

Concept Plan
**MUMBAI
METROPOLITAN
REGION**

Summary Report

August 2011

Concept Plan
MUMBAI
METROPOLITAN
REGION

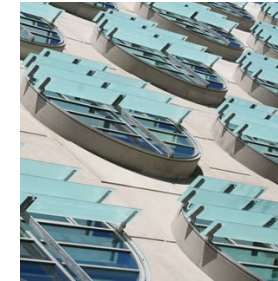
Summary Report

August 2011

Glimpses of a Global City

CENTRE OF
EXCELLENCE IN
URBAN
MANAGEMENT

THE ECONOMIC
ENGINE
OF INDIA



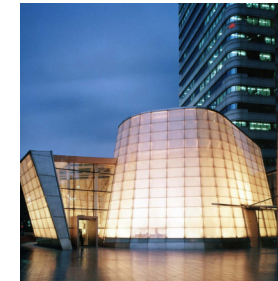
GATEWAY TO
SOUTH ASIA



JOBS FOR ALL



A CITY FOR ITS
PEOPLE



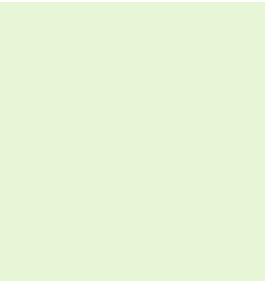


IN SYNC WITH
NATURE



Table of Contents

Preface	.....01
Assessing Future Growth of MMR	.....03
Envisioning the Future of MMR	.....05
Concept Plan for MMR	.....07
9 Moves to Get There	.....14
Balanced Urban Growth	.....15
A Distinctive Global Financial Centre	.....17
Well Distributed Job Opportunities	.....21
Quality Living For All	.....23
Seamless Connectivity	.....31
Infrastructure Excellence	.....35
A Well-Nurtured Environment	.....39
An Extensive Green Network	.....41
A “Glocal” Cultural Centre	.....43
Making It Happen	.....45
Improvements to the Planning & Regulatory Framework	.....46
Development Phasing & Priority	.....50
Immediate Critical & Catalytic Projects	.....51
Increasing Government Land Holdings & Revenue Stream	.....55



A MELTING POT OF
CULTURES



A METROPOLIS ON
THE MOVE



A PLACE TO CALL
HOME



PREFACE

IMAGINE MMR¹ – THE GLOBAL FINANCIAL HUB, a business powerhouse with a diverse and expanding economy, the city of dreams and ambitions, the shining metropolis of South Asia.

IMAGINE MMR – INDIA’S MOST ENIGMATIC CITY, home to regional and international cultures, with busy streets and endearing cityscapes, leafy residential enclaves and hip urban lifestyle, quiet nature retreats and attractive recreational spots.

MMR NEEDS TO BE BOTH, India’s futuristic international city as well as the city firmly rooted in its heritage, which every Mumbaikar calls home.

MMR’s future challenges?

In the next two decades the Mumbai Metropolitan Region (MMR) will become one of the largest urban agglomeration in the world. Attracted by its escalating economy, by 2050 its population will grow to be more than 40 million with a working population of over 20 million. Accordingly, massive investments is needed in the creation of employment centers, housing, transport & infrastructure which have to be done properly within a well-managed environment.

What is a Concept Plan?

In order to guide MMR’s growth in the future, it is critical to formulate a strategic development vision and a long-term physical development framework for the Region which will direct its physical & sectoral growth. As per the Empowered Committee on Mumbai’s Transformation under the Chief Secretary of Maharashtra’s decision, the Concept Plan is intended to be such a macro-level blueprint which will guide all future development and planning activities in MMR. Planned for horizon years 2032 and 2052 it will steer medium and long term growth of MMR in a coordinated manner.

Why is it Needed?

Mumbai is increasingly being recognized as an important economic hub of South Asia. However, the state of its urban development is undermining its international competitiveness. The key objective of the Concept Plan is to explore bold and break-through ideas from international experiences in city development so as to help MMR leap-frog into a world-class state of development. Its also establishes benchmarks for development of various sectors based on global best practices and determines strategies to help bring about this transformation.

¹ MMR : MUMBAI METROPOLITAN REGION

What is its Role?

Albeit there have been a few regional planning initiatives in the past, each with varying degrees of success and shortfalls; the Concept Plan is an attempt to take a fresh look at Mumbai's regional development. It is a first such plan which ventured to incorporate regional concept planning along with supportive sector wise studies. The Concept Plan will help determine the long-term positioning of MMR nationally and internationally. Based on this strategic development vision, the Concept Plan will illustrate steps to help achieve this position. It will help achieve a balance between the urbanization and environmental conservation. It will demonstrate strategies to bring about renewal of its existing urban areas as well as optimize development in the newly urbanizing areas.

MMR is riddled with a complexity of developmental issues and a multiplicity of planning agencies. It will ensure that growth in the region occurs in a comprehensive and coordinated manner. The Concept Plan will ensure that region maintains its competitiveness in the global arena as well as offer a safe, healthy and holistic lifestyle to its residents.

²MMRDA : MUMBAI METROPOLITAN REGION
DEVELOPMENT AUTHORITY

³MTSU : MUMBAI TRANSFORMATION SUPPORT UNIT

How has it been developed?

On behalf of the MMRDA², MTSU³ invited an international tender for the preparation of a Concept Plan for MMR. In November 2009, the tender was awarded to the team led by Surbana International Consultants Pte. Ltd., Singapore. The duration of this project was 66 weeks, with commencement in March 2010. The project included several stages, including the preparation of:

- A socio-economic study to determine the dimensions of growth of the region upto 2032 & 2052.
- A planning Vision and regional development strategies
- The Concept Plan for MMR–2032 & 2052
- 7 Sectoral Studies focusing on Housing, Transport, Utilities & Infrastructure, Environment, Parks & Recreation, Heritage Conservation & Urban Design, Land Use Management.
- Development Guide Plans (DGP) or detailed plans for 3 prototypical areas of the region
- 2 Urban Design plans for key areas.
- A study on implementation & financing

The Concept Plan has been a collaborative effort with critical inputs from the project's Steering Committee, Technical Committee, Focus Groups and various stakeholders at various stages of the project.

How will it be realized?

Planning at regional level in MMR is currently under the purview of the Metropolitan Planning Committee (MPC), with technical assistance from the MMRDA. The current Regional Development Plan (RP) is due to expire this year and shall be updated by the Regional Development Plan presently being prepared by MPC. This Regional Development Plan broadly directs growth in MMR & regulates growth in the area which are not under the jurisdiction of municipalities or other local bodies. MMRDA/MPC is proposed to be the custodian of the Concept Plan to ensure its adoption in the Regional Development Plan & Local Development Plans.

The Concept Plan suggests broad level recommendations for all areas of the region which would form the basis for developing the DP for each of the local areas. Currently, at the local level the various municipalities and urban local bodies (ULBs) prepare detailed Development Plans (DPs) for areas under their jurisdiction. The various recommendations suggested by the 3 detailed local level plans and urban design are proposed to be incorporated in the Development Plans of various ULBs, e.g. the DP being prepared for Greater Mumbai.

In addition, the Concept Plan has identified few catalytic projects to jump start the redevelopment and realize the vision for MMR.

ASSESSING THE FUTURE GROWTH OF MMR

Planning Area

LOCATED IN THE STATE OF MAHARASHTRA, MMR, is widely seen as the financial and entertainment capital of India. The planning area of MMR encompasses 4,355 sq km in total and is spread over four districts: namely, Mumbai District, Mumbai Suburban District, and parts of Thane and Raigad Districts. MMR comprises of 8 municipal corporations, 9 municipal councils, 17 town-municipal urban centers, and over 900 villages.

MMR's Projected Growth Scenario

MMR is expected to be amongst the 5 most populous regions of the world with a high-end services-based economy and a large employment base.

ECONOMIC PROJECTIONS

- Per capita GDP in 2052 beyond INR 1 mil
- GDP CAGR between 7% - 9%.
- Increasing share of GDP from RoMMR v/s GM, from present 41%:59% to 50%:50%
- Dominant share of GDP from tertiary sector (75%)
- A sustained secondary sector (25%)
- Key drivers of the economy - Financial Services, Biotech, IT/ITES, Retail, Media & Entertainment, Tourism, Education, Healthcare and Logistics

LABOR MARKET PROJECTIONS

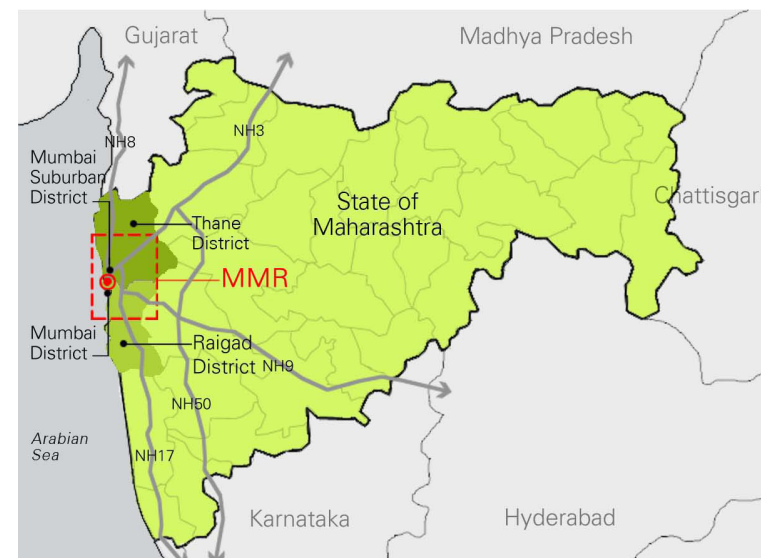
- High labor participation rate (53%)
- Bulk of employment in tertiary sector (25%)
- Sustained share in secondary sector (68%)
- Employment in informal-sector (>10%)

Heavy industries are likely to move out of MMR and be replaced by knowledge-based services sectors or high value added exports based products. This shift would need development of intellectual capital & talent pool. Creating jobs in the peripheral urban areas will be necessary.

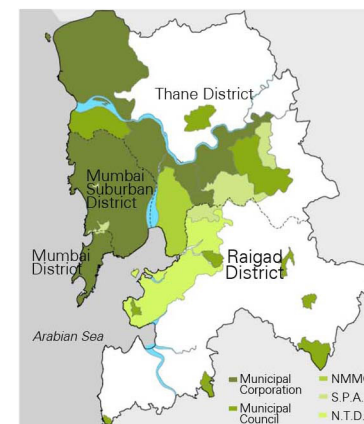
SOCIO-DEMOGRAPHIC PROJECTIONS

- By 2032 sharp increase in population to 35 mil (1.4% growth)
- By 2052 stabilized population growth to 40 mil (0.7% growth)
- Dominant age group: 14-60 years (over 60%)
- Pop. distribution would increase in RoMMR v/s GM, from present 50%:50% to 60%:40%
- Average household size would decrease, from present 4.15 to 3.60 by 2032 and 2.95 by 2052
- Average household income will increase with an expanding and dominant middle class

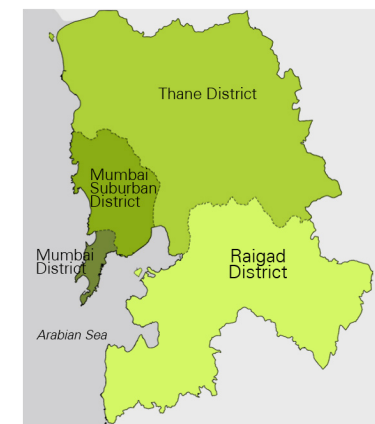
GDP growth would moderate population growth, but this would be substituted by inward migration, resulting in population growth, and a huge demand in housing & infrastructure.



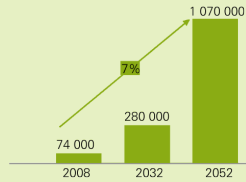
REGIONAL CONTEXT OF MMR



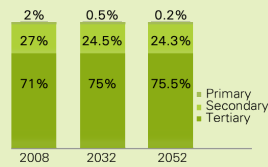
ADMINISTRATIVE BOUNDARY WITHIN PLANNING AREA



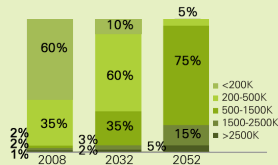
DISTRICT BOUNDARIES IN MMR



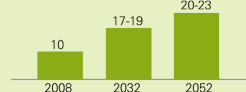
GDP Per Capita



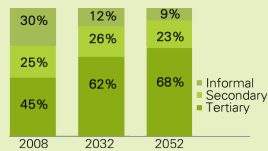
Sectoral Composition of GDP



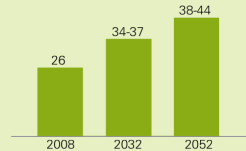
Household By Income



Labour Market Projection



Sectoral Composition of Labour Force



Population Projection

International Benchmarks					
Indicators		MMR	Singapore	Shanghai	Seoul
Population	sq. km.	4,335	710	6,340	605
	mill	24.6	4.6	18.6	10.4
Population density	p/sq km	5,970	8,350	13,400	16,700
GDP	p/ha	4.15	3.50	3.02	2.48
	USD Bn	40	183	178	136
	-	2%	-	1%	<1%
	-	27%	30%	46%	6%
Tertiary	-	71%	70%	53%	94%
Past 10 yrs GDP growth	-	6-7%	6.9%	13.8%	3.4%
	USD	4,385	39,500	16,200	16,700
Exports	USD Bn	38 (Maharashtra)	450	144	27
Key Exports		<ul style="list-style-type: none"> Textiles Cotton Yarn Gems & Jewelry Metal and Metal Products Agro-based Products 	<ul style="list-style-type: none"> Electronics Refined Petroleum Products Data Processing Machines 	<ul style="list-style-type: none"> Hi-tech Products Electro-mechanical Products 	<ul style="list-style-type: none"> IT Products Heavy Industry Goods

* Benchmarking undertaken against Asian cities due to similarity in context

SPACE FOR WORKING AND LIVING

Living Space: increasing per person space consumption with increasing GDP

Population (mn)	Year 2032		Year 2052		
	Living Space per Person (sq.mt)	Total Living Space (mn sq.mt)	Population (mn)	Living Space per Person (sq.mt)	Total Living Space (mn sq.mt)
38	10-15	350 - 530	44	20-25	810 - 1020

Working Space: catering for changing office & industrial space requirements

	Year 2032			Year 2052		
	Employment (mn)	Floor Space per Employee (sq.mt)	Total Working Space (mn sq.mt)	Employment (mn)	Floor Space per Employee (sq.mt)	Total Working Space (mn sq.mt)
Services	11	20-25	220 - 275	14.6	20-25	30-50
Industry	4.6	30-50	138 - 230	5	30-50	150 - 250
Total	15.6	-	-	19.6	-	-

ENVISIONING THE FUTURE OF MMR

from **WORLD CLASS** CITY...

2032

Transforming MMR into a “World Class Metropolis” with a vibrant economy, a globally comparable quality of life

MMR is envisioned to achieve ‘world-class’ standards in the next 20 year, as a global financial centre and as a region with international living standards.

2052

Elevating MMR to be a “Global City” with a unique identity and global recognition as an international business hub, a leading technological innovator, a melting pot of local and cosmopolitan cultures, and a centre of excellence for urban environmental management

The long-term goal for MMR is beyond just achieving basic international standards. In the next 40 years, MMR will position itself as a “global-city”

Vision Mumbai

...to GLOBAL CITY



"On the world economic stage, Mumbai is envisioned as a Global City, comparable with the ranks of New York, London, Singapore and Shanghai. It is intended to become the business hub for the South Asian Region..."

CONCEPT PLAN FOR MMR

Existing Scenario

AT PRESENT, population density is concentrated in Greater Mumbai and the urban areas around it. The sparsely developed outlying areas of the Region offer opportunities to accommodate the future population surge in a planned manner, while diffusing the high densities from Mumbai City and allowing for its systematic redevelopment. Upcoming projects such as the 2nd International Airport at Panvel and the Virar-Alibaug Multi-modal corridor are opening up the largely undeveloped areas in the hinterland for development.

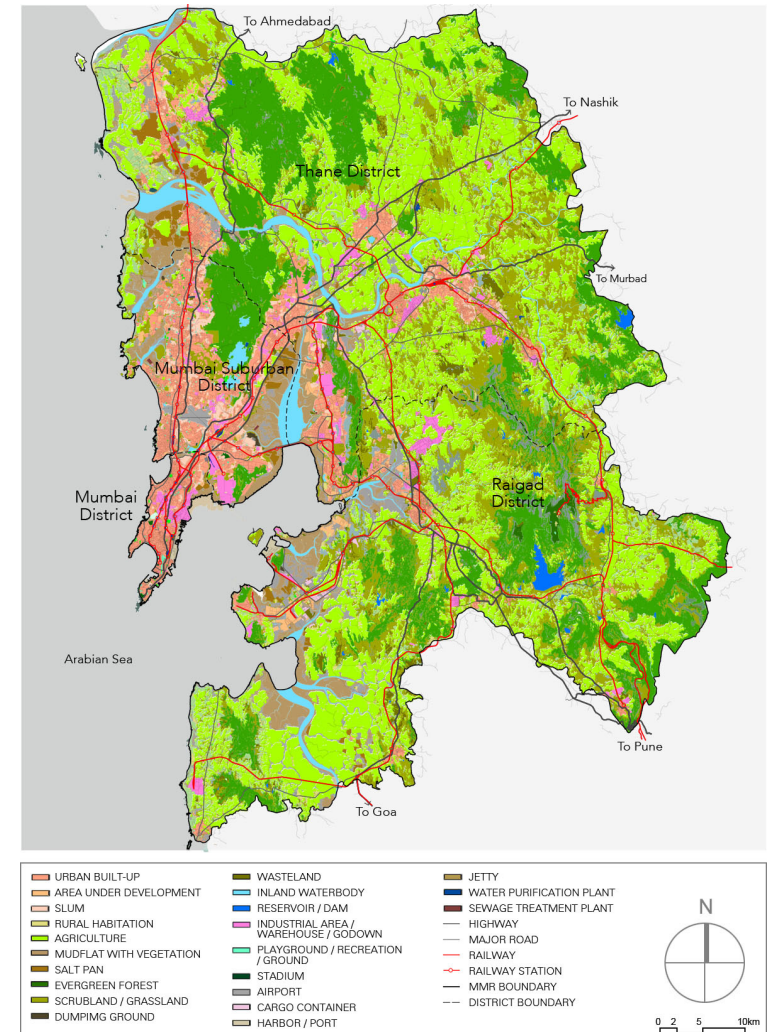
EXISTING DEVELOPMENT DENSITY

- 31,500 p/sq. km. in Greater Mumbai, the highest in MMR
- 5,970 p/sq. km. overall density
- 14,000 p/sq.km. average density of urban areas

To slow down the seemingly unstoppable densification of the urban area due to the imminent population increase, alternate decentralization strategies will have to be explored and enforced

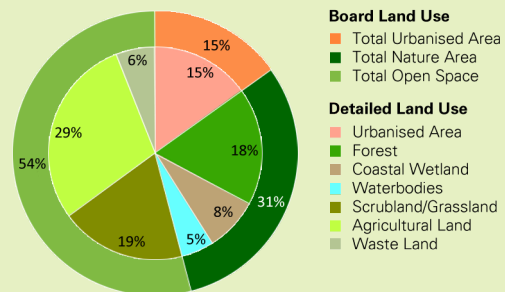
Comparison of Densities		
	Inner City Density (P/Sq. Km)	Regional Density (P/Sq. Km)
MMR	31,500(GM)	5,970
Singapore	-	7,150
Seoul	17,300	2,060
Shanghai	24,670	2,620

International Benchmarks: Land Use Distribution & Ownership				
Sector	Singapore (future goals)	US Cities	European Cities	Goals for MMR
Urbanized Area	34%	-	-	40%
Regional Parkland	20%	-	-	12%
Infrastructure & Utilities	22%	36%	18%	15%
Working and Living	19%	10%	30%	25%
Strategic Government Land Ownership	>80%	-	-	5-7%

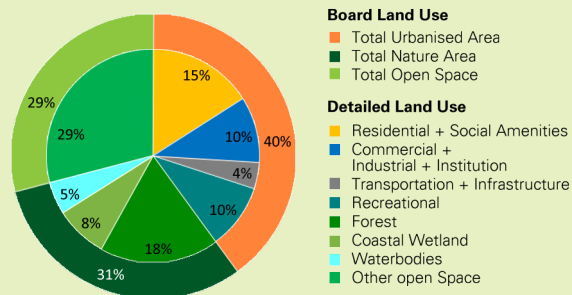


EXISTING LAND USE MAP OF MMR-2010

Existing Land Use Distribution



Board Land Use Requirements



Broad Urban Land Requirements

Sector	Existing	Year 2032	Year 2052
DENSITY IN URBAN Areas	40,000 (peak in GM)	25,000	25,000
Urban Population	26 mil	32.5 mil	43.4 mil
Urbanization Area	650 sq.km.	1,300 sq.km.	1,740 sq.km.
Strategic Government Land Ownership	3.6% 16 sq.km	5% 217 sq.km.	7% 304 sq.km

EXISTING LAND USE DISTRIBUTION

- 15% urbanized area
- 31% protected area
- Large development opportunities on non-urbanized hinterland

BROAD LAND USE REQUIREMENTS

- Urbanization to be restricted to 40%
- 31% protected nature areas to be conserved
- Average development density limited to 25,000 p/km²
- Additional land required by 2032 = 700 sq.km. (1.6 times the size of GM)
- Additional land required by 2052 = 1100 sq.km. (2.6 times the size of GM)

In order to accommodate the large influx of population it is critical to make prudent use of the scarce land resources so as to preserve the rich natural assets as well as encourage self-sustaining compact urban growth.

Regional Development Strategies

KEY HIGHLIGHTS

The Land Use Plan 2052 intends to reshape the overall existing development pattern of MMR and aims to enable a balanced urban growth across the Region. It intends to play upon the physical development opportunities and work around the physical constraints to create opportunities for redevelopment and growth. The following are some of the key strategies which will help this restructuring in the long-term.

