

MITHI RIVER DEVELOPMENT PROJECT

Climate Change adaptation and future proofing Mumbai



30th May 2023, Mumbai



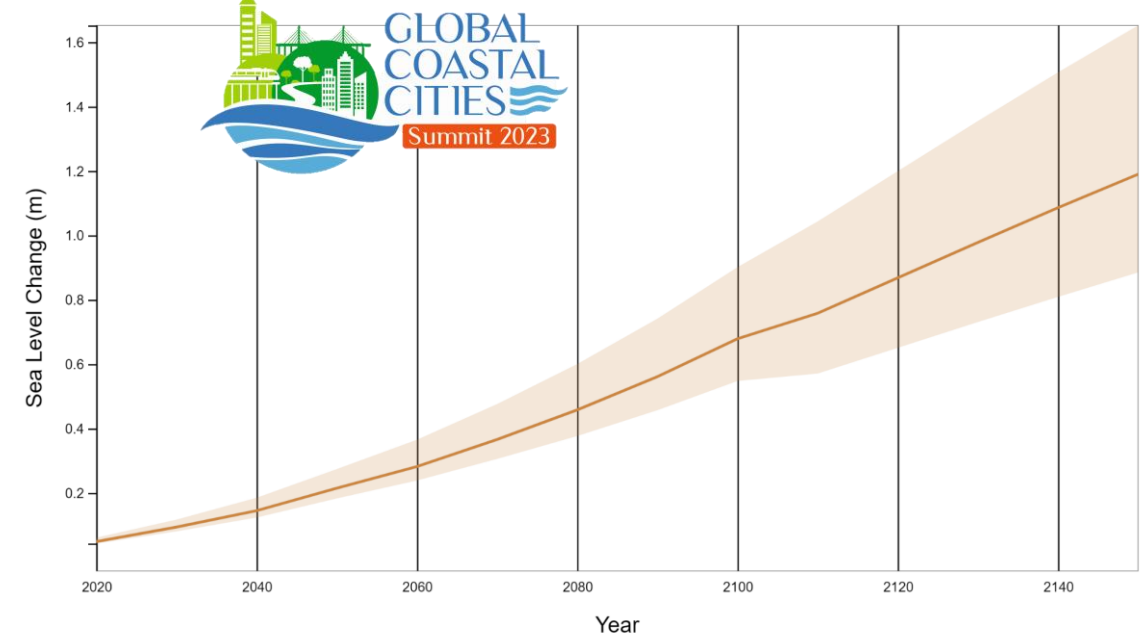
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Chief, Town & Country Planning Division, MMRDA
PD &MS,MRDPA

SUSTAINABLE DEVELOPMENT GOALS



Global Sea Level Rise Over Years



- 1901 - 2018, the average global sea level rise was 1-2mm per year
- 2018 onwards, the average global Sea level rise is 3.5-3.7 mm per year
- This is because of human caused Climate Change – constantly heating oceans because of GHG emissions



CLIMATE CHANGE: SEA LEVEL RISE



MUMBAI

MUMBAI METROPOLITAN REGION

INDIA

Mumbai: 250 km Coastline

MMR: 800 km Coastline

India: 7500 km Coastline

VULNERABILITY

Mumbai: 13 Million

MMR: 17 Million

India: 37 Million

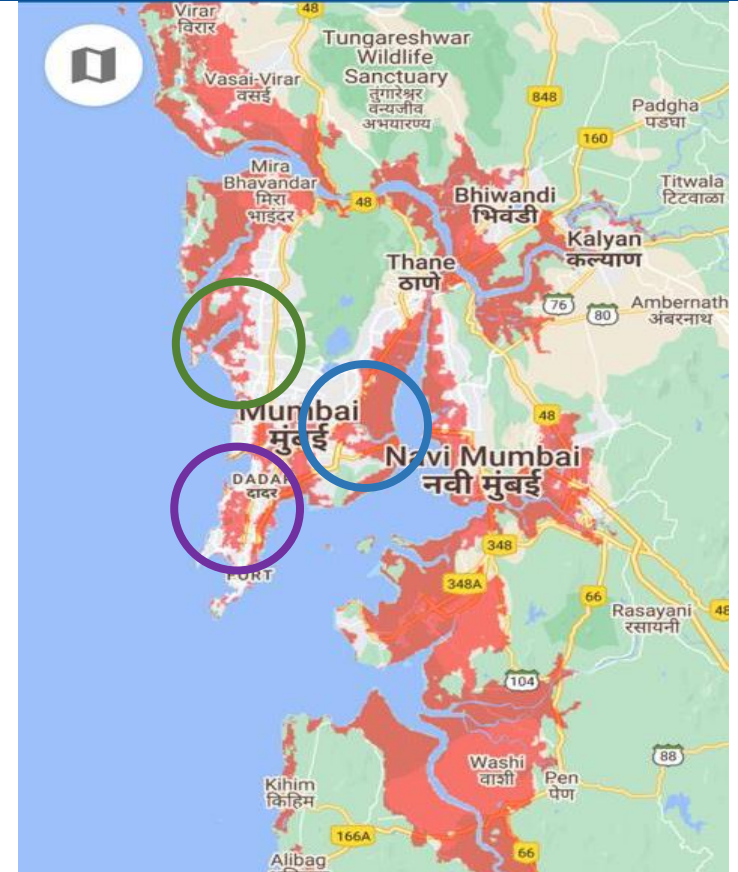
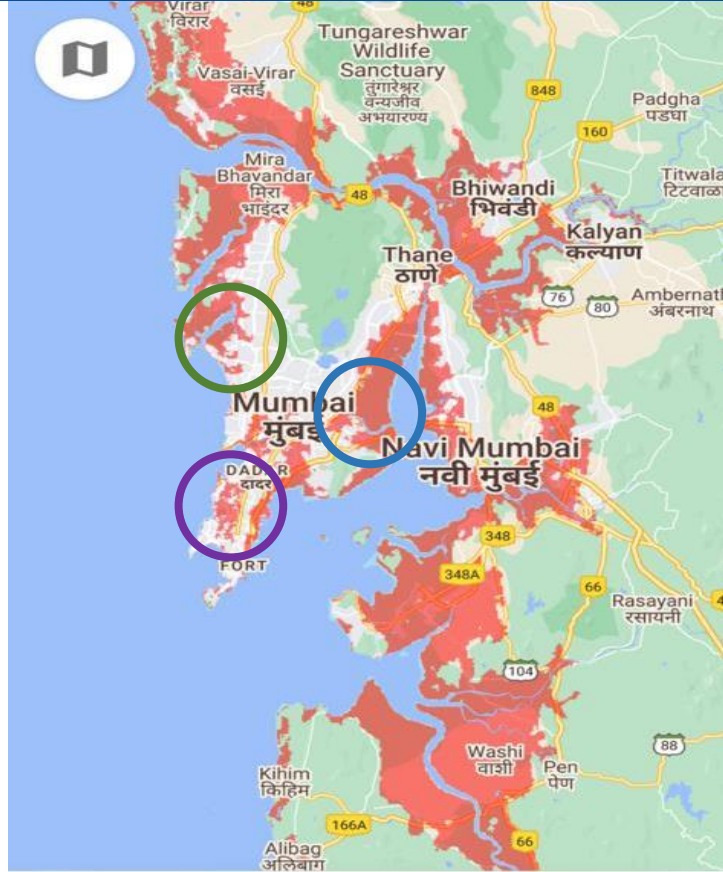
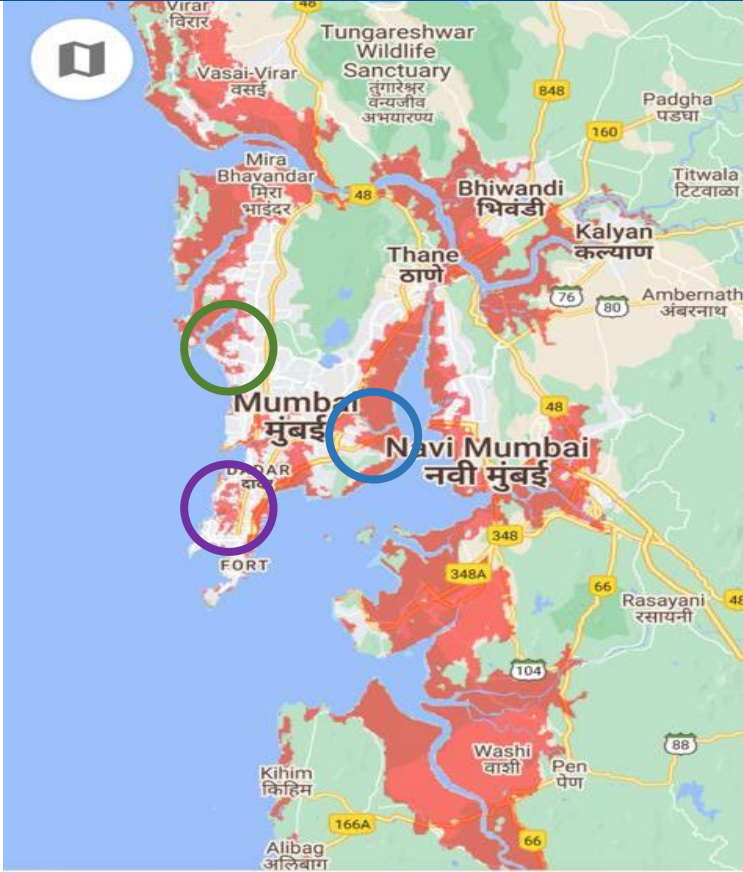
SEA LEVEL RISE – VULNERABILITY OF MUMBAI

