

Plan BENGALURU 2020

Bringing back a Bengaluru of Kempe Gowda's dreams

Road, Traffic Management & Transportation

Draft Ver. 1.0 Net
16.01.2009

abide

Agenda for Bengaluru
Infrastructure and
Development Task force





Roads , Traffic Management & Transportation

Principal Authors:
Ashwin Mahesh
R.K. Mishra

BACKGROUND EXAMINED

Key reference points

- Abide Planning report, NUTP 2007
- KUIDFC CTTP Report
- B-TRAC 2010
- BMRDA plans for the Metropolitan Region
- Consultations and Deliberations with city agencies
- Annexure 1 – for Background data

... Together, the above sources provided a comprehensive picture of the challenges ahead, and the choices to be made for the future of the city.

Guiding Principles - Policy

- **Efficient use of available financial resources**
We have finite financial resources – so, the solutions must be a combination of efficiency & Intelligence along with new capacity building. All new projects to be subjected to ‘alternate choice cost & benefit’ assessment.
- **Public transport & pedestrian amenities are top priority**
A significant push to increase share of public transport to 60% is needed, and must be provisioned. Mass transit and public transport must form the backbone and any new capacity addition must conform to this paradigm.
- **Equip existing sub-urban areas to decongest the city**
To manage growth and relieve the pressure in the core city, transport infrastructure in existing suburban areas (Whitefield, Yelahanka & Kengeri) should be created ahead of demand as they provide immediate relief.
- **Planning should be data-led, dynamic & flexible**
Planning for the long-term should allow flexibility in responding to the changing patterns (geographic as well as demographic) in the city's growth based on regular data updates.

Guiding Principles - Administration

- **Techno-managerial governance**
Introducing techno-managerial governance is necessary to deliver noticeable changes quickly, and sustain them in the long run.
- **Coordinated administration**
Elimination of silos in public administration of traffic and transport is a must, and these must be replaced by deliberate integration and consolidation of functions.
- **Data led planning**
Continuous, data-led planning and implementation must be woven into the management of traffic and transport.
- **Continuous demand–supply assessment**
An ongoing Transport demand growth study and research focus is needed, to provide data-led input into subsequent planning decisions.
- **Single window approach**
A single nodal agency should be responsible for data collection and management. Initially this should be housed with ABIDE itself, to get this started.

Guiding Principles - Method

- **Improve utilization of existing capacity by Identifying trouble spots/corridors & streamline**

Immediate prioritization of high mobility pathways is must. Vehicle movement on these roads to be streamlined with massive junction streamlining. This will minimize tree cutting and across the board road widening.

- **Focus on public transport**

Public transport on arterial roads to be strengthened and integrated with high-frequency service in the Core Business District.

- **Pedestrians to be given highest priority**

Pedestrian infrastructure, safety and convenience to receive highest priority.

- **Traffic impact assessment of new development**

Impact of large business campuses, apartments, malls and other developments to be mandatorily accounted for in the traffic and transport planning.

- **Capacity addition vs maintenance expense**

Expenditure on maintenance to be separated from expenditure on new infrastructure capacity addition.

Recommendations

Existing Capacity Management

Big 10 Arterial Roads – Between City Center & ORR

- An aggressive strategy of junction elimination to reduce travel time on Big 10 arterial roads to ORR and beyond.
Big 10 -Tumkur, Hosur, Bannerghatta, Kanakapura, Mysore, Bellary, Magadi, Sarjapur , Old Madras & HAL Airport Rd.
- Each of these Big 10 roads to be surveyed to arrive at scientific solution for junction redesign or removal. Intersections of these 10 roads with ORR should be made junction free.
- At all T junctions on these 10 roads, underpasses for the through traffic should be provided.
Roundabouts to be explored at other locations.
- U-turns on these Big-10 roads to be made pre-emptive, so that motorists can take U turn before intersections, using Jug Handles with extra lanes provided for U turning traffic.

Recommendations

Existing Capacity Management

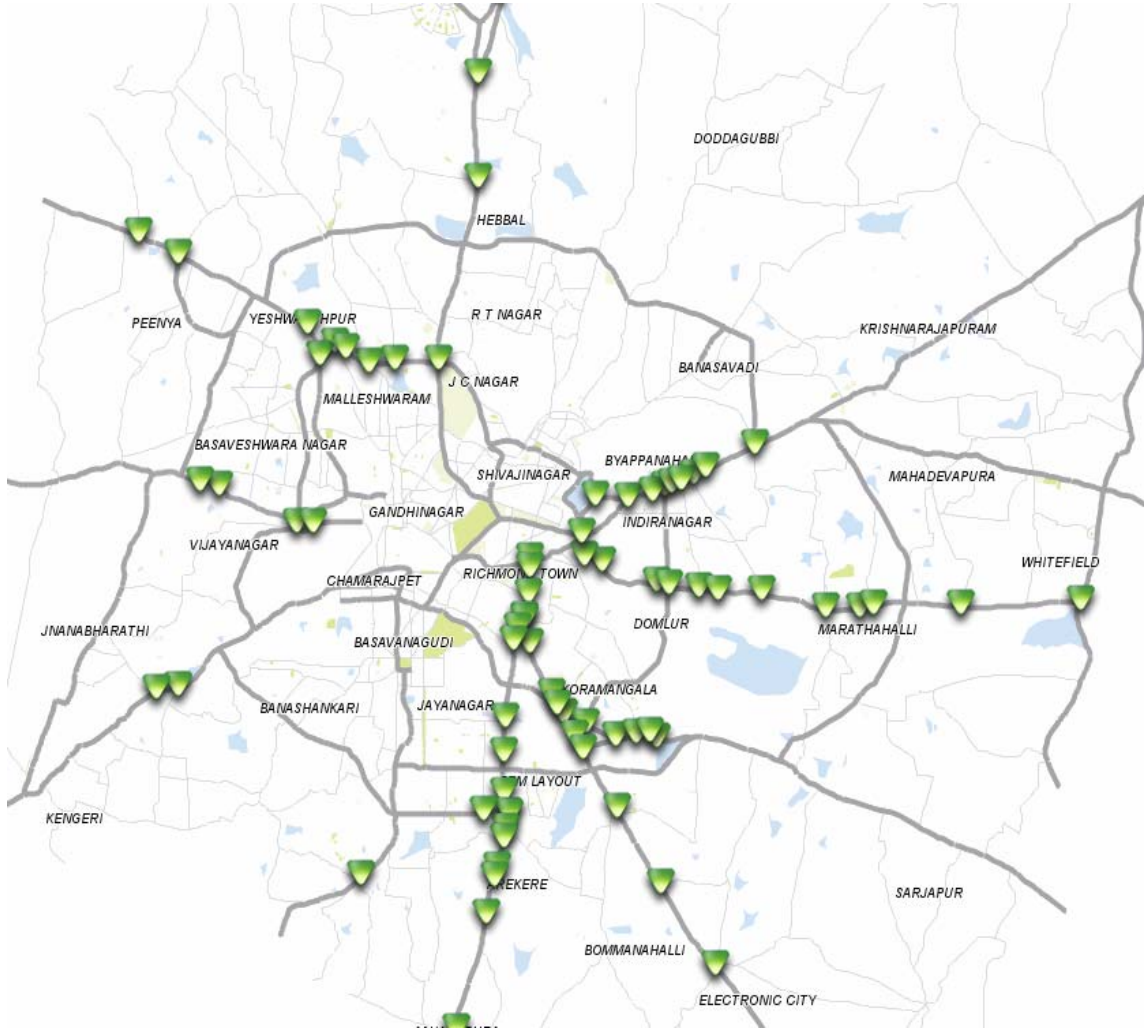
Big 10 Arterial Roads – Between City Center & ORR

- 'Bus Bays & Footpath' to be mandatory on all Big-10 roads. Higher FSI permission to be given to owners giving land for bus bays, if required.
- Priority (not dedicated) bus lanes to be marked on all these 10 routes for faster movement of public transport – buses.

