

# Delhi- Meerut Regional Rapid Transit System: Shaping the Semi High Speed Rail Development in Asia and Beyond



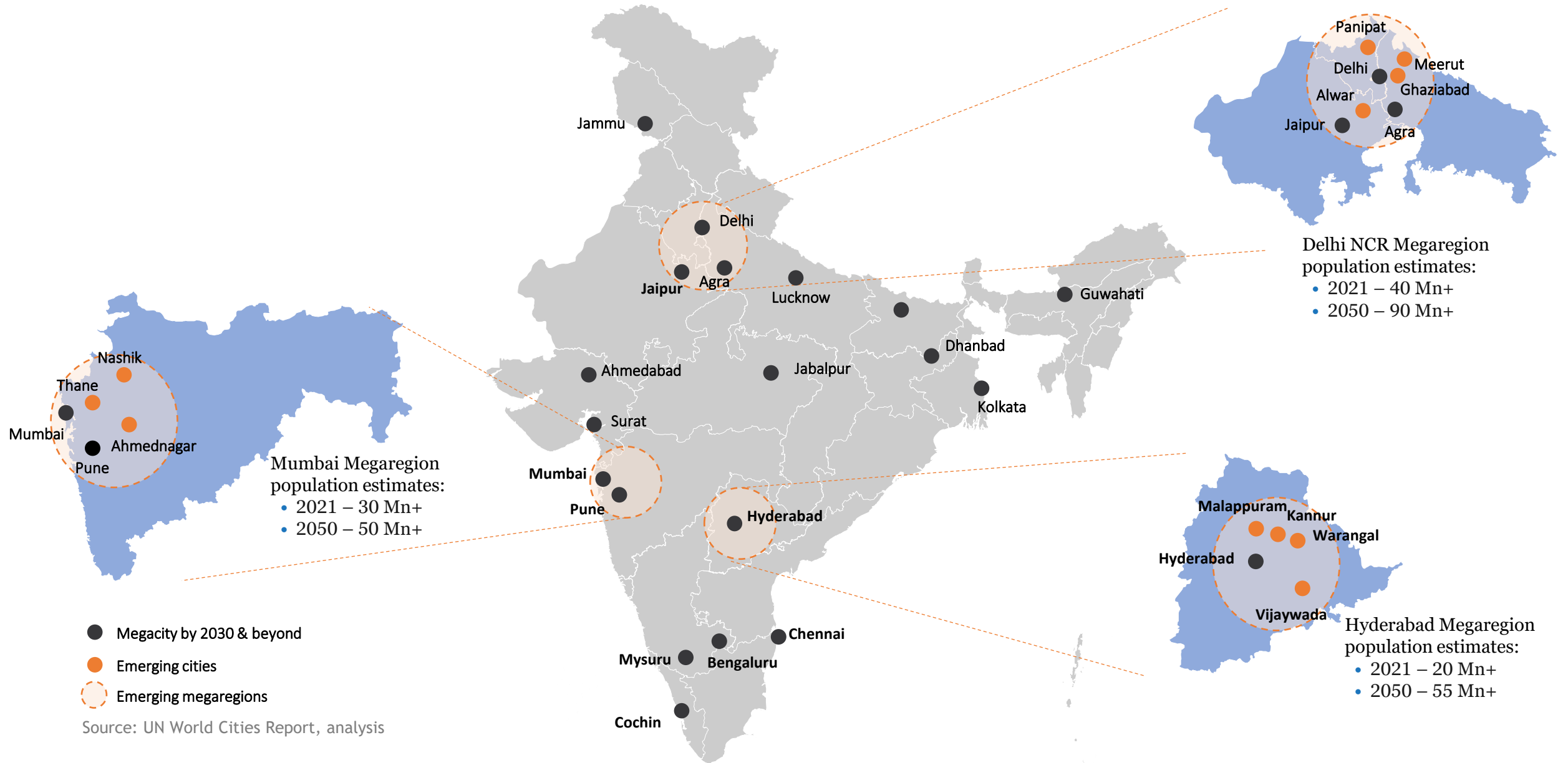
May 2024



# Agenda

1. Regional Rapid Transit System (RRTS) in India
2. Delhi-Meerut RRTS corridor
3. Multimodal Integration on Delhi-Meerut RRTS
4. Technology & Innovations
5. Non farebox revenues
6. RRTS Impact
7. NCRTC – capabilities and service offerings

# Multiple Mega Regions are emerging across India



# RRTS – filling the gap of India's Inter city (Region) commute



## National-level

(>150 km)

- ✓ National Railways
- ✓ National Airlines
- ✓ High Speed Rail



## Regional-level

(20-150 km)

- ✓ Passenger Trains
- ✓ Inter-state Buses
- ✓ RRTS (Semi-high-speed rail)



## City-level

(10-25 km)

- ✓ Metro Rail Transit
- ✓ Bus Rapid Transit
- ✓ City Buses



## Last Mile

(<10 km)

