

## **Chapter - IV**

### **Traffic and Transportation**

#### **A. Introduction**

4.1 The need to take an integrated long term view of transport needs of CMA and to plan road development, public transport services and suburban rail transport as a part of the urban planning process have been well recognized as essential for the efficient functioning of the urban system.

4.2 The traffic and transportation schemes are presently implemented by several departments and agencies. While long-term planning and coordination is carried out by CMDA, individual schemes are executed by Southern Railway, National Highways Authority of India (NHAI), Department of Highways (DoH), Corporation of Chennai (CoC), and Metropolitan Transport Corporation (MTC). Traffic enforcement is done by Chennai Traffic Police (CTP).

4.3 While the urban rail network development is carried out by the Southern Railway, the major arterial & sub-arterial road corridors and other roads are developed and maintained by NHAI, DoH and the local bodies concerned respectively. The roads within the local body areas are improved and maintained by the Directorate of Municipal Administration, Directorate of Town Panchayats and Directorate of Rural Development through the local bodies concerned. As regards traffic management and enforcement, the same is looked after by the CTP in respect of Greater Chennai Area and District Police for the remaining CMA. The public bus transport is with MTC.

#### **B. Existing situation**

##### **Road Network**

4.4 The total length of road network in Chennai City is 2780 km. Chennai has radial and ring pattern of road network. Prime radial network comprises

- (i) Anna Salai (NH45)
- (ii) Periyar EVR Salai (NH4)
- (iii) Chennai-Kolkotta Salai (NH5) and
- (iv) Chennai-Thiruvallur Salai (NH205).

4.5 Other radial roads include Kamarajar salai, East Coast Road, Rajiv Gandhi Salai (OMR), NSK Salai (Arcot Road) and Thiruvottiyur High Road. Orbital road network implemented as per the First Master Plan comprises Jawaharlal Nehru Road (IRR) and Chennai By-pass Road. The orbital road network has improved the accessibility and reduced the congestion on the radial network particularly Anna Salai and Periyar EVR

Salai. Radial roads in and around Chennai Metropolitan Area (CMA) for a length of 250 km have also been improved.

### **Rail Network**

4.6 Commuter rail system in CMA operated by Southern Railway essentially consists of the following 3 lines:

- i. Chennai Beach - Tambaram, running south-west
- ii. Chennai Central - Thiruvallur, running west and
- iii. Chennai Central - Gummidipoondi, running north.

4.7 The first 2 lines have dedicated tracks for commuter trips. The 3<sup>rd</sup> line, however, caters to both suburban and inter-city passenger movement.

4.8 In addition phase I and phase II of MRTS are currently in operation traversing a length of more than 15 km covering the residential and IT corridor in the south-eastern part of the City.

### **Road Characteristics**

4.9 Following problems mark the road network:

- Poor quality of riding surface
- Inadequate, shrunken and encroached footpaths
- Lack of properly designed intersections
- Poor lighting conditions
- Missing links in the road network
- Mismatch between the growth rate of vehicles and road supply. Increase in road space accounts only 3 to 4% of the total area while 425 vehicles are added to the City every day and
- Poor drainage system compounded by frequent cutting open of carriageways and footpaths for attending to utility / service lines repair thereby substantially reducing the effective availability of road space / footpath.

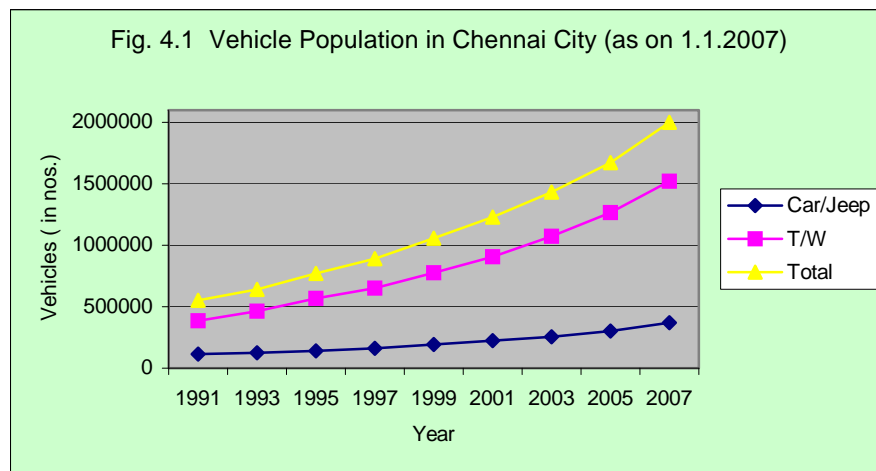
### **Rail Characteristics**

4.10 (i) The capacity of Chennai Beach - Tambaram rail line is especially restricted by the presence of a number of road / rail level crossings. Both the Chennai Beach - Tambaram and the Chennai Central - Gummidipoondi rail corridors witness overcrowding of trains during peak hours.

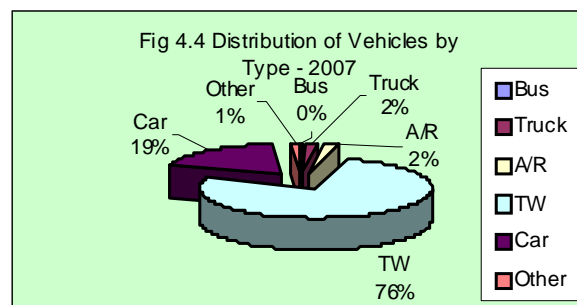
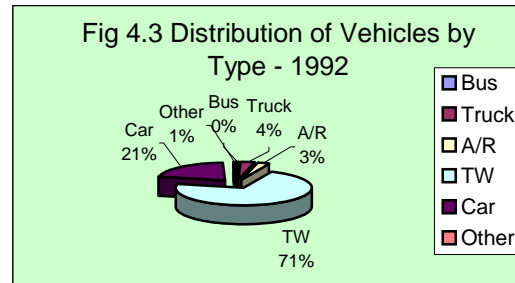
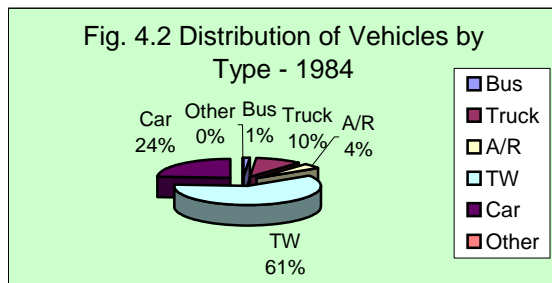
(ii) Despite development of the new rail corridor viz. MRTS, the patronage of the corridor has been below par. The same can be attributed to many factors which include lack of adequate access and circulation, under-development of inter-modal interchanges at the stations, higher rail fares and non-exploitation of the inter-operability of services among the four rail sectors.

## Trend of growth of vehicle population and its composition

4.11 Motor vehicle population has increased at a phenomenal rate during the last few decades. Fig.4.1 presents the trend of growth of motor vehicle population in Chennai City. Composition of vehicle population for the period 1984, 1992 and 2007 is shown in Fig. 4.2, 4.3 & 4.4 respectively. Figures reveal that the number of buses remained almost stagnant while two wheelers experienced a remarkable increase from 87,000 (1984) to 15,19,357 (2007).



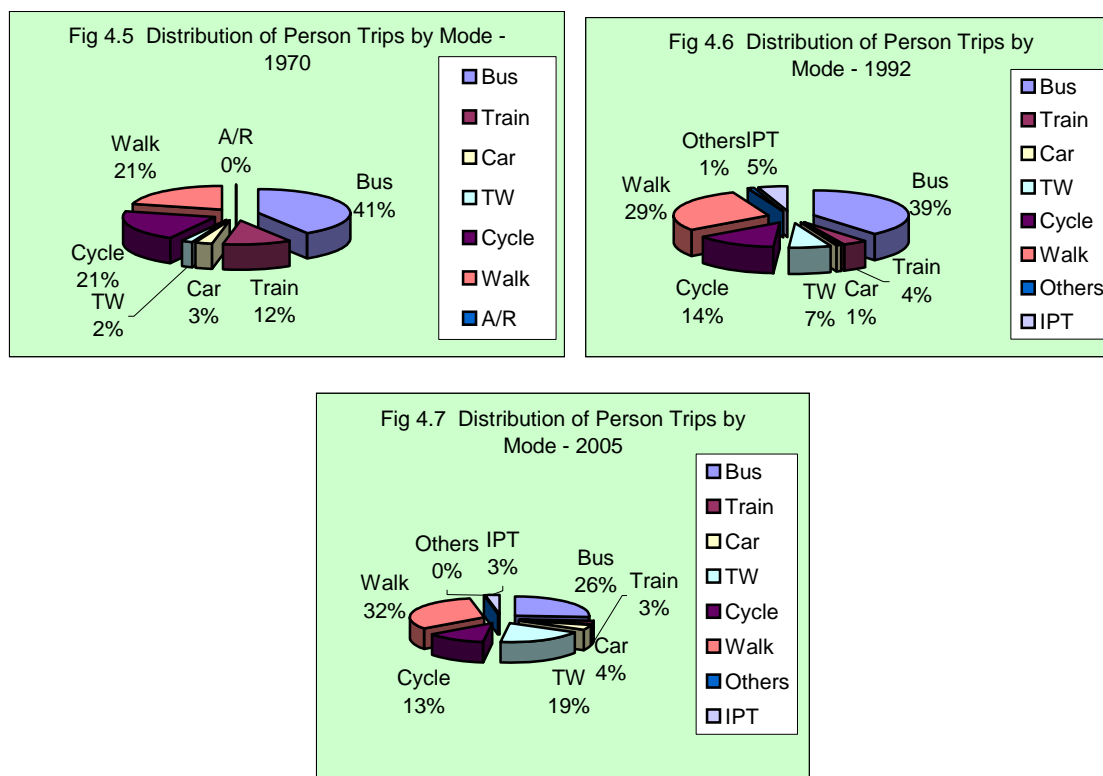
Distribution of Vehicle type



## Travel Characteristics

4.12 Per Capital trip rate is 1.30 per day and trip rate per household is 5.88 per day, as per the CTTS (Comprehensive Traffic and Transportation Study of 1992-95). Total person trips performed in Chennai were about 7.45 m and 9.59 m trips during 1992 and 2005 respectively. Fig. 4.5, 4.6 & 4.7 present distribution of person trips by mode during

1970, 1992 and 2005. It could be observed that the share of public transport, cycle and IPT have declined over years. This dismal trend can be attributed to the increasing vehicular ownership, the stagnant growth of bus fleet and the unsafe rights-of-way for the cycles.



