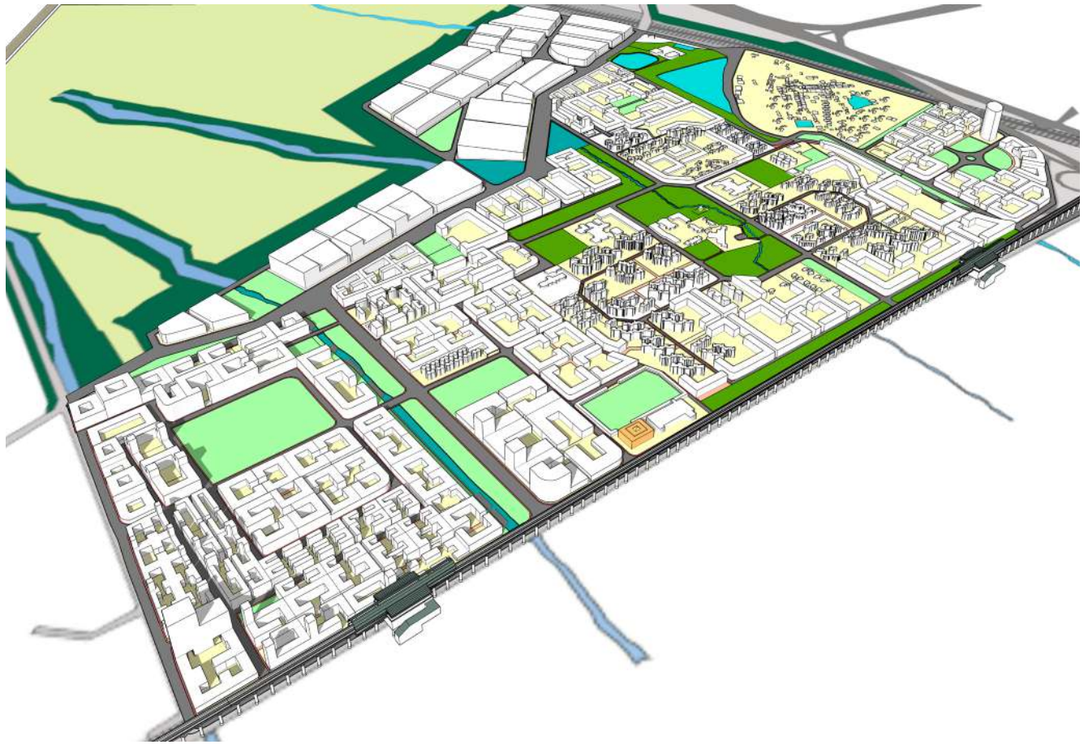

Fig. 2: Assumed character of the Test Case

For the purpose of demonstration, the land use characteristics and applicable benchmarks have been referred from a metropolitan city, which has a regional plan and development plan. The Development Control Norms from the development plan have been adopted. It is also assumed that part of the area is brownfield, while the remaining areas are vacant land parcels for future growth. Other assumptions will become clearer in the subsequent sections where CBALP overlays are explained.

The assumed land use characteristics is for 250 Ha of land area which comprise of existing areas, future proposed areas, natural zones to be preserved, etc. Refer tables and figure below for details.

Township Redevelopment	
FSI	2.5
Township's Estimated Residential Population	60,000
Total Existing Area in Hectares	102
Proposed Population Density in PPH	588
New Residential Development surrounding the Township Area	
FSI	2.5
Total Proposed Residential Population in Test Case	18,800
Proposed Population Density in PPH	250
Additional Proposed Residential Area in Hectares within Township	36.88
Additional Proposed Residential Population within Township	9220
Total Residential Population (Township Redevelopment + New Residential Development)	69,220
Gaothan/ Village Abadi (Jaskhar)	
Proposed Population	7,734
Total Area in Hectares	20.46
Proposed Population Density in PPH	378
Total Residential Population (Township)	**76,954**

Table 2: Population Calculation

Land Use Category	**Area (in Ha.)**
Residential Excluding Gaothan	79.22
Gaothan	17.54
Commercial	22.5
Public / Semi-Public (PSP)	16.63
Natural Green	16.05
Natural Blue	5.56
Man-made Green	16.11
Man-made Blue	3.83
Warehousing	15.98
Industrial	22.37
Roads	49.16
Total	**264.95**

Table 3: Area statement

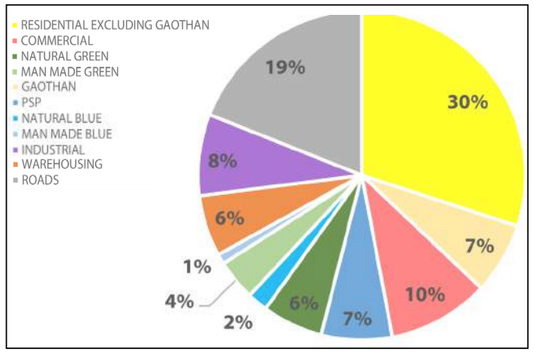

Fig. 3: Land use distribution

2.2 Social Infrastructure Requirements

The Test Case consists of few existing social infrastructure. Based on the horizon year population projection, additional amenities are required to meet future demands. Planning for different levels of amenities is critical in brownfield areas (already developed) but can be restructured through TDR rights and redevelopment schemes. In greenfield areas (new development) considering the continuous growth of population for different horizon years, techniques for efficient utilization of land to attain its full value/ potential benefits through the process of Accommodation Reservation must be adopted. Horizontally and vertically mix of use is to be promoted. The emphasis is on multiple use of zones/ areas through social amenities and activities, and is reflected in the CBALP. Tables below depict the quality and quantity of social infrastructure required for the Test Case area.

Categories of Educational Facilities	Amenities Required	Existing / Available Amenities	Additional Amenities Proposed	Area in Ha
Play School	1 for every 2500 population served per unit	2	31	2.5
Primary School	1 for every 5000 population served per unit	2	15	6.2
Secondary School/ Sr. Sec. School	1 for every 7500 population served per unit	2	10	18.5
Junior College	1 for every 1.25 lakh population served per unit	1	-	-
School for Physically Challenged	1 for every 45000 population served per unit	0	1 to 2	1.4

Table 4: Requirements of Educational Facilities in the Test Case

Categories of Healthcare Facilities	Amenities Required	Existing / Available Amenities	Additional Amenities Proposed	Area in Ha
Dispensary	1 for every 15000 population served per unit	0	5	0.4 to 0.6
Nursing Home, Child Welfare and Maternity Centre	1 for every 45000 to 1 Lakh population served per unit having 25 to 30 beds	1 Private Hospital (20 beds)	-	-
Polyclinic	1 for every 1 Lakh population served per unit having some observation beds	1 Government Polyclinic (2 beds)	-	-
Family Welfare Centre	1 for every 50000 population served per unit	0	2	0.1
Diagnostic Centre	1 for every 50000 population served per unit	0	2	0.1
Intermediate Hospital (Category A)	1 for every 1 Lakh population served per unit	1 Government Hospital	-	-

Table 5: Requirements of Healthcare Facilities in the Test Case

Categories of Open Spaces	Amenities Required	Existing / Available Amenities	Additional Amenities Proposed	Area in Ha
Housing Area Park	1 for every 15000 population served per unit	1 (0.5 Ha)	5	2.6
Neighborhood Park	1 for every 15000 population served per unit	0	5	5.1
Natural Green Spaces	-	16.05 Ha	-	-

Table 6: Requirements of Open Spaces in the Test Case

Categories of Socio Cultural Facilities	Amenities Required	Existing / Available Amenities	Additional Amenities Proposed	Area in Ha
Anganwadi - Housing Area/ Cluster	1 for every 5000 population served per unit	1	15	0.3 to 0.5
Community Room	1 for every 45000 to 1 Lakh population served per unit	0	15	1.2
Community Hall, Mangalkary-alaya, Barat Ghar/ Library	1 for every 15000 population served per unit	1 Community Center	5	1.0
Religious Facilities at neigh-borhood/ housing cluster level	1 for every 5000 population served per unit	3 Temples	5	0.2

Table 7: Requirements of Socio-Cultural Facilities in the Test Case

Categories of Commercial Centers	Amenities Required	Existing / Available Amenities	Additional Amenities Proposed	Area in Ha
Convenience Shopping	1 for every 5000 population served per unit	0 (Small scale retail & eat-eries are available)	15	2.3
Local shopping including service center	1 for every 15000 population served per unit	0 (Small scale shopping centres are available)	5	2.4

Table 8: Requirements of Commercial Centers in the Test Case

Miscellaneous	Amenities Required	Existing / Available Amenities	Additional Amenities Proposed	Area in Ha
Cremation Ground/ Burial Ground	1 for every 2 Lakh population served per unit	1	-	-
Post Office	1 for every 15000 population served per unit	0	5	0.04
Bank with extension counters and ATM facility	1 for every 15000 population served per unit	0	5	As per require-ment

Table 9: Miscellaneous Facilities required in the Test Case

2.3 Physical Infrastructure Requirements

The water consumption in the case area is calculated as per broad land use categories ie, residential, commercial and industrial. The base data required for this process in case of residential (low/ medium/ high density) is average dwelling unit size in square meters is calculated by considering density, family size, standard requirement for water consumption in liter per capita per day (LPCD) and percentage of water losses / wastage.

For commercial and industrial use zones, floor area per unit in square meters, occupancy per unit in square meter per person and occupancy load as occupancy calculated; is to be divided by floor area per unit and standard requirement for water consumption in liter per capita per day (LPCD).

Requirement of sewage treatment in the Test Case is calculated as the emphasis is on the percentage of water to reach the sewers with minimum waste or losses in the water supply system. Ideally, 80% of the water can be treated before reaching sewers if managed and only 20% is black water which requires further treatment. Considering adoption of systematic infrastructure planning, and sustainable measure in the CBALP to avoid wastage of water, total water consumption (use wise) and sewage treatment is as follows:

Residential Category	Per DU Unit Size	Family Size	Water Required (LPCD)	Total Water Consumption (LPCD)	Water Losses/ Wastage @50% additional	Water Consumption (LPCD/ Sqm)
Low Density Residential	100	4	135	540	810	8.1
Medium Density Residential	67	4	135	540	675	10.07
High Density Residential	45	5	135	675	709	15.75

Table 10: Water Requirement/ Consumption in Residential land use zone in the Test Case

Commercial Category	Floor Area Per Unit	Occupancy (Sqm/Person)	Occupant Load (Occupancy/ Floor Area)	Water Required (LPCD)	Total Water Consumption	Including Fire @100% additional	Total Water Consumption (LPCD/Sqm)
Commercial Office	150	10	15	45	675	1350	9

Table 11: Water Requirement/ Consumption in Commercial land use zone in the Test Case

Commercial Category	Floor Area Per Unit	Occupancy (Sqm/Person)	Occupant Load (Occupancy/ Floor Area)	Water Required (LPCD)	Total Water Consumption	Including Fire @100% additional	Total Water Consumption (LPCD/Sqm)
Industrial (Textile)	1000	10	100	45	4500	9000	9
Industrial (Paper)	1000	10	100	45	4500	9000	9

Table 12: Water Requirement/ Consumption in Industrial land use zone in the Test Case

For power/ electricity supply and consumption, the data required is population of the Test Case for horizon year analysis, units or kWh consumption per person per day and number of electric sub-stations required in kV, for population to be served.

The equation to calculate electricity consumption per unit is:

$$E = P*(t/1000)$$

where; E = energy measured in Joules or kilowatt-hours (kWh), P = power units in watts, and t = time over which the power or energy was consumed. Use of sustainable measures like solar panels by individual property/ plots and solar power plant at area level, depending upon climatic conditions, is emphasized at the CBALP level.

Following table depict the calculations for electricity demand and supply for the Test Case area:

A. Residential Category	Water (LPCD/ Sqm)	Sewage (@80% of water supply is expected to reach the sewers)
Low Density Residential	8.1	6.48
Medium Density Residential	10.07	8.05
High Density Residential	15.75	12.6
B. Commercial Category		
Commercial Office	9	7.2
C. Industrial Category		
Industrial (Textile)	9	7.2
Industrial (Paper)	9	7.2

Table 13: Sewage Treatment Requirement in the Test Case

Population of Horizon Year	Electricity Consumption (1000 Units or 2.74 kWh/ Person/ Day)	Electric Sub-Station (@ 1 Sub-Station of 11 kV for a population of 15,000)
76,954 persons	210853.96 kWh/ Day	5 Electric Sub-Stations

Table 14: Electricity Consumption/ Requirement in the Test Case

For solid waste management, planning through sustainable techniques for treatment of each category of waste is necessary to maintain the surroundings environment as clean, healthy and liveable.

For this, measures adopted start at household/ domestic level. This aims to segregate waste at source, through reduce, reuse and recycle (3 R approach) before residues are disposed, collected, transported, recovered and processed.

Other hazardous waste like e-waste, chemical waste, pharmaceutical waste etc. are to be processed separately as per standard procedure to protect the environment.

Following tables depict the requirement of management of solid waste generated in the Test Case, as per designated land use:

Residential Use Category	Per DU Unit Size	Family Size	Solid Waste to be generated (Kg/Person/Day)	Total Solid Waste generated in residential zone (Kg/Person/Day)	Total Solid Waste generated in residential zone (Kg/Person/Day/Sqm)
Low Density Residential Refuse	100	4	0.6	2.4	0.02
Medium Density Residential Refuse	67	4	0.6	2.4	0.04
High Density Residential Refuse	45	5	0.6	3	0.07

Table 15: Solid Waste Management in Residential Use Zone within the Test Case

Commercial Category	Floor Area Per Unit	Occupancy (Sqm/person)	Occupant Load (Occupancy/ Floor Area)	Solid Waste to be generated (Kg/ Person/Day)	Total Solid Waste generated in residential zone (Kg/Person/Day)	Total Solid Waste generated in residential zone (Kg/Person/Day/ Sqm)
Commercial Refuse	150	10	15	0.2	3	0.02

Table 16: Solid Waste Management in Commercial and Institutional Use Zone within the Test Case

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2.4 Outdoor Space Plan (OSP)

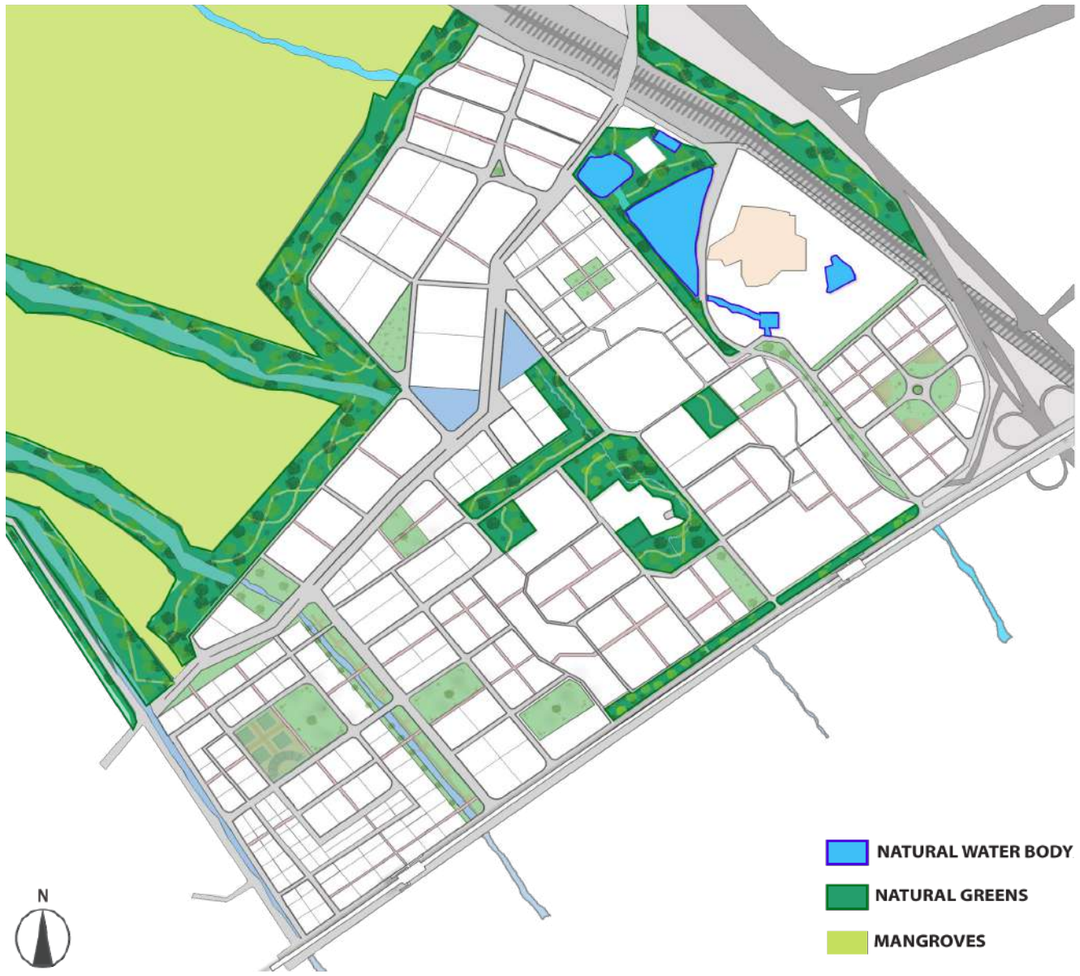

Fig. 4: Natural Blue-Green Open Space Network Map

Step 1: The base map of OSP for Test Case is generated considering the following information:

1. All existing natural blue and green areas are mapped, for analysis and preservation to mitigate against disaster. A large percentage of this natural green area is located at the north-west, along industrial use zone. A natural blue-green area is at the north-east and adjacent to primary roads and existing Gaothan. At the center of the township is the main institutional zone supporting a mix of activities of surrounding residential zone.
2. All man-made blue and green assets are mapped. This makes the dearth of such assets (organized green and public spaces such as parks, playgrounds, plazas, water fronts, etc for recreation) in the brownfield area evident. Promoting such spaces will enhance the character and quality of life in the area, besides providing space for emergency evacuation and storm water management.