- ✓ Autos / Shared Autos
- ✓ E-Rickshaws
- ✓ Feeder Buses

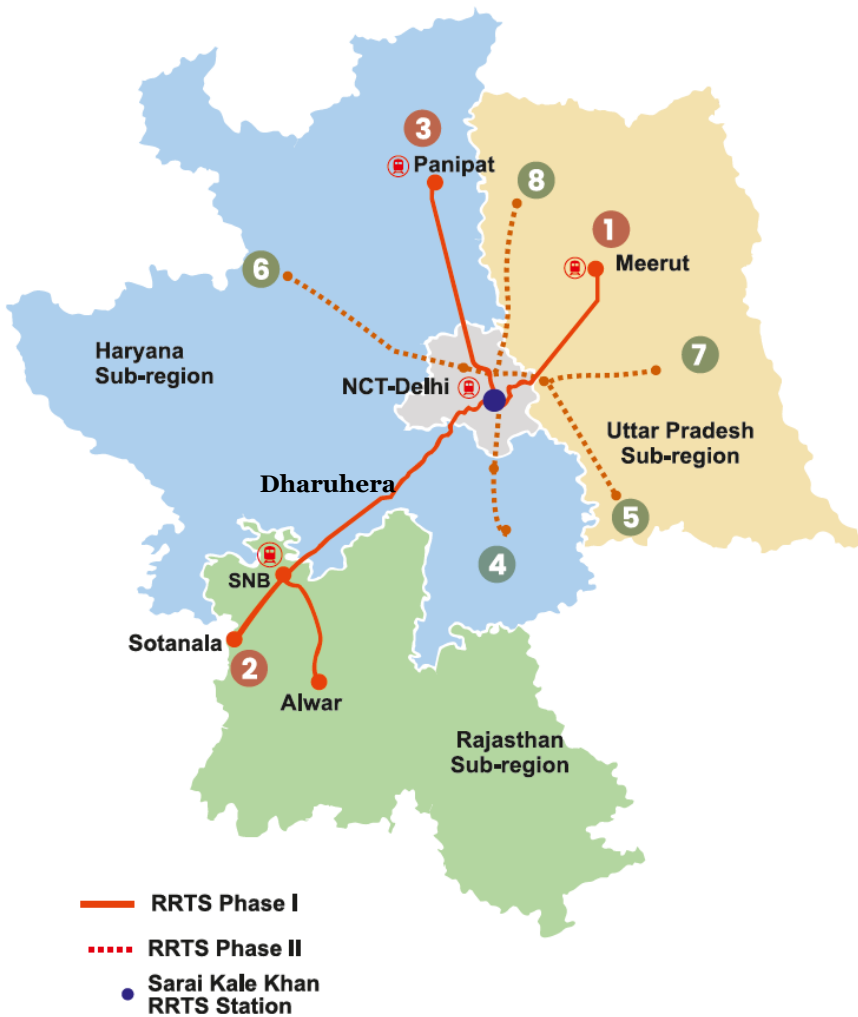
*High Speed Rail & Semi-High-Speed Rail are in advance stages of implementation*

✓ Implemented already

✓ Under implementation for first time

# Regional Rapid Transit System (RRTS) in National Capital Region

## National Capital Region (NCR)



Eight RRTS corridors identified in Functional Plan of Transport for NCR (2032) out of which three corridors prioritised in Phase-I

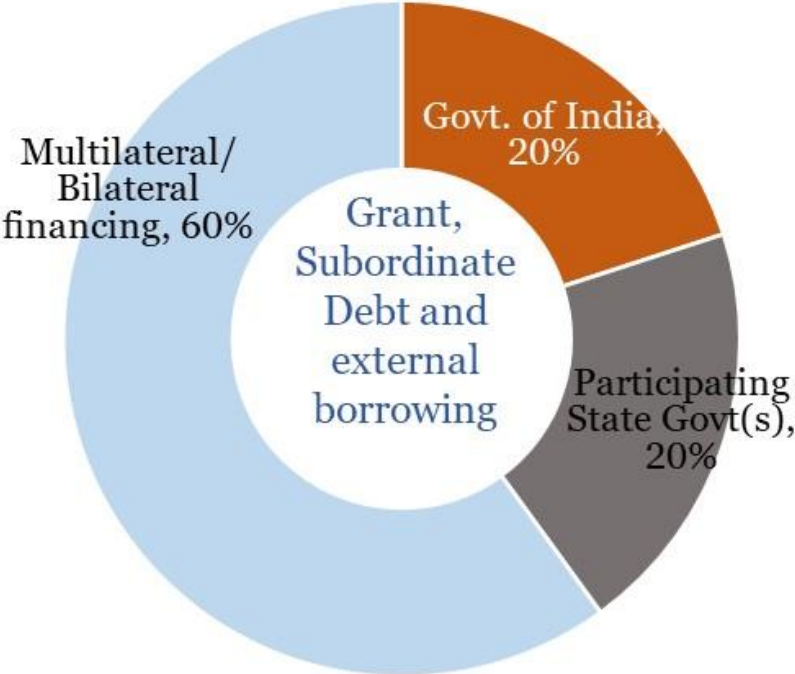
## Phase-I: 3 RRTS corridors

Parameters	Delhi (SKK) – Meerut	Delhi (SKK) – Panipat	Delhi (SKK) – Dharuhera
<b>Total Length (Km)</b>	82.15	103.02	71
<b>Estimated travel time (min)</b>	60	72	51
<b>No. of total stations</b>	25	17	13
<b>Total Completion Cost (~)</b>	\$ 4.3 Bn (2019)	\$ 4.1 Bn (Mar 2023)	\$ 4.5 Bn (Mar 2023)

The three RRTS corridors (Phase-I) are included in the National Infrastructure Pipeline (NIP)