## Traffic characteristics

4.13 Arterial roads leading to the CBD carry heavy traffic and are congested. Level of congestion on arterials and other major roads has increased seven-fold for the period 1984 to 2004. The average volume carried by Anna Salai during 2006 was about 1.58lakh PCU as against its capacity of 60,000 PCU per day.

4.14 The volume capacity (V/C) ratio on many links during peak hours was more than one. In CBD, the V/C ratio was more than 1.5 for most of the road links. Phenomenal growth of vehicles coupled with minimal increase in road space, has led to a low speed of 15 kmph in CBD and 20 kmph in other major roads. Provision of orbital roads such as IRR and Chennai By-pass (southern segment) has generally increased the speed on the radial roads.

## Bus Transport

4.15 MTC with a fleet size of 2815 buses is operating along 551 routes. Almost invariably buses run with crush-load. The overcrowding is as high as 150%. The demand far outstrips supply leading to inhuman conditions of travel. This could be attributed to the inadequate fleet strength and poor frequency. MTC has extended its coverage up to 50

km beyond the CMA. During 2007, MTC has purchased about 500 new buses. It has also introduced a new service known as deluxe bus at a premium with an objective to encourage those who use personal modes to shift to bus transport.

### **Goods Transport**

4.16 The number of goods vehicles in Chennai has increased from 6,671 in 1980 to 32,629 in 2005. According to a study by CMDA (1985) the main items of movement are manufactured goods (15.5%), building materials (9.9%), industrial raw materials (9.2%), perishables (9.1%) and parcels (8.5%).

4.17 The most important places of arrival and dispatch are George Town, Salt Cotaurs, Chennai Harbour, industrial estates at Guindy and Ambattur and the timber yards near Chromepet and Tambaram on NH-45 and the petroleum installations at Korukkupet and Manali.

4.18 At present the movement of goods vehicles is considered as a nuisance and hazard to other users and several restrictions are placed on their movement which evidently place an economic cost on the City.

4.19 CMDA had taken steps to shift some of the wholesale markets and create truck terminals on the periphery of the City. Of these Sathangadu steel market, Koyambedu perishables market and Madhavaram truck terminal have been made operational.

### **Traffic Management and Enforcement**

4.20 The City faces severe problem of congestion due to runaway growth of personalised vehicles. The traffic management in the City is marked by introduction of a series of one-way traffic system. The one-way traffic system has, however, implications on pedestrian safety and fuel consumption. One-way traffic is generally desirable when there are complementary roads and the additional traveling distance is not more than 300m as per IRC. Hence whenever such systems are introduced, the interests of public transport modes and pedestrians are duly addressed.

4.21 Traffic control devices, traffic signs and road markings are not adequately maintained to retain their legibility and visibility. Inadequate enforcement of traffic rules, lack of road sense and restraint by road-users and insufficient regulatory measures characterise the present situation.

## Parking

4.22 Demand for parking in the CBD is 2 times the supply. Acute shortage of parking supply is witnessed in commercial areas of Anna Salai, T. Nagar, Purasawalkam and Mylapore. Unauthorised and indiscriminate parking impedes free flow of traffic and causes accidents. Peak parking demand, as per a study in 2003, was 13,000 PCE as against the supply of 5,100 PCE. For example the supply in T. Nagar is 794 PCE against a demand of 2151 PCE and the supply in Parrys is 704 PCE against a demand of 4426 PCE. The haphazard parking has led to loss in the road capacity that ranges between 15% to 60%.

## Pollution due to Vehicular Emission

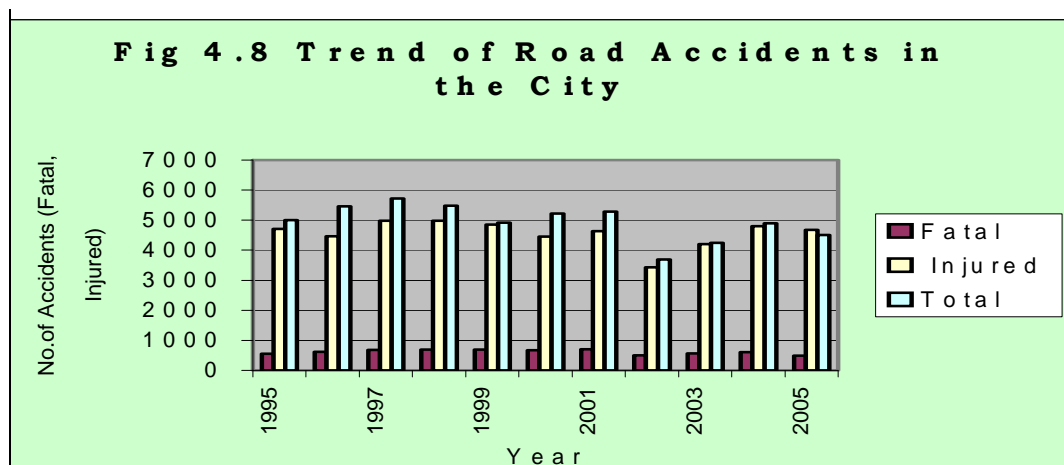
4.23 Pollution due to vehicular emission has done a lot of harm to the environment. Periodical monitoring conducted by the Tamil Nadu Pollution Control Board (TNPCB) revealed the following level of pollution:

<b>Pollutant</b>	<b>Load</b>	<b>Permissible level</b>
Carbon Monoxide (Co)	1908 to 4198 $\mu\text{g}/\text{m}^3$	2000 $\mu\text{g}/\text{m}^3$
Suspend particulate Matter (SPM)	264 TO 451 $\mu\text{g}/\text{m}^3$	200 $\mu\text{g}/\text{m}^3$

4.24 Another study carried out by TNPCB has also shown that the emission from nearly half the vehicles in the City exceeded the permissible limit.

## Road Accidents

4.25 Accident data reveals that on an average about 620 persons die on City roads annually. Fig. 4.8 shows the trend of road accidents over the years. Fatality rate works out to 35/10,000 vehicles. Other sources of data indicate that 42% of road accidents involve pedestrians and 10% cyclists. Chennai Traffic Police (CTP) is responsible for reporting and investigation of road accidents.



### Unified Metropolitan Transport Authority (UMTA)

4.26 The National Transportation Policy Committee (1980) recommended establishment of single transport authorities for Delhi, Mumbai, Calcutta and Chennai. In pursuance of this the Government of Tamil Nadu (GoTN) in June 1994 accepted in principle to form a Unified Metropolitan Transport Authority (UMTA) for Chennai. Based on the recommendations of a consultancy commissioned in 1995, GoTN have taken up with Govt. of India (GoI) for the setting up of the UMTA for Chennai.

4.27 The National Urban Transportation Policy approved by the GOI in April 2006 has also recommended creation of UMTA. Following various initiatives taken subsequently, the GoTN have decided in July 2007 to create the UMTA Orders since issued on 24-10-07.

### C. Projected Travel Demand

4.28 The travel demands have been projected on the basis of increase in per capita trips. The per capita trip that was 1.44 in 2005 (*HHI Survey carried out as part of the DPR for the Chennai Metro Rail Project, DMRC, 2005*) has been projected to 1.6 by 2016 and 1.65 by 2026.

4.29 Three scenarios based on different modal splits between the road and rail system have been contemplated. These have been worked out gradually increasing the modal share of the public transport and also increasing the share of the rail transport within the public transport modes. The scenario selected for master planning has the following assumptions.

- i) The modal split between public and private transport will change from 28:72 (2005) to 55:45 (2011) and 60:40 (2016), 65:35 (2021) and 70:30 (2026) in line with the trend in share of public transport increasing with city size.
- ii) The sub modal split between bus and rail will have to change from 91:9 (2005) to 75:25 (2011) and 70:30 (2016), 65:35 (2021) and 60:40 (2026).

**Table 4.1: Projected Daily Trips by Public Transport**

		2004	2011	2016	2021	2026
1. Population in lakh		75.61	88.71	99.62	111.98	125.82
2. Daily per capita Trips		1.32	1.50	1.60	1.60	1.65
3. Total Daily Person Trips in lakh		99.81	133.07	159.39	179.17	207.60
Scenario 2 Modal Split %	Private	64.57	45	40	35	30
	Public	35.43	55	60	65	70
Total Daily Person Trips by Public Transport in lakh		35.36	73.19	95.64	116.46	145.32
	By Rail %	14.54	25	30	35	40
	By Road %	85.46	75	70	65	60
Daily Trips in lakh	By Rail	5.14	18.30	28.69	40.76	58.13
	By Road	30.22	54.89	68.95	75.70	87.19

Source: Short term study to update CTTS (1992-95)(CMDA, RITES & PTCS, 2004)

4.30 The total person trips in the CMA which was 9.59 m / day have been projected to 20.76 m / day in 2026. The number of trips carried by bus transport in 2005 would become nearly 3.5 times in the year 2026. Similarly the volume of passengers to be carried by rail transport will be nearly 24 times the present volume.

