CONCEPT PLAN
Mumbai Metropolitan Region

PRESENTATION TO SECRETARIES of GoM
Jan 2013

Surbana Deloitte.
BACKGROUND TO THE CONCEPT PLAN


2005 : CM’s Task Force extends “Vision Mumbai” to MMR

2005 : Establishment of MTSU to facilitate Mumbai’s transformation

2007 : Business Plan for MMR by MMRDA & LEA International Ltd.

2008 : Mumbai First gets agreement from EC on need for CP for MMR

2009 : MMRDA agrees to finance the CP, CP process entrusted to MTSU

2010 : Thru a global tender, Surbana, Singapore awarded the project

2011 : Surbana completes and submits the Concept Plan
THE NEED FOR A CONCEPT PLAN

- Declining economy and population growth in Mumbai
  Rampant growth in it’s Region

- No over-arching plan to guide all areas towards a single vision
  Individual DPs of ULBs & MMRDA's RP have no integration

- DPs focus on land allocation without fully incorporating the
economic, social, environmental and financial dimensions

- 2nd Gen CDP under JNNURM-II mandates need for a
  comprehensive strategy plan for regional development
  CP provides MMR a lead on this aspect

- Comprehensive Planning will incentivize FDI flow
  Will keep MMR competitive
PART 1: OVERVIEW OF REGIONAL CONCEPT PLAN

Comments by Hon. Chief Secretary

PART 2: DETAILED SECTORAL PLANS

- Housing
- Transport
- Utilities Infrastructure
- Environment
- Parks & Recreation
- Heritage & Urban Design

IMPLEMENTATION

Q & A
In the next 4 decades MMR will become . . .
THE LARGEST METROPOLIS IN THE WORLD

2052 – some projections . . .

Population – 44 mn
Work force - 23 mn
Housing demand - 14.8 mn
Urban area - 1,750 sq km
commercial space demand - 100 mn sq m
Passenger trips/day - 59.2 mn
Park land demand - 200 km sq
OBJECTIVES OF CP FOR MMR

- A comprehensive short, mid & long-term guide plan for MMR
- To structure redevelopment & growth in MMR in a polycentric pattern
- To provide for long-term needs of land, economy, housing, transport & infra
- To enhance Mumbai’s competitiveness
- To ensure holistic lifestyle and equitable opportunities for all
- To protect the rich, yet sensitive culture & environment of MMR
- To chalk out a implementation road map

A vision plan which explores BOLD & BREAKTHROUGH solutions based on intnl. best practices for the critical situation of MMR
ECONOMIC PROJECTIONS - 2052

- GDP 7% - 9%
  (Compound Annual Growth Rate)
- GDP size INR 82,500 bn stretched case
  (2008: INR 1,860 bn
  base case : INR 43,567 bn)
- Increasing share from Rest of MMR v/s
  Greater Mumbai (from 40:60 to 60:40)
- Dominant share from an increasing
  tertiary sector (75%)
- A sustained secondary sector (25%)
- Key drivers : Intl Finance, Banking,
  IT/ITES, Retail, Media & Entertainment,
  Logistics, Education, Healthcare,
  Tourism, Mfg & Construction

Economic study prepared by Deloitte India
Socio-economic and demand projections based on study by McKinsey India
DEMOGRAPHIC PROJECTIONS - 2052

- By 2032 37.3 mil (1.6% growth)
- By 2052 43.7 mil (0.7% growth)
- 60% pop. in working age group (14-60)
- Decentralization of population from Greater Mumbai to Rest of MMR (40:60)
- Average HH size :
  - 2008 – 4.15
  - 2032 – 3.60
  - 2052 – 2.95
- A dominant middle class requiring large number of jobs, homes, facilities, transport & infrastructure

Socio-demographic study prepared by Sreekumar-Siddique & Co. Pte. Ltd.
Socio-economic and demand projections based on study by McKinsey India
Labor Market Projections - 2052

- High labor participation (53%)
- Work force: 2032 = 18.7 mil, 2052 = 23.2 mil
- Bulk of employment in tertiary sector (68%)
- Sustained employment in secondary sector (25%)
- Employment in informal sector (9%)
- Significant investment needed in the creation of jobs & a skilled workforce

Economic study prepared by Deloitte India
Socio-economic and demand projections based on study by McKinsey India
LOOKING BEYOND PROBLEM SOLVING

from WORLD CLASS CITY...

2032

...to GLOBAL CITY

2052

Vision Mumbai
GLIMPSES OF A GLOBAL CITY

CBD: The Engine of Growth

Quality Housing Choices:

Seamless Connectivity:

Vibrant 24/7 City:

Excellence in Urban Management:

Heritage & Identity

A Global Cultural Hub:
TAKING STOCK OF EXISTING SITUATION

- **Total area of MMR**: 4,355 sq. km.

