

SESSION II



Strengthening Chennai's Public Transport Systems



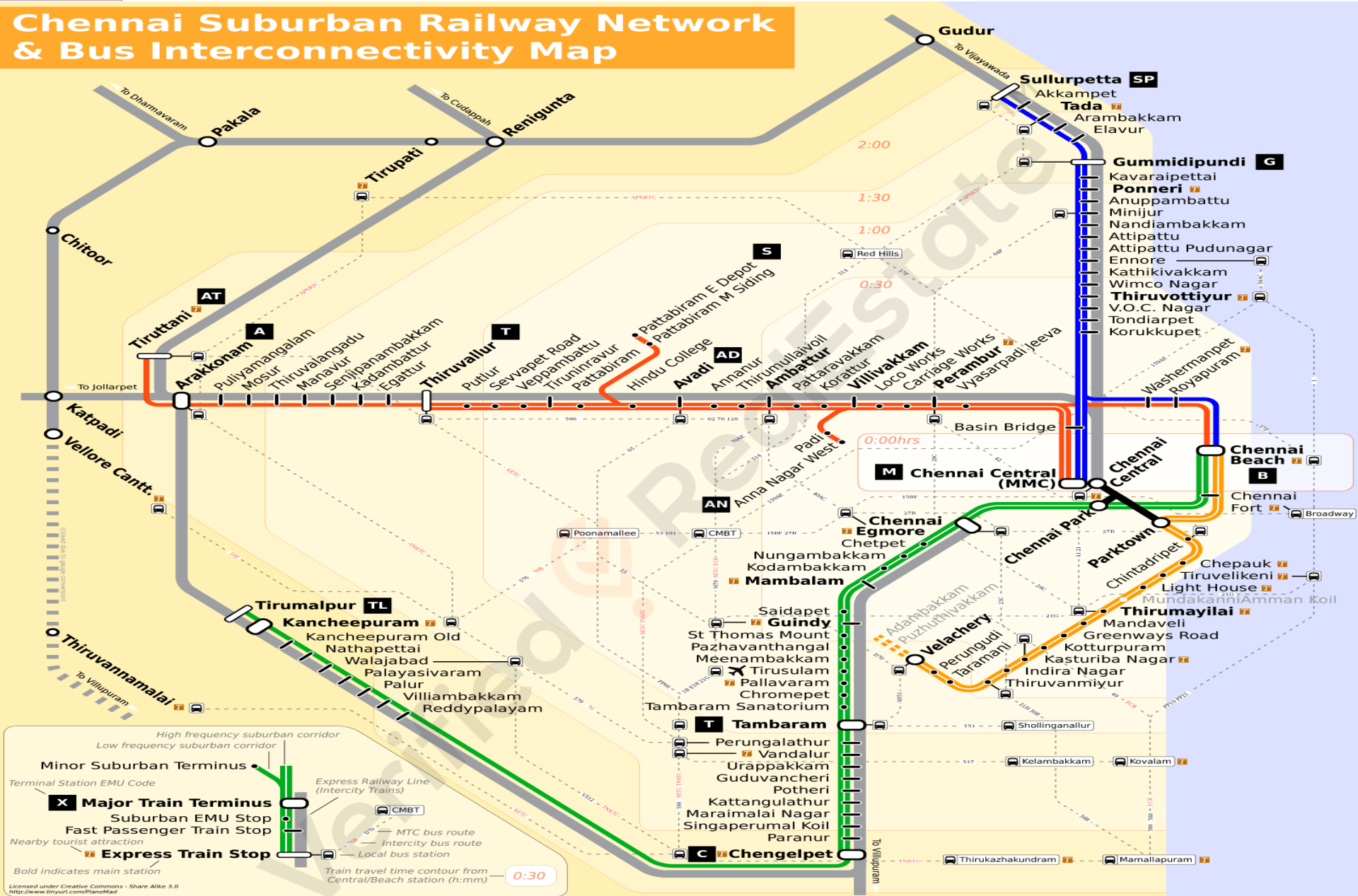
Chennai Metro Rail Limited

Contents

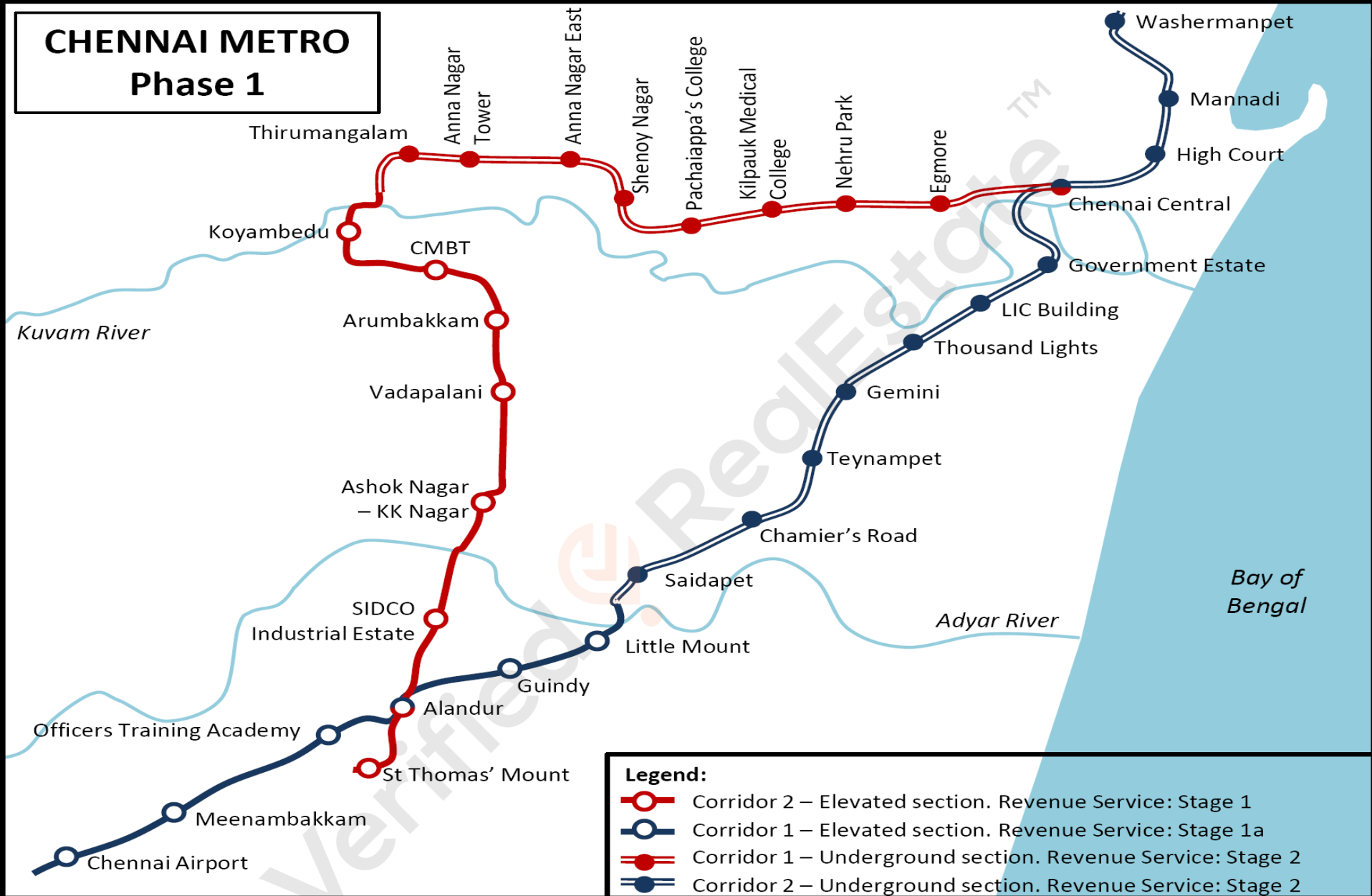
1. **Metro Project** presentation and progress
1. **Multimodal integration** concept and progress



Chennai Suburban Railway Network & Bus Interconnectivity Map



CHENNAI METRO Phase 1



Chennai Metro Rail Limited

Tender Progress – Civil packages

Contract package		Status of procurement	
AC-01	Viaducts Corridor 2	Awarded to SOMA in	Feb.09
ECV-02	Viaducts Corridor 2	Awarded to L&T in	Jan.10
ECV-03	Viaducts Corridors 1&2	Awarded to L&T in	Jan.10
EAS-04	El. Stations Corridor 2	Awarded to CCCL in	Jun.10
EAS-05	El. Stations Corridors 1&2	Awarded to CCCL in	Jun.10
EAS-06	El. Station St Thomas Mt (Corridor 2)	Awarded to CCCL in	Jan.11
ECV-07	Viaducts & El. Stations OTA to Chennai Airport (Corridor 1)	Tender being finalized. Award planned in	Apr.11
ACD-01	Koyambedu Depot	Awarded to L&T on	Dec.10
UAA-01 & 05	Underground (tunnels and stations)	Awarded to Afcons–Transtunnelstroy JV in	Dec.10
UAA-04	Underground (tunnels and stations)	Awarded to L&T–SUCG JV in	Dec.10
UAA-02 & 03	Underground (tunnels and stations)	Awarded to Gammon OJSC “Moscow Metrostroy” JV in	Feb.11

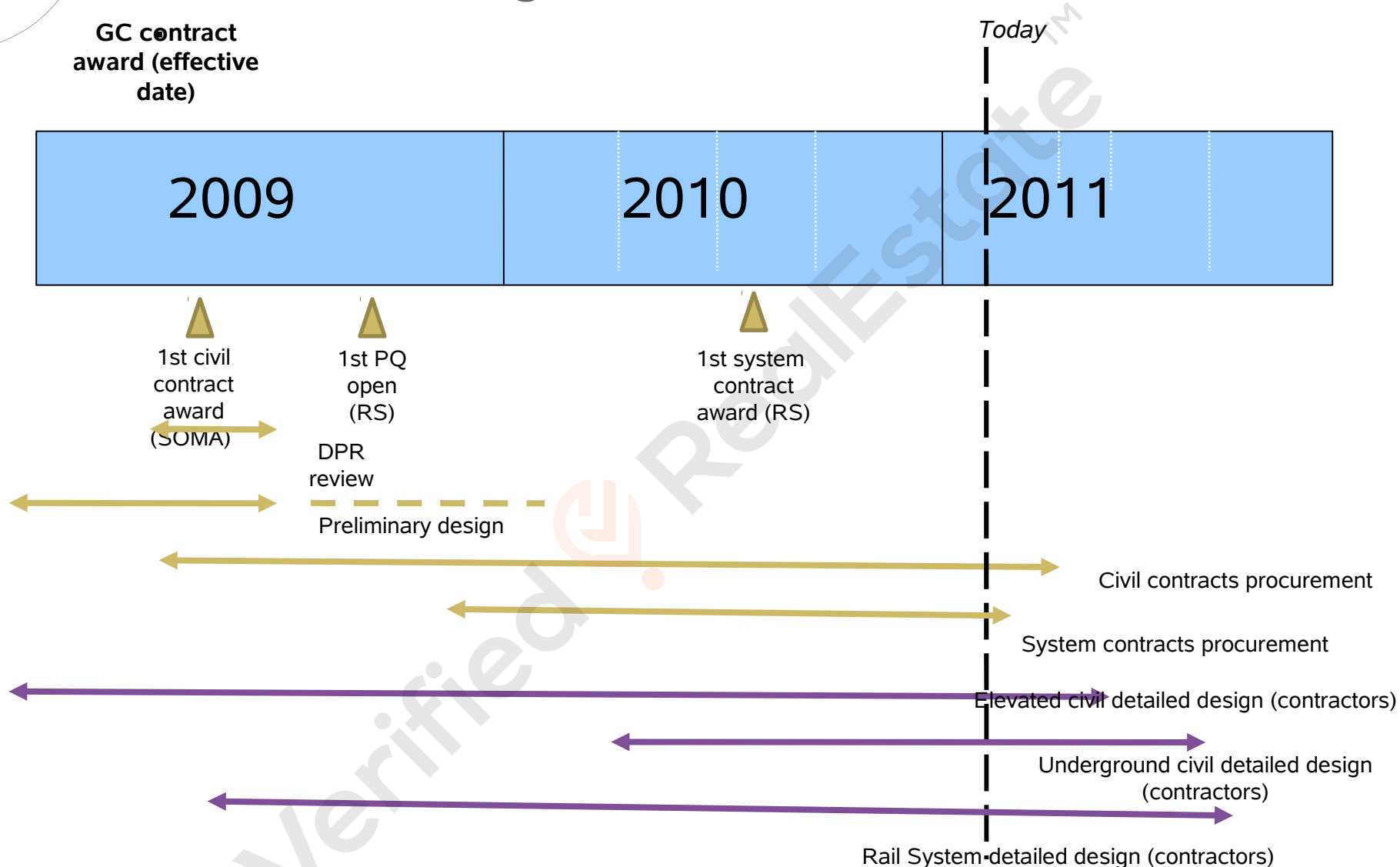


Tender Progress – Systems packages

Contract package		Status of procurement	
ARE-01	Rolling Stock	Awarded to Alstom in	Sep.10
ATA-01	Track Works	Awarded to in L&T-Alstom JV in	Jan.11
AEP-01	Power Supply and Overhead Equipment	Awarded to Siemens in	Jan.11
ASA-01	Signalling, PSDs and Telecommunication	Awarded to Siemens in	Feb.11
AES-01	Lifts and Escalators	Awarded to Johnson Lifts-SJEC JV in	Jan.11
AFA-01	AFC Equipment	Planned award in	Mar 11
AQD-01	Major Depot Special Machines	Planned award in	Mar 2011
UAA-06	Tunnel Ventilation System	Planned award in	Mar.11
UAA-07	Underground Station Air Conditioning System	Planned award in	Mar.11