■ Below Water Level

2030

2050

2080



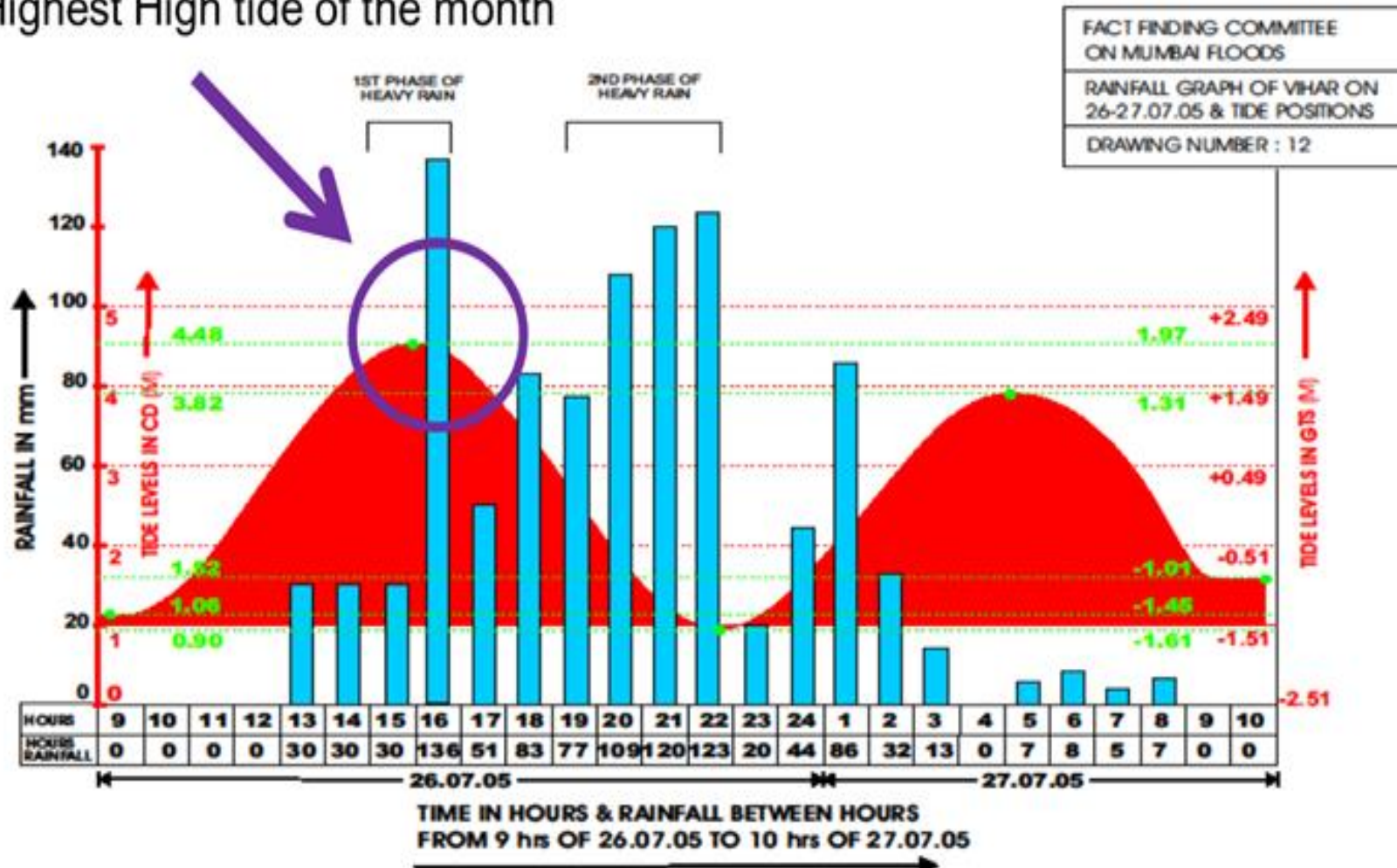
"The sea level damages in Mumbai alone by 2050 are pegged \$49-50 billion and could increase up to three-fold by 2070"

Regional Sea Level Rise and Tidal impact on Seal Level Rise: Scientific Analysis Awaited

26TH JULY 2005- EXTREME EVENT

High Tide (4.48m) + Unprecedented Rainfall (944 mm in 24 hour)

Highest High tide of the month



- Average Annual Rainfall in last 50 years is 2400mm
- 40% annual rain in just 24 Hours
- Density of Mumbai 28,000 people/ sq.km.
- Economic damage – Rs. 1000 Cr in 3 days
- About 900 deaths
- Airport non-operational
- Telecom, transports severely affected