- **Land utilization**
  - 15% Urbanization
  - 31% nature area
  - 54% agriculture & open space

- **Density concentrated in Greater Mumbai & urban areas around it**
  - Greater Mumbai = 31,500 p/sq. km.
  - Overall = 5,970 p/sq. km.
# TAKING STOCK OF EXISTING SITUATION

## Existing LU Distribution

![Diagram showing existing land use distribution](image)

## Broad Land Requirements

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2032</th>
<th>2052</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Urban population</strong></td>
<td>26.0 mil</td>
<td>32.5 mil</td>
<td>43.4 mil</td>
</tr>
<tr>
<td><strong>Forest/wetland &amp; water body</strong></td>
<td>31% 1,350 sqkm</td>
<td>31% 1350 sqkm</td>
<td>31% 1350 sqkm</td>
</tr>
<tr>
<td><strong>Agriculture/waste/scrubland</strong></td>
<td>54% 2,350 sqkm</td>
<td>39% 1650 sqkm</td>
<td>29% 1216 sqkm</td>
</tr>
<tr>
<td><strong>Urbanized area (%)</strong></td>
<td>15% 650 sqkm</td>
<td>&lt;30% 1300 sqkm</td>
<td>&lt;40% 1734 sqkm</td>
</tr>
<tr>
<td><strong>Density (ppl/sqkm)</strong></td>
<td>40,000</td>
<td>27,000</td>
<td>25,000</td>
</tr>
</tbody>
</table>
SALIENT FEATURES OF THE CONCEPT PLAN

- **A distinctive Global Financial Centre**: Nariman Point, Cuffe Parade, Fort Redevelopment
- **5 Townships in the Suburbs**: Alibaug-Pen, Greater Panvel, Greater Kalyan, Bhiwandi, Vasai-Virar
- **Existing City Regeneration**: Mumbai & Navi Mumbai
- **Comprehensive Housing**: slum free, increased per capita living space, public & affordable housing
- **Well-distributed Employment**: Industries, city & town centers
- **Efficient transportation**: 5 trans-harbor links, high-speed rail, Public Transport (incl. rail & BRTS)
- **Green City**: waterfront, wetlands, mangroves, parks, forests & biodiversity, waterbodies, air-quality
SALIENT FEATURES OF THE CONCEPT PLAN

- Land reservations for future Mumbai-Goa growth corridor
- Relocating Mumbai Port to Rewas
- A 3rd airport in Rewas to meet long term needs (100mil pass)
- Logistics hubs at JNPT & Rewas
- Hi-tech industrial ring in Navi Mumbai
- Knowledge corridor along Pune rd.
- General industries along Nashik & Ahmedabad corridors (in line with DMIC)
- Future City Centre Expansion in Thane Creek (subject to scientific studies)
- Utility-infrastructure excellence
- Reliving the “magic” of Mumbai
IMPLEMENTATION APPROACH & STRATEGIES

- Legislative & Institutional Framework for Adoption of CP
- Systematic staging of devpt. priorities for short, mid & long-term Critical & priority start-up projects
- Incentivizing city renewal & expansion
  Attracting private sector to undertake critical & catalytic projects
- Strategic land reservations to meet long-term needs
  Leveraging on land owned by different government entities
- Coordinated & integrative planning process
  Capacity building of planning authorities
  Periodic review and regular monitoring of CP, RP & DPs
- Improvement to Development Control Parameters
  Rethinking CRZ norms within key areas of MMR
- Integrated Land Use Management (using GIS platform)
- Active public participation & awareness building
ADOPTION OF CP INTO RP & DP

SHORT-TERM ADOPTION STRATEGY

- Adoption of CP in the upcoming RP being prepared by MPC with MMRDA
- Adoption of CP & DGPs into the upcoming DP of Greater Mumbai and other ULBs
- Designated CP Task Force to oversee adoption processes in the short term
- Strategic legislative framework for enforcement of CP in the long term

[Diagram showing the flow from Regional Development Plan to Concept Plan to Local DGPS to Local Development Plan]
INSTITUTIONAL FRAMEWORK

CURRENT

Urban Development Department (UDD)

  ↓
  
  MPC

  ↓
  
  MMRDA

Regional Development Plan

  ↓
  
  Urban Local Bodies

Development Plan

  ↓
  
  SPA / NTDA

Development Plan

PROPOSED

CABINET

  ↓
  
  MPC

  ↓
  
  UDD

MMRPA (Concept Plan)