Big 10 Arterial Roads - ORR to Suburban Towns

- All Big-10 arterial roads to be converted into 6-lane, signal-free and junction-free pathways between ORR and next major towns – Whitefield, Yelahanka, Kengeri, Hoskote, Sarjapura, Hosur & Nelamangala etc., with median provision for MRTS later.

Big 10 Arterial Roads – Junctions



Big 10 Arterial Roads – Junctions

TUMKUR ROAD

Heserghatta
Jalahalli Cross
Yeshwantpur RS
Tumkur Road Flyover
Yeshwantpur Circle
New BEL Road
C N R Rao Circle
BEL road

MAGADI ROAD

Pete Mariappa Circle
Kamakshipalya
Dr Rajkumar Rd Jn
Magadi Rd @ Chord Rd

BELLARY ROAD

Bagalur Main Rd
Kugulu Cross
Kodigehalli Jn
Yelahanka Jn
Mekhri Circle

SARJAPURA ROAD

Sector 5 Lake Road
Jakkasandra 1st Main
Jakkasandra 7th Main
Krupanidhi College
Indian Institute of Astrophysics
Mphasis / HPCL

OLD MADRRAS ROAD

Kaggadaspura Road
NGEF
Suranjan Das Road OMR
Indiranagar 80 Ft Road
Baiyapanahalli Rd
Indiranagar 100 Ft Rd Jn
Indiranagar BDA Junction
Jayalakshmi Ammal Temp
Philips Junction

MYSORE ROAD

Bangalore University
Rajarajeswari Nagar

KANAKAPURA ROAD

Khoday Breweries/Vasanthpura Rd

BANNERGHATTA ROAD

Gottigere
Hulimavu
Arekere Gate
IIMB South Jn / Samrat Layout
IIM North Jn / Bilekahalli
Devarchikkanahalli Rd Jn
BTM 29th Main - Mantri Elite II
BTM 29th Main - Mantri Elite
Sarakki Jn
Jayadeva Hospital / BTM Flyover
Jayanagar 9th Block 39th Cross
Sagar Appollo / Tilaknagar
MICO Jn / Pukhraj Layout
Marble Market

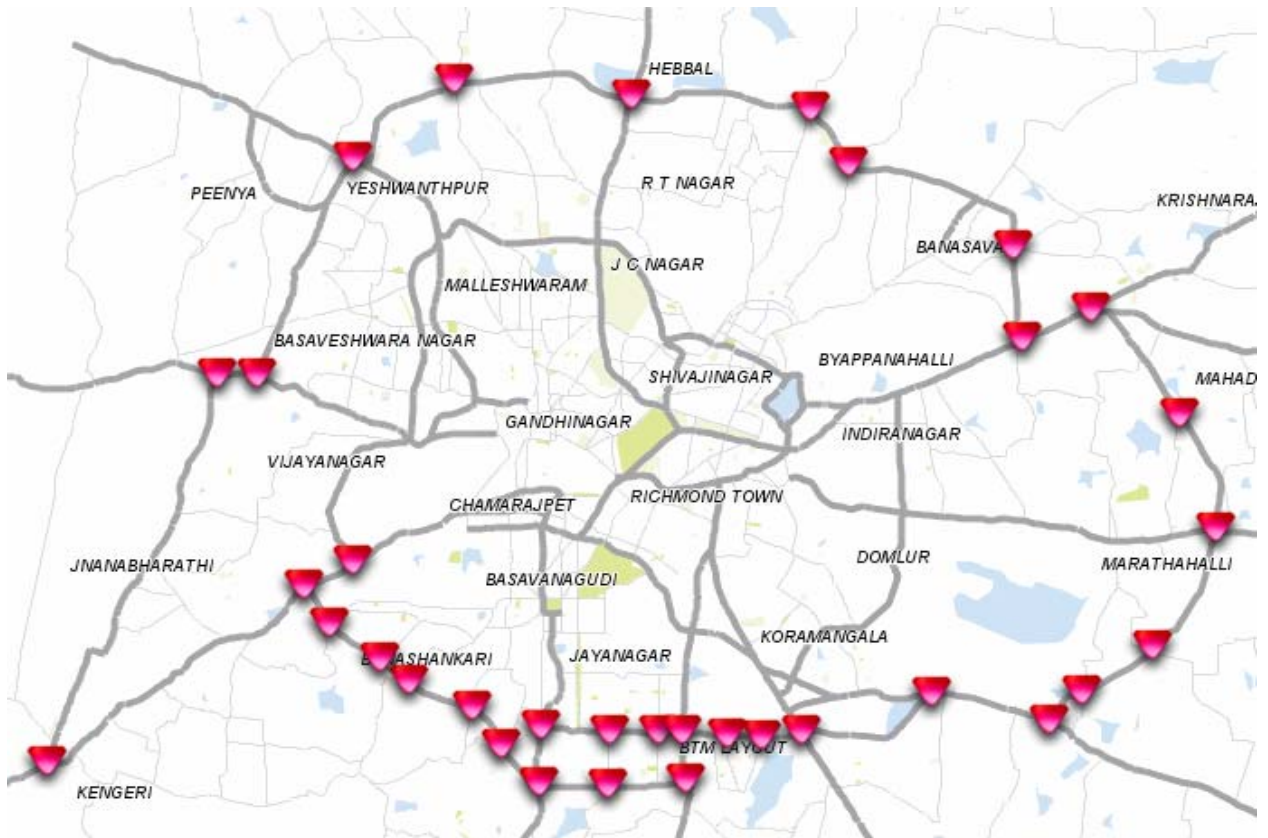
HAL AIRPORT ROAD

Varthur Kodi
Kundalahalli Rd
Dodda Nekundi Rd
Yamlur Jn
Namjoshi Rd
Suranjan Das Road
Wind Tunnel Road
Manipal Hospital
Domlur Flyover
Domlur Bus Stand
Command Hospital
Agram Junction
Trinity Junction

HOSUR ROAD

Jail Junction
Novell Jn / Kudlu Road
Begur Road
Madivala Police Station
Koramangala 17th Main
Mphasis / Marigowda Rd
Raheja Arcade / Forum
Aduodi Jn
Anepalya Rd Jn
St.Patrick's Cemetery
Langford Road CMP Gate
Fatima Bakery
Vellara Junction