ECONOMY & EMPLOYMENT

- Revitalized global CBD at Nariman Point and Fort Area
- World-class International Airport in Rewas-Mandwa with quick access to the CBD
- High speed rail connectivity to other metros of India
- Consolidated port and logistics activities at JNPT and Rewas-Mandwa
- Relocation of existing Mumbai Port and redevelopment as a waterfront development zone in the long run.
- Venue for global economic, cultural and entertainment events near CBD
- International research and education destination along Mumbai-Pune knowledge corridor
- Well-distributed commercial & industrial centers in the Region

HOUSING AND QUALITY OF LIFE

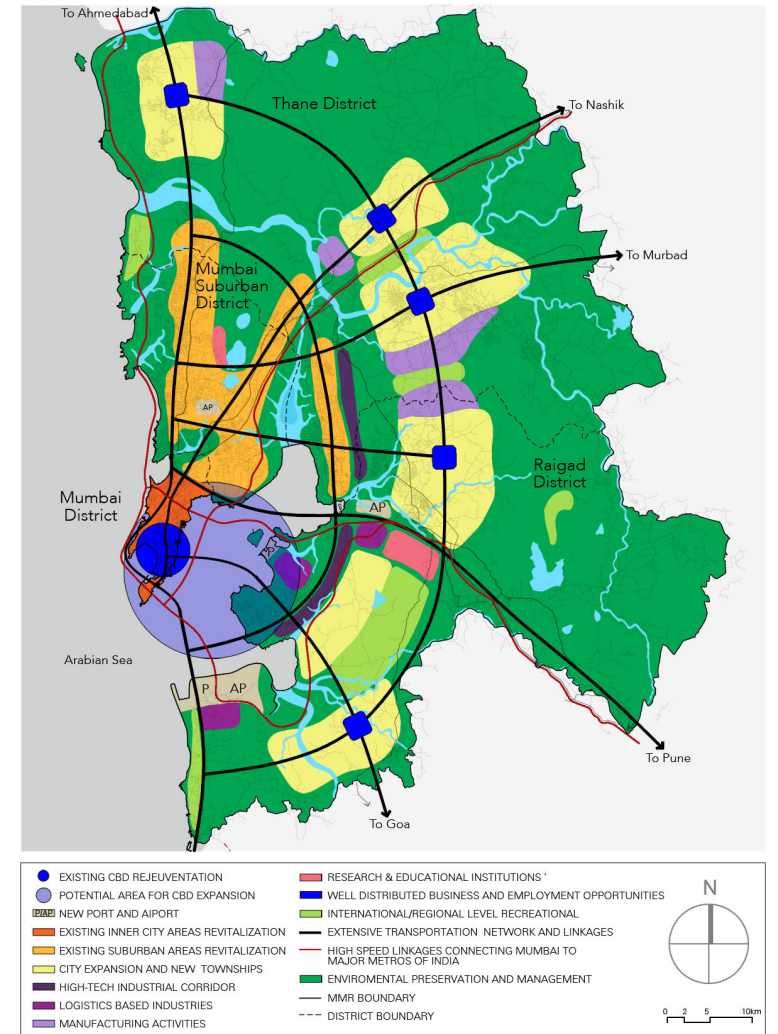
- Comprehensive renewal of built-up Inner City and City Fringe Areas
- Integrated and independent townships in the outlying Suburban Areas
- Comprehensive provision of social and public amenities

CONNECTIVITY & GROWTH

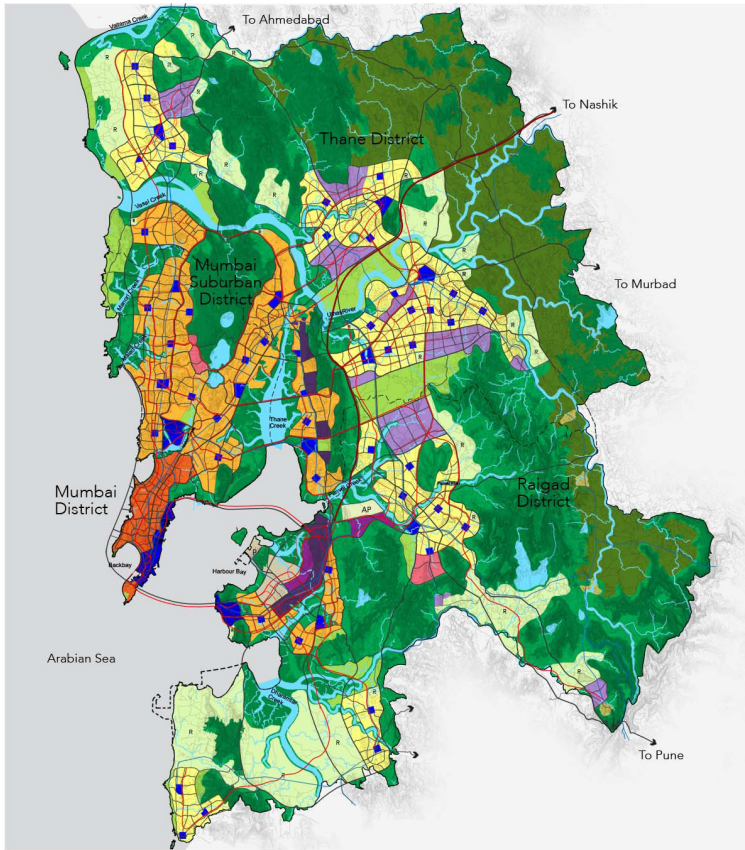
- Extensive highway and rail linkages across the harbor
- Facilitation of urban expansion towards south
- Strengthening of the northern and north-eastern industrial corridors
- Transit-oriented development

ENVIRONMENT & RECREATION

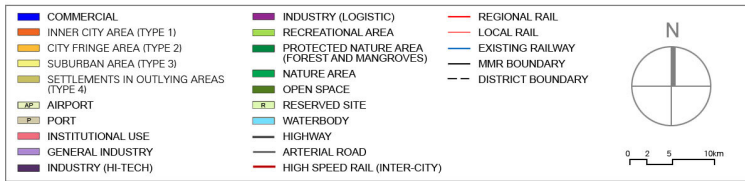
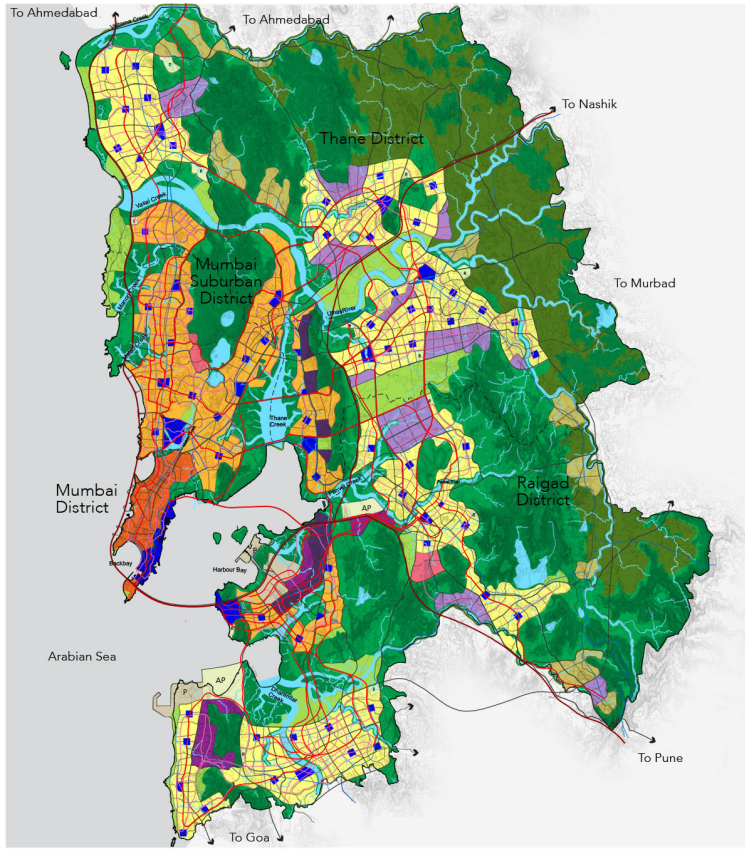
- Protecting and networking nature
- Integrated storm water and coastal management
- Innovative and resource efficient infrastructure
- Access to green and recreational amenities at all levels



REGIONAL DEVELOPMENT STRATEGY

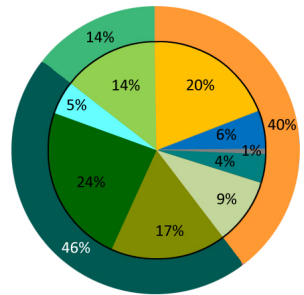


CONCEPT PLAN PROPOSAL- 2032

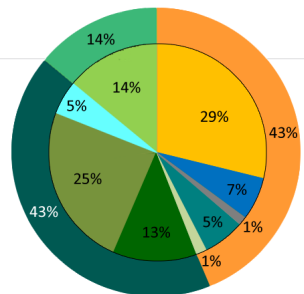


CONCEPT PLAN PROPOSAL- 2052

Proposed Land Use Distribution 2032



Proposed Land Use Distribution 2052



Board Land Use

- Total Urbanised Area
- Total Nature Area
- Total Open Space

Detailed Land Use

- Residential + social amenities
- Commercial + Industrial + Institution
- Port Airport
- Recreational
- Reserved Site
- Other Nature Area
- Protected NatureArea
- Waterbodies
- Other Open Space

2 Ways to Grow

THE PROPOSED LAND USE PLAN demonstrates the long-term restructuring of MMR and intends to balance the distribution of commercial, industrial, housing, institutional, infrastructural, environmental and recreational uses in the Region. But, this envisioned transformation in MMR would be led by its economy, which would largely revolve around its international business hub.

Two possible case scenarios explore how MMR's business hub could be strengthened and positioned as the preferred gateway of South Asia.

City of Cities

BASE CASE

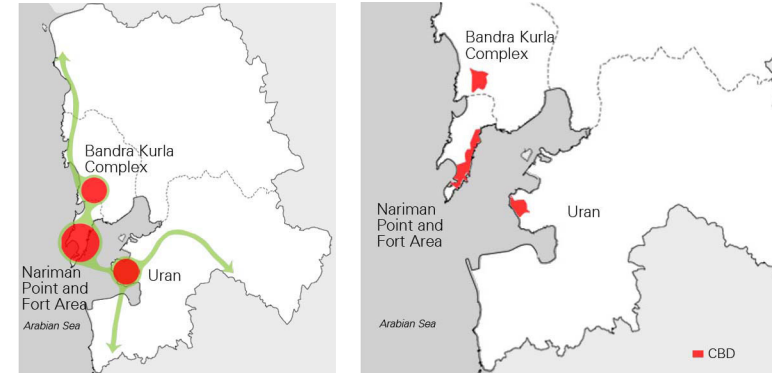
"Creating opportunities of having several thematic CBDs, making MMR a polycentric Megapolis."

This option suggests a polycentric model, where the Nariman Point - Fort area would continue to develop as the prime business area of MMR supported by the 2nd established business centre in BKC and a new commercial centre proposed to be developed across the harbor in Uran. Subsequent to the Mumbai Trans-Harbor Link another cross-channel link would connect the revitalized CBD to this new & complementary CBD on the hinterland in Uran. This commercial centre would be a key link between the historic CBD & the Rewas-Mandwa airport in the long-term.

This option is in consideration with the current development trend of MMR, and the desire to decongest existing urban area by moving the city development inland.

The CBD in Nariman Point-Fort area would be renewed and extended over the eastern waterfront replacing the existing Mumbai Port in the long run, and providing prime waterfront venues, thus transforming the inner city.

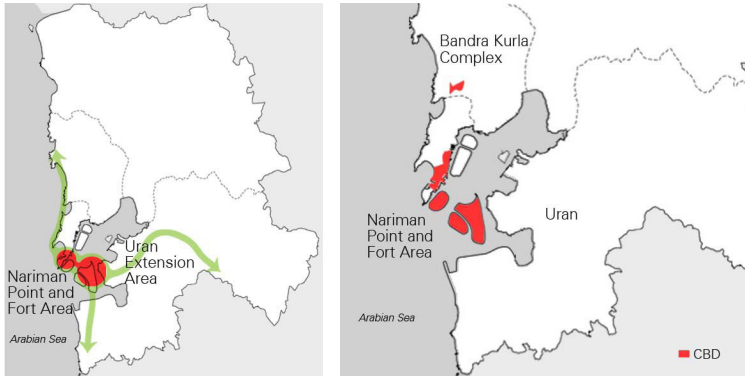
The CBD at BKC would be revamped and expanded, making it a 24x7 activity centre in the heart of the City.



CITY OF CITIES- A POLYCENTRIC MEGAPOLIS WITH MULTIPLE CENTRAL BUSINESS DISTRICTS



EXTENSION OF BKC CBD - CREATING A VIBRANT WATERFRONT ALONG MITHI RIVER



CITY OF ISLANDS - EXPANSION OF CITY CENTRE INTO MULTIPLE ISLANDS IN THE BAY



CREATING STRATEGIC NEW LAND BANKS AND DEVELOPING A VIBRANT NEW WATERFRONT CITY

City of Islands

ENHANCED CASE

“Creating opportunities for expansion of the city centre into multiple attractive ‘islands’ with vibrant waterfront setting and for strategic land banking.”

This option explores the opportunity of expanding the existing CBD in South Mumbai through the creation of land in the Harbor Bay. These newly crafted islands would bring the Island City closer to its hinterland. The strong island character would mirror Mumbai’s legacy as an “Island City”. It would allow the development of a state-of-the-art financial district, supported by cultural, entertainment, tourism, MICE and lifestyle destinations, which would launch Mumbai on the international business scene.

Through the development of new linkages the extended financial district would form the geographic centre around which the region can grow. Such new land would offer the Government a large stake in the form of strategic land holdings for controlling & shaping the future growth.

Weighing the Options

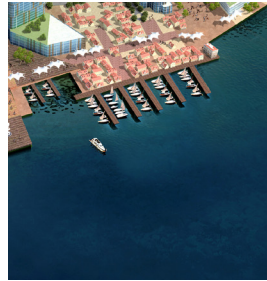
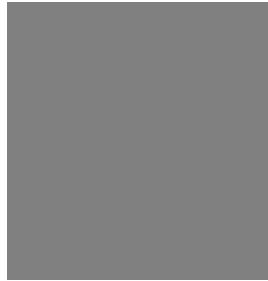
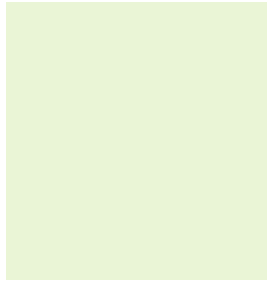
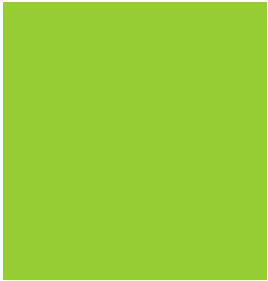
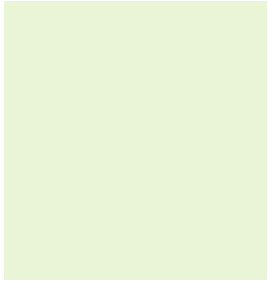
City of Cities	City of Islands
In conformity with regulatory framework	Needs mitigation of regulatory framework
Minimal environmental mitigation	Extensive environmental mitigation
Constrained land supply	Large supply of new land for city transformation
Limited waterfront development	Prime waterfront developments
Land cost* – USD 7.56 bn (in land)	Land cost* – USD 24.86 bn (reclamation)
Land yield* – USD 29.40 bn	Land yield* – USD 334.00 bn
Net gain* – USD 21.84 bn	Net gain* – USD 309.14 bn
Limited increase in connectivity to hinterland	Increased connectivity to hinterland

* Based on current market rate

CONSIDERATIONS ON ‘RECLAMATION’

Land reclamation for city expansion has been a prevalent trend in many urbanized cities of the world. However, it is extremely sensitive to the coastal environment and hence, needs detailed studies and scientific implementation.

Opportunities	Mitigations
The Harbor Bay is a naturally sheltered marine areas from strong wave and current actions.	Ensuring protection and zero-net loss of coastal vegetation actions.
Except for the navigation access channel serving the two ports, the areas along Mumbai Island have a shallow sea bed, less than 5m deep, making it easy to reclaim.	Mitigation of hydraulic, ecological, morphological, water quality and navigational impacts



9 MOVES TO GET THERE

The Regional Concept Plan suggests the broad redistribution of the land uses and activities in the Region. The following 9 steps suggest strategies for the various sectors and issues, which will help realize the proposed intentions of the Concept Plan.

- 1 **Balanced Urban Growth**
- 2 **A Distinctive Global Financial Centre**
- 3 **Well-distributed Job Opportunities**
- 4 **Quality Living for All**
- 5 **Seamless Connectivity**
- 6 **Infrastructure Excellence**
- 7 **A Well-Nurtured Environment**
- 8 **An Extensive Green Network**
- 9 **A 'Glocal' Cultural Centre**

1 BALANCED URBAN GROWTH

Urban Area Hierarchy

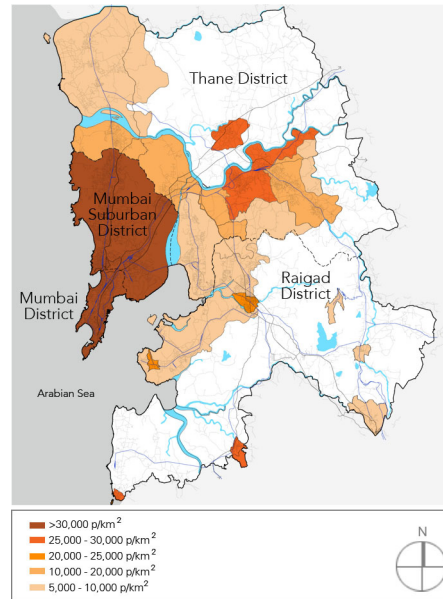
Growth within the region is structured into three urban area categories with varying densities, namely:

- The existing and newly created Inner City Area – 35,000 p/km²
- The existing suburban areas transformed into City Fringe Areas – 25,000 p/km² (The eastern and western suburbs of Greater Mumbai, Mira-Bhayander, Thane, Navi Mumbai and Uran,)
- The existing outlying areas transformed into Suburban Areas – 21,000 p/km² (Vasai-Virar, Bhiwandi, Kalyan, Panvel and Pen-Alibaug)

PROPOSED URBAN AREA HIERARCHY

To accommodate the larger population and to balance growth and density, the urban areas in MMR need to be restructured with a proper planning structure. A hierarchy of urban areas, with varying densities and urban characters would help achieve such change.

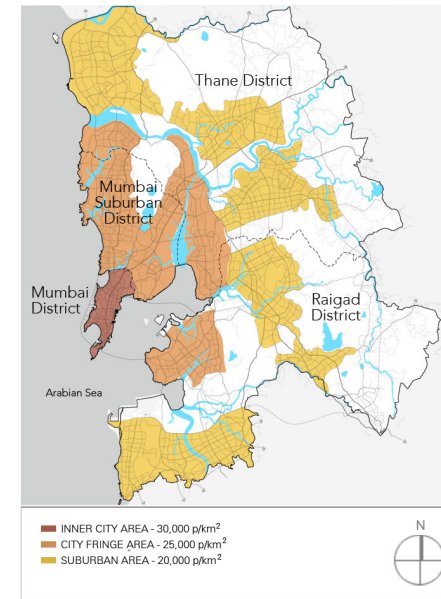
The Inner City Areas, will have predominantly business, retail and hotel uses to support the financial centre, along with a range of living choices for the city's working classes, young professionals as well as up market tenements. By preserving the historic legacy, the city's quarters will be renewed with a mix of old and new uses.



EXISTING DEVELOPMENT DENSITY

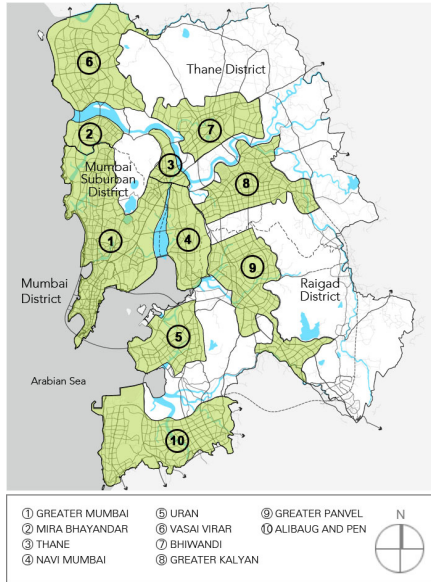
The City Fringe Areas, comprising of the present built-up suburbs of Greater Mumbai, Mira-Bhayander, Thane and Navi Mumbai will be home to new age enterprises and contain a wide range of housing options for city dwellers. By preserving the vibrant character of the street life, the city fringes will allow a mix of land uses along the city roads.

The outer areas of MMR will be shaped into multiple new suburban cities in the long run. Five distinct suburban cities, bounded and

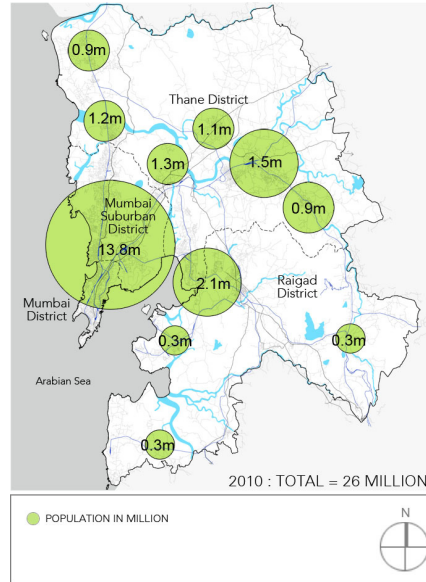


PROPOSED DEVELOPMENT DENSITY

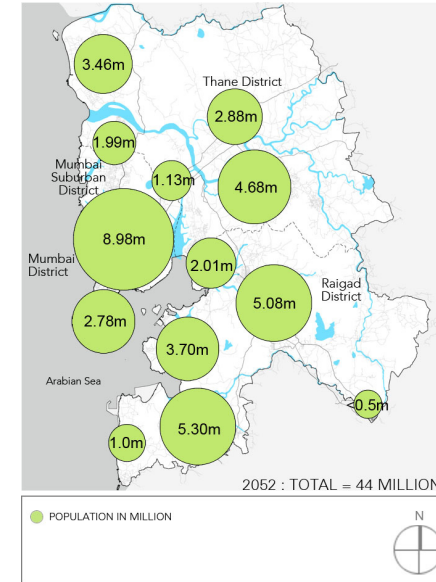
connected by a series of green belts are proposed; namely, Vasai-Virar, Bhiwandi, Kalyan, Panvel and Alibaug. These cities would offer quality housing choices in the outlying areas of the Region.



PROPOSED REORGANIZATION OF CITY BOUNDARIES



EXISTING POPULATION DISTRIBUTION



PROPOSED POPULATION DISTRIBUTION

Urban Area Hierarchy				
Urban Area		Population	Commercial Centres	
	Metropolitan Region	44 mil		International Commercial Centre
	Inner City Area	4 mil		Fringe Centre
	City Within City	2-3 mil		City Centre
	City Within Suburban Area	2-3 mil (total - 22 mil)		Town Centre
	Township	200,000 400,000		

Population Distribution

The existing population distribution across the region is highly imbalanced. More than 50% of the population is crowding within Greater Mumbai (GM) which has only 10% of the total land area of MMR, resulting in a very high population density of 35,000 p/km². With the redevelopment of the City Fringe Areas and the development of the Suburban Areas, by 2052, the population within MMR would be redistributed to achieve a ratio of 30:70 between GM and RoMMR as development of the Suburban Areas picks up.

2 A DISTINCTIVE GLOBAL FINANCIAL CENTRE

Creating an International Downtown

MUMBAI'S VISION OF BECOMING A GLOBAL CITY would be spearheaded by vibrant inner city area and a world-class Global Business District. Positioned as the Financial District of Mumbai and the core of the International Business Centre, South Mumbai's Downtown CBD will re-establish itself as the Financial Centre of India. With improved new regional & international transportation connectivity, it will be the Gateway to India. With a new waterfront CBD, it will be the preferred first stop to doing business in India and the Region. With its unique heritage and culture, it will become a Global Cultural Hub. With attractive new waterfronts and places to live, work & recreate, it will be the preferred destination for businesses, tourists and locals.

Key Features of Downtown

1 ICONIC NEW FINANCIAL DISTRICT

Iconic waterfront CBD through re-profiling of the Backbay Area & the redevelopment of the Colaba Area. This is proposed to be supported by the redevelopment of the Nariman Point.

Features:

- Well designed Quality Office Spaces
- Unique waterfront skyline
- Iconic open spaces & a Central Urban Deck
- New Arts & Cultural Centres & Museums
- New transit lines well integrated with CBD

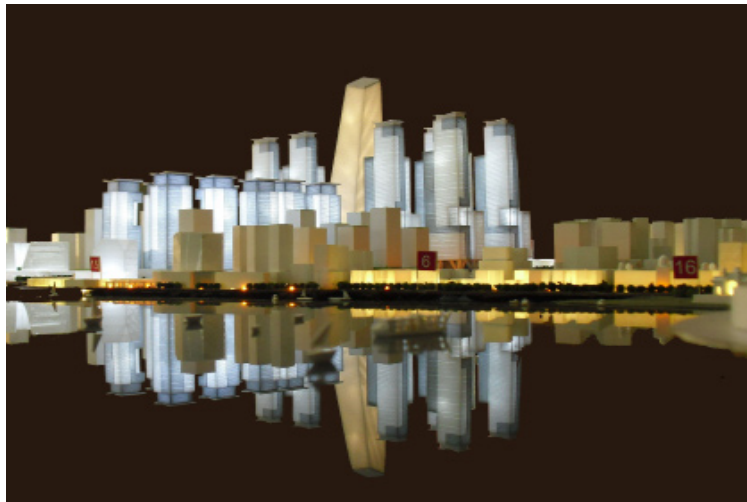
"A Waterfront City Centre...a Gateway to India"



A NEW BACKBAY FINANCIAL DISTRICT OFFERING QUALITY OFFICE SPACES AND VARIETY OF OPEN SPACES



REJUVENATED HERITAGE AREAS WITH WELL NETWORKED PUBLIC SPACES AND A GRAND CENTRAL-PARK



ICONIC SKYLINE OF THE BACKBAY FINANCIAL CENTRE WITH AN ATTRACTIVE NEW WATERFRONT

2 CONSERVING HERITAGE

Rejuvenation of the Downtown heritage area to complement Mumbai's role as a Global City. This is suggested through creation of a holistic heritage conservation framework. Establishment of a Heritage Management Cell and development of a Heritage Network that links the various heritage areas will create a seamless experience of the heritage areas. Conservation efforts need to be tied in with traffic, infrastructure, landscape, parking, urban form & streetscapes considerations. Developing clear guidelines for regeneration of heritage areas is necessary to achieve a good well balanced mix of old and new which will make the experience of the heritage areas richer.