Formulation, Adoption, Implementation, Monitoring & Periodic Review as mandated

  ↓
  
  MMRDA

  ↓
  
  ULB

  ↓
  
  SPA / NTDA

REGIONAL PLAN

Development Plan

Development Plan

Development Plan
ACTION PLAN FOR TAKING FORWARD CURRENT CONCEPT PLAN

1. Presentation to MPC for endorsement
2. Submitting to GoM for approval
3. Amendment to MRTP Act for:
   - Constitution of MMRPA
   - All ULBs to route their DPs through MMRDA, MMRPA & MPC
4. Govt. directives to MMRDA & all ULBs to integrate their RP and DP respectively with CP
5. Constitution of MMRPA
6. Endorsement to Concept Plan by all ULB's, MMRDA, etc.
7. Presentation to Stakeholders
8. Preparation of Action Plan for implementation of development strategy, projects & improvement to regulatory framework recommended by CP for short, medium and long term.
9. Identifying technical challenges associated with long term development scenarios and specific detailed studies to be carried out
10. Govt. to give broad guidelines to all ULBs for preparation/revision of their DP
PART 2: DETAILED SECTORAL PLANS

- Housing
- Transport
- Utilities Infrastructure
- Environment
- Parks & Recreation
- Heritage & Urban Design

IMPLEMENTATION

Q & A
CONCEPT PLAN 2032

CONCEPT PLAN 2052
9 Moves to Get There

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

EXISTING DENSITY DISTRIBUTION
1 BALANCED URBAN GROWTH

Urban Area Hierarchy

PROPOSED DENSITY DISTRIBUTION

- INNER CITY AREA - 30,000 p/km²
- CITY FRINGE AREA - 25,000 p/km²
- SUBURBAN AREA - 20,000 p/km²
1. BALANCED URBAN GROWTH

Reorganized City Boundaries

EXISTING CITY BOUNDARIES

PROPOSED CITY BOUNDARIES
Balanced Population Distribution

Existing Population Distribution

2010: Total = 26 million

Proposed Population Distribution

2052: Total = 44 million
Creating an International Downtown

“A Waterfront City Centre... a Gateway to India”

Global Financial Centres – 400 to 800 ha

- City of London
- New York Downtown
- Shanghai CBD
- Singapore City Centre
- La Defense Paris
- Tokyo CBD

Mumbai International CBD proposed next to Nariman Point & Fort Areas

- New Financial District
- Nariman Point Redevelopment
- Heritage Precinct Revitalization
A DISTINCTIVE GLOBAL FINANCIAL CENTRE

A rejuvenated Inner City, the Eastern & Western Waterfronts centred around the International Financial Centre

- Extension of Sea Link
- Transit-oriented growth
- Waterfront rejuvenation
3 WELL DISTRIBUTED JOB OPPORTUNITIES

Decentralizing Commercial & Services Centres

A total of 100 mil sq m of commercial space for 15 mil workforce

<table>
<thead>
<tr>
<th></th>
<th>Commercial quantum (m²)</th>
<th>Population catchment</th>
<th>Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBD</td>
<td>34 million</td>
<td>International 44 mil</td>
<td>2.5 million</td>
</tr>
<tr>
<td>City &amp; Fringe Centres</td>
<td>2 - 2.8 million</td>
<td>3 - 4 mil</td>
<td>130,000 – 180,000</td>
</tr>
<tr>
<td>Town Centre</td>
<td>200,000</td>
<td>250,000 – 350,000</td>
<td>13,000</td>
</tr>
</tbody>
</table>
Decentralized Industrial Distribution

- Hazardous/pollutive uses in GM to be gradually phased out of Greater Mumbai
- Hi-tech industries in the urban fringe area
- Manufacturing industries in suburban areas
Distinct City Functions

1. NORTHERN COASTAL CITY (VASAI-VIRAR)
2. FASHION AND DESIGN CITY (BHIWANDI)
3. AUTOMOTIVE CENTRE (KALYAN DOMBIVALI)
4. ELECTRONIC CITY (ULHASNAGAR)
5. CENTRAL CITY OF CULTURE (THANE)
6. MEDIA AND DESIGN CITY (WESTERN CITY FRINGE)
7. BUSINESS SERVICE CENTRE (EASTERN CITY FRINGE)
8. HI-TECH CITY (NAVI MUMBAI)
9. EDUCATION CITY (PANVEL)
10. PORT AND LOGISTICS HUB (URAN)
11. SOUTHERN COASTAL CITY (ALIBAUG)
12. INTERNATIONAL BUSINESS CENTRE (MUMBAI INNER CITY)
4 QUALITY LIVING FOR ALL

SINGAPORE
• Strong public housing agency (HDB)
• from rental to home ownership
• No free housing
• Land banking (90% land)
• housing stock development
• Price control to ensure affordability
• Resettlement tied to employment
• Comprehensive townships
• Effective estate management
• Move towards quality lifestyle for all

HONG KONG
• Strong public housing agency (HKHA)
• Public Rental Housing
• Assistance to low income groups
• Serviced land for private hsg
• Constant review of affordability & income based schemes
• Lock-in period & premium to housing authority for resale of subsidized flats

SEOUl
• Korea National Housing Corporation (KNHC) & Korea Land Corporation (KLC)
• Housing price & size control – public & private
• Direct financial assistance & loans
• Public rental housing schemes
• Substandard housing renewal schemes thru private sector intervention (similar to SRA)
• Satellite towns