ORR Junctions including those on Big 10 roads



Banashankari Bus Stand

Chord Road Jn

Nayandanahalli Jn

ORR at Kengeri

Vokkaligara College

ORR at Magadi Road

Goruguntepalya

Hebbal Flyover

Nagavara Jn

Ramamurthy Nagar

ORR on OMR

K R Puram Rly Stn

Doddenakundi Jn

Marathahalli ORR

Agara Kere

JD Mara Jn / Mandovi

Motors

Silk Board

Jayadeva Hosp. BTM

Flyover

Family Mart

Kadabisanahalli

Bellandur Jn ORR

Iblur Jn

Hennur Main Rd

Kuvempu Circle

Kuvempu Nagar

NCERT

Kathrigupe Road

Deve Gowda Petrol Bunk

Subramanyapura Main Rd

Puttenahalli

JP Nagar 24th Main Rd

East End Circle

Udipi Garden

BTM 29th Main

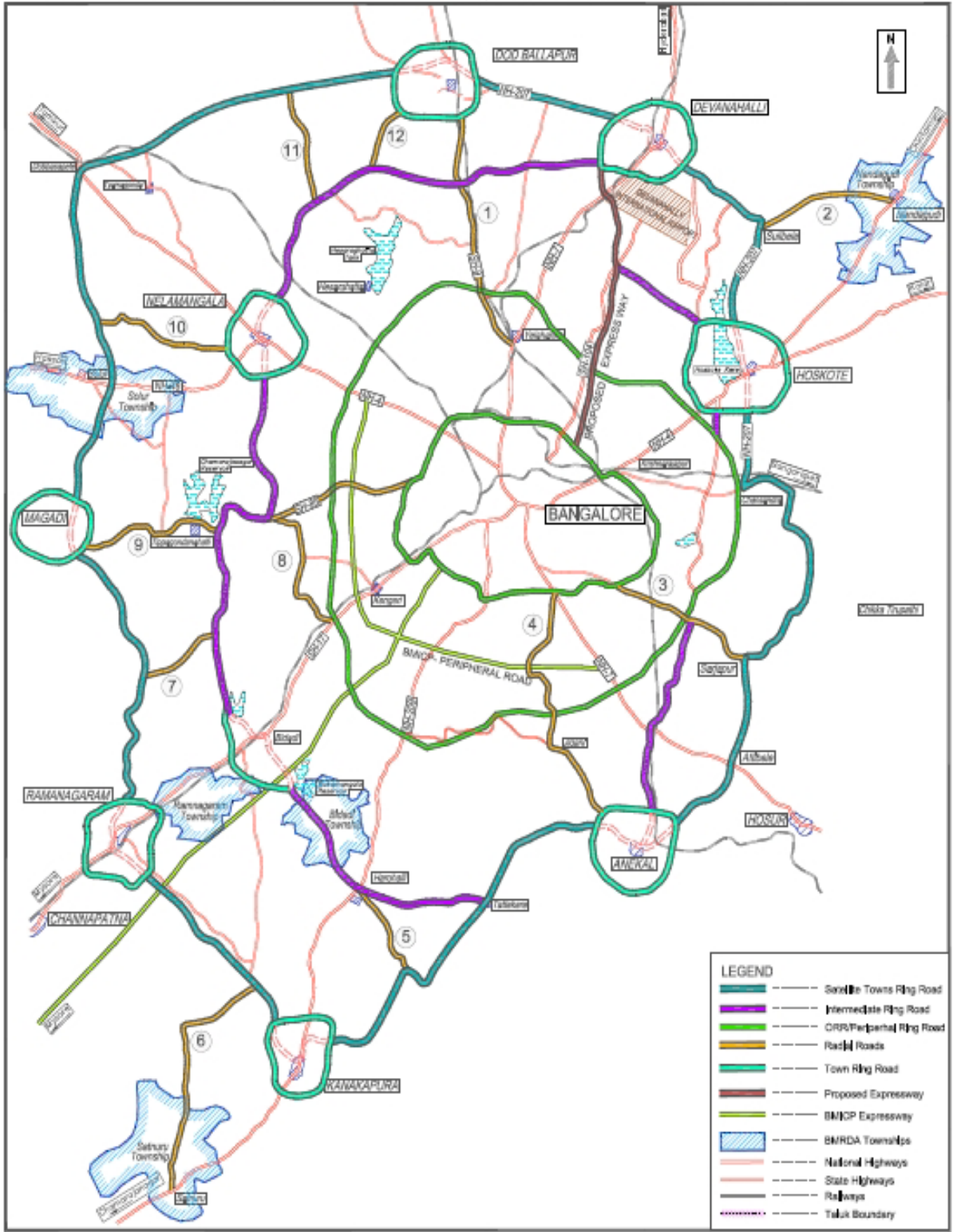
Recommendations

Existing Capacity Management

ORR Improvements

- ORR to be made signal free.
- Service roads along ORR, wherever available, to be completed in all respects . Bus bays/shelters/Footpaths to be made mandatory.
- Priority (not dedicated) Bus Lanes to be marked all along ORR to for faster movement/promotion of public transport
- All Big 10 roads' intersections with ORR to be made junction free.
- Being a major pathway, upkeep and lighting of ORR to be of the same standard as Bellary road to BIAL. Median greening, mechanical cleaning and improved lighting to be the immediate priority.
- Need for elevated ORR on the median to augment it's capacity and provide for BRTS to be assessed after it is made signal-free.

GOVERNMENT OF KARNATAKA,
 BANGALORE METROPOLITAN REGION DEVELOPMENT AUTHORITY,
 SATELLITE TOWNS RING ROAD, INTERMEDIATE RING ROAD, RADIAL ROADS AND INDIVIDUAL TOWN RING ROAD



Recommendations

New Capacity Creation

IRR-STRR

- Of these two, only STRR may be retained. Connectivity between nearby towns to be established using existing direct road linkage between them, rather than a full IRR.

PRR(with decision on interconnecting to NICE)

- Decision to interconnect to NICE subject to agreement on technical and commercial terms. Between the ORR and PRR/NICE, provide connectivity between each set of 2 adjoining Big-10 arterial roads using the existing roads/MDRs.

Recommendations

New Capacity Creation

Airport connectivity

Road Access – Single access to BIAL using Bellary road is congestion prone & strategically flawed.

➤ **West-Side Road Access**

Connectivity between Tumkur Road (NICE at Nelamangala) and Bellary Road to be established, to ensure fast, West-side access to the airport.

➤ **East-Side Road Access**

Connectivity between Old Madras Road (Hoskote) and Airport to be established via Budhigere Road to provide alternate road access to BIAL from East side.

➤ **Rail Access**

Rail connectivity to airport should be explored along existing SW Railway track on Chikaballapur route.

➤ Hourly service on this route from the major stations within the city (City, Cantonment, K R Puram, Whitefield) can be established using existing SW Railway lines.

Recommendations

New Capacity Creation

Local lakeside circular roads

- All lakes within the BMRDA region should be fully encircled by well developed roads. In anti-clockwise movement, a two-way bicycle and walking path shall be developed to the left of the road. No further construction to the left of this path is to be permitted. In the case of lakes where such circular roads exists partially (e.g. Madivala lake), the remaining portion of the road should be constructed to provide a full circle of movement. This approach should also be considered for all large campuses – e.g. greater than 30-50 acres; i.e. these should have circumference roads abutting their periphery, and acquisition to ensure this can be considered. Such roads will also serve as boundaries for lakes and protect against encroachment in future.