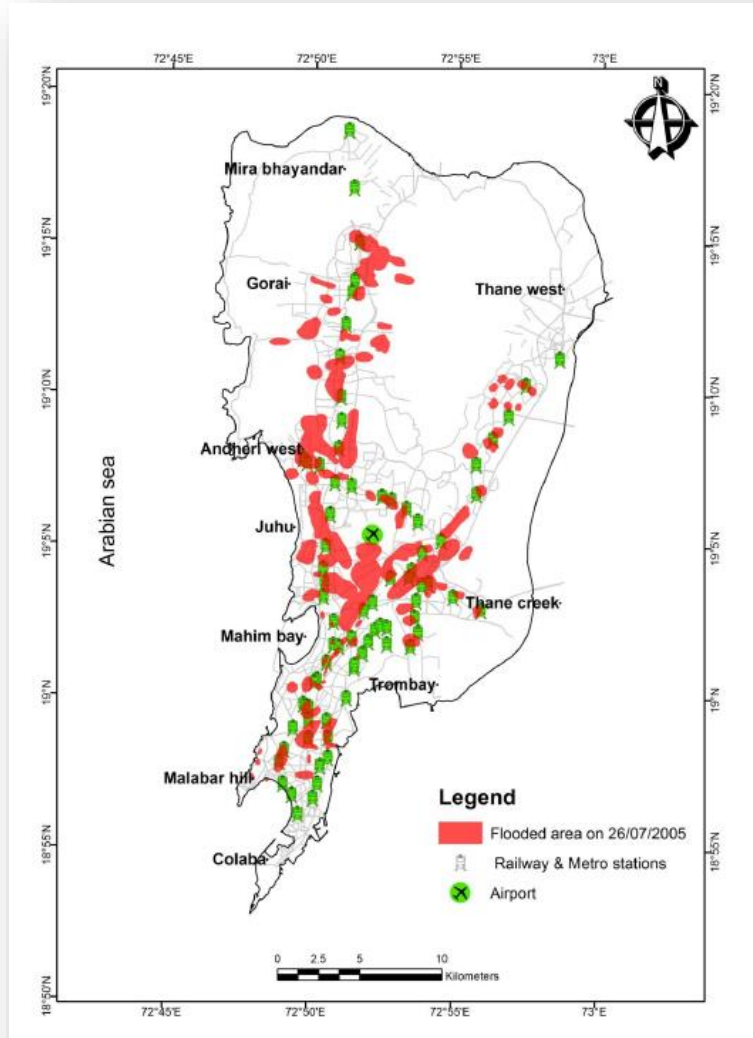


FLOODING

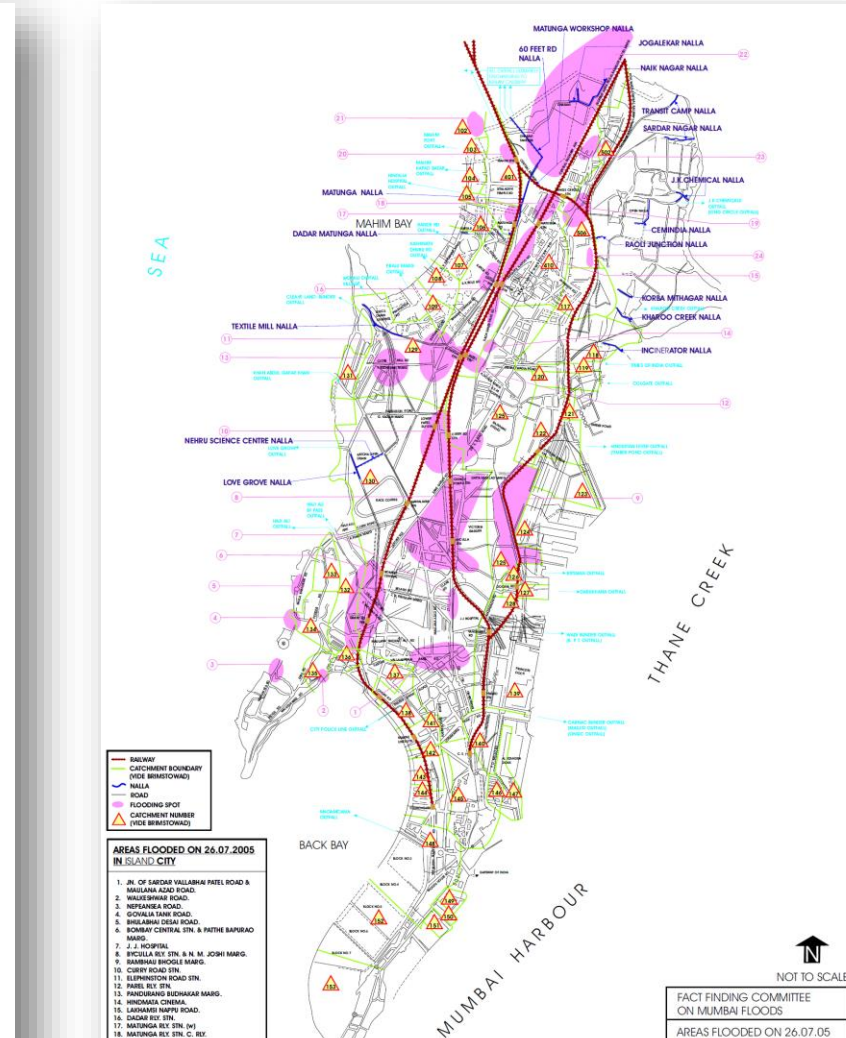
26th July 2005



MUMBAI FLOOD SPOTS – 26th July 2005

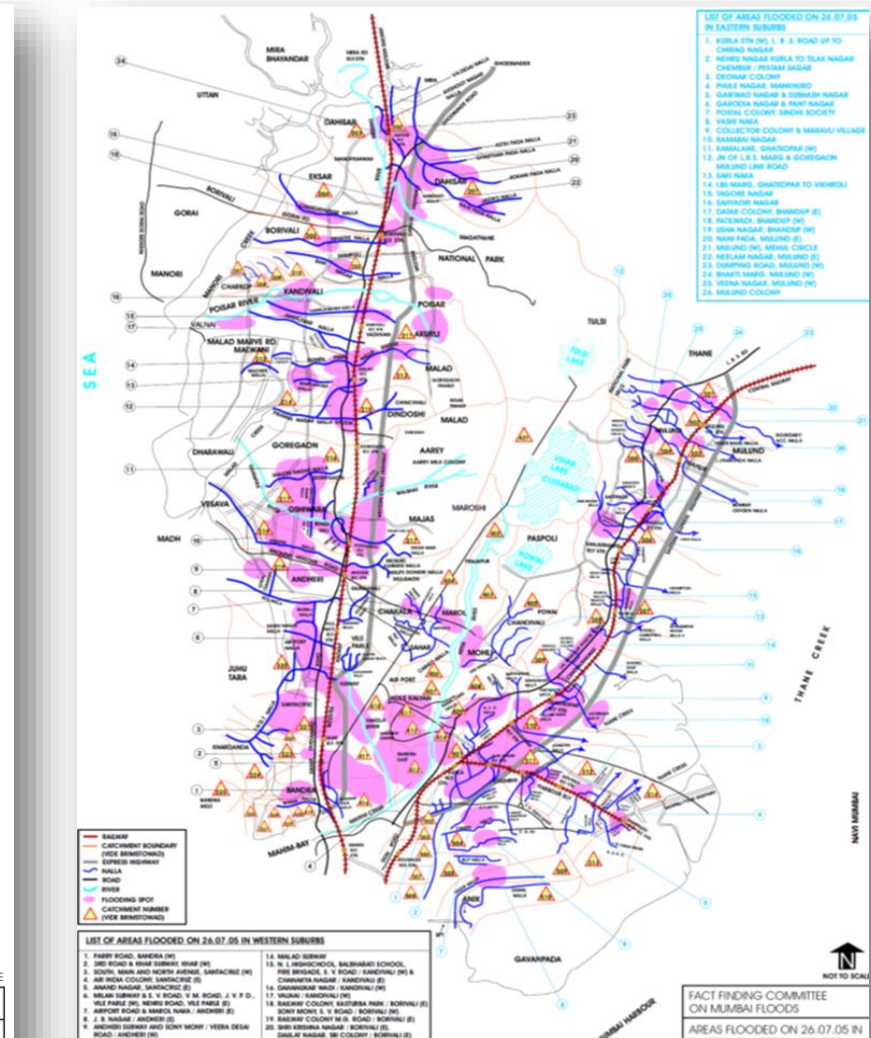


Mumbai



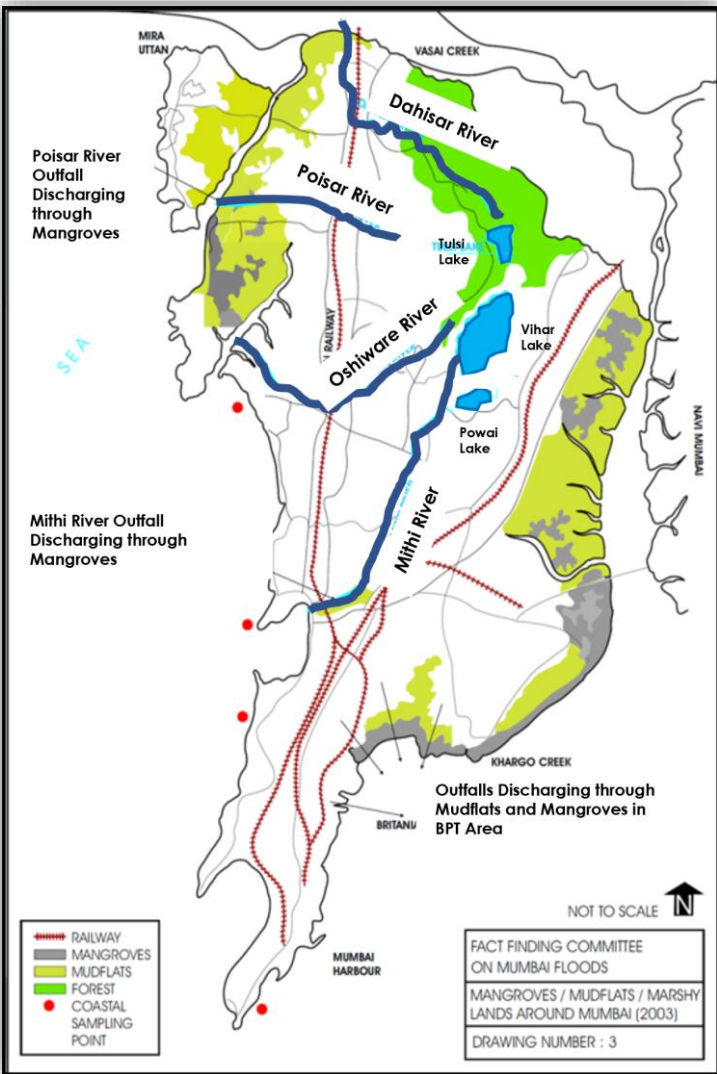
THE FLOOD SPOTS

Mumbai City



Mumbai Suburbs

CHARACTERISTICS OF FOUR RIVERS



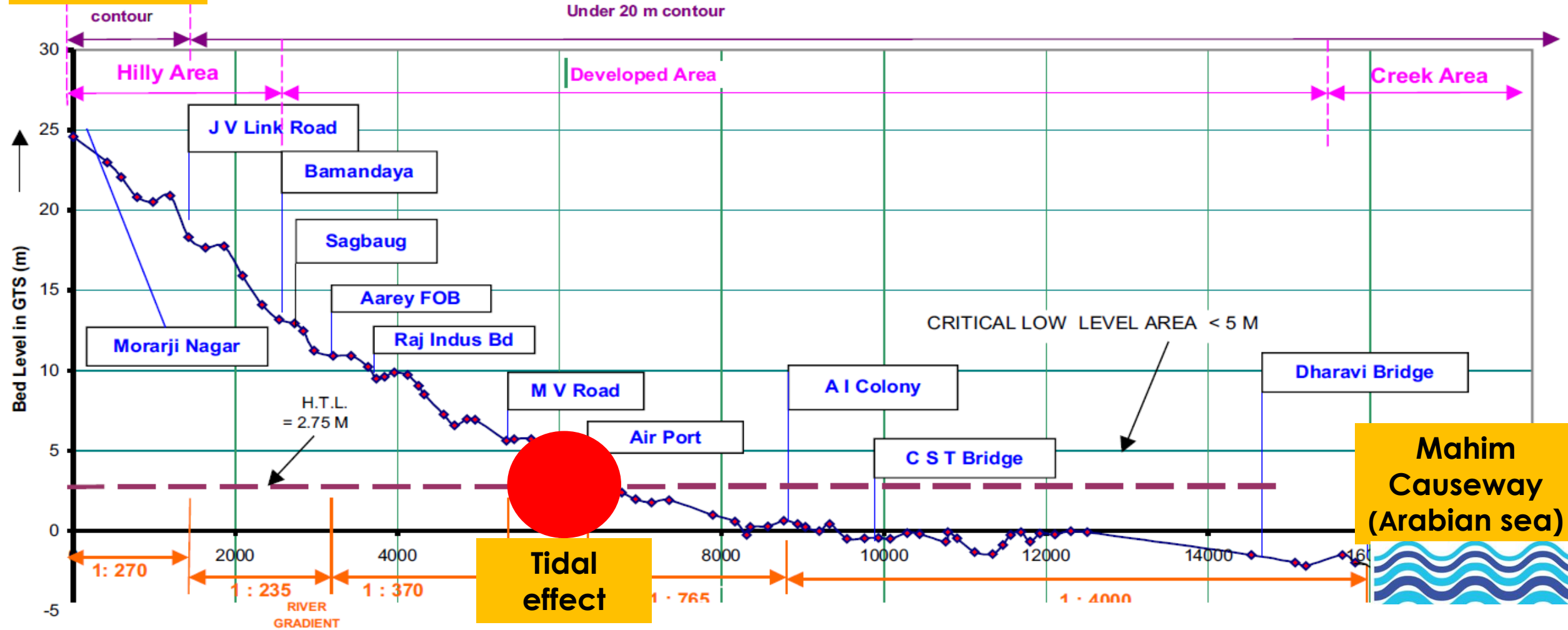
**River in Mumbai –
Mithi, Oshiwara, Poisar, Dhaisar**

Name of River	Origin	End	Alt. m	Length (km)	Avg. width in m	Catchment (Ha)
Mithi	Vihar Lake	Mahim Creek	246.5	17.84	15-25	7295
Oshiwara	Arrey Milk Colony	Goregaon Malad Creek		13	12-52	2940
Dahisar	Tulsi Lake	Bhyander Creek	112	25	15-85	3488