SAO PAULO
• The Municipal Secretariat for Housing (SEHAB)
• Legal neighborhood program – legalize & upgrade. Benefitted 45,000 families in 160 shanty towns.
• Tied in with Sao Paulo’s strategic Master Plan
• Tied in with Environmental Upgradation Programs
• Data Management system – HABISP
## Quality Living for All

### Benchmark Cities & Key Lessons

<table>
<thead>
<tr>
<th>City</th>
<th>Public-private housing ratio</th>
<th>Rental housing percentage in public housing</th>
<th>Per capita living space in sq.m</th>
<th>Key lessons for MMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singapore</td>
<td>82 : 18</td>
<td>3%</td>
<td>23 sq.m.</td>
<td>Township model, effective estate management</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>47 : 53</td>
<td>62%</td>
<td>12.84 sq.m.</td>
<td>Emphasis on public rental housing</td>
</tr>
<tr>
<td>Shanghai</td>
<td>38 : 62</td>
<td>18%</td>
<td>25 sq.m.</td>
<td>Demand &amp; supply side subsidies for affordable housing by private sector</td>
</tr>
<tr>
<td>Seoul</td>
<td>6 : 94</td>
<td>100%</td>
<td>20.1 sq.m.</td>
<td>Satellite townships</td>
</tr>
<tr>
<td>Sao Paulo</td>
<td>Informal settlements &amp; squatters</td>
<td></td>
<td></td>
<td>Tenure regularization, effective data management systems</td>
</tr>
<tr>
<td>Johannesburg</td>
<td>Informal settlements &amp; squatters</td>
<td></td>
<td></td>
<td>Community participation &amp; Role of NGOs</td>
</tr>
<tr>
<td>Mumbai</td>
<td>10 : 90</td>
<td><strong>Negligible</strong></td>
<td><strong>4-6 sq.m.</strong></td>
<td></td>
</tr>
</tbody>
</table>
## Housing Goals & Strategies

<table>
<thead>
<tr>
<th>ITEM</th>
<th>2010</th>
<th>2020</th>
<th>2032</th>
<th>2052</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PUBLIC: PRIVATE HOUSING RATIO</td>
<td>10 : 90</td>
<td>30 : 70</td>
<td>27 : 73</td>
</tr>
<tr>
<td>2</td>
<td>PUBLIC RENTAL HOUSING</td>
<td>Negligible</td>
<td>60% (of 30%)</td>
<td>61% (of 27%)</td>
</tr>
<tr>
<td>3</td>
<td>SLUM POPULATION IN %</td>
<td>45%</td>
<td>28%</td>
<td>12%</td>
</tr>
<tr>
<td>4</td>
<td>AVERAGE LIVING SPACE PER PERSON</td>
<td>4-6 sq.m</td>
<td>8-10 sq.m</td>
<td>10-15 sq.m</td>
</tr>
</tbody>
</table>

### Diagrams
- High-end waterfront housing at CBD
- City Fringe High Density Redevelopment
- Medium density Housing at Outlying area
- Rental housing
4 QUALITY LIVING FOR ALL

REDEVELOPMENT OF EXISTING CITY AREAS

- Continue Slum, Cessed bldg & MHADA redevpt, RAY & BSUP Schemes

- Enforcement against new slums. Complete & gazette slum inventory & develop comprehensive slum redevelopment strategy

- Propose new incentives catalyze & speed up redevelopment. Deadline for “free home” schemes. Proactive government involvement in cluster redevelopment schemes.

- New incentives around transit nodes for pvt sector led redevelopment (dedicated TDR)

- Special schemes to address sites not feasible for redevpt. (ex: CRZ)

- Develop Estate Management Model for redevelopment housing. Better design guidelines
4 QUALITY LIVING FOR ALL

NEW SUBURBAN AREAS

- Push development of industries & employment in suburban areas.
- Immediately plan & develop **4 MHADA Townships** (900 ha each) in suburban area. New town development schemes
- Tie in mega-city & special township schemes with CP & DPs (address employment, transport & affordability)
- Showcase affordable housing with good living environment (new gen. township)
- Develop Estate Management system for new townships
- Strategic land bank for future (esp Uran – Alibaug)
Rental Housing

- Continue rental housing scheme to achieve 1.5 million units by 2032 or 75,000 units per year.