# Delhi-Meerut RRTS Project Financing

## Delhi-Meerut RRTS Project Financing Structure



*Govt. Land – borne by respective state; Pvt. Land – part of project cost*

## Delhi-Meerut RRTS Project Cost Breakup

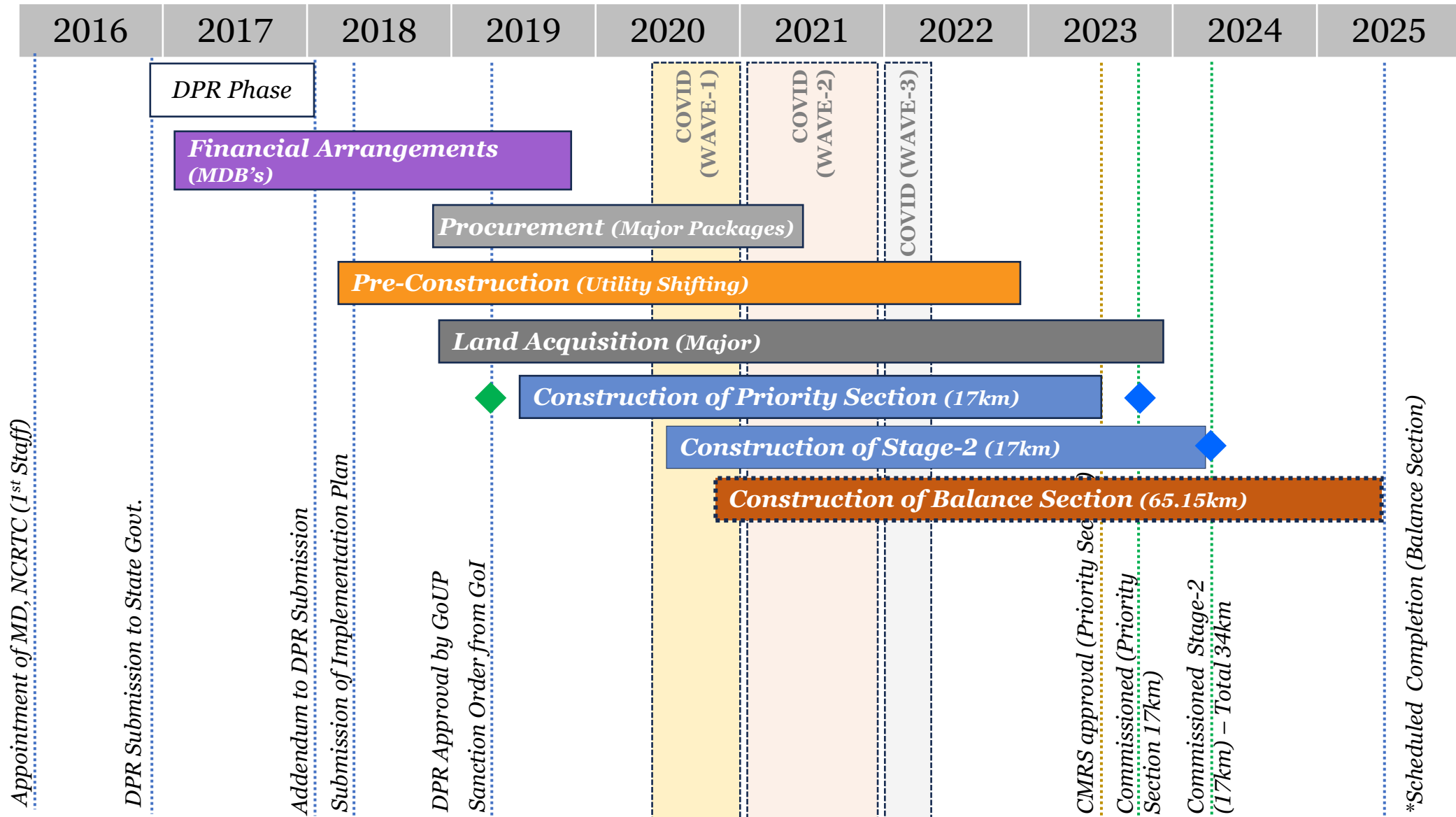
Contribution by	Amount (USD Mn)
Governments (in lieu of equity)	1,860
Debt	2,400
<b>Total Project Cost</b>	<b>4,260</b>

*Excludes private sector participation*

## Delhi-Meerut RRTS External Borrowings

International Banks	Loan Amount
Asian Development Bank	USD 1,049 Mn
Asian Infrastructure Investment Bank	USD 500 Mn
New Development Bank	USD 500 Mn

# Delhi-Meerut RRTS corridor – Implementation timeline



# Identification and Mitigation of Risks at Planning Stage

## Fundamental Parameters

- Pre-emptive design of SOD, DBR, etc. – approved by Railways – standard for future RRTSs/ other high speed rail systems

## Alignment design

- Review of alignment options to maximise catchment and from constructability point of view
- Govt. land vs private land

## Land Acquisition & Enabling Works

- Max. alignment on ROW of National Highway – Minimum land acquisition
- Pre-construction works-Utility shifting

## Planning schedules

- Extensive package-wise planning to ensure that float is kept at the end and earliest possible path schedule is followed

## Detailed Design

- Elevated viaduct & stations – separate design + BOQ tender – Make in India; nearly complete for priority section

## Tests/ Studies

- Noise & Vibration: CRRI – baseline survey – handling future litigations
- Pre-emptive Pile Load Tests – saving of more than 4 months

## Technical Advisory Group

- Eminent ex Railway experts, IIT professors, industry experts – overall technical guidance

## Other Tech. Support MOUs

Tapped globally best technical expertise - MoU with ADIF (Spain), and renowned domestic institutions (NIUA, IUT, RITES, DIMTS, GMDA).



# What Delhi-Meerut RRTS offers to its users?

RRTS – Rail based high speed, high capacity, comfortable and safe commuter service connecting regional nodes.  
It will help in **reducing Road Congestion, Energy Consumption and Pollution**



**Design speed of 180 kmph  
(Delhi to Meerut in less than an hour)**



**Train every ~5-10 min. & serving  
traffic nodes every 5-10 kms**



**Inter-operable Corridors &  
Multimodal Integration**



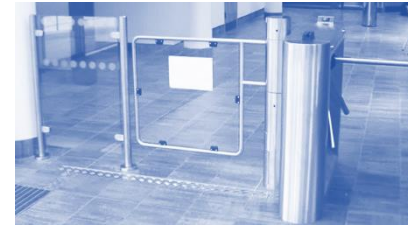
**Priority seating - women, disabled,  
elderly & children**