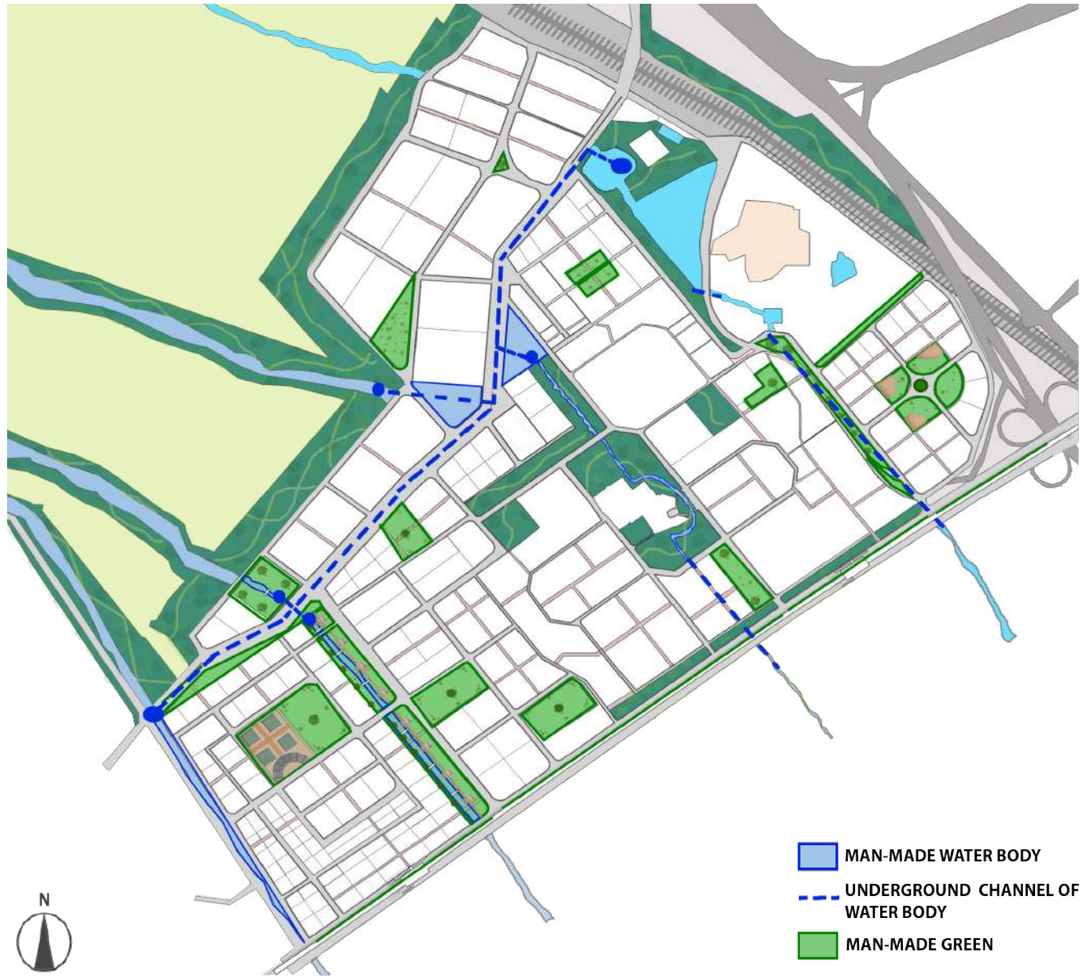

Fig. 5: Man-Made Blue-Green Open Space Network Map

Step 2: Based on Situation Analysis, proposals for additional outdoor/ open spaces are planned:

1. In brownfield area provision of large green and open spaces is challenging. Therefore, private property(ies) in the built up areas are incentivized to provide such spaces at different levels. This will enhance the health and wellness of residents, and increase the supply of green and open spaces.
2. In greenfield areas, a network of blue-green spaces are planned across the township. It provides a hierarchy of recreational spaces that are easily accessible and provide for multiple activities, utilities, management of natural slope and water catchment etc.
3. Plans address four requirements: Natural Green with Natural Blue, Natural Green with Man-Made Blue, Man-made Green with Natural Blue and Man-Made Green with Man-Made Blue.

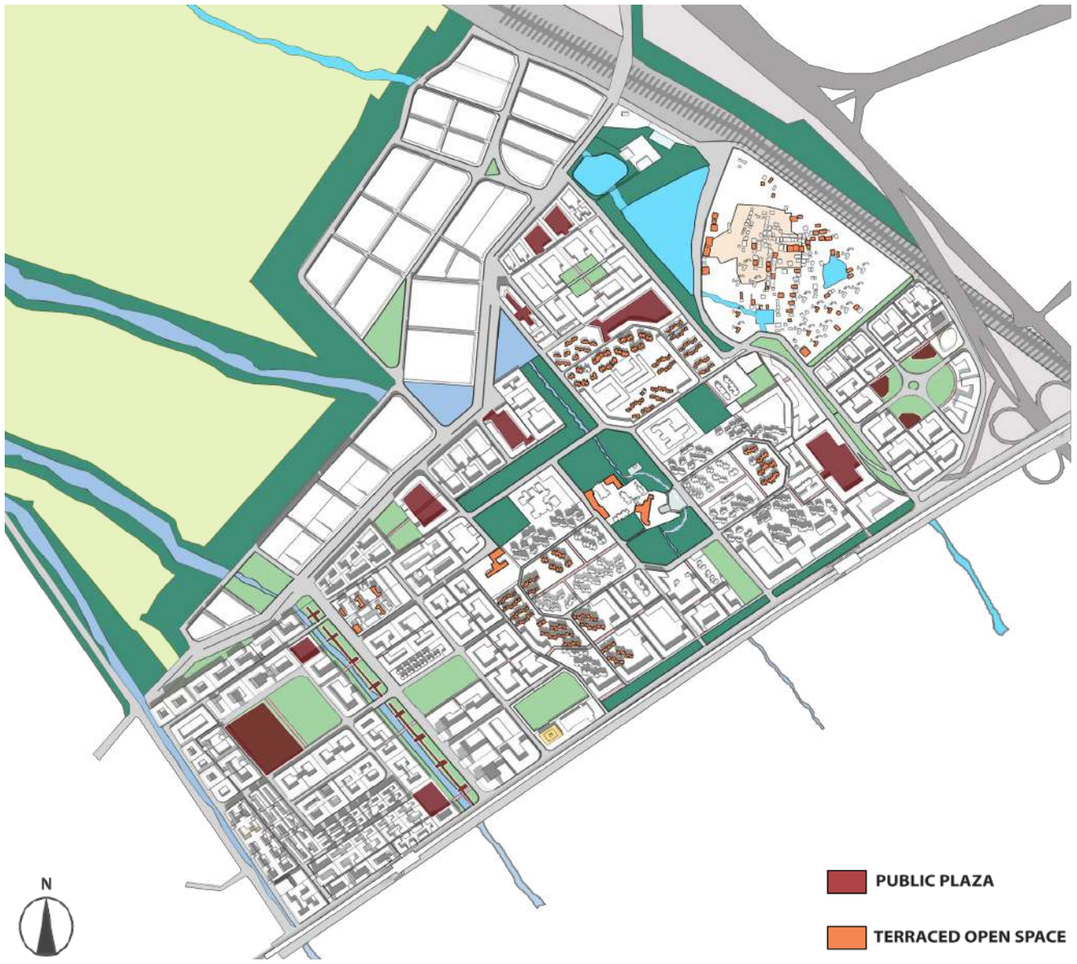

Fig. 6: Public Plazas and Terraced Open Space Map of the Test Case

Step 3: Demarcation of public plazas and terraced open spaces public / private plots:

1. Plazas and public terraces increase potential for activities and revenue.
2. Designated functional space for public plaza at ground level of large residential, institutional and commercial plots with direct access from the main street with active frontages is a fundamental requirement.
3. Public space on terraces have been recommended where space at ground level is not available. This will enable an equitable distribution of public space and resource in the planned area.
4. Providing an additional FAR to existing areas and reclaiming of encroached open/ green areas through Green TDR are adopted for the purposes.

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2.5 Low Carbon Mobility Plan (LCMP)

Fig. 7: Street Hierarchy, Junction Type and Shared Parking Map of the Test Case

Step 1: Based on the function, capacity and level of service of each road, a proposed LCMP is prepared:

1. Road Right of Ways (RoW) for existing roads and carriageway widths were analyzed and demarcated.
2. Map of existing transport network was prepared considering:
   - Public Transport (PT)
   - Intermediate Para Transit (IPT)
   - Non Motorized Transport (requirements for footpath, cycle tracks etc) (NMT)
3. Referring the Master Plan for Test Case area, the existing road hierarchy, grid pattern and road junctions were mapped to generate a structure of existing road network.
4. It has been observed that the existing street network follow a pattern but lacks the hierarchy and necessary transport infrastructure for PT, IPT and NMT services.

Fig. 8: Mobility Network Plan of the Test Case

Step 2: The proposals for road and junction improvement consisting of sidewalks and footpaths to augment the mobility network is prepared:

1. Roads are hierarchically categorized as primary, secondary and tertiary. Further, connected networks (Vehicular Ways) are made for enhanced accessibility and mobility.
2. PT, IPT and NMT routes are aligned on complete streets and through open spaces within plots (Pedestrian Ways).

Step 3: All junctions are demarcated following road geometry and design and categorized as:

1. Roundabouts.
2. Regular junctions (Signalized or Signal free).
3. Mid-block NMT crossing.
4. Road Geometry Improvements.

Step 4: Streets and adjoining spaces are identified for:

1. Transport Interchange locations and types.
2. Shared Parking Facility for public within properties.

Step 5: TDR Mechanism for land sharing is proposed.

2.6 (Re)generation Opportunity Plan (ROP)

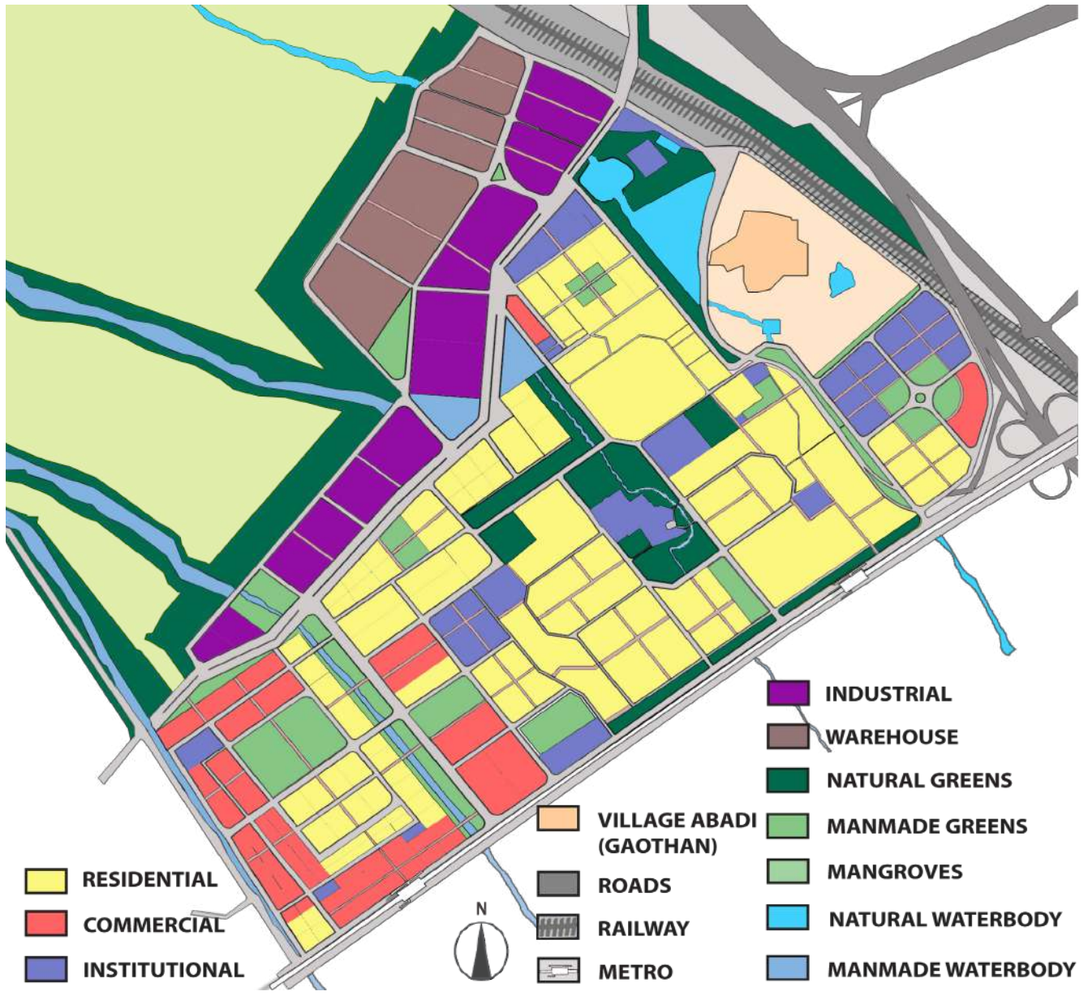

Fig. 9: Proposed Land Use Map of the Test Case

Step 1: Existing and proposed use premise (Built or Un-Built) is demarcated after referring to the Master Plan for Test Case area.

The predominant land use in the existing/ developed area of the township is residential (centrally distributed) followed by commercial (majorly in south-west side) and institutional (spatially distributed across the whole area). The Industrial use zone is located at the periphery in north-west side along with adjoining warehousing zone. All the Master Plan use premises are recommended to allow mix of uses.

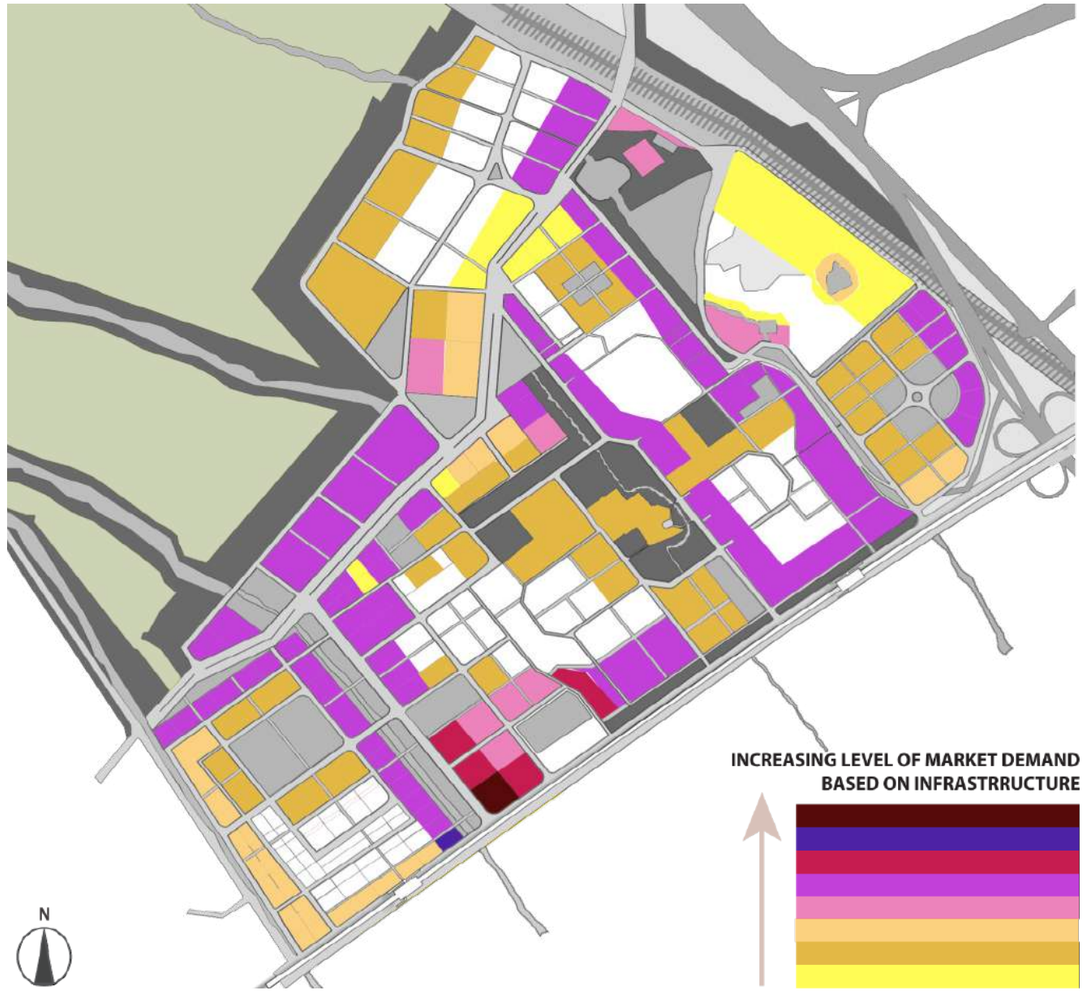

Fig. 10: Real Estate Value Map of the Test Case

Step 2: Market demand for various use types and asset classes, w.r.t. parameters mentioned below are assessed:

1. Zones of impact based on real estate values and high feasibility are mapped :
   - Connectivity along Primary and Secondary roads
   - Access to transit facility
   - Place making and Urban Aesthetics (Blue, Green, Heritage)
   - Existing and Planned Utility
   - Plot size and Geometry
   - Consultation/ Survey for demand
   - Any other suitable Parameter
2. For all zones created based on aforementioned aspects, the BUA demand is assessed and a volumetric map is generated.