Poisar	Sanjay Gandhi National Park	Malad Creek		16	5-35	2095

Name of Lake	Area (Ha)	Full Supply Level in THD	Capacity in ML	Spillway overflow
Tulsi	135	139.17	8046	Vihar Lake
Vihar	726	80.12	27698	Mithi river
Powai	223	59.44	5455	Mithi river

CHARACTERISTICS – MITHI RIVER

Vihar Lake



Tidal reach :
7 km from Mahim Bay upto Airport

RIVERS AND NALLAS- CATCHMENT



Near Krantinagar Bridge



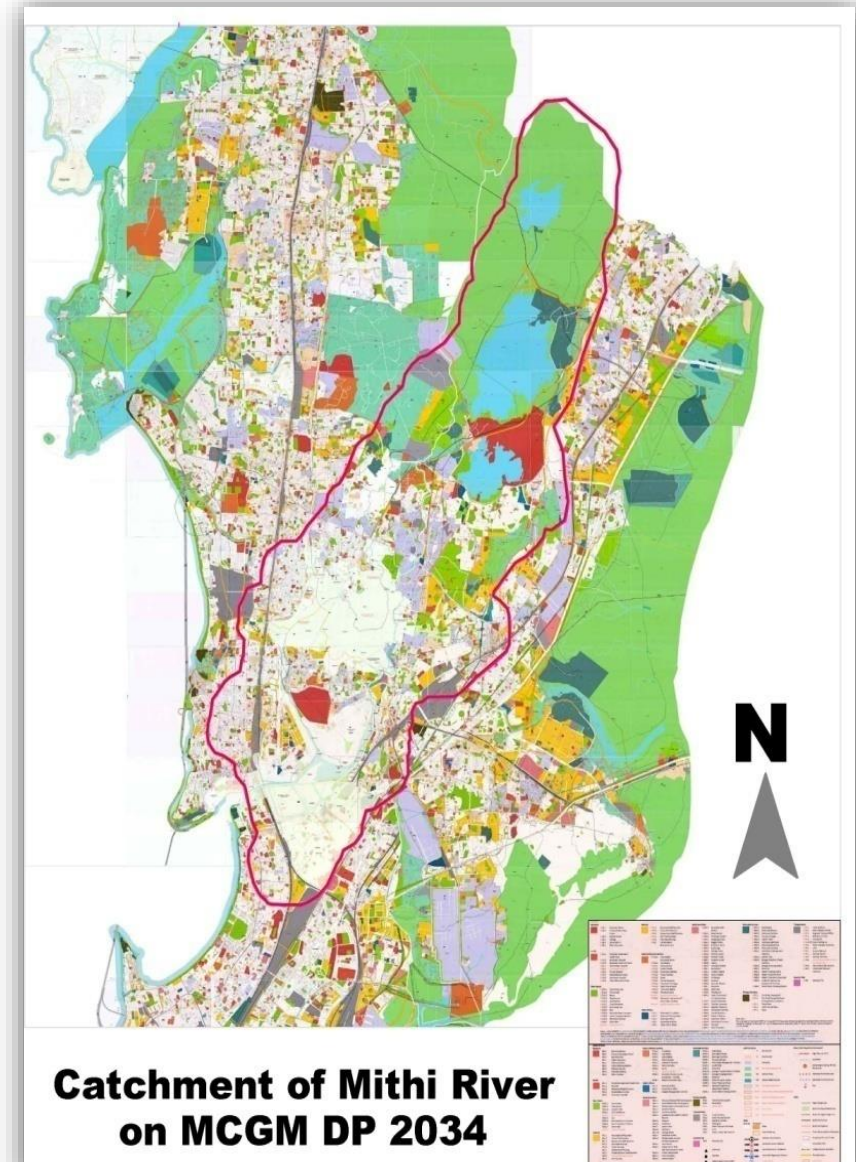
Near Downstream of JVLR



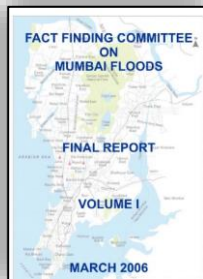
Near Dhobighat



Near Ambedkar Nagar



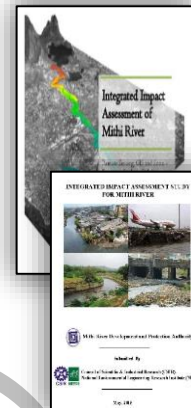
MITIGATION INTERVENTIONS



- FFC Appointed
- Recommending **mitigation measures** to overcome natural disasters