Features:

- Linking heritage - The Museum Square
- A new pedestrian plaza- Horniman Circle Boulevard & Plaza
- A vibrant market street- Bora Bazaar Link
- Rejuvenating a market square - Crawford Market Plaza
- A Continuous open space - Central Park

3 VIBRANT NEW WATERFRONTS

The unique geographical location of the downtown provides ample opportunities to make Mumbai a beautiful and vibrant *waterfront city*.

The rejuvenation of Marine Drive & Gateway waterfront, and development of new waterfronts along the coastal edges will form a continuous public space along the water edge linking various areas of the downtown CBD. This unique waterfront will have a variety of characters to be enjoyed by visitors as well as all Mumbaikars.

Features:

- Enhanced historic waterfront- Gateway Waterfront & Tourism Precinct
- Enhanced Marine Drive Promenade
- Backbay Waterfront Promenade & Cultural Link
- New Mangrove Parks
- Rejuvenated Fishing Villages
- An Iconic Monument Park

4 TRANSFORMED INNER CITY AREA

Supporting the role of a Global Financial Centre, South Mumbai's inner city would also be revitalized.

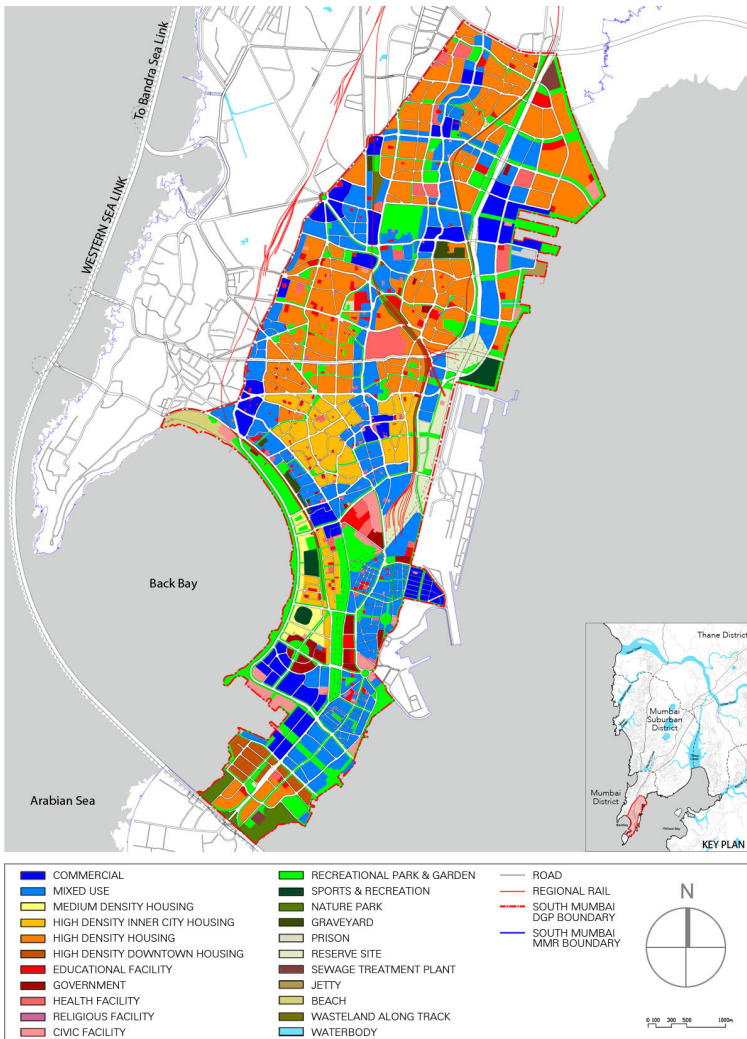
Features:

- Variety of public transit to enhance accessibility of the inner city.
- Distribution of employment and activity centres around the transit nodes and along the transit routes.
- An extensive green network integrating the open spaces and the waterfronts.
- Rejuvenation of city quarters, especially the cessed areas.

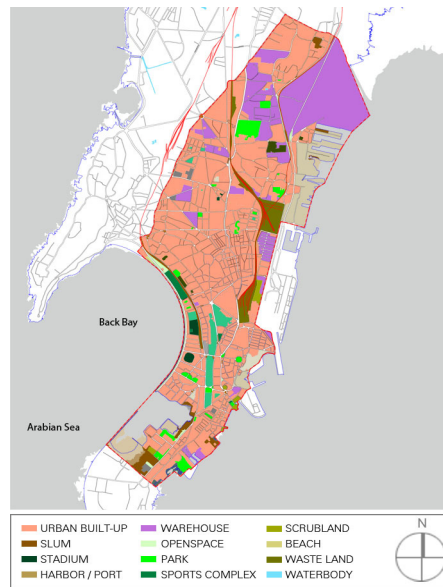
"A World Class Waterfront City...A Financial & Cultural Hub of South Asia"



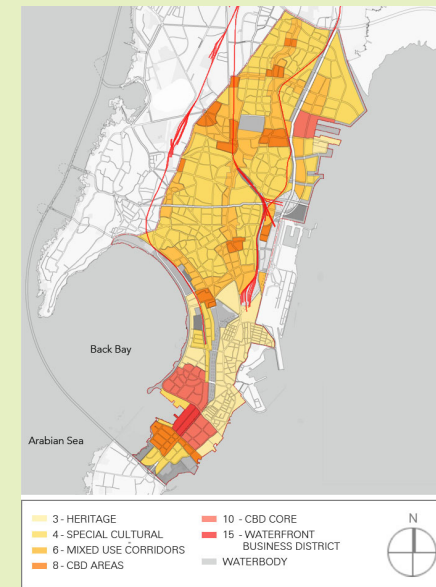
SOUTH MUMBAI INNER CITY: A GLOBAL CITY CENTRE



PROPOSED LAND USE PLAN FOR INNER CITY CORE PLANNING AREA



EXISTING LAND USE MAP - SOUTH MUMBAI PLANNING AREA



PROPOSED FSI PLAN - SOUTH MUMBAI PLANNING AREA

FSI REDISTRIBUTION IN INNER-CITY

The FSI allocation would be the key tool to translate the planning intentions of the Land Use Plan. It suggests allocation of FSI within different areas based on proximity to the transit nodes, the prevailing character of the areas and the intended function for the area.

THE PROPOSED LAND USE PLAN emphasizes on strengthening the existing CBD for making a robust international business centre through creation of new business spaces with exposure to various waterfronts. The planning proposals also attempt to further improve the road & public transportation system & promote transit oriented growth. It attempts to refresh the City's image by facilitating urban renewals of the old areas & the heritage precinct. The plan will offer ample opportunities for local, regional & global employment; enable availability of affordable housing; & offer avenues for experiencing new lifestyles in the inner city.

3 WELL DISTRIBUTED JOB OPPORTUNITIES

Existing Scenario

In the existing set-up, the larger offices, institutions and retail activities are concentrated in the City of Mumbai and Navi Mumbai. The outlying urban areas are largely with an industrial base and dependant on Mumbai City for high-level employment and civic amenities, resulting in long commuting to these centers. Decentralized employment opportunities would be the key tool to regenerate the City Fringe and Suburban Areas. Moreover to address the large informal sector and help services-based start-ups and small businesses to flourish, it would be critical to provide affordable workspaces.

Proposed Commercial Distribution

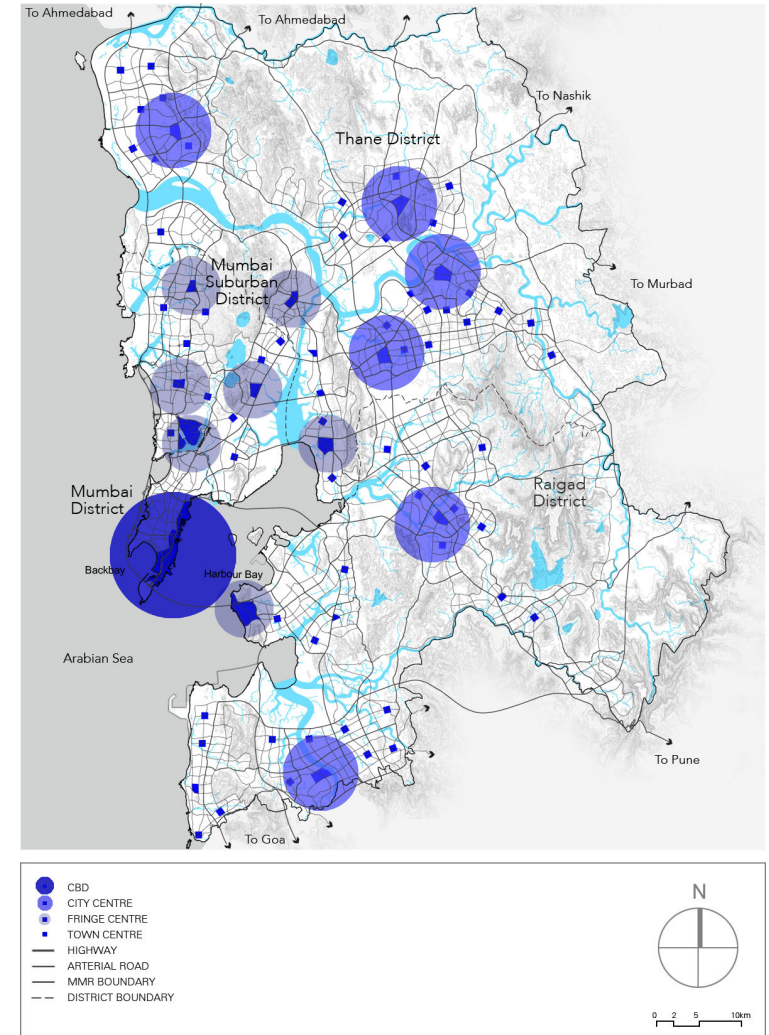
A hierarchical series of commercial nodes are proposed to be distributed throughout the region:

- The revived CBD in South Mumbai would be the international business hub
- 6 Fringe Centers in the City Fringe areas and 5 City Centers in the Suburban cities would, like mini CBDs, offer city level business and institutional venues making these urban clusters independent and self-sustaining
- Smaller Town Centers distributed in the Fringe and Suburban cities would cater to daily and local level commercial needs.

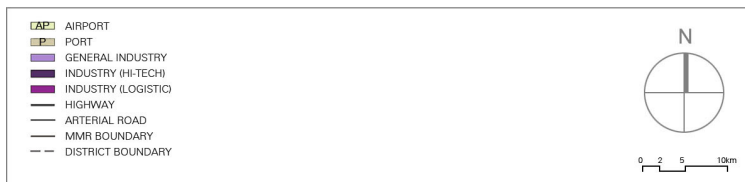
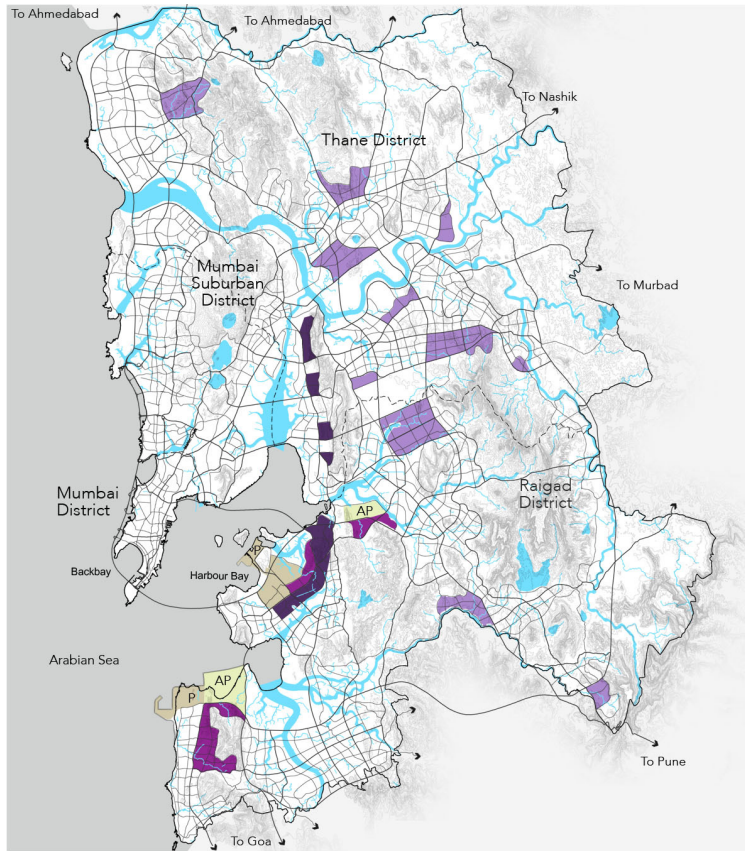
Proposed Industrial Distribution

Though a bulk of employment would result from the services sector, the manufacturing sector would also remain a key source. Industrial space is proposed to be distributed according to the potential of the different areas of the Region.

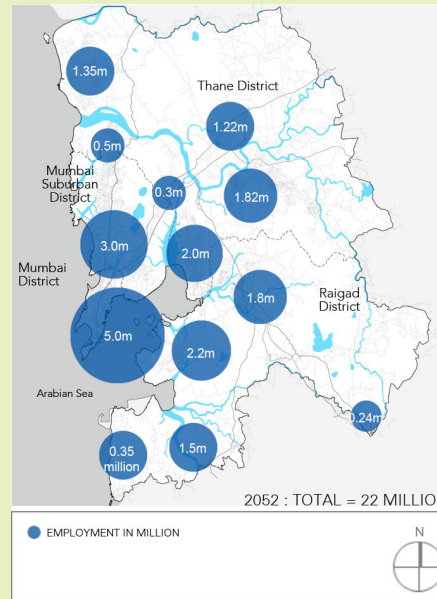
- The high-tech industrial corridor in Navi Mumbai is extended south to Uran-Dronagiri, offering employment to skilled professionals in the City Fringe Areas. It would contain high-value added R&D and manufacturing components related to biotech, media, IT, health care, etc.
- Logistics based industries are proposed around the 2 port-airport hubs in Panvel and Rewas.
- General manufacturing activities would be distributed closer to the Suburban Cities, bringing jobs closer to homes.
- By 2052 all pollutive industries would be shifted out of MMR. Small-scale non-pollutive industries would be distributed within each township to cater to local needs of the residents.



PROPOSED COMMERCIAL DISTRIBUTION PLAN



PROPOSED INDUSTRIAL DISTRIBUTION PLAN

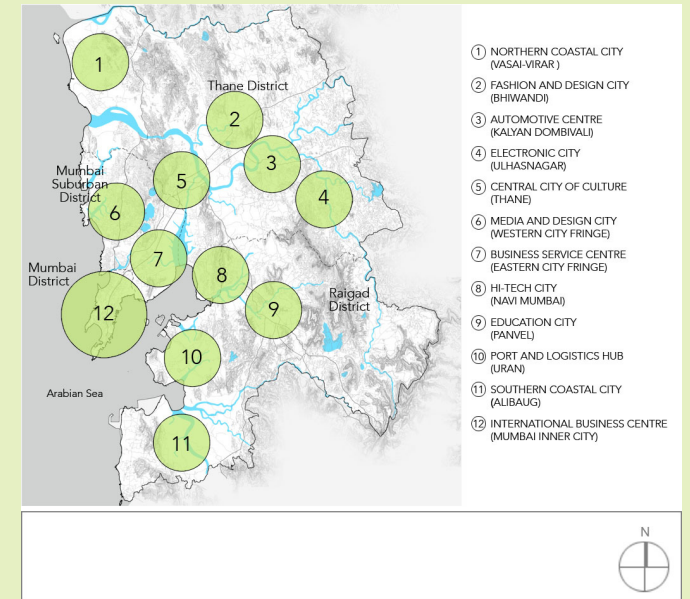


PROPOSED EMPLOYMENT DISTRIBUTION PLAN

Affordable Workspaces

Several strategies are suggested to help generate affordable workspaces in the region, so as to formalize the informal sector and promote the growth of creative & services-based sectors.

- Mandating provision of working spaces for SMEs within slum & MHADA redevelopment projects, rental housing schemes & new housing estates in the Suburban Areas
- Regulating hawkers through provision of dedicated road-side hawking zones



PROPOSED CITY FUNCTION PLAN

Proposed Employment Distribution

The distribution of employment throughout the region would help achieve a 40:60 work force distribution ratio between Greater Mumbai and rest of the Region by 2052. In order to ensure a well-rounded growth in the Region, based on its existing and intended strengths, each city has been assigned a specific economic focus.

4 QUALITY LIVING FOR ALL

Existing Scenario

With 45% of the Region's population living in informal overcrowded settlements, housing is the most critical challenge facing MMR. Land shortfall, high property prices, and inadequate public and rental housing are the key reasons.

Another key issue is the large quantum of dilapidated and deteriorating building stock resulting from outmoded policies and lack of an estate management framework.

By 2032 about 65% and by 2052 about 50% of households would still need housing related subsidization.

Several housing schemes such as public housing development by MHADA⁴; slum area redevelopment under the SRA⁵ the JNNURM⁶ and the RAY⁷ Schemes; city areas renewal under the Cluster Redevelopment Schemes 33(7) & 33(9); and rental housing development under the MMRDA rental housing initiatives, etc are currently being administered at various levels of government as a response to the housing crisis.

	INTERNATIONAL BENCHMARKS: HOUSING			GOAL FOR MMR	
	Singapore	Hong Kong	Existing MMR	2032	2052
Public : Private Housing Ratio	70:30	44:56	10:90	27:73	23:77
Rental Housing	-	-	-	61% (of 27%)	43% (of 23%)
Slums	-	-	45%	12%	Slum free
Living Space*	25 sq.mt /p	12.8 sq.mt /p	4-6 sq.mt /p	10-15 sq.mt /p	20-25 sq.mt /p

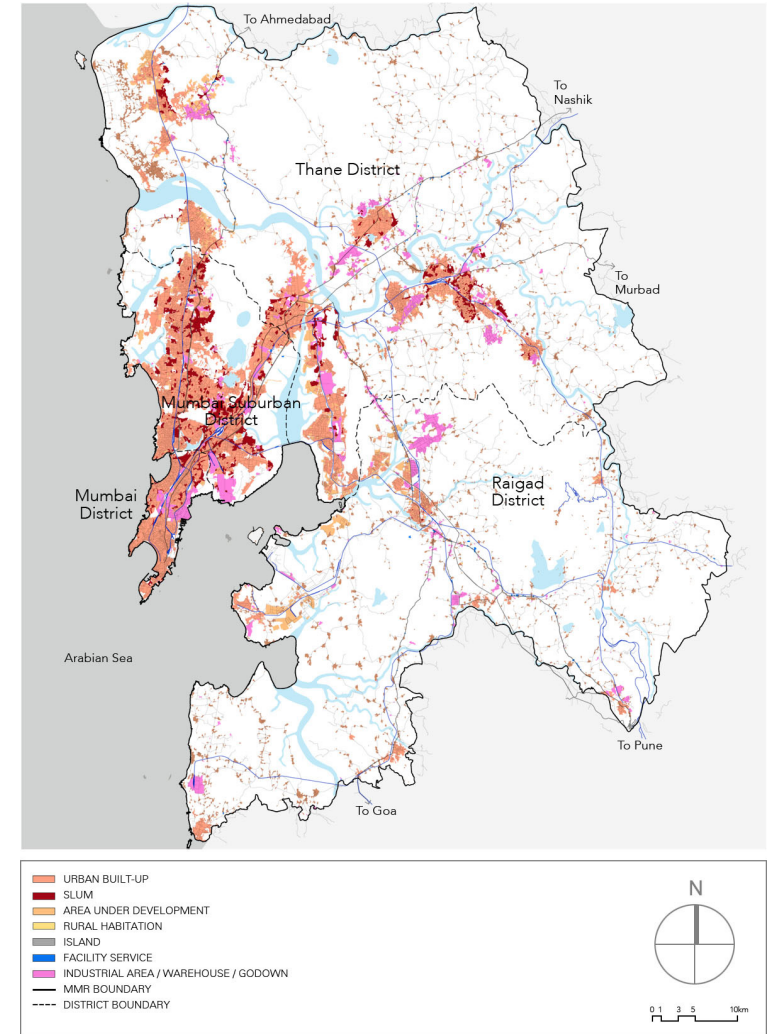
* Japan: 18 sq.mt /p, UK: 31-44 sq.mt /p, China Planning Standards: 25 sq.mt /p.

⁴MHADA: THE MAHARASHTRA HOUSING AND AREA DEVELOPMENT AUTHORITY

⁵SRA: SLUM REDEVELOPMENT AUTHORITY

⁶JNNURM: JAWAHARLAL NEHRU NATIONAL URBAN RENEWAL MISSION

⁷RAY: RAJIV AWAS YOJANA



EXISTING HOUSING DISTRIBUTION MAP

Proposed Housing Development Strategies

BY 2052, HOUSING DEMAND IN MMR would be 13 million units, with 50% of the demand being for affordable housing. As such, the housing strategy for MMR would focus on initiatives which will make housing stock affordable and help accommodate the growing population in the hinterland, such as:

- Continuation and intensification of the slum redevelopment efforts
- Redevelopment of dilapidated building stock such as the rent controlled tenements, cessed buildings, BDD chawls, CRZ affected areas etc.
- Ensuring large supply of rental housing
- Creation of new waterfront housing stock (for all income groups) on the Mumbai Port land.
- Systematic existing city area renewal schemes
- Opening up land for township development in the hinterland, with a strong emphasis on public housing
- Land banking for future city expansion and township development

In the short to medium-term the emphasis would be to meet the large housing shortfall and continuation of existing schemes. In the long run the focus would shift on improving of quality of housing stock. In the case of inner city areas, with the redevelopment of all the informal and old housing stock through existing schemes, there would be a marked increase in population. Hence, this would need to be diffused through creation of new housing stock on the Mumbai Port site as well as creating attractive lifestyle options in the suburban areas and incentivizing out-migration to these areas. The outlying suburbs are intended largely to absorb the future increase in population.

In order to ensure quality urban growth two prototypical planning models are proposed, one to guide development in the existing built-up areas and another in the largely greenfield suburban areas. These models are developed based on the existing context and on the principles of transit-oriented development and suggest the following:

- Organizing areas into integrated townships

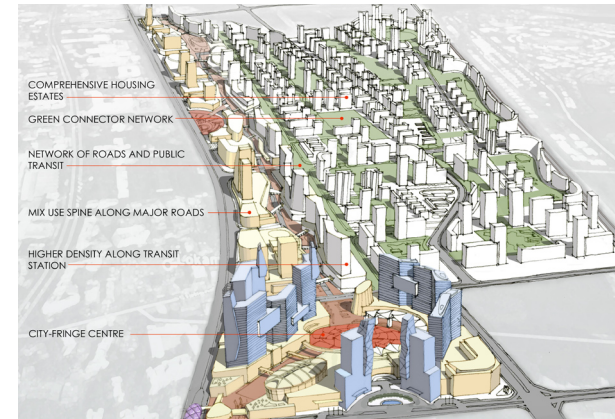
of 900 to 1200 ha with 200,000 to 300,000 population

- Planning a highway grid of 3-5 km to contain the township with an arterial grid of 1-2 km
- Creating a robust public transport system to serve all areas of the township
- Creation of town / city centre around the major public transit node with high density residential concentrated along major public transit routes
- Creation of vibrant mix-use belts along major transit routes
- Distributing regional level public facilities around the town centres and local level public facilities within the sectors
- Integrating a local light-industrial component
- Organizing the township into smaller self-sustaining walkable eco-cell or communities made up of 3-4 residential sectors.

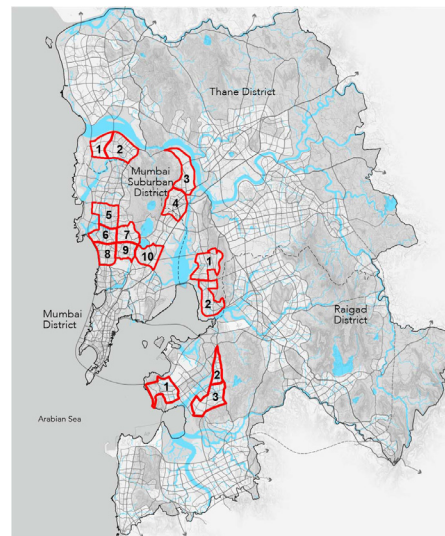
The 2 models set the principles for restructuring the City Fringe Areas and for new township planning in the Suburban Areas.