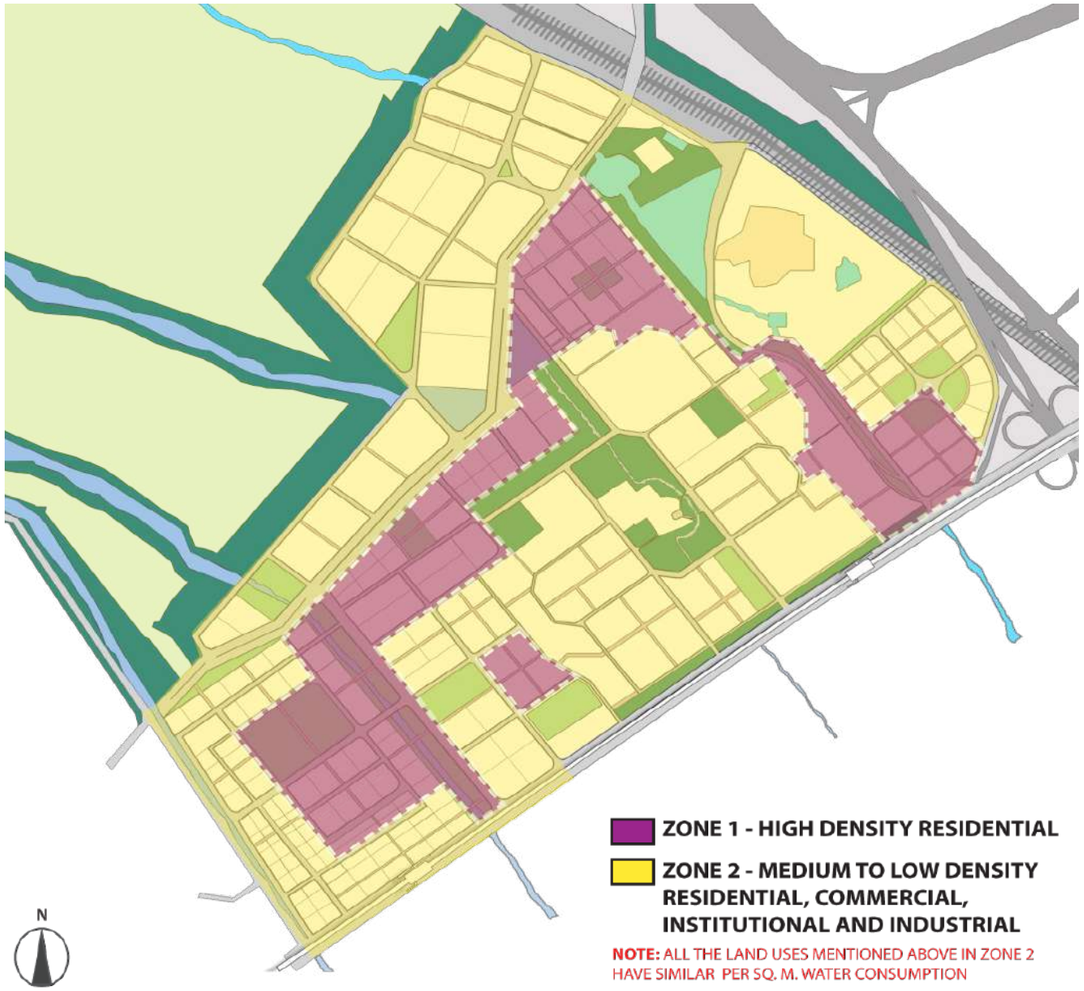

Fig. 11: Infrastructure Holding Capacity Map of the Test Case

Step 3: The Infrastructure Holding Capacity is calculated as mentioned below:

1. Data available in the Land Use Plan is used to assess available trunk infrastructure that could be utilized for the overall planning of the CBALP. The land use zone-wise water consumption, solid waste generation and power consumption is calculated based on standards. PHPDT on roads considering all modes of transport like PT, IPT, NMT etc. is also calculated based on road capacity.
2. For social infrastructure, additional basic amenities are enlisted and calculated based on horizon year's population demand. Various amenities are then mapped onto different land use zones.
3. Infrastructure capacities in terms quantum of additional floor space that can be accommodated are then finalized using the limiting BUA and base FAR.
4. For Solid Waste, the city should have a policy, regulations and designated area(s) within identified open space(s) for decentralized Waste Management.

Step 4: In this step, the values generated from Market Demand in Step 2 and Infrastructure capacity in Step 3 are overlapped onto the land use map used as the base.

The intersecting areas provide:

Zone 1 with adequate infrastructure and Real Estate market demand, making it suitable for mixed use.

Zone 2 with high market demand while requiring infrastructure augmentation to capitalize it, thereby encouraging mixed use by:

1. Improving/ upgrading infrastructure
2. Adoption of decentralized infrastructure and sustainable mobility by Plot developers.

Zone 3 with excess infrastructure and where market demand needs to be generated to boost property values, by promoting features of public realm like park-facing areas, plaza-facing areas etc.

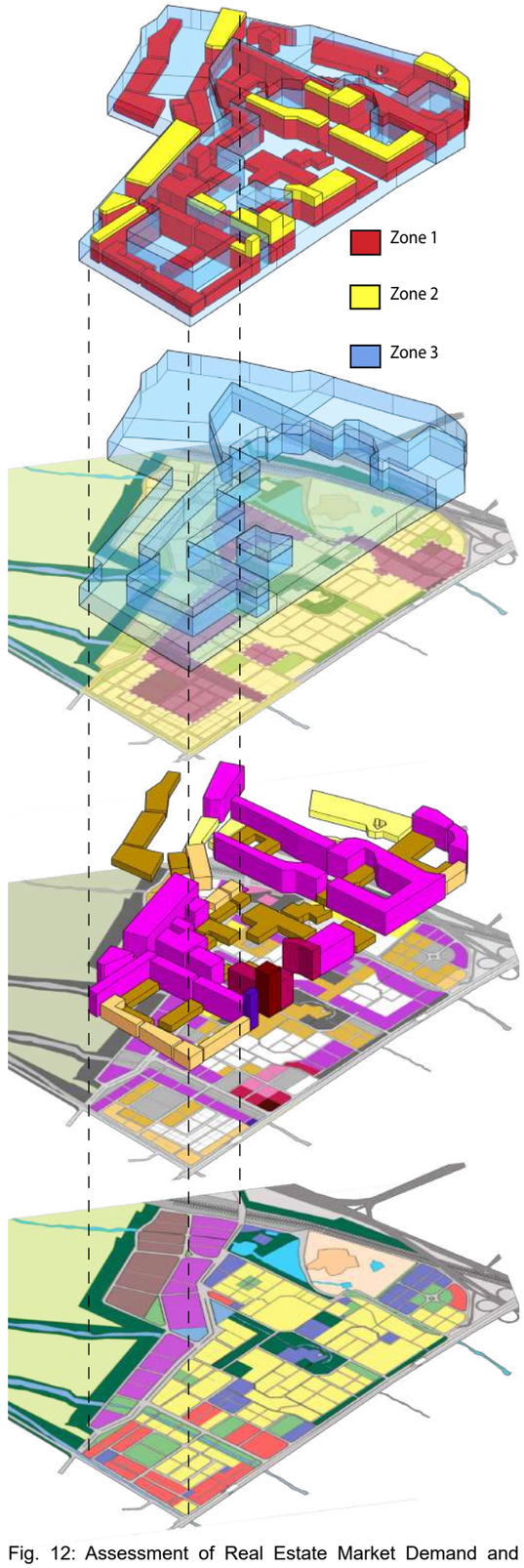

Fig. 12: Assessment of Real Estate Market Demand and Infrastructure Holding Capacity for the Test Case

2.7 Property Development Plan (PDP)

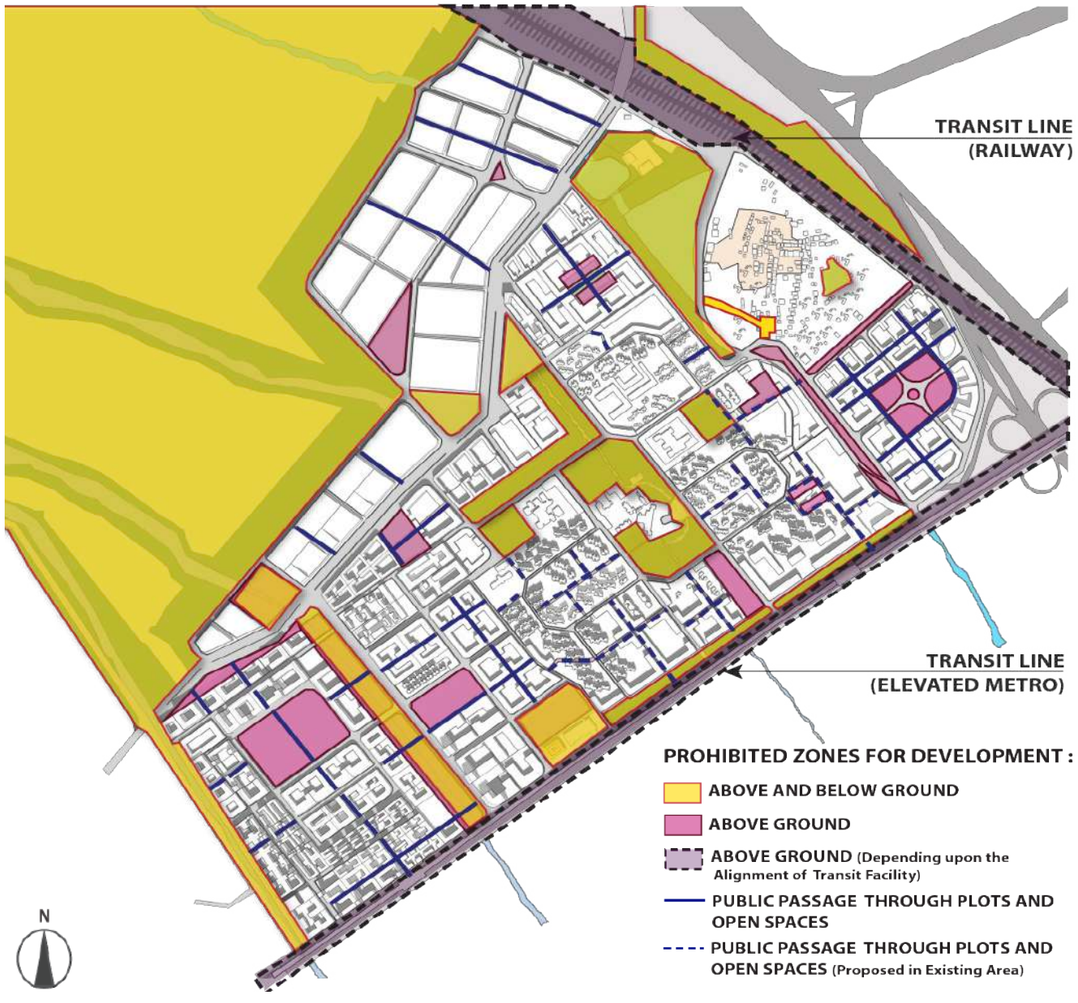

Fig. 13: Map of Public Passages through Open Spaces within Plots and Construction Restricted Zone within Township

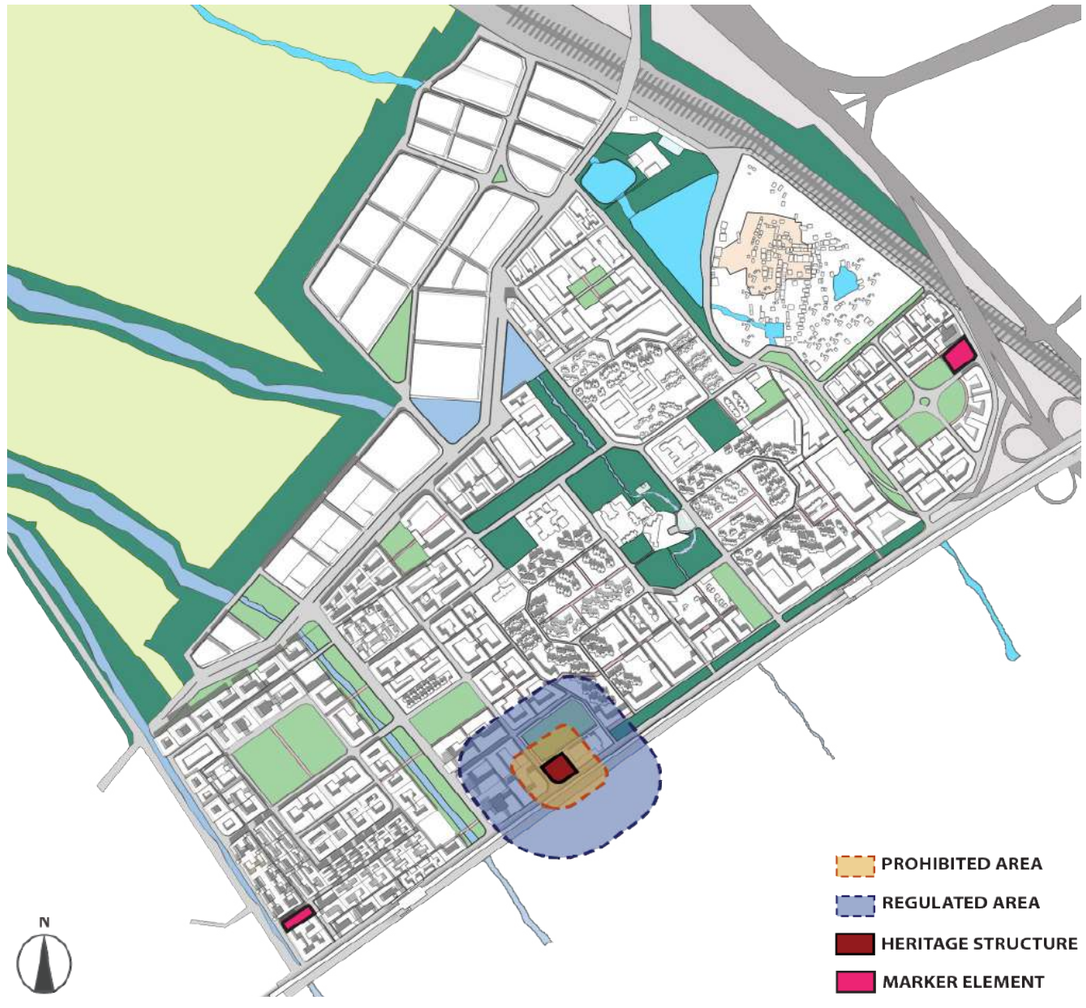

Fig. 14: Map of Heritage Regulations and Marker Elements within CBALP of the Test Case

Step 1: Collating all the overlays prepared earlier to demarcate mandatory development actions on each plot. For example:

1. From LCMP, all Pedestrian Ways and Vehicular Ways passing through plot are mapped.
2. From OSP, all public spaces required within plots are marked.

Step 2: All zones where expansion under and above public roads, green areas and water bodies are restricted, have been mapped, while all remaining areas have no restrictions in expansion above or below public spaces. The aforementioned conditions manifests as three types of zones-

1. Zones where expansions are prohibited above or under it.
2. Zones where expansions are only prohibited above ground.
3. Zones where expansions are prohibited either above or below ground depending upon existing conditions.

Step 3: Zones with heritage and where architectural/ design controls (like heritage precinct) are applicable have been mapped along with the following:

1. Protected and unprotected Heritage (Natural and Built) are located
2. Areas of design controls are demarcated
3. Plots that are subject to norms of the following are demarcated:
   - Prohibited, Regulated Areas
   - View corridor, Vision Cone
   - Conservation Zones, Green Buffers, any other

Step 4: The location of High-rise towers as marker elements are mapped while ensuring that their shadows do not block access to sunlight for nearby buildings. All buildings hence receive atleast two hours of sunlight on shortest day of the year.

2.8 Interface Regulation Plan (IRP)

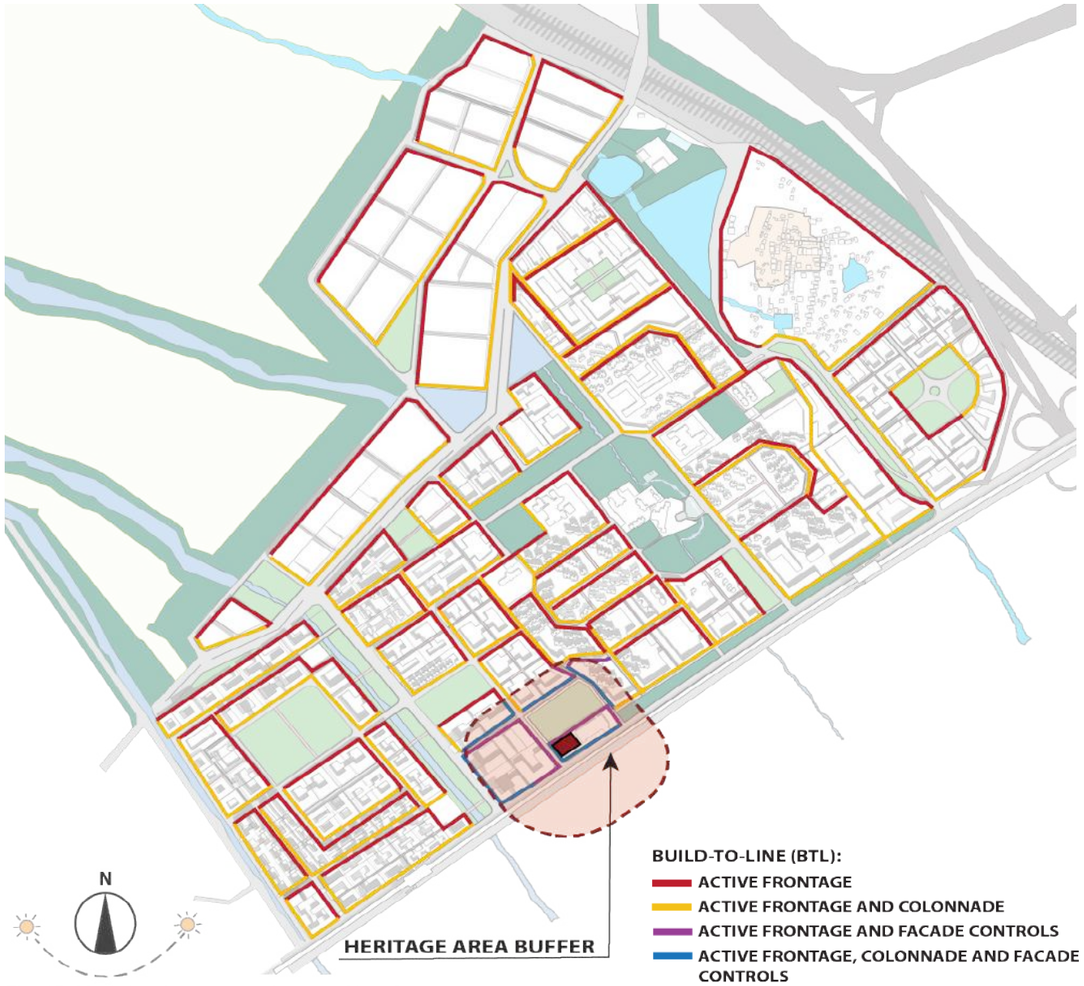

Fig. 15: Map showing proposed types of interfaces

Step 1: IRP is proposed to regulate interfaces of plots with public spaces, where it is mandatory to provide active frontage, pedestrian colonnade, facade controls and their combination.

IRP is proposed by demarcating the following-

1. Mandatory active frontages on plots abutting, primary, secondary roads, green areas, water bodies
2. Mandatory pedestrian colonnades along frontages facing western and southern sun, as per the sun path diagram
3. Facade controls for plots within prohibited and regulated area of Heritage assets.

