

1. With the fast expansion of urban area in the NCT of Delhi the transportation network has also expanded with many new features. The mega cities with population of more than 10 million need to maintain their Public Transport System in view of the requirement of linkages between work place and residence, educational institutions and residence, trade and cultural centers and residence besides linkages with inter-city transportation terminals of rail, road and air.
2. A number of studies have been conducted so far by different agencies for different areas and aspect of transport planning and traffic engineering in Delhi from time to time viz DDA, NCR Planning Board, Railways, Ministry of Urban Development and Transport Department. Studies relating to traffic demand as per origin and destination were conducted by Transport Department through RITES during 1994-98 to finalize the corridors of Delhi Metro.
3. An Integrated Multi-Modal Public Transport Network comprising of 43 corridors to cater to the public transport demand upto 2021 was prepared by the Govt. of NCT of Delhi. However, database on which this network was prepared was old and traffic and travel characteristics have also gone a significant change.
4. It was decided to undertake a detailed study for developing a fresh Travel Demand Modal for culling out exact requirement of the proposed Integrated Road cum Multi-Modal Transport Network for the city. GNCTD has commissioned the group composed by RITES Ltd., MVA Asia Ltd. and TERI to carry out the study "Transport Demand Forecast Study and Development of an Integrated Road cum Multi-Modal Public Transport Network for the NCT of Delhi". This group submitted its report in October, 2010.
5. DUEIIP-21 Project also prepared a detailed project report on integrated

transport and traffic management for Delhi in February 2001. It has been used by various subsequent studies and surveys on transportation planning network for Delhi and also by MPD-2021.

6. The decision to put entire Public Road Transport System on CNG Fuel System in November 2002 brought a tangible impact in control on vehicular pollution in the NCT of Delhi. However, the fast growth of vehicles each year in Delhi is creating problem particularly with more diesel driven vehicles.

### **Major Programmes / Projects implemented during 11<sup>th</sup> Five Year Plan**

1. The construction of 24 ROB/RUB/ Flyover/Grade-separator and widening of Calcutta Bridge during 11<sup>th</sup> Five Year Plan has improved the vehicular movement on all major roads to a great extent. However, non-completion of Western & Eastern Peripheral Express-ways by NHAI has forced to continue the congestion by inter-city vehicles on city roads along with pollution due to vehicle's exhaust.
2. Completion of second phase of Delhi Metro provided assured and convenient Public Transport System not only to the commuters of Delhi but also to the adjoining NCR towns of Gurgaon, Noida & Ghaziabad.
3. Addition of more than 3700 low floor air-conditioned and non-air conditioned buses in DTC fleet, withdrawal of blue-line buses and introduction of Corporate Sector Bus Operators System has improved the quality of bus transport system.
4. Pedestrians safety has also been given due attention along with construction of new roads and widening of existing road network in NCT of Delhi. Construction of more than 51 Foot-over Bridges has already been completed and 25 more Foot-over Bridges are under construction.
5. Parking is a major problem linked to the growing number of vehicles in the city. Some of the major parking sites are being developed under PPP approach.

6. Delhi Transport Infrastructure Development Corporation has been set up to manage Inter State Bus Terminals and Bus Queue Shelters in Delhi. Renovation of existing ISBT at Kashmere Gate is in progress. Anand Vihar and Sarai Kale Khan bus complex will be re-developed by DTIDC.
7. All Regional Offices of the Transport Department have been renovated and linked with Headquarter network so as to provide maximum services to the citizens more conveniently.
8. Work on Signature Bridge on river Yamuna near Wazirabad is in progress with the use of new technology. On its completion, it may become one of the distinct identity symbols for the city.
9. GPS System has been introduced to monitor the DTC bus Service. Taxi and Autos are also being covered with GPS network so as to provide assured and convenient services to the citizens.
10. Ring Road Bye-pass and Elevated Corridor on Barrapula drain have provided signal free flow of traffic on these roads.
11. The above mentioned quantitative and qualitative expansion & improvement in public transport network and transport infrastructure could be possible with highest plan funds investment of Rs.16048 Crore under Transport Sector during 11<sup>th</sup> Five Year Plan 2007-12 which is 29.66% of total likely Plan expenditure in 11<sup>th</sup> Five Year Plan of Delhi.