#### **D. Policies and Strategies**

4.31 To cope with the scale of the travel demand projected for the horizon year 2026, the policies and strategies proposed are as follows:

i) Moving people rather than vehicles

Redefining the role of both the rail and bus transits so that they move the bulk of the travel demand in the metropolis. The strategy includes within itself

- Augmenting the coverage and capacity of the rail and bus transits resulting in higher accessibility and mobility to the commuters
- Removing bottlenecks in the rail transit and bus transit networks i.e. replacing road / rail level crossings by underpasses / overpasses, providing flyovers at critical road intersections
- Priority for bus transit by reservation of lanes along major arterial roads and priority at traffic signals
- Making the transit system affordable to all segments of the commuting population by differential pricing commensurate with the level of service, at the same time reducing the gap between the cost of operation and the revenue and
- Running mini-buses between the railway y. stations and nearby bus transit corridors and between railway. stations and residential areas.

ii) Integrating land use and urban transportation

Recognising the strong interrelationship between land use and transportation, land uses can be planned matching transportation supply and vice versa. The strategy includes within itself

- Carrying forward the process of planning and developing a road and transport network based on comprehensive traffic and transportation studies, as done in the implementation of the First Master Plan
- Recognising the energy, economic and environmental advantages of densifying developments around transit nodes, restructuring the land use distribution and disposition accordingly
- Ascertaining the adequacy or otherwise of the road and transport supply vis-à-vis, the land use planning for the plan period by undertaking a comprehensive transportation study and
- Recognising the fact that there is a wide gap in the supply of 2nd and 3rd order roads in the Outer-CMA and that in the absence of which the primary road network gets



unduly congested, developing a road network plan with a grid of 2km x 2km so that development of these road grids is implemented by the respective local bodies.

iii) Priorities to non-motorised transport (NMT)

Appreciating the fact that the modal share of trips made by cyclists and pedestrians is more than 45%, allocating higher proportion of road space for them, if not an equitable one. The strategy includes within itself

- Footpaths are not less than 1.5m in residential streets and 3.0m on major roads with commercial activities
- Redeeming the existing footpaths from such encroachments as flag-posts, hoardings, hawkers, shops, places of worship, eat-outs, construction materials, parking of vehicles, PCOs, telephone boxes, electrical transformers / junction boxes, traffic umbrellas, waste bins, milk booths etc.
- As in the case of evicting the encroachments on water-bodies with stringent penal actions as provided for in the recent Ordinance, similar legal framework is proposed for evicting the encroachments on footpaths / roads
- Demarcating stretches of roads or areas exclusively for movement by pedestrians and cyclists and
- Providing safe passage of pedestrian / cyclists by sub-ways.

iv) Optimising the existing road and transport infrastructure

Keeping pace with the increasing mobility requirements, increasing the supply of road and transport infrastructure. The core of the strategy, apart from creating new additional infrastructure, includes within itself -

- Optimising the capacity of existing road network by widening critical road links and intersections
- Optimising the capacity of signalised road intersections by periodically recalibrating the signal cycle times to cope with the traffic volumes including deployment of Area Traffic Control (ATC) system
- Programming to widen all the roads to their prescribed street alignment width in a phased manner with a finite timeframe
- Articulating the road network by developing missing links
- Improving the throughput of a corridor as a whole by appropriate intersection treatment in a phased manner vis-à-vis improving intersections sporadically across the road network
- Introducing high occupancy vehicles (HOV) lanes along critical road corridors
- Commensurate with the development densities along the corridor(s) upgrading the same as multi-modal transit corridors
- Introducing additional sub-urban rail stations along existing rail corridors

- Quadrupling the existing sub-urban rail system
- Augmenting the rail network for commuting by shifting the inter-regional terminal from city core to the city fringe (e.g. shifting the long distance terminal from Egmore to Tambaram) and
- Increasing the length of trains (3 coaches to 6 coaches to 9 coaches).

v) Putting a parking policy in place

Recognising parking control as a powerful tool in combating traffic congestion, the strategy is to

- Give effect to the off-street parking norms arrived at for various landuses through a comprehensive parking study; these are binding on all including the enforcing authority namely Chennai Traffic Police
- Develop multi-level parking at major traffic generating locations with (or without) private participation
- Develop park-and-ride facility at all critical sub-urban / RTS / metro rail stations
- Develop park-and-ride facility at all critical bus terminals
- Enforce effectively accommodating visitors' parking within flats
- Launch a special drive by CPT to remove unauthorised on-street parking and in the case of certain critical commercial streets, ban on-street parking permanently after giving adequate notice to the commercial establishments to arrange to provide off-street parking on their own to their customers, recognising the fact that the roads are meant only for movement and not for parking
- Introduce the concept of community parking
- Use the underneath space of flyovers for parking
- Ban operation of tourist cars / vans / taxis / trucks / lorries / buses if the operators do not have parking of their own
- So price the parking as to improve the parking turnover and reduce the use of private modes
- Make land owning agencies viz. Corporation of Chennai etc. to readily part with their land for the construction of multilevel parking complexes and
- Review the adequacy of parking standards periodically say, once in 5 years to cope with the increasing vehicular growth.

vi) Redefining the role of para-transit

Recognising the gap in travel demand unserved by either the transit modes or private modes, redefining the role of para-transit as a viable modal choice. The strategy is to

- Encourage wider coverage and capacity by the para-transit comprising autos, share autos, taxis, call taxis, call autos, maxi-cabs and cycle rickshaws
- Provide parking for para-transit at critical rail stations / bus terminals / bus stops

- Encourage cycle-rickshaws to operate between residential areas and transit routes and
- Regulate the operation of para-transit by enforcing minimum safety norms.

vii) Segregating freight traffic from passenger traffic

The seaport activities of the City necessitate the freight traffic to flow to and from the CBD. With the expanding cargo movement and the general traffic flowing virtually all through the day without the distinction between peak and non-peak hours, the necessity to plan and develop exclusive and semi-exclusive freight corridors not only from economic considerations but also to minimise the conflicts between passenger and freight traffic.

The strategy is to

- Plan and develop exclusive elevated corridors for freight traffic within the City core
- Plan and develop orbital roads in the form of urban bypasses to segregate inter-city traffic from intra-city traffic which essentially facilitate semi-exclusive freight movement
- Enhance the connectivity of seaports with National Highways and
- Plan and develop outstation truck terminals and parking.

viii) Deploying various travel demand management (TDM) measures

Recognising the fact that all the travel demand can not be satisfied by matching road and transport supply, the potentials of attacking the problem on the demand side itself rather than on the supply side merit consideration. The strategy is to

- Stagger the school opening times zone- wise
- Stagger the office opening times
- Stagger the holidays to markets sub-CBD- wise
- Encourage car-pooling and van-pooling
- Encourage the coverage and fleet size of share autos and maxi-cabs
- Allocate HOV lanes along major arterial roads
- Encourage new industrial complexes to provide quarters for their employees within their premises
- Decentralise major activities to reduce traffic
- Encourage tele-shopping and shopping through internet
- Deploy congestion pricing, hefty parking fees, permit system to own private vehicles, etc.

ix) Putting in place an environmental development management mechanism

To mitigate the negative impact of vehicular traffic on environment particularly air quality, it is necessary that various suitable measures are taken. The strategy is to

- Enlarge the segments of vehicular population converted to pollution free fuels viz. LPG / CNG / battery

- Strictly enforce the road users obtain EUC
- Establish an air quality monitoring system which maps the quality of air across the road network periodically
- Subject every major transport development measure to comply with environmental safeguards and
- Subject every major transport development measure to safety audit.

x) Setting up a unified institutional framework encompassing all modes

Recognising the positive synergies in setting up a single organisation to take care of all vehicular modes and to remove or minimise the redundancies in the number of departments / agencies presently looking after the various functions to plan, operate and regulate the different modes, creating a set up namely Unified Metropolitan Transport Authority (UMTA) for Chennai. The strategy is to

- Set up UMTA within a specified timeframe with coordinating, planning and advisory role initially but eventually graduating into a full-fledged regulatory and tariff fixing authority for all urban transport modes in CMA
- Take continued efforts to integrate bus and rail transport pending the formation of UMTA
- Mobilise additional resources for road development including collection of betterment levy provided for in the Tamil Nadu Highways Act
- Make private sector to participate not only in the development of urban transport infrastructure but also in the operation (e.g. bus transport, LRT, multilevel parking, toll plaza etc.) by employing such financing models as BOO, BOOT etc.
- Implement those options of development of urban transport infrastructure borne out of broad based public participatory approach and
- Establish a traffic database by capturing information on the traffic along road corridors by installing automatic traffic recorders.

xi) Enforcement as a potential tool for development

Unless the enforcement is incisive, the entire urban development planning exercise will not produce the desired results. The traffic could have been kept well under control if only the encroachments on road / footpaths and the unauthorised on-street parking have been ruthlessly removed by effective enforcement. The strategy is to

- Effectively keep all the roads, footpaths and designated off-street parking clear of encroachments both by the asset owning agencies and by the CTP by constant patrolling
- Organise campaigns and special drives to educate the road users to adhere to traffic discipline
- Delink driver training and licensing from the vehicle registration and licensing and

- Ensure training institutes catering to heavy vehicle drivers have driving simulators and audio visual presentation and evaluate drivers by written, oral and field tests.

xii) Promoting other transit options

Given the configuration of certain segments of the road network which can not lend themselves for development of metro rail or RTS, it is necessary to identify alternative transit solutions matching the profile of these segments of road network. The strategy is to