**High capacity, comfortable  
journey, airline seating**



**Wheelchair & stretcher lift  
space provision**



**Two level AFC for premium class**



**UPI enabled Ticket  
Vending Machine**

**RRTS trains will travel at 3 times the average speed of Metro**

# Delhi-Meerut RRTS corridor - milestones

Mar 2019 -  
Project  
approved

Jun 2019 –  
Construction  
started

Oct 2023 –  
17 Km  
Opened

Mar 2024 –  
34 Km  
Opened

May 2024 –  
1 Million  
Boardings  
(cumulative)



Flag-off of Namo Bharat train by Hon'ble  
Prime Minister in Oct 2023

नमो भारत ट्रेन



Operated by DB

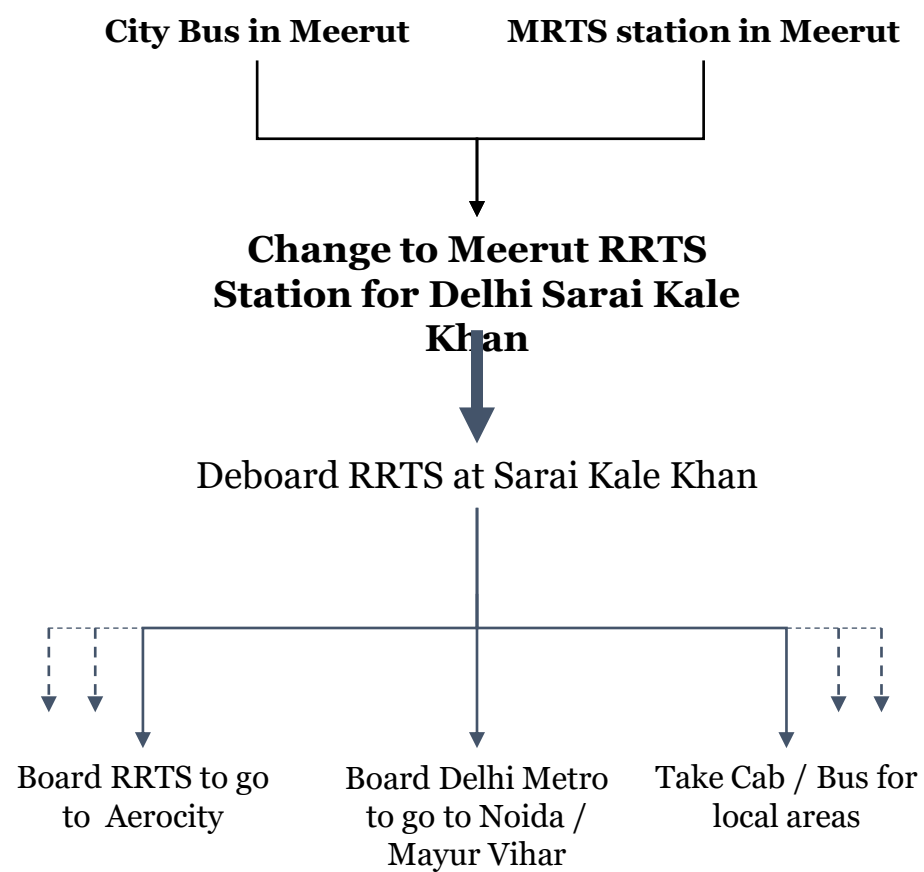
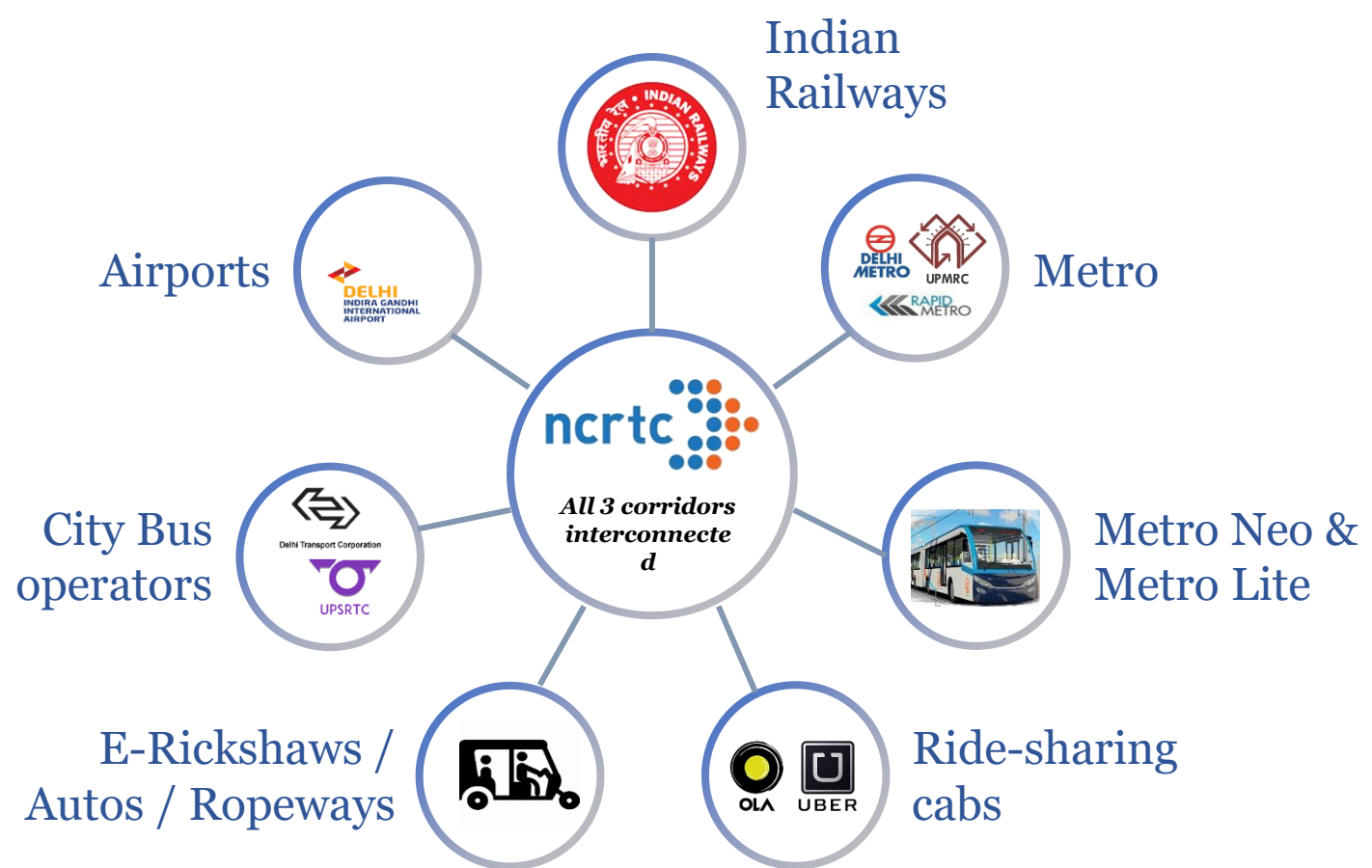
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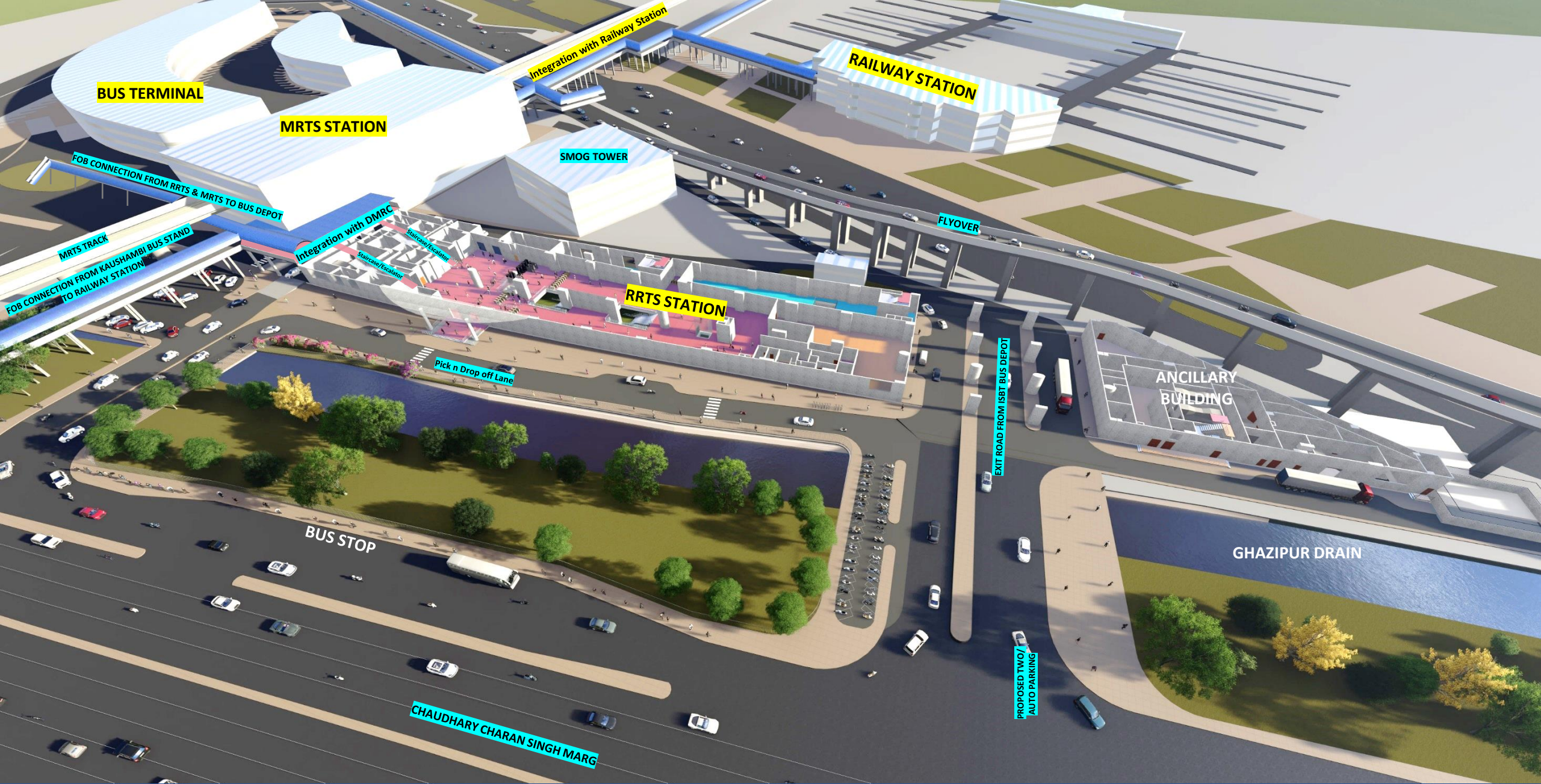
**Once fully commissioned, the 82 Km long Delhi-Meerut corridor  
expected to serve 8 million commuters daily**

# Integration of existing infra & other modes central to RRTS implementation

All 3 RRTS corridors interconnected & planned to be integrated with other transport modes...