Types of interfaces that are proposed-

1. Active Frontage
2. Active Frontage and Colonnade
3. Active Frontage and Facade Controls
4. Active Frontage, Colonnade and Facade Controls

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2.9 Community Building Program (CBP)

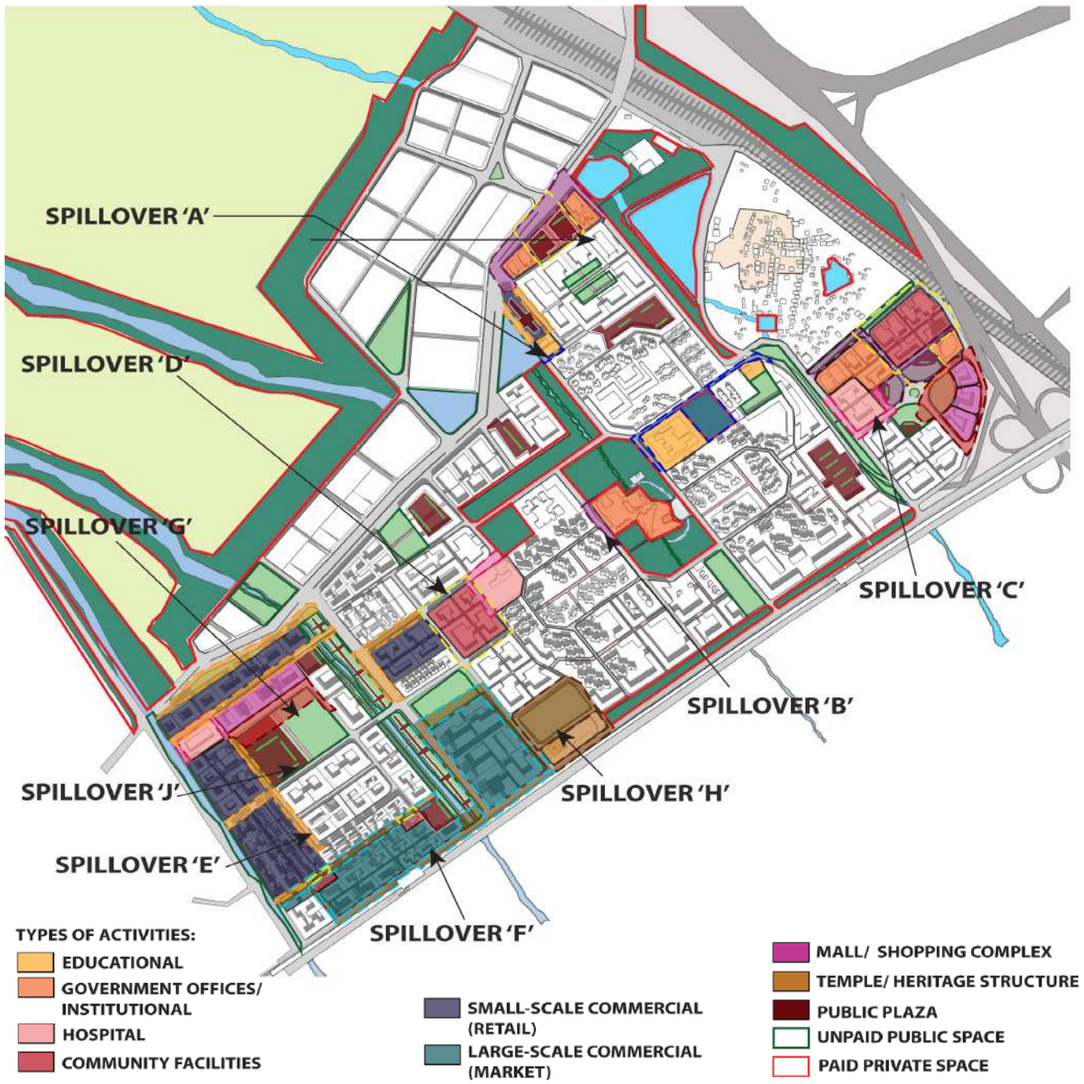


Fig. 16: Map showing different Activities and Spillovers within the CBALP of the Test Case

Step 1: All existing and proposed community facilities, amenities and spaces were mapped. These included and were not limited to educational, Govt. office/ institutional, hospitals,small and large-scale commercial (retail and market zones), mall/ shopping complex, temple/ heritage structure, public plazas, unpaid public space and paid private spaces etc.

Step 2: The existing and expected spillover zones of all activities onto the outdoor space and designated time of day/ week, were mapped.

Types of spillovers mapped, ranged from-

A - Parking, entry/ exit of educational institutes
B - Vending stalls around government institutes
C - Emergency entry/ exits, medical stores around Hospital
D - Entry/ exit during community functions

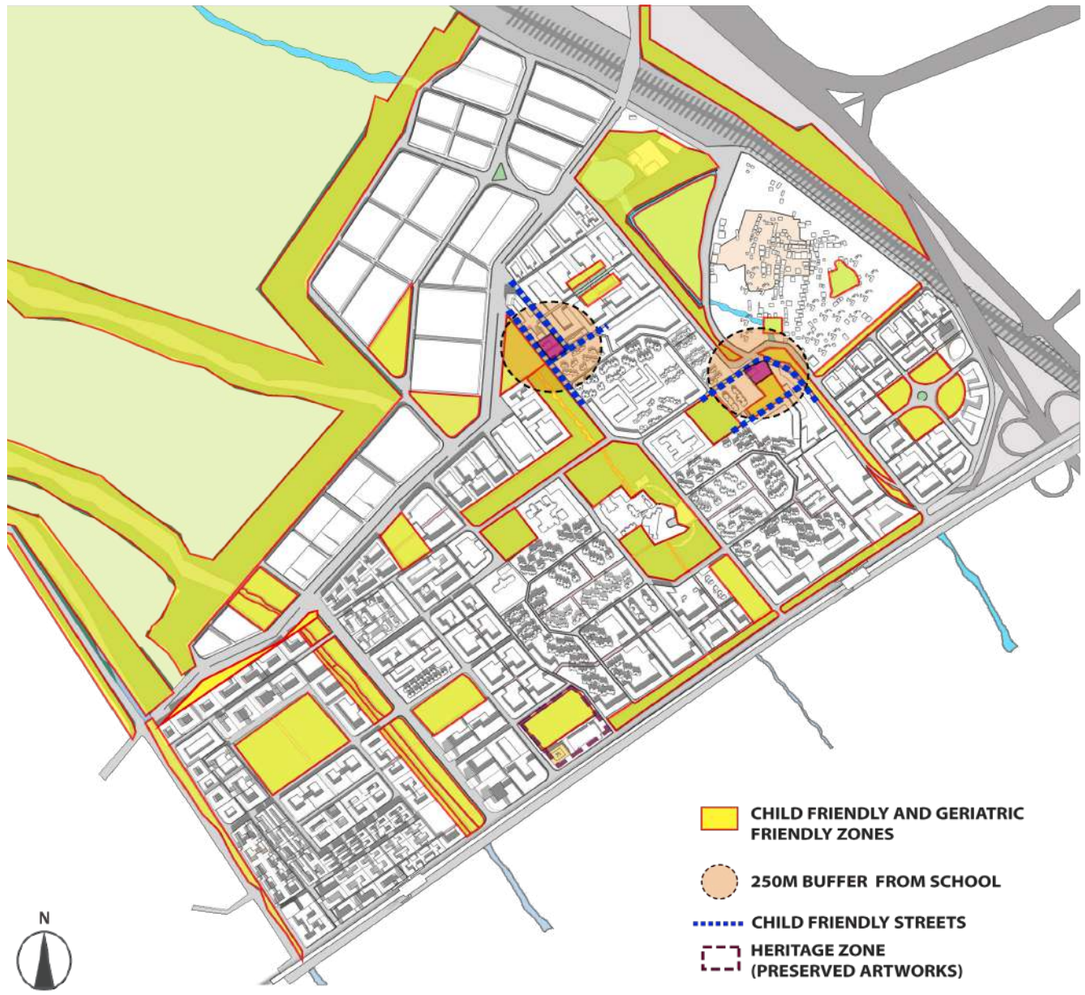


Fig. 17: Map showing Special Design Provisions within the CBALP of the Test Case

E - Outdoor seating and vending around small scale commercial
F - Vending stalls and spillover from eating joints around Large Commercial
G - Entry/ exit and parking around Malls/ shopping complexes
H - Festivals and gatherings around religious institutes
J - Vending stalls and gatherings at Public Plazas

Step 3: All open/ public spaces are proposed to be Universally Accessible. Activities which require special attention have been designated separately:

1. Zones requiring specific design measures for children, such as a buffer of 250m radius from school premises.
2. Zones requiring geriatric and child-friendly design; such as interchange points, crossing facilities, public spaces et al.
3. Zones requiring preservation and promotion (Heritage Properties); such urban forests, buffers of conservation zones, precincts with traditional art, craft, skills, monuments etc.

2.10 Sample Property Development Card

PROPERTY DEVELOPMENT CARDS NO. [CITY/PLOT UID/YEAR]				
Plot Area			**500 sq.m.**	
VP	**Volumetric Parameters**		**Applicable Regulations/ Measurements (**Development Control Norms/ Local Byelaws)	
	VP.1.	Applicable F.A.R./ F.S.I.	2.5	
	VP.2.	Applicable Ground Coverage	50 %	
	VP.3.	Use Premise as LP/ CBALP	Residential/ Commercial/ Public-Semipublic/ Industrial/ Transportation/ Social Infrastructure (Educational/ Hospitals) etc	
	VP.4.	Permissible mix of use	66% Residential 33% Commercial 33% 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- 3m, to be maintained as public space without boundary wall,	
			Frontage abutting another plot- N.A.	
	VP.6.	Maximum permissible height of Superstructure	h= 150m, above natural ground level	
	VP.7.	Maximum permissible depth of underground structure	d= 4.5m, below natural ground level	

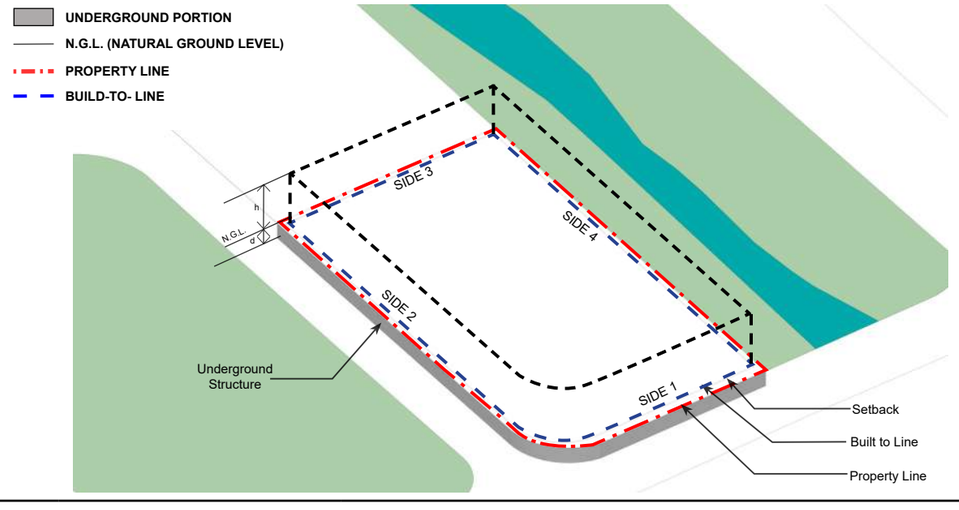


Table 17: Sample PDC- Volumetric parameters

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**
			3 m	1.5 m	1.5 m	1.5 m
	IR.2.	Active Frontage	Y	Y	Y	Y
	IR.3.	Colonnade	Y	Y	--	--
	IR.4. (H)	Facade Control- 1. Proportions and offsets 2. Colour 3. Material Palette	--	--	--	--

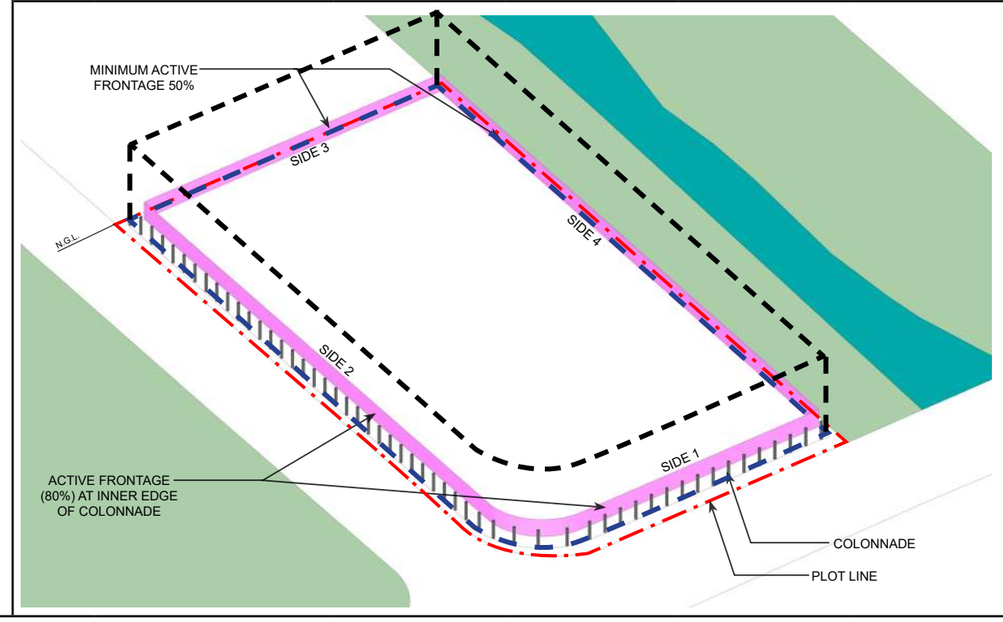
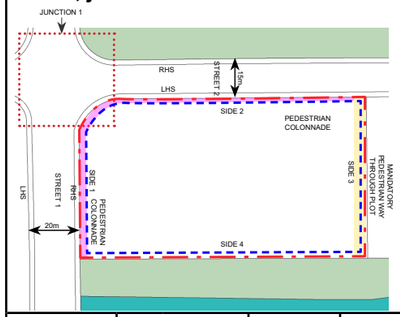


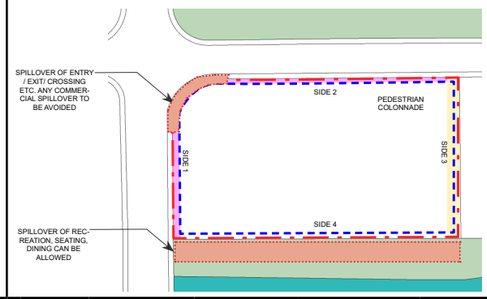
Table 18: Sample PDC- Interface Regulations

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 Land Use	Footpath Width	Dead Width	Multi-Utility Zone	Walkable Space	Cycle Track
Side 1	Primary	20 m	Residential					
L.H.S.				3.5 m	--	1 m	2.5 m	1.5m
R.H.S.				4.5 m	0.5 m	1.5 m	2.5 m	1.5m
Side 2	Secondary	15 m	Green					
L.H.S.				3.5 m	--	1 m	2.5 m	--
R.H.S.				2 m	--	--	2 m	--

Type of Junction: 4 arm, regular, pedestrian and cyclist crossing

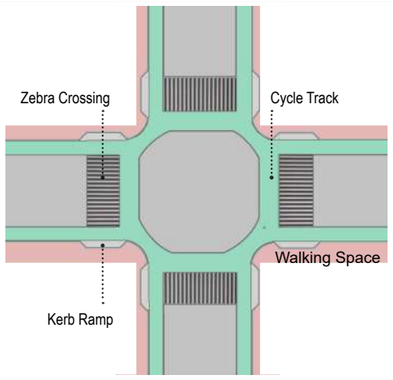


Table 19: Sample PDC- Street Design Regulations

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

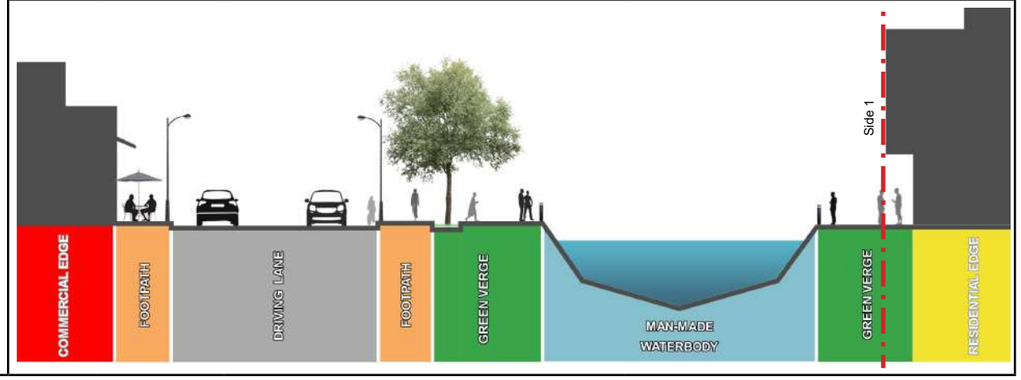


Table 20: Sample PDC- Waterfront Regulations

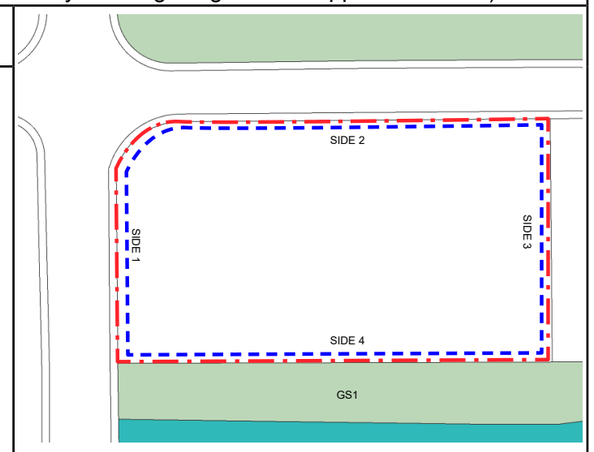
OS -G	Green Space Regulations	**Applicable Regulations/ Measurements** (As per CBALP- Outdoor Space Regulation Plan, Community Building Program and applicable UFRs)
	Name- GS1- Side 1	**Types of Green-** Man-Made
	Activities Permitted- • Spaces for revenue generation • Recreation • Festivals • Community Functions/ Events • Vending Spaces near entry/ exit • Public Utilities • Sports facilities • Multi-Activity Recreation	

Table 21: Sample PDC- Green Space Regulations

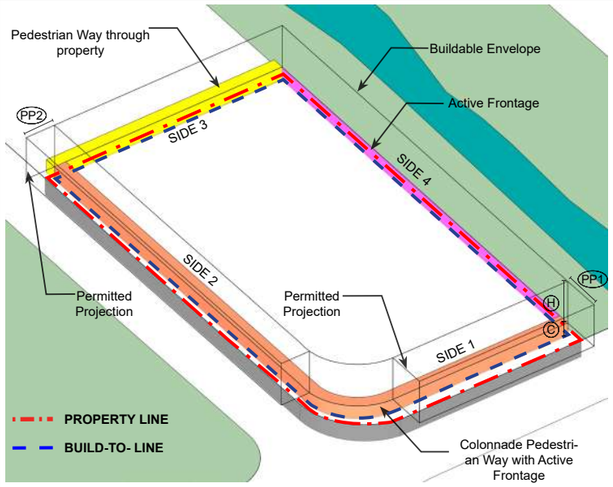
PR	Plot/ Building Regulation	**Applicable Regulations/ Measurements** (As per CBALP- (Re)generation Opportunity Plan, Property Development Plan and applicable UFRs)	
	Buildable Envelope	**Component**	**Regulation**
		C	Min. 5.5 m
		C+H	Max. 150 m
		PP1	Max. 10 m
		PP2	Max. 7.5 m
		LEGEND: Ⓒ MINIMUM MANDATORY CLEARANCE UNDER PERMITTED PROJECTION Ⓗ MAXIMUM HEIGHT OF PERMITTED PROJECTION P.P. PERMITTED PROJECTION	
	Marker Element- N.A.		