Existing Urban Area Redevelopment Model

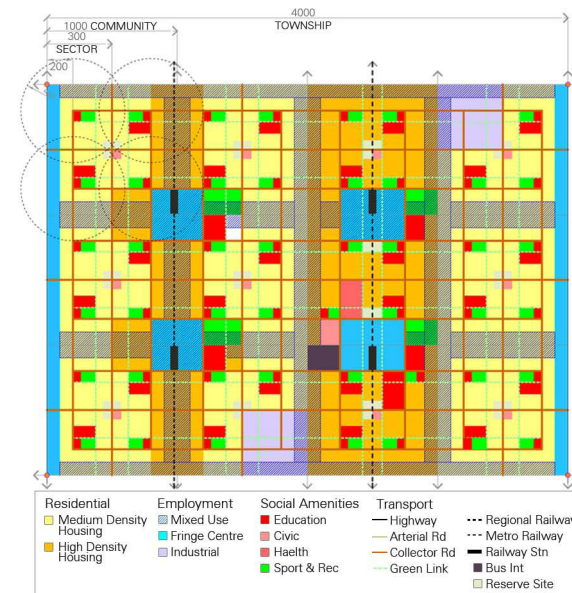
THIS MODEL builds on the fact that large parts of the City Fringe areas are planning to build a parallel transit line, opening up redevelopment opportunities. It thus proposes concentrated growth around the transit nodes and routes. This is a model for urban renewal and through a structured FSI reallocation strategy encourages redevelopment. It advocates renewal on a cluster basis and suggest a minimum size of 2ha for creation of comprehensive housing estates.



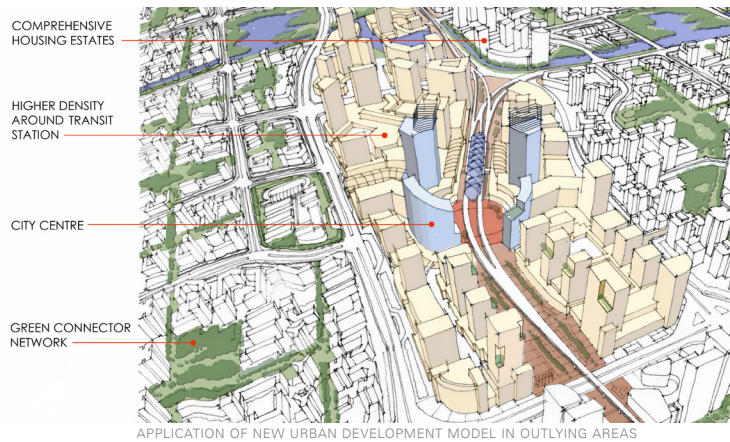
APPLICATION OF EXISTING URBAN AREA REDEVELOPMENT MODEL IN TAGORE NAGAR



EXAMPLE OF DEFINING TOWNSHIP BOUNDARIES FOR CITY FRINGE AREAS

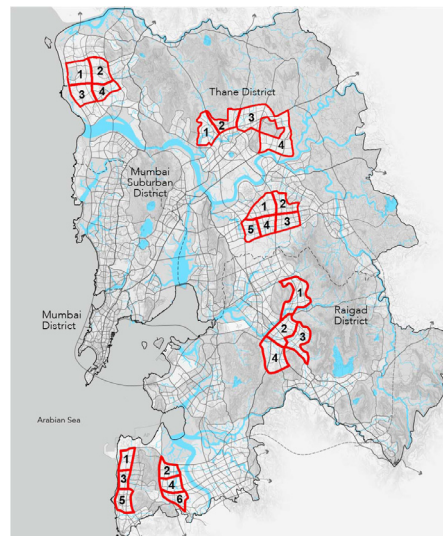
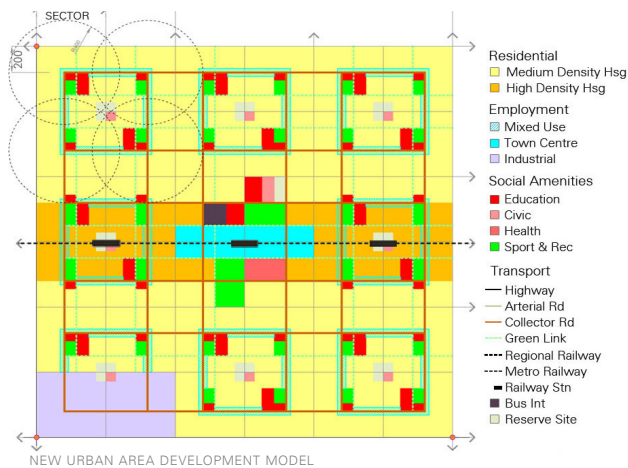


EXISTING URBAN AREA REDEVELOPMENT MODEL



New Urban Area Development Model

This model promotes development of compact, walkable and comprehensive townships in the Suburban Area. It also suggests creation of large (min 2ha) housing estates instead of plot-by-plot development.



EXAMPLE OF DEFINING BOUNDARIES FOR SUBURBAN AREAS

Social Facilities

Provision of social amenities is dealt with at two levels – regional & local or township level. Since this is a physical planning exercise, the emphasis of the proposals is more on the adequacy of provision rather than qualitative aspects of facility provision.

Public Facilities Provision Standards

Planning Area	Facility Type		Number	Size (ha)
City	Educational	University	1-2 / city	50.0
		Integrated school	1 / city	5.0
	Socio-Cultural	Central library	1-2 / city	4.0
		City park	1-2/ city	>20.0
Sports & Recreation	City sports complex	1-2/ city	15.0	
	Township / Local level	Educational	College	1 / township	2.0
Technical education institute			1 / township	2.0
Secondary school			2/community	1.6
Socio-cultural		Primary school	1/ sector	0.4
	Recreation club / cultural centre	1 / township	1.6	
Healthcare	Community hall / library	1/community	0.4	
	Religious site	1/ sector	0.15	
	Hospital (general/specialized)	1 / township	5.0	
Parks	Nursing, child & maternity	1/community	0.15	
	Town park	1 / township	>6.0	
Sports & Recreation	Sector park / playground	1/ sector	1.5	
	Town sports complex	1 / township	5.0	
Civic	Fire station	1 / township	0.5	

- Township population – 180,000 to 300,000
- Community population – 20,000 to 30,000
- Sector population – 5,000 to 7,500

Andheri Redevelopment: The Premium Fringe Centre of Western Mumbai

Restructuring an Exciting City Area

THE ANDHERI AREA REDEVELOPMENT is the demonstration of application of the “Urban Area Redevelopment Model” and attempts to restructure the existing built-up area in and around Andheri.

Key Features of the Renewal Scheme

1 REGIONAL CITY FRINGE CENTRE & EMPLOYMENT OPPORTUNITIES

- Creation of a landmark Business Centre at and around Andheri Station
- Development of an attractive Lifestyle Hub at D.N. Nagar Interchange
- Encouraging the growth of a Media and Entertainment Hub at Link Road
- Promoting the development of Mix-use Corridors along major roads
- Revitalization of the Hospitality Hub along Juhu sea face
- Large regional scale educational, health, civic & recreational institutions

2 TRANSIT ORIENTED GROWTH

- Development of vibrant mix-use developments around public transit nodes
- Creation of high-density housing zones along public transit lines

3 COMPREHENSIVE LIFESTYLE OPPORTUNITIES

- Ensuring the availability of a range of housing choices through comprehensive redevelopment of MHADA colonies and slum areas
- Development of integrated townships in the vacant plot around Esic Nagar
- Integration of parks and playgrounds, schools & hospitals, sports clubs & cultural halls within residential estates

4 OPTIMIZED TRANSPORTATION NETWORK

- Establishing a grid of expressways & arterials
- Increasing east-west connectivity across the suburban railway line
- Increasing public transport routes within walking distances
- Improving pedestrian amenities and linkages

5 AN INTERCONNECTED GREEN NETWORK

- Protection and revitalization of natural and cultural assets
- Integrated parks, plazas and pedestrian connector system

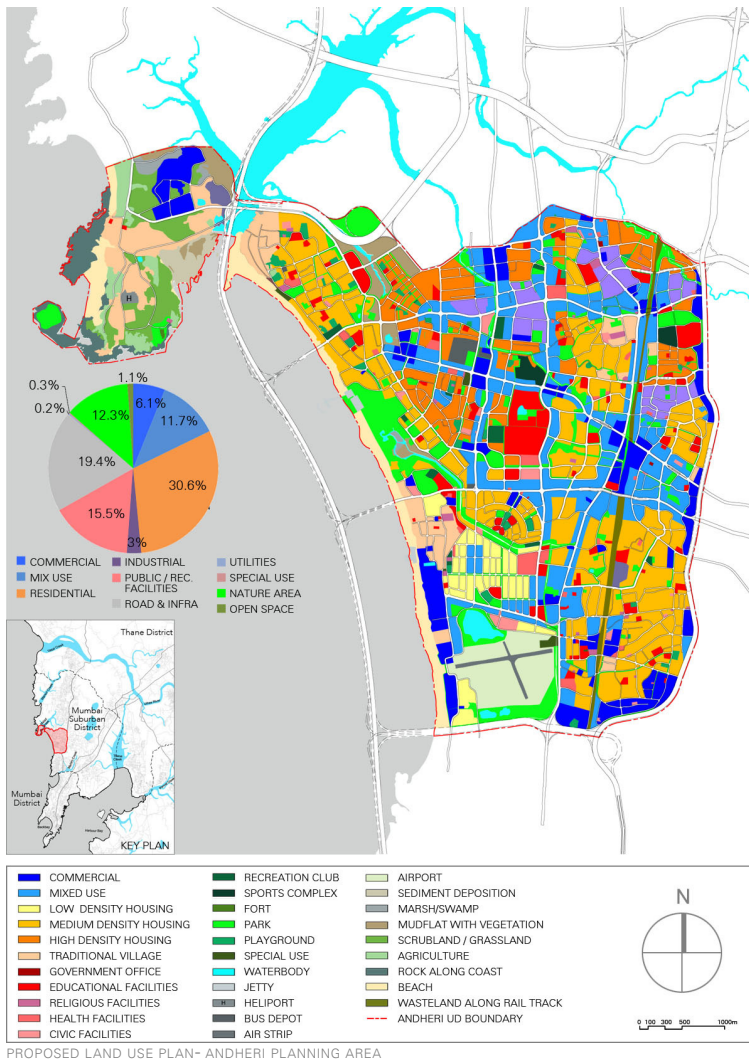


REGIONAL FRINGE CENTRE AT ANDHERI STATION

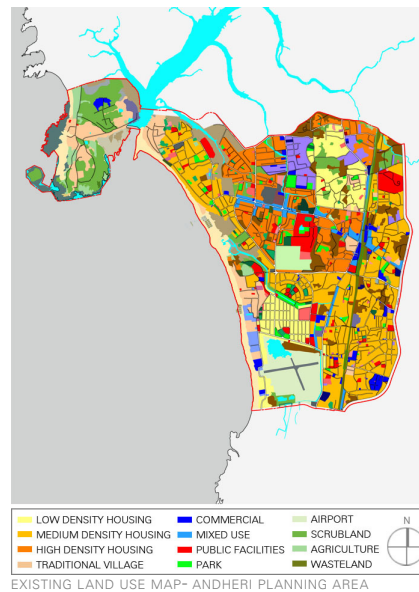
LIFESTYLE HUB AT D.N. NAGAR INTERCHANGE



ANDHERI AREA – THE REVITALIZED GROWTH AREA OF WESTERN MUMBAI



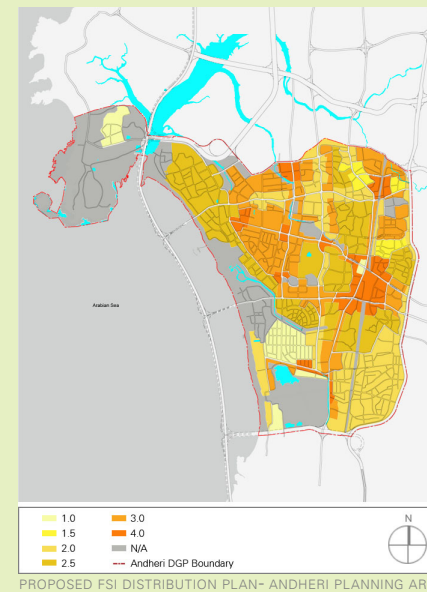
PROPOSED LAND USE PLAN- ANDHERI PLANNING AREA



EXISTING LAND USE MAP- ANDHERI PLANNING AREA

Planning Proposal:

The DGP proposal focuses on two strategies – to create a regional business, employment & civic centre in Andheri which serves the western suburbs of Mumbai, and to inject better quality of living environment. The plan restructures the area to achieve high-intensity transit-oriented growth nodes around the major rail stations; vibrant commercial & mix-use belts along the major roads; a comprehensive distribution of public facilities; a range of housing choices, an efficient transportation system; as well as conservation & rejuvenation of environmental assets.



PROPOSED FSI DISTRIBUTION PLAN- ANDHERI PLANNING AREA

FSI PLAN:

Similar to South Mumbai, the FSI distribution for various areas of the DGP is based on the level of accessibility and the intended role for that area. It is intended to incentivize renewal of the existing built up area to achieve the desired reorganization of the city area.

Panvel Eco-City: "The First Model Eco-Township in MMR"

Creating Comprehensive Townships in the Hinterland

PANVEL EAST ECO-TOWN is a demonstration of the application of the "New Urban Area Development Model" which promotes development of compact, walkable and comprehensive townships in the outlying future suburban areas.

Key Features

1 NEW REGIONAL IDENTITY WITH LANDMARK PANVEL EAST CENTRAL

– A City Centre with 2.9 mil sq.m of commercial floor space & specialized services.

2 QUALITY HOUSING COMMUNITIES

– Securing 70% affordable housing supported by a range of social facilities.

3 STRATEGICALLY ANCHORED EMPLOYMENT CENTRES

– Providing new Town Centres & local industries to generate 240,000 new jobs.

4 ENHANCED ACCESSIBILITY WITH PUBLIC TRANSIT PRIORITY

– 100% service coverage by various public transit modes within 300m walking distance
– A well planned grid of highways & roads.

5 ENVIRONMENT CONSCIOUS PUBLIC GREEN & RECREATION

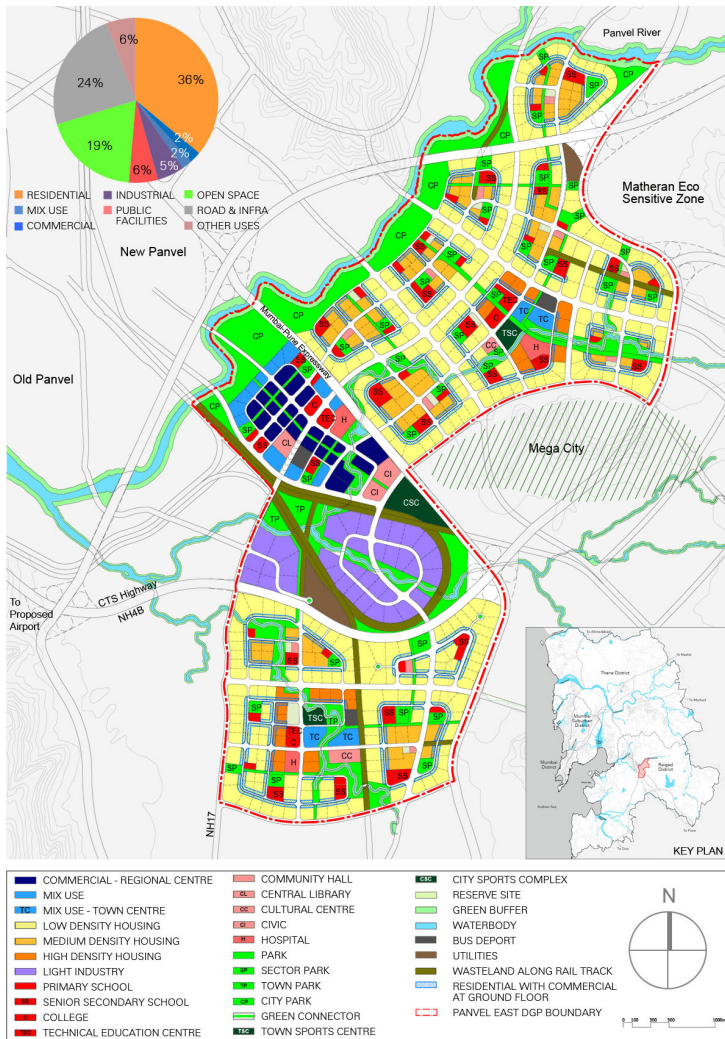
– Expanding total open spaces to an average of 7 sqm/person by networking various natural assets: regional, city-level & local parks.

Planning Proposal

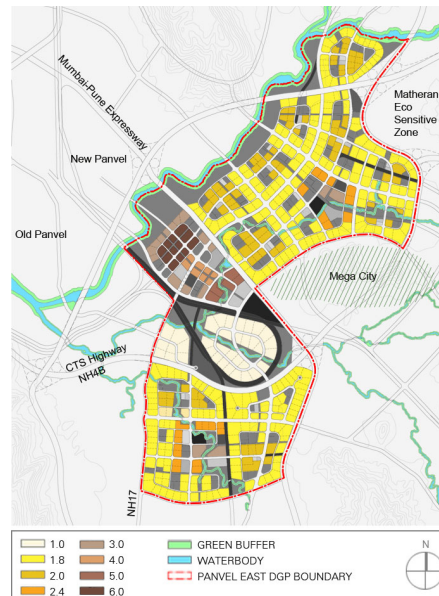
The proposed land use plan crystallizes the proposed suburban township model, by translating it to fit to the local context of Panvel. It will enable creation of multiple "living cells" or communities in the largely greenfield areas supported by a comprehensive network of public transit, roads, social amenities, and strategically placed employment centres.



PANVEL EAST: A COMPREHENSIVE ECO-TOWNSHIP IN THE SUBURBS



PROPOSED LAND USE PLAN- PANVEL EAST ECO-TOWN



PROPOSED FSI DISTRIBUTION PLAN FOR PANVEL EAST ECO-TOWN

FSI PLAN:

Consistent to the recommended approach of differential FSI in the Regional Concept Plan, varying FSI bands are proposed for the planning area in order to recognize the specific locational significance. To align with the principle of promoting public transits, higher FSI is proposed for the regional commercial and transit nodes, moderate FSI for local transit nodes and lower FSI for the peripheral areas thus dictating the desired planning densities within the planning area.

Eco-TOWNSHIP OBJECTIVES:

Panvel East is aimed to be the first eco-township in MMR, and is intended to be a model for green city development in the region. Focusing on the three core sustainability issues namely environmental, social & economic, the Eco-Township model for Panvel will concentrate on:

- Conserving & enhancing all the natural features & creating quality public spaces
- Ensuring sustainable transportation through provision of efficient public transit
- Balancing compact & affordable living with quality community environment
- Ensuring 100% population living within walking distance of basic social amenities
- Facilitating more local employment with target of the jobs-to-household ratio of 1 : 1



ECO-TOWNSHIP COMPONENTS

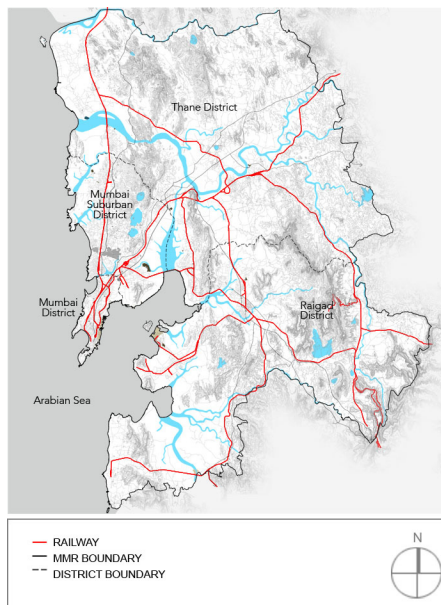
5 SEAMLESS CONNECTIVITY

Existing Scenario

MMR'S TRANSPORTATION SYSTEM is established but, not enough. Inadequate road space and under-capacity rail system hamper mobility of people and goods in the region.

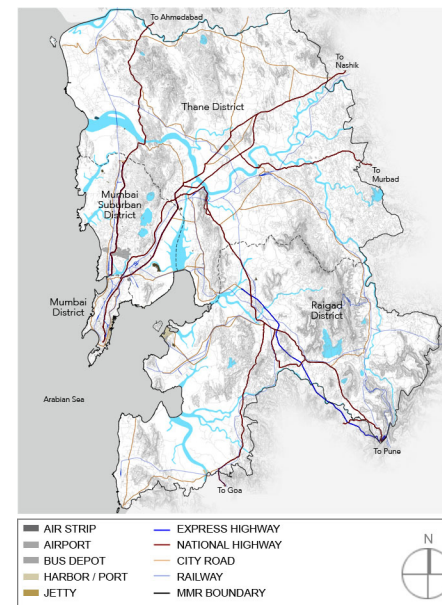
Due to uneven employment distribution, the bulk of daily passenger traffic commutes to the south of Mumbai City. East - west linkages within Greater Mumbai and across the harbour are insufficient, constraining expansion into the outlying region. The two ports - Mumbai Port and Nava Shewa Port generate goods traffic for distribution into the countryside further straining the road capacity. The efficiencies of buses are greatly reduced due to inadequate road capacity. This has increased reliance on para-transit, which contributes to congestion, pollution and deteriorated air quality in the city. The city streets are marked by insufficient and unclear pedestrian amenities and unregulated and illegal curbside parking.

Public transport in MMR consists of 78% of the current modal share, attributed by a highly subsidised public transport system, unaffordability of private vehicles & informal sector employment where walking is common.



EXISTING ROAD NETWORK IN MMR

Various strategic road projects, under planning or under way, will improve connectivity across the harbor and strengthen mobility within Mumbai City. These include Mumbai Trans-Harbour Link, the Western Freeway Sea Link, the Eastern Expressway, Virar-Alibaug multi-modal corridor and Sion-Panvel Expressway.

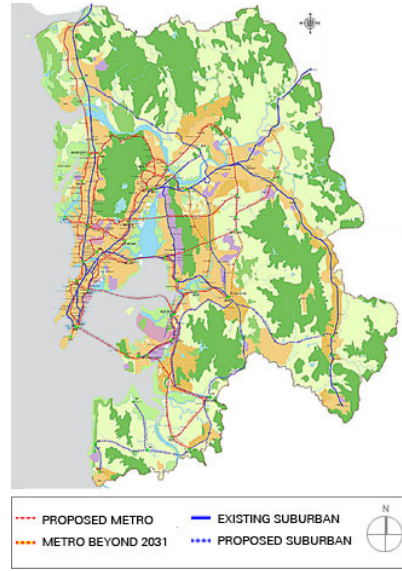


EXISTING RAIL NETWORK IN MMR

The various metro rail projects, the monorail projects and the various improvements under the MUTP I & II schemes are also underway. Renovation of the international aviation hub in Sahar and the upcoming Panvel Airport would greatly boost inter-city and international connectivity.



CTS ROAD NETWORK



CTS RAIL NETWORK

Comprehensive Transportation Study, 2031

Jointly initiated with the World Bank, in 2005 MMRDA completed a Comprehensive Transport Study (CTS) for MMR, which accounts for the region's transportation requirements until 2031. The study envisions a seamless, integrated regional transportation system with a strong emphasis towards public transit. There are many detailed recommendations in this study and a list of priority projects have been drawn-up and approved for implementation, such as:

- Further expansion of the Metro network
- Enhancement of the regional highway network ensuring a defined road hierarchy
- Implementation of BRT across the region
- Construction of new inter-city rail & bus terminals
- Construction of strategic multi-modal terminals
- Construction of freight terminals
- Improvement of existing road infrastructure and acceleration of maintenance
- Implementation of new passenger water transport terminals
- Strengthening of the current institutional organization
- Introduction of a framework for monitoring and evaluation

International Benchmarks: Transport				Goal for MMR		
	Singapore	Tokyo	Shanghai	Existing MMR	2032	2052
Modal Share-Public transport: walking	65%	75%	77%	82%	78%	75%
Rail (km/mil pop)	30 -100 LONG TERM	30	-	22 (318 ROUTE KM)	30	70
Highways (km/mil pop)	30	28	41	23	28	30
High Speed Rail (250 + km/h)	-	SHINKANSEN	MEGLEV	-	to major Indian cities	-
Airport (million passengers)	42 mil (Changi)	62 + 35 mil (Haneda + Narita)	31+60 mil (Hongqiao + Pudong)	25 mil passengers*	120 mil passengers	150 mil passengers
Seaport (TEUs)	29.9 mil	5 mil	27.9 mil	4.2 mil	30 mil TEUs	75 mil TEUs

* Upgraded CST Airport: 40 mil passengers & 1 mil MT cargo, Panvel Airport: 40 mil passengers & 1 mil MT cargo.