- IIT Bombay
- Preparing **Environmental Action Plan**



- **Integrated Impact Assessment Study** of Mithi River By IIT BOMBAY & NEERI-2013

- UDD, GoM GR: **MMRDA & MCGM** will respectively carry out **implementation** works in their **jurisdiction**

19th Aug 2005

19th Aug 2005

Aug 2005

Sep 2005

Mar 2006

2013

9th Apr 2014

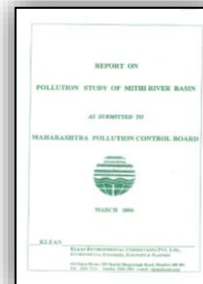
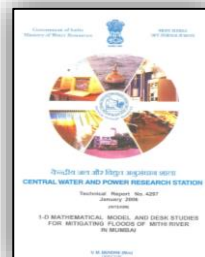
29th Jul 2015

- MRDPA Formed
- Resolving the **issues** related to **flooding of Mithi River**

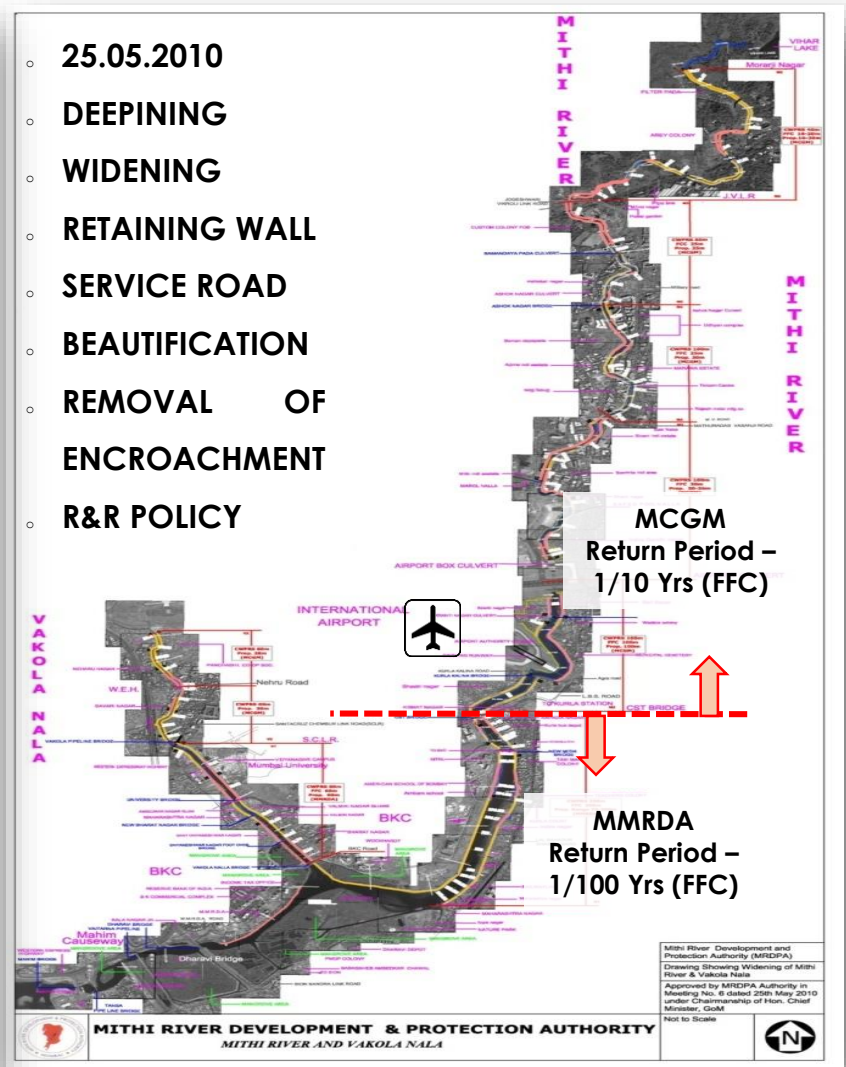
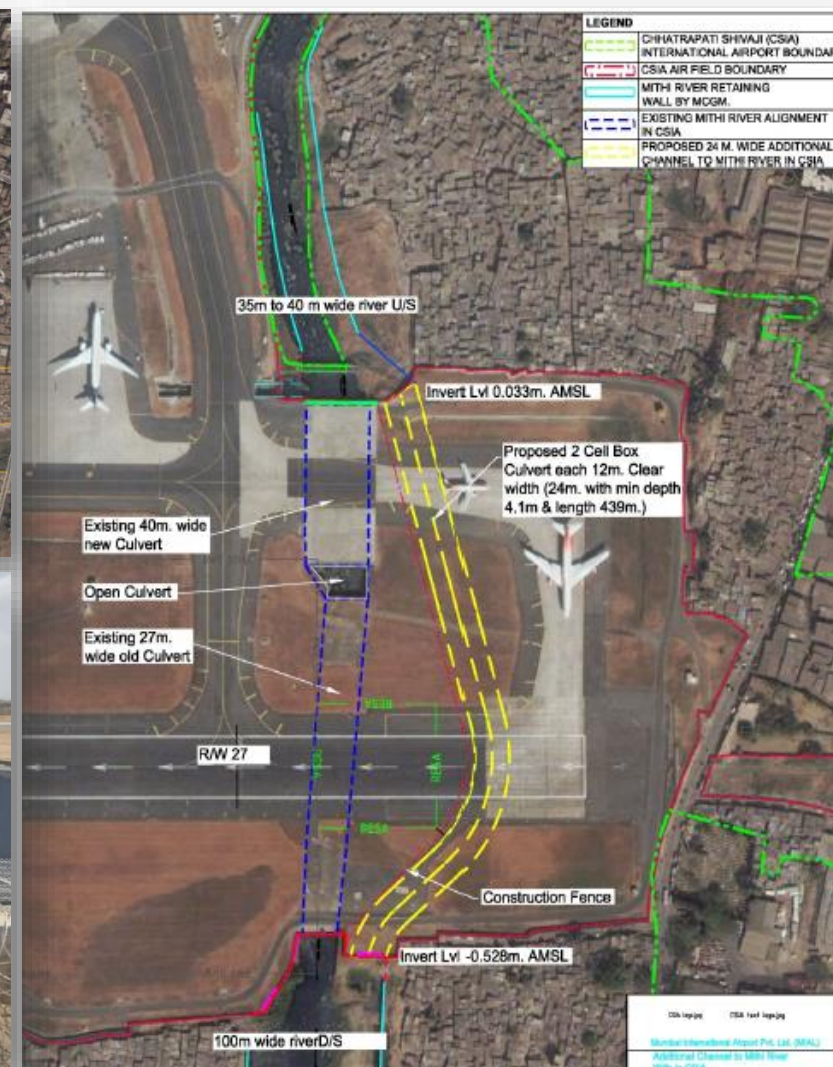
- CWPRS appointed
- Carrying out **Mathematical model study - Channelization of Mithi river**

- **Pollution Study** of Mithi river Basin by MPCB

- UDD, GoM letter: MRDPA primarily will act as **co-ordinating agency** between the Implementing Agencies (MMRDA & MCGM)