- Propose incentives and deadlines to catalyze & speed up the process

- Tie in rental housing schemes around industrial estates as workers’ housing scheme

- Rental schemes in line with CP & DPs

- Progressive increase in per capita living space tied in with income profile changes

- Address quality of living & operation & maintenance issues
Organizing development into townships

- Setting a basic eco-cell, parcel size & configuration
- Setting the road hierarchy and road grid
- Setting the residential distribution & density
- Setting public facilities standard & distribution
- Setting a Transit Oriented Development TOD Model
4 QUALITY LIVING FOR ALL

Andheri Area Redevelopment
Andheri Redevelopment: The Premium Fringe Centre of Western Mumbai

Andheri Station Area Redevelopment

Metro Station Interchange Redevelopment

REGIONAL FRINGE CENTRE AT ANDHERI STATION

LIFESTYLE HUB AT D.N. NAGAR INTERCHANGE
Panvel Eco-City: "The First Model Eco-Township in MMR"
• Total trips 50 mn – 2032 & 60 mn – 2052
• High Public transport share (Rail + Bus + IPT + Walking) : 78%
• Max 1 hr travel time within MMR
• 1 major public transport node at every 500 mts (walkable)
• Total trips in future almost 2 times of the trip volume recorded in 2005. So, more comprehensive road & rail networks expected
5 SEAMLESS CONNECTIVITY

Achieving 78% Public Transport Modal Share by 2052

- High Speed Rail (+250 kmph) + Sea Link
- Suburban Rail
- Intracity light rail /BRTS / Buses
- Intermediate Public Transport
- Multi-modal integration
- Common Fare Card System

EXISTING RAIL NTWRK

CTS PROP. RAIL NTWRK

PROPOSED RAIL NETWORK2052

<table>
<thead>
<tr>
<th>Year</th>
<th>2010</th>
<th>2032</th>
<th>2052</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pop mn</td>
<td>25</td>
<td>36</td>
<td>44</td>
</tr>
<tr>
<td>Rail Length (route-km)</td>
<td>485</td>
<td>1,050</td>
<td>3,080</td>
</tr>
<tr>
<td>Rail (route km) /mn pop</td>
<td>20</td>
<td>30</td>
<td>70</td>
</tr>
</tbody>
</table>
Achieving 30 km Hwy/mil pop by 2052

<table>
<thead>
<tr>
<th>Year</th>
<th>EXISTING HIGHWAY NTWRK</th>
<th>CTS PROP. HIGHWAY NTWRK</th>
<th>PROPOSED HIGHWAY NEWORK 2052</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>25</td>
<td>36</td>
<td>44</td>
</tr>
<tr>
<td>2032</td>
<td>36</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td>2052</td>
<td>44</td>
<td>44</td>
<td>44</td>
</tr>
</tbody>
</table>

- **Pop mn**: 25, 36, 44
- **Expressway Length (km)**: 579, 980, 1,320
- **Expressway (km)/mn pop**: 23, 28, 30

**Seamless Connectivity**
5 SEAMLESS CONNECTIVITY

Managing traffic demand thru road pricing & parking policy

IMMEDIATE

• Study on parking policy & other policies to limit use of car
• Introduce parking charges in MMR
• Enforce parking policy in City Centres
• CBD road pricing
• Car Pooling & “Part-tine” Car Schemes

2020 - 2032

• Introduce car quota system
• Enforce no roadside parking policy for GMR & MMR
• Selective Road pricing at City Centers & Area Licensing Schemes

2032 - 2052

• Introduce total road pricing policy
SEAMLESS CONNECTIVITY

Major Aviation hub of India & South Asia

Major Gateway Sea Port of India

• International Airport within 20 mins of travel from CBD

IMMEDIATE

• Feasibility study on new port & airport at Rewas
• Introduce Ferry Services in & across Thane Creek.

2020-2032

• Development of Rewas Port
• Decommissioning of MPT
• Introduce cruise services in MPT

2032-2052

• Development of a 80 Million annual passenger Rewas Airport
• Redevelop Mumbai Port Trust as leisure harbour.
Water Supply & Demand

- Supply from rivers & lakes from around the Region
- Water scarcity in urban & rural areas around GM
- 40% unaccounted-for water losses
- Localized flooding during rains
- Water pricing policy not updated

