

PREFACE

Most of the cities in India have been facing transport problems for past many years affecting the mobility of people and the economic growth of the urban areas. Keeping these in view, the Government of India approved the National Urban Transport Policy in April 2006. It focuses on mobility of people; integration of land use and transport planning; improvement in public transport; introduction of intelligent transport system; facilities for non-motorised modes; capacity building; revolving legal and administrative issues; involvement of private sector; innovative financing mechanism; use of cleaner technology and major awareness campaign for citizens.

In this context, many urban transport initiatives have been taken up in India, such as Modern Bus Services, Bus Rapid Transit System, Public-Private Partnership, Unified Mass Transport Authorities, Metro Rail Systems etc.

In view of the above, the present study documents transport initiatives /projects undertaken in ten cities of India, which includes four BRTS projects of Ahmedabad, Pimpri-Chinchwad, Vishakhapatnam, Jaipur; five modern city bus services of Jalandhar, Jabalpur, Surat, Vadodara and Jalgaon; and multi-level underground parking project of Kolkata. Barring Jaipur Public Transport project, remaining projects are PPP based projects. The study presents description of the project, identifies challenges/constraints, lessons learnt and finally gives suggestions.

We hope that the report will be helpful to urban transport planners and professionals in formulating and implementing the transport projects in the country.

We wish to express our sincere thanks to the Ministry of Urban Development for giving us this opportunity to work on the study. Thanks are also due to officials of Special Purpose Vehicles, Urban Local Bodies, State Governments and Private-Sector Organisations of the selected cities.

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List of Abbreviations

ADB	Asian Development Bank
AMTS	Ahmedabad Municipal Transport Service
AMC	Ahmedabad Municipal Corporation
BOT	Built Operate and Transfer
BOOT	Built Own Operate and Transfer
BRTS	Bus Rapid Transit System
CIRT	Central Institute for Research in Transportation
CBD	Centre Business District
CEPT	Centre for Environmental Planning & Technology
CMP	Comprehensive Mobility Plan
CNG	Compressed Natural Gas
DPR	Detail Project Report
DP	Development Plan
ETS	Efficient Transport System
FoB	Foot over Bridges
GPS	Global Positioning System
GoI	Government of India
GoR	Government of Rajasthan
GIDB	Gujarat Industrial Development Board
GSRTC	Gujarat State Road Transport Corporation
ITS	Intelligent Transport System
IPT	Intermediate Public Transport
JCTSL	Jaipur City Transport Service Limited
JDA	Jaipur Development authority
JNNURM	Jawaharlal Nehru National Urban Renewal Mission

KM:	Kilometre
KMC	Kolkata Municipal Corporation
LRT	Light Rapid Transport
MIDC	Maharashtra Industrial Development Corporation
MSRTC	Maharashtra State Road Transport Corporation
MRTS	Mass Rapid Transit system
MoUD	Ministry of Urban Development
NUTP	National Urban Transport Policy
NGO	Non Government Organisation
PHPDT	Peak Hour Peak Direction Trip
PPHPD	Person per Hour per Direction
PCMC	Pimpri-Chinchwad Municipal Corporation
PPP	Public Private Partnership
PMPML	Pune Mahanagar Parivahan Mahamandal Ltd.
RSRTC	Rajasthan State Road Transport Corporation
RUIDP	Rajasthan Urban Infrastructure Development Program
RTA	Regional Transport Authority
RoW	Right of Way
SPV	Special Purpose Vehicle
SMC	Surat Municipal Corporation
TDR	Transfer of Development Right
UMTA	Unified Mass Transit Authority
UTF	Urban Transport Fund
UTF	Urban Transport Fund
VMSS	Vadodara Mahanagar Seva Sadan

Executive Summary

Background

The present study documents ten urban transport initiatives / projects undertaken in ten cities of India. It covers four Bus Rapid Transit System (BRTS) projects of Ahmedabad, Pimpri-Chinchwad, Visakhapatnam, Jaipur; five modern city bus services of Jalandhar, Jabalpur, Surat, Vadodara and Jalgaon; and multilevel underground parking project of Kolkata. Apart from Jaipur Public Transport (through BRT and modern city bus service) project, the remaining are Public-Private Partnership (PPP) based projects. For each, the study documents description of the project including situation before implementation of the initiative, factors of success, budgetary implications, performance and impact of the project. Besides, it also identifies challenges / constraints, lessons learnt and finally provide suggestions.