First Years Progress



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Site works



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Site works

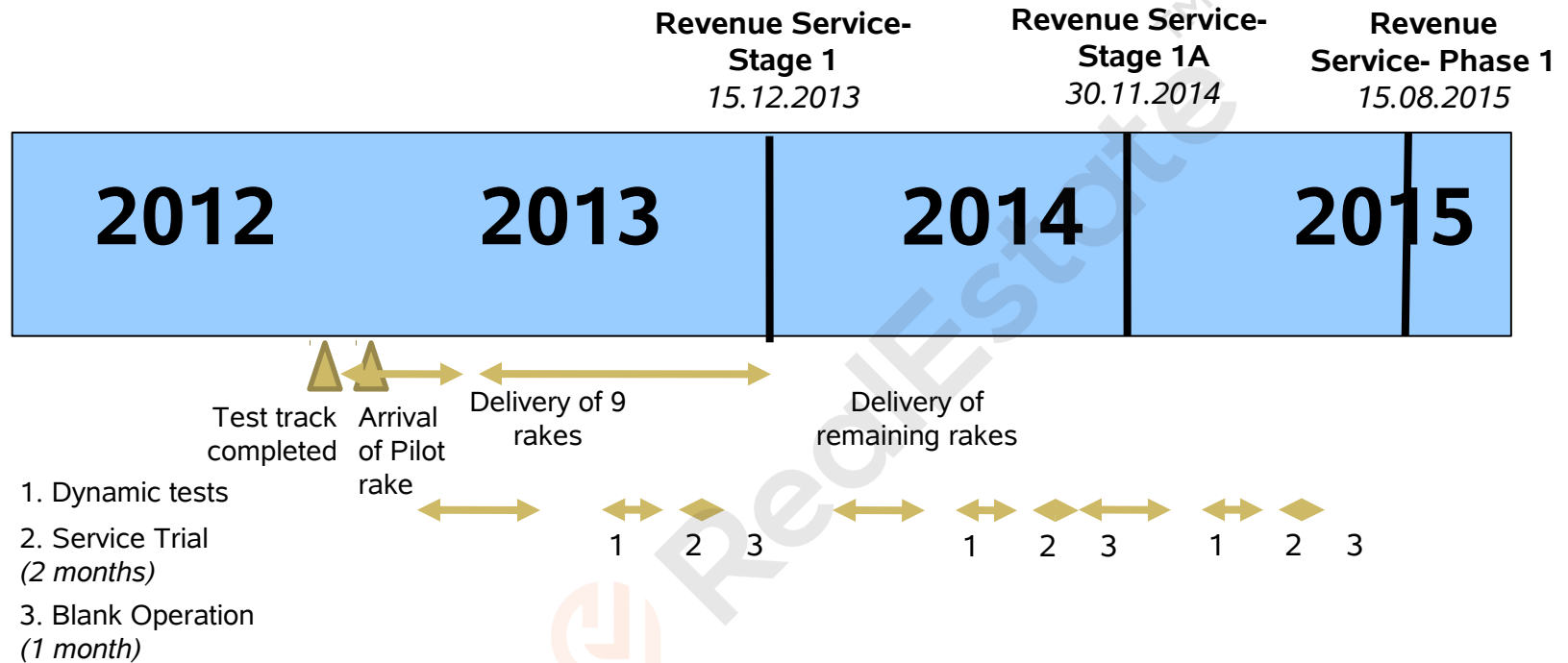


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Towards Revenue Services



2. Multimodal integration concept and progress



Multimodal integration

Links between transport systems:

- Existing Southern Railway lines
- Existing MRTS line (and future extension)
- Integration with bus network
- Chennai Metro Project and future extensions
- Integration with IPT
- Strong support for pedestrianisation
- Seamless Ticketing



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Inter modal integration with Public Transport

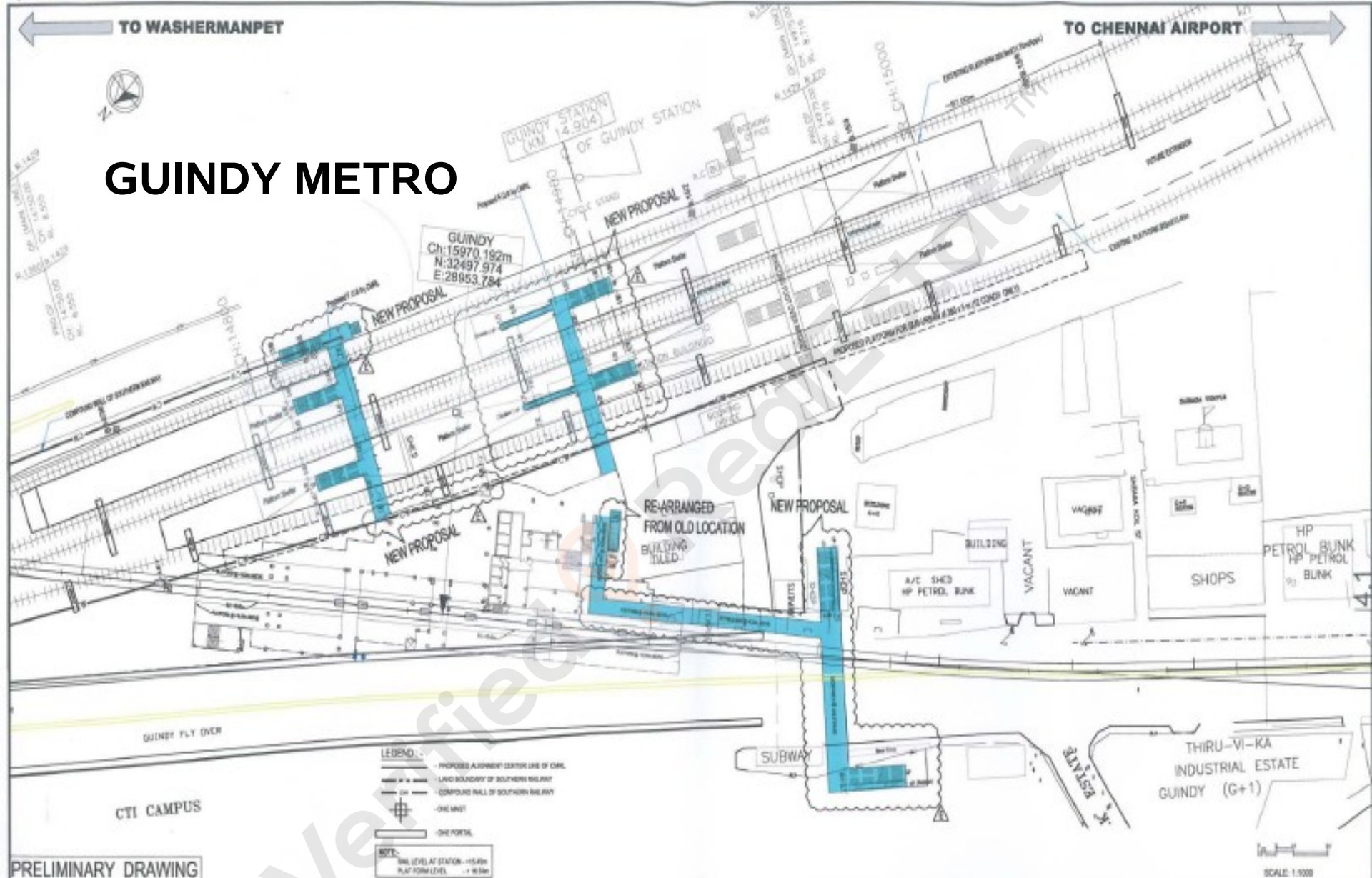
- **Washermanpet** : link with Washermanpet Suburban rail station & Mint bus station
- **Central** : interchange with Central SR, Moore Market Suburban, Park station suburban and MRTS stations
- **High Court** : with Broadway bus stand
- **Egmore**: with Egmore suburban and long distance rail
- **CMBT**: with CMBT
- **Alandur & Central** : between Corridor 1 and 2
- **St. Thomas Mt** : with MRTS
- **Airport** : with buses and Air transport