Table 22: Sample PDC- Plot/ Building Regulations

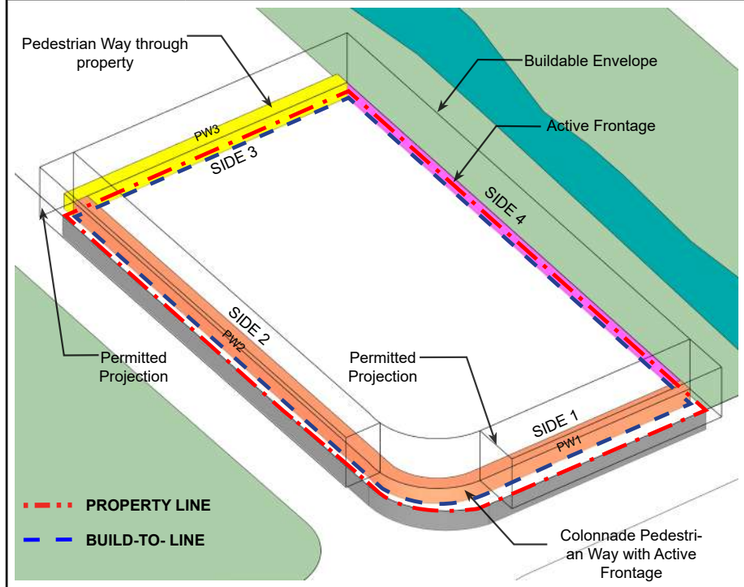
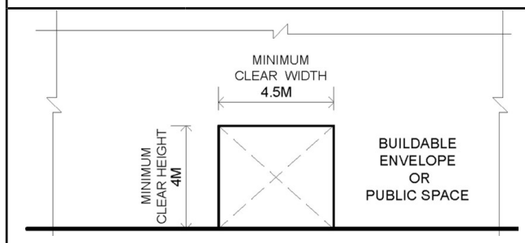
PR	Plot/ Building Regulation	**Applicable Regulations/ Measurements** (As per CBALP- (Re)generation Opportunity Plan, Property Development Plan and applicable UFRs)	
	Name	**Description**	**Colonnade**	**Any other control**
	PW1	Pedestrian Way along Side 1	Y	--
	PW2	Pedestrian Way along Side 2	Y	--
	PW3	Pedestrian Way along Side 3	--	--
			
			

Table 23: Sample PDC- Plot/ Building Regulations

CR	Climate Resilience Regulations	**Applicable Regulations/ Measurements** (As per applicable Green Building UFRs)
	All Guidelines mentioned in Climate Resilience Regulations in SOP-II to apply	

Table 24: Sample PDC- Climate Resilience Regulations

03 Other Policies and Regulations

This Chapter contains some of the policies related to area planning and urban asset management. The policies mentioned in this section are indicative of ongoing actions in various cities which support adoption of Form Based Codes approach.

3.1 Area Based Planning Norms

There has been increasing number of policies, programs and plans that indicate the need for Area Based Planning. The object and key provisions of these Area Plans are discussed in this Section. Also note, Guidebook II details a simplified process, outputs and key performance indicators of such policies, programs and plans.

Policies for Area Planning concerned with diverse building blocks of Form Based Codes are:

1. **Norms and guidelines for Area Based Planning**
   - Land Pooling Policy (Case of Guwahati)
   - Parking policy (Case of Pune)
   - TOD policy (Case of Uttar Pradesh)
   - Green Development Area policy (Case of Delhi)
   - Electric vehicle policy (Case of Delhi)
   - Waste management policy (Case of Indore)
   - Solar Power policy (Case of Telangana)
   - Solar Power policy (Case of Tamil Nadu)
2. **Norms and guidelines for Public Space**
   - Street Design Guidelines (Case of Pune)
   - Treatment and Design of Waterbodies (Case of Delhi)
3. **Norms and guidelines for Plot/Building**
   - Green Building Policy (Case of Maharashtra)
   - Conservation of Heritage Buildings/ Precincts/Natural Features (Case of Pune)

Norms and Guidelines for Plot to Public Space Interface-

Today, norms and guidelines for design of interface between the plots/buildings and public space are absent in the absolute sense. Cities that have initiated the modernization of Building bye-laws are addressing the norms for the design and treatment of such interfaces as follows:

- Plot Frontages;
- Building Line;
- Building Facade.

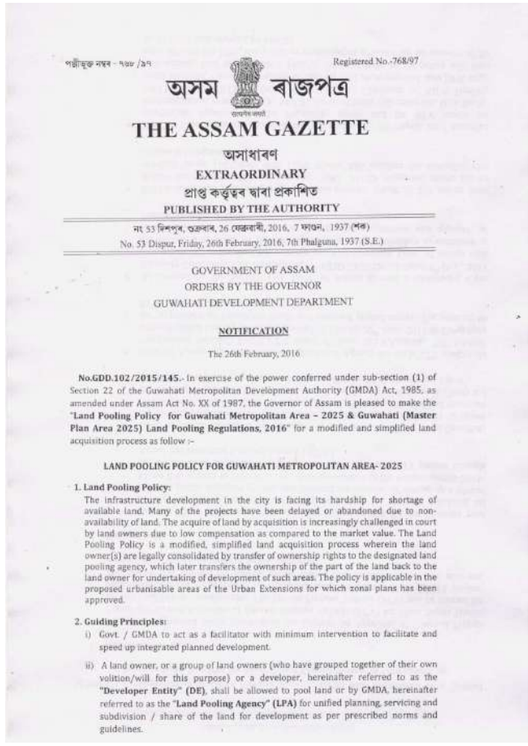
A. Land Pooling Policy: Case of Guwahati Metropolitan Area

Owing to shortage of land for infrastructure development and difficulty in its acquisition, the Guwahati Metropolitan Development Authority (GMDA) has notified Land Pooling Policy for Guwahati Metropolitan Area, 2025. This policy involves transfer of ownership to land pooling agency and a part of it is returned to the owner.

1. **The norms for Land Pooling involves categorization for land assembly into:**
   - Category I - 100 bigha and above land assembled through Developer Entity.
   - Category II - Land assembled by Land Pooling Agency from many land owners. Land to be returned to respective land owners and Developer Entities within 5km of pooled land subject to planning requirements.

2. **Development Control Norms**
   - FAR 400 for group housing.
   - 15% of residential FAR for EWS housing.
   - Commercial and PSP FAR as per GMDA's norms.
   - Off street parking - 2 ECS/100 sqm of Built Up area (residential developer entity)
   - Off street parking - 0.5 ECS/100 sqm of Built Up area (EWS housing)
   - Basement upto 2m from plot line allowed.
   - Tradeable FAR allowed for development (tradeable in the same planning zone for projects above 30 bigha).

3. Land Use distribution under this policy
   - Gross Residential - 51%
   - Commercial - 5%
   - Industrial - 5%
   - Recreational - 15%
   - Public and Semi Public - 12%
   - Roads and Circulation - 12%



পঞ্জীভুক্ত নম্বৰ - ৭৬৮ /৯৭ Registered No.-768/97

অসম ৰাজপত্ৰ

THE ASSAM GAZETTE

অসাধাৰণ

EXTRAORDINARY

প্ৰাপ্ত কৰ্ত্তৃত্বৰ দ্বাৰা প্ৰকাশিত

PUBLISHED BY THE AUTHORITY

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No. 53 Dispur, Friday, 26th February, 2016, 7th Phalguna, 1937 (S.E.)

GOVERNMENT OF ASSAM

ORDERS BY THE GOVERNOR

GUWAHATI DEVELOPMENT DEPARTMENT

NOTIFICATION

The 26th February, 2016

No.GDD.102/2015/145.- In exercise of the power conferred under sub-section (1) of Section 22 of the Guwahati Metropolitan Development Authority (GMDA) Act, 1985, as amended under Assam Act No. XX of 1987, the Governor of Assam is pleased to make the "**Land Pooling Policy for Guwahati Metropolitan Area – 2025 & Guwahati (Master Plan Area 2025) Land Pooling Regulations, 2016**" for a modified and simplified land acquisition process as follow :-

LAND POOLING POLICY FOR GUWAHATI METROPOLITAN AREA- 2025

1. **Land Pooling Policy:**
The infrastructure development in the city is facing its hardship for shortage of available land. Many of the projects have been delayed or abandoned due to non-availability of land. The acquire of land by acquisition is increasingly challenged in court by land owners due to low compensation as compared to the market value. The Land Pooling Policy is a modified, simplified land acquisition process wherein the land owner(s) are legally consolidated by transfer of ownership rights to the designated land pooling agency, which later transfers the ownership of the part of the land back to the land owner for undertaking of development of such areas. The policy is applicable in the proposed urbanisable areas of the Urban Extensions for which zonal plans has been approved.

2. **Guiding Principles:**
i) Govt. / GMDA to act as a facilitator with minimum intervention to facilitate and speed up integrated planned development.

ii) A land owner, or a group of land owners (who have grouped together of their own volition/will for this purpose) or a developer, hereinafter referred to as the "**Developer Entity**" **(DE)**, shall be allowed to pool land or by GMDA, hereinafter referred to as the "**Land Pooling Agency**" **(LPA)** for unified planning, servicing and subdivision / share of the land for development as per prescribed norms and guidelines.

Fig. 18: Gazette Notification for Land Pooling Policy for GMDA

Source: https://gmda.assam.gov.in/sites/default/files/swf_utility_folder/departments/gmda_webcomindia_org_oid_4/menu/document/Gazette%20Notification%20No.%2053%20dt.%2026-02-16%20-Land%20Pooling%20Policy%20for%20GMA-ilovepdf-compressed.pdf

B. Transit Oriented Development (TOD) Policy (Draft): Case of Uttar Pradesh

The aim of the policy is to promote mix of uses, pedestrianization, NMT streets and shared common spaces. Uttar Pradesh's TOD Policy' 2022 delineates TOD Zones based on spatial geometry such as Transit Corridors and Radial Transit Zones and includes identification of high potential areas other than the respective TOD Zones. These high potential areas will be demarcated in the Master Plan. The policy also requires preparation of Zonal Plans for approval of TOD projects. This policy provides exhaustive Value Capture Finance mechanism including fund management to support the improvement in infrastructure.

Transit Project	TOD Zone
Lucknow Metro	Corridor TOD
Kanpur Metro	Corridor TOD
Delhi-Ghaziabad-Meerut RRTS	Radial TOD zone on RRTS Stations
Meerut Metro	Corridor TOD
Agra Metro	Corridor TOD

Table 25: TOD Zones, TOD Policy, Uttar Pradesh

Components of Zonal Plan for TOD zones

- Situation analysis
- Delineation of TOD Zone boundary.
- Demand and Gap Assessment.
- Co-ordination with different departments and integration with projects and schemes.
- GIS-based mapping of physical and social infrastructure (existing and proposed).
- Land Ownership details.
- Traffic and Transportation survey.
- Study of proposals of Master Plans and respective Sector Plans.
- Study of current, floating and expected Population distribution and density.
- Calculation of FAR distribution as per TOD Policy.
- Develop Traffic and Transportation Model, reflecting expected infrastructure facilities as a result of TOD development.

Proposals and Projections

- Preparation of proposed Land Use map.
- Implementation of proposals of Master Plan in Zonal Plan.
- Building Bye-Laws for TOD Zone.
- Identification of redevelopment projects/areas.
- Improvement of physical and social infrastructure.
- Market feasibility analysis of existing and proposed TOD projects.
- Consultation with stakeholders.

C. Green Development Area Policy: Case of Delhi

Delhi`s Green Development Area (GDA) Policy focuses on preparation of Integrated GDA plan and framework for development areas such as green belts and low density residential areas and plots. The policy prescribes FAR and landscape guidelines to create city-level hubs for green living and recreation with special focus on green economy. The GDA policy also promotes food production and horticulture to ensure food security at regional level and a regional-level environmental buffer to tackle the impacts of environmental changes.

1. Guiding Principles

- Delineation of GDA boundary.
- Replacement of earlier provisions for Green development.
- Comprehensive framework defining mix of uses and density for green development.
- Environmentally sustainable development norms for land owners.
- Connectivity and infrastructure for areas within and around GDA.
- Provision of three grades of development.
- Private initiative for land development in GDA.
- Development of service providing agencies.

2. Applicable norms

The norms define three grades of development based on:

- Land area
- Road access
- Green rating
- Permitted activities

3. Special conditions for Farmhouses

Special guidelines for farmhouses based on:

- Right of Way (RoW)
- Access road width
- Setbacks
- Maximum Built Up area
- Building height
- Floor Area Ratio (FAR)

4. Provision of infrastructure and connectivity in the GDA

- Preparation of GIS-based Integrated GDA plan.
- Integration with Master Plan and Zonal Plans.
- Provision of physical and social infrastructure.
- Development of zonal roads.

5. Implementation Framework

- Single-Window System for GDA policy implementation.
- Online portal for Green Development Scheme.
- Suitable incentives for landowners.

D. Parking Policy: Case of Pune Municipal Corporation

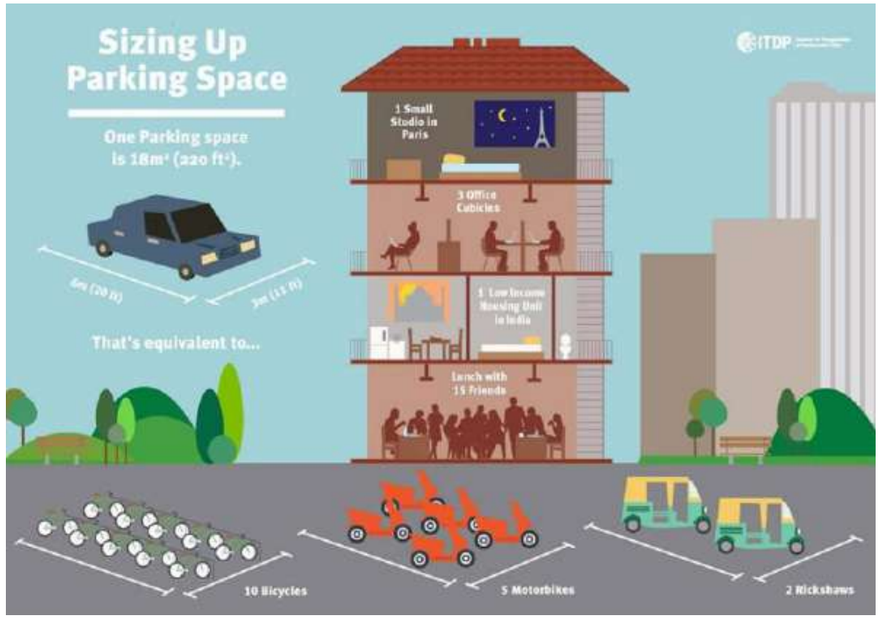

Fig. 19: Sizing up parking space (ITDP Street Design Guidelines)

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

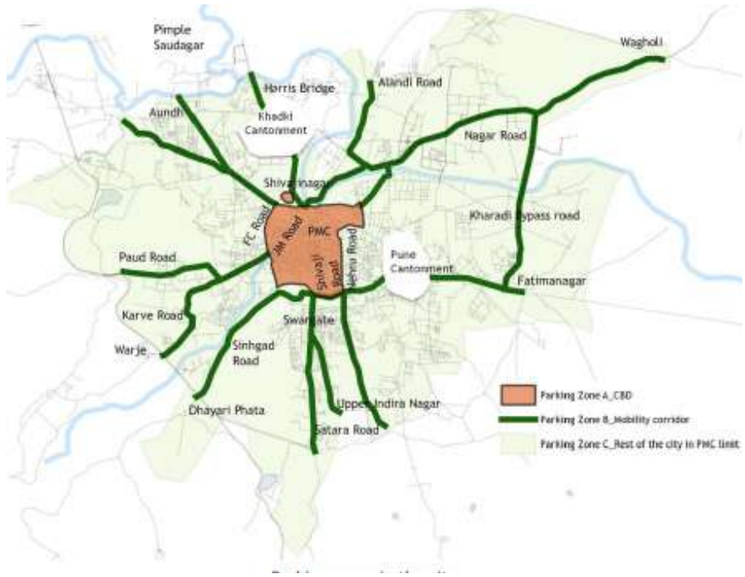

Fig. 20: Parking Zone Map, Pune

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

Fig. 21: Pune Public Parking Policy, Pune

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

“ One car parking occupies space equivalent to one affordable housing unit in India. It is important to prioritize people and not cars while supplying parking spaces in the city “

With the change in occupational pattern and economic growth, urban India has experienced rise in aspirations and private motor vehicles. This has increased the demand for on and off-street parking in core areas of cities. The space wasted and cost of infrastructure for parking facilities, come at a disproportionately high expense to the exchequer.

Due to exponential rise in vehicles count annually, the supply for parking infrastructure always proves inadequate. This encourages unauthorized and adhoc parking spaces inconveniencing the public and adding to pollution and congestion levels. To address this situation, some urban local bodies have devised parking policies to regulate demand.

Municipal Corporation of Pune has developed a policy for traffic and parking (demand) management and to increase reach of public transport network. The policy specifies targets to reduce traffic during peak hours in the Central Business District and other dense parts of the city. Pune has been divided into 3 parking zones based on intensity of development which have different demands for traffic and parking. The base rates for on-street parking varies in different parking zones.