### **Issues and Challenges for 12<sup>th</sup> Five Year Plan (2012-17)**

1. MPD-2021 mention that MPD-62 was based on a poly-nodal, poly-centric, distribution of work centers, largely based on road transport nodes. A major fall out of this has been distortion between infrastructure, transport and land use. To achieve spatial balance, development should take place according to new corridors of mass movement. This has implications in terms of land use planning along major transport corridors and mass-rapid transport/transit system. This would not only help to solve to some extent the enormous

problems of mass transportation but would also generate a dynamic potential for growth and employment. This is particularly true for the Metro Rail System. In this context, the Metro Corridors upto a certain depth would require selective Re-development and Re-densification of the existing land uses based on site conditions.

2. Different studies conducted so far on Transportation, Planning and Traffic engineering indicates that the per capita trip rate (excluding walk trips) has increased from 0.72 in 1981 to 0.87 in 2001. It is estimated that per capita trip rate may reach to 1.2 by 2021 in Delhi.
3. Delhi Intra-City Motorized persons trips are expected to increase from 117 lakh in 2007 to 174 lakh in 2021. Inter-city trips will increase from 33.4 lakh per day in 2007 to 79.6 lakh per day in 2021.
4. The total road length (km. lane) was 14316 km in 1981 which increased to 28508 km in 2001 and 31373 km in 2009 in Delhi. However, the number of vehicles increased from 5.62 lakh in 1981 to 34.57 lakh in March 2001 and 64.52 lakh in March 2010. This situation of fast increase in number of vehicles has created the problem of congestion on Delhi's roads and accordingly slowed down the vehicles movement.
5. The demand forecast and development of public transport network study prepared by RITES and others in October, 2010 recommends that total Metro length within Delhi shall be 330 km., light Metro (LRT) 40.3 km. and BRT Corridors 359 km. in 2021 so as to take care of 255.27 lakh motorized daily trips estimated to be met by Public Transport Network in Delhi in 2021. The modal share of the estimated total daily trips of motorized vehicles will be 23.3% by Car, 18.6% by Two-wheelers, 32.8% by Bus, 20.1% by Metro, 4.6% by Auto and 0.5% by Train.
6. Future transport system shall consist of a mix of rail and road base system which includes Metro Rail, Ring Rail, dedicated Rail corridors for daily commuters (IRBT/RRTS), Bus Rapid Transit System (BRTS) and Inter-

mediate passenger transport on private modes on selected corridors to be identified as per the needs from time to time.

7. Establishment of a single authority is the need of the hour for planning/development of an integrated system, implementation and enforcement of the policies which may be framed in that context. This would help to avoid a wasteful expenditure and other problems that could arise from duplication, overlap and contradictory facilities. As such a single Unified Metropolitan Transport Authority is required for Delhi.
8. In order to reduce the congestion on the existing roads, additional/alternative linkages and Express Corridors need to be identified. Alignment of such urban relief roads may be along a drain or covering by the drain or in the form of elevated road or grade separators. Identification of some such urban relief roads has been mentioned in the MPD-2021.
9. In some critical areas in the city, construction of underground roads or tube roads may also be explored. To make the intersections or major junctions signal-free, construction of grade separators may be required on identified sites.
10. Free-ways or defined as Divided Arterial High Ways for vehicular traffic with full access control may also be examined. Free-way network in the NCR area is also required so that a criss-cross movement through Delhi is reduced.
11. The integration of all public transport modes is essential to provide convenient public transport system to the commuters in the city. Bus transport need to be planned in the form of Feeder Services to the Metro Rail Stations, ISBTs, Ring Railway System. Park and Ride facilities will also have to be developed at important Sites.
12. Bus Rapid Transit System is proposed to cover the entire city on all roads with ROW greater than 30 meters with exclusive bus lanes for the BRTS. New Bus Terminals need to be planned and developed in a strategic location to make the use of BRTS and Metro Stations more convenient for all

commuters.