Public-Private Partnership

Based on the analysis, one can infer that public and private sectors enter into PPP through various types of agreements, contracts or concessions to meet their requirements. Public sector usually do not have sufficient finances or technical expertise or means due to which they have to depend upon private sector for procuring, operating and maintaining of buses; erection of bus shelters / bus stops; providing ITS and other infrastructures. However, the role of public sector is planning, designing, identification of routes, fixing of fares, over all supervision and monitoring of the project. In a nutshell, this is all done for providing efficient and better quality of services to the citizens.

It is expected that the PPP arrangements may help in making the project successful in terms of operational performance. This largely depends upon financial performance, which itself is subject to management efficiency and fare structure. The system should initially recover its operating cost from its fare box (achieving breakeven point). Capital cost is recovered in a fixed period of time either from fare box or revenue from other sources, like advertisements, rents, etc. The following section of this chapter tries to identify success stories - 'Best Practices' by evaluating overall performance of the case projects with the available data / information on the projects.

Best Practices

Out of ten urban transport projects, eight have been implemented and running successfully. However, Jalgaon City Bus Service (JCBS) has been started recently. Amongst the eight implemented projects, two are the BRTS of Ahmedabad and Jaipur; five are City bus services of Jalandhar, Surat, Jabalpur, Vadodara, Jalgaon; and Kolkata Multilevel Underground Parking Project. Above mentioned case studies may be treated as success stories in terms of their overall performance and impacts of the projects.

Major Challenges / Constraints

It is to be mentioned that these case studies are success stories in many respect but these have encountered many challenges or constraints, either at the time of planning or at the time of implementation. Challenges / constraints indicated in the case studies may be classified in following categories:

a) Finance

- Financial constraints due to cost escalation; and
- Financial sustainability of overall operation.

b) Planning

- Inadequate 'Right of Way' (RoW) in some areas;
- Availability of minimum RoW to achieve segregation of traffic on the corridors;
- Land acquisition of properties to produce RoW;
- Acquisition of land for construction of depot, workshop and bus terminals;
- Unavailability of lands for provision of parking near bus stops;
- Land acquisition which delays the implementation process;
- Lack of interagency coordination; and
- Shifting of utility services addressing drainage.

c) Operation of Buses

- Low frequency of buses;

- Buses are time efficient but the frequencies of these buses are very low; and
- Existing routes are not viable for profit to the Bus Operators.

d) Technical

- Problem of driving buses as the engine fitted at the rear side of bus and there is no automatic transmission system; and
- As buses are big in size, operation on narrow road is not smooth having inadequate turning radius.

e) Socio-Economic Issues

- Agitation by auto rickshaws drivers;
- Poor knowledge of traffic sense of the citizens have created difficulties in day to day traffic despite efforts towards high standards of traffic engineering in the city; and
- Strategic locations of settlements where property acquisition is rather difficult.

Suggestions

Following are the suggestions based on review of case studies:

- a) The analysis of various case projects reveals that PPP is one of the factors, which is responsible for making the project successful.
- b) The public sector should be responsible for planning, designing, identifying routes and locations of bus stops / bus queue shelters, fixing of fares etc Moreover, it should be responsible for monitoring the operation of buses to ascertain as to whether the operators are operating buses as per the schedule or time table.
- c) Fixation of fares or preparing fare structure should be done by the public authorities. Moreover, the fares should be revised periodically to meet the operating cost.
- d) The authorities should explore other ways to generate revenues besides the fare box.