MRDPA MASTER PLAN

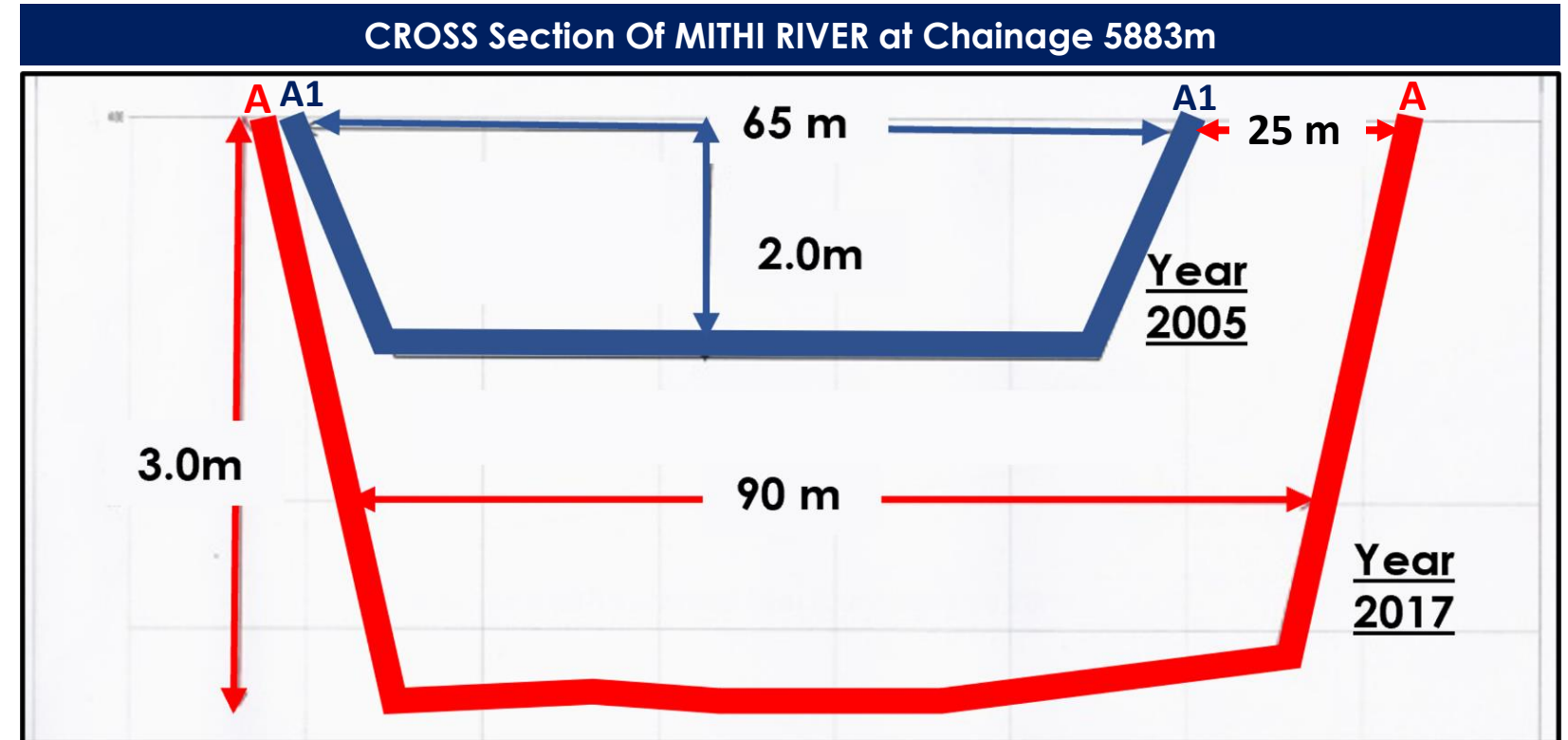


FUTURE PROOFING: RESILIENCE

- **Deepening, Widening, Rock excavation, Retaining Wall, Service Road and Beautification : 95% complete**
- **About Rs. 1,300 Cr expenditure**
- **About 10,000 Encroachments removed**
- **More than 5,000 PAPs rehabilitated**



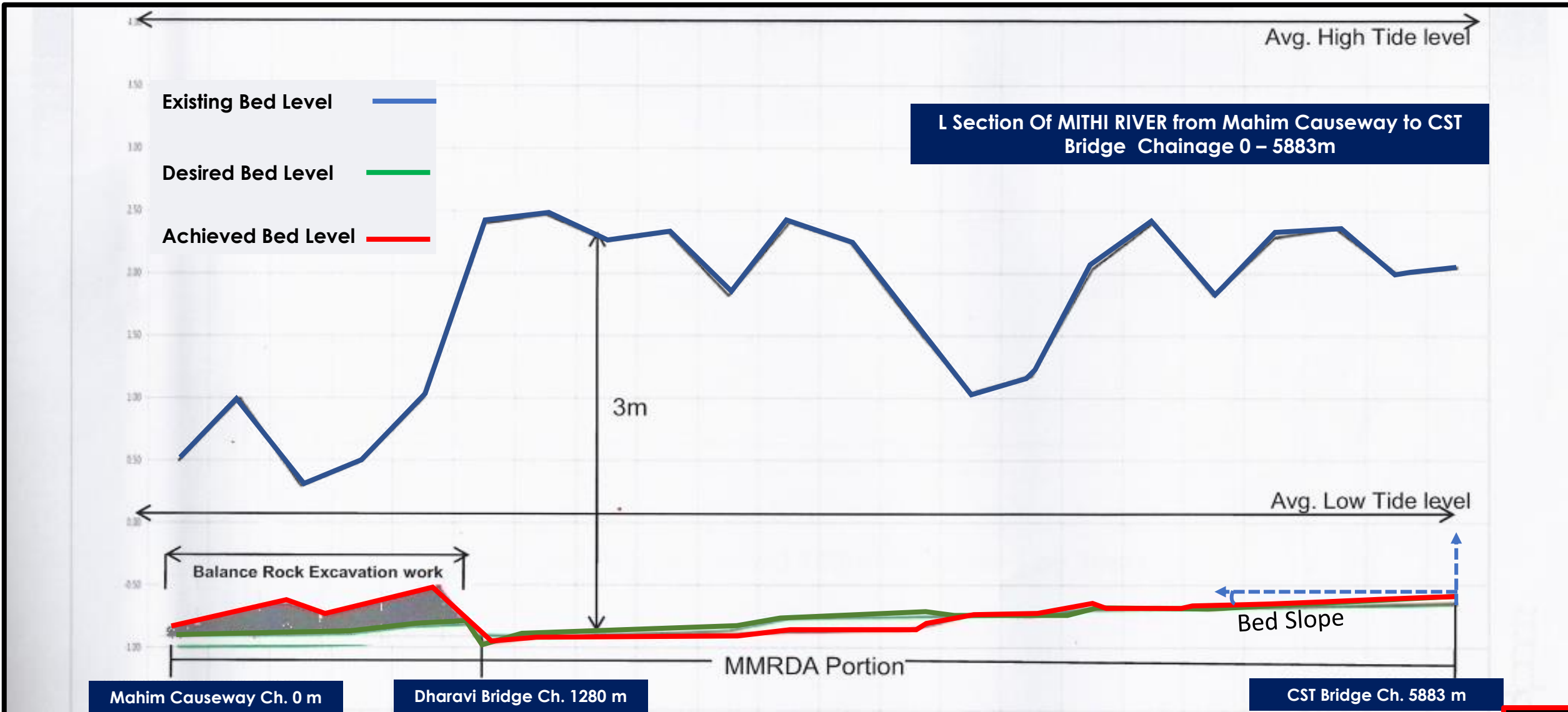
WIDENING



Average width increased- 25 m

Average depth increased - 2m

DEEPENING & BED SLOPE



CHALLENGES

- Topography
- High density around river
- Untreated discharge
- Solid waste disposal
- Encroachment: bank and beds of river



ACHIEVEMENTS

- Widened - 30m, Deepened - 2.0m
- Holding capacity up - 2.0 times
- Discharging capacity up - 3.0 times
- Flushing activity increased
- Pollution Decreased, DO ↑ BOD COD ↓
- Siltation Reduced
- Retaining walls protect embankment
- Enhanced Aesthetic view
- Marine Ecology Restored, Flora And Fauna, Aquatic Life enhanced
- Widening of 11 bridges completed.