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<thead>
<tr>
<th>SUPPLY</th>
<th>MLD</th>
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<tbody>
<tr>
<td>Existing</td>
<td>4,642</td>
</tr>
<tr>
<td>Planned</td>
<td></td>
</tr>
<tr>
<td>Damanganga Basin</td>
<td>5,110</td>
</tr>
<tr>
<td></td>
<td>(2,490 MLD)</td>
</tr>
<tr>
<td>Total</td>
<td>9,752</td>
</tr>
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<table>
<thead>
<tr>
<th>DEMAND</th>
<th>MLD</th>
<th>MLD</th>
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</thead>
<tbody>
<tr>
<td>Basic hygiene</td>
<td>13,140</td>
<td>13,140</td>
</tr>
<tr>
<td>Best-in-class</td>
<td>15,372</td>
<td>19,308</td>
</tr>
<tr>
<td>Reduction in Water Demand</td>
<td>2032</td>
<td>2052</td>
</tr>
<tr>
<td>---------------------------</td>
<td>--------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td><strong>Reduction in demand through water-saving device</strong></td>
<td><strong>1,537 MLD</strong> (10% of overall demand)</td>
<td><strong>2,317 MLD</strong> (12% of overall demand)</td>
</tr>
<tr>
<td><strong>Singapore:</strong> 18% water demand reduction through water-saving devices</td>
<td><strong>Tokyo:</strong> 20% water demand reduction through water-saving devices</td>
<td></td>
</tr>
<tr>
<td><strong>Reduction in demand through active leakage control &amp; metering in the supply system</strong></td>
<td><strong>1,537 MLD</strong> (10% of overall demand)</td>
<td><strong>1,931 MLD</strong> (10% of overall demand)</td>
</tr>
<tr>
<td><strong>Singapore:</strong> Less than 5% water loss through network leakages</td>
<td><strong>Tokyo:</strong> Less than 5% water loss through network leakages</td>
<td></td>
</tr>
<tr>
<td><strong>Seoul:</strong> 8.6% water loss through network leakages</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Water recycling for non-potable use &amp; Rainwater harvesting</strong></td>
<td><strong>2,284 MLD</strong> (35% of commercial demand)</td>
<td><strong>4,441 MLD</strong> (48% of commercial demand)</td>
</tr>
<tr>
<td><strong>Singapore:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• NEWater (30% of total water consumption)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Industrial Water (8% of total water consumption)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total reduction in demand</strong></td>
<td><strong>5,358 MLD</strong></td>
<td><strong>8,689 MLD</strong></td>
</tr>
<tr>
<td><strong>Additional Water Supply Required</strong></td>
<td><strong>262 MLD</strong> (2.7% of ext’g &amp; planned supply)</td>
<td><strong>867 MLD</strong> (6.2% of ext’g &amp; planned supply)</td>
</tr>
<tr>
<td><strong>NEED ALTERNATIVE SOURCES OF SUPPLY</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
INNOVATIONS IN WATER SUPPLY & STORM WATER MANAGEMENT

WATER SUPPLY & FLOOD CONTROL - Case Study - Marina Barrage
INNOVATIONS IN WATER SUPPLY & STORM WATER MANAGEMENT

FLOOD CONTROL - Case Study - London Thames Barrier
Water supply option -
Proposed Mahim barrage & Thane creek development

- Marina Barrage (130 MLD)
- Mahim barrage (100 MLD)
- 5,000 Ha (610 MLD)
SEMAKAU LANDFILL,
SINGAPORE

- Commenced operations in April 1999
- Capacity: 63 million m³
- Area: 350 Ha
- Non-incinerable waste (3% of total waste)
- Incinerator ash (reduced to 10% of original volume)
- 1,400 tons/day
- Expected to meet landfill needs beyond 2030
PROPOSED INTEGRATED WASTE MANAGEMENT ZONES - Case Study
### Integrated Waste Management

#### Sewage Treatment Capacity

<table>
<thead>
<tr>
<th></th>
<th>No of STPs</th>
<th>Capacity MLD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing</td>
<td>20</td>
<td>3007</td>
</tr>
<tr>
<td>Planned</td>
<td>1 new + 5 upgrade</td>
<td>428</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>21</strong></td>
<td><strong>3,435</strong></td>
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</table>

#### Demand

<table>
<thead>
<tr>
<th></th>
<th>MLD</th>
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<tbody>
<tr>
<td></td>
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</tr>
<tr>
<td>Basic hygiene</td>
<td>10,143</td>
</tr>
<tr>
<td>Best-in-class</td>
<td>12,512</td>
</tr>
<tr>
<td>Additional STP Capacity Required</td>
<td>9,077</td>
</tr>
<tr>
<td>Tertiary Treatment for Water Recycling (For non-potable use)</td>
<td>1,767 MLD</td>
</tr>
<tr>
<td>Total</td>
<td>16,026*</td>
</tr>
</tbody>
</table>

*Assuming life span of existing & planned STPs in over by 2032

<table>
<thead>
<tr>
<th></th>
<th>Capacity / day</th>
<th>Remaining Usable Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dumping Gr. capacity</td>
<td>9,550</td>
<td>(&gt; 20 yrs)</td>
</tr>
<tr>
<td>Planned</td>
<td>4,500</td>
<td>25 yrs</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>14,050</strong></td>
<td>-</td>
</tr>
</tbody>
</table>
A WELL-NURTURED ENVIRONMENT

ENVIRONMENT PERFORMANCE INDEX

<table>
<thead>
<tr>
<th>EPI 55-70</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Singapore</td>
<td></td>
</tr>
<tr>
<td>South Korea</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EPI 40-55</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td></td>
</tr>
<tr>
<td>India</td>
<td></td>
</tr>
<tr>
<td>MMR</td>
<td></td>
</tr>
</tbody>
</table>

MMR ENVIRONMENT

- Water
- Coastal
- Wetlands
- Air Quality
- Forest Biodiversity

NOW
Case Study 1-Singapore

Polluted Singapore River banks

The Singapore River today

Case Study 2-Shanghai

Algae bloom in Suzhou River

The new look of current Suzhou River

Case Study 3-Seoul

Smoggy Seoul before 2000

The greatly improved air quality in Seoul
### Development Strategies and Recommendations