Maximum travel time of 1 hour within the region....

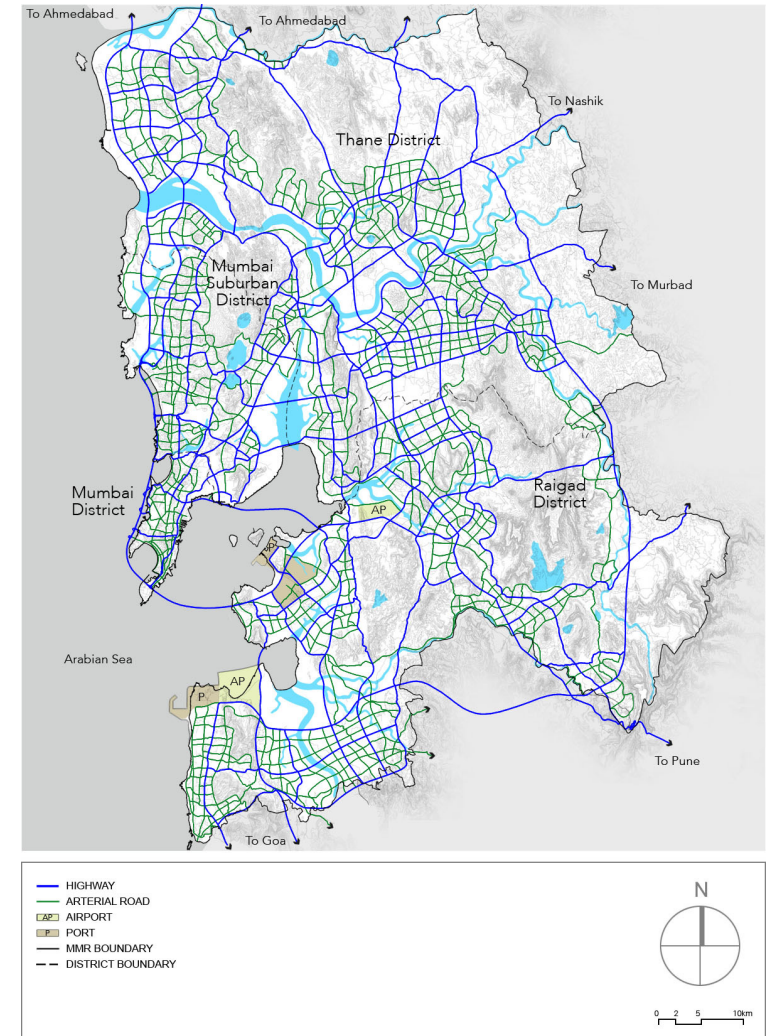
Proposed Transportation Development Strategies

THE PROPOSED TRANSPORTATION PLAN FOR MMR targets a goal of **"1-hour average travel time within the Region"**. For the short and medium-term it is recommended to continue with the proposals of the CTS, MUTP and MUIP etc, with an aim to ensure adequacy of provision. However, for 2052, the transportation framework for the region would need to be extended assuming urbanization beyond the U1 and U2 zones⁸. It would also need

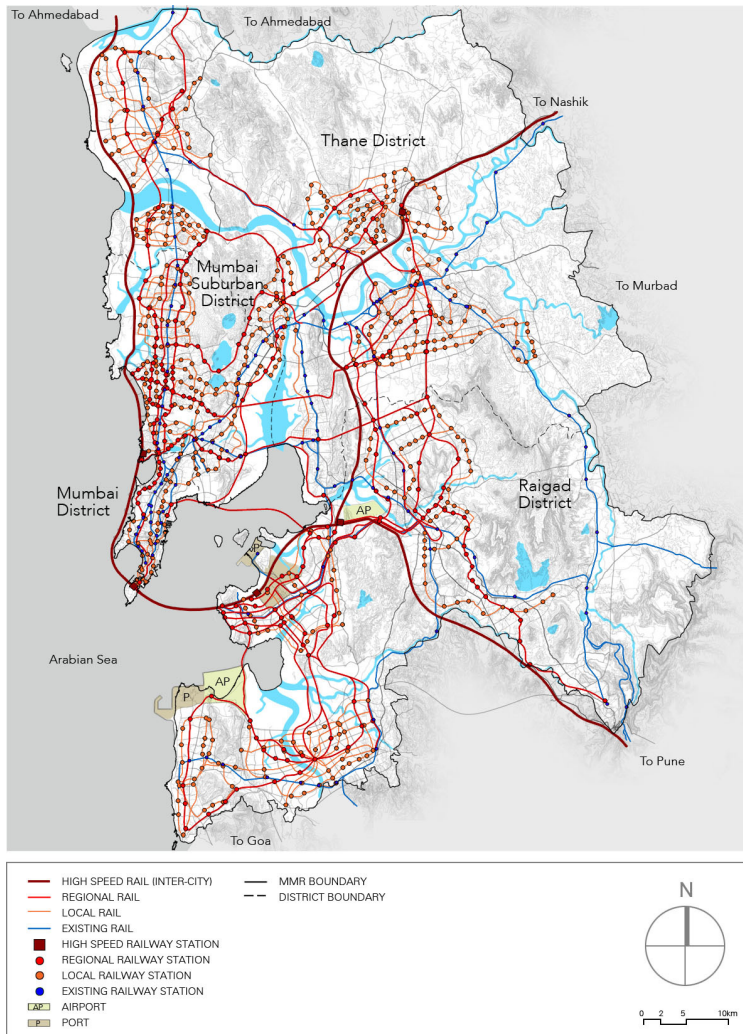
to account for the higher ratio of urbanization in RoMMR against GM.

The transportation plan for MMR emphasizes heavy reliance on quality public transit (75%) and optimization of the road network. It suggests growth along the 4 movement corridors, i.e. towards Ahmedabad, Nashik, Pune and Goa & east-west connections, and across the harbor.

⁸The Regional Plan for MMR 2011 proposes various urban area types. The CTS assumes growth only within the U1 and U2 zones for 2031.



2052 PROPOSED ROAD NETWORK



The Highlights of the Proposed Transportation Framework:

ROAD

- A defined road hierarchy & a systematic grid with highway at 3-4km spacing & arterial roads at 1-1.5km
- Optimization of road usage through progressive introduction of demand & traffic management initiatives
- Development of a car parking plan and progressive introduction of centralized parking management

PUBLIC TRANSPORT

- A defined rail hierarchy with an integrated network of regional / express and local rail
- Multi-modal interchanges for seamless mobility
- Improvement in bus services in terms of convenience, riding comfort and travel time through initiatives such as BRTS, common fare card system, etc.
- Promotion of walking and cycling through development of eco-cells and pedestrian connector network
- Improvement in water transport for movement across the harbour.

NATIONAL & INTERNATIONAL CONNECTIVITY

- A new futurist airport in Rewas which along with the airport at Panvel satisfies the demand of 150 mil passengers per annum (the long term need of the region) The recommended location is close to the CBD and ensures the securing of a green corridor along the flight path.
- High Speed Rail Links to major cities of India which substitutes the demand for domestic travel for distances between 500 – 1000 km
- A new world-class port at Rewas to position Mumbai as a global transshipment hub of South Asia. This recommended location shortens the approach channel from the Arabian Sea.
- A new international cruise terminal at the relocated MPT site to enhance tourism.

6 INFRASTRUCTURE EXCELLENCE

Existing Scenario

WATER SUPPLY

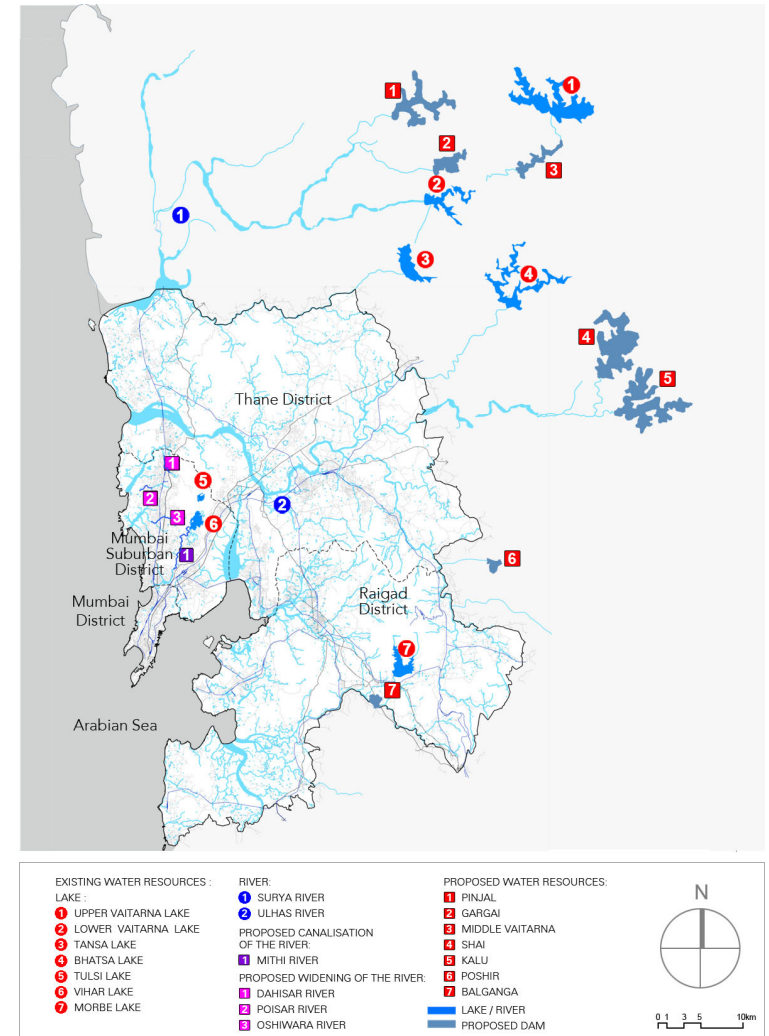
Water supply in MMR is the responsibility of the municipal corporations. Existing and planned water supply is from numerous lakes around the region. However, this is constantly being outpaced by the rapid urbanization and population growth. In urban areas water supply is available for only 2-4 hours in a day and in rural areas 1-2 days in a week. Distribution of domestic wastewater systems can be found only within municipal areas. Ground water is utilized as a supplementary source mainly used for washing and irrigation. In the rural parts of the Region, ground water is used as a primary source. Deteriorating supply network and poor maintenance result in up to 40% unaccounted-for water losses, further marred by un-metered usage and pilferage.

STORM WATER DRAINAGE

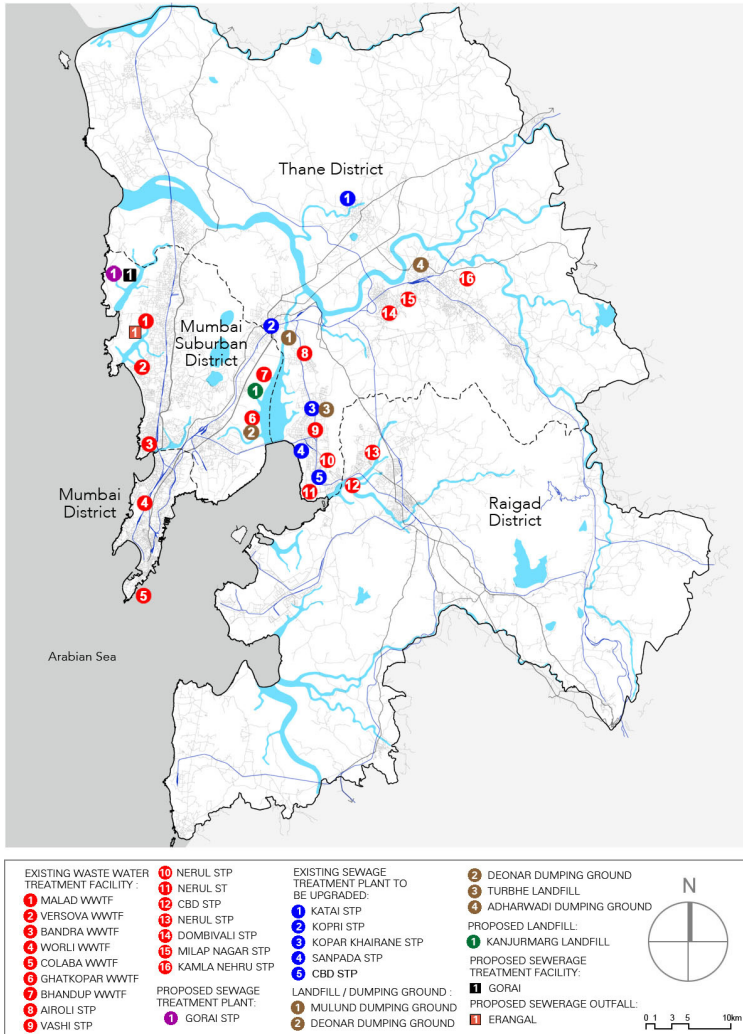
Due to its low lying coastal topography, in events of concurrent heavy rains and high tides, MMR is hit by localized flooding 2-3 times annually. Such annual flash floods during monsoon seasons are mainly caused by poorly maintained drains, reduction in the existing storm water retention ponds due to landfill, and increase in storm water runoff volume and velocity as a result of expanding coverage of impervious surfaces in urbanized areas. This is further aggravated by the dumping of garbage and discharge of raw sewage into public drains.

SEWERAGE

Sewerage networks are only available in the urban areas, but are mostly aged and dilapidated. In other areas, many households still rely on septic tanks, which pose a hazard to the environment. In the slums, sanitation system comprises of public and community toilets and septic tanks. The risk to health and hygiene is worse in areas where slum dwellers resort to open defecation due to a lack of public toilets. The collected sewerage is generally treated before discharge. However, the quality of the treated effluent is still below the allowable standards set by the Maharashtra Pollution Control Board (MPCB) leading to contamination of creeks and seas.



EXISTING AND APPROVED WATER RESOURCE & STORM WATER PROJECTS



EXISTING AND APPROVED SEWERAGE AND SOLID WASTE PROJECTS

SOLID WASTE MANAGEMENT

Currently, there are 14 authorized dumping sites for municipal and industrial wastes in MMR. These are without scientifically engineered lining and often pose a hazard to the environment due to leaching of contaminants to the water bodies. Most of these are nearing their usable lifespan.

In the urban areas, municipal solid waste is collected by municipal and private collectors. Construction debris is either recycled or dumped illegally in the open spaces or at the dumping grounds. Hazardous waste is required to be treated by the generator, but this is not fully complied with always. In many cases, waste separation is done in the dumping grounds by rag pickers and collected recyclables are sold to the recycling facilities.

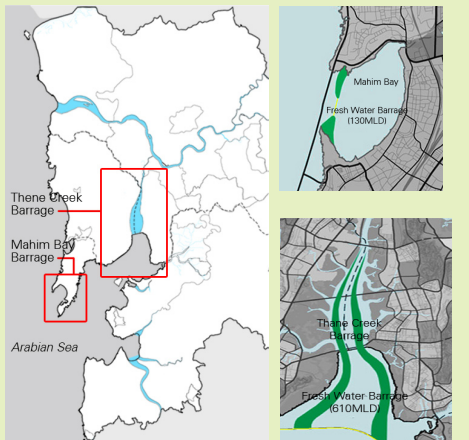
Goals: Infrastructure & Utilities

Indicators	MMR GOALS : 2032	MMR GOALS: 2052
Water Supply		
100% 24x7 piped water supply	All urban areas (15,372 MLD)	Entire MMR (19,308 MLD)
Unaccounted-for-water loss	15-30%*	10-15%*
Water availability	180 lcpd**	180 lcpd**
Storm Water Drainage		
Flood control system	50 year return period	100 year return period
	No discharge of raw sewage & untreated industrial effluents into all water bodies	To use water bodies for the purpose of recreation
Sanitation		
100% sewerage coverage	all urban areas (12,512 MLD)	Entire MMR (16,026 MLD) with decentralized STPs in suburbs
Solid Waste		
100% solid waste collection	All urban areas (50,618 T/day)	Entire MMR (64,607 T/day)
	Proper landfill sites for scientific disposal	Rehabilitate all unlined landfills, provide refuse incineration plants

*Existing: 20-40%, ** Existing: 160 lcpd

FRESH-WATER BARRAGES IN THE SEA

A concept similar to the Marina Barrage along the Singapore could be explored for Mumbai where, the Mahim Bay and the Thane Creek can be gated so as to, through gradual desalination, create sweet water reservoirs. Such barrages can be used not just as an alternative source of water supply but also as a flood-control system and an active recreational venue in the region. In order to conserve the mangroves present at both locations, the profile of the reservoir would need to be scientifically engineered so as to maintain salinity along the sensitive wetlands.



PROPOSED FRESH WATER BARRAGE AT MAHIM BAY & THANE CREEK

Proposed Utilities Infrastructure Development Strategies

WATER SUPPLY

The existing and currently planned additional water supply would be unable to meet the projected demand (deficit of 5,822 MLD by 2032 and 9,758 MLD by 2052) and would require planning for additional supply sources. To mitigate this, alternative sources can be explored, such as creation of fresh water barrages in the Mahim Bay and the Thane Creek, seawater desalination, wastewater reclamation, rain water harvesting etc. Water demand reduction can be achieved through active leakage control and metering systems as well as mandating the use of water saving devices.

STORM WATER DRAINAGE

The Brihan Mumbai Storm Water Drainage Project (BRIMSTOWAD) is currently underway to mitigate flood risks during the monsoon seasons in Greater Mumbai and involves upgrading of existing drains and installation of storm water pumping stations and flood gates at selective areas. However, as a long-term solution, a comprehensive action plan needs to be devised for the Region, which caters for flood-events of upto a 100 year return period and which stipulates strategies for clean-up and management of all waterways.

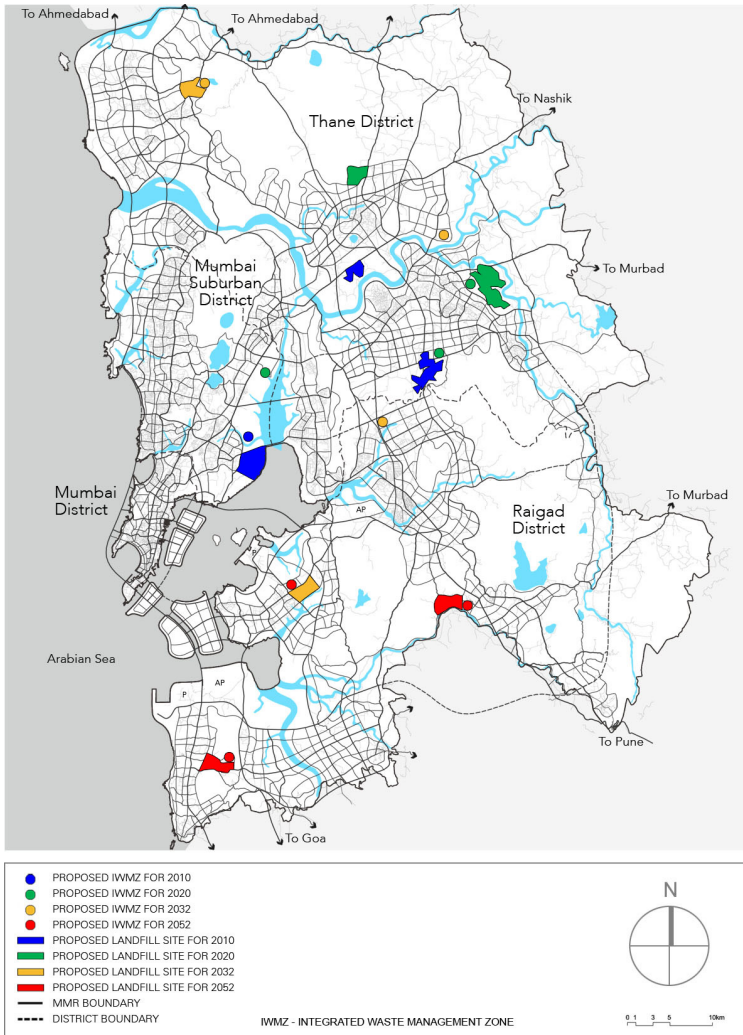
WASTE MANAGEMENT:

SEWERAGE:

To improve the existing sanitation conditions in MMR, the Mumbai Sewage Disposal Project (MSDP - Stages 1 & 2) is implemented for urban developments, while Slum Sanitation Program (SSP) is carried out in rural areas. However, to achieve the long term demand (deficit of 9,077 MLD by 2032 and 16,026 MLD by 2052), extensive sewer rehabilitation and construction of new sewerage systems for newer urban developments have to be carried out. At least 2 centralized STPs meeting MPC discharge standards are proposed per district with 14% recycling of the treated sewage effluent for use in non-potable uses.

SOLID WASTE MANAGEMENT

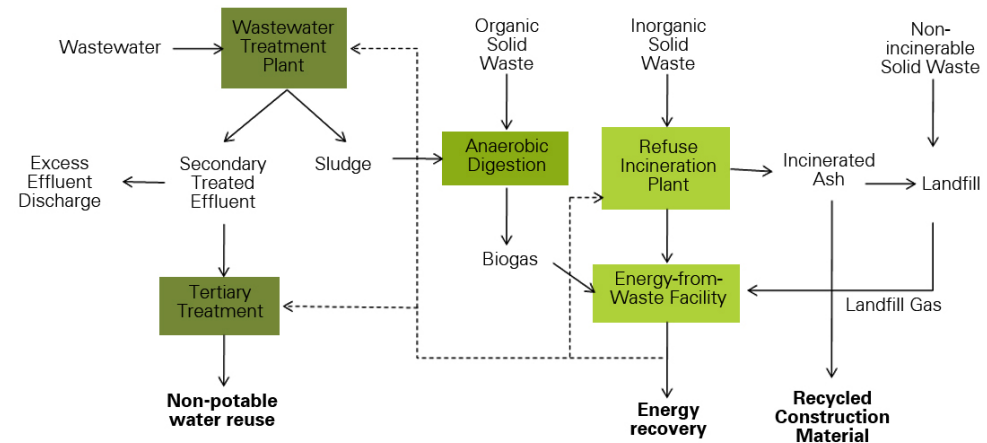
With rapid urbanization and a more affluent society, the amount of solid waste generated will increase significantly (gap of 15,127 ton/d by 2032 and 19,975 ton/d by 2052). Thus, solid waste disposal through landfill will not be sustainable in the long run, and alternative technologies will have to be explored in the future. In addition, there is also a need to emphasize more on the reduction and proper collection of waste through initiatives such as provision of waste collection facilities in public areas and greater public education and awareness of keeping a hygienic living environment.



PROPOSED IWMZ AND LAND FILL SITES IN MMR

INTEGRATED WASTE MANAGEMENT ZONE:

7 Centralized IWMZs are proposed to meet the long-term needs to the Region. The IWMZ would help optimize consumption of land for waste treatment by combining wastewater and solid waste treatment. This would include an anaerobic digester and a wastewater recycling facility, an incineration plant for organic waste, sorting and recycling of non-incinerable waste and production of power by energy-recovery. The much reduced ash (upto 90% by volume) and the non-incinerable waste can then be directed to the scientific landfill sites.