- Plan and develop mono-rail / LRT / ETB
- Plan and develop SKYBUS and
- Plan and develop hovercraft transport along seacoast.

xiii) Promoting innovative technologies / practices

The utility and capacity of urban transport infrastructure can be maximized by reinventing some of the (abandoned but) best practices or by deploying methods and techniques exploiting the advances in new technologies. The strategy is to

- Introduce the potential of information technology in the traffic management system viz. SCOOT / SCAT in area traffic control system, advanced passenger traveler information system etc.
- Make available the road metal recycling machinery (associated milling machine) to the contractors or include in the contract document use of the machinery mandatory to ensure that new road surface is laid without increasing the height of the pavement, considering the avoidable nuisances, caused by the constant raising of the road levels, to the properties on either side
- Construct half-elevated and half-below-road pedestrian sub-way which allows ease of crossing the road with the objective of improving the utility of pedestrian subways
- Adopt German type mobile flyover technology on pilot basis and extending the same based on its success
- Dewater vehicular sub-ways promptly during monsoon and use the same for rain water harvesting, Construct foot-over bridges / pedestrian sub-way connecting shopping complexes on either side in commercial centres
- Develop any road from the edges so that the reserve land is naturally protected as median
- Develop new roads with ducts for services / utilities
- Cement-concrete the existing road pavement particularly the road intersections and
- Take advance action to acquire land or tracts of land around major transit nodes / intersections so that these could be utilised not only for major junction improvement in future but also plan and develop organised urban (growth) centres exploiting the vantage location of these lands.

## **E. The Plan**

4.32 The shelf of urban transport infrastructure projects, based on various studies, incorporated in the draft Master Plan II, has been publicly disclosed. The shelf of projects has subsequently undergone enlargement and fine-tuning not only in the light of the objections and suggestions received during the public consultative process and subsequently moderated by the Committee on Transport constituted specifically for the purpose but also in the light of the schemes proposed for implementation in the medium and long term by a high level committee comprising all the agencies concerned with the urban transportation. The broad shelf of urban transport infrastructure projects with rough cost estimates wherever readily available is indicated in the Annexure I & II.

4.33 A quick review of the shelf of projects, indicate that the targeted modal share of 70% by public transport is fairly realizable provided the metro rail network is implemented in full and the road network expanded by development of elevated highways. The total person trips by motorised vehicles constituted 54.5% of all person trips made in the CMA in 2005. The target of 70% of these trips by the public transport (i.e 38.15% of all person trips by motorised vehicles) by 2026 works out to 7.9m trips / day. With the implementation of 46km of Metro rail which would carry not less than 0.4m trips / day, the MRTS together with the sub-urban network 0.8m trips / day and the MTC with the expanded fleet size of not less than 6000 and a network of BRT carrying about 7.0m trips / day, the target is fairly achievable (*even though the rail transit is expected to carry as much as 6 m trips / day*). As for the remaining person trips by motorised vehicles (i.e 30% of all person trips by motorised vehicles) works out to 3.4m trips per day by 2026. Implementation of the network of elevated highways, the network of BRT and the series of debottlenecking measures viz. underpasses / overpasses, flyovers, etc proposed in the shelf would assist in coping with these many trips by private vehicles.

4.34 While every scheme in the shelf might merit consideration in its own right, it is necessary that the shelf is validated as a whole with a view to eliminate any redundancy. Further some schemes that prima facie qualify on a conceptual basis require detailed studies to establish their feasibility. The recently commissioned 18-month Comprehensive Transportation Study (CTS) would assist in validating the shelf of schemes. Implementation of every major scheme would, however, be preceded by a public interface and a detailed feasibility study to comply with the economic, environmental and social considerations.

## **F. Monitoring and Review**

4.35 A committee to be known as “ Traffic, Transportation, Road and Rail, Para Transport and Communication Committee” with representation of Government and non-government stakeholders and experts will be constituted to monitor the implementation of

policies and strategies in this sector and to initiate such studies and assemble such information as needed for the purpose. This committee will meet at least once in three months or as many times as needed. It will draw up detailed terms of reference for its work in consultation with the concerned stakeholders.

4.36 This committee may work through special working groups created for the purpose for the different sub-sectors under it.

## Annexure I

### List Of Medium – Term Transportation Schemes

Sl. No.	Project	Broad Cost (Rs. in crores)
<b>A.</b>	<b>Urban Rail Transit System</b>	
A1	Augmentation of rail network	
i)	MRTS extension from Velachery (about 5km)	600.00
ii)	3rd rail line from Beach to Korukkupet (4.1km)	55.23
iii)	3rd rail line from Korukkupet to Athipattu (18km)	70.56
iv)	Central- Egmore rail link (2.6km)	80.00
	Sub –total (A1)	805.79
A2	Road/Rail crossings - RoB/RuB	
i)	At Vyasarpadi on GNT Road	74.53
ii)	Villivakkam - Ambattur (11/31A - 12/1)	15.00
iii)	Tambaram - Vandalur (32/11-12)	15.00
iv)	Villivakkam - Ambattur (13/4 – 6)	15.00
v)	Ambattur - Avadi (17/34 - 18/2)	15.00
vi)	Pattabiram Military siding (1042 – 1043)	15.00
vii)	Avadi - Pattabiram East (23/12-14)	15.00
viii)	Tondiarpet - Tiruvottiyur (7/22-24)	15.00
ix)	Tambaram - Perungalathur (32/8-9)	15.00
x)	Vandalur - Oorapakkam (36/6-7)	15.00
xi)	On MKT Road @ Minjur Station (LC16)	15.00
xii)	Karunika street	8.00
xiii)	Meenambakkam	10.00
xiv)	Vaishnav College @ Chrompet	2.70
	Sub -total (A2)	245.23
<b>A3</b>	<b>Pedestrian facility @ Railway Stations</b>	
	Escalators in sub-urban stations (30)	75.00
	Sub –total (A3)	75.00
	<b>Total (A)</b>	<b>1126.02</b>
<b>B.</b>	<b>Urban Bus Transit System</b>	
B1.	<i>Fleet augmentation</i>	
	Replacement of 500 to 600 buses / year & augmentation of 500 to 600 buses / year	733.00



Sl. No.	Project	Broad Cost (Rs. in crores)
	Sub –total (B1)	733.00
B2.	Depots and terminals	
i)	Construction of 26 new bus depots (Kovalam,, Kelambakkam, Thaiyur, Semmancheri, Medavakkam, Agaramthen, Vandalur, Guduvancherry, Mudichur, Somangalam, Kundrathur, Mangadu, Noombal, Kamarajnagar, Kil Ayanambakkam, Chembarabakkam, Puduksathram, Thirunindravur, Pudur, Ayappakkam, Teachers' Colony (Kolathur), Alamathi, Padiyanallur, Karanodai, Madhavaram Milk Colony and Manali New Town)	212.00
ii)	Construction of 11 new bus terminals (Broadway, Anna Square, Sholinganallur, Tambaram East, Vandalur, Mangadu, Saligramam, Chembarabakkam, Thirunindravu, Ayapakkam and Kallikuppam)	33.00
iii)	Renewal of existing depots and bus terminals (34)	100.00
iv)	Machinery & equipments for the new depots	50.00
	Sub – total (B2)	395.00
B3.	Other operational infrastructure such as computerisation & networking, electronic route boards, electronic ticketing system, on-line GPS for vehicle tracking, PIS and IVRS system	175.00
	Sub – total (B3)	175.00
B4.	Bus Rapid Transit ways (Limited)	
i)	Rajiv Gandhi Salai (OMR) (20km)	100.00
ii)	Taramani Link Road (5km)	25.00
iii)	MBI Road (15km)	75.00
iv)	Pallavaram Thorapakkam Road (15km)	75.00
v)	Sardar Patel Road (10km)	50.00
vi)	NSK Salai (Arcot Road) – KS Road (20km)	100.00
vii)	Mt. Poonamallee Road (15km)	75.00
	Sub -total (B4)	500.00
B5.	Bus lay-byes & Shelters	
i)	Construction of bus lay-byes and bus shelters (200 Nos.)	50.00
ii)	Bus stand improvement (Municipalities)	2.70
iii)	Bus stand improvement (TP)	0.75
iv)	Bus stand improvement (VP)	4.90
	Sub -total (B5)	58.35
	<b>Total (B)</b>	<b>1861.35</b>

Sl. No.	Project	Broad Cost (Rs. in crores)
<b>C</b>	<b>Development Of Road Network</b>	
C1	Elevated highways	
i)	From Light House to Besant Nagar across Adyar Estuary (10 km length) and on to ECR (along existing road links)	500.00
ii)	Along City Waterways (52.6km along existing links and 46.7km new construction)	2500.00
iii)	Along Jawaharlal Nehru Salai (IRR) from SIDCO Junction (km0/6) to Koyambedu Kaliamman Koil Street Junction (km8/1)	600.00
iv)	Along Arcot Road from Vadapalani up to Porur	300.00
v)	Along Thiruvottiyur High Road from Tollgate to Ernavur Bridge	250.00
vi)	Along Rajaji Salai from Parrys Corner to Tollgate @ Thiruvottiyur	350.00
vii)	Along Nungambakkam High Road, Valluvar Kottam High Road, Mc. Nichols Road, College Road and Haddows Road	300.00
viii)	Along G.S.T Road from Chennai Port to Tambaram	1,400.00
	Sub -total (C1)	6,200.00
C2	Development of Freight Corridors	
i)	Elevated Highway along the banks of River Cooum from Chennai Port to Maduravoyal	800.00
ii)	Truck terminal on GST Road @ Maraimalai Nagar	75.00
iii)	Truck terminal @ the intersection of ORR & 200' wide arterial road at Karunakkarancheri	500.00
	Truck parking at Manali	75.00
	Sub-total (C2)	1450.00
C3.1	<i>Major Flyovers</i>	
i)	@ Madhya Kailash junction	150.00
ii)	@ Thiruvanmiyur West Avenue x LB Road junction	30.00
iii)	On Anna Salai combining i) Blackers Road junction, ii) Dams Road x Thiru-Vi-Ka Road (General Patters Road) junction and iii) Binny's Road x Pattulos Road junction;	75.00
iv)	On Anna Salai combining i) Eldams Road x Theagaraya Road intersection, ii) Cenatoph Road junction, iii) Venkata Narayana Road x Chamiers Road intersection and iv) CIT I Main Road junction	82.00
v)	@ the junction of Anna Salai and Sardar Patel Road	22.00
vi)	On Periyar EVR Salai combining i) Nelson Manickam Road junction and ii) Anna Nagar III Avenue junction	60.00