- e) Where Municipal Corporations or Public Transports Undertakings are not financially sound, they should enter into PPP and engage the private sector through service contract to procure, operate and maintain buses.
- f) If a public sector does not have technical and engineering means, it may involve the private sector for specific purposes.
- g) In order to make the BRTS more successful, it may be suggested to identify nodal points at BRT corridors and provide 'feeder' services from these nodal points to important city areas.
- h) Land acquisition for providing 'Right of Way' in city area had become one of the major constraints. In such cases, the Government should take a quick decision to release the land by giving appropriate compensations to the property owners.
- i) Coordination problems have been faced with the agencies involved. In this regard, it may be suggested that the public body-Special Purpose Vehicle (SPV) or transport committee should intervene to solve the coordination problem with the relevant departments or agencies involved.
- j) Technically sound projects are not successful in many instances due to unavailability of adequate project information for the general public. Awareness Campaign should be organized to provide knowledge about the project.

1.0 Introduction

1.1 Background

India's urban population is expected to increase from 286 million in 2001 to 534 million in 2026 (38%). Our country has to improve its urban infrastructure to achieve objectives of economic development. However, most of the cities in India have inadequate infrastructure. Urban transport is one of the major problems, affecting the mobility of people and economic growth of the urban areas. These problems are due to prevailing imbalance in modal split; inadequate transport infrastructure and its sub-optimal use; no integration between land use and transport planning; and no improvement or little improvement in city bus service, which encourage a shift to personalized modes. In view of this, the Government of India approved the National Urban Transport Policy (NUTP) in April 2006.

The Policy primarily focuses on the mobility of people and not the mobility of vehicles. This will require the public transportation system to be more attractive to use. The challenge for improved bus transport is to provide good quality service at an affordable price. It is important to evaluate alternative public transport technologies in the context of city characteristics. The public transport options vary between low cost buses to high cost rail metros. Moreover the shape of a city is very important for selecting the appropriate mode of transport and capacity building is a very important factor in introducing and implementing public transport system.

Several initiatives have been taken in India in this regard: Many cities have prepared Comprehensive Mobility Plans and have plans to introduce modern bus services; Bus Rapid Transit System (BRTS) is coming up in eleven cities; six cities are planning new metro rail systems; and Unified Metropolitan Transport Authorities have been set up in two cities. The Government of India has funded 15,260 modern and intelligent transport systems enabled buses for city transport for 61 mission cities as a part of the economic stimulus package.

Amongst various urban transport projects, rail based Metro are being developed in many cities of India, viz. Delhi (357.37 km, ₹ 58298.47 crores), Mumbai (62.89 km, ₹ 20587 crores), Bangalore (33 km, ₹ 6395 crores), Kolkata (13.77 km, ₹ 4676 crores), Chennai (50 km, ₹ 14600

crores), Kochi (25.3 Km, ₹ 2991.5 crores), Hyderabad (71.29 km, ₹11892 crores) [Annex-I]. Light rail systems have been proposed in Kolkata while monorail systems in Delhi, Bangalore and Mumbai.

Under road based Bus Rapid Transit System (BRTS) in JNNURM, many projects have been sanctioned, the cities, namely, Ahmedabad (88.50 km, ₹ 981.35 crores), Visakhapatnam (42.80 km, ₹ 452.93 crores), Indore (11.45 km, ₹ 98.45 crores), Jaipur (39.45 km, ₹ 479.55 crores), Bhopal (21.71 km, ₹ 237.76 crores), Rajkot (29.00 km, ₹ 110.00 crores), Vijayawada (15.50 km, ₹ 152.64 crores), Pimpri-Chinchwad (42.22 km, ₹ 738.16 crores), Pune (101.77 km, ₹ 1051.00 crores), Surat (29.90 km ₹ 469.00 crores) and Delhi (14.6 Kms- implementing with its own funds) [Annex-III].