...Allowing customers to travel seamlessly across the region

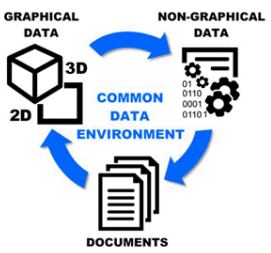




**Multi Modal Integration at Anand Vihar RRTS Station**

# Leveraging technology in project implementation

## Common Data Environment (CDE) *'single source of truth'*



## Building Information Modelling (BIM) *Collaborative design Synergies*



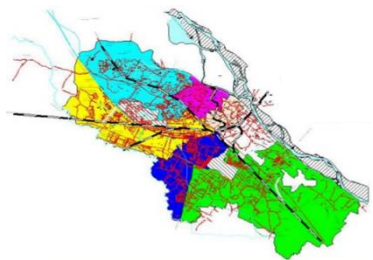
## UAV (Drone) Videography *Creation of baseline docs. Project monitoring*



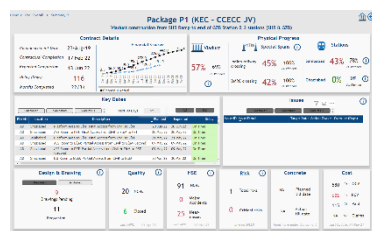
## Virtual Reality *3D visualisation*



## Geospatial Information System *Conducting LVC study Survey of land parcels*



## Project planning & management *Primavera P6 SPEED (In-house)*



## CCTV/ PTZ Cameras Time Lapsed Video *Project monitoring*



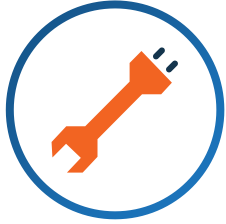
## Asset Management *Real-time Enterprise Asset Management System (iDREAMS) ERP + Maximo (IBM)*



Design process  
on BIM platform

C(-86)-11(23) : PLATFORM LEVEL (91)

# Enhancing private sector participation



1

## Operations & maintenance

- Comprehensive 12-year O&M contract awarded to Deutsch Bahn India
- First of its kind contract in the country – in line with Metro Rail Policy 2017
- Predictability of long-term costs, managerial efficiencies and entrepreneurial spirit
- Now being followed by peer organisations in the country



2

## Procurement and maintenance of Rolling stock

- Supply bundled with 15-year maintenance – awarded to Alstom India
- Optimised life cycle cost with efficient maintenance – predictability of long-term cost
- Leveraging OEM capability – learning best practices of maintenance
- Now being followed by peer organisations in the country



3

## Implementation of AFC system

- Open loop system - National Common Mobility Card (NCCM)
- Unbundled into two contracts - system integrator and financial institution
- PPP Hybrid Annuity Model adopted
- Two level AFC gates for enabling access to premium class coach

# Initiatives towards environmental sustainability

- Besides enabling a modal shift to public transport, NCRTC is committed to sourcing Green Energy to reduce Carbon footprint as a part of larger objective of India's **Commitment in COP 28**.
- NCRTC will require about **325 Million units** of electrical energy annually for its operation for Delhi-Meerut RRTS Corridor.
- To maximize share of Renewable Energy, following initiatives are being taken:
  - Harnessing **11 MWp** peak '**Rooftop Solar Projects**' over station sheds, Office, Depot, and Station buildings which will be adequate to meet the entire requirement of Lighting loads at the elevated stations. Out of this, 3 MW capacity already installed.
  - For **Traction and Auxiliary energy requirement** (110 MW), NCRTC will be utilising Renewable Energy through **blending of power** from solar plants. These interventions will be adequate to cover up about **60% electrical energy requirement**.

## Reduction in Carbon Footprint

These interventions of tapping Renewable energy will reduce CO<sub>2</sub> emission by about **185,000 tonnes** annually

Shift of commuters will also result into reduction in CO<sub>2</sub> emission by about 150,000 tonnes of annually which will progressively be increased to about **300,000 tonnes** annually after full scale operation





## **Initiative for Women Empowerment**

Hon'ble Prime Minister interacting with train operators onboard NamoBharat train

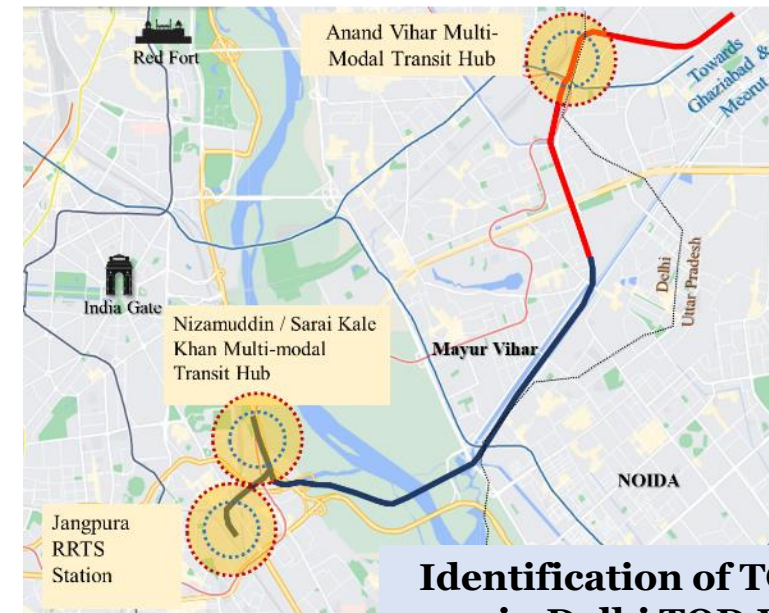
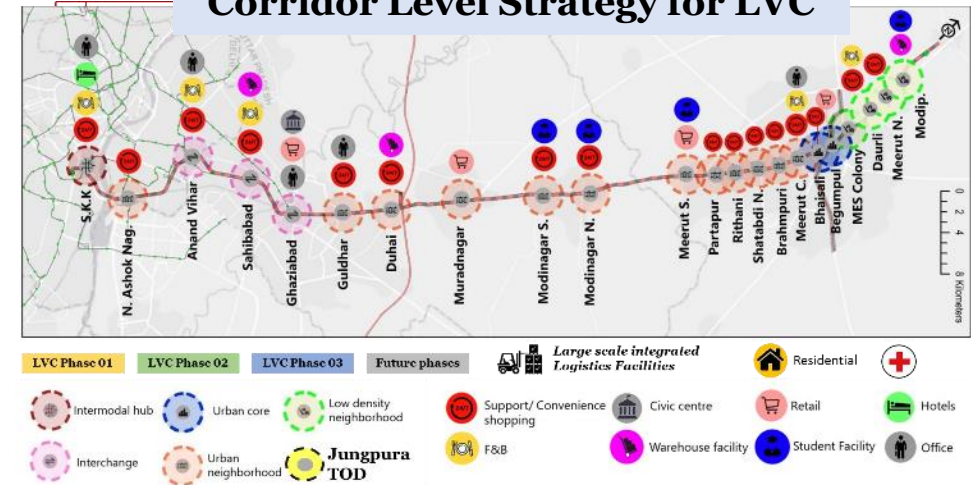
# Non-fare revenues: Initiatives for augmenting revenues