Monorail and Elevated Core Ring Road

- These proposals may be deferred for consideration until recommendations here are implemented. Elevated Roads in CBD to be avoided since they will cause too much damage to city environment and aesthetics.

Recommendations

Town Planning

New layout developments

- Road & transport planning to be part of any township spatial planning, with specifications to be standardized.
- All arterial roads and public transport corridors to be planned with set-back and green ribbon on each side.
- Corner Plots in new layouts, and corner plots along roads of 60 feet width or more should be retained by the government, to allow bell mouting, roundabouts, clover-leafing and other choices in the future.
- STRR, when developed, should be signal free and junction free, for inter-township connectivity and for bypass. Similarly, PRR should also be signal free, junction free (one half or 2 half depending on agreement with NICE on 8 lane and toll).

Recommendations

Infrastructure Planning & Maintenance

Road maintenance and new infrastructure creation

- BBMP road network, especially the arterial roads, to be maintained through multi-year contracts as in the case of NHAI.
- Safe pedestrian cross-walks to be installed underground or overhead at all major junctions. An initial list of these junctions is provided (A3), and may be expanded by city agencies. Diagonal crossings should also be provisioned.
- Specific maintenance plans and schedules for additional infrastructure, such as parking, pedestrian walkways, and intersections should be developed, and maintained publicly.
- Expenditure on the maintenance of road infrastructure should be separated from capital expenditure on new projects.

Recommendations

Promoting Public Transport & Making it Efficient

➤ **Emphasis on public transport**

'BUS PRIORITY' (not dedicated) lanes to be marked on Big-10 arterial roads. BRT Service to be explored on existing major roads having 3 lanes in each direction.

➤ **Fleet Expansion**

BMTC's fleet strength should be doubled as rapidly as possible from current 5700 to 11,000. Care should be taken that a portion of the new additions (10-15% of the overall fleet) is small buses capable of serving narrow lanes in neighborhoods.

➤ **Big-10 Bus Service on Arterial Routes**

BMTC should introduce Big 10 service at sufficient frequency to cater to mobility along these arterial routes. **Suvarna** services with fixed fare may be considered.

Recommendations

Promoting Public Transport & Making it Efficient

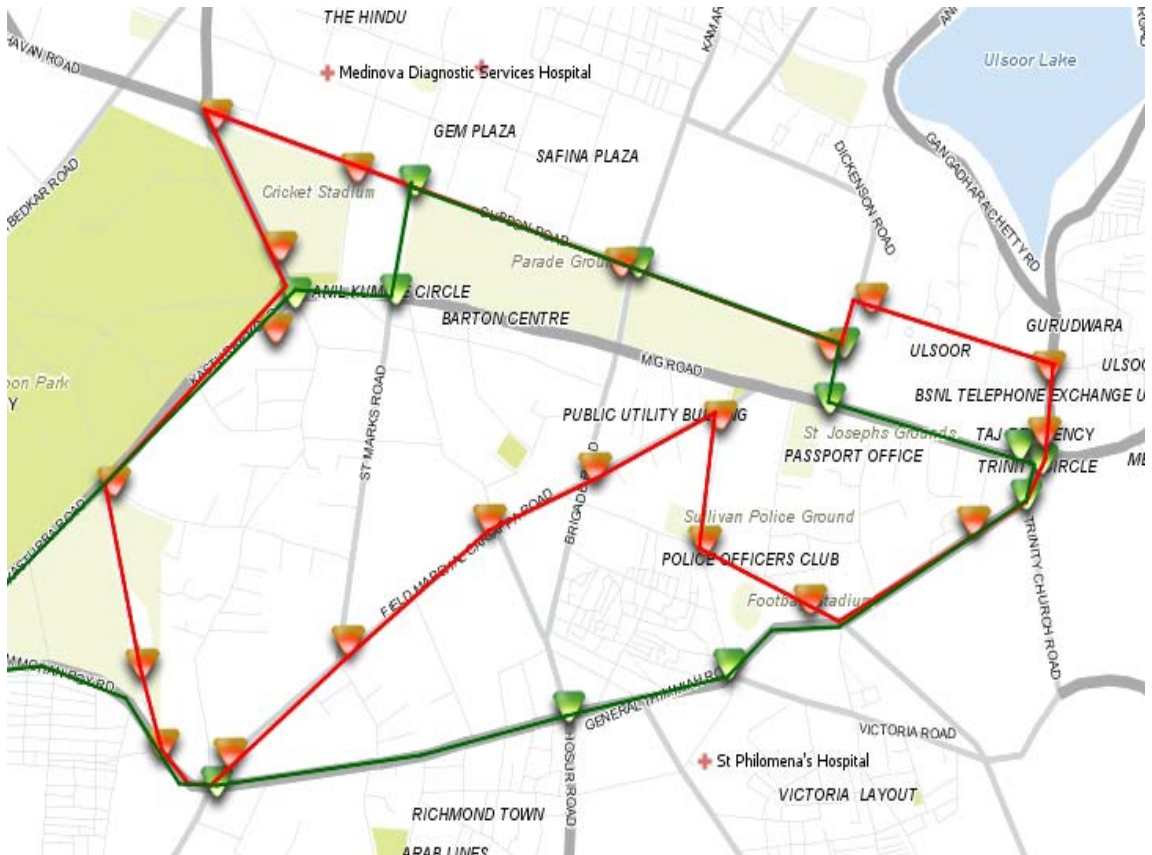
➤ **Hop On Hop Off (HOHO) Circular Service in CBD**

BMTC should introduce clockwise and anti-clockwise loop service (Hop On Hop Off or HOHO) around the Central Business District. These services should be at high frequency, fixed fare (Rs.5), and include pedestrian crossings at all bus stops. An initial path for each of these is annexed (A2).

➤ **Efficiency**

BMTC to develop specific level-of-service metrics in addition to considerations of profit.

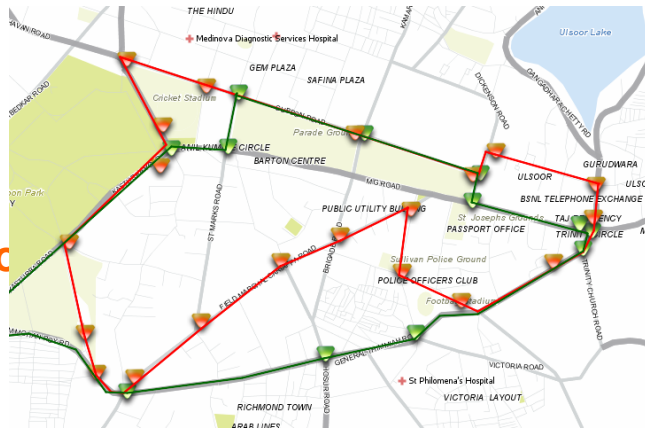
Hop On Hop Off (HOHO) Circular Service in CBD