TO WASHERMANPET

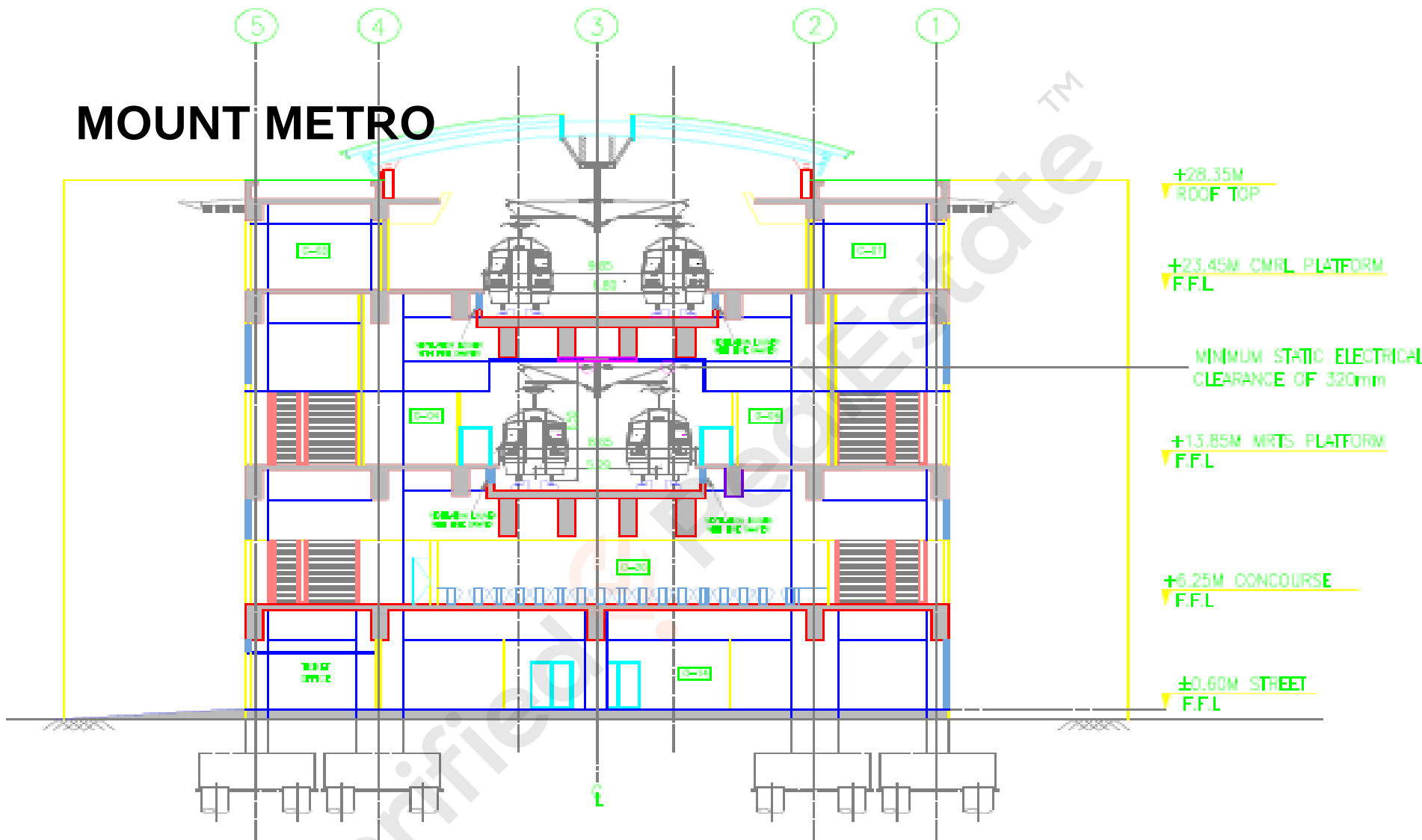
TO CHENNAI AIRPORT

GUINDY METRO



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MOUNT METRO

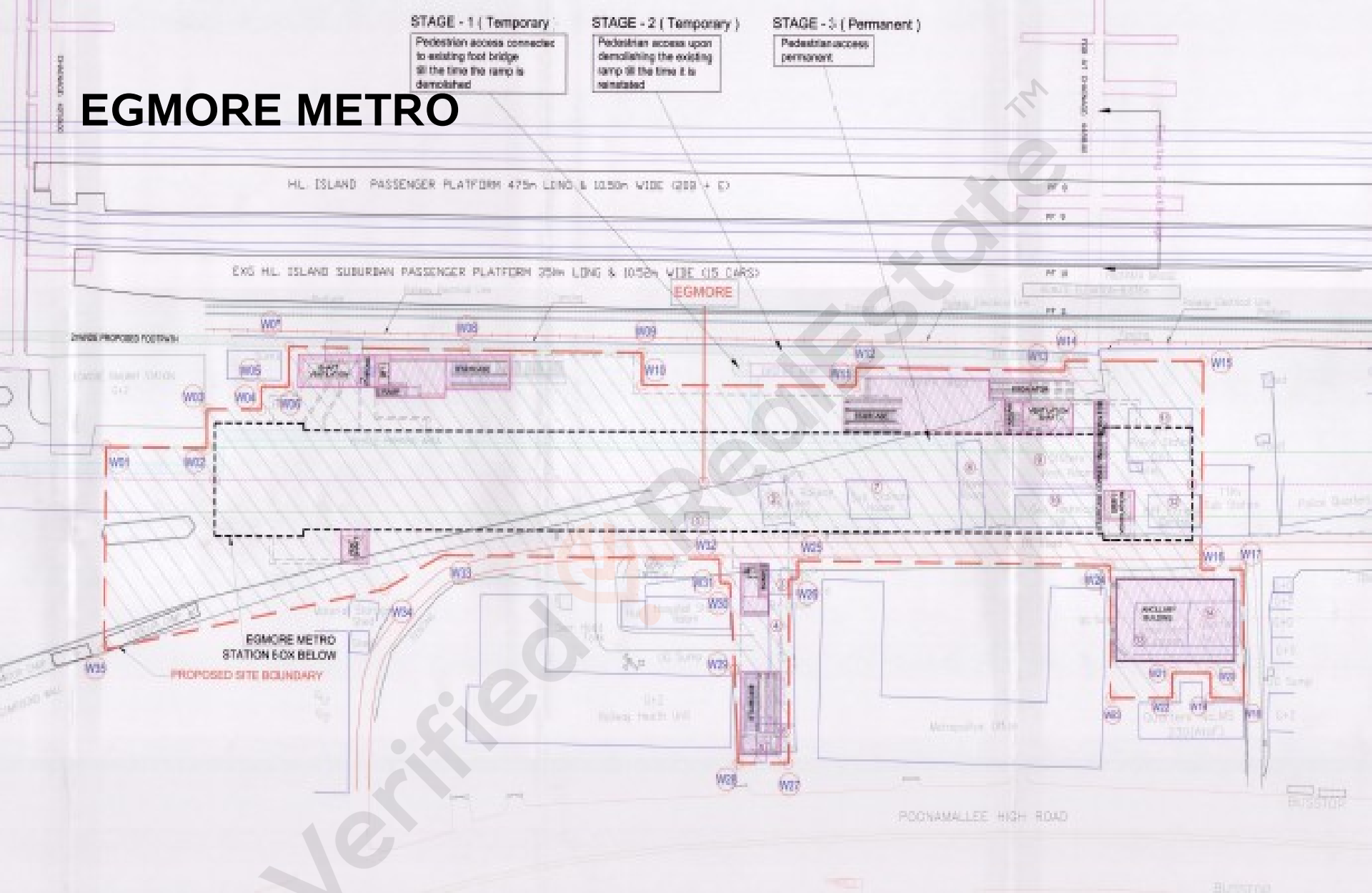


ST. THOMAS MOUNT
MID STATION SECTION DRAWING



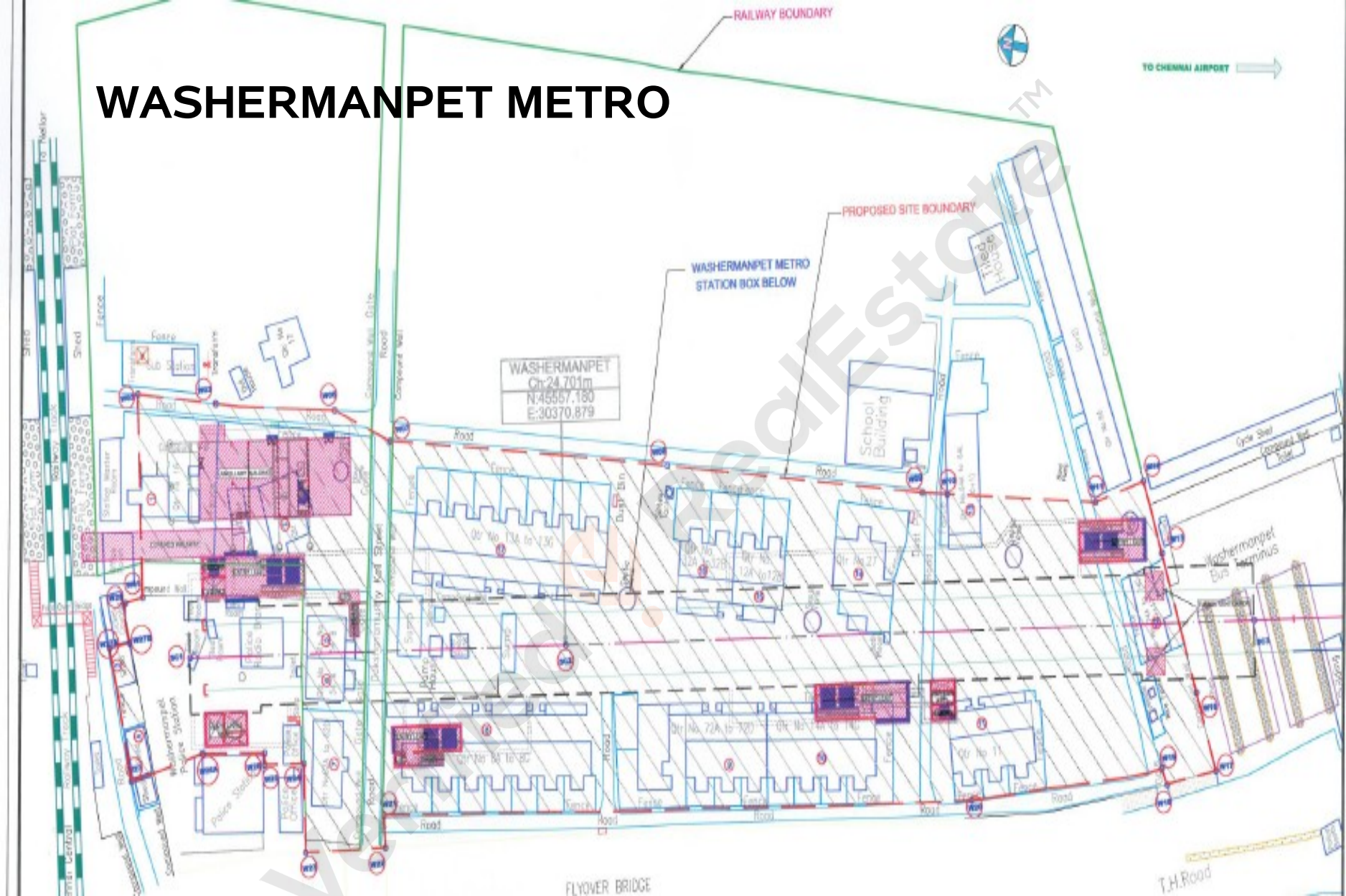
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EGMORE METRO



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WASHERMANPET METRO



Multimodal integration

In the immediate vicinity of stations:

1. During **preliminary design, identification of the areas** available for:
 - Walkways, Walk through, skywalks, UG passages
 - Bus bays
 - Drop-off and pick-up areas
 - Parking for 2 or 4 wheelers
 - Pedestrian Amenities
 - Linkages with existing large developments
1. **Detailed design** of these areas within the boundaries to be done by D&B contractors under the control of CMRL/GC



Multimodal integration

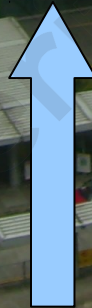
In areas around the stations (500m radius):

1. Broader study initiated in coordination with other stakeholders to make an **inventory study of**:
 - Major streets and their conditions (pavement, drainage, ...),
 - Pedestrian Walkways and their condition,
 - Walk through / Cross passages,
 - Available public spaces,
 - Main landmarks and connectivity to these,
 - Bus stops, drop-off and pick-up locations
 - Feeder routes to stations
1. Further steps: **Detailed design** of required measures to be implemented.



Hung Hom Station/Commercial area at Level 1, 0 & Platforms at -1

Hung Hong Station



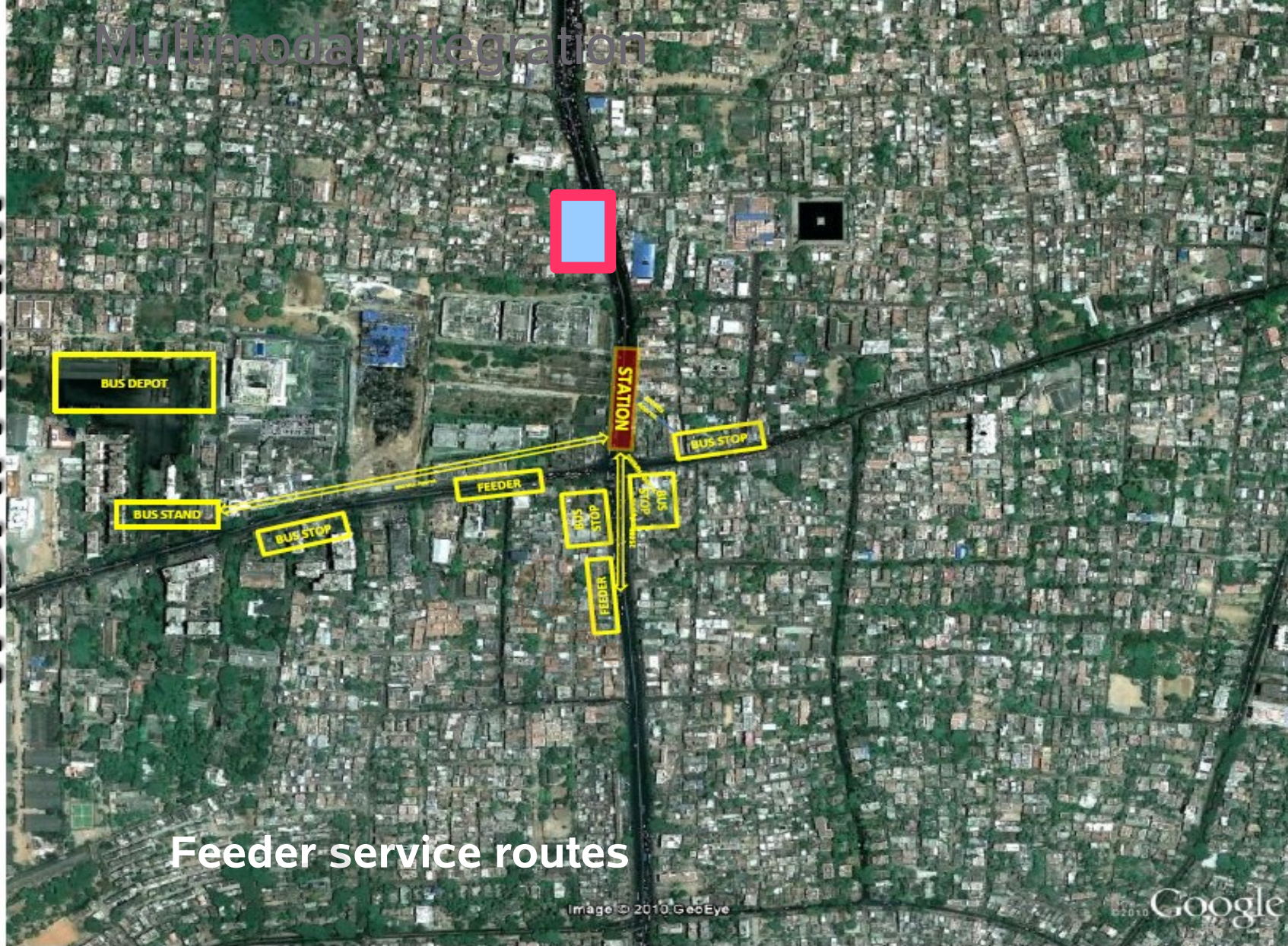
Commercial & Ticketing Area

Multi-level parking

Hung Hom Station : Traffic Integration Taxis and Minibuses at Level 1



Multimodal integration



Plan of action : Track 1

- Traffic Integration Committee led by CMRL with participation of HW, CoC, CMDA, MTC and SR
- Preparation of MMI engineering plan for each station and approval by HPC
- Implementation of MMI plan by each organisation under supervision of HPC



Plan of action : Track 1

- MMI plan for each station :
 - Improve walkability of pedestrian walks
 - Barrier free access between modes
 - User friendly Signages
 - Pedestrian walkthroughs/skywalks to major developments directly to stations
 - Bus and IPT bays near stations
 - Parking lots near stations
 - IPT/Mini bus based feeder network



Plan of Action : Track 2

- Use the Chennai UMTA as the focal point for initiating seamless ticketing
- CMRL will lead the coordination as its AFC has a smart card base AFC and CCHS which will be the nodal point
- Preparation of a seamless smart card based ticketing plan by 2011 end
- Implementation by 2013



Phase 2 DPR

- CMRL has commissioned DMRC to prepare DPR for Phase-2
 - 63 km planned in 3 corridors
 - Line 3 [19 km] Moolakadai — Perambur — Kilpauk — Thousand Lights — Mylapore — Thiruvanmiyur
 - Line 4 [22 km] Moolakadai — Redhills — Ambattur — Mogappair — Thirumangalam
 - Line 5 [22 km] Mylapore — Luz — Teynampet — T Nagar — Vadapalani — Saligramam — Iyyapanthangal — Poonamallee
- DMRC has commenced work on DPR



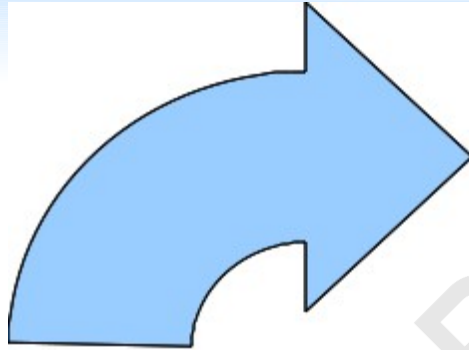
Recommendations for strengthening Chennai's Public Transport Systems



Chennai Metro Rail Limited

State Urban Transport Policy

- Implement measures to raise Public Transit share from 27% to 55% by 2020 (as indicated in CMDA CCTS)
- Rationalise parking Policy
- Rationalise vehicle permit policy
- Give due importance to bicycle and pedestrians
- Reserve main road space for public transport



**Primacy for PT
in road space**

Strengthening Chennai's existing Urban Transport Systems

- Ministry of Railways to convert Chennai Suburban Rail into a Corporation and re-investment in rolling stock and systems to be undertaken on Mumbai model
 - Form an SPV (like MRVCL)
 - World Bank or ADB assistance (like MUTP)
- MRTS also to be converted into a Corporation with funds infusion for re-investment in modern rolling stock and systems
 - Same process as above

New Transit Systems – CCTS implementation

- Continue modernisation of Bus fleet
- Implement BRTS in key corridors
 - OMR, Thirumangalam to Ambattur, KK Nagar to Ashok Nagar, Annanagar Main Road
- Select new Metro Corridors New Metro Corridors / Light Rail Corridors and launch DPR studies

Transit Oriented Development

- All MRTS/Metro/Rail/Bus stations to have a proper off-road traffic integration point
- Bus/Metro/Rail/MRTS stations to also link into major developments in alignment through UG passages or skywalks
- Effective inter-modal integration of all modes of transport, including seamless common smart card ticketing (UMTA role)
- Standard and walkable Pedestrian walks leading to Bus/Metro/MRTS or Rail stations
- Bicycle tracks & Bicycle sharing systems where possible