**Transit Oriented Development –**  
Jangpura, Sarai Kale Khan, Anand Vihar,  
Ghaziabad, Duhai Depot, Bhainsali

**Value Capture Finance**  
Instruments – Purchasable additional  
Floor Area Ratio, Special Amenity Fee

Working with UP and Delhi Governments  
for **regulatory enablement**

## Corridor Level Strategy for LVC

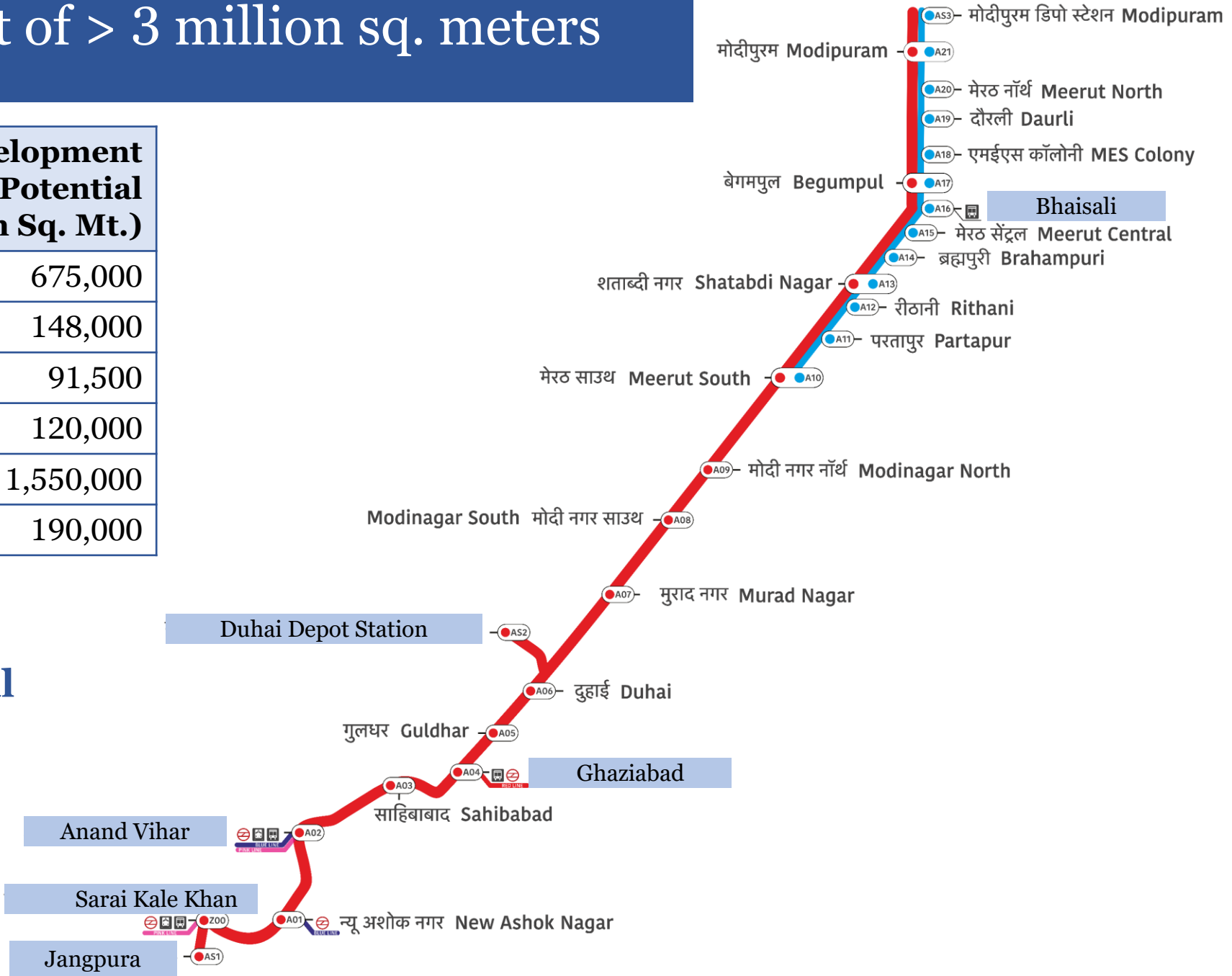


**Identification of TOD nodes in Delhi TOD Policy**

# Real estate development of > 3 million sq. meters

Site	Area (in Ha)	Development Potential (in Sq. Mt.)
Jangpura	17.20	675,000
Sarai Kale Khan	02.95	148,000
Anand Vihar	01.83	91,500
Ghaziabad	02.40	120,000
Duhai Depot	31.00	1,550,000
Bhaisali	03.80	190,000