Hop On Hop Off (HOHO) Circular Service in CBD

ANTI-CLOCKWISE

Police Housing Corp
Hosmat Hospital
Garuda Hall
Mayo Hall
War Memorial
St Josephs Business Co
Cash Pharmacy
Bangalore Club
Woodlands
Mallya Hospital
UB City
Jewels de Paragon
KSCA
Minsk Square
KSRP Ground
Parade Ground
Manipal Centre
Dickenson road
Begum Mahal Circle
Taj Residency



CLOCKWISE

The Oberoi
East Parade Church
Manipal Centre
Army School
BRV Junction
Anil Kumble Circle
Siddalingaiah Circle
Hudson Circle
Richmond Flyover
Vellara Junction
D'Souza Circle
Trinity Church
Trinity Circle

Recommendations

Promoting Public Transport & Making it Efficient

Metro

- All Metro stations to have provision for simultaneous arrival and departure of 4-5 buses integrated into their design. It should not be necessary to leave the Metro premises to board a bus. Covered walkways to bus stops from stations should be provided.
- Metro shall be responsible for providing protected pedestrian access to all stations from within 500 metres of the station, or nearest large junction.
- This pedestrian infrastructure should be integrated with Metro station design, look & feel. The work should be started right away to boost the public image of Metro, given the hardship caused by Metro construction.
- Metro stations should have parking for sufficient numbers of cycles, 2-wheelers, autos, taxis and 4-wheelers. Terminal stations shall have Park & Ride facilities sufficient to accommodate demand.
- Metro expansion from Byappanahalli to IPTL/EPIP to be considered in 1st phase to improve financial viability.

Recommendations

Big campuses, apartment complexes & malls

- Entrance to campuses, large buildings and offices on arterial roads must ensure that their gating is well inside the roadway, and does not cause back-ups on the road.
- A framework and ready-to-use model should be developed for private buildings, offices, apartment complexes, malls and office campuses to provide pedestrian walkways, footpaths, over-bridge & underpasses for public use adjoining their premises.
- Visitor and regular commuter parking to be adequately provisioned within the premises as part of Building plan approval process. All new plan approvals to have this as mandatory. All past plans to be allowed to do this as CSR.
- Impact Taxation on high traffic sources. (Commercial and Residential)
- Large employers must promote public transport and maintain 'Traffic Footprint' indexing measures, and promote schemes for improvement. BMLTA to maintain a list of such schemes and promote these.

Recommendations

Traffic Management

Techno-Intelligent Management of Traffic

- All signals within the city to be made intelligent, and controllable from central traffic management centre. Continuous assessment of traffic flow on roads to be used to set signal timings.
- All Traffic junctions equipped with video camera must also have a Public Address System (PAS) connected to central traffic management system to announce and educate motorists on traffic issues.
- Integrate traffic control rooms of BTP and BMTA into single center with shared resources. To start with, these should be co-located, preferably on BMLTA premises.
- Transport department managing vehicle registrations & driving licenses should have centralized database accessible to traffic police to effectively manage and monitor traffic violations and issue advisory and warnings in a timely manner.
- Commuter education plans to be developed, and revised on an ongoing basis. Effectiveness of these plans in improving commuter behavior to be studied by BMLTA.

Recommendations

Institutional Capacity Augmentation

Techno-management

- BMLTA to be strengthened and made the nodal agency for infrastructure planning and management.
- BMLTA should employ traffic and urban planners, transport engineers, designers, software and hardware professionals and other domain experts. The agency should also have expertise in project negotiations, RFP-writing, contract creation, and project monitoring.
- Traffic data collection and analysis on major routes should be an ongoing exercise carried out by BMLTA, using dedicated resources. Suitable infrastructure and manpower must be provided.
- An ongoing transport demand growth study is needed to be carried out, to provide dynamic knowledge for subsequent decision-making.

Recommendations

Parking and enforcement

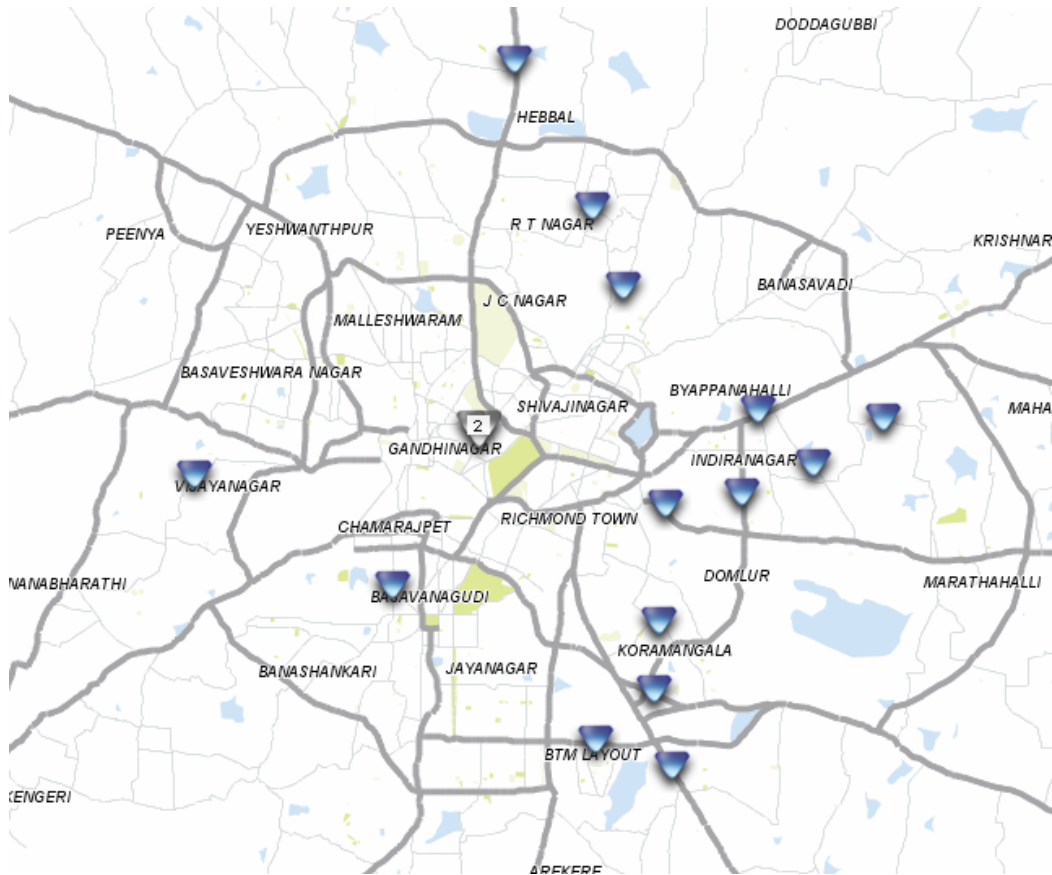
- BBMP to develop stand-alone parking facilities (surface or multi-storey) on its empty land parcels in the city using its own resources. O&M could be outsourced to private operators on a revenue-share basis.
- Current building bye-laws to be amended to provide for adequate parking facilities in line with contemporary life-style and vehicle usage patterns for all office, residential and commercial buildings. This must be done urgently.
- No public parking capacity creation should be linked to a commercial complex or mall. The current proposal of developing parking capacity in conjunction with real estate development does not create sufficient net parking, and should be discouraged.