Thank you



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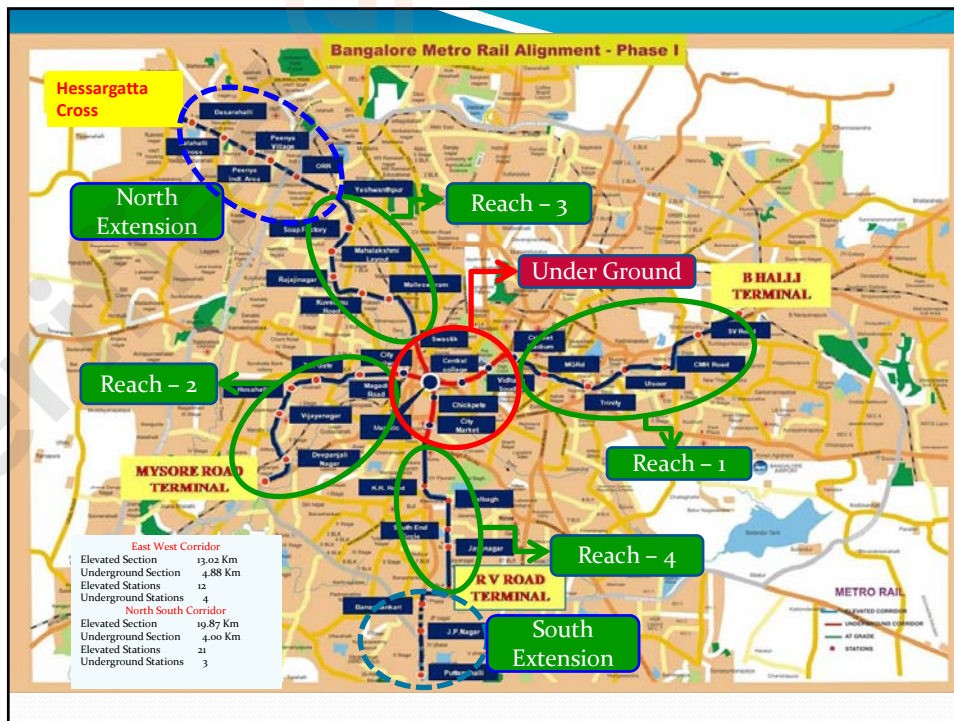
What to Expect in this presentation

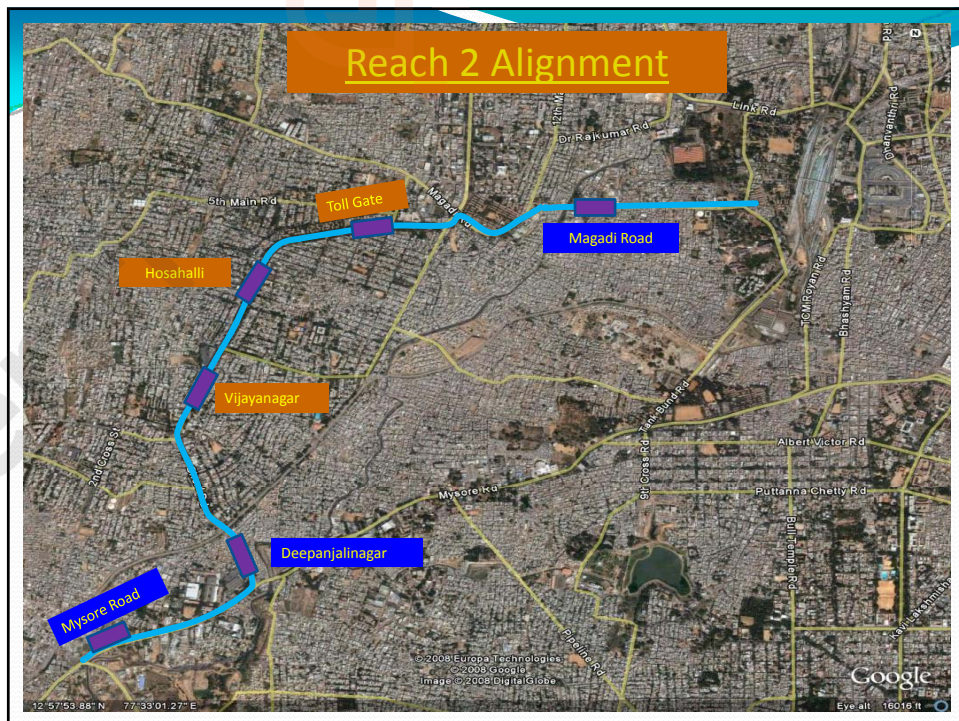
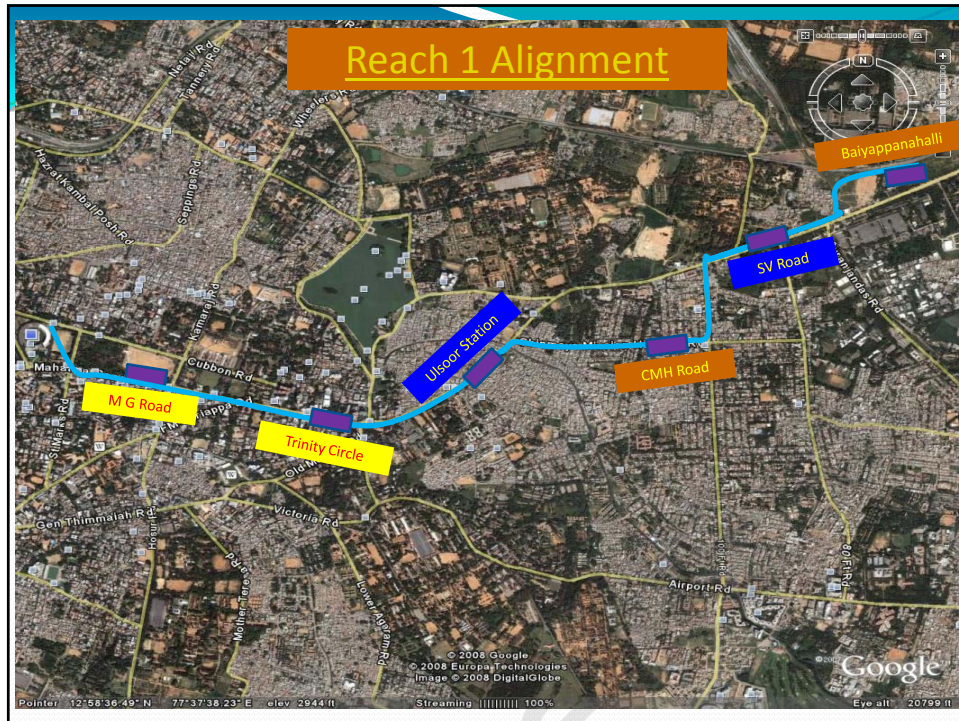
- Route planning and Alignment
- Traffic Management issues
- Project social responsibility
- Inter-modal integration
- Project status
- Future plans
- Q&A – from the audience

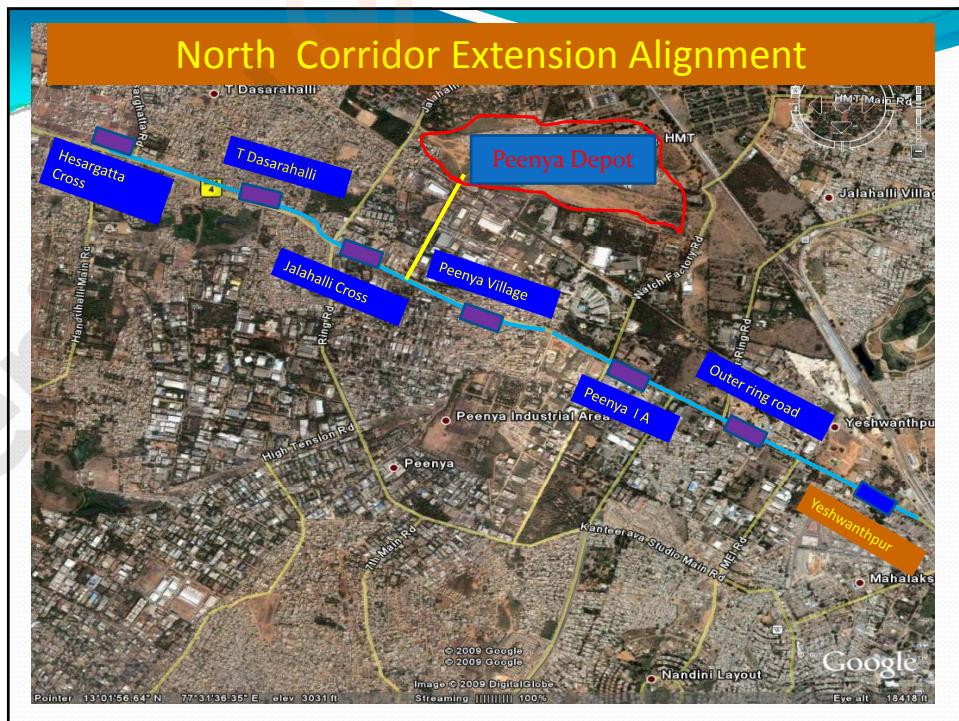
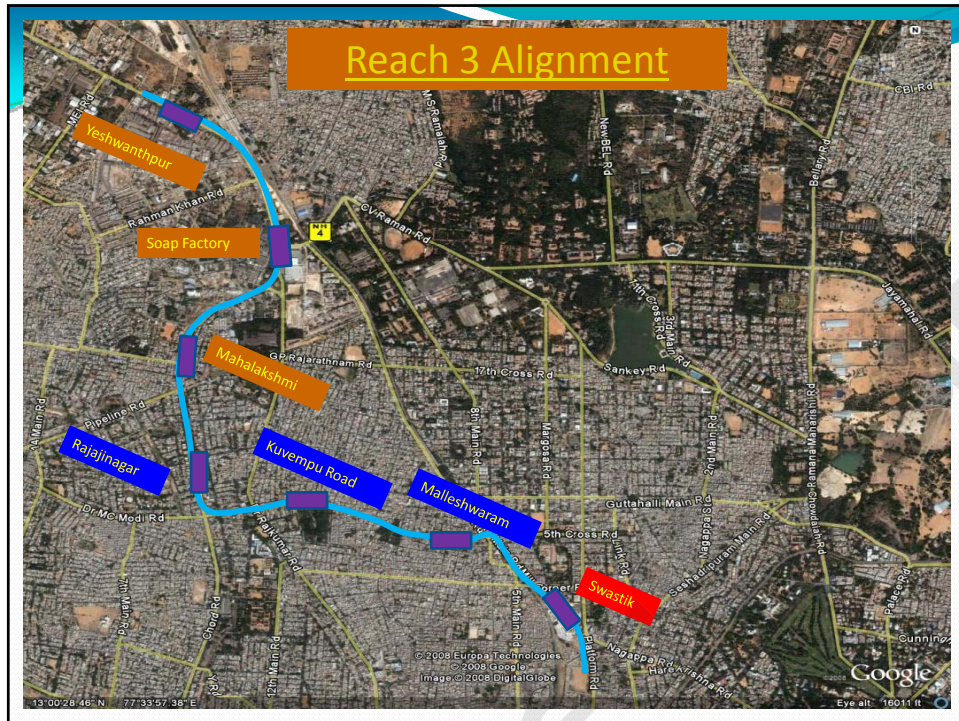
Namma Metro

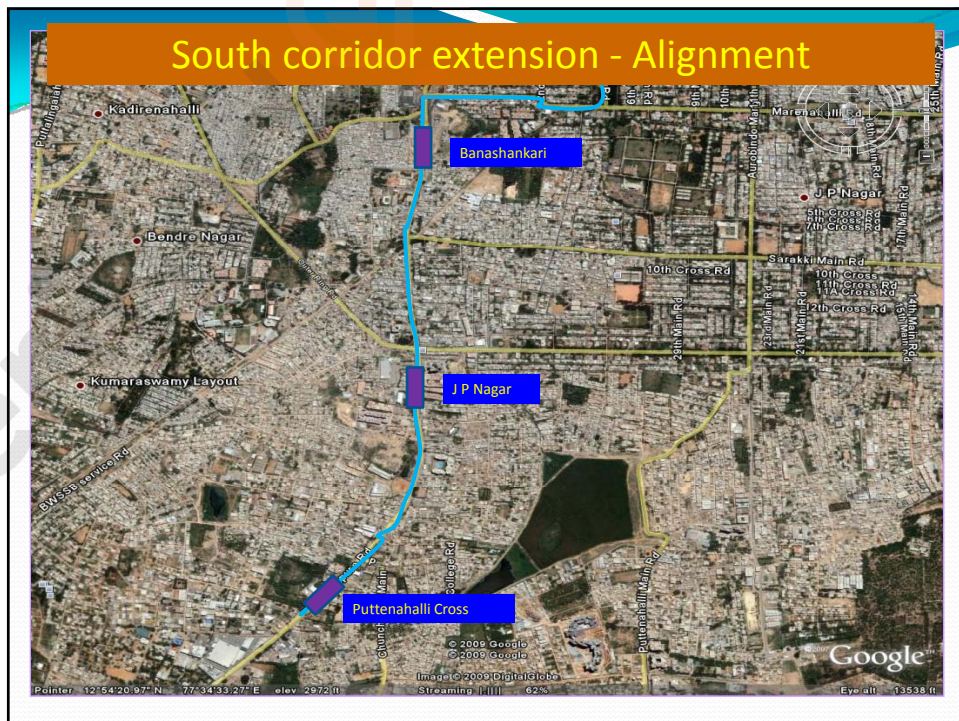
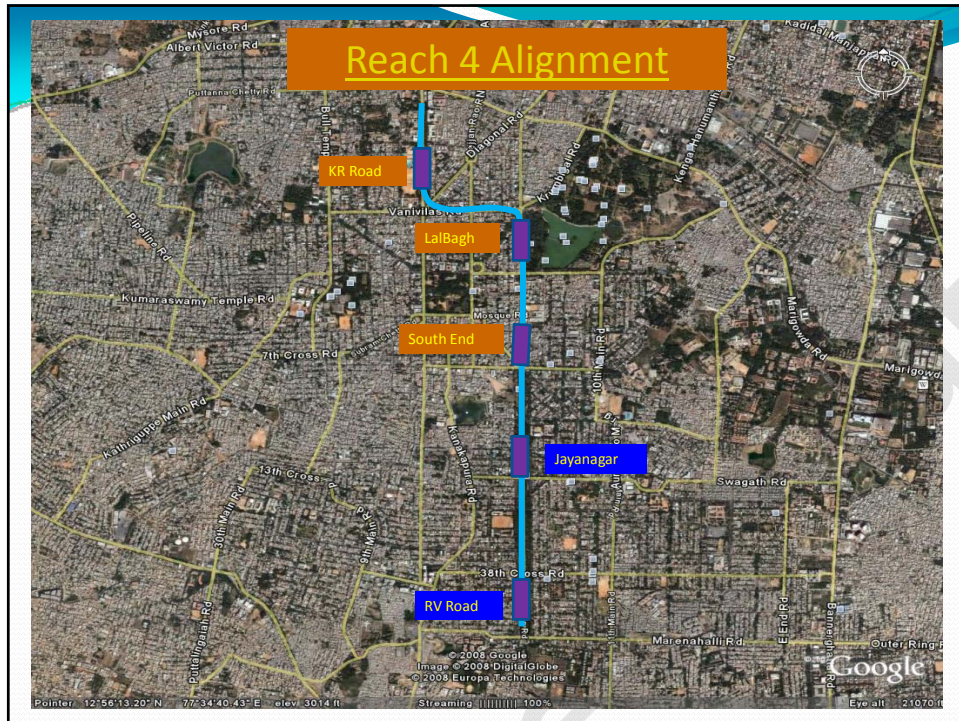