Sl. No.	Project	Broad Cost (Rs. in crores)
vii)	@ the intersection of IRR x Anna Nagar II Avenue Road @ Thirumangalam	30.00
viii)	@ the intersection of IRR x Arcot Road @ Vadapalani	30.00
ix)	@ the intersection of GNT Road x Madhavaram High Road @ Moolakkadai	42.72
x)	@ the intersection of Mount-Poonamallee Road x KS Road x Kundrathur Road @ Porur	28.40
xi)	@ the junction of Taramani Link x M.B.I.Road @Vijayanagaram	60.00
xii)	@ the junction of M.P.road x Poonamallee Kundrathur Road @ Poonamallee Town.	60.00
xiii)	@ the junction of Mount Madipakkam Road x Pallavaram Thorapakkam Road	30.00
xiv)	@ the junction of Anderson Road Medavakkam Tank Road x Konnur High Rd	30.00
xv)	@ Anna Nagar Roundtana	30.00
xvi)	@ the junction of New Avadi Road x Kilpauk Garden Road	15.00
	Sub-total (C3.1)	775.12
C3.2	<i>Mini Flyovers</i>	
i)	At the intersection of Old Jail Road and Basin Bridge Road @ Mint jn.	20.00
ii)	On Dr. Ambedkar College Road @ Ganesapuram	15.00
	Sterling Rd. and College Road junction	20.00
	Dr. Gurusamy bridge Road and Periyar EVR Salai	20.00
	Sub-total (C3.2)	75.00
	Sub-total (C3)	850.12
C4	Widening of Bridges And Culverts	
	Widening of major bridges across rivers	
i)	Additional two lanes to Thiru-Vi-Ka Bridge across Adyar river	9.00
ii)	Construction of new bridge across Cooum river at Mogappair	5.00
iii)	Construction of new bridge across Ennore creek	20.00
iv)	Additional two lanes to the bridge on Sardar Patel Road across B'canal	1.00
v)	Construction of new bridge across Cooum river at Nolambur	5.00
vi)	Construction of new bridge across Cooum river along Karumariamman koil Road	5.00
	Sub -total (C4)	45.00

<b>Sl. No.</b>	<b>Project</b>	<b>Broad Cost (Rs. in crores)</b>
C5	New Link Roads	
i)	Tambaram Eastern Bypass (from MBI Road to GST Road) (9 km)	45.00
ii)	Puzhal to IRR (4 km)	20.00
iii)	Link Road between Thiru-Vi -Ka Bridge and Kotturpuram Bridge along southern bank of Adyar river and extending up to Marai Adigal bridge (4.4 km)	50.00
iv)	Link road between Madhaya Kailash and Muthuramlinga Thevar Salai along West Canal Bank Road (1.8 km) (elevated)	40.00
v)	Link from Kotturpuram – Gandhi Mandapam Road and West Canal Bank Road (utilising the approach road to Birla Planetarium and existing road behind CLRI) (1.16 km)	25.00
vi)	Link road along Ponni Amman Koil Street connecting Gandhi Mandapam Road and West Canal Bank Road (1 km)	30.00
vii)	Link road between Rajiv Gandhi Salai (OMR) and East Coast Road (Pallavan Kudiruppu to Prarthana Theatre) (3 km)	30.00
viii)	Link road between Rajiv Gandhi Salai (OMR) and East Coast Road at Palavakkam	30.00
ix)	Outer Ring Road from NH45 to TPP Road : 0/00 – 62/0 (62 km)	900.00
x)	Outer Ring Road from ECR to NH45	157.00
xi)	Outer Ring Road from Seemapuram to Ennore Port	93.40
xii)	Missing link of Outer Ring Road from MBI Road to Rajiv Gandhi Salai (OMR) through Jaladampettai (4km)	60.00
xiii)	Ambattur Estate to ORR (via Paruthipattu) (15 km)	150.00
xiv)	Bypass roads to Tirumazhisai & Tiruvallur towns (12 km)	180.00
xv)	Link road between New Avadi Road and Medavakkam Tank Road	5.00
xvi)	Mudichur Road to Darkas Road (2km)	4.00
xvii)	Velachery – Rajiv Gandhi Salai link Road (3.2km) (4 lane)	32.00
xviii)	Velachery - Kelambakkam Link Road –(8.6) (4 lane)	86.00
xix)	Darkas Road to Mudichur Road via TNHB Colony (1.2km)	1.44
xx)	Tambaram Sanatorium to ORR (5.5km) (4 lane)	55.00
	Sub-total (C5)	1993.84
C6.	Widening Strengthening and resurfacing of arterial, sub-arterial and collector roads to at least 4 lane width	
i)	in City (100 km)	100.00
ii)	in CMA (400 km)	1,600.00
iii)	Nesapakkam Road	14.00
iv)	Improving Bus Route Roads (300 km)	300.00

Sl. No.	Project	Broad Cost (Rs. in crores)
v)	Vadaperumbakkam Chettimeedu Nayaru Road, km 0/0-24/0 (four lane)	150.00
vi)	The link road connecting Kaliasman koil street and NH4 through Nerkundram road to act as a parallel road to Jawaharlal Nehru Salai (IRR) behind the KWMC (km 0/0-2/4) (four lane)	47.00
vii)	Alandur Road (4 lane)	7.20
viii)	Velachery tank south bund Road (2km) (4 lane)	12.00
ix)	From Anna Salai (Alandur) to Station (3km)	18.00
x)	Medavakkam Main Road (0.9km)	5.40
xi)	Velachery Road (3km)	3.00
xii)	Mudichur Road from G.S.T. Road to ORR (5.8km)	34.80
xiii)	Choolaimedu High Road (four lane)	5.00
xiv)	Redhills road from Srinivasa Nagar to CTH Road	15.00
xv)	Thirunneermalai Road (1.5km)	10.50
xvi)	Kishkinta Road (2.7km)	1.69
xvii)	Agaram Road	15.00
	Sub-total (C6)	2,338.59
C7	Concreting of City Roads	
C7a	Concreting of City Roads (20km) I phase (Cochrane Basin Road, Tondiarpet High road, Konnur High Road, Anna Nagar III & IV Avenue, MGR Salai, Ashok Nagar IV Avenue, Ashok Pillar Road, Anna Main road and Velachery Main Road)	95.00
C7b	Concreting of City roads II Phase (i) Kamarajar Salai & Santhome High Road : km 2/7-7/5 (4.8km) @ Rs.20.00cr; ii) Nungambakkam High Road (1.4 km) @ Rs.5.00cr; iii) Dr.Radhakrishna Road & Cathedral Road (3.3 km) @ Rs.17.00cr; iv) College Road & Haddows Road (1.5 km) @ Rs.5.00cr; v) Rajaji Salai (2.5 km) @ Rs.10.00cr; vi) Lattice Bridge Road (3.5 km) @ Rs.14.00cr; vii) Venkatnarayana Road & North Usman Road (3 km) @ 12.00cr; viii) Muthuramalinga Thevar Salai (Chamiers Road & Greenways Road) (3 km) @ Rs.13.00cr; ix) Purasawakkam High Road (1.5 km) @ Rs.13.00cr and x) Millers Road, Gangadeeswar Koil st. & Alagappa Road (1.5 km) @ Rs.10.00cr)	118.00
C7c	Concreting of Major roads (i) G.S.T road to 0/0 - 28/0 (28 km) @ Rs.150.00cr and ii) G.N.T.Road (Walltax Road) 0/8-3/2 (2.5 km) @ Rs.10.00cr)	20.00
	Sub-total (C7)	233.00
C8	Improvements with white-topping and landscaping @ <b>25 junctions</b> @ Rs.3.00cr each (Jawaharlal Nehru Salai (IRR) @ its jn. near SIDCO, its jn. with Pillayar Koil st. near Kasi Theatre, its jn. with Udhayam theatre, its	75.00