Recommendations

Miscellaneous

- Team to be constituted to focus on land relinquishment from Armed forces, Central PSUs, St Johns Medical College for road widening and upgrade etc.

BBMP executed projects on arterial roads



ROAD WIDENING

Race Course Road
 Bellary Road
 Sarjapura Road
 Nagarbhavi Road
 Madiwala Village Panchayat Rd
 **

Byrasandra Rd **
 Bull Temple Road
 Sevashram Road **
 Shampura Road
 Tannery Road
 Palace Road
 Hosur Road

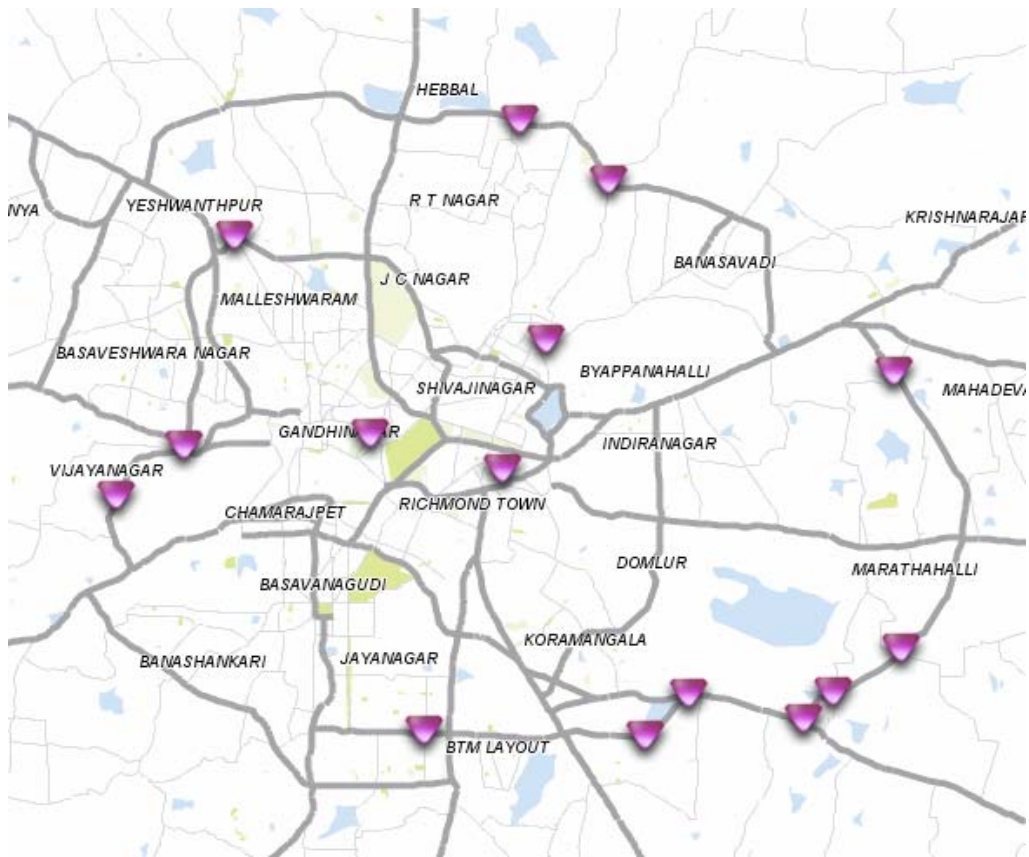
Old Airport Road up to
 Whitefield++
 Suranjan Das Road – HAL to
 OMR++

ITBT ROADS WORK

Indiranagar 100 Feet Road
 Koramangala 80 Ft Road
 Kaggadasapura Main Road
 BTM Layout ORR Silk Board to
 Jayadeva++
 Old Madras Rd Ulsoor to
 ITPL/Hope Farm++
 EPIP Rd – Brookfield to
 Hoodi/EPIP

**++ - Proposed Additions by
 ABIDe**

BDA executed projects on arterial roads/ORR



FLYOVER

Iblur Jn
Agara Jn
Yeshwantpur Circle

GRADE SEPARATOR

Magadi Rd–Chord Rd

UNDERPASS

Forum Mall **
Garuda Mall
Ragi Gudda Temple
Maharani's College

SIGNAL FREE ORR

HSR Layout Jn
Bellandur Jn
Devarabeesanahalli Jn **
Kadubeesanahalli Jn
Mahadevapura Jn
Kalyannagar Jn
Hennur Jn
Veeranapalya Jn

PEDESTRIAN SUBWAY

City Market **
Vijayanagar Bus Stand

RAIL OVER-BRIDGE

Wheeler Road

Background

Scenario in India:

Although local conditions and circumstances differ, the basic scenario in most of the Indian cities is same. The substantial increase in population, rise in income levels, boom in information technology, commercial and industrial activities have in turn put an additional demand on transportation. However, the Indian cities are unable to meet the demand. On an average, while the population on India's six major metropolises increased by about 1.9 times during 1981 to 2001, the number of motor vehicles went up by over 7.75 times during the same period.



Background

Scenario in India:

The explosive growth in motor vehicles operates on the limited amount of road space. Inadequate transport infrastructure has led to private / personal vehicles as well as intermediate means such as autos and taxis which in turn lead to congestion of road. This in turn has resulted in sub optimal performance of public transport (overcrowding, delay). Further, inadequate parking space have resulted street parking in most of the roads, in turn reducing their carrying capacity.

Compared to International standards in developed cities, the car ownership in India is still significantly low and is expected to grow over coming years

Poor mobility may reduce the economic growth of the cities and reduce the quality of life. In order to address the urban mobility issues and ensure a safe and sustainable mobility in the coming decades, the Ministry of Urban Development, Government of India, formulated the National Urban Transport policy in April 2006.

Background: National Urban Transport Policy (NUTP) 2006

Key Objectives:

- Incorporation of urban transportation as an important parameter at the urban planning stage rather than being a consequential requirement.
- Encouraging integrated land use and transportation planning.
- Bringing about a more equitable allocation of road space with people, rather than vehicle, as its main focus
- Addressing concerns of road safety and trauma response
- Associating the private sector in activities where their strengths can be beneficially tapped.

Background: NUTP 2006

In order to promote the development of integrated land use and transport plan for all cities, all urban development and planning bodies in the States would be required to have in house transport planner as well as representation from transport authorities in their management.

The government of India would extend support for the preparation of such integrated land use and transportation plans by

- Providing 50% of the cost of preparing comprehensive city transport plans and detailed project reports.
- Offering equity participation and / or viability gap funding to the extent of 20% of the capital cost of public transport systems.
- Offering 50% of the cost of project development whenever such projects are sought to be taken up through public-private partnerships, so that sound basis for attracting private partners can be established. The remaining cost of such project development will have to come from the City development Authority/State Government and a project developer.

Background: Study on Traffic and Transportation Policies and Strategies in Urban Areas in India

A study has been conducted by Ministry of Urban Development, Government of India in 2007 to update the transportation information and projection made from the previous study (conducted in 1994 to establish the urban transport scenario and forecast the anticipated issues that would most likely crop up in the future. The report was submitted in 1998) in order to review the National Urban transport Policy.