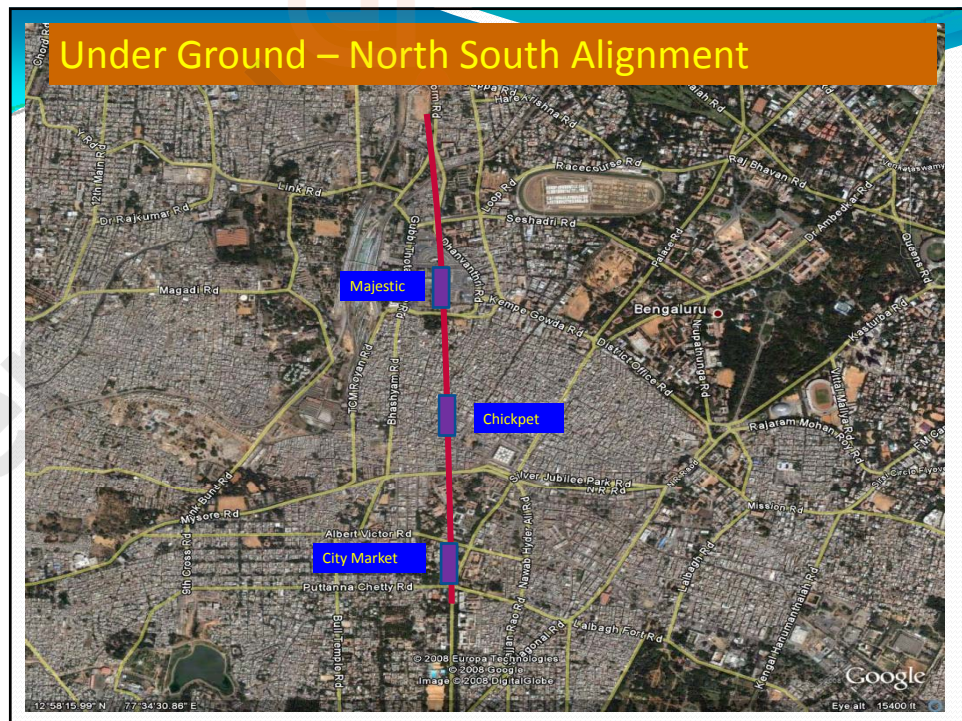
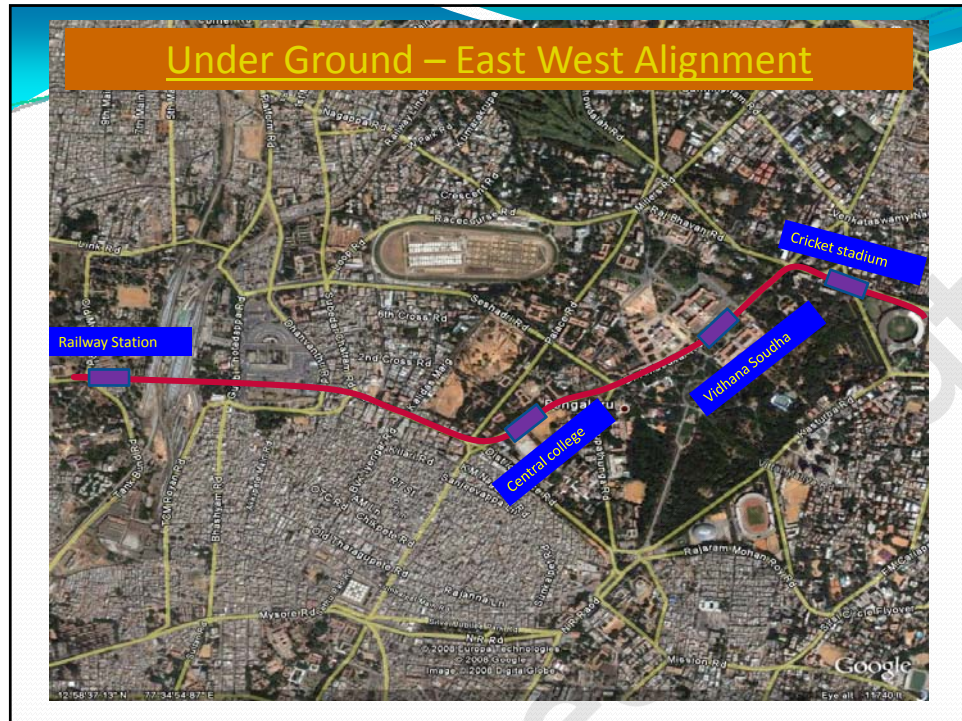
EAST – WEST CORRIDOR	18.10 KMS
NORTH-SOUTH CORRIDOR	24.20 KMS
TOTAL	42.30 KMS
ELEVATED	33.48 KMS
UNDERGROUND	08.82 KMS
GAUGE	Standard Gauge
TRACTION	750V dc Third Rail
SPEED	Max 80Kmph ; Avg. 34Kmph
NO. OF STATIONS	40 (33 elevated, 7 UG)
TRAVEL TIME	33 / 44 Mins. (end to end)
HEAD WAY	4 Mins at start; later 3 Mins











BREAK UP OF ROUTE LENGTH

CORRIDOR	TOTAL LENGTH IN KMS	ELEVATED LENGTH IN KMS	UNDER GROUND LENGTH IN KMS	% OF LENGTH IN CURVES
EAST-WEST	18.10KMS	13.25KMS	4.85KMS	44.30%
NORTH-SOUTH	24.20KMS	20.23KMS	3.97KMS	39.70%

What Lessons?

- North-South and East-West Alignment in a PLUS formation for maximum reach.
- Each Corridor passes through High Density Population areas to the Central Business District enabling connecting commercial with residential areas – uniform loading between corridors.
- Station location at high density circulation locations – easier access to destination.
- Technical parameters are within permissible levels.

Muddling Through!



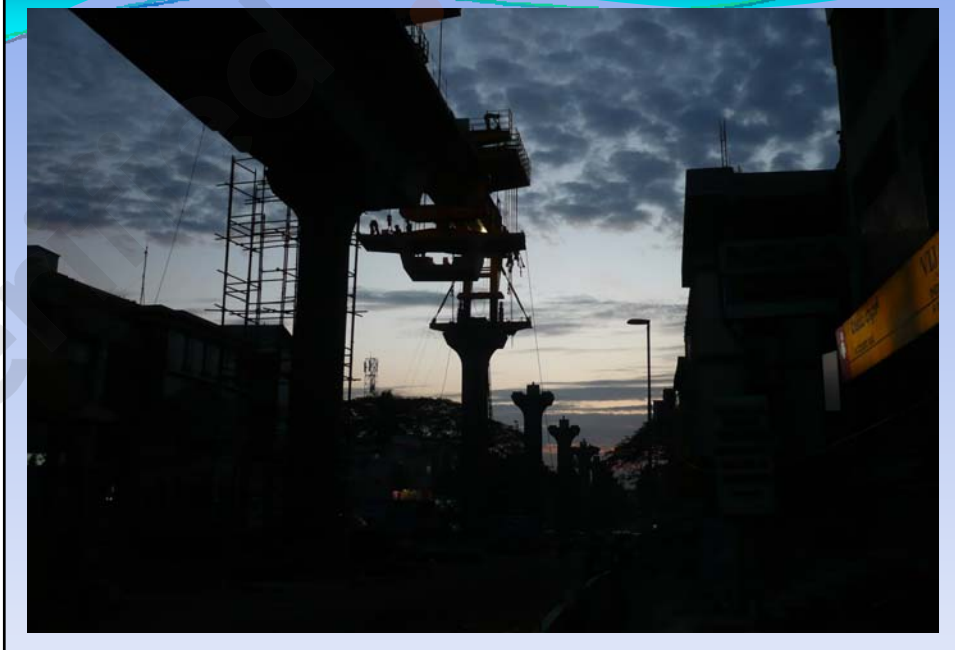
Sliding to glory or disaster!



Working at heights – Safety Issues



Nocturnal Creatures – Metro Work



As Near as you can get to trouble!

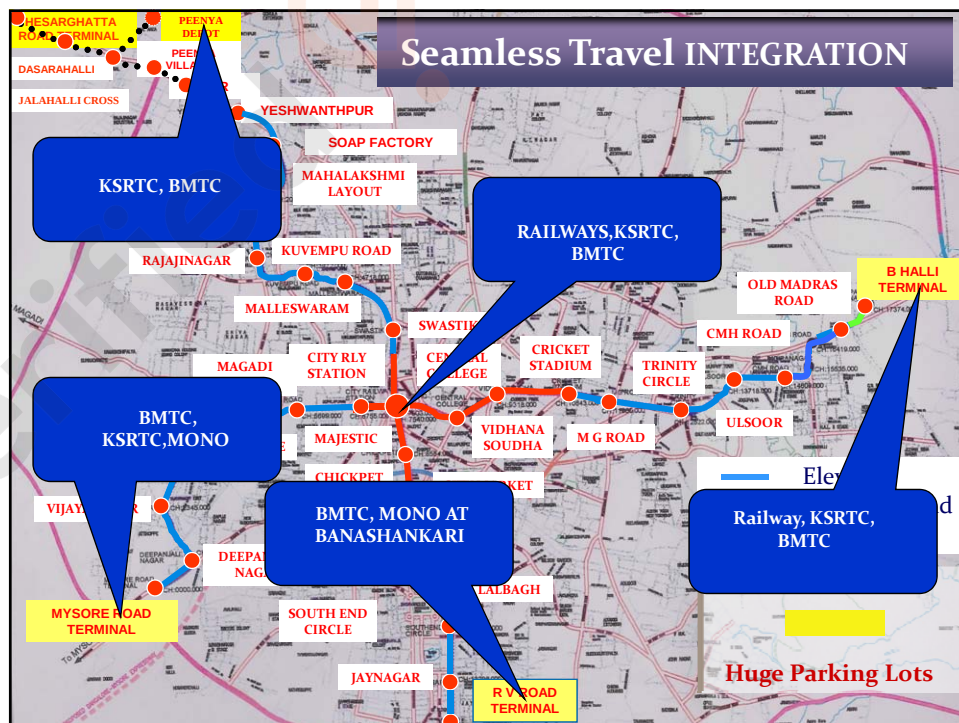


Adjust PANIKKO PAA - Cultural Ethos



Managing Traffic

- Traffic plans carefully planned in consultation with Traffic police
- All Planned traffic arrangements announced by traffic police in press releases at least one week before implementation
- Notified to comply with legal requirements
- On-site co-ordination with local police for emergency road closure/traffic diversions