13. Bicycle/cycle rickshaws could be an important mode of travel particularly with reference to short and medium trip lengths.
14. The congested areas of the walled city Sadar Bazar, Karol Bagh etc. need medium capacity mass transit system comprising of BRTS and LRT.
15. Parking is going to be a major problem area in the Transport Sector of Delhi. Besides public parking required in all institutional centers, markets and trade centers, parking in residential areas in Delhi need due attention and practical solutions by land developing agencies and colonies developers. Multi-level car parking under PPP approach need to be explored.
16. The unrestricted growth in the number of vehicles will create a number of problems not only for traffic flow on the roads but also for parking and pollution due to vehicular exhaust. Higher rates of parking and congestion fee for some selected areas may also be required as an incentive for use of public transport and disincentive for use of personal vehicles.
17. MPD-2021 recommends following Modal Split Projections for 2011 and 2021 :

Mode	Modal Split (%)		
	2001 (Actual)	2011	2021
Public Transport (including Rail/ Light Rail /MRTS/IRBT/Bus/ Tram)	64.1	70.25	80.00
Personal modes (including Personal Fast Modes/ Hired Fast Modes/ Hires Slow Modes/Bicycle)	35.9	29.75	20.00

18. Transport Demand Forecast Study in 2010 by RITES and others projected it as follows:

S. No.	Mode	Daily Trips-2021 (Intra City)	Modal Share (%)	Daily Trips-2007	Modal share (%)
1.	Car	2983510	17.1	1806380	15.5
2.	Two Wheeler	3490954	20.0	2976832	25.5
3.	Auto	549351	3.2	518329	4.4
4.	Public Transport	10409024	59.7	6369088	54.6
	<b>Total</b>	<b>17432839</b>	<b>100</b>	<b>11670629</b>	<b>100</b>

19. Transport Demand Forecast Study in 2010 by RITES and Others estimated Passenger Kilometers Served by various Modes in 2021 as under:

S No.	Mode	Daily Trips-2021 (Intra & Inter City)	Modal share by Trips (%)	Avg. Trip Length (in Km)	PKM (2021)	PKM Share (%)
1.	Car	5953694	23.3	11.3	67098136	23.4
2.	Two Wheeler	4751593	18.6	7.7	36539750	12.7
3.	Auto	1184732	4.6	9.6	11408969	4.0
4.	Bus	8377185	32.8	10.7	89803420	31.3
5.	Metro	5128868	20.1	15.3	78574256	27.4
6.	Train (Intra city)	131317	0.5	27.8	3651912	1.3
	<b>Total</b>	<b>25527388</b>	<b>100</b>		<b>287076443</b>	<b>100</b>

20. MPD-2021 projected Modal Split for 2011 and 2021 indicated in para-17 on the basis of projected population of 180 lakhs in 2011 and 230 lakhs in 2021. RITES has projected Intracity Trips in 2021 as indicated in para 18 and PKM

served by various modes in 2021 based on projected population of 182 lakhs in 2011 and 243 lakhs in 2021. RITES has then distributed projected population in 360 Transport Zones covering entire NCT in 2011 and 2021 to work out Modal Split and PKM projections.

21. In order to further increase the Modal Split in favour of public transport, some additional measures such as restriction on car ownership, increase in fuel cost, congestion pricing etc. may need to be thought at a time when all the areas in Delhi are provided with an adequate and convenient integrated public transport and thus alternative to car use is available.
22. An integrated passenger information system covering all modes through publication of common route guides, time-table and information boards at all-terminals for providing up-to-date information for the system users is also important. Introduction of common ticketing and their availability at convenient places will also be necessary.
23. To serve increasing traffic demand between Delhi and other NCR towns such as Panipat, Sonapat, Rewari, Alwar, Meerut, Hapur, Bulandshar, Palwal etc. dedicated commuter rail service should be provided in order to reduce traffic loads on Delhi roads.
24. Carriageway of major roads should be kept free of encroachments. A city-wide parking plan should also be prepared indicating where parking will be permitted and where not. Quality and enhanced capacity of footpaths need to be provided throughout the city.
25. Street lights, street signages, design of Central verge may need improvement not only from aesthetic point of view but also commuters convenience and maintenance point of view.
26. Storm water drain's maintenance and frequent road cutting are major problems in maintenance of roads in Delhi. Some viable solutions are required.