The Salient features of the study are as below:

30 cities selected as study out of a total of 87 cities. The factors considered for selection of cities included size of the city, shape of city, availability of public transport, economic activity level of the city, congestion and geographical locations.



The 30 study cities include Bangalore, Hyderabad, Chennai, Mumbai, Pune, Kolkata, Delhi and Ahmadabad.

Background: Bangalore

The study area of Bangalore covered Sq. km in Bangalore Metropolitan Region Development area with a population of 86.25 lakh in 2001.

- ✓ 2007 population (estimated) – 106.7 lakh
- ✓ 2007 employment (estimated) – 34.53 lakh

Important study findings:

- Public transport has dwindled, while share of personalized modes, especially 2 wheelers have gone up with growth of 12% per annum. Consequently, street congestion has dramatically increased and overall speeds on major corridors have dropped.
- Operating bus services in congested roads has become difficult. Fleet sizes in most of the Public undertakings have declined rather than grow to meet the demand.
- Decline of Non motorized transport, especially cycling. Many factors have contributed to reducing cycling to less than 11% of the mode share which is down from nearly 30% in 1994.
- The facilities for pedestrians are almost nil. The percentage of roads with pedestrian footpaths is hardly about 30% in most of the cities.

Background: Bangalore

The study area of Bangalore covered Sq. km in Bangalore Metropolitan Region Development area with a population of 86.25 lakh in 2001.

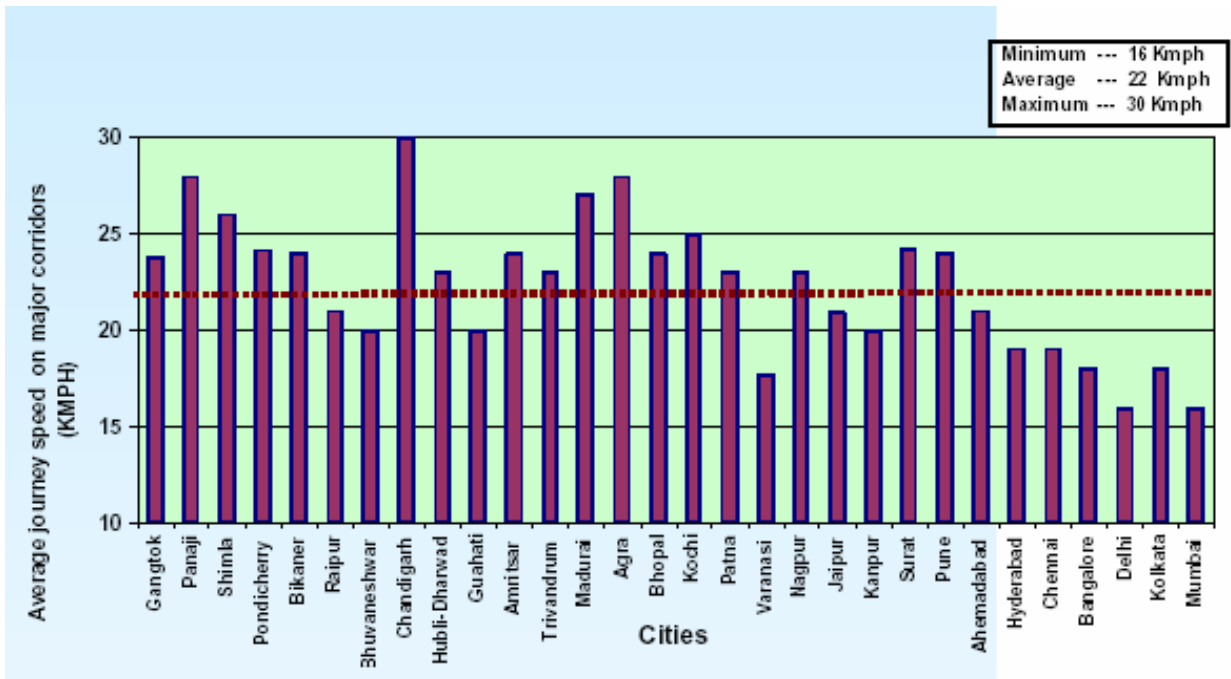
- ✓ 2007 population (estimated) – 106.7 lakh
- ✓ 2007 employment (estimated) – 34.53 lakh



Network Map

Network Length	: 1206Km
Number of Links	: 2328
Number of Nodes	: 1565

Average journey speed on major corridors during peak hours:



Anticipated Average journey speed (KMPH) on major corridors by city category:

Sl. No.	City Category	Population	2007	2011	2021	2031
1	Category – 1	< 5 lakh	26	22	15	8
2	Category – 2	5-10 lakh	22	18	13	9
3	Category – 3	10-20 lakh	18	13	10	7
4	Category – 4	20-40 lakh	22	18	12	9
5	Category – 5	40-80 lakh	19	15	10	7
6	Category – 6	> 80 lakh	17	12	9	6

The present average peak hour journey speed on main corridors in Bangalore is 18kmph.

Growth trend in vehicle population:

Sl. No.	Name of City	Annual Growth rate (1995 - 00)
1	Bangalore	14%
2	Chennai	8%
3	Delhi	7%
4	Hyderabad	12%
5	Kolkata	7%
6	Mumbai	8%

The Annual rate of growth of motor vehicle population in India is about 10% in the decade 1991-2001. From the above table it can be seen that the vehicle growth rate in Bangalore higher than Mega cities like Delhi, Chennai, Mumbai and Kolkata.

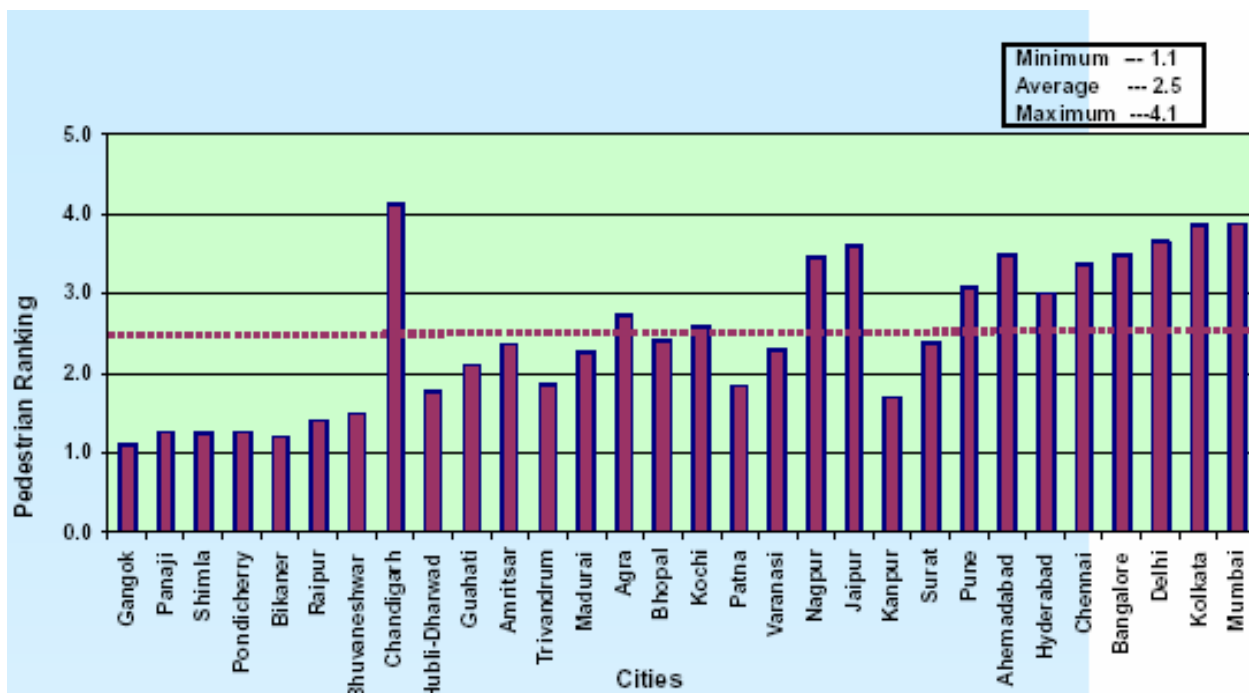
Share of major roads used for parking:

Sl. No.	Name of City	% of Major roads used for on-street parking
1	Chennai	27
2	Hyderabad	29
3	Bangalore	17
4	Delhi	14
5	Mumbai	16

Share of bicycles and pedestrians in road accidents (2005):

Sl. No.	Name of City	Bicycle accidents (%)	Pedestrian accidents (%)
1	Chennai	2	5
2	Hyderabad	5	19
3	Bangalore	5	44
4	Kolkata	5	64
5	Delhi	6	24
6	Mumbai	3	35

Pedestrian facility ranking:

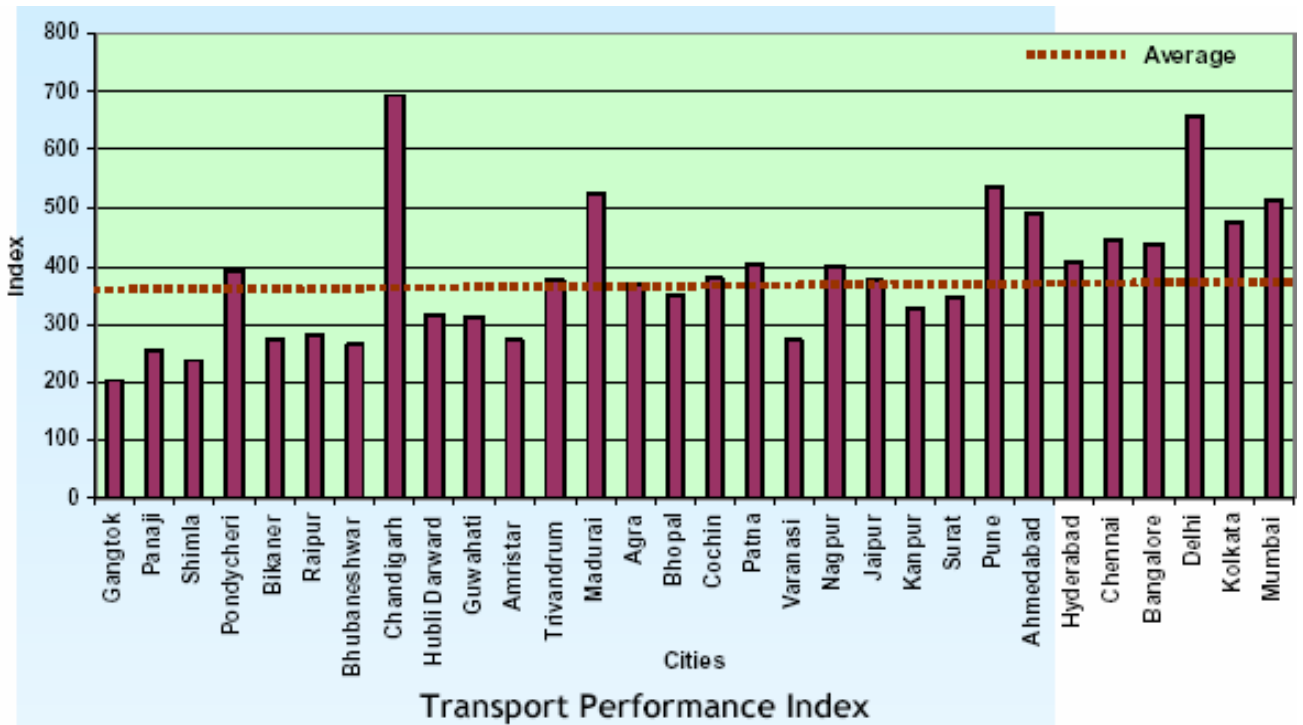


Mode share (%):

Sl. No.	City	Walk	Cycle	Two Wheeler	Public Transport	Car	IPT	Total
1	Gangtok	56	0	4	0	40	0	100
2	Panaji	34	3	26	5	27	5	100
3	Shimla	58	1	8	16	17	0	100
4	Pondicherry	40	15	30	7	4	4	100
5	Bikaner	46	19	22	0	8	5	100
6	Raipur	35	28	25	0	9	4	100
7	Bhuvaneshwar	28	21	30	4	12	4	100
8	Chandigarh	23	18	10	18	28	3	100
9	Hubli Dharward	23	19	25	22	10	0	100
10	Guwahati	21	21	20	8	18	12	100
11	Amritsar	27	25	31	0	14	4	100
12	TVM	26	19	14	21	10	10	100
13	Madurai	34	18	15	16	7	9	100
14	Agra	27	21	31	2	17	3	100
15	Bhopal	26	17	31	15	9	3	100
16	Kochi	16	5	14	51	9	6	100
17	Patna	26	31	20	0	12	10	100
18	Varanasi	24	17	34	0	10	15	100
19	Nagpur	21	28	35	12	3	2	100
20	Jaipur	26	13	26	22	8	4	100
21	Kanpur	29	19	21	9	16	7	100
22	Surat	27	16	34	0	16	7	100
23	Pune	22	11	35	12	12	7	100
24	Ahmedabad	22	14	25	16	17	6	100
25	Hyderabad	22	9	19	35	9	7	100
26	Chennai	22	9	20	31	10	8	100
27	Bangalore	26	7	17	35	8	7	100
28	Delhi	21	12	5	43	14	6	100
29	Kolkata	19	11	4	54	8	4	100
30	Mumbai	27	6	7	45	8	7	100

Transportation Performance Index:

The transportation performance of the selected city was evaluated by developing Transportation Performance Index based on computing several indices such as Accessibility index (Public Transport and Services), Congestion index, Walkability index, City bus supply index, Para transit index, Slow moving vehicles index, On street parking interference index.



NUTP recommendations

- Focus transport supply in the Mass Transport domain
- Serious attention is to be given to Non Motorised Transport
- Set up a Dedicated Transport Fund
- Give a thrust to Traffic system management / intelligent Transport System
- Create a national level database
- The Institutional setup needs to be strengthened
- Develop transportation plans in conjunction with land use plans.

Updates have to be done atleast once in 5 years. It would be suitable to carry out Comprehensive Mobility at a city level in 5 years so that the data from these can be used to update the overall transport strategy also once in 5 years.

Thank You