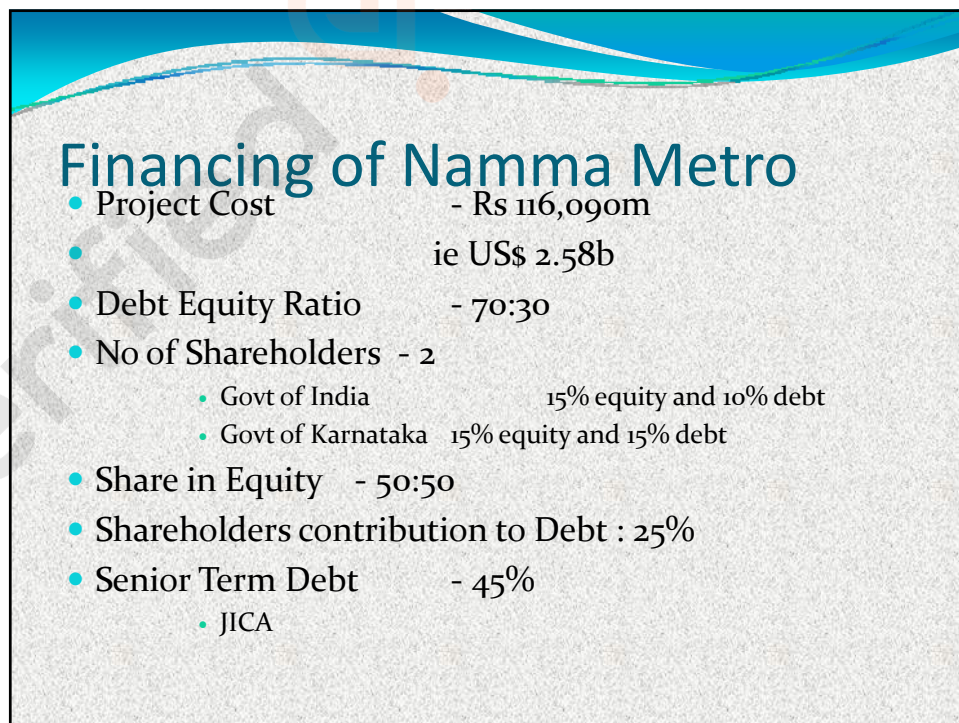
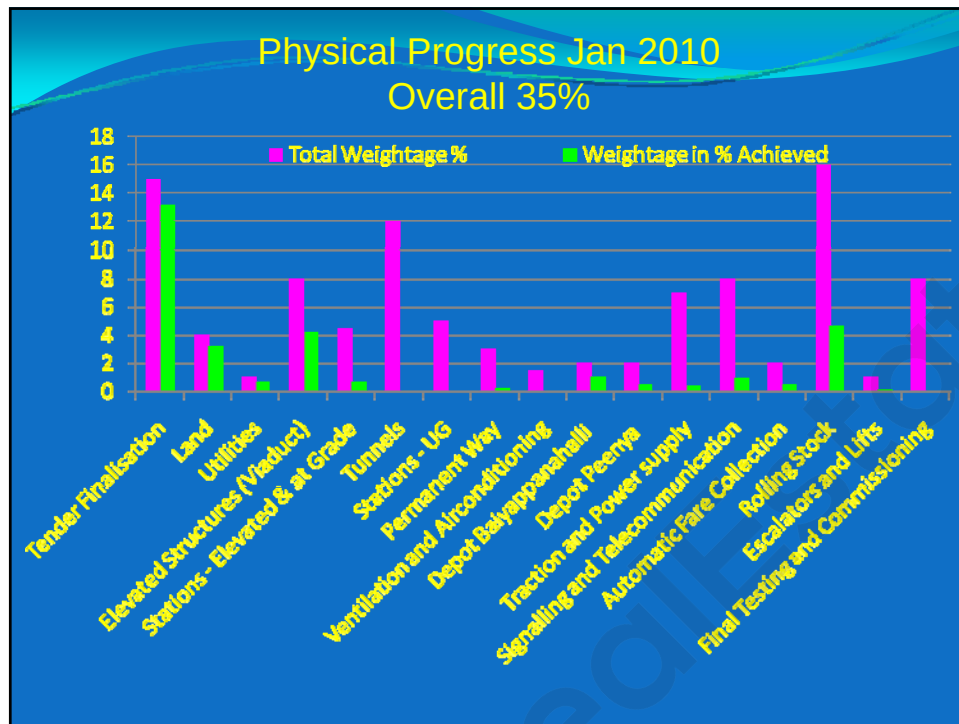


Seamless Travel

- Integration with KSRTC, BMTC, IPTs, Railways.
- Bus bays, Pick Up and Drop areas - at all Metro stations.
- Feeder bus services to be provided to all the Metro stations.
- Common ticketing for Metro & feeder buses.
 - Rs 70/- for Day pass on non-A/c buses
 - Rs 100/- for Day pass on all buses
- Continuous interaction with City Transport for feeder services to Namma Metro with Single ticket System.
 - 32 routes identified for 6 stations in Reach1.
- City Bus transport routes not to run parallel nor to clash with Metro, but to run radial services.

Slum Rehabilitation



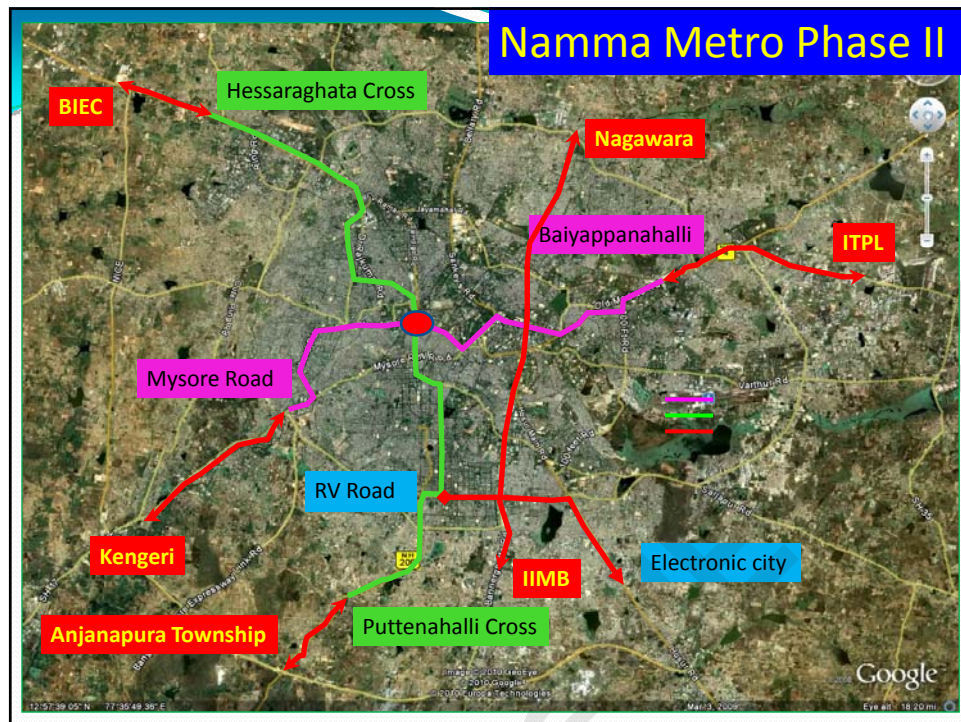


Sources of Funds

- Government of India
- Government of Karnataka
- JICA - Yen 44b (Rs 22b or US\$ 0.50 b)
- Balance loan Rs 30b under finalisation with Indian Commercial Banks and Multilateral funding agencies
 - In-principle sanctions received for Rs 40b.
- Average interest cost 4.8%
- Average loan tenure 23 years.

What Next?

- Four extensions and Second N-S corridor line approved by the State Government
 - Extension to the Eastern Corridor line to reach ITPL promoted by the Singapore Government. Metro Station at ITPL entrance.
- DPR under preparation. Expected to be finalised and approved by March 2011.
- Line linking Electronics City to South corridor line.



BANGALORE METRO PHASE-II			
Sl. No.	Corridor	Length in kms	Cost in Rs million
1.	Hessarghatta Cross to Bangalore International Exhibition Centre (BIEC) on Tumkur Road	4.20	9530
2.	Puttenahalli to Anjanapura Township (Nice Road)	6.70	15200
3	Mysore Road Terminal to Kengeri on Mysore Road	7.70	17470
4.	Extension of East West Line from Baiyappanahalli to ITPL	11.60	26330
5.	North-South line from IIMB / Nagavara	21.10	54210
6	RV Road to Electronic City	15.60	35410
7.	Land cost		25000
	Total	66.90	183150

INTERCONNECTED CITIES – Caring cities

- Sustainable cities – Addressing mobility issues
 - Look at cities from the time perspective
 - Chennai – Bangalore in ONE HOUR –
 - affordable, sustainable
 - For enhanced livelihood opportunities
 - Sharing of city resources
- Chennai – Bangalore – Mysore High Speed Rail
 - City level institutional partnerships for planning and execution
 - – CMDA-BDA-CMRL-BMRL



JAI HIND

Ridership Forecast for Jaipur Metro

Wilbur Smith Associates

February 25th, 2011

Dr. Valsala C Nair, Director, Rail Unit (Asia)

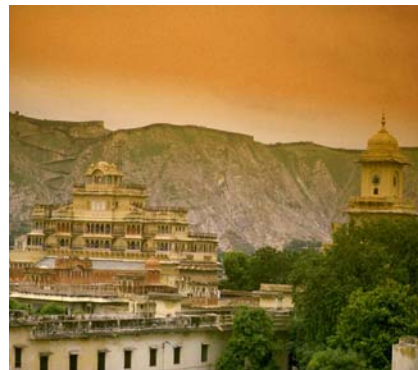
Dr. R. Udayakumar, Project Manager



1

JAIPUR - INTRODUCTION

- Known as Pink City
- A major tourist destination
- Area – 326 sq kms
- Population – about 33 lakhs
- National Highways
 - National Highway No. 8 (Delhi - Mumbai)
 - National Highway No. 11 (Agra - Bikaner)
 - National Highway No. 12 (Jaipur - Jabalpur)
- Headquarters of North Western Railway
- Earlier economic activities concentrated in the walled city.
- Hills on east and immediate north are physical barriers for development
- The city have grown radially in South, South-eastern, Western, & North-Western parts of walled city (CBD).



TRANSPORT PLANNING STUDIES UNDERTAKEN

Comprehensive Traffic & Transportation Study By NATPAC - 1985



Recommended Rail based transport system

Traffic Study by RITES - 1992



Recommended LRT 50.4 km. (5 Lines)
First phase 35.4 km by 2005 (2 lines N-S, E-W)
Second phase 15 km by 2011

Study by CRRI - 1996



Recommended LRT 90.85 km.
37.55 km. to be operational by 2005
23 km. elevated corridor operational by 2011
Balance 30.3 km to be reviewed in 2005



3

RECENT URBAN TRANSPORT INITIATIVES IN JAIPUR

- Comprehensive Mobility Plan Prepared.
- BRTS corridor sanctioned with a length of 39.45 km costing Rs 479 crore (2007-09).
- Seven Kms dedicated BRTS corridor completed
- Mass Transport system in the form of Metro Rail Project planned in downtown area with 10000 phpd+ and routes having less than 45 m RoW .



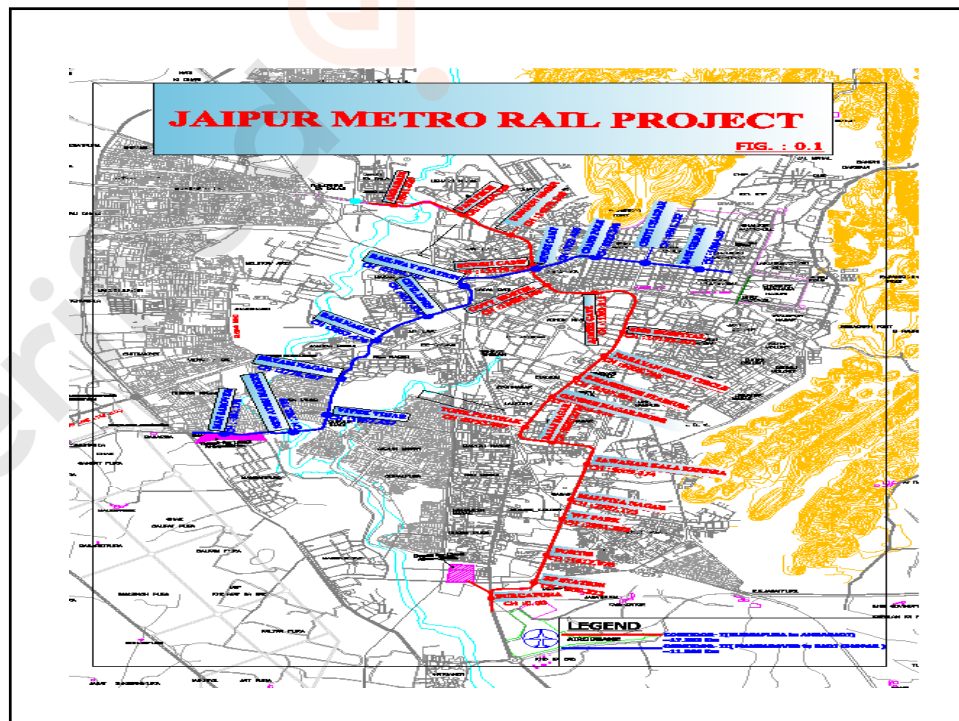
METRO RAIL PROJECT

GoR has resolved to take up Jaipur Metro Rail Project on PPP Mode

Two Corridors considered

- Corridor 1: Ambabari to Sitapura (23.5 km)
- Corridor 2: Manasarovar to Badi Chopar (11.5 km)
(of which about 9.25 kms from Manasarovar to Chandpole will be developed by DMRC on turnkey basis)

5



STUDIES UNDERTAKEN BY WILBUR SMITH ASSOCIATES

- Comprehensive Mobility Plan
- Ridership for the proposed Jaipur Metro Corridors

The Steps followed and the results that led to the planning and design of the Metro is presented