Sl. No.	Project	Broad Cost (Rs. in crores)
	<i>jn. @ Ashok Pillar, its jn. with Ambedkar road, its jn. with P.T. Rajan Salai, its jn. with Anna Nedum Pathai, its jn. with Periyar Pathai, its jn. @ Vinayagapuram, its jn. with Kaliyammann Koil St., its jn. with Anna Nagar II Avenue, its jn. @ Thirumangalam and its jn. with School Road; Adyar jn.; Thiruvnmijur jn.; TTK Road &amp; Dr. Radhakrishnan Salai jn.; Turnbolls Road jn.; Canal Bank Road &amp; Mandhaveli jn.; Parrys Corner &amp; Rajaji Salai jn.; Kellys jn.; Purasavakkam High Road &amp; Millers Road jn.; Kilpauk Garden Road &amp; Anna Nagar I Avenue @ Chinthamani; Anna Nagar Roundtana; Konnur High road &amp; Medavakkam Tank road jn.; and Perambur High Road &amp; Lucas Road jn.)</i>	
	Sub-total (C8)	75.00
C9	<i>Utility Duct and Storm Water Drains along Major Roads</i>	
i)	City Roads (500 km)	700.00
ii)	NH (urban) & Jawaharlal Nehru Salai (IRR) (70 km)	90.00
	Sub-total (C9)	790.00
C10	<i>Road works including bridges/culverts / concreting / black-topping in Municipalities, Town Panchayats and Village Panchayats in outer -CMA</i>	
i)	Road works including bridges/culverts in 16 Municipalities in outer CMA ( <b>Ambattur</b> : 933 works : 270.7 km @ Rs.151.17cr; <b>Avadi</b> : 506 works : 475.68 km @ Rs.79.24cr; <b>Kathivakkam</b> : 142 works : 37.77 km @ Rs.5.12cr; <b>Madhavaram</b> : 1288 works : 328.40 km @ Rs.66.05cr; <b>Thiruvottiyur</b> : 689 works : 482 km @ Rs.105.20cr; <b>Alandur</b> : 848 works : 187.19 km @ Rs.39.71cr; <b>Pallavapuram</b> : 1396 works : 374 km @ Rs.83.74cr; <b>Tambaram</b> : 187 works : 178.25 km @ Rs.43.87cr; <b>Anakaputhur</b> - 153 works - 56.57 km @ Rs.8.26cr; <b>Pammal</b> : 626 works : 121.6 km @ Rs.15.80cr; <b>Puzhuthivakkam</b> : 398 works : 120.94 km @ Rs.22.92cr; <b>Madhuravoyal</b> - 321 works - 102.72 km @ Rs.15.95cr; <b>Poonamallee</b> : 256 works : 105.01 km @ Rs.10.39cr; <b>Thiruverkadu</b> : 150 works : 91 km @ Rs.11.93cr; <b>Valasaravakkam</b> : 115 works : 82.22 km @ Rs.12.54cr; and <b>Manali</b> : 90 works : 26.50 km @ Rs.3.26cr)	675.15
ii)	Concreting of roads in the above 16 Municipalities in outer CMA (939 works : 170.52 km)	22.69
iii)	Black-topping of roads in the above 16 Municipalities in outer CMA (1637 works : 438.45 km)	38.61
iv)	Road works(including bridges/culverts / concreting / black-topping) in Town Panchayats in outer CMA	61.30
v)	Road works(including bridges/culverts / concreting / black-topping) in Village Panchayats in outer CMA	145.10
	Sub -total (C10)	942.85
	<b>Total (C)</b>	<b>14918.40</b>

Sl. No.	Project	Broad Cost (Rs. in crores)
<b>D</b>	<b>Pedestrian Facilities</b>	
D1	Subways	
i)	Along <b>Anna Salai</b> @ the following 6 locations @ Rs.3cr each: a) GP Road junction b) Nandanam Chamiers Road junction c) Thodhunter Nagar d) Saidapet Bazaar Road junction e) Little Mount A.G. Church f) TNPL Office	18.00
ii)	Along <b>GST Road</b> @ the following 2 locations @ Rs.3cr each: a) M.K.N. Road junction b) Chrompet	6.00
iii)	Along <b>Periyar EVR Salai</b> @ the following 6 locations @ Rs.3cr each: a) Dasaprakash b) Pachaiappas College c) Aminjikarai Market d) Anna Arch e) N.S.K. Nagar junction f) Vaishanava College	18.00
iv)	Along <b>Jawaharlal Nehru Salai (IRR)</b> @ the following 7 locations @ Rs.3cr each: a)Ekkattuthangal b)14th Avenue junction c) Ashok Pillar d) Arcot Road junction e) C.M.B.T. f) Kalamman Koil junction g) Thirumangalam	21.00
v)	Along <b>other major roads</b> @the following 13 locations @Rs.3cr each: a) Nungambakkam High Road @ IOC junction b) Dr.Radhakrishnan Salai @ Q.M.C. c) Sardar Patel Road @ Anna University d) Sardar Patel Road @ C.L.R.I. e) Kamarajar Salai @ PWD Complex f) Kamaraj Salai near Light House g) College Road @ Meteorological Office h) Thiruvanniyur ECR - Marundeeswarar koil point i) N.S.K. Salai - Vadapalani Depot j) N.S.K. Salai - Meenakshi College k) Porur - M.P. Road junction l) Greenways Road @ Sathya Studio m) Thiruvanniyur - LB Road junction n) Valasaravakkam - Arcot Road junction o) Old Jail Road opp. Stanley Hospital p) GNT Road opp. Puzhal Central Prisons	48.00
	Sub-total (D1)	111.00

Sl. No.	Project	Broad Cost (Rs. in crores)
D2	Escalators	
	Providing escalators at 20 FoB / Sub-way locations	50.00
	Sub-total (D2)	50.00
D3	Footpaths	
i)	Along Arcot Salai	10.00
ii)	Along Mt.Poonamallee Road	28.00
iii)	Along Kundrathur Road	10.00
	Sub-total (D3)	48.00
	<b>Total (D)</b>	<b>209.00</b>
<b>E.</b>	<b>Multi -Level Car Parking</b>	
i)	At Panagal Park, T.Nagar (8 floors catering to 361 cars & 290 TW)	15.89
ii)	Broadway Bus Stand (7 floors catering to 69 buses, 369 cars & 310 TW)	14.80
iii)	MUC ground (5 floors catering to 576 cars & 178 TW)	28.88
iv)	Govt. Estate Anna Salai (6 floors catering to 426 cars )	11.17
v)	Adyar (Gandhi Nagar) bus terminal (1 floor catering to 100 cars & 105 TW)	5.62
vi)	T.Nagar bus terminal (5 floors catering to 36 buses & 472 cars )	16.62
	<b>Total (E)</b>	<b>92.98</b>
<b>F</b>	<b>Expansion Of Port Activities</b>	
i)	Additional facilities at Chennai port under National Maritime Development Project (including reception facilities for ICD containers, multi-level car-parking facility, 2 <sup>nd</sup> container terminal, desalination project of 3000MT/day, ship repair facility and port connectivity-bridging gap)	<b>418.00</b>
ii)	Expansion of the Ennore Port through EPL (including tankage terminals, 1000 MW power plant, Ennore Special Economic Zone, 2000 MW power plant, container terminal, LNG terminal, LNG Regassification facilities and power plant, POSCO Steel - steel plant)	<b>6500.00</b>
	<b>TOTAL (F)</b>	<b>26918.00</b>
<b>G</b>	<b>Expansion Of Airport Activities</b>	
	Expansion of existing airport	<b>2000.00</b>
	Development of Greenfield airport	
	<b>TOTAL(G)</b>	<b>2000.00</b>



<b>Sl. No.</b>	<b>Project</b>	<b>Broad Cost (Rs. in crores)</b>
<b>H</b>	<b>Creating Traffic Data Base For City</b>	
	Installation of automatic traffic recorders at 15 locations	<b>10.00</b>
	<b>TOTAL (H)</b>	<b>10.00</b>
<b>I</b>	<b>Air Quality Monitoring System</b>	
	Establishment of air quality monitoring system for the City	1.00
	<b>Total (I)</b>	<b>1.00</b>
	<b>Grand Total</b>	<b>47811.90</b>

- *Costs are not readily available*

## Annexure II

### The List of Long – Term Urban Transportation Schemes

Sl. No.	Project	Broad Cost (Rs. in crores)
<b>A.</b>	<b>Urban Rail Transit System</b>	
A1	Augmentation of rail network	
i)	Metro rail ( 46.5 km including 14km UG)	9032.00
ii)	4 <sup>th</sup> rail line from Beach to Athipattu (22.1km)	50.23
iii)	Extension of MRTS from Thiruvanmiyur to Mammallapuram	4000.00
iv)	Avadi -Sriperumbudur -Kancheepuram new link	355.00
v)	Saidapet -Sriperumbudur - Kancheepuram new link (partly elevated)	2500.00
vi)	Athipattu -Puthur & Link line from Periyapalayam to Tiruvallur	635.00
vii)	2 <sup>nd</sup> line from Chengalpattu to Arakkonam (60 km)	150.00
viii)	3 <sup>rd</sup> & 4 <sup>th</sup> line from Tambaram to Chengalpattu (30 km)	150.00
ix)	5th & 6th line from Chennai to Avadi	300.00
x)	4 <sup>th</sup> line from Tiruvallur to Arakkonam (30 km)	80.00
xi)	3 <sup>rd</sup> & 4 <sup>th</sup> line from Athipattu to Gummidipoondi (25 km)	120.00
xii)	Dedicating 4 lines for commuter service between Egmore and Tambaram consequent to development of Tambaram Railway Station as coaching terminal	*
xiii)	Additional metro rail from Foreshore Estate-Mylapore-T.Nagar-Vadapalani-Porur	*
xiv)	Rail line from Sriperumbudur and Chengalpattu via Oragadam	*
xv)	Rail line from Kelambakkam to Vandalur	*
xvi)	Rail line from St. Thomas Mt. to Porur	*
xvii)	Circular rail line from Chennai Beach to Chennai Beach via Tambaram, Chengalpattu, Kancheepuram and Arakkonam	*
	Sub-total (A1)	17372.23
A2	<i>Road/Rail crossings - RoB/RuB</i>	
	A new RoB between Wimco Nagar and Ennore railway stations	25.00
	Sub-total (A2)	25.00
A3	<i>Inter-City Rail Terminals</i>	*
i)	Augmentation of passenger terminal facilities at Chennai Central and Tambaram stations	300.00
ii)	Developing rail terminals at MM Nagar, Thiruvallur and Gummidipoondi	*
iii)	New coaching terminal at Thirumazhisai	*
iv)	Royapuram Railway Station as coaching terminal	*
v)	Tambaram Railway Station as coaching terminal	*