The Parking Demand Management includes:

- Creation of parking districts
- On and off street parking management
- Off-street parking structures
- Technology for on and off-street parking
- Parking Pricing
- Organizational structure for implementing parking policy
- Enforcement, police involvement and supporting measures
- Parking revenue management

E. Electric Vehicle Policy: Case of Delhi

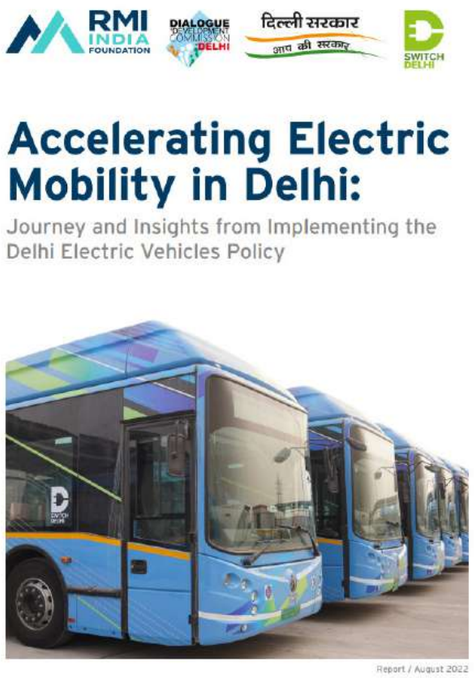

Fig. 22: Electric Vehicle Policy, Delhi

Source: https://ev.delhi.gov.in/files/Accelerating-Electric-Mobility-in-Delhi8497bf.pdf

To align towards sustainability and affordability wrt. urban mobility, the Government of Delhi has formulated the Electronic Vehicle Policy to promote and increase the consumption of EVs upto 24% of the total vehicle usage by 2024. This aims to improve the air quality by reducing emissions from vehicles thereby improving the quality of life in Urban Environment.

1. **Guiding principles for implementation of Delhi EV Policy**
   - Consultative approach
   - Time-bound policy implementation
   - Equitable access to infrastructure/ services
   - Technology and business model agnostic approach
   - Dedicated funding source
   - Dedicated institutional setup

2. **Pillars of Delhi's EV policy**
   - Driving EV adoption
   - Charging Infrastructure
   - Recycling Ecosystem
   - Funding
   - Job Creation
   - Policy Implementation

3. **Delhi's approach to incentive design**

The policy includes purchase incentives for various vehicle segments:

- Incentives to improve cost parity of EVs Buses
- Promote scrapping of old and more polluting vehicles
- Motor vehicle tax exemptions
- Technology-agnostic incentive allocation
- Facilitating financing for EVs

4. **Purchase Incentives**

The policy also includes purchase incentives for various vehicle segments:

- Electric 2 wheelers
- Auto-rickshaws and good carriers
- E-Rickshaw
- E-Carts
- E-Cars
- Buses

F. National Action Plan for Municipal Solid Waste Management

Increase in waste generation in cities have led the Govt. of India to undertake multiple initiatives at national level for its efficient management. The National Action Plan for Solid Waste management in compliance with Hon'ble National Green Tribunal Order Dated 5th February, 2015 in the Matter of OA No. 199 of 2014, Almitra H. Patel & Anr. Vs Union of India & Ors. enlists indicative measures for States and Union Territories to adopt. These measures may be used as guidelines for the individual urban local bodies across India.

The proposed action plan for formulation and implementation:

i. Quantum of waste generation,
ii. Indicative action plan and
iii. Suggested/ Indicative guidelines for drafting DPR / Plan to implement and accordingly estimate cost to accomplish target.

Components to be covered for action plan and indicative guidelines include:

- Collection of Waste
- Segregation of waste
- Storage of Waste
- Transportation of waste
- Processing of waste
- Disposal of waste
- Rehabilitation or reclamation of dump sites

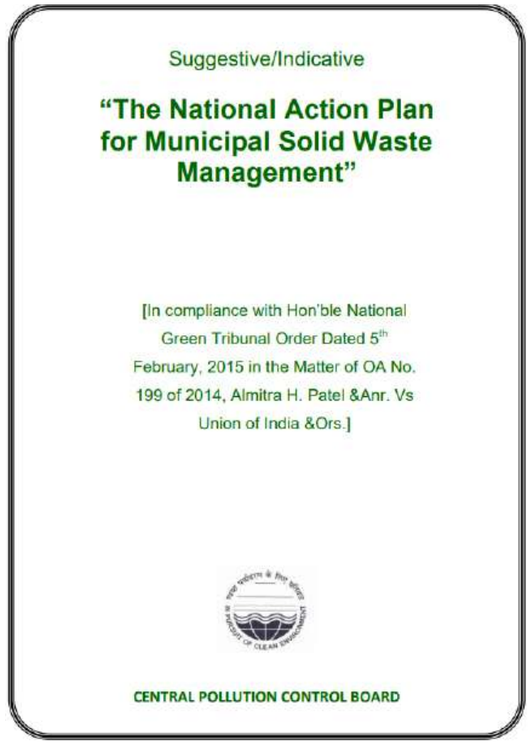

Fig. 23: National Action Plan for Municipal Solid Waste Management

Source: https://cpcb.nic.in/uploads/MSW/Action_plan.pdf

G. Waste Management Policy: Case of Indore Municipal Corporation

Indore Municipal Corporation has divided the city into 19 zones and 85 wards wherein all the households are covered by the door-to-door collection system. The high waste generating areas are catered by bulk collection system.

The detailed aspects of Indore's Solid Waste Management Policy:

- Waste Generation and Segregation
- Waste Collection and Transportation
- Weighbridge facility
- Waste Processing

Solid Waste Management in Indore is carried out in different stages namely:

- Primary Collection
- Secondary Collection

H. Solar Power Policy: Case of Telangana

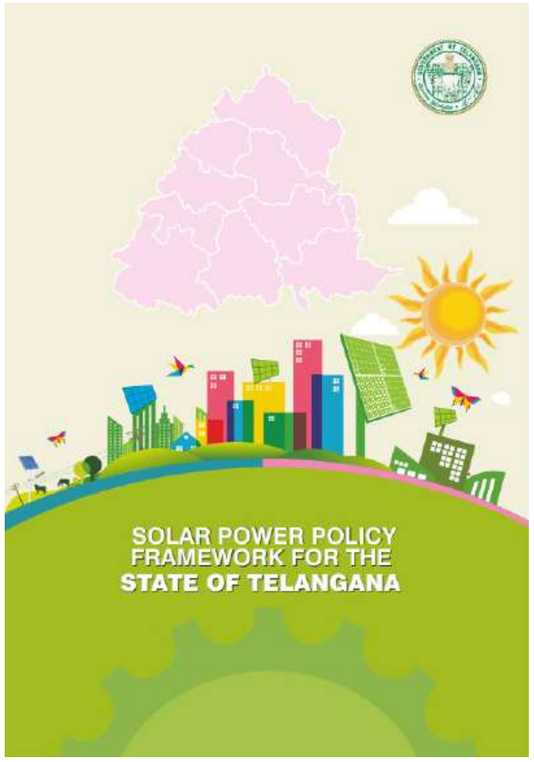

Fig. 24: Solar Power Policy, Telangana

Source: https://www.tssouthernpower.com/telanganastatesolarpowerpolicy

All governments have shifted their attention to renewable and clean energy sources, like Solar Power. The latter is believed will relieve the power grid and shift the demand onto non-renewable sources of energy. To efficiently manage the growing demand for power leading to rapidly depleting conventional sources of power, the Govt. of India seeks to increase solar capacity to 100 GW by 2022 and 200 GW by 2050. To achieve this, government has set various regulatory mechanisms and policy interventions.

Telangana has huge potential in generating solar energy as the state receives adequate sunshine over 300 days a year. Government here is implementing the Telangana Solar Power Policy 2015 to efficiently generate solar power.

To encourage generation of solar power and ensure EoDB, provisions for the Solar Rooftop Projects and Solar Parks have been prepared. Their key features are as follows:

- Expeditious approvals through single-window clearance
- Conversion to Non-agricultural land status
- Exemption from Land Ceiling Act
- Transmission and Distribution charges for wheeling of power
- Power scheduling and Energy Banking
- Electricity Duty
- Cross subsidy Surcharge
- Bill settlement
- Grid Connectivity and Evacuation facility
- Payment of Development Charges and Layout fee and permission from Gram Panchayat
- Refund of VAT
- Refund of Stamp Duty
- Open Access
- PCB clearances
- Provisions under the Factories act

I. Solar Power Policy: Case of Tamil Nadu

The Tamil Nadu Solar Energy Policy emanates from the Special Report on Global Warming (SR 15, 2018) by the Intergovernmental Panel for Climate Change (IPCC) that estimates a 1.5° C rise in global temperature.

To address this situation, the Government of Tamil Nadu has formulated their policy intending to drastically reduce carbon dioxide emissions by de-carbonising the existing energy systems. It also incentivizes promotion of Solar Energy systems.

In order to implement the policy guidelines, the following framework has been adopted:

- Provision of Solar Energy Vision
- Enlisting the policy objectives
- Defining the scope of the policy
- Defining solar energy targets
- Legislative framework for policy
- Solar Energy grid feed-in
- Solar Energy feed-in tariffs
- Solar Energy Implementation models
- Solar Energy mandates and programs
- Incentives
- Grid connectivity and energy evacuation
- Awareness creation, education and capacity building
- Solar Energy research
- Monitoring and Evaluation
- Highlighting the role of state agencies

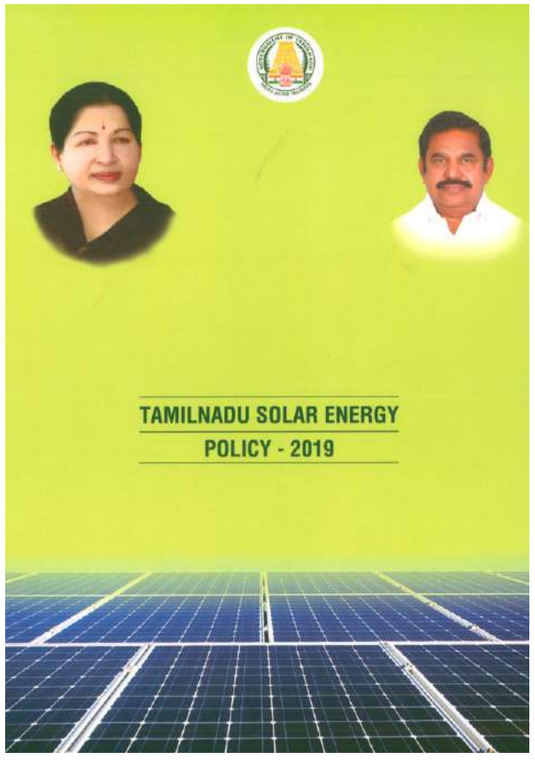

Fig. 25: Tamil Nadu Solar Energy Policy, Tamil Nadu

Source: https://teda.in/wp-content/uploads/2019/02/SOLARPOLICY2019.pdf

3.2 Public Space Norms

Public Space comprises streets, green areas/ plazas and water bodies. The current policy framework includes guidelines and norms for streets wherein different cities have adopted street-design guidelines. On the other hand, design guidelines for green areas/plazas, water bodies and waterfronts are absent and the design for green areas/plazas and water bodies are conceived as part of public projects.

Therefore cities need to formulate, adopt and implement guidelines for different components of public space mentioned above. The guidelines should emanate from the Area Based Planning approach with respect to Blue Green Network plan as laid out in the CBA plan.

A. Street Design Guidelines: Case of Pune

Urban Street Design Guidelines have been prepared in addition to other studies and projects related to Comprehensive Urban Mobility in accordance with the National Urban Transport Policy (2006). The ultimate aim of these guidelines is to enable easy implementation of street design by standardizing the regulations based on different street types and elements. The preparation of Urban Street Design Guidelines is a priority of the Pune Municipal Corporation to enhance the quality of urban streetscape by focusing on various features related to walkability and transportation.

Fig. 26: Urban Street Design Guidelines, Pune

Source: https://www.itdp.in/wp-content/uploads/2016/07/Urban-street-design-guidelines.pdf

Urban Street Design Guidelines, Pune provide design norms for following elements of streets-

Pedestrian Related Elements

1. Footpath
2. Railings
3. Bollards
4. Universal accessibility for footpaths
5. At grade pedestrian crossing
6. Mid block crossing
7. Pedestrian refuge island
8. Grade separated pedestrian crossings
9. Pedestrian Signals
10. Universal accessibility- Tactile paving
11. Universal accessibility-Curb ramp and slope ramp
12. Universal design for pedestrian grade separators

Cycle Related Elements

1. Cycle track
2. Intersection design for cyclists
3. Cycle box
4. Merging - de-merging cycle lane
5. Paint marking cycle priority lane

Intersections

1. Curb extensions
2. Turning radius
3. Channelizer
4. Roundabouts
5. Tight turns
6. Universal accessibility for intersection and crossing

Carriageway Elements

1. Carriageway design
2. Shoulders
3. Road markings
4. Traffic Signage
5. Traffic signals
6. Universal design for traffic signal
7. Medians
8. BRT lanes
9. Traffic calming measures
10. Speed breakers

Road Side Elements

1. Multi-Utility Zone (MUZ)
2. Bus stops
3. Street Lights
4. Tree Plantation
5. Hoardings, Advertisements
6. On street parking
7. Parking Bay design
8. Auto rickshaw stands
9. Utilities and Services

Other Elements

1. Storm water management
2. Street furniture
3. Garbage containers
4. Public toilet
5. Universal design for street furniture and street signage

B. Treatment and Design of Waterbodies: Case of Delhi

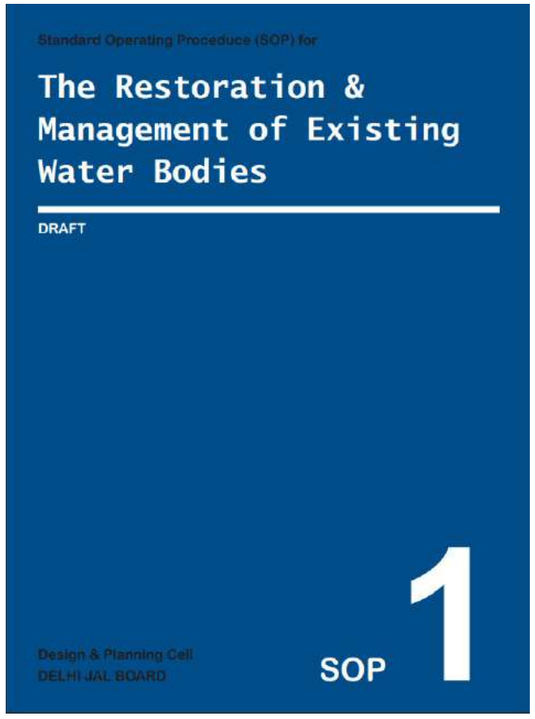

Fig. 27: SOP for Restoration and Management of Existing Water Bodies, Delhi

Source: https://cityoflakesdelhi.com/wp-content/uploads/2022/10/SOP-for-Restoring-Managing-Existing-Water-Bodies_FINAL.pdf

Addressing the abuse of natural water bodies in the region of Delhi caused by pollutants from gray water from areas without sewer management infrastructure, encroachments and dryness of lakes, the Delhi Jal Board has prepared a Standard Operating Procedure (SOP) for the restoration and management of existing water bodies with the aim to restore, rejuvenate and preserve natural water bodies and wetlands. The case of Rajokri Lake rejuvenation has been used as a reference for preparing SOPs for restoring water bodies involving multiple stakeholders.

Vision and Objectives

1. Substantial enhancement of water quality of water bodies
2. Ground water recharge
3. Enhanced capacity for accommodating monsoon flows, thereby mitigating local flooding
4. Provision of much needed public space for all irrespective of gender / age
5. Positive impact on local micro-climate
6. Enhanced value of nearby properties
7. Improvement of social conditions and public health of the surrounding areas

Approach

1. Cleaning of a water body
2. Restoring the ecological value of a water body
3. Creating Economic value for the city

Principles & Priorities

1. Cleaning of the existing water body to ensure water quality meets the standards prescribed by the Water Quality Assessment Authority, Government of India.
2. Trapping and cleaning of existing water inlets into the water body.
3. Removal of historical sludge and its management
4. Creation of enhanced capacity to hold monsoon flows on the site.
5. Restoration of the larger catchment of the water body and its reconnection to the water body to increase collection of storm water.
6. Where appropriate, creation of ghats in an environmentally friendly manner.
7. Creation of ecologically designed easy to maintain landscapes for public use.
8. Putting in place management regimes that are sustainable for the long term.

C. Stormwater Master Plan: Case of Pune

Stormwater Master Plan aims to reduce urban flooding events in the city by integrating the policy with existing building permissions, which protect the natural water bodies and provide appropriate size for clean water passage.

Some principles recommended in the Storm water Management Master Plan of Pune are-

- Identification of roads and streams/ nallahs that will drain the watershed.
- Demarcation of nodes on the network.
- Design as per Central Public Health and Environmental Engineering Organization (CPHEEO) manual.
- Catchments area to be classified depending on the proposed land use of the area.
- Rational formula to be used for calculation of flood flow.
- Hydraulic capacity of the drains to be computed by using Manning's Formula.
- Proposed Land use as per Development Plan (DP) to be considered for design.
- Adequacy of existing nalla and drains to be checked and adequate size of drains to be designed.

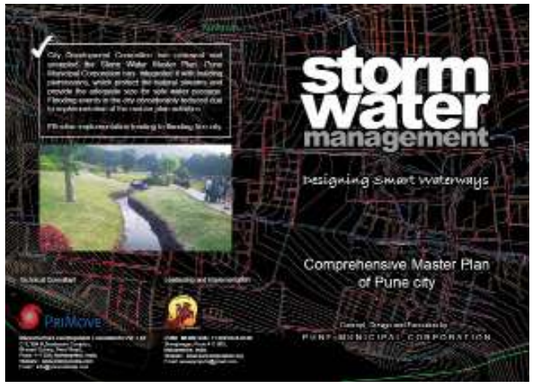

Fig. 28: Stormwater Master Plan, Pune

Source: https://www.pmc.gov.in/sites/default/files/project-glimpses/Storm_Water.pdf

D. Stormwater Management Policy: Case of Coimbatore, Marutha Nagar Bio Park

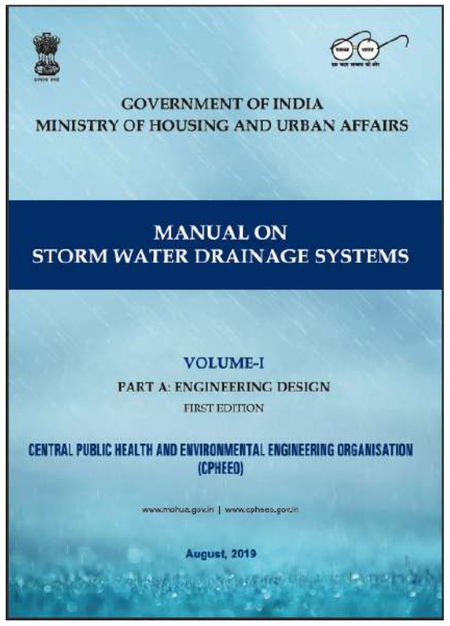

Fig. 29: Manual on Stormwater Drainage Systems (Vol. I & II)

Source: http://cpheeo.gov.in/cms/manual-on-storm-water-drainage-systems---2019.php

The Manual on Stormwater Drainage Systems Volumes I and II, are to address the urban flooding in cities by managing surface water runoff and establishing a storm water drainage network. Volume I of the manual guides survey, planning and design considerations for drainage systems and recharge structures and highlights case examples. Volume II consists of operation, maintenance and management of stormwater drainage systems, stormwater recharge structures, pumping stations, etc. and emphasizes on inspection, analysis and constant monitoring.