Primary Traffic Surveys

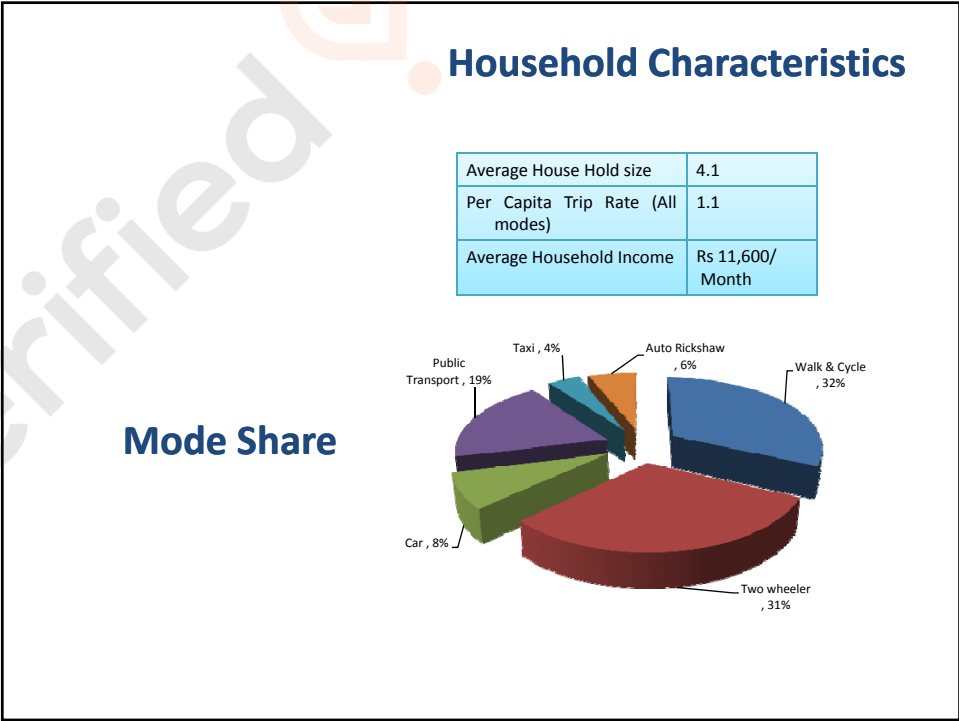
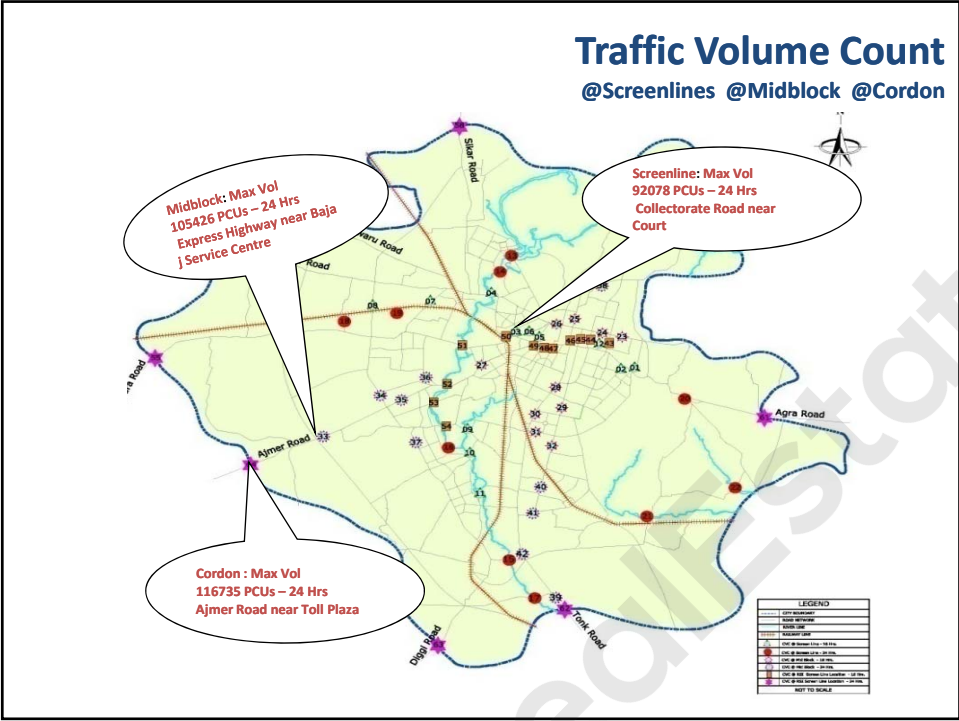
Traffic Surveys	Time	Locations
Cordon & Screen Line Volume Count	24 Hrs	10
	16 Hrs	12
Classified Traffic Volume Counts and Origin Destination by Road side Interview	24 Hrs	10
	16 Hrs	12
Mid Block Volume Count	24 Hrs	10
	16 Hrs	10
Speed and Delay	Identified stretches	30 km
Stated Preference Survey	-	1000 sample
Bus Occupancy Survey	9am-1pm	20
Boarding & Alighting Counts and Bus passenger Interview survey	& 4pm-8pm	20
Household Interview	-	10000 Sample

8

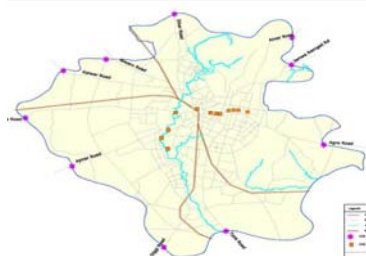
- Master Plan for the study area
- Ongoing and committed projects
- Land use Map
- Population and employment
- Path and frequency of bus routes
- Fare structure of other modes of transport
- Vehicle registration
- Accident statistics
- Studies carried out for BRTS
- List of industries and employment
- Reports from planning agencies
- List of Schools & Colleges and student enrollment

Survey Location Map - Jaipur





RSI Survey at Cordon Points



Travel Pattern at Outer Cordon

The Through Traffic bypassing the city is 28%

Average Occupancy at Outer Cordon



Mode	Average Occupancy
Two Wheeler	1.6
Car	1.8
Auto	2.6
Taxi	2.6

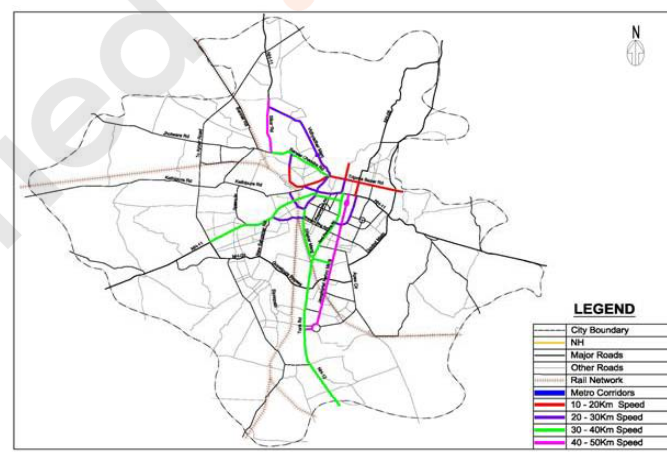


Journey Purpose at Outer Cordon

Mode	Work	Business	Education	Social & Recreation	Tourism	Others	Total
Two Wheeler	64%	14%	7%	4%	3%	8%	100%
Car	46%	19%	7%	8%	8%	11%	100%
Auto	46%	12%	9%	4%	4%	25%	100%
Taxi	48%	11%	6%	5%	13%	17%	100%



Speed and Delay Survey



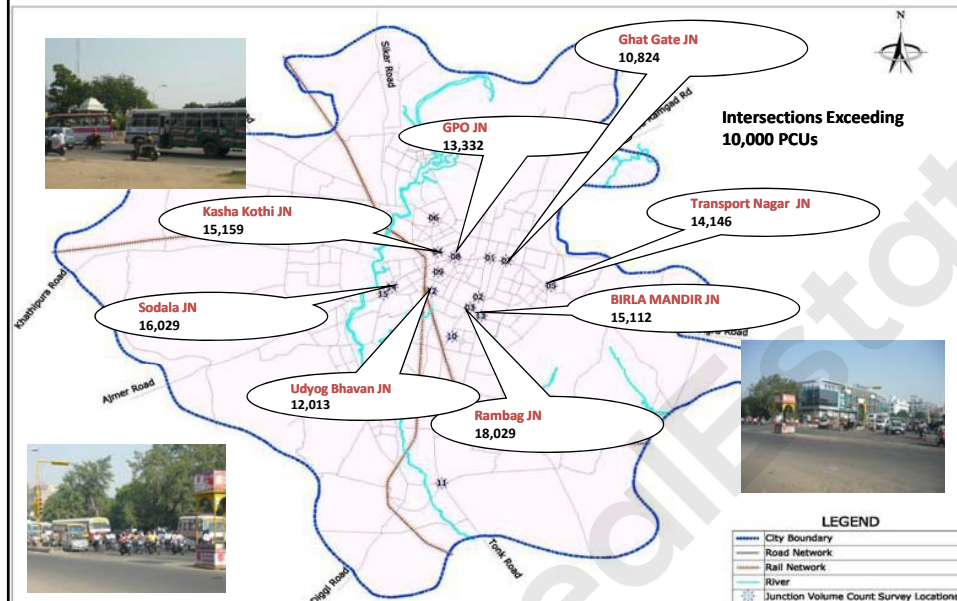
The Average Journey speed

Commercial area – 16 kmph

Non-commercial – 30 kmph

Turning Volume Count

Peak Hr Traffic

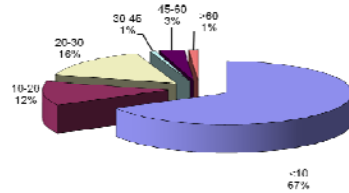


Bus Passenger Survey

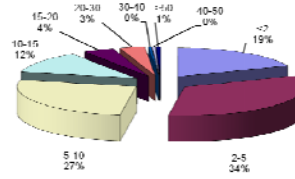
- Max observed Volume :
Chandpol Bazaar 3662 passengers both directions
- Bus occupancy : 45
- Distance travelled to go bus stop : < 2 km (49%)
- Waiting Time : > 10 minutes (67%)
- Cost : 5-10 Rupees (47%)



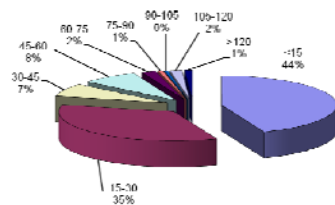
Waiting Time



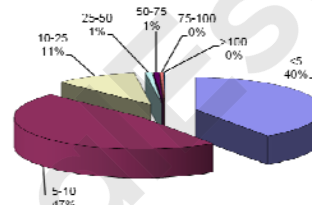
Travel Distance



Travel Time



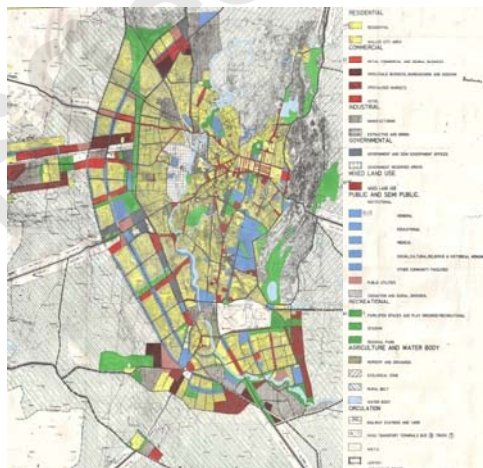
Fare Paid



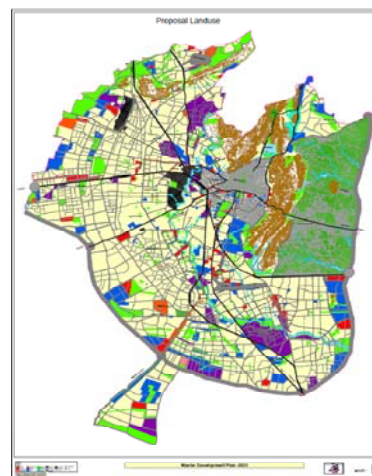
17

Existing & Proposed Land Use

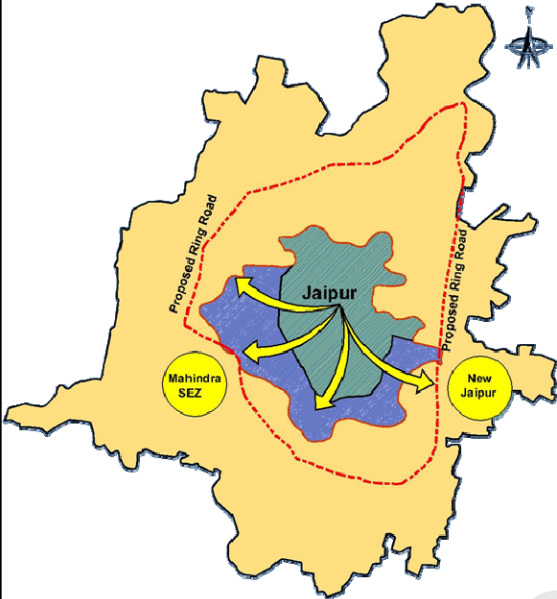
2009



2025

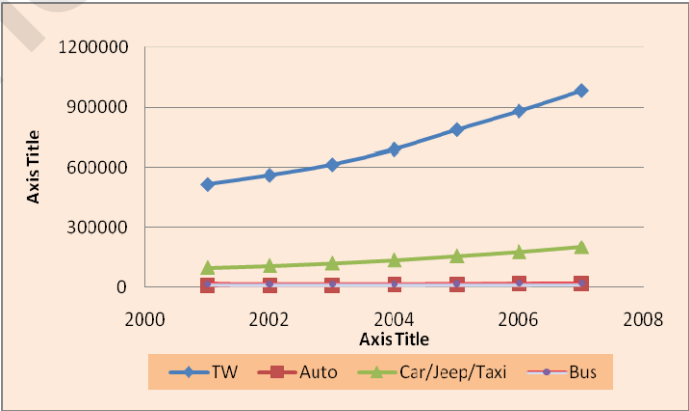


Land Use Developments

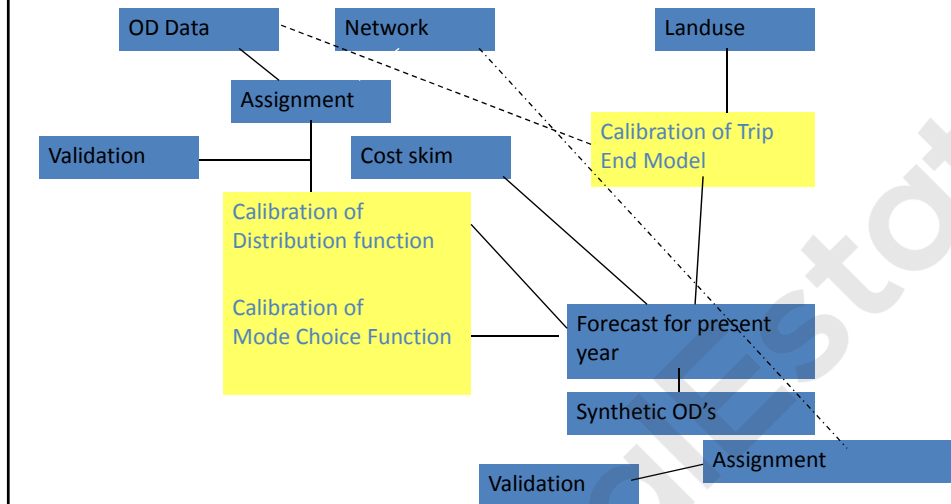


Growth Nodes	Location	Area Specified (Acres)
Mahindra SEZ	Bhankrota	25000
International Conventional Center & Golf Course	Dehmikalan	125
Vatika IT City	Bhankrota	800
Sports City	Achrol	512
Film City	Sumel Village	1000