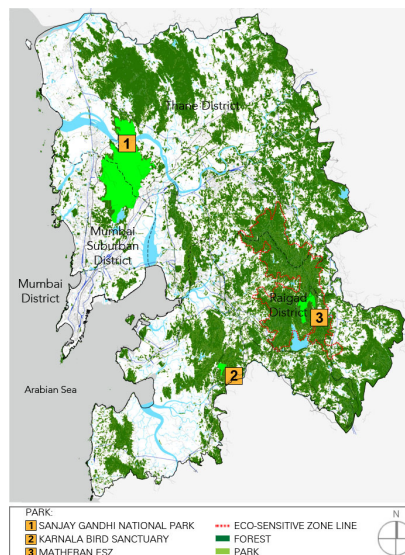
IWMZ PROCESS DIAGRAM

7 A WELL-NURTURED ENVIRONMENT

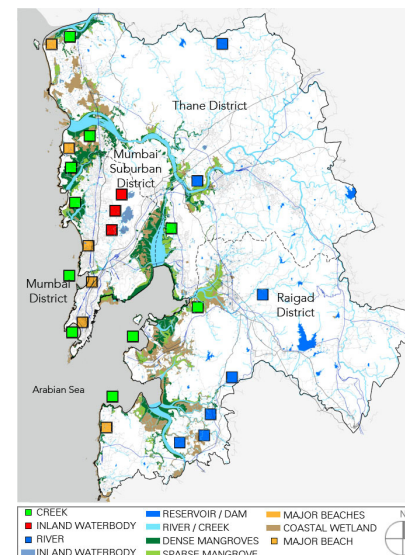
Existing Scenario:

31% OF LAND AREA IN MMR IS UNDER NATURAL ASSETS in the form of forests, coastal wetlands and inland water bodies such as rivers, creeks and lakes. However, a majority of them are under threat from the urbanization. Due to disturbance of the coastal vegetation and rampant reclamation, areas of Mumbai City are threatened by flooding. Inadequate wastewater and solid waste management has polluted the land and water resources. Urbanization and quarrying are affecting the forest and biodiversity. Transport and industries add increasing levels of pollution impairing air quality.

There is lack of an integrated environmental management agency which looks after the overall environmental issues of the region and marine biodiversity is currently not included within the individual city environment framework.

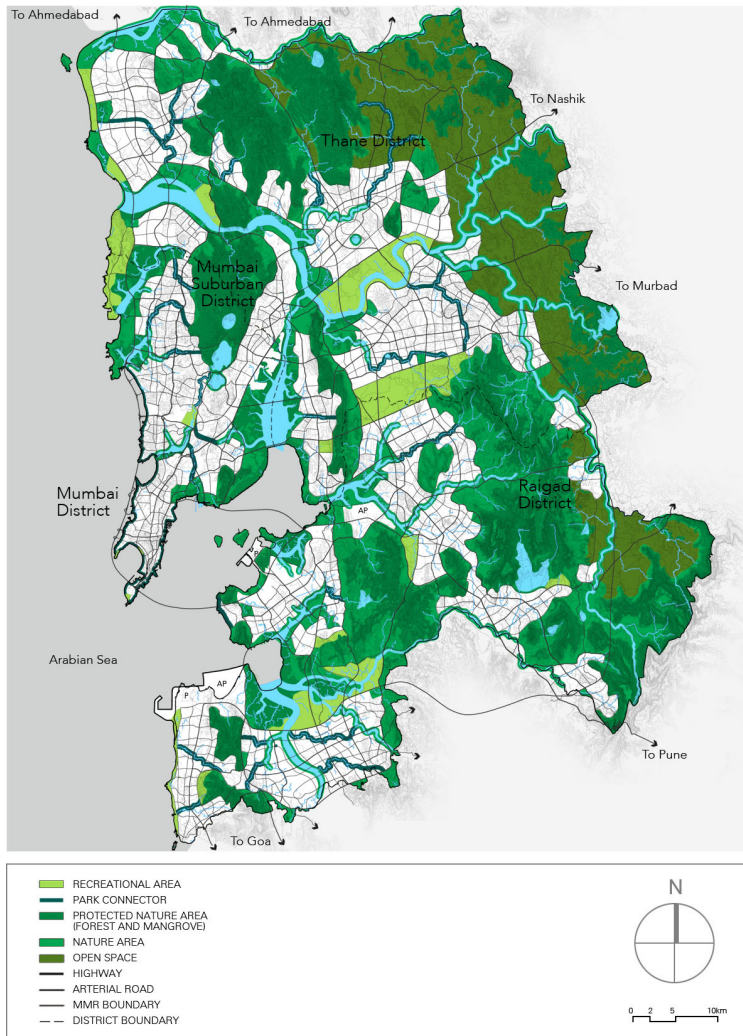


EXISTING FORESTS & OPEN SPACES MAP



EXISTING COASTAL AREAS AND WATER BODIES MAP

Goals: Environment Conservation		
Indicators	Goals for MMR 2032	Goals for MMR 2052
Coastal Environment	<ul style="list-style-type: none"> Restore 100% degraded coastal land Protect coastal environment from effects of sea level rise by 2032 	<ul style="list-style-type: none"> Protect coastal environment from effects of sea level rise by 2052
Wetlands & Mangroves	<ul style="list-style-type: none"> Restore 100% degraded wetlands Ensure 0% net loss of wetlands from urban development 	<ul style="list-style-type: none"> Protect wetland from effects of sea level rise by 2052
Water Resources	<ul style="list-style-type: none"> Restore 100% degraded inland water bodies 	<ul style="list-style-type: none"> Explore non-conventional sources to augment water supply
Biodiversity	<ul style="list-style-type: none"> Restore 100% degraded forest areas 	<ul style="list-style-type: none"> Maintain natural biodiversity at post-restoration level
Air Quality	<ul style="list-style-type: none"> Achieve Pollution Standard Index within "Good" range for 10% of the year, "Fair" for 60% of the year and "Moderate" for remaining 30% of the year Increase use of renewable energy from 5% to 20% 	<ul style="list-style-type: none"> Achieve Pollution Standard Index within "Good" range for 20% of the year, "Fair" for 65% of the year and "Moderate" for remaining 15% of the year Increase use of renewable energy to 40%
Noise Quality	<ul style="list-style-type: none"> Achieve noise levels within Indian standards for 50% of the year 	<ul style="list-style-type: none"> Achieve noise levels within Indian standards for 80% of the year



PROPOSED GREEN & BLUE PLAN

Proposed Environmental Management Framework

THE ENVIRONMENTAL MANAGEMENT FRAMEWORK focuses on protection and demarcation of proper boundaries for all natural assets in the short-term; cleaning-up and restoration of the degraded assets in the medium-term; and progressively opening them up for the purposes of recreation in the long-term. It suggests a comprehensive action-plan hinging on the following strategies:

- Creation of an Integrated Coastal Zone Management (ICZM) System with an aim of coastal pollution prevention, coastal and maritime environmental management, and climate management to mitigate the threat due to sea-level rise

- Creation of a wetland restoration programme, regulatory policies for wetland pollution control, and mitigations strategies for the future sea-level rise
- Undertaking river clean-up and restoration projects
- Creation of a regional biodiversity database & conservation framework for delineating and protecting sensitive areas
- Creation of a strategic framework to prevent air pollution through stricter enforcement and monitoring, and promotion of clean and renewable energy
- Creation of a noise control management system targeted at the transportation, industrial and residential sectors



TRANSFORMING WETLAND AREAS INTO AN ATTRACTIVE MANGROVE PARK

8 AN EXTENSIVE GREEN NETWORK

Existing Scenario:

MMR suffers from a very low recreational space per capita (1.77 sq.mt/p). Despite such extensive coverage the natural assets are underutilized for the purpose of recreation. The major urban parks are concentrated in South

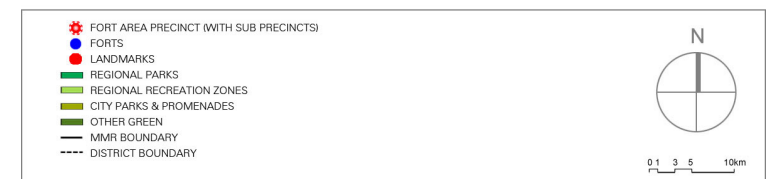
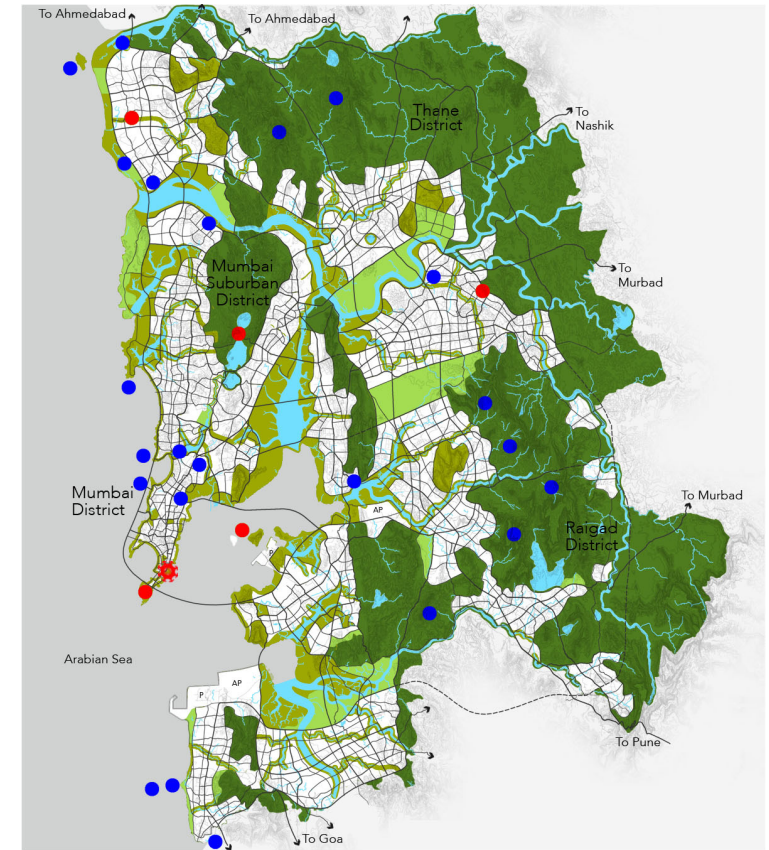
Mumbai. There are many historic, tourist and recreational spots but, due to the lack of a comprehensive parks management body there is no overall parks development strategy in the Region.

International Benchmarks: Parks & Recreation

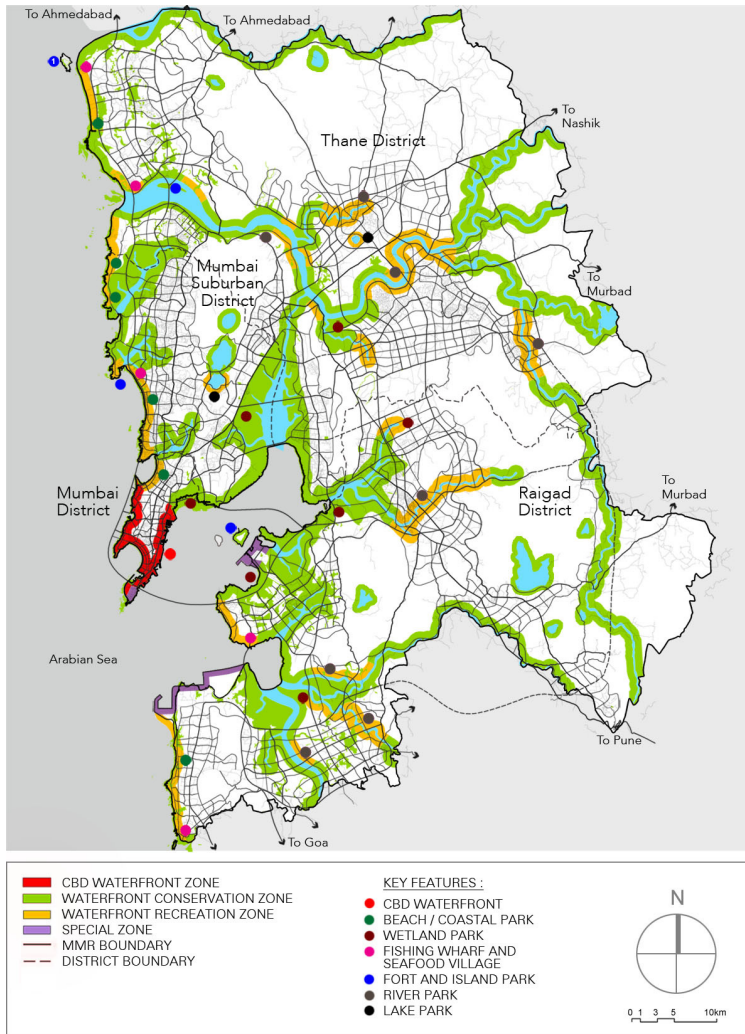
Indicators	Greater Mumbai	MMR	Singapore	New York	Chandigarh	Goal for MMR
Urban recreational space / person	1.77 sq.mt./p	1 sq.mt./p	4 sq.mt./p	6 sq.mt./p (target)	12 sq.mt./p (includes urban greenery)	4 sq.mt./ person
Nature reserve	16 sq.mt./p	50 sq.mt./p	7 sq.mt./p	-	36 sq.mt./p	30 sq.mt./p
Urban/road side greenery	-	-	5 sq.mt./p	-	12 sq.mt./p	4-5 sq.mt./p (30% of total open space)
Park connectors	25 sq.mt./p	-	100 km (20 km/mil)	190 km (23 km/mil)	-	1000 km (20 km/mil)
Total parkland / person	-	-	16 sq.mt./p	14 sq.mt./p	48 sq.mt./p	40 sq.mt./p

Goals: Parks & Recreation

Indicators	Goals for MMR - 2032	Goals for MMR - 2052
Adequate provision	4 sq.mt./p of urban open space	4 sq.mt./p of urban open space
Waterfront City	1 waterfront park per district	1 waterfront park per city
Wetland Parks	1 wetland/ mangrove park per district	1 wetland/ mangrove park per city
Accessibility	1 local space within 400 m walking radius & 1 regional park within 10 km	Extensive regional green network connecting all major parks
International Destination	1 world-class theme park (>150 ha)	2 world-class theme park (>150 ha)



PROPOSED PARKS & OPEN SPACES PLAN

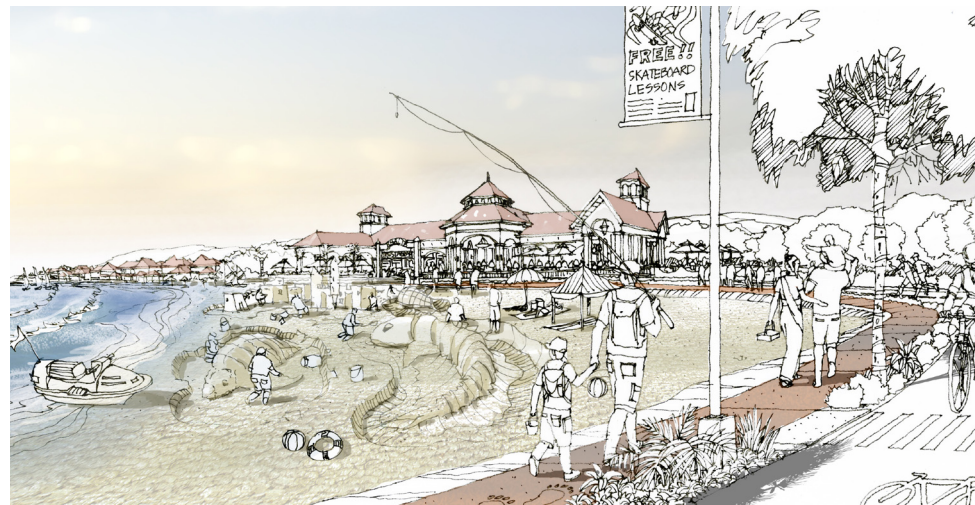


PROPOSED WATERFRONT RECREATION PLAN

Proposed Parks & Recreational Distribution

The proposed recreation strategy focuses on the creation of a hierarchy of parks and open spaces at the local, city and regional levels to meet the various recreational needs of the people. While provision of local parks would be under the purview of local administrative bodies, a regional scale MMR Parks Body needs to be established to develop, manage and fund the regional and city scale parks. In order to increase the provision of green and open spaces in the Region, especially in Mumbai City, it proposes the following strategies:

- Creation of a series of local, city & regional scale parks & recreational destinations.
- Opening up the nature areas such as forest reserves, coastal belts, river and lake fronts, for noninvasive recreational use.
- Development of an extensive park connector system, thus creating a comprehensive park network in the Region
- Development of international sports and recreational attractions
- Introducing urban greenery through initiatives such as way-side planting & incentivizing of sky-rise greenery within buildings.



ENHANCING MUMBAI'S WATERFRONT

9 A “GLOCAL” CULTURAL CENTRE

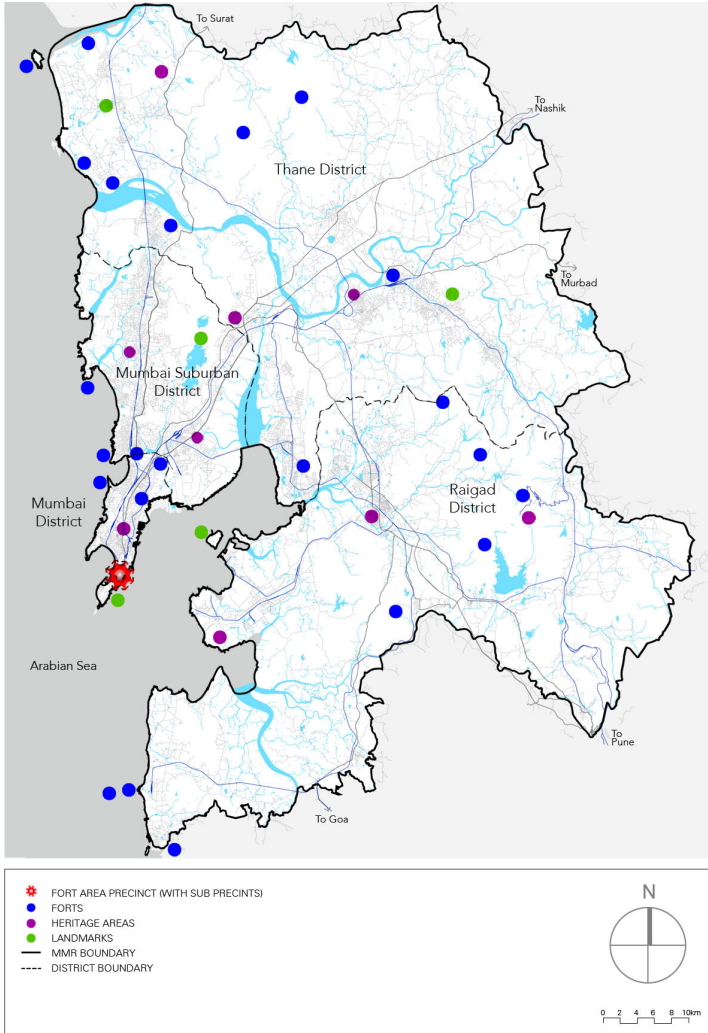
Existing Scenario

Mumbai with its unique cosmopolitan culture, a rich mix of historic legacy juxtaposed with progressive ideologies, is ever-changing and yet strongly rooted. MMR’s waterfronts, maidans, chowks, bazaars, wadis and landmarks give it its unique identity. However, most of these assets are concentrated in the old City of Mumbai and are rapidly crumbling. There have been very limited efforts in the past targeted towards improvement of the city character, attributed largely to the lack of urban design (UD) in the planning framework and a comprehensive heritage conservation action plan.

To be a Global City, MMR has to adopt a “Glocal” approach to improve its imageability, by reinvigorating its historic legacy and creating an endearing city quarter with strong identity and character. The role of Mumbai as a cultural melting pot needs to be reinforced to accommodate local as well as international cultures.



A REJUVENATED CRAWFORD MARKET: CREATING A RICH MIX OF OLD AND NEW



EXISTING HERITAGE SITES IN MMR

Goals: Urban Design and Heritage Conservation

Indicators	Goals for MMR - 2032	Goals for MMR - 2052
Heritage Conservation & Rejuvenation	Conserve all heritage precincts with selective adaptive reuse	Conserve and rejuvenate all significant post independence heritage
Global Urban Centre	Redevelop the CBD in South Mumbai	Develop a new world-class CBD in South Mumbai
Urban Nodes and Precincts	Urban Design for Fringe and City Centres, 1 special precinct in each City and waterfronts along built-up areas	Urban design for all transit nodes, 3 special precincts in each City and all urban waterfronts

Urban Design Framework

In order to inject a new sense of life and belonging into the cityscape of MMR, it is important that urban design is incorporated in the local level Development Plan. This would involve the setting-up of a UD (Urban Design) cell within the planning agencies. This cell would be in-charge of identification of appropriate areas to undertake UD, creation of a UD plan and incorporation of UD guidelines as an overlay over the development control regulations for the UD controlled areas. Such UD plans need to be well marketed and are intended to catalyze development in the key areas. The implementation of UD in these areas can be undertaken either as special projects by the government or through enforcement of the UD guidelines and reliance on the private sector to achieve the design intent.

Similarly, this UD cell needs to undertake preparation of a comprehensive Heritage

Management Plan which includes extensive mapping and grading of heritage assets, a clear heritage strategy with room for conservation adaptive reuse and in-fill redevelopment. The focus of this plan should be on creation of special precincts with historic significance which will help conserve the identity and character of the city & *enliven the Magic of Mumbai*.

To guide planners and policy makers, a comprehensive Urban Design framework has been suggested for MMR which suggests undertaking Urban Design for 5 types of areas in the Region, namely:

- Heritage precincts
- Global business district
- Major urban nodes, fringe & city centres
- Special precincts with cultural or civic significance
- Urban waterfronts

MAKING IT HAPPEN

RREALIZING THE GROWTH envisioned in the Concept Plan would require commitments and partnerships from all stakeholders - the public agencies, including the state, MMRDA, the cities and local authorities; the private sector; the voluntary organizations; and above all, its citizens.

The most significant means by which the proposed plans would be realized would be through incorporation within the statutory plans. The Regional Concept Plan would form the base for the upcoming Regional Development Plan being prepared by MPC. The local area plans and urban design schemes for South Mumbai and Andheri need to be incorporated within the DP being prepared by MCGM.

The key challenge for city development in MMR is the limited stake the government has due to a limited land bank, limited funding and a large shortfall in infrastructure and housing. In addition the planning and implementation framework is riddled with rigid and blanket regulatory policies and a complicated and multi-layered planning and administrative system.

Hence, the implementation strategies proposed for MMR focuses on preparing for progressive and long-term growth, attracting the private sector to undertake critical and catalytic projects, incentivizing city renewal and expansion and resolving administrative complexities and increasing the government stake in development. A four-pronged implementation strategy is proposed for MMR, involving:

- 1 Improvements to the Planning & Regulatory Framework**
- 2 Development Phasing and Priority**
- 3 Immediate Critical & Catalytic Projects**
- 4 Increasing Government Land Holdings & Revenue Stream**

1 Improvements to the Planning & Regulatory Framework

Planning in MMR happens at two levels, wherein the Metropolitan Planning Committee with technical assistance from MMRDA, prepares the Regional Development Plan; and the individual urban local bodies (ULBs) / municipalities prepare the local level Development Plans (DP). Besides these there are several notified Special Planning Authorities (SPA) which prepare DPs for their areas. Development Control is carried out by individual ULBs within their administrative areas and by MMRDA in areas of the region outside the purview of the ULBs and SPAs.

The Regional Development Plan is limited to functions such as demarcating urbanization limits, defining urban area types, delineating protected areas, and establishing regional connectivity and infrastructure. However, within this planning framework of MMR there is a lack of an overall strategic Regional Plan which binds and directs growth of various areas of the region, and organize/ distribute infrastructure development in a coordinated manner. The proposed Concept Plan is intended to fulfill this role.

To ensure seamless integration of the proposed Concept Plan, the following improvements are suggested to the current planning and regulatory framework:

ADOPTION OF CONCEPT PLAN INTO THE REGIONAL DEVELOPMENT PLAN & LOCAL DEVELOPMENT PLAN

In the short term MMRDA/ MPC is proposed to be the custodian of the Concept Plan and is recommended to ensure its adoption in the Regional Development Plan & Local Development Plan. However, in the long-term it is suggested that MMRDA's role be extended to being a central planning body which is in charge of developing such long-term strategies like the Concept Plan for the Region. It is critical to ensure that the Concept Plan forms the basis for preparing and evaluating the Development Plans at regional and local scale.

REVIEW PERIODS, APPROVAL PROCESSES AND MONITORING

In order to ensure effective adoption of the Concept plan it is recommended to expand MMRDA's role to be a central coordinating agency in the Region. It is recommended to engage with the local planning agencies at the inception, approval and review stages. A Review & Coordination Committee may be formed directly under MMRDA, which would give initial inputs at the start of the DP process as well as would need to approve the DPs before submission to the State for gazetting. This committee would serve as a platform for integration and coordination of all physical planning activities by individual ULBs across the Region. Members of this committee may

include representatives from various planning agencies or ULBs and meetings can be convened either at regular intervals or during the planning and approval stage of various development plans so as to allow extensive consultations among different planning bodies and across technical departments of different sectors.