**Coastal Environment**
- Restore degraded areas
- Protect against sea-level rise

**Wetland & Mangroves**
- Restore degraded areas
- Protect against sea-level rise
- Zero-net loss due to urban development

**Water Resources**
- Restore polluted areas
- Explore innovative ways to augment supply thru run-off

**Biodiversity**
- Restore degraded forest areas
- Maintain bio-diversity at post-restoration level

**Air Quality**
- Improved Pollution Standard Index
- Use of renewable & “green” energy
## AN EXTENSIVE GREEN NETWORK

<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Urban Recreational Spaces/Person</strong></td>
<td>1.77 sqm / person</td>
<td>1 sqm / person</td>
<td>4 sqm / person</td>
<td>6sqm / person (Target)</td>
<td>4 sqm / person</td>
</tr>
<tr>
<td><strong>Total Open Spaces/Person (Incl. Nature Reserve)</strong></td>
<td>16 sqm / person</td>
<td>~50 sqm / person</td>
<td>16sqm / person</td>
<td>18sqm / person (Mun.)</td>
<td>&gt;30 sqm / person</td>
</tr>
</tbody>
</table>

- Open up nature areas for non-intrusive recreational use
- Creation of hierarchy of accessible parks – local, city, regional
- Extensive Park Connector Network
- International Sports & Recreational Attractions
- Urban Greenery – wayside planting, skyrise greenery
- Centralized Park Development / Management Agency
AN EXTENSIVE GREEN NETWORK

- 1 local Park within 400 m walking radius
- 1 Regional Park within 10 km
- Extensive Regional Green Connector
AN EXTENSIVE GREEN NETWORK

- 1 Waterfront Park per City
- 1 Wetland / Mangrove Park per City

EXISTING COASTAL AREAS & WATER BODIES MAP

PROPOSED WATERFRONT RECREATION PLAN
AN EXTENSIVE GREEN NETWORK

MANGROVE / WETLAND PARKS

COASTAL PARKS
9 A “GLOCAL” CULTURAL CENTRE

- Tourism promotion
- Attractive, walkable streetscape
- Spaces for cultural expression
- Sense of belonging & social endearment
- Distinctive skyline & Great City Image
- Increased Real-estate value

- Comprehensive Urban Design Framework for 5 typical areas:
  - Heritage Precincts, Buildings & Landmarks
  - Global Business District
  - Major Urban Nodes, Fringe & City Centres
  - Special / Thematic Precincts with Cultural or Civic Significance
  - Urban Waterfronts

- Incorporation of Listed Heritage Assets & UD guidelines within the DC Regulations of CP, RP & DPs
CASE STUDIES

Developing a Waterfront CBD: CANARY WHARF, LONDON

Infill Development: CHINA SQUARE, SINGAPORE

Optimization of air space over constrained land: RIVE GAUCHE, PARIS

Reviving a River: CHEONGGYEcheon RESTORATION PROJECT, SEOUL
A “GLOCAL” CULTURAL CENTRE

ACCÉNuate the Tourism Gateway through a Heritage Spine

The Gateway Promenade
The Museum Square
Horniman Boulevard
The Bora Bazaar Link
A “GLOCAL” CULTURAL CENTRE

ACCENUATE THE TOURISM GATEWAY THROUGH A HERITAGE SPINE

- BOMBAY STOCK EXCHANGE
- FLORA FOUNTAIN
- HORNIMAN CIRCLE
- NAVAL DOCK
- GATEWAY PLAZA
- MUSEUM PLAZA
- RAISED PUBLIC PARK
  (With Multi-Level Parking and Shops Underneath)
A "GLOCAL" CULTURAL CENTRE

SELECTIVE IN-FILL REDEVELOPMENT

- Crawford Heritage Market & Cultural Centre
- (Conserved built-form and uses)
- Tree-lined boulevard
- Mixed-use inner-city living (SOHO towers)
- Urban set-back greenery
- Public transport priority
- Pedestrian-friendly amenities
- Attractive street furniture
- Crawford Square (landscaped public plaza)
- Outdoor shopping area
- Pedestrian-only zone

[Diagram of a culturally diverse and revitalized urban space with annotated features]
A “GLOCAL” CULTURAL CENTRE