<b>Sl. No.</b>	<b>Project</b>	<b>Broad Cost (Rs. in crores)</b>
vi)	Villivakkam Railway Station as Coaching Terminal	*
	Sub-total (A3)	300.00
<b>A4</b>	<i>Pedestrian facility @ Railway Stations</i>	
i)	Pedestrian subway at Nungambakkam	2.0
ii)	Pedestrian subway at Kodambakkam	2.0
iii)	Escalators in sub-urban stations (30)	75.00
	Sub-total (A4)	79.00
<b>A5</b>	<i>Commercial exploitation of vantage rail stations</i>	
i)	RTS Stations (9)( Mandaveli, Greenways Road, Kottur, Kasthurba Nagar, Indira Nagar, Thiruvannamiyur, Taramani , Perungudi & Velachery )	50.00
ii)	Sub-urban stations (15)	75.00
	Sub-total (A5)	125.00
	<b>Total (A)</b>	<b>17901.23</b>
<b>B.</b>	<b>Urban Bus Transit System</b>	
<b>B1</b>	<i>Bus Rapid Transit-ways (Full-fledged)</i>	
i)	Anna Salai (30km)	300.00
ii)	Periyar EVR Salai (25km)	250.00
iii)	Jawaharlal Nehru Salai (IRR) (45km)	450.00
iv)	GNT Road (20km)	200.00
v)	CTH Road (15km)	150.00
vi)	Chennai Bypass (20km)	200.00
vii)	Outer Ring Road (ORR) (62km)	620.00
viii)	CMBT to Sriperumbudhur (25km)	300.00
	Sub-total (B1)	2470.00
<b>B2</b>	<i>Inter-City Outstation Bus Terminals</i>	
	Terminals at the 4 intersections of ORR with NHs	800.00
	Sub-total (B2)	800.00
	<b>Total (B)</b>	<b>3270.00</b>
<b>C</b>	<b>Mono-Rail / LRt</b>	
i)	Dams Road jn.-Royapettah-Mylapore-Adyar-Guindy (Halda jn.)	480.00
ii)	Kalangaraivilakkam RTS Staion- Anna flyover-Kilpauk-Perambur	1000.00
	<b>Total (C)</b>	<b>1480.00</b>
<b>D</b>	<b>Development Of Freight Corridors</b>	
i)	Road connecting Ennore Port (northern gate) and NH5 @ Thatchur	100.68
ii)	Road connecting Ennore Port (northern gate) and TPP Road @ Vallur	142.98

Sl. No.	Project	Broad Cost (Rs. in crores)
iii)	Developing an exclusive road along Beach connecting Ennore Port and Chennai Port for container traffic	1500.00
iv)	Truck terminal @ the intersection of ORR & GST Road	750.00
v)	Truck terminal @ the intersection of ORR & GWT Road	750.00
vi)	Truck terminal @ the intersection of ORR & GNT Road	750.00
	<b>Total (D)</b>	<b>3993.66</b>
<b>E</b>	<b>Development Of Road Network</b>	
<i>E1</i>	<i>Elevated highways</i>	
i)	Along Anna Salai	750.00
ii)	Along EVR Salai	600.00
iii)	Along Kamarajar Salai	480.00
iv)	Along Rajiv Gandhi Salai	900.00
v)	Along Arcot Road	360.00
vi)	Aminjikarai to Sterling Road	225.00
vii)	Along Kathivakkam High Road	600.00
viii)	Along Thiruvottiyur High Road from Monroe statue to Manali	600.00
ix)	Along NH45 from Kathipara to Tambaram	1350.00
	Sub-total (E1)	5865.00
<i>E2</i>	<i>Grade - Separators</i>	
i)	@ Sothupakkam Road x Chennai bypass	30.00
ii)	@ NH4 x Thirumazhisai Road	30.00
iii)	@ Vadakarai – Madhavaram Road x Naravarikuppan Town Panchayat limits.	30.00
	Sub-total (E2)	90.00
<i>E3</i>	<i>Widening Strengthening and resurfacing of arterial, sub-arterial and collector roads</i>	
i)	CTH Road from Avadi to Thiruvallur as a 6-lane expressway	200.00
ii)	Approach road from Rajiv Gandhi Salai to Nookampalayam Road from 10m to 30.5m	90.00
iii)	Navalur-Thalambur-Siruseri Medavakkam Road	200.00
iv)	Existing 50' approach road connecting the Global Hospitals to the Medavakkam-Sholingallur Road (Perumbakkam)	7.00
v)	Strengthening and improving the network of radial roads of 250km length ( <i>improved during 1998-2000</i> )	200.00
	Sub-total (E3)	697.00
<i>E4</i>	<i>New Link Roads</i>	
i)	Network of secondary roads to supplement the ORR	*
ii)	Link from Tambaram to NH -4 (Sunguvarchattram) (24km)	250.00
iii)	Walajabadh Road – Sriperambudur Link Road (10.2km) (4lane)	102.00

Sl. No.	Project	Broad Cost (Rs. in crores)
iv)	Providing an east-west link connecting the RoB near Ambattur Rly.and IRR near Villivakkam station, north of the Central-Arakkonam Rail line	150.00
v)	Link connecting Sadayankuppam Road to Ennore Expressway	75.00
vi)	An approach road on Alamathi Road to Red Hills-Tiruvallur main road	25.00
vii)	Link connecting Vanagaram-Ambattur Road and Porur through Chettiaragaram	25.00
viii)	Link connecting Ambattur-Red Hills Road and IRR by widening and strengthening the Water Canal Road from Madanamkuppam	25.00
ix)	Integrating inter-and intra-regional road network just outside CMA	*
	Sub-total (E4)	652.00
	<b>Total (E)</b>	<b>7304.00</b>
<b>F</b>	<b>Pedestrian Facilities</b>	
F1	<i>Escalators</i>	
	@ 20 FoB / Sub-way locations	50.00
	Sub-total (F1)	50.00
F2	<i>Elevated walkway</i>	
	Along the median of roads and pathways on the bank of River Cooum and linking them to provide access to railway stations, bus stops and parking areas	*
	<b>Total (F)</b>	<b>50.00</b>
<b>G</b>	<b>Development Of Waterway Transport</b>	
i)	Developing the waterways in CMA as inland transport corridors	*
ii)	Exploring the operation of hovercraft along the seacoast	*
	<b>Total (G)</b>	*
	<b>Grand Total</b>	<b>33998.89</b>

\* Costs are not readily available

#### **List Of Roads Requiring Advance Action to Acquire Land to Maintain the Street Alignment Prescribed in the Second Master Plan**

*(Within 10 years, the land frozen as street alignment shall be made available for the road widening purpose either by compulsory acquisition or by operating Transfer of Development Rights (TDR) tool.)*

Sl.No	Name of the Road	Stretch		Right of way (m)
		From	To	
A	<b>ROADS OWNED BY CoC</b>			
1	M.S.Koil Street,* Suriyanarayana Road *	Ebrahim Sahib Street	City Limits	30.5

Sl.No	Name of the Road	Stretch		Right of way (m)
		From	To	
2	Thambu St (Royapuram)	East Kalmandapam Road	Sheik Mastry St.	10.0
3	Kathivakkam High Road *	Cochrane Basin Road	City Limits	30.5
4	Moolakkadai-Thondiarpet Road	G.N.T. Road	B'canal	27.0
5	Kodungaiyur – Chinna sekkadu Road (New Link)	Moolakkadai-Thondiarpet Road	City Limits	18.0
6	Erukkancherry High Road (GNT Road)	Basin Bridge Road	City Limits	27.0
7	Madhavaram High Road	Melpatti Ponnappa Street	GNT Road	24.0
8	Paper Mills Road	Siruvallur Road Junction at Perambur High Road	City Limits	18.0
9	Konnur High Road	Medavakkam Tank Road	Its junction with New Avadi Road	30.5
10	C.T.H. Road	New Avadi Road	Jawaharlal Nehru Salai (IRR) (City Limits)	30.5
11	New Avadi Road	Kilpauk Water works	Its junction with Konnur High Road	30.5
12	New Link Road *	New Avadi Road	Medavakkam Tank Road	24.0
13	New Avadi Road	Periyar EVR Salai	Kilpauk Water works	18.0
14	Kilpauk Garden Road	Taylor's Road	Anna Nagar 1 <sup>st</sup> Main Road	18.0
15	Thiru Narayana Guru Road (Hunters Road & Choolai High Road)	Perambur Barracks Road	Sydenhams Road (Rajamuthiah Road)	24.0
16	Periyar EVR Salai	Mc.Nichols Road	City Limits	30.5
17	Nelson Manickam Road	Periyar EVR Salai	Tank Bund Road	18.0
18	Tank Bund Road	Nelson Manickam Road (junction of Sterling Road)	Valluvar Kottam	18.0
19	Village Road (Valluvar Kottam Road)	Kodambakkam High Road	Nungambakkam High Road	27.0
20	Uthamar Gandhi Salai (Nungambakkam High Road)	Anna Salai	Sterling Road	27.0
21	Greens Road *	Anna Salai	Pantheon Road	18.0