TRANSFORMATION...ADAPTATION

2005

2023

Near Airport (Ch. 8700m)



TRANSFORMATION...ADAPTATION

2005

2023

CST Bridge (Ch. 5883m)



TRANSFORMATION...ADAPTATION

2005

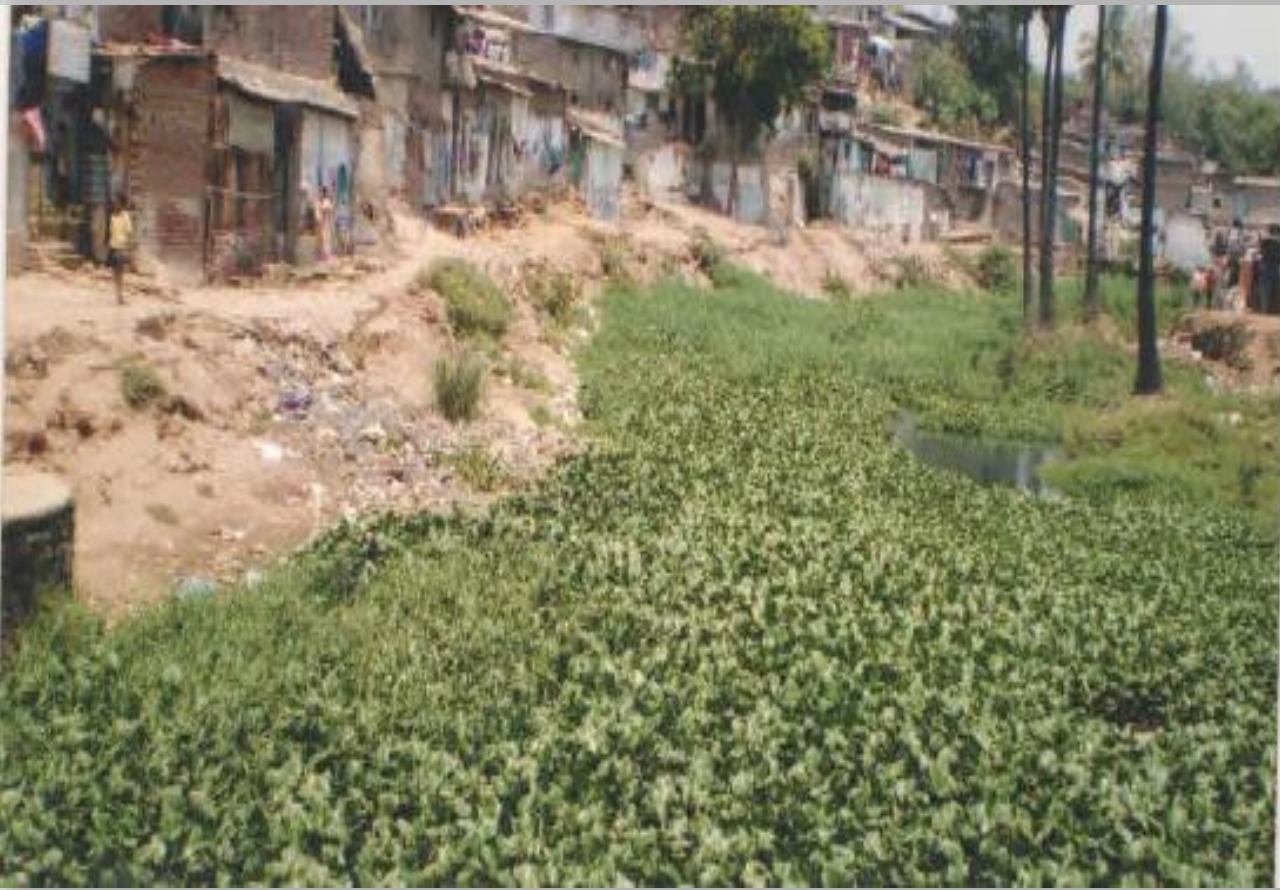
2023

Vakola Nalla (Ch. 705m)



TRANSFORMATION...ADAPTATION

Morraji Nagar



TRANSFORMATION...ADAPTATION



EOI - CLIMATE ACTION PLAN FOR MMR



Tender ID:
2022_MMRDA_854275_1

Expression of Interest Document

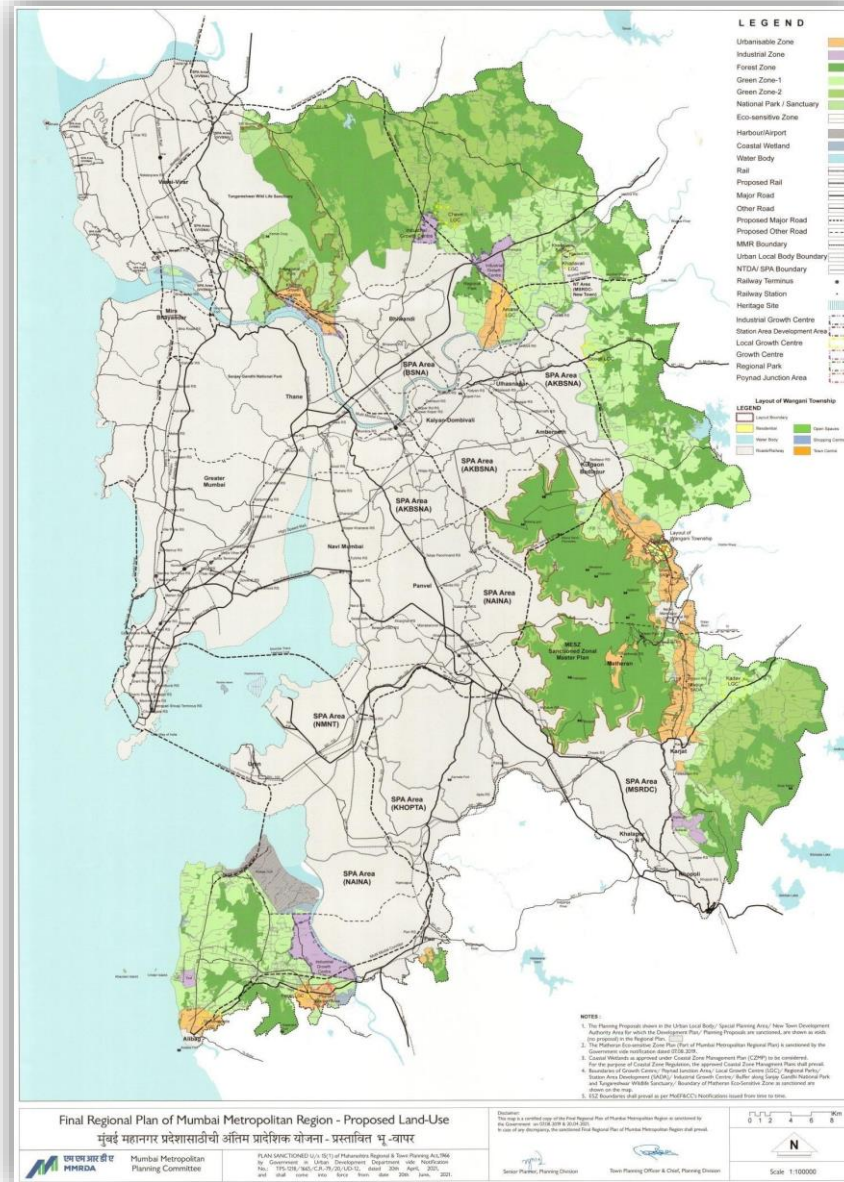
Tender Reference Number:
PD/Climate Change/EOI/298/2022

For

Preparation of Climate Action Plan for
Mumbai Metropolitan Region

- Study of:
 - Climate
 - Geography of the region
 - Macro and Micro-climatic factors
 - Eco-systems
 - Risks
- Mitigation and Adaptation Strategies
- Resource Mobilization
- Governance and Collaboration
- Use of Technology