**Non-fare revenue potential  
of USD 200+ million  
per annum**



## 1 Empowering masses through access: inclusive growth

### Healthcare



- *Better access to best of national hospitals (AIIMS)*
- *Reliable and comfortable transportation of patients*

### Education



- *Better access to education institutions*
- *Safe transit for students*
- *Fast transit from Delhi – better faculty*

### Employment



- *Better access to business centers of NCR*
- *Larger workforce availability for the employers*
- *Supporting women employment – safer transit*

### Leisure



- *Better access to best of entertainment hubs/ shopping malls*
- *Faster transit enables frequent leisure trips from sub-urban nodes*

# Socio-Economic Impact

1 Empowering masses through access: inclusive growth

## 2 Social and Environmental benefits

### Universal Access



- *Ensuring access to specially abled, old and children*
- *Dedicated coach for women*

### Reduced Pollution



- *Reduced vehicle operating costs – reduced fuel consumption – reduced carbon emission*

### Reduced congestion & higher safety



- *Reduced vehicles on road – reduced road congestion*
- *4 to 6 lane conversion of roads*
- *Safer rail based transit - reduced road accidents*

### Minimal Displacement



- *Minimal ground footprint – lesser land acquisition – minimal displacement*

# Socio-Economic Impact

1 Empowering masses through access: inclusive growth

2 Social and Environmental benefits

## 3 Economic Benefits

**Better urban agglomeration**



- *Connecting sub-urban nodes - controlled urban sprawl*

**Enhanced labour productivity**



- *Travel time savings as high as 60%-70%*
- *Reliability – no travel time buffer*
- *Increased productivity*

**Employment**



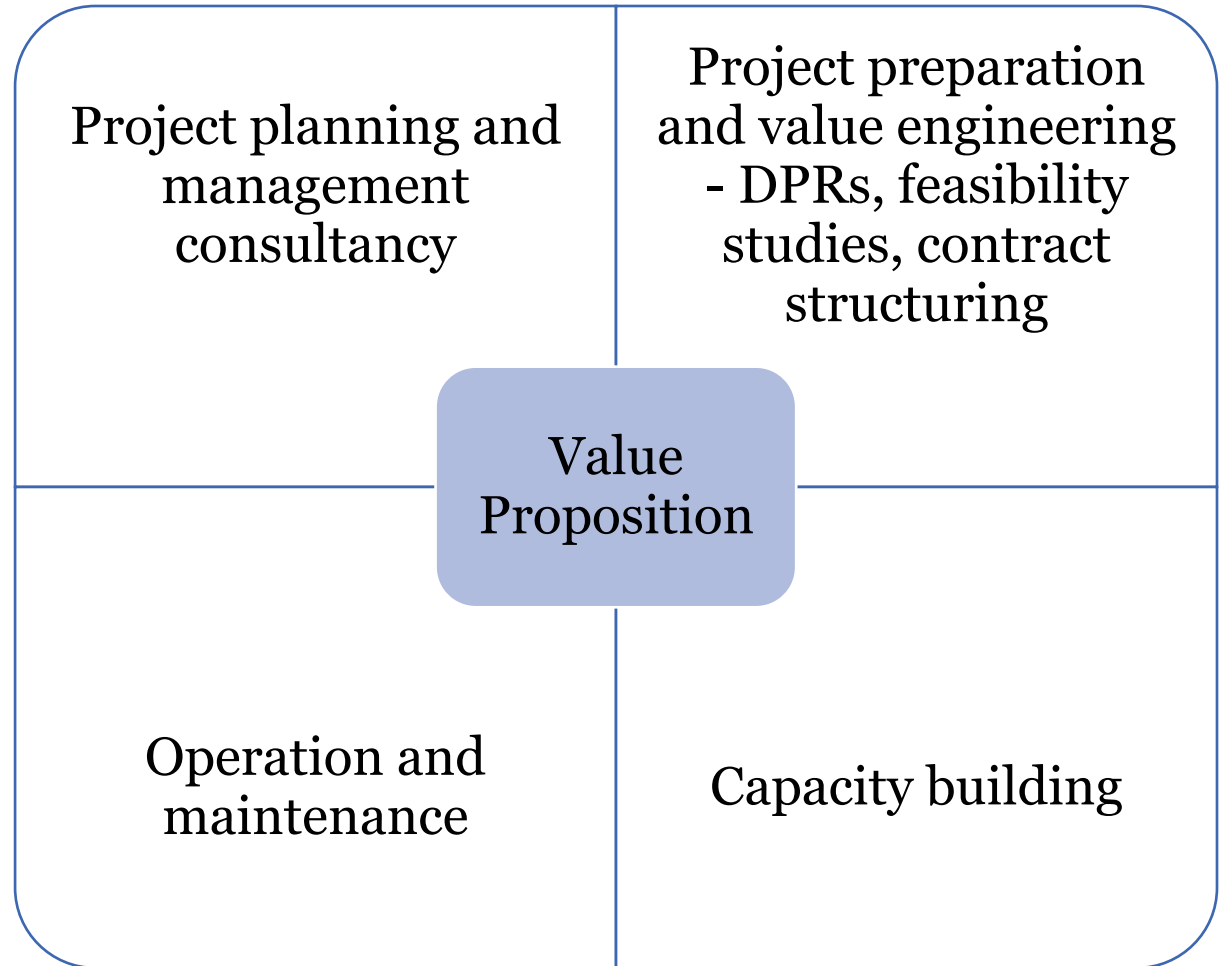
- *Direct job creation – passenger and non passenger services*
- *5x - Induced job creation*

**Polycentric economic development**



- *Enabling development in sub-urban nodes*
- *More livelihood opportunities*

# Capabilities developed - supporting peer organisations in India – keen to support large scale project implementation



# गति से प्रगति

## Thank you



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