Sl.No	Name of the Road	Stretch		Right of way (m)
		From	To	
22	Ethiraj Salai (Commander-in-Chief Road)	Pantheon Road	Cooum River	18.0
23	Dr.Radhakrishnan Salai (Cathedral Road) *	Anna Salai	Music Academy	30.5
24	Eldams Road *	Anna Salai	TTK Road	18.0
25	TTK Road	Chamiers Road Junction	Alwarpet Junction	18.0
26	Pasumpon Muthu Ramalinga Thevar Road (Greenways Road)	Durgabai Deshmuk Road	MRTS alignment	30.5
27	Sardar Patel Road	Anna Salai	Madya Kailash (I.T. Expressway)	30.5
28	Dr.Muthulakshmi Salai (L.B.Road)	M.G. Road	City Limits	30.5
29	West Avenue Road	L.B. Road	East Coast Road (MTC terminus)	24.0
30	East Coast Road	West Avenue Road (MTC Terminus)	City Limits	30.5
31	Taramani Road	Vijayanagar Junction	L.B. Road Junction	45.0
32	Perungudi Station Road (New link)	Taramani Road	Perungudi Station	18.0
33	Velachery Road	Vijayanagar Junction	City Limits	45.0
34	Velachery Bypass Road	Velachery Road Junction	Vijayanagar Junction	45.0
35	Velachery Road *	Sardar Patel Road	Bypass Junction	45.0
36	Nandambakkam – Nesapakkam Road (Lake View Road and its extension Kanu Nagar Main Road)	Anna Road Junction near CMWSSB Plant	Adayar River (City Limits)	18.0
37	Ramapuram – Neasppakkam Road (Kamarajar Salai)	Nandambakkam – Nesapakkam Road	City Limits	18.0
38	Vanniar Street	Rajamannar Salai	Arcot Road	18.0
39	Arcot Road	Railway line	City limit	30.5
40	Nesapakkam Road	Arcot Road	Reddy Street	24.0
41	Nesapakkam Road	Reddy Street	CMWSSB Sewage Farm (southern end)	24.0
42	Nesapakkam Road	CMWSSB Sewage Farm (southern end)	Jawaharlal Nehru Salai (IRR)	27.0

Sl.No	Name of the Road	Stretch		Right of way (m)
		From	To	
<b>B</b>	<b>ROAD OWNED BY DoH</b>			
1	Ennore Expressway	City Limits	Kathivakkam High Road junction near Ennore creek	45.0
2	Thiruvottiyur High Road	City Limits	Manali Expressway	27.0
3	Manali Expressway	TPP Road	Ennore Expressway	61.0
4	Vallur-Edayanchavadi Road	Edayanchavadi – Athipattu Road	TPP Road	18.0
5	TPP Road	Kamaraj Salai junction (near Organic Chemicals)	CMA Limits	30.5
6	Kattur Road	TPP Road	CMA Limits	30.5
7	Kathivakkam High Road – Basin Road - Manali Road	City Limits	Kamaraj Salai junction (near Organic Chemicals)	30.5
8	Kodungaiyur – Chinnasekkadu Road (New Link)	City Limits	Kamaraj Salai	18.0
9	Vichoor – Vilangadupakkam Road	Nayaru – Vichoor Road	Vadaperumbakkam - Perungavur Road	18.0
10	Kadapakkam - Vichoor – Nayaru Road	TPP Road	Nayaru Junction	18.0
11	Karanodai –Nayaru Road	GNT Road	Nayaru Junction	18.0
12	Vadaperumbakkam – Perungavur – Nayaru Road	Madhavaram - Red Hills Road	Nayaru Junction	18.0
13	Sholavaram – Budur -Thirunilai Road	GNT Road	Nayaru – Vichoor Road	18.0
14	Redhills - Budur Road	GNT Road	Sholavaram - Thirunilai Road	18.0
15	Karanodai Palaya Erumeivettipalayam Road	GNT Road	Palaya Erumai vettipalayam	18.0
16	GNT Road (through Bypass Road)	City Limits	CMA Limits	45.0
17	Madhavaram-Red Hills Road	GNT Road at Moolakadai	Red Hills Bypass Road	18.0
18	Madhavaram High Road	City Limits	GNT Road at Moolakadai	18.0
19	Sembium – Red Hills Road (Extension of Paper Mills Road)	City Limits	GNT Road	18.0
20	NH Bypass Road	GWT Road	GNT Road	61.0



Sl.No	Name of the Road	Stretch		Right of way (m)
		From	To	
21	Ambattur Red Hills Road	CTH Road	GNT Road	24.0
22	CTH Road	City Limits (Jawaharlal Nehru Salai) (IRR)	CMA Limits	45.0
23	Avadi-Morai Road	CTH Road	CMA Limits	18.0
24	Vellanur-Pammadukulam Road	Avadi-Morai Road	ORR	18.0
25	Pandeswaram - Keelakondaiyur Road	Avadi _ Morai Road	Thiruninravur – Periyapalayam Road	18.0
26	Morai -Kadavur Road	Morai junction	Kadavur junction	18.0
27	Thandarai – Palavedu Road	CTH Road	Thiruninravur-Periyapalayam Road	18.0
28	Thiruninravur Periyapalayam Road	CTH Road	CMA Limits	18.0
29	Korattur - Thiruninravur Road	Poonamallee - Thirumazhisai - Thiruvallur Road	CTH Road	18.0
30	Poonamallee - Thirumazhisai - Thiruvallur Road	GWT Road	CMA Limits	18.0
31	Kuthambakkam - Nemam Road	GWT Road	Poonamallee - Thirumazhisai - Thiruvallur Road	18.0
32	Poonamallee – Pattabiram Road	Poonamallee Bypass Road	CTH Road	18.0
33	Poonamallee – Avadi Road	Poonamallee Bypass Road	CTH Road	18.0
34	Proposed East-west arterial Road	Chennai Bypass Road at Ambattur Estate	ORR	61.0
35	Vanagaram – Ambattur Road	GWT Road	Arterial Road at Athipattu	18.0
36	GWT Road (through Bypass Road)	City Limits	CMA Limits	45.0
37	Poonamallee High Road	Mangadu Road junction	Poonamallee Bypass road junction	30.5
38	Mount Poonamallee Road	Kathipara	western boundary of St.Thomas Mt.Contonment	18.0
		western boundary of St.Thomas Mt.Contonment	Porur jn.	27.0
		Porur jn.	Poonamallee High Road	30.5

Sl.No	Name of the Road	Stretch		Right of way (m)
		From	To	
39	Mangadu Road	Mount Poonamallee Road	Porur - Kunrathur Road	18.0
40	Mangadu-Moulivakkam Road	Mangadu Road	Porur - Kunrathur Road	18.0
41	Porur – Kunrathur Road	Porur Junction	CMA Limits	30.5
42	Arcot Road	City limits	Porur Junction	30.5
43	Maduravoyal - Porur Road	GWT Road	Arcot Road	18.0
44	Ramapuram – Valasarawakkam Road	Mount-Poonamallee Road at Manapakkam	Arcot Road @ Valasarawakkam	18.0
45	Anna Salai, Kuppusamy St, Naidu St, Bharathi Salai, Kamaraj Salai	City Limits	Arcot Road (near ARS Garden)	18.0
46	Nandambakkam Nesapakkam Road	Mount Poonamallee Road	City Limits	18.0
47	GST Road	City Limits	CMA Limits	45.0
48	Pallavaram – Kundrathur Road	GST Road	Porur - Kunrathur Road	18.0
49	Pammal – Polichalur Road	Pallavaram – Anakaputhur Road	Polichalur	18.0
50	Pallavaram – Thiruneermalai – Thirumudivakkam Road	GST Road	ORR	18.0
51	Thirumudivakkam – Kunrathur Road	Pallavaram – Thirumudivakkam Road	Porur - Kunrathur Road	18.0
52	Tambaram – Thiruneermalai Road	Tambaram - Naduveerapattu Road	Thiruneermalai Road	18.0
53	Tambaram – Naduveerapattu Road	GST Road	Poonthandalam Road	18.0
54	Poonthandalam Road	Kundrathur Sriperumbudur Road	Naduveerapattu	18.0
55	Mudichur Road	GST Road	Vandalur – Padappai Road at Mannivakkam	18.0
56	Mudichur – Manimangalam Road	Mudichur Road	CMA Limits	18.0

Sl.No	Name of the Road	Stretch		Right of way (m)
		From	To	
57	Vandalur – Padappai Road	GST Road	CMA Limits	18.0
58	Kelambakkam Road	GST Road	CMA Limits	30.5
59	Tambaram Bypass Road (New Link)	GST Road	MBI Road	45.0
60	MBI Road	GST Road	Tambaram Bypass junction	30.5
61	MBI Road	Tambaram Bypass Junction	City Limits	45.0
62	Mount-Madipakkam Road	GST Road	MBI Road at Medavakkam	18.0
63	ORR South Eastern Segment (New Link)	MBI Road	Rajiv Gandhi Salai (OMR)	61.0
64	Extension of MMRD Scheme Road (New Link)	Rajiv Gandhi Salai (OMR)	ECR	30.5
65	ECR	City Limits	CMA Limits	30.5
66	Sholinganallur – Kudimiyandi Thoppu Road	Rajiv Gandhi Salai (OMR)	ECR	18.0
67	Medavakkam – Sholinganallur Road	MBI Road	Rajiv Gandhi Salai (OMR)	18.0
68	Sithalapakkam – Ottiyambakkam Road	Maduraipakkam Road	CMA Limits	18.0
69	Medavakkam-Maduraipakkam Road	MBI Road	CMA Limits	18.0
70	Vengaivasal – Madambakkam Road	MBI Road	Madambakkam Road	18.0
71	Madambakkam Road	MBI Road at Rajakilpakkam	Maduraipakkam Road at Sithalapakkam	18.0
72	Agaramthen Road	Madambakkam Road	Maduraipakkam Road at Kovilancheri	18
73	Rajiv Gandhi Salai (OMR)	Madya Kailash Junction	CMA Limits	As notified for acquisition by DoH shown in the individual village map
74.	Nookampalayam Road	Rajiv Gandhi Salai (OMR)	Semmancheri village limits in the west	18.0

\* Excluding the stretches covered in approved Detailed Development Plans