The planning intervals for the Regional Development Plan and Local Development Plans need to be shortened from the current intervals in practice; so as to ensure that they keep pace with the rate of urbanization and economic changes. The difference in the timing of release of the regional and local level plans needs to be shortened and synchronized so as to ensure effective coordination between these two levels of the Plans.

In order to ensure an effective implementation of the master plans, the institutional capacity within each ULB needs to be strengthened. These should be, within each planning agency, a well established planning division staffed with qualified planners, urban designers, sociologists, economists and real estate specialists. This planning would monitor fulfillment of the master plans.

Key Difference between Existing Regional Development Plan and Proposed Regional Concept Plan

Existing Regional Development Plan	Proposed Regional Concept Plan
<ul style="list-style-type: none"> Bottom-up Plan capturing all the grassroots level issues 	<ul style="list-style-type: none"> Vision oriented and forward looking long term development concept
<ul style="list-style-type: none"> Indicates Urbanization area and classifies land as urbanizable zones, industrial zones and the rest largely as open space classifications 	<ul style="list-style-type: none"> Proposes an integrated regional concept plan with rational distribution of land resources to cater for various land needs, different housing densities, hierarchical commercial nodes, different industrial typologies, regional level educational institutions, recreation and transportation
<ul style="list-style-type: none"> Urban area is largely defined by ULB occupied areas Planning of the region is governed by the local authority boundaries and ad-hoc proposals in the region 	<ul style="list-style-type: none"> Proposes organization of the region into cities and townships defined by uniform highway grid (3km by 3km)
<ul style="list-style-type: none"> Specifies Urbanization areas based on growth potential 	<ul style="list-style-type: none"> Proposes restructuring of MMR into 3 urban hierarchies based on densities and growth potential
<ul style="list-style-type: none"> Blanket FSI 	<ul style="list-style-type: none"> Proposes diversified FSI and zoning classification
<ul style="list-style-type: none"> Indicates broad Industrial Zones 	<ul style="list-style-type: none"> Proposes distribution of key commercial and industrial employment centres of different types Proposes establishment of a world class CBD in South Mumbai
<ul style="list-style-type: none"> Indicates only highways and regional suburban rails 	<ul style="list-style-type: none"> Proposes extensive regional/ local transportation with all the arterial road linkages, and regional and local rail networks
<ul style="list-style-type: none"> Respects all the forest and naturally sensitive areas and designates them accordingly 	<ul style="list-style-type: none"> Proposes organization of green structure in addition to the protection of all the forest and naturally sensitive areas

DEVELOPMENT CONTROL PARAMETERS

In comparison to the Development Control Regulation (DCR) of many developed cities, the current zoning classes and the control parameters within the current DP and DCR prepared for local areas in MMR are very limited. For example there are several categories for public facilities and infrastructure reservation, but only a few types of residential, commercial and industrial classes within the private domain. Also the control is more at the building level (setbacks, height, coverage) and not so much at the urban level (building edge, ground storey use, corner articulation etc.). This creates a monotonous and non-distinctive character within the city areas.

It is recommended that at the DP stage a range of appropriate zones or zoning types be developed based on the city's existing structure and intended physical character to encourage newer urban area typologies within the city areas.

One of the key additions to the suggested Zoning Framework is the stipulation of minimum plot sizes for key zoning classes, such as regional and city level commercial, so as to encourage amalgamation and comprehensive redevelopment.

URBAN DESIGN

Development of Urban Design Plans and Guidelines is not necessitated by the current planning framework. However, detailed control and urban design guidelines are very important to define the character of the key areas in a City. It is therefore recommended that the preparation of urban design plans be included in the DP preparation process, where certain areas are marked as Urban Design Controlled Areas and additional requirements need to be complied with by developers and land owners. Typical UD guidelines include parameters such as pedestrian linkages, arcade requirements, access, signage, perimeter fencing, heritage conservation, etc.

Suggested Zoning and UD Guidelines for the local plans for the South Mumbai, Andheri and Panvel areas are presented in the Appendix.

Recommended FSI Restructuring in General			
Area	Existing Situation	FSI Allocation Strategy	Recommended FSI Provision in General
CBD	Existing Base FSI in Island City: 1.33 <ul style="list-style-type: none"> Nariman Point - upto 4 High ground coverage & FSI in Fort Area 	To promote redevelopment of prime areas: <ul style="list-style-type: none"> CBD (Nariman Point) New Backbay Financial District Heritage areas revitalization schemes with Heritage TDR incentives 	Downtown CBD Area: <ul style="list-style-type: none"> CBD redevelopment: 8-15 Heritage areas retain current with Heritage TDR
Areas for higher FSI allocation in the Inner City	Existing Base FSI in Inner City: 1.33 <ul style="list-style-type: none"> Dense Inner Core areas with FSI averaging: 3 Usage of TDR Incentive FSI for DCR 33(7), 33(9) & SRA Schemes Additional incentive FSI of 2.5 for MHADA redevelopment JV Scheme : Incentive FSI of upto 2.5 Rental Housing: upto FSI 4 	To promote redevelopment of commercial and residential areas in inner city: <ul style="list-style-type: none"> Heritage areas revitalization schemes 500 m around key transit nodes 100 m on both sides of major arterial roads New Waterfront Hub at northern areas of the Mumbai Port To restrict the transfer of TDR to dedicated areas: <ul style="list-style-type: none"> Within the same block, cluster or precinct 100 m on both sides of major arterial roads 500 m radius from transit stations Phasing out use of TDR by 2020 To refine and focus on redevelopment schemes: <ul style="list-style-type: none"> Cluster redevelopment of cessed, rent controlled and CRZ controlled areas Redevelopment of slums under SRA Scheme and incentivizing redevelopment or relocation of all informal settlements 	<ul style="list-style-type: none"> Residential in Inner City : 3-5 Mixed Use Corridors in Inner City : 4- 6 Transit Nodes in Inner City: 8
Areas for higher FSI allocation in the City Fringes	Existing Base FSI in Island City suburbs : 1 <ul style="list-style-type: none"> BKC CBD area has FSI of 2 Usage of TDR Incentive FSI for DCR 33(7), 33(9) & SRA Schemes Additional incentive FSI of 2.5 for MHADA redevelopment JV Scheme : Incentive FSI of upto 2.5 Rental Housing: upto FSI 4 	To promote redevelopment of prime areas which will be dedicated transfer sites/ corridors for TDR: <ul style="list-style-type: none"> CBD (BKC) Fringe Centers (Andheri, Borivali, etc.) 500 m around important transit stations 100 m on both sides of major arterial roads Phasing our use of TDR by 2020 To promote redevelopment of key commercial are residential areas: <ul style="list-style-type: none"> Smaller commercial nodes (town centers) Low density residential areas with higher level of access and connectivity 500m around important lower-order transit stations To refine and focus on redevelopment schemes: <ul style="list-style-type: none"> Redevelopment of slums under SRA Scheme and incentivizing redevelopment or relocation of all informal settlements 	<ul style="list-style-type: none"> Transit Nodes in Fringe Areas: 4-6 Residential Development in Fringe Areas: 1-3.5
Areas for higher FSI allocation in the new Suburbs	FSI in outlying areas: 0.5-1 <ul style="list-style-type: none"> Usage of TDR Incentive FSI for DCR 33(7), 33(9) & SRA Schemes Additional incentive FSI of 2.5 for MHADA redevelopment JV Scheme : Incentive FSI of upto 2.5 Rental Housing: upto FSI 4 	To promote intensive development in under-developed areas: <ul style="list-style-type: none"> Suburban City Centres (Vasai-Virar, Bhiwandi etc.) 500 m around important transit stations In the dedicated industrial zones 	<ul style="list-style-type: none"> Transit Nodes in Suburban Areas: 3- 6 Residential Development in Suburban Areas: 1-2.5 Industrial: 1

* A special detailed study need to be conducted to develop an appropriate FSI Restructuring in MMR

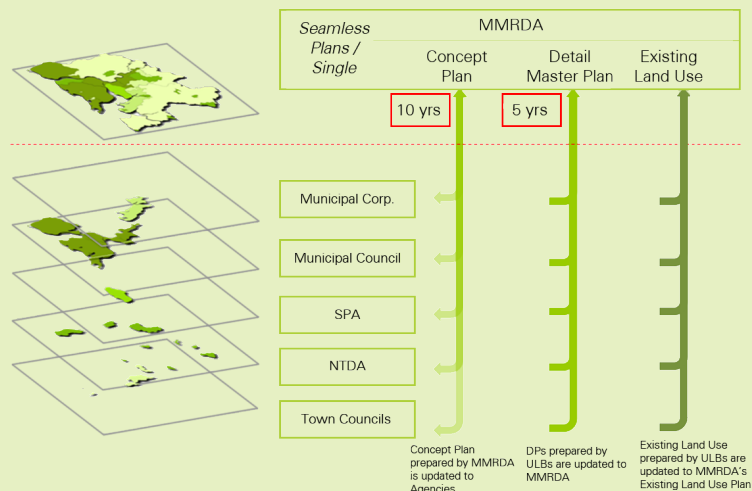
FSI STRATEGY, TDR & RELAXATIONS

In comparison to other metropolitans globally, the allocation of FSI in MMR is very low & is applied uniformly over large areas. The FSI distribution currently is not differentiated between commercial and residential uses and is not reflective of accessibility to transit stations. The FSI distribution is also not linked to the land value . Further more, the use of policies such as TDR & FSI relaxation for several schemes creates un-planned-for scenario in the city areas, thus undermining planning efforts. A comprehensive FSI Strategy has been proposed for the entire region to ensure that FSI allocation is tied in with the development potential and infrastructure capacity of different areas. This would be one of the key tools to incentivize renewal of built-up areas & encourage development in the outlying areas so as to create employment opportunities & housing.

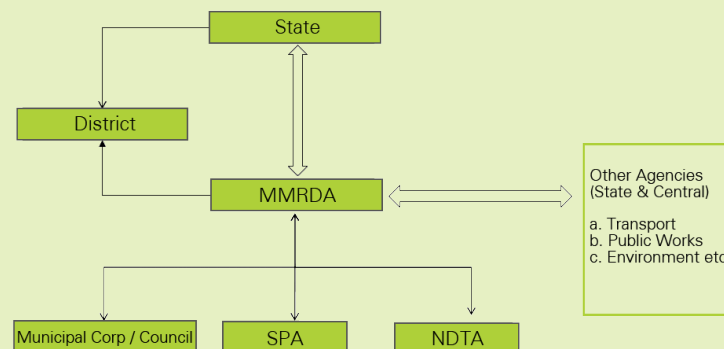
INTEGRATED LAND USE MANAGEMENT

The rapid urban development in MMR demands effective tools and technology to allow for planning activities to be captured accurately, evaluated, communicated and shared among users. For the purpose of monitoring and guiding development as per planning intentions, as well as to ensure effective coordination between planning initiatives of different agencies, it is absolutely critical to ensure that there is a well-structured and comprehensive land use data management system in place at all levels. A centralised regional scale GIS enabled Spatial Data Centre is proposed for MMR with the following objectives:

- Ensuring a single base plan to ensure that plans (at different levels) are generated based on the most accurate data (ortho map, topo map and field survey) which is controlled and updated from time to time. Such a single spatial data platform would facilitate sharing of land use and related information between MMRDA and ULB's/SPA's as well as across agencies.
- Integrating cadastral information within the base land use plan for effective planning and development control.
- Automated updating process and maintaining of existing land use data base for the purposes of monitoring, reviewing and decision making process.



PROPOSED PLANNING RELATED DATA WORKFLOW IN MMR



PROPOSED DATA SHARING STRUCTURE FOR MMR

Recommended Development Staging for MMR

	Short - Term (2020)	Medium - Term (2032)	Long - Term (2052)
Focus	<ul style="list-style-type: none"> Meeting basic needs • Employment • Affordable housing • Key infrastructure 	<ul style="list-style-type: none"> Improving Quality of Life • Quality housing & Public facilities • Public transport • Recreation & Environment 	<ul style="list-style-type: none"> Towards a Global City • World's best • Arts & culture • MICE & Tourism
Key Strategies	<ul style="list-style-type: none"> • Consolidate the inner city • Shift the focus to suburb • Protect & safeguard land & resources • Develop strategic plans 	<ul style="list-style-type: none"> • Cleaning up • Beautification • Improvement • Expansion 	<ul style="list-style-type: none"> • World-class infrastructure • Unique features • State-of-the-art technology
Employment	<ul style="list-style-type: none"> • New CBD (phase 1) at Colaba • Revitalization of Nariman Point & Fort • Waterfront Hub at north of Mumbai Port • City Fringe Centers at Andheri, Thane, Vikhroli, Uran • Suburban City Centres at Panvel, Vasai • Industries at Bhiwandi, Talaja 	<ul style="list-style-type: none"> • Suburban City Centres at Alibaug, Bhiwandi, Ulhasnagar • Industries at Vasai, Kalyan, Rewas 	<ul style="list-style-type: none"> • New CBD at reclaimed islands / re-profiled Backbay area
Housing	<ul style="list-style-type: none"> • Affordable units - 100,000 by MHADA, 200,000 by CIDCO & 230,000 through JV • Redevelopment of C Ward, BDD Chawls and MHADA colonies at D.N. Nagar and Kannamwar Nagar • Slum redevelopment units - 250,000 through SRA in GM, 50,000 through SRD in RoMMR, 350,000 through RAY and BSUP • Rental units - 1,000,000 by MMRDA • New townships at Panvel and Rewas 	<ul style="list-style-type: none"> • Affordable units - 100,000 by MHADA, 200,000 by CIDCO & 100,000 through JV • Redevelopment of Chembur Industrial area • Slum redevelopment units - 250,000 through SRA in GM, 100,000 through SRD in RoMMR, 500,000 through RAY and BSUP • Rental units - 500,000 by MMRDA & 100,000 by SRA • New townships at Vasai, Kalyan, Bhiwandi and Alibaug 	<ul style="list-style-type: none"> • Inner City renewal and new waterfront housing at relocated Mumbai Port
Infrastructure & Environment	<ul style="list-style-type: none"> • Completion of ongoing transport projects • Traffic and parking management • Completion of committed utility systems • Continuation of BRIMSTOWAD • IWMZs at Mulund, Deonar and Kalyan, Landfill site at Deonar, Kalyan and Bhiwandi • Clean-up projects – Mithi, Ulhas & Panvel Rivers 	<ul style="list-style-type: none"> • Committed public transport projects • Introduction of vehicle ownership and usage control • IWMZs at Talaja, Bhiwandi and Virar, Landfill site at Virar and Dronagiri • Alternative water sources • Coastal area re-profiling 	<ul style="list-style-type: none"> • New Airport and port at Rewas • High-speed rail
Recreation, Culture & Tourism	<ul style="list-style-type: none"> • Improve existing parks and maidans – Cross, Oval and Azad Maidans, Shivaji Park, 5 Gardens, etc. • Waterfronts – Mithi River Revitalization, Eastern & Western Waterfront Development in Mumbai City, Vasai-Arnala & Rewas-alibaug Coastal Parks • Forest – Improve Sanjay Gandhi National Park, Matheran SEZ, Karnala Bird Sanctuary • Urban design in key nodes and special precincts 	<ul style="list-style-type: none"> • Waterfronts – Panvel River Park, Ulhas Wetland Park, Manori Mangrove Park, Gorai Resort District • Forest – Tungar Hill Park • Extensive park connector network 	<ul style="list-style-type: none"> • International arts museums & performing arts centre • World-Expo Site • International Theme Park • Regional City Park at old Airport site
Strategic Studies	<ul style="list-style-type: none"> • Inventory of slums and cessed buildings, • Heritage areas management plan, • Forest, wetland & urban diversity management plan • Inventory of coastal and maritime environmental assets • Climate change management plan 	<ul style="list-style-type: none"> • Feasibility studies for reclamation at Harbor Bay / Backbay, high-speed rail, port and airport at Rewas 	

2

Development Phasing & Priority

The Concept Plan is long-term physical development framework for Regional development & requires strategic & progressive planning. 3 phases of regional growth are proposed, namely short-term with the focus on meeting basic needs, mid-term with the focus on improving quality of life & long-term with the focus on making a Global Metropolis.

3

Immediate Critical & Catalytic Projects

In the short-term the focus needs to be on mobilizing development in MMR, meeting the large back-log and deficits, and leveraging on the upcoming projects such as the new airport at Panvel, the expansion of the JNPT port, the Mumbai Trans Harbor Link (MHL), the metro and mono rail, the western sea-link, the Eastern Freeway and the Virar-Alibaug multi-modal corridor. In order to kick-start the growth envisioned in the Concept Plan, several start-up projects have been suggested for each sector. These projects are intended to be realized through a concerted effort of the public agencies, private sector, voluntary and citizens groups.

The criteria for selection of these projects are that they should be:

- Impactful
- Large-scale
- Bankable and attractive for PPP (Public Private Partnership)
- Diverse and addressing different sectors
- Spread throughout MMR
- Leverage on existing and committed infrastructure
- Replicable and have multiplier effect to spin-off development
- Sustain at least 5 years

REGIONAL LEVEL PRIORITY PROJECTS

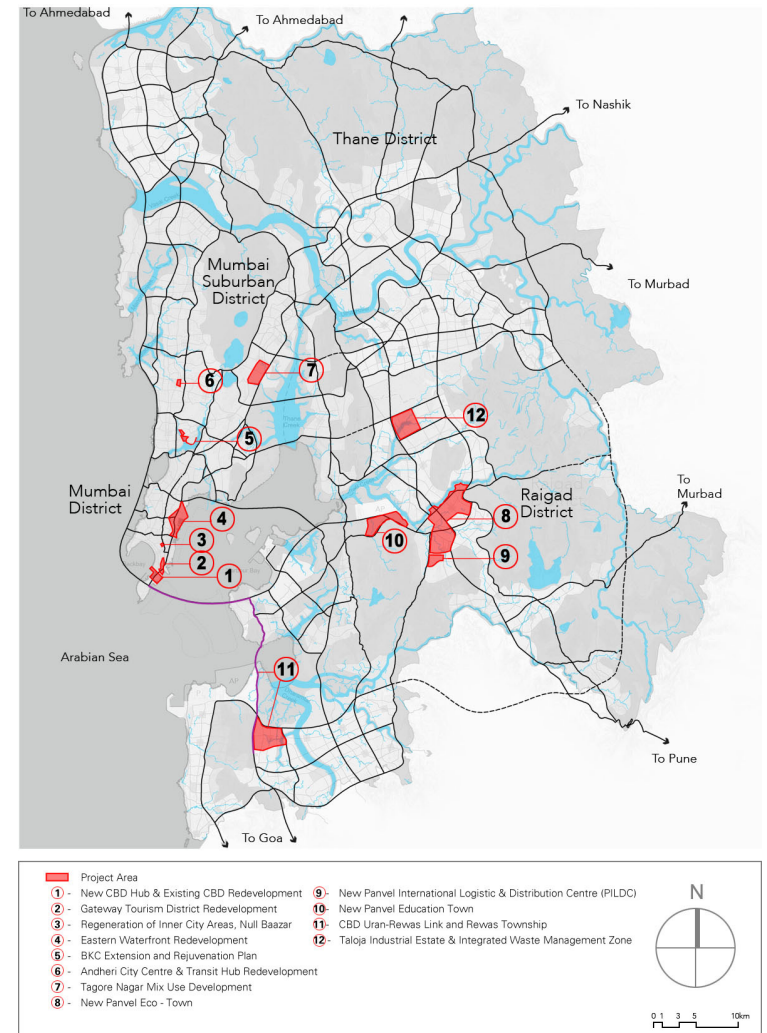
12 bankable projects & 7 critical environmental & recreational projects have been identified as priority projects at the Regional level:

Various implementation and financing models have been explored. The key thrust for materializing these projects would need to lie on a pro-active role by the government. While these projects are recommended to be realized on a PPP basis, it would be critical for the government to lay down the overall implementation and monitoring framework to ensure that these projects achieve their intended goals.

From these projects, the following 6 high-priority bankable projects have been selected for detailed analysis so as to demonstrate the various implementation and financing strategies:

1. New CBD Redevelopment
2. Andheri City Centre & Transit Hub Redevelopment
3. New Panvel Eco-Township
4. Gateway Tourism District Development
5. CBD-Uran -Rewas link & Rewas Township
6. Talaja Industrial Estate & IWMZ

These are expected to be launched in the near future and would act as development catalyst in the next 5 years.



LOCATION OF RECOMMENDED CATALYTIC PROJECTS

Recommended Catalytic Projects			
Project	Objective	Scope	Tasks
1. New CBD Hub & Existing CBD Revitalization Area: 250 Ha By: MCGM Focus: Employment	To create a world-class business environment to cater to international businesses	Creation of new CBD in the re-profiled Backbay area and the existing Colaba area. Revitalization of existing CBD in Nariman Point and Fort area	<ul style="list-style-type: none"> Detailed master plan Revised zoning and urban design Improvement to public spaces, streetscape and pedestrian network. Traffic and parking management
2. Gateway Tourism District Redevelopment Area: 69 Ha By: MCGM Focus: Tourism	To demonstrate revitalization of existing inner city heritage precincts	To develop an attractive tourist route from the Gateway of India up to Horniman Circle with attractive streetscapes, and plazas.	<ul style="list-style-type: none"> Develop a landscaped plaza and waterfront promenade along Gateway of India. Develop the streetscapes and pedestrian linkages along the route Pedestrianize selected existing roads Develop underground public car parks below Horniman Circle and Museum Plaza
3. Regeneration of Inner city areas: Null Baazar Area: 10 Ha By: MCGM Focus: Conservation, Tourism, Housing	To demonstrate exemplary redevelopment of the cessed area in inner city	To encourage redevelopment of the cessed area in inner city through cluster redevelopment and adaptive-reuse of significant heritage buildings so as to preserve the character.	<ul style="list-style-type: none"> Detailed master plan, urban design & rezoning Public design & build tender Implementation supervision
4. Eastern Waterfront Redevelopment Area: 401 Ha By: MCGM Focus: Employment Housing, Tourism, Recreation	To demonstrate effective reuse of the northern area of the Mumbai Port	To develop a new waterfront business and lifestyle district by redeveloping the industrial and port land as a new commercial hub in the waterfront with well integrated regional transit linkages, high density quality residential with 20% affordable housing, new world class waterfront cricket stadium & the waterfront park.	<ul style="list-style-type: none"> Detailed planning & design 20% affordable housing World class Infrastructure development Public housing, social and recreational facilities development Commercial Land sale
5. BKC Extension & Rejuvenation Plan Area: 47 Ha By: MMRDA Focus: Employment, Tourism	To add vibrancy to the CBD at BKC	To redevelop the existing slum and expand the existing BKC boundary towards north securing additional land for mixed development around the current commercial node. And, to create iconic new waterfront park as a recreational public destination within BKC.	<ul style="list-style-type: none"> Detailed master plan, urban design & rezoning Public space redevelopment Commercial land sale
6. Andheri City Centre & Transit Hub Redevelopment Area: 27 Ha By: MCGM Focus: Employment, Urban Renewal	Decentralization of business and employment opportunities and rejuvenation of the City Fringe areas.	To create a new regional business centre around Andheri Station as a showcase of urban renewal initiative for similar areas.	<ul style="list-style-type: none"> Detailed master plan Revised zoning and urban design Improvement to public spaces, streetscape and pedestrian network. Traffic and parking management

Implementation Models

In line with the existing regulatory framework three models are suggested for undertaking the various catalytic projects namely:

1. LAND ACQUISITION MODEL

Involves land acquisition, infrastructure development, formulating vision, master plan, development control and land sales.

SUITABILITY: Large tracts of government owned land, or small number of owners, or single use such as industrial or infrastructure.

2. LAND POOLING MODEL

Involves notification of development scheme of the project, land pooling, development of public infrastructure and re-distribution of land to the owners in line of payment of betterment fees.

SUITABILITY: large green-field sites with multiple owners.