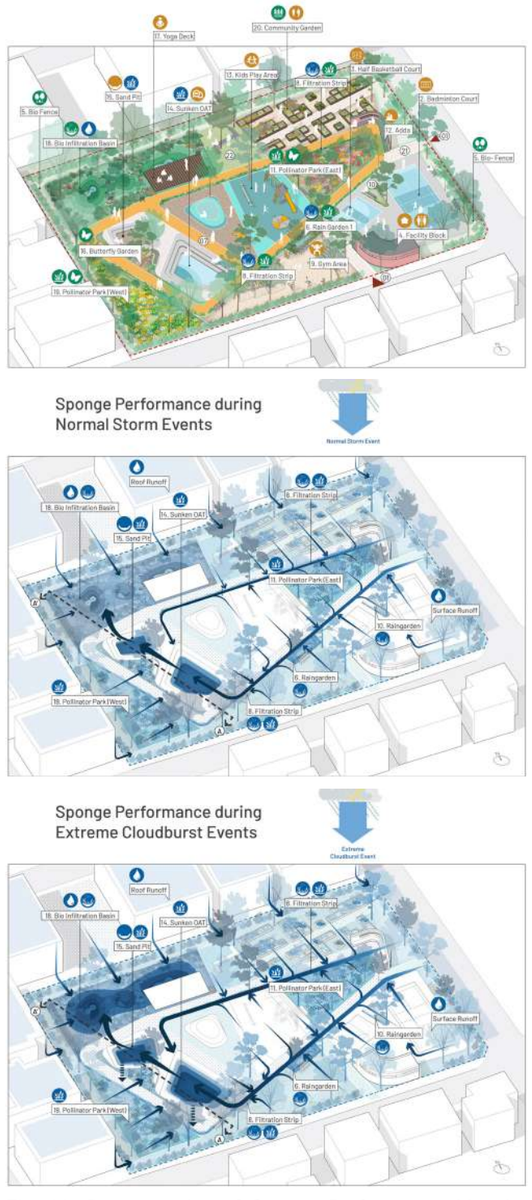

Fig. 30: Demonstration of Sponge Performance, Marutha Nagar bio-park, Coimbatore

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3.3 Plot and Building Development

A. Green Building Norms: Case of Maharashtra

Fig. 31: Green Building Policy, Maharashtra
Source: https://maharashtra.mygov.in/en/task/maharashtra-green-building-policy/

To ensure the construction of green buildings in residential and commercial zones, the Govt. of Maharashtra has laid down the Green Building policy. This is with an objective to incentivize developers and buyers to invest in Green Buildings.

Vision
" We envision an urban Maharashtra with a thriving construction sector as a backbone for economic progress while balancing environmental concerns and setting new benchmarks for sustainability. "

Scope
The policy covers future developments such as commercial buildings, residential buildings, offices, IT parks, banks, shopping malls, hotels, hospitals, airports, stadiums, convention centers, educational institutions (colleges, universities), libraries, museums, etc.

The incentives are laid down wrt different stakeholders:

- *Developers*: Government provides rebates on development charges to developers seeking Green Building certification according to the rating secured.

TERI-GRIHA

Ratings	Rebate
Three stars	2.5%
Four stars	5%
Five stars	7.5%

GBCI-LEED

Ratings	Rebate
Silver	2.5%
Gold	5%
Platinum	7.5%

Table 26: Incentives for developers, Green Building Policy, Maharashtra
Source: https://www.maharashtra.gov.in/Site/Upload/Acts%20Rules/Marathi/Notification%20for%20Green%20Building%20Policy.pdf

- *Consumers*: Consumers are entitled to property tax rebate for a period of five years from receiving the Occupancy Certificate based on the Green Building rating of the property.

TERI-GRIHA

Ratings	Rebate
Three stars	5%
Four stars	7.5%
Five stars	10%

GBCI-LEED

Ratings	Rebate
Silver	5%
Gold	7.5%
Platinum	10%

Table 27: Incentives for consumers, Green Building Policy, Maharashtra
Source: https://www.maharashtra.gov.in/Site/Upload/Acts%20Rules/Marathi/Notification%20for%20Green%20Building%20Policy.pdf

B. Conservation of Heritage Buildings/Precincts/ Natural features: Case of Pune

Development Control and Promotion Regulations for Pune Municipal Corporation (DCPR-2017)

Source: https://www.pmc.gov.in/sites/default/files/DCR_PUNE_FINAL.pdf

Pune Municipal Corporation has laid out guidelines for the conservation of assets of historic and cultural significance such as heritage buildings, heritage precincts and natural features in the Development Control and Promotion Regulations, 2017. The DCPR (2017) includes formation of Heritage Conservation Committee to detail out the guidelines related to treatment of built heritage and allied features such as signage control. The guidelines also include incentive uses for heritage buildings and grading of heritage assets.

1. **Applicability**
   The guidelines are applicable to assets such as Heritage Buildings, Heritage Precincts and Natural features.

2. **Preparation of List of Heritage Buildings, Heritage Precincts and Natural Features**
   The list is prepared by consultation between the Municipal Commissioner and Heritage Conservation Committee.

3. **Restriction on development, Redevelopment/repairs etc.**
   Development, redevelopment and repair works, etc. to be performed only by due consultation between the local public, Municipal Commissioner and Heritage Conservation Committee.

4. **Incentive uses for Heritage Buildings**
   Commercial/Office Use of the heritage building to be done only by prior approval from the Heritage Conservation Committee and the Municipal Commissioner.

5. **Grant of Transferable Development Rights to owners/lessees of heritage buildings/ heritage precincts**
   Compensation for FSI to be provided in the form of Transferable Development Rights (TDR) to the respective owners, as mentioned in the TDR regulations.

6. **Maintaining Skyline**
   Listed buildings and Heritage precincts to maintain the skyline as defined by the Heritage Conservation Committee in consultation with the local public and Municipal Commissioner.

7. **Restrictive Covenants**
   The restrictive regulations on the leasehold plots to continue as per the existing regulations. However, in case of conflict between the stakeholders, the restrictive covenants to prevail.

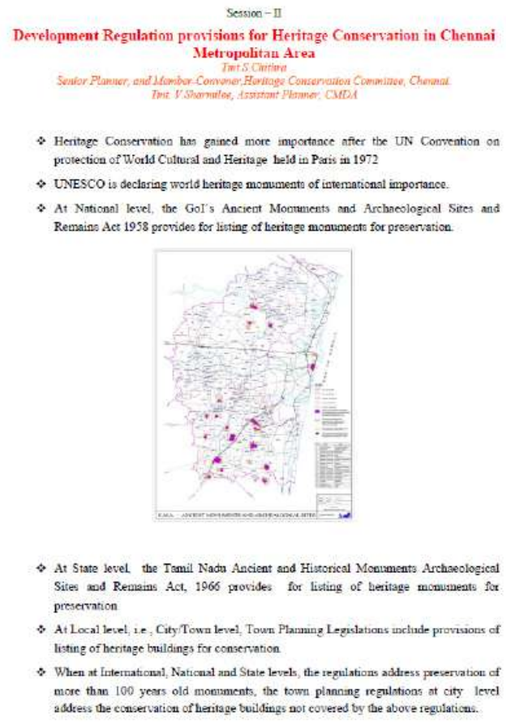
8. **Grading of the listed buildings/Listed Precincts**
   The guidelines give authority to the Municipal Commissioner to classify the heritage buildings into Grade-I, II and III.

9. **Signs and outdoor display structures**
   The display and advertising signages to be prepared conforming the Part X of National Building Code.

10. **Composition of Heritage Conservation Committee**
    The Heritage Conservation Committee to be constituted by the Municipal Commissioner comprising of members defined in the guidelines.

11. **Heritage Conservation Fund**
    The funds for maintenance and repair of Heritage assets to be maintained, at the disposal of Municipal Commissioner.

C. Development Regulation provisions for Heritage Conservation : Case of Chennai



Session – II

Development Regulation provisions for Heritage Conservation in Chennai Metropolitan Area

Tmt.S.Chitra
Senior Planner, and Member-Convener,Heritage Conservation Committee, Chennai.
Tmt. V.Sharmilee, Assistant Planner, CMDA

- Heritage Conservation has gained more importance after the UN Convention on protection of World Cultural and Heritage held in Paris in 1972
- UNESCO is declaring world heritage monuments of international importance.
- At National level, the GoI's Ancient Monuments and Archaeological Sites and Remains Act 1958 provides for listing of heritage monuments for preservation.

- At State level, the Tamil Nadu Ancient and Historical Monuments Archaeological Sites and Remains Act, 1966 provides for listing of heritage monuments for preservation
- At Local level, i.e., City/Town level, Town Planning Legislations include provisions of listing of heritage buildings for conservation.
- When at International, National and State levels, the regulations address preservation of more than 100 years old monuments, the town planning regulations at city level address the conservation of heritage buildings not covered by the above regulations.

Fig. 32: Development Regulation provisions for Heritage Conservation, Chennai

Source: https://www.pmc.gov.in/sites/default/files/DCR_PUNE_FINAL.pdf

The provisions for Development Regulations for Heritage Conservation emanates from the critique of general Heritage Conservation norms, understanding the feasibility and applicability thereby acknowledging the need for city specific guidelines and norms. It regulates treatment of Heritage buildings at the city level by providing guidelines related to identification of heritage buildings and criteria for grading. It also includes framework for actions and implementation with the involvement of concerned authorities and stakeholders. The policy also provides incentives and compensation for land owners in the form of TDR.

SEQUENCE OF ACTIONS

1. Finalizing the evaluation criteria.
2. Public Notification inviting suggestions for heritage conservation.
3. Involvement of different stakeholders and consultation.
4. Public notification of initial draft list.
5. Consultation with owners of draft listed buildings and precincts.
6. Multiple public consultation workshops within the Metropolitan area.
7. Re-examine the list based on suggestions and place it before Heritage Conservation Committee.
8. Final approval and Gazette notification.

1. **Criteria for Listing of Heritage Buildings and Precincts**
   - **A. Historical**
   - Date / Period of construction
   - Trends exhibited by the building
   - Associated with events
   - Associated with persons
   - **B. Architectural**
   - Design
   - Style
   - Designer/Builder
   - Physical conditions
   - Design Integrity
   - **C. Cultural**
   - Community Context

2. **Screening of heritage buildings**
   - Screening of Heritage buildings and precincts with reconnaissance survey.
   - Inventory making and photo documentation.
   - Further screening followed by evaluation and overall rating.
   - Categorization into Grade I, II and III based on overall rating.

3. **Major provisions relating to heritage conservation in the Development Regulations**
   - No development, redevelopment or repair work allowed without prior permission.
   - MS, CMDA to act in consultation with the Heritage Conservation Committee.
   - Changes, repairs, additions, alterations and renovations of religious buildings based on religious codes laid down in sacred texts are permitted, in accordance with original structure, architecture, designs, aesthetics and other special features.

4. **Grading of listed buildings/precincts**
   - Grade-I: Heritage buildings/precincts of national or historical importance (Minimal changes allowed only if necessary).
   - Grade-II: Heritage buildings/precincts of regional or local importance (Internal changes and adaptive reuse to be allowed).
   - Grade-III: Important for town spaces (External and internal changes and adaptive reuse to be allowed).

5. **TDR**
   - Private owner to be compensated in case of rejection of development rights in Heritage buildings/Precincts.

6. **Repair Fund**
   - Separate repair fund to be created at the disposal of MS, CMDA for disbursement in consultation with Heritage Conservation Committee.

04 Expert Reviews

This chapter includes the comments received from the expert reviewers. The Guidebook and SOPs have been updated to address the inputs from reviewers.

4.1 Comments from Expert Reviewers

A. Expert Reviewer- R. Sriniwas,

Urban Planning Advisor, MoHUA, GOI, Ex-Chief Town Planner, TCPO, New Delhi

- It is important to map the CBALP especially with regard to plot level details. For greenfield planned townships, the digital records are normally available, however, for brownfield towns , the digital records especially the legacy data of land and property are not available. Hence, it is imperative to have the digital records. Plot level inventory can facilitate the extent of redevelopment/retrofit which may be proposed based on adopting the FBC.

- The concerned report clearly need to bring out the difference between a layout plan and local area plan and the FBC will be applicable in both the case. The LAP can explicitly tell about areas conducive for redevelopment or retrofit depending on the existing condition of buildings and while the layout plan can precisely tell the configuration of plots and arrangement of buildings, roads, pedestrian/cycle track, open spaces, and other infrastructure within a larger area such as a neighborhood. There is a need to identify FBC Area or Zone depending on development typology and area characteristic.

- The adoption of FBC on area basis should demarcate the CBALB based on existing property lines, streets and public space boundaries , important landmarks etc. The report may add that how the application of drone can facilitate effective implementation of FBC. Drones have extremely high accuracy, with aerial mapping reaching centimeter-level accuracy and mapping accuracy generally reaching 1:1000. However, generation of plot maps at a scale of 1:500.The plot maps shall comprise of base map overlain by different layers of topographical features, man-made structures, land parcel information, ward/zone boundary information, etc.

- Form-based codes emphasize the appearance and qualities of the public realm, the places created by buildings. Hence, it would be desirable to amend certain building regulations by removing contradictions by an amendment for 'removal of Ground coverage' with modified setbacks. Evidence: work out Area Statement of Project plots and height.

- In the consultation process, it would be desirable to identify the stakeholders. Table 1 need to include the stakeholders viz., Resident Welfare Associations/Community Building Organizations/Elected Ward Representatives.

- Indian cities have well laid zoning regulations which also encourages mixed uses. Form-based code that requires complying with extensive, predetermined design standards as well as a lengthy process of public review and subsequent approval should rather be a quick process duly taking into consideration of above mentioned stakeholders.

- It has to be ensured that FBC which require private buildings to shape public space through the use of building form standards with specific requirements for building placement. Hence, in this regard consensus building becomes crucial for the overall betterment of the society.

- It would be desirable to include a section (preferably in tabular form) on Concept of Form Based Codes clearly explaining how they are different from conventional Master Plan Regulations/Development Control Regulations as the latter traditionally focused on the segregation of land-use types, permissible property uses, and the control of development intensity through simple numerical parameters (e.g., FAR, dwellings per acre, height limits, setbacks, parking standards).

- How FBC creates a predictable public realm by including specific standards for the design of streets and open spaces, and focusing primarily on the physical form of development, with a lesser focus on building use than conversional zoning regulations. This explanation may also be included.

- Character based Layout Plan Application Requirement, its approval process and approval criteria needs to be elaborated. It would be desirable that step-by-step Process for Character based Layout Plan approval to be highlighted. The approval authority has to be clearly stated and who will convey the approval and at what hierarchic level. All layout submission to be made online with minimum documentation in order to bring the ease in the approval process.

- Presently as Indian cities follow Building bye-laws or Development Control Regulations which have pan city enforcements, while Form Based codes have to be applied in accordance with neighborhood or community needs which will be area specific. The enforcement of FBC should avoid subjective interpretation. Hence,to begin with the applicability should rather be at ward level.

- The performance parameters have been mentioned but how the FBC shall emphasize standards and parameters are to be quantified for form with predictable physical outcomes (build-to lines, frontage type requirements, etc.) rather than relying on numerical parameters (FAR, density, etc.) whose outcomes are rather difficult to predict.

- The reports do mention regarding Economically Weaker Section or Affordable Housing. How this can be facilitated especially if there is a proposal for in-situ redevelopment ?

- Form Based cost in its practice may vary widely from one neighbourhood to the other, and may have implications on housing costs, market rents and economic development. If a form-based code is drafted by the ULBs /UDAs and put into effect in a way that allows politicians and other stakeholders to micro-manage every element of a development proposal, it may become a barrier to the efficient entry of real estate investment into a local market especially in the context of India. Following a basic law of economics, when the supply of new dwelling units either plotted or group housing in a neighborhood goes down, the price of housing invariably increases. This needs to be addressed once Form Based codes are adopted.

- The true intent of the form-based approach is to reorient the planning process to regulate only the public realm – the scale and mass of the building, its setbacks, height and integration with the pedestrian and automobile environments. A Form Based Code is not intended to regulate the private realm, which would be how the building is used, its aesthetics, colors, design, internal components, and so on. Hence it may be perceived as design oriented not planning oriented by the State TCP Departments.

- The interpretation should not become a conflict point as it is quite possible people may oppose redevelopment and there may not be any unanimity amongst them towards form based code. However, it is quite possible it may witness increase in property related litigations. Alternatively, through Area based strategies, we can have area specific regulations that could be dovetailed with FBC.

- The key to this approach would be in distinguishing between form and aesthetics in building design. Planners normally focuses on building elements that are defined, such as height, ground coverage , setbacks and the placement of entry and exits, rather than on subjective elements like architectural style, color and design. Hence, the FBC needs to address this issue.

- What could be the road map of adoption and how the State TCP Departments/Urban Development Authorities/ Urban Local Bodies can adopt especially when Master Plan process in the country realizing the Euclidean zoning to non-segregated and mixed uses to ensure efficiency in land use. Perhaps ,understanding needs to be developed that by FBC, more land would be under the public realm and bring more efficiency in land use pattern

B. Expert Reviewer- Dr. Sujata Govada,

Urban Designer, Founding Director of the Institute for Sustainable Urbanisation (ISU), CEO/ Managing Director of UDP International (Hong Kong, China, India, Philippines and USA)

Overall

- The effort put in to develop the FBC Guidebook and the SOPs is commendable, the documents are well written and illustrated with simple graphics.

FBC Guidebook

- FBCs should not just cater to plot owners, developers and administrators, they should also think about the people, community representatives, NGOs etc.

- The city should have a common vision developed with community involvement to begin with and city level principles and strategies formulated within FBCs can be prepared.

- Integration of FBCs in the Planning Process is indicated clearly, but the relationship of FBCs with respect to existing zoning of the area should be clear and implementation will take time and may happen in a phased manner.

- Noted that the implementation of FBCs is a consultative process and good to recognize that it may vary from place to place and needs to developed by the concerned local authorities working together with various stakeholders based on the specific context. Applying same codes across the board for various cities or for different areas within the city may not work wel.l

- Using as performance oriented and area based approach for FBCs with a Dynamic portal offering flexibility is good so that the codes are not too prescriptive and rigid.

- Seems to be focussed on market responsive urban development for value maximization, it should not be just economic value, more importantly social value and ecological value should be considered and given enough weightage as well.