NEW LANDMARKS & NEW DESTINATIONS - BKC Mithi River front
## DEVELOPMENT PHASING & PRIORITY

### MAKING IT HAPPEN

<table>
<thead>
<tr>
<th>Phasing</th>
<th>Focus</th>
<th>Key Strategies</th>
<th>Key Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short term</strong> (2020)</td>
<td>Meeting basic needs:</td>
<td>- Shift the focus to suburb</td>
<td>- Eco model townships in the suburb</td>
</tr>
<tr>
<td><strong>Consolidation Phase</strong></td>
<td>- Affordable Housing</td>
<td>- Consolidate the inner city</td>
<td>- Jobs for the suburb</td>
</tr>
<tr>
<td></td>
<td>- Employment</td>
<td>- Protect &amp; safeguard land &amp; resources.</td>
<td>- Slum redevelopment program</td>
</tr>
<tr>
<td></td>
<td>- Key Infrastructure</td>
<td>- Develop Strategic Plans</td>
<td>- Key infrastructure projects</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- River cleaning-up projects</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Basic park projects</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Strategic studies</td>
</tr>
<tr>
<td><strong>Medium term</strong> (2032)</td>
<td>Improving Quality of Life:</td>
<td>- Cleaning up</td>
<td>- Recreational and park projects</td>
</tr>
<tr>
<td><strong>Platforming Phase</strong></td>
<td>- Recreational</td>
<td>- Beautification</td>
<td>- Nature &amp; Reforestation projects</td>
</tr>
<tr>
<td></td>
<td>- Environment</td>
<td>- Improvement</td>
<td>- Sport Centres, hospitals</td>
</tr>
<tr>
<td></td>
<td>- Public Facilities</td>
<td>- Expansion</td>
<td>- Libraries, Universities</td>
</tr>
<tr>
<td></td>
<td>- Public transport</td>
<td></td>
<td>- Public transport projects</td>
</tr>
<tr>
<td><strong>Long Term</strong> (2052)</td>
<td>Towards Global City:</td>
<td>- World class infrastructure (high speed rail)</td>
<td>-Museums &amp; Heritage</td>
</tr>
<tr>
<td><strong>Launching Phase</strong></td>
<td>- World’s best</td>
<td>- Unique features</td>
<td>- New CBD,</td>
</tr>
<tr>
<td></td>
<td>- Art &amp; culture</td>
<td>- State of the art technology</td>
<td>- Expo Site &amp; Theme Park,</td>
</tr>
<tr>
<td></td>
<td>- MICE</td>
<td></td>
<td>- High speed rail project</td>
</tr>
<tr>
<td></td>
<td>- Tourism</td>
<td></td>
<td>- Quality housing projects</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- New Airport at Rewas</td>
</tr>
</tbody>
</table>
MAKING IT HAPPEN

- Restructured FSI Regime
- Dedicated TDR transfer areas & special FSI incentives / relaxations

**Strategic government land holding**
(inner city, city fringe & suburbs)

- Land for CBD & City / Fringe Centre Redevpt. / Devpt.
- Key parcels around transit & commercial nodes
- Key transport and infrastructure projects
- Future public housing
- Industries in suburban area
- Special urban projects such as future Rewas Airport
- Institutional & Recreational Uses
- Leveraging upon “soft areas” such as governmental lands

- Increased revenue through sale of government land

- Increasing government revenue streams through A robust system of “Development Charges”

<table>
<thead>
<tr>
<th>Area</th>
<th>Recommended FSI Provision in General</th>
</tr>
</thead>
</table>
| CBD  | Downtown CBD Area: 8 -15  
CBD redevelopment: 8-15  
Heritage areas retain current with Heritage TDR |
| Areas for higher FSI allocation in the Inner City | 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 | Transit Nodes in Fringe Areas: 4-6  
Residential Development in Fringe Areas: 1-3.5 |
| Areas for higher FSI allocation in the new Suburbs | Transit Nodes in Suburban Areas: 3-6  
Residential Development in Suburban Areas: 1-2.5  
Industrial: 1 |
## Making It Happen

### Periodic Review & Monitoring

<table>
<thead>
<tr>
<th>Planning Activity</th>
<th>Regional Concept Plan</th>
<th>Local Areas DP</th>
<th>Urban Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan Preparation (Review of previous plans)</td>
<td>10 yearly</td>
<td>5 yearly (within 2 years of approval of RP)</td>
<td>On need basis After approval of DP</td>
</tr>
<tr>
<td>Interim Review</td>
<td>5 yearly</td>
<td>On need basis</td>
<td>-</td>
</tr>
<tr>
<td>Urban Design Review</td>
<td>-</td>
<td>-</td>
<td>5 yearly</td>
</tr>
<tr>
<td>Responsible Agencies</td>
<td>By MMRDA</td>
<td>By ULBs / SPAs</td>
<td>By ULBs / SPAs</td>
</tr>
</tbody>
</table>

### Proposed Improvements to Development Control Parameters

- **Diversified Zoning Classification**

- **Amalgamation of Parcels** (minimum plot size requirement)

- **Specifying clear UD guidelines such as pedestrian linkages, arcade requirements, access etc. for UD Areas**

- **Preparation of UD plans as part of DP** (Also to be complied by developers)
INTEGRATED LAND USE MANAGEMENT

- Ensuring a single Base Plan
- Integrating cadastral information with the Base Plan
- Auto-updation process & maintaining currentness of Existing Land Use
Q & A

Thank You