MITIGATION MEASURES- DISASTER PREPAREDNESS OF URBAN LOCAL BODIES IN MMR



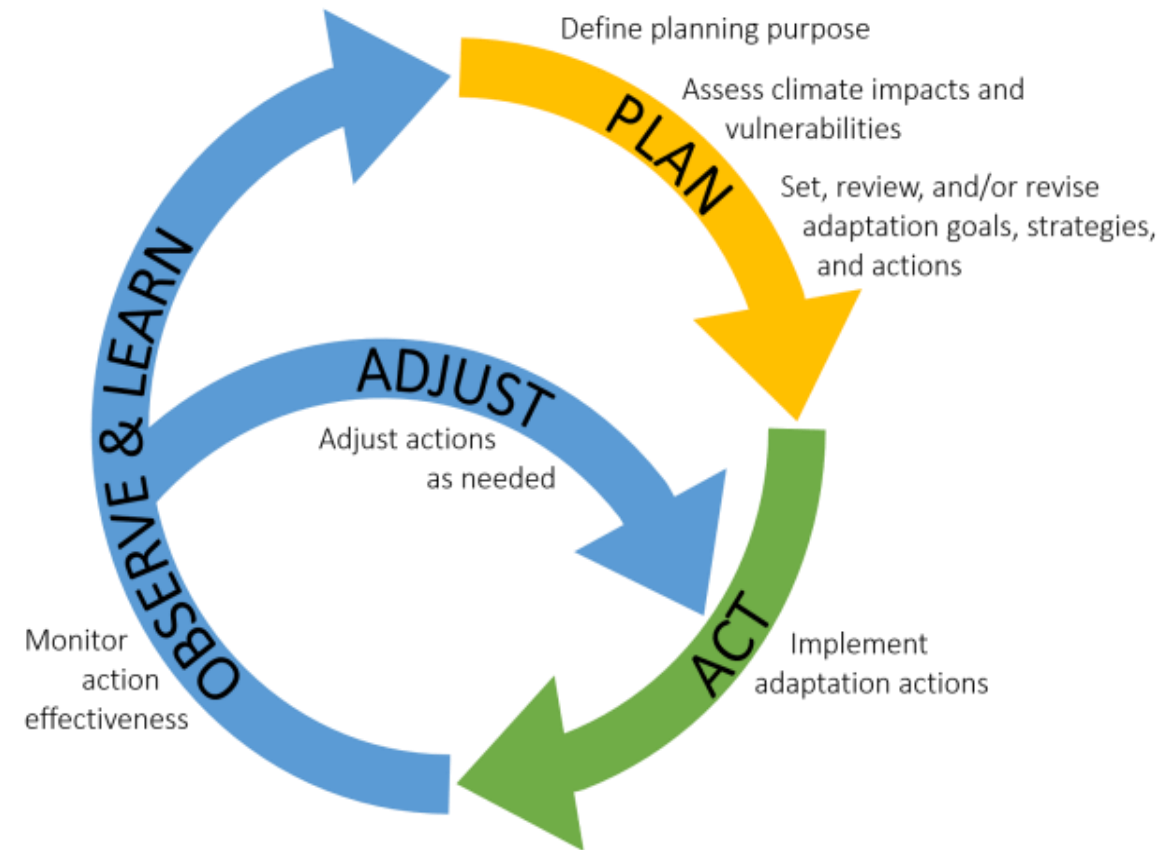
Urban Local bodies within MMR	Mitigation measures undertaken towards disaster preparedness
Municipal Corporation of Greater Mumbai (MCGM)	<ul style="list-style-type: none"> Mumbai climate Action plan IFLOWS - Integrated Flood Warning system
Navi Mumbai Municipal Corporation (NMMC)	<ul style="list-style-type: none"> Dedicated Disaster management cell Has initiated a Urban Climate Risk Management project in collaboration with UNDP-GEF
Kalyan Dombivli Municipal Corporation (KDMC)	<ul style="list-style-type: none"> Active Disaster management cell Early Warning system and dissemination of alerts system in place Detailed disaster management plan
Ulhasnagar Municipal Corporation (UMC)	<ul style="list-style-type: none"> Dissemination of alerts system in place Active Disaster management cell Detailed disaster management plan
Vasai Virar Municipal Corporation (VVMC)	<ul style="list-style-type: none"> Plastic ban Afforestation program Awareness raising about Reduce, Reuse and Recycle Disaster management cell
Mira Bhayander Municipal Corporation (MBMC)	Disaster management cell active during Monsoon
Bhiwandi Nizampur Municipal Corporation (BNMC)	Disaster management cell active during Monsoon
Uran Municipal Council	<ul style="list-style-type: none"> Plastic ban Afforestation program Emergency cell for disaster management

Source: Primary surveys and consultations by TERI

Adaptation- Adjustments in Ecological, Social, or Economic Systems

- Environmental Resources provide opportunity to help mitigate flooding risks and increase Region's Resilience
- Strategic Options
 - ❑ Identify important **river corridors and reserve land for green corridors**
 - ❑ **Green areas** like Sanjay Gandhi National Park, Karnala Wildlife Sanctuary identified to **connect plantation & afforestation** leading to **reduction in degradation of soil**, channelize the urbanisable areas and also serve as lungs to the developed areas
 - ❑ **Creating greenways** along roads connecting important recreational places & tourism development potential

Climate Change Adaptation Cycle

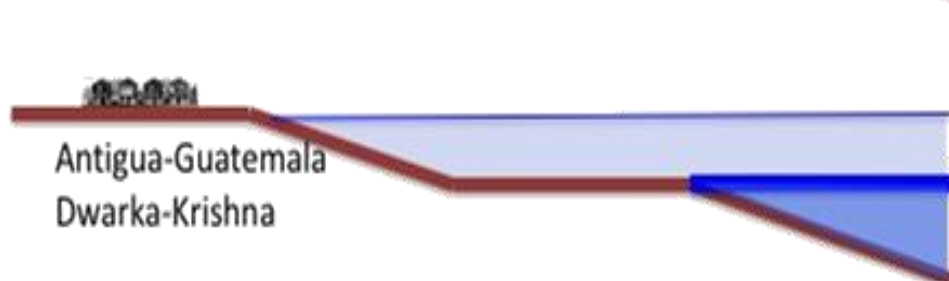
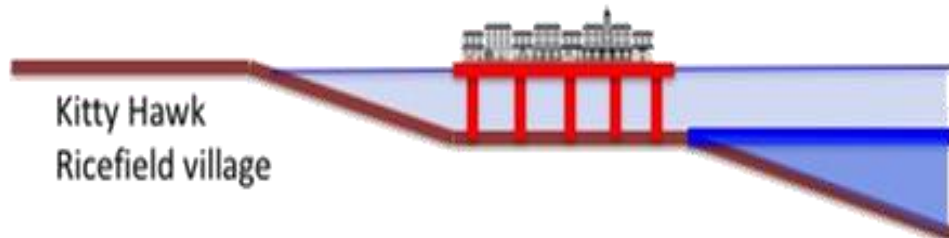
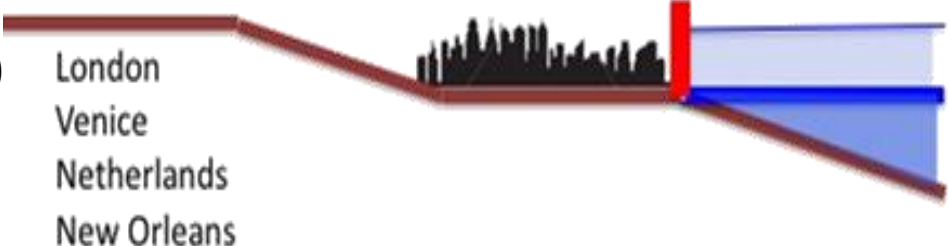
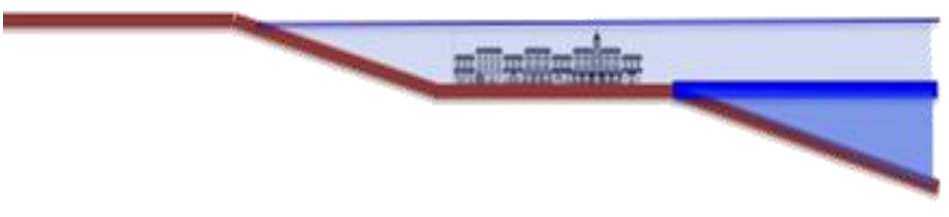


CLIMATE CHANGE: SEA LEVEL RISE, MITIGATION ADAPTATION RESILIENCE FUTURE PROOFING

Challenge - Risk

1) Confront

Protect \$\$\$ (values)



2) Adapt

\$\$

3) Run away

\$

London
Venice
Netherlands
New Orleans

Kitty Hawk
Ricefield village

Antigua-Guatemala
Dwarka-Krishna

Regulatory framework

- DCRs – height regulations, taller stilts, pervious materials for paving, reduced use of glass on facades
- Climate sensitive Platinum rated building
- Green Energy, reduce energy use

Governance Intervention

- Capacity building – efficiency
- Rethinking cities – flood management (Sponge Cities, restoration of coastal features)
- Adequate monitoring & evaluation of climate parameters

People Centric Cities

- Reduce Dependence on Vehicles
- Decentralized Jobs to reduce travel
- Increasing Green cover

Political Commitment

CLIMATE CHANGE



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THANK YOU