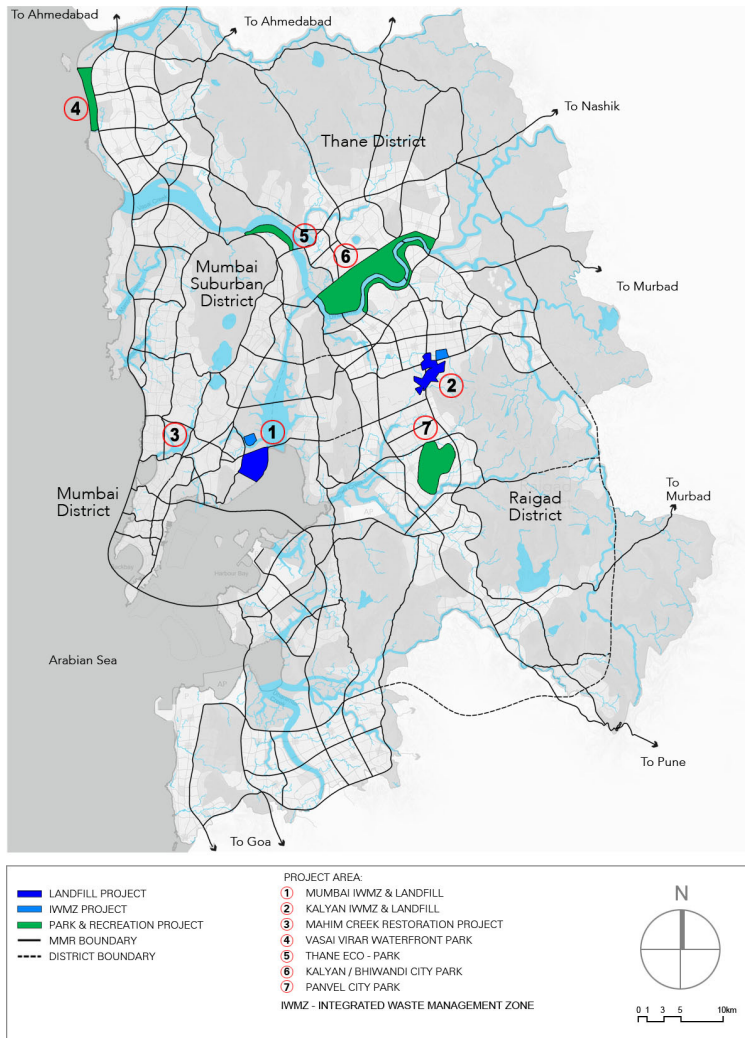
3. FACILITATOR MODEL

Involves review of master plan and development control, development of public infrastructure, and assisting redevelopment.

SUITABILITY: large brown-field, built up areas.

Recommended Catalytic Projects

Project	Objective	Scope	Tasks
7. Tagore Nagar Mix Use Redevelopment Area: 500 Ha By: MHADA Focus: Public Housing, Employment, Urban renewal	To demonstrate the exemplary redevelopment of the existing MHADA colony	Comprehensive Redevelopment of MHADA colony, with integrated employment centre around transit node	<ul style="list-style-type: none"> Detailed planning & design with improvement to MHADA guidelines Survey of owners and residents and generating consensus Infrastructure redevelopment Public housing and social facilities redevelopment Sale for surplus land and built-up units
8. New Panvel Eco- Town Area: 2000 Ha By: MMRDA Focus: Housing, Employment	Promotion of growth in the outlying areas of the Region. To set a new benchmark on sustainable township planning in the Region.	To develop an eco-town with local employment opportunities, compact community living, 70% affordable housing, quality public recreation.	<ul style="list-style-type: none"> Detailed planning & design Zoning and urban design Land acquisition / pooling Infrastructure development Public housing and social facilities development Commercial Land sale
9. New Panvel International Logistic and Distribution Centre (PILDC) Area: 707 Ha By: MIDC Focus: Employment	To capitalize on the upcoming international airport at Panvel for creating employment opportunities	To develop the PILDC as a world class EPZ and logistics hub.	<ul style="list-style-type: none"> Detailed planning & design Infrastructure development Industrial and ancillary building development Lease/relocation schemes
10. New Panvel Education Town Area: 300 Ha By: CIDCO Focus: EDUCATION, EMPLOYMENT	To ensure an adequate high-value skilled labor to help MMR in its goal of becoming a Global City.	To develop a dedicated international education town contributing to the growth of tertiary education	<ul style="list-style-type: none"> Master planning Infrastructure development Investment scheme for foreign universities.
11. CBD-Uran-Rewas Link & Rewas Township Area: 980 Ha By: MMRDA/ MHADA Focus: Transport, Housing	To induce growth & development in the southern part of the region.	To establish new link between CBD and southern part of MMR and to develop an attractive residential township with quick access to the CBD.	<ul style="list-style-type: none"> Detailed planning & design Zoning and urban design Land acquisition / pooling Infrastructure development Public housing and social facilities development Commercial Land sale
12. Taloja Industrial Estate & Integrated Waste Management Zone Area: 845Ha By: MIDC Focus: Employment, Environment	To promote expansion of industries in the outlying areas, to offer substantial local employment.	Development of consolidated industrial estates which optimize land uses.	<ul style="list-style-type: none"> Detailed planning & design Infrastructure development Industrial and ancillary building development Lease/relocation schemes



LOCATION OF RECOMMENDED ENVIRONMENTAL & RECREATIONAL PROJECTS

Recommended Environmental & Recreational Projects

Project	Objective	Scope	Tasks
1. Mumbai IWMZ Area: 115 Ha IWMZ + 786 Ha Landfill site By: MCGM Focus: Environment	To cater to the anticipated high volume of waste generation. And, to address the land scarcity for processing plant & landfill through conversion of the existing sewerage plant into an integrated waste plant, energy recovery & landfill.	To redevelop the landfill site at Deonar to develop and Integrated Waste Treatment Zone and a scientifically constructed landfill site.	<ul style="list-style-type: none"> • Land acquisition • Infrastructure development • Commercial land sale
2. Kalyan IWMZ Area: 115 Ha IWMZ + 534 Ha Landfill site By: MMRDA Focus: Environment	To support Kalyan eco-city, Navi Mumbai & the surrounding industrial areas in the waste management needs. And, to promote recycling & industrial ecology in the suburb.	To redevelop the identified waste management site at Kalyan to develop and Integrated Waste Treatment Zone and a scientifically constructed landfill site.	
3. Mahim Creek Restoration Project Area: 17.8 km long & catchment area of 7295 Ha By: MMRDA Focus: Environment, Recreation	To showcase a pilot environmental project in MMR for river clean-up & restoration and beautification.	To clean-up the Mithi River and develop a vibrant waterfront park along BKC	<ul style="list-style-type: none"> • Detailed master plan and urban design • River clean-up • Improvement to public spaces, streetscape and pedestrian network. • Development recreational / waterfront parks and provision of basic park facilities.
4. Vasai Virar Waterfront Park Area: Phase 1 – 100 Ha. (Total Area 708 Ha) By: Vasai-Virar Municipality Focus: Recreation	To provide a regional recreation destination and improve living quality in the suburb.	Development of Regional Park along the coast in stretching from Vasai to Virar	
5. Thane Eco-Park Area: 391 Ha By: Thane Municipality Focus: Recreation	To provide a regional recreation destination and improve living quality in the city fringe.	Development of Regional Park along the Ulhas River supporting the City of Thane	<ul style="list-style-type: none"> • Detailed master plan and urban design • Improvement to public spaces, streetscape and pedestrian network. • Development recreational / waterfront parks and provision of basic park facilities.
6. Kalyan/ Bhiwandi City Park Area: Phase 1 – 100 Ha. (Total Area 4182 Ha) By: Kalyan Municipality Focus: Recreation	To improve living quality in the suburbs of Kalyan City	Development of Regional Park along the Ulhas River between Kalyan and Bhiwandi	
7. Panvel City Park Area: Phase 1 – 100 Ha. (Total Area 1672 Ha) By: MMRDA Focus: Recreation	To improve living quality in the suburb of Panvel City	Development of Regional Park on the hill north of Panvel Eco-City.	

4 Increasing Government Land Holdings & Revenue Streams

Non-availability of adequate funding and sizeable areas of government-owned land available for development are the two key factors which constrain planned and integrated development in MMR. In order to ensure that the government has an adequate stake in steering the growth direction in different areas two strategies are recommended, namely:

STRATEGIC GOVERNMENT LAND HOLDINGS

Strategic ownership of land aids the government to dictate the type of development and also to generate large sums of revenue for infrastructure development through land sales. With a view to consolidate government land holdings, it is recommended to undertake a land ownership study for the region so as to identify “soft” areas such as land held by other government agencies who can be pooled in JV schemes, slum and informal areas with high redevelopment potential, etc. Either through land acquisition or through partnership with the private sector on project basis, it is recommended to create strategic government land holdings for the following regional development projects.

SETTING A COMPREHENSIVE DEVELOPMENT CHARGE SYSTEM

There needs to be put in place an updated Development Charge System in MMR in order to benefit on the enhancement in land value of the private plots due to the improved infrastructure and the increased development rights due to a new differential FSI distribution system. As in many other countries this can form a key revenue source for the cities to undertake public works.

Such a regional DC framework needs to be developed for MMR where differential rates are worked out for variations in the development potential of land parcels based on their geographical locations, allowable land uses, historical development size and new allowable development quantum. The DC rates need to be regularly updated (1-2 yrs) to reflect the changes in the property markets.

Recommended Areas for Government Land Holdings		
Area	Purpose	Recommended Location
Inner City	• CBD development	• Land through re-profiling of Backbay for CBD extension • Key parcels around important transit nodes such as Churchgate, CST and Sandhurst Road
	• Residential development	• Pilot project sites for exemplary cluster redevelopment projects in C ward • Key parcels around important transit nodes such as Jacob Circle, Grant Road, Charni Road, Dadar & Wadala for high-density TOD
	• Transport and Infra projects	• Reserves for high-speed rail and key expressways • Reserves for new and widened local roads and rail
City Fringe Areas	• Commercial centre development	• BKC expansion along Vakola Nallah • Key parcels around Fringe Centers in Andheri, Borivali, Vikroli-Kanjurmarg, Thane, Vashi and Uran-Dronagiri
	• Residential development	• Land freed-up by the relocation of the present Airport in the long-term • Land freed-up by the relocation of petro-chemical and fertilizer industries in Trombay • Key parcels of the newly developing areas west of Mira-Bhayander and along Godhbunder Road
	• Transport and Infra projects	• Reserves for high-speed rail and key expressways • Reserves for new and widened local roads and rail
	• Commercial centre development	• Key parcels around Suburban City Centers around Vasai-Virar, Bhiwandi, Kalyan-Dombivali, Ulahsnagar-Ambarnath, Panvel, Pen-Alibaug
	• Industrial projects	• Key parcels for high-value added industries in Panvel and Uran
Sub-urban Areas	• Residential Development	• Key parcels for consolidated industries around Vasai-Virar, Bhiwandi, Kalyan, Talaja and Alibaug
	• Transport and Infra projects	• Reserves for high-speed rail and key expressways • Reserves for new and widened local roads and rail
	• Future airport & port	• Reserves for future airport and port in Rewas-Mandwa
	• Institutional Uses	• Reserves for international scale institutions in Panvel and around Goregaon Film City
	• Recreational	• Recreational and tourism sites along Gorai-Manori, the coast of Vasai, Alibaug and city limits of Bhiwandi, Kalyan, Panvel

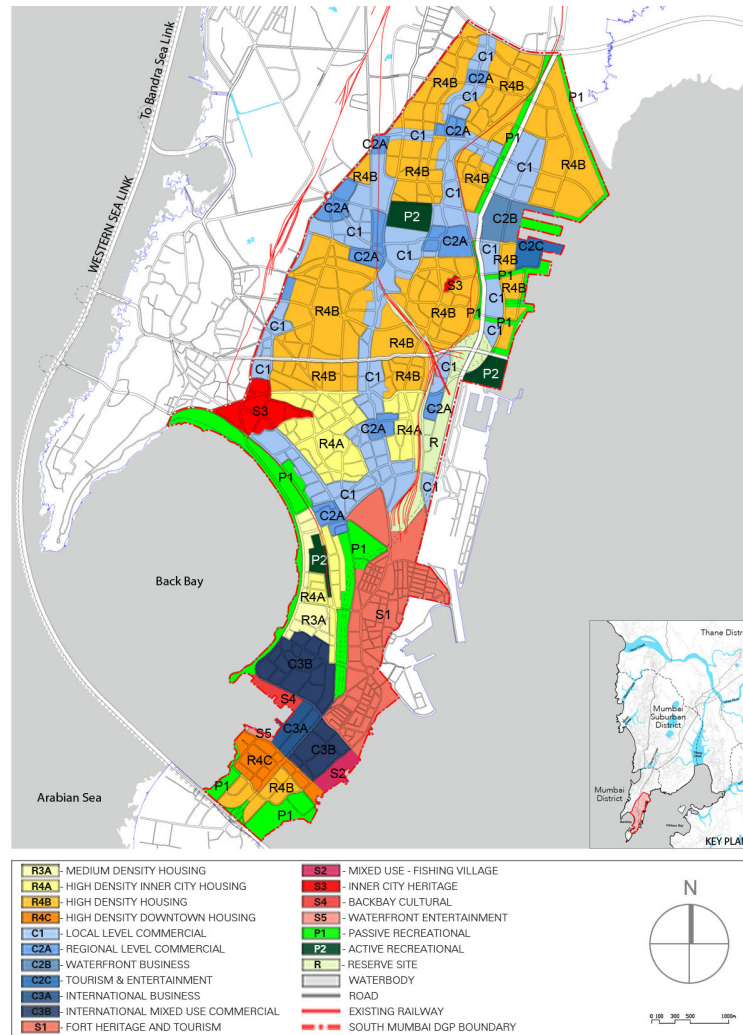
MMR NEEDS TO ASPIRE not just for fulfilling its own growth needs, but it also shoulders the responsibility of advancing India into the global arena. It needs to continue in its role of being a leader in urban development by becoming a model for other metropolitan cities in India. 40 years is a long time to envision growth of a Region. For MMR this transforming process will be long drawn. Nonetheless, with concerted efforts to move step-by-step and project-by-project, the vision embodied in the Concept Plan would come true.



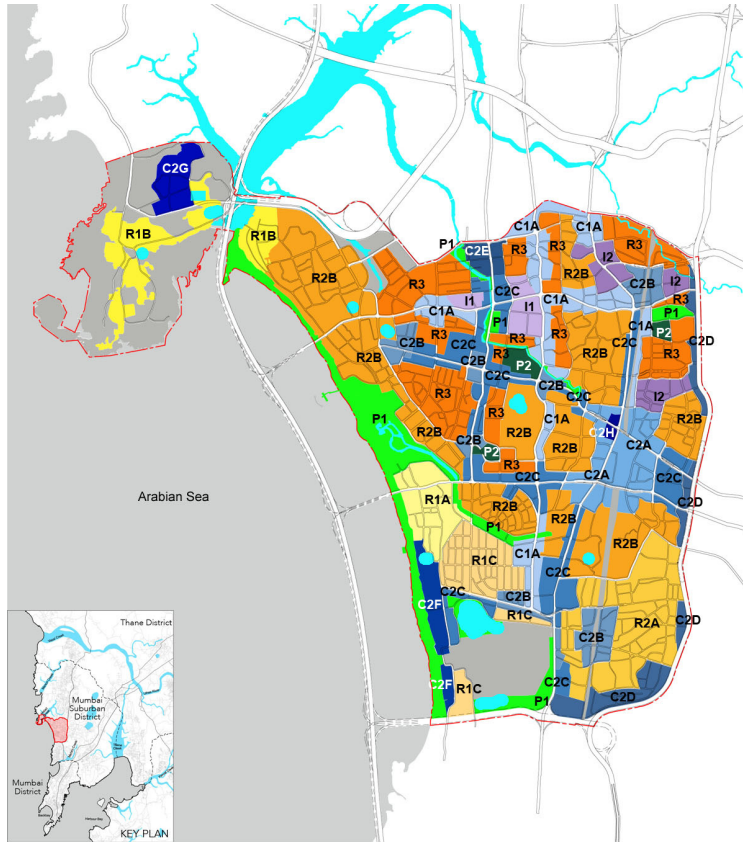
Appendix

RECOMMENDED ZONING PLAN & GUIDELINES

This recommended Zoning Plan is only proposed as an illustration to support the proposed planning structure. In order to make it implementable, detailed studies of the existing plot ratio allocation, plot sizes, development typologies, ownership patterns, etc. need to be undertaken during the DP stage.

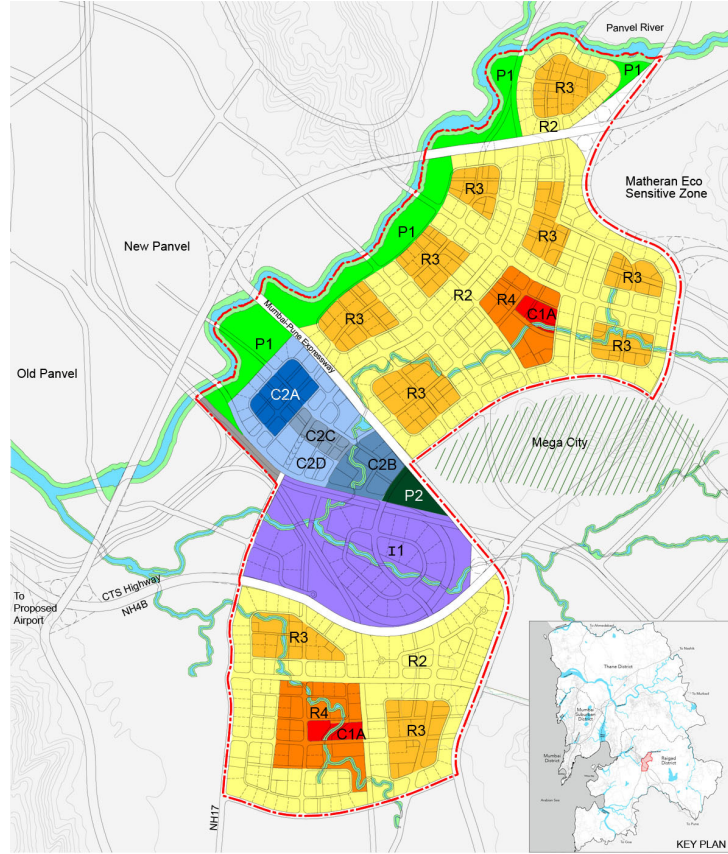


RECOMMENDED ZONING PLAN - SOUTH MUMBAI PLANNING AREA



R1A Low Density Housing - Traditional Village District	C2E City Level Commercial - Office Belts
R1B Low Density Housing - Fishing Village District	C2F City Level Commercial - Shopping and Entertainment
R1C Low Density Housing - Bungalow and Walk-up Apartment District	C2G City Level Commercial - High-end Hotel District
R2A Medium Density Housing - Low Rise Apartment District	C2C City Level Commercial - High-end Resort District
R2B Medium Density Housing - Mid Rise Apartment District	C2H City Level Commercial - Heritage and Tourism
R3 High Density Housing District	I1 Light / Media Based Industrial District
C1A Local Level Commercial	I2 General Industrial District
C2A City Level Commercial - Regional Business District	P1 Passive Recreational District
C2B City Level Commercial - Regional Lifestyle District	P2 Active Recreational District
C2C City Level Commercial - Mix Use Belts	Existing Railway
	Andheri DGP Boundary

RECOMMENDED ZONING PLAN - ANDHERI PLANNING AREA



R2 - LOW DENSITY HOUSING	P1 - PARKS
R3 - MEDIUM DENSITY HOUSING	P2 - SPORTS & RECREATION
R4 - HIGH DENSITY HOUSING	GREEN BUFFER
C1A - MIX USE TOWN CENTRE	WATERBODY
C2A - REGIONAL CENTRE COMMERCIAL AROUND REGIONAL INTERCHANGE	HIGHWAY
C2B - REGIONAL CENTRE COMMERCIAL AROUND LOCAL INTERCHANGE	ARTERIAL
C2C - REGIONAL CENTRE COMMERCIAL AWAY FROM TRANSIT NODES	PANVEL EAST DGP BOUNDARY
C2D - MIX USE AROUND REGIONAL CITY CENTRE	
I1 - LIGHT INDUSTRIES	

RECOMMENDED ZONING PLAN - PANVEL EAST PLANNING AREA

Project Team

PLANNING, URBAN DESIGN AND HERITAGE CONSERVATION

- Djoko Prihanto, Project Director - Senior Vice President, Surbana
- Alfred Tsang, Project Manager - Sr. Vice President, Surbana
- Lim Siah Gim, Urban Design Team Leader, - Sr. Vice President, Surbana
- Hrydhal Damani, Planning, Urban Design & Land Use Mgt. - Sr. Urban Planner, Surbana
- Shrena Joshi, Planning & Parks and Recreation - Urban Planner, Surbana
- Shrijan Joshi, Planning, Urban Design & Heritage Conservation - Urban Designer, Surbana

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- P. Jagan Narayan, Economic Team Leader - Manager, Deloitte
- Amit Maru, Financial Team Leader - Senior Manager, Deloitte

HOUSING

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- Vijay Sane, Deputy Project Manager - Project Director, Surbana
- Ashok Bhairi, Housing - Architect & Urban Designer - Surbana
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TRANSPORT

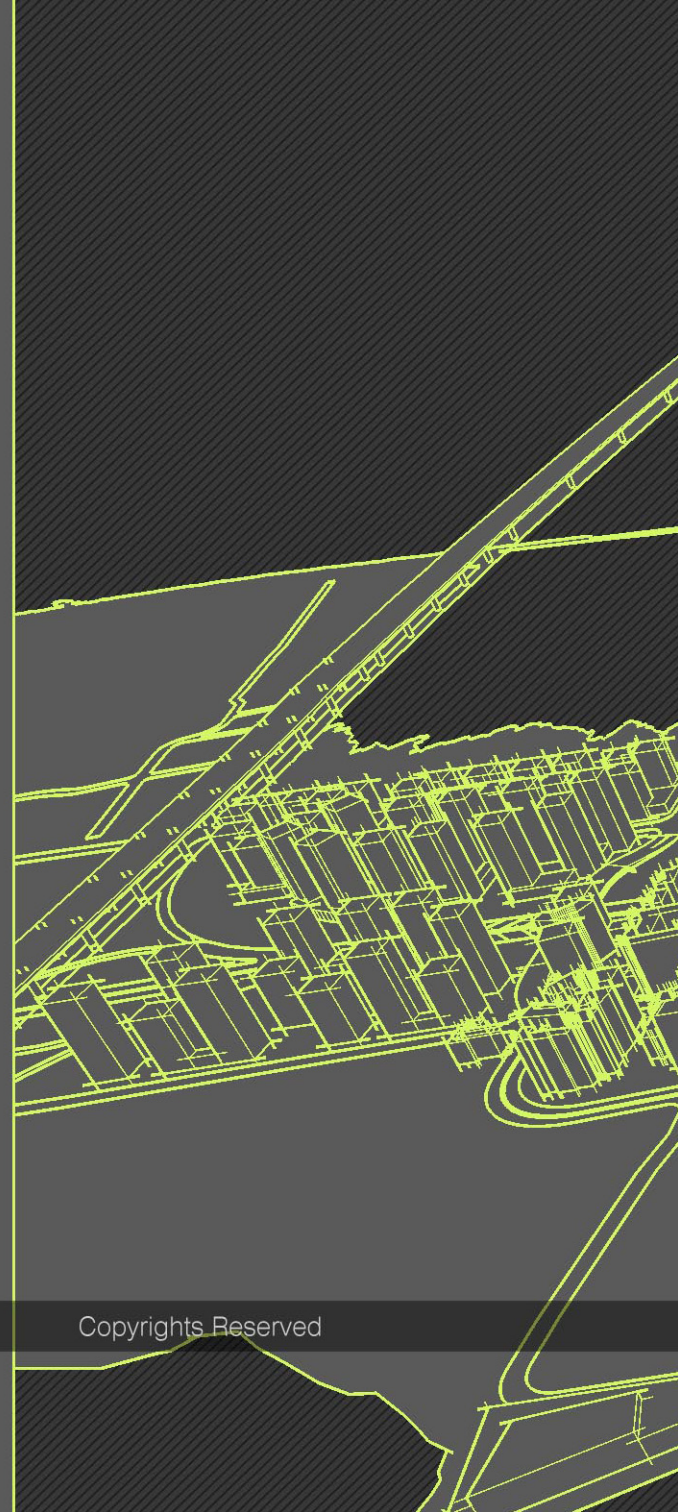
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- Dr. Mark Chong, Transportation Team Leader - Transport Specialist, Surbana
- James Ellison, Transport - Assistant Vice President, Surbana

UTILITY INFRASTRUCTURE

- Simon Wong, Infrastructure Team Leader - Vice President, Surbana

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