- FBCs to be climate responsive and addressing resilience while integrating natural and built resources is good.

- FBCs to create 24x7 walkable, safe and comfortable and liveable urban environment is good.

- There is a tendency for FBCs to create similar looking plans, this should be avoided so you can create context sensitive sustainable developments.

- The emphasis should be on walkability in India cities before getting into liveability and resilience.

- Recommendation for hybrid and advanced FBCs is good, but ideally these should tie into the city vision, strategies and principles for specific areas along with the preparation of CBALP as well as the formulation of UFR.

- The graphics are good and easy to understand. The proposed integration of FBCs with the planning and regulatory framework is clear but maybe good to have a time frame to indicate how long it will take.

- CBAs definition is clear especially with existing local examples, but it would be good to indicate how small or large these areas can be, would be good as well.

- What is it going to cost to develop and implement FBCs and how long will it take to get this done and where will the funding come from, it would be good to tie these in rather than just talking about benefits.

- Good to consistently mention walkability along with liveability so that you are addressing the issues currently plaguing many Indian cities such as traffic congestion, pollution. The aim should be to promote transit and pedestrian oriented development and avoiding car dependence.

- Any bonus plot ratio through relaxation of building heights etc should be done more for public good rather than private gain.

- Good to indicate the different type of CBALP overlays it should be Outdoor Space Plan of Open Space Plan. Also consider having indoor open spaces or public rooms like in Singapore, but these need to be managed and maintained well thought.

- It is good you have indicated the timeline for the preparation of CBALPs

- A bit more introduction to CBA and URF might be good so users understand the background rather than getting into definitions directly.

- Using a generic template to explain the CBAs and URFs is good, but perhaps it could be larger area as the chosen template seems too simple and small in area also the CBD area seems much smaller in contrast, and typically TOD should be in the CBD area which should be larger as well and there should be more open space and green area in your template.

- The type of transit or the lack of it also defines the character of an area in addition to public open space, interface between plots/buildings and open space .

- FBCs also need to promote transit and pedestrian oriented development to be more successful otherwise difficult to deal with issues related to car dependence, traffic congestion and pollution.

- Be careful with abbreviations, better to use PPPW for Public Pedestrian Passage Way and PVPW for Public Vehicular Passage Way rather then PPP which refers to Public Private Partnership and PVP which refers to Player Versus Player.

- Is it possible to include transit friendly streets, paving, landscaping, utilities, waste management, signage and wayfinding in Street Design Regulations.

- It should be Waterfront Design Regulations, as Water Front Design Regulations seems odd.

- It should be Open Space and Green Areas rather than Open Green Areas and how about including public space or public realm not just limiting to within properties.

- Use of CBALPs and URFs and PDCs to implement and regulate FBCs is good, although Build Institutional Capacity is mentioned, it needs more a little more elaboration and detail should be included so agencies understand the need and importance of capacity building as well as community engagement. FBCs to be accepted will require a lot of sensitisation through capacity building workshops within institutions as well as workshops for the community and various stakeholders so there is a sense of ownership only then FBCs can successfully be implemented.

- Digital Dynamic CBA platform properly supported by IT services is important for users to be able to access FBCs and related information but also to ensure it is EoDB friendly. Yes, Singapore is a good example for this.

- PDCs is in an easy to understand format so it will be useful for various users, perhaps the graphic can be misread as 100% site coverage is permissible. Also, it would be good to show a couple PDC example one low rise and another for high rise development as well.

- Again, as is the case with CBA and URF it will be good to give a little more introduction for PDCs as well rather than starting with definition.

- FBC Readiness Checklist is good but there could be cities that are barely ready or with less than 25% readiness as well so good to have these two perhaps 5% ready and 15% ready

categories and good to indicate how long it will take to implement based on the % ready so cities have an idea whether it takes less than 1 year, 2 years or 3 years etc hopefully not longer than that to implement FBCs.

- It is good to have SOP I and SOP II to better understand CBALPs and URFs can be prepared. But it will be helpful to have SOP for Capacity Building and Stakeholder engagement with Stakeholder Engagement Cards SECs as well as for community and various other stakeholders as it is equally important to have the authorities and the community to be on board as well.

- Also good to set up an FBC Committee including public sector, professionals, public sector, academia and community members to ensure that FBCs are developed and implemented well.

SOP -I

- It is good that FBC approach is performance oriented but it should also focus on improving the environment, quality of life of citizens in addition to optimization of resources while being pedestrian and transit oriented, as well as environmentally friendly.

- In the identification of special areas it could also include pedestrian areas, waterfront areas and heritage areas as well.

- Perhaps a line or two for data categories like Public/ Private Ownership Map, Circle and Market Rate Map, Land Use map, Built/Unbuilt/ Encroachment map similar to other categories, informal areas should be captured as well.

- In the analysis sections it is good to see existing street and transport networks included as well as informal areas as well

- Good to see Consultation Process included here as part of the preparation of CBALPs indicating timeline as well.

- Good to see Community Building Program included in here, also good to encourage EWS and affordable housing as part of performance indicators. Perhaps good to include education and awareness as a performance indicator for community engagement as well.

- The graphics are simple and clear for CBA overlays and good the Low Carbon Mobility Network Plan is included. So mention on transit and mobility should be mentioned earlier in the FBC guidebook as well.

- Reclaiming not just land but also streets for transit use, bikeways and pedestrian pathways etc is a way to discourage car usage as well

- Good to add indoor spaces of respite especially during inclement weather and using Green TDR is good.

- Checklists and Performance Indicators should be included consistently for all overlay similar to that included for ROP.

- Multi-level Pedestrian linkages and open space can be included as part of the Open Space Plan.

- There should also be prioritization of Development Plans as it may be difficult and unlikely that everything is developed at the same time.

SOP II

- Under Category C: Plots/ Buildings it is good to include set back, site coverage etc.

- Would it be more clear to say MR, MR(H) and OR for Mandatory Regulations, Mandatory Regulations for Heritage Areas and Optional Regulations, but which are OR some of these could include incentives to ensure public benefit.

- Shouldn't the pedestrian pathway also form part of the open space and not necessarily the road space.

- Good to have detailed typical street sections as well in addition to the local reference images.

- Good universal accessibility is a requirement for streets.

- Also, good to include performance indicators and checklists consistently throughout as indicated in SOP I .

- Some typos need to be corrected for example it should be still water in place of sill water and for in place of fro.

- 50% to 80% active street frontage is good could we push it to 60% to 90% to have streets that are more engaging with continuity.

- Additional regulations for heritage and high-density areas is much needed and is welcomed.

- Not sure your graphic representation for plots/ buildings is accurate, the line should cover the buildings on the ground floor as well.

- PPPWs can be maximized but PVPWs should be minimized as much as possible rather than be encouraged.

- Should also include maximize public benefit not just optimization of land and other resources.

- In some instances of adaptive reuse of heritage buildings, it may be good to allow limited sensitive additions to create better use of space while making the development viable without reducing the character or heritage value of the site.

Conclusion

- It may be good to include an international and local pilot case study that have already been developed so users can better understand how FBCs can contribute to better urban form while helping to improve the quality of life of the people in cities in India.

C. Expert Reviewer- Dr. Ajay Khare,

Prof. Ajay Khare, PhD (Leicester, UK), MArch.(York, UK), M. Arch. (SPA N.Delhi), FIIA
Professor (HAG) and Dean Research & Faculty Welfare
School of Planning and Architecture, Bhopal, India. (Ministry of Education, Govt. of india)
Former Member, National Monuments Authority, (Ministry of Culture, Govt. of India),
Former Director, (Founder) SPA Bhopal, (2009-2014)

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.

To share an experience that highlights the aforementioned -

During my tenure at the National Monument Authority, we were shouldered with the responsibility to handle project applications to develop (new construction in) the area defined as the Regulated and Prohibited zones in the AMASR Act. The number of applications were overwhelming and included areas with monuments that were both – famous and not; ranging in density. Now, most Regulated zones of most urban areas do not have Heritage byelaws responsive of heritage as required as per AMASR Act. Few cities like Delhi, and in places like Jabalpur, where development pressure are yet to manifest – were prioritized over complex cases like Mumbai, Ahmedabad, - where the rate of transformation is extreme. Even these cities with Heritage Byelaws have a complex procedure of its application to facilitate essential need-based transformations.

Herein, comes the role of these Codes – which can address two important aspects –

i. It synchronizes response to existing laws and regulations. Regulated area and its provisions regarding development control is under a Parliamentary Act. This cannot simply be overlooked (For example, in the case of Regulated zone of Jogeshwari cave, Mumbai, the applicant had already received permits to construct 30 floors and had approached NMA for permission / clearance.) wherein, projects are not informed a-priori. The codes can serve to inform projects of compliances in advance, so that development is uninterrupted and leads to productivity (Ease of Doing Business or EODB). It is therefore necessary to inform what can and cannot be achieved legally and how to generate appropriate options.

Practical experience is – solutions cannot just be 'height-based alone'; but rather a region (or context) appropriate solution. Such solutions shall take into cognisance of Form, Plot Area and the Buildable Volume – as a causal effect of each other and not in a standalone manner. The articulation and approach of this code, simplifies generation of options and buildable volumes – therefore creating a ground for constructive negotiations and contextual prioritization.

For example – cases like Mumbai and Pune (Shanivarwara) both have this dilemma. While Mumbai may require a standalone treatment, the case of Pune required a priority on maintaining the visual lines.

Further, as the Codes 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.

Another strong point of these codes is their ability for directing this course of action is enhanced by articulation in third dimension. And, as these Codes can encourage regeneration, what can be hoped is that it provides the necessary support to develop historic settlements to sustain home-grown and culture-based economies. For that matter even the inherent logic of the original layout including the wayfinding features, gradation in densification and volumes etc – evident in our historic areas may be used as reasons to suitably develop FBC and UFRs.

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.

ii. These codes can encourage Brownfield regeneration, for example, say, a slum area. Urban Regeneration – can happen only when there is an incentive to plot owners. And, when disincentivized – they will find ways of meeting their requirements in a manner that neither help the area, nor the enforcement agencies. For plot owners to opt for the best option, the planning documents, need to articulate in a manner that is comprehensible for a non-technical person. The articulation in third dimension of the proposed documents is a good solution, in filling this gap. Such forms of graphical articulation appeal to all, irrespective of levels of literacy, and helps end-users and stakeholders, visualize the potentials (including monetary returns) of a proposed form of development.

Another example of note is the locations where metro-lines, especially in the case of underground ones, local authorities are prioritizing on preparation of LAPs in such areas. This is because the authorities (and stakeholders) have realized that betterment charges alone is only a fraction of the benefits. The introduction of metro is likely to bear higher benefits including improvement of connectivity, revenue potential and other externalities associated with it. This is especially true (and the reality) for tier 2 cities like Lucknow, Jaipur, Bhopal. In fact in the case of Bhopal – the Local Area Plans, are being used to manage development city in parts in-lieu of a Master Plan (yet to be adopted and notified).

Now, another form of pressure, where the proposed Codes are applicable is to shape the regularization process of unauthorized / illegal colonies as existing norms fall short in addressing these specific requirements. This is because existing norms are land based and cannot provide solutions for the strict requirements of social and physical infrastructure, green area and even parking. Planning in such areas need to be based on availability of resources, including space and hence look for customized negotiations (like the requirement in Regulated and Prohibited areas).

Therefore - keeping the above points in considerations, the proposed Codes are apt for-

i. Area-Based Approach and
ii. Smaller towns and cities. The latter types of towns and cities are the essence of the country, and their requirements are context driven. Such forms of Codes as proposed, respond to context-specificity and being solution-driven are more compatible.

Another word of note – is that these documents reflect learnings from Indian towns rather than "looking to the west". It has captured how smaller towns have developed necessary customized solutions (for example Gangtok) and how they have responded to 'character-based areas' approach, through their layout planning process. This is a very useful exercise.

Moving forward – besides the three-dimensional articulation, the Codes also embed need to have greater synergy between disciplines like Urban Planning and Design, Conservation, Landscaping, to transform Indian cities. Integrated multi-disciplinary planning is the future of area planning approaches. In fact – the New Education Policy may just be able to address this gap in education by removing silos of discipline by integrated learning and application. In fact, it will benefit the Planners and all stakeholders concerned with mandate of city management to create a platform for evolving suitable (and logical) incentives and negotiations. The stakeholder engagement process may be furthered to delve into processes of guideline preparations too, for development planning.

D. Expert Reviewer- Dr. Sumana Bhattacharya,

Senior specialist in Climate Mitigation Strategies (IPCC)

Very good piece of work done and relevant considering even the Hon` PM`s speech covered such topics.

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. These documents, add to the repertoire without overriding existing ones. Infact, if we notice carefully, area-based exercises, such as the SMART City, AMRUT, PRASAD, would have benefited if such frameworks were used.

Some of the additional areas to explore and incorporate may be:

1. Create a decision trees – this will encourage users by identifying actionable points. The issue is, the process for brownfield transformation is complex and several aspects need to be covered. The decision tree helps by breaking the complex processes into smallest steps and indicates when a stage is completed clearly. It will also provide alternative approaches, chart out expected challenges and need for customization, yet ultimately handhold progress. It also becomes convenient for administrators to visualize the process and participate.

2. Include drafting a GHG inventory – This may be a graded process, depending on the quality of available data. Say, it can be in three tiers, where the middle is optimum data and third level is an advanced one.

3. Mainstream sustainable form of development through FBC. Indicate the benefits and how resilience and liveability is achieved through it. In this regard perhaps exploring more details on how to achieve gender inclusivity, child friendly, affordable housing, urban finance and economy, sponge cities, recharge areas, net zero et al, will help.

4. Introduction of urban gardening/ farming and management of urban forests – People`s involvement in these aspects regulates urban environment. For example, during urban farming, people can grow small organic produce and superwise its quality. And, through forestry management, specifically planting of native species, are instrumental to control air quality and ambient temperature.

5. Real estate bonds, green bonds and even carbon markets – explore 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 for real estate development and boosts revenue capture. When quality and feasibility is converted into real estate shareable bonds, it becomes easier to incentivize everyone to participate.

6. Trying to integrate the other planning tools of Ministry and agencies in the documents.

E. Expert Reviewer- SMH Adil,

Senior Green Building and sustainability expert,
Built Environment Simulation Specialist, CEO, GEED

My sector specific inputs/ feedback on FBC Guidebooks and SOP`s are as follows:

1. May address/ incorporate the following aspects in sections on Green Building and others:
   i. Adoption of weather resilience and some sort of index
   ii. Wind pattern and Natural ventilation
   iii. Surface/ Volume ration and related thermodynamics
   iv. Window to wall ration
   v. Adoption of high-performance computing for optimisation
   vi. Problem definition and objective function
   vii. Disaster management, flood and earthquake considerations
   viii. Adoption of new construction methods

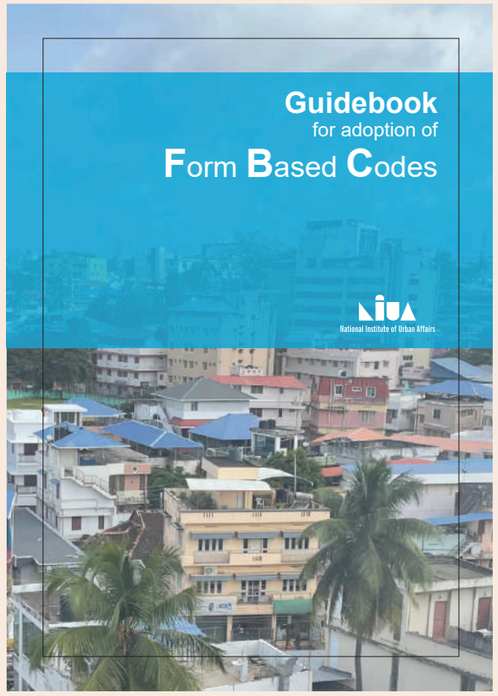
2. May note that to achieve environmental sustainability and to ensure pedestrian priority, material selection and enabling fire and life safety, respectively are the key.

3. In the section on Vision for Indian Cities, include water-averse/ management and streamlining supply chain for garbage as means to achieve set goals.

4. In the definition of Character based area, include ‘Climate’ as a function.

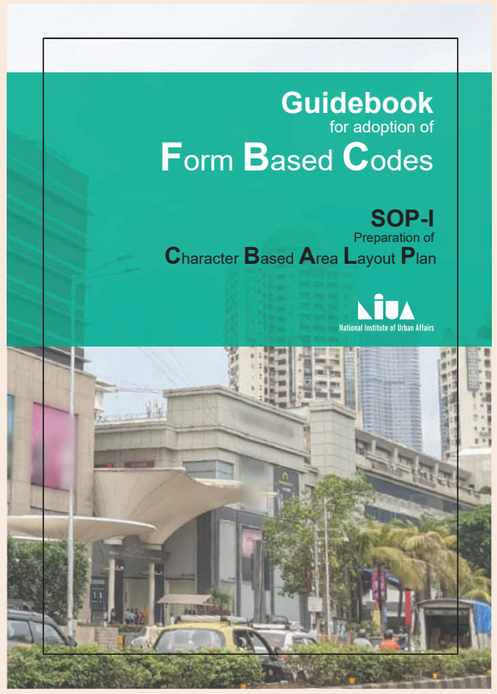
Other Documents

Guidebook



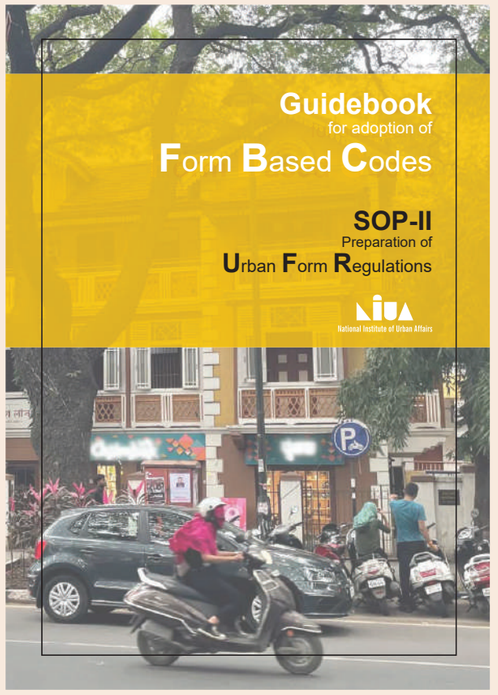
Guidebook explains all tools and processes to adopt Form Based Codes and its component parts, like CBALP, UFR, PDC.

SOP I



SOP-I provides tools and processes for creating CBALP.

SOP II



SOP-II provides tools and processes for formulating UFRs applicable to various CBALP.

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 incentivize 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

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Notes:

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