Traffic Growth



Travel Demand Modeling Process



Development of Transport Model

- **State of the Art Model**
- **Planning Period**
- **Four step Modeling Process**
 - Trip Generation
 - Trip Distribution
 - Modal Choice
 - Network Assignment
- **Base year Model Development**
 - Validation on screen line-Traffic Volume
 - Validation of speeds
- **Horizon year Model Development**

Model Inputs

Field Survey Data

1. Volume counts

- Outer cordon surveys
- Inner cordon surveys
- Screen line counts
- Mid block volume counts

- Road Inventory
- Speed & Delay Survey

- Boarding Alighting Survey
- Terminal Survey

Model Input

Peak hour PCU values on Network links and junctions for Highway validation

Network Characteristics

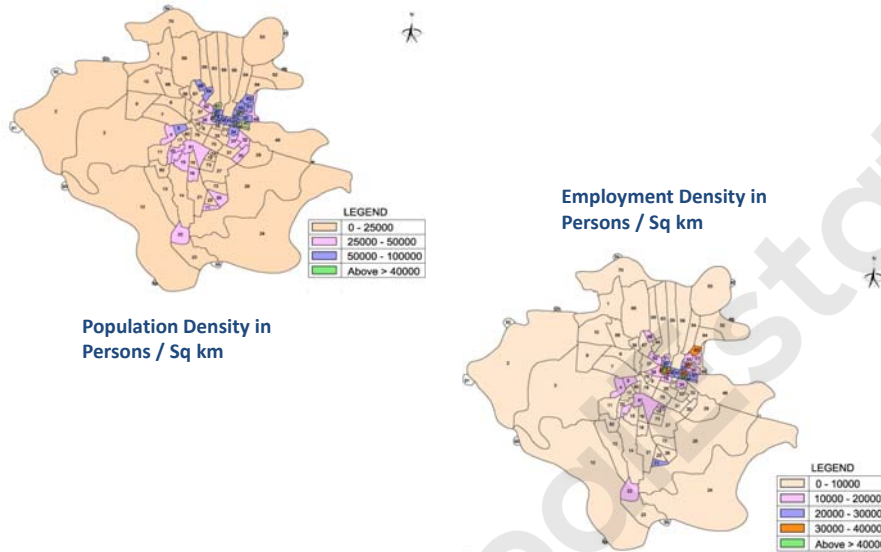
- Functional Class
- Length
- Flow parameters
- Speed

- Public Transport Validation

Demographic Projections

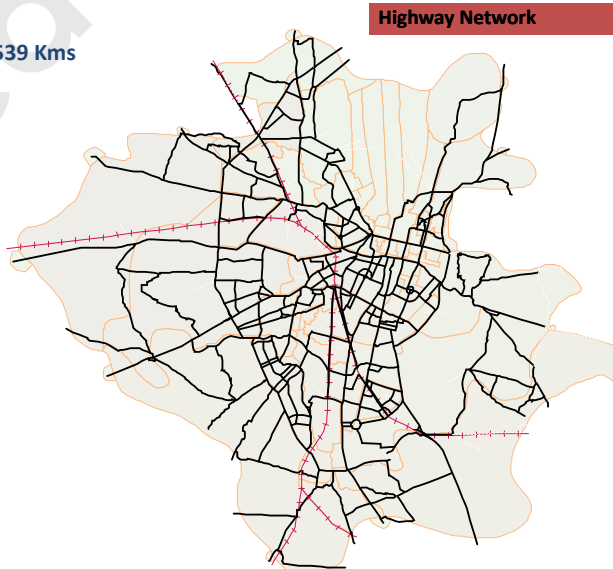
Forecast Input Variables	2009	2014	2021	2031	2041
Population (in Lakhs)	32.61	38.05	49.60	66.87	81.51
Employment (in Lakhs)	11.41	13.32	17.36	23.40	28.53

Population & Employment Density Map



Development of Transport Model

- Total road length : 539 Kms
- No. of Nodes: 483
- No. of Links: 679
- Total Zones: 80
 - Internal : 70
 - External : 10

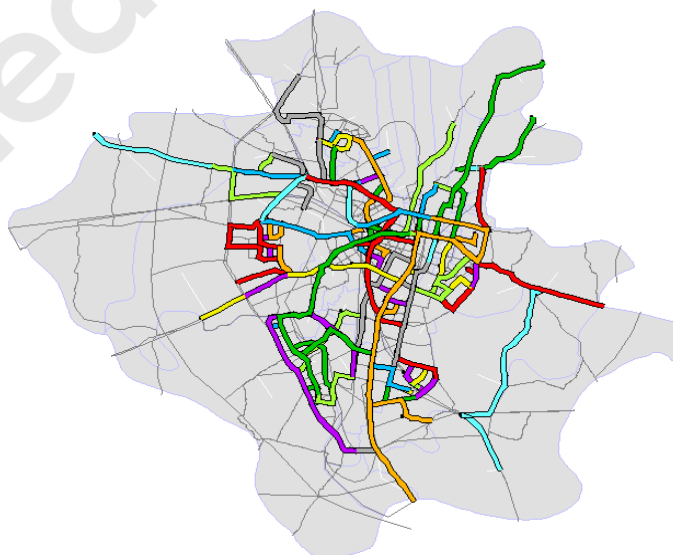


Validation Screen lines

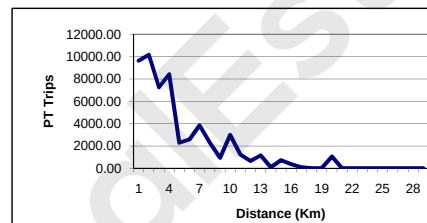
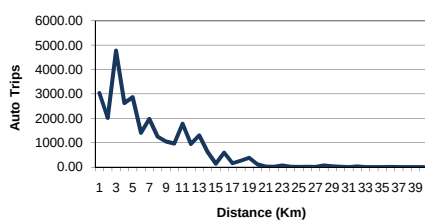
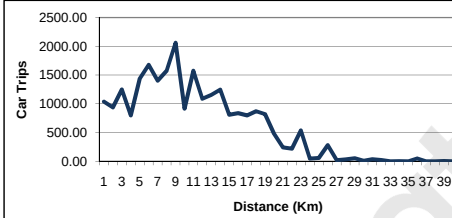
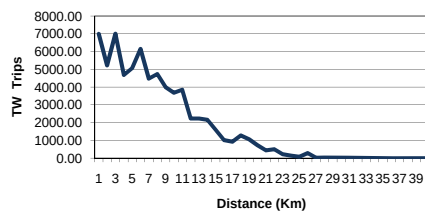
Screen line 1 - NORTH - SOUTH						
Mode	Direction 1			Direction 2		
	Assigned	Observed	%Difference	Assigned	Observed	%Difference
Two wheeler	6373	7075	-10%	8533	8440	1%
Car	2734	2586	6%	2786	3028	-8%
Auto rickshaw	3380	3477	-3%	4940	5076	-3%
Taxi	2197	2116	4%	3334	3613	-8%
Public transport	30277	28962	-5%	31414	27263	-15%

Screen line 2- EAST-WEST						
Mode	Direction 1			Direction 2		
	Assigned	Observed	%Difference	Assigned	Observed	%Difference
Two Wheeler	4458	4237	5%	3758	3709	1%
Car	2221	2260	-2%	1785	2072	-14%
Auto rickshaw	2221	2394	-7%	1891	2094	-10%
Taxi	1316	1314	0%	1557	1754	-11%
Public transport	13788	12109	-14%	15438	14351	-8%

Bus Route Network Map



Trip length distribution



FLOW DIAGRAMS



TRUCK-MAV



LCV



PV

JAWAHAR CIRCLE TO JALMAHAL (N-S)

Jawahar Circle To Jalmahal									
Direction 1 - North - South Corridor					Direction 2 - North - South Corridor				
Station	Node	ON	OFF	PPHPD	Station	Node	ON	OFF	PPHPD
Jawahar Circle	1669	4131	--	4131	Jalmahal	1708	1707	--	1707
Fortis	1670	897	679	4349	Maharani chhatri	1706	483	209	1980
WT Center	1671	452	282	4520	Jorawar Singh Gate	1703	4098	37	6042
Malviya Nagar	1672	380	326	4574	Subhash Chowk	1700	1320	303	7060
Malviya Nagar Institute	1673	740	218	5096	Badi chopar	1694	348	501	6907
Bajaj Nagar	1675	367	286	5177	Sanganeri Gate	1690	3092	2676	7323
Kendriya Vidyalaya	1679	1643	2633	4187	SMS Hospital	1685	635	453	7505
Nehru Palace	1680	524	470	4242	Narayan Singh Circle	1682	609	677	7437
Mansingh Stadium	1681	1081	586	4736	Mansingh Stadium	1681	1144	1130	7451
Narayan Singh Circle	1682	484	585	4636	Nehru Palace	1680	653	539	7565
SMS Hospital	1685	449	330	4754	Kendriya Vidyalaya	1679	4120	2491	9194
Sanganeri Gate	1690	2112	2352	4514	Bajaj Nagar	1675	1154	137	10211
Badi chopar	1694	489	354	4650	Malviya Nagar Institute	1673	616	1305	9523
Subhash Chowk	1700	381	877	4154	Malviya Nagar	1672	461	421	9563
Jorawar Singh Gate	1703	126	2752	1528	WT Center	1671	1066	515	10115
Maharani chhatri	1706	108	730	906	Fortis	1670	740	1892	8963
Jalmahal	1708	--	906	--	Jawahar Circle	1669	--	8963	--

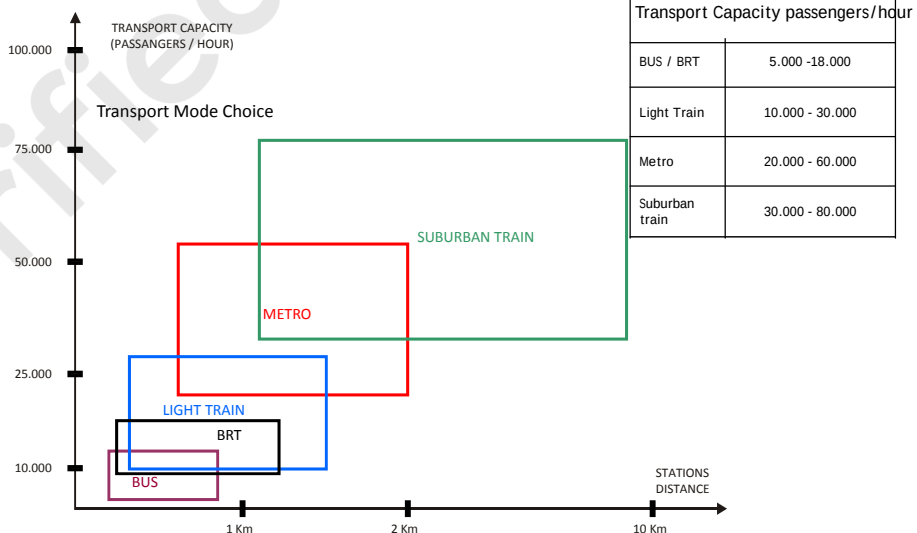
Ridership Flow Diagram



Ridership Forecast

North-South Corridor – Metro								
Year	From	Via	To	Corridor Length (km)	Max. Sectional Load (PPHPD)	Daily Passenger-KM	Daily Ridership	Average Lead (KM)
2014	Ambabari	SMS Hospital	Durgapura	17.3	11300	1875200	293000	6.4
2021	Ambabari	SMS Hospital, Tonk Road	Nalla Crossing	24.3	18200	4734730	520300	9.1
2031	Govindpura	Raghunathpura, SMS Hospital, Tonk Road	Outer Ring Road	40	27300	7534860	810200	9.3
East-West Corridor – Metro								
Year	From	Via	To	Corridor Length (km)	Max. Sectional Load (PPHPD)	Daily Passenger-KM	Daily Ridership	Average Lead (KM)
2014	Badi Chopar	Railway station, Sindhi camp	Manasarovar	11.2	10000	1034400	206000	5
2021	Badi Chopar	Railway station, Sindhi camp, Gopalpura Bypass (PRN)	Outer Ring Road	18.9	20200	2210650	340100	6.5
2031	Badi Chopar	Railway station, Sindhi camp, Gopalpura Bypass (PRN)	Outer Ring Road	18.9	34100	3971430	490300	8.1

TRANSIT OPTIONS – DECISION MATRIX



JAIPUR METRO – FEATURES



SALIENT FEATURES

1. Gauge (Nominal) 1435 mm

2. Route Length (between dead ends)

Description	Underground(Km)	Elevated(Km)	Total (KM)
Corridor-1 Durgapura to Ambabari	5.095	12.257	17.352
Corridor-2 Mansarovar to Badi Chaupar	2.789	8.777	11.566
Total	7.884	21.034	28.918

3. Number of stations

Description	Underground	Elevated	Total
Corridor-1 Durgapura to Ambabari	5	13	18
Corridor-2 Mansarovar to Badi Chaupar	3	8	11
Total	8	21	29

- DPR FOR METRO RAIL PREPARED BY DMRC AND AGREEMENT EXECUTED WITH DMRC TO IMPLEMENT STAGE – I

PRESENT STATUS

- Rajasthan Government has setup Jaipur Metro Rail Corporation Ltd for execution and operation of Jaipur Metro .
- Work of stage – I awarded to Delhi Metro Rail Corporation on turnkey basis.
 - DMRC has invited Tenders for Civil works.
- For Stage –II, to be implemented on PPP model
 - The Financial and legal consultants have been selected
 - RFP for technical consultants has been issued.

METRO RAIL - A REQUEST TO PLANNING AUTHORITIES

- **Since Metro Rail is a highly capital intensive project (with the cost in the range of 300 to 400 Crores per km), the Planning Authorities should**
 - Undertake detailed planning studies to finalise the corridors to be developed
 - take all steps to derive maximum benefit from this huge investment by developing metro corridor as a part of the city wide integrated urban transportation system and it should be possible to link it to future growth centres without much difficulty.
 - Phasing of the corridor should be decided mainly based on Ridership demand
 - Avoid developing stand alone corridors, which cannot be intergrated with the rest of the network in future

THANK YOU