The BRT projects are also being considered in a number of cities, like, Vadodara, Mumbai, Hyderabad, Nagpur, Bangalore, Bhubaneshwar, Chennai, Lucknow, Kanpur and Kolkata. BRT has started in Pune, Ahmedabad and Delhi (from Moolchand to Ambedkar Nagar) also. Attempts were made to privatize the passenger transport in many cities of India, like, Delhi, Jaipur, Bhopal, Indore Visakhapatnam etc. However, in some cities, such as Jalandhar, Ludhiana, Amritsar, Ajmer Nagpur, Jodhpur and Surat initiatives are being taken in this regard.

Keeping in view of the above-mentioned initiatives taken by the cities of the country, it becomes imperative to review them and document them in a proper way. This would help the planners and researchers for future planning and implementation of the projects. Accordingly, this study has tried to document the initiatives / projects / best practices in the field of urban transport. These projects may be based on Public Private Partnerships.

1.2 Objectives, Case Studies and Methodology

Objectives

The objectives of the study are to:

- 1) Document the initiatives (rail based and bus based projects) undertaken and are being undertaken by 10 cities of India with focus on PPP.
- 2) Identify challenges, lessons learned and give suggestions.

Case Studies

The present study indicates the success stories – best practices in the field of urban transport. Besides, it throws light on the challenges or constraints encountered during planning and implementation of the projects. Finally, it makes suggestions on the basis of lessons learned, to improve planning and implementation of projects in future.

The study covers bus based projects, viz. Bus Rapid transit System (BRTS), Modern Bus Services (by Government funding or PPP based models) and their supporting infrastructure such as multilevel or under-ground parking etc. Nevertheless, it describes each case study (project) under the heads and sub-heads of the ‘Best Practice Format’ (as followed by UN-Habitat Best Practice Documentation, Annex IV of the study) to make it meaningful and technically sound. All case studies are based on the information which could be shared with us by the transport agencies/organizations, discussions held with the concerned officials of the respective projects and observations of the study team.

In order to achieve the objectives of the study, the first hand information (lists of urban transport projects) regarding the completed projects and ongoing projects were collected from the Ministry of Urban Development. The information regarding various urban transport projects in India were also downloaded from the Internet.

The selection of 10 urban transport initiatives / projects for the study has been done on the basis of the population size of the cities, regions / states, progress / performance of the projects, involvement of the private sector etc. Ahmedabad and Kolkata are two mega cities of Gujarat and West Bengal, respectively. Surat (Gujarat), Jaipur (Rajasthan), Vadodara (Gujarat), Visakhapatnam (Andhra Pradesh), Jabalpur (Madhya Pradesh), Pimpri - Chinchwad (Maharashtra) are the cities having million plus population. However, Jalgaon (Maharashtra), and Jalandhar (Punjab) have less than one million populations. Moreover, barring Pimpri-Chinchwad, Jalgaon and Jalandhar, all cities are JNNURM cities. All the selected cities, except Jaipur, have PPP based transport projects.

Out of a total of 11 BRTS projects (undertaken or being undertaken) in different states of India, 4 BRTS projects of Ahmedabad, Pimpri-Chinchwad, Jaipur and Visakhapatnam have been

selected for the study. Amongst BRTS projects of Ahmedabad, Delhi and Pune (which are operational), Ahmedabad BRTS is the most successful project which is why it has been selected for the study. The selection of remaining three BRTS projects of Pimpri-Chinchwad, Visakhapatnam and Jaipur has been done keeping in view of their progress.

Modern City Bus services on PPP model have been planned in 15 cities of different states / regions of India. Amongst 15 projects, 5 cases of city bus services of Jalandhar, Surat, Jabalpur, Vadodara and Jalgaon have been selected for the purpose. City bus services of Surat has been awarded first prize for the excellence in best PPP practices in urban mobility in December 2008. Vadodara city bus service has been awarded for Excellence in Urban Mobility, in 2008. City bus services of Jalandhar, Jabalpur and Jalgaon, having different PPP models, are being operated successfully. Amongst these three, Jalgaon City bus service is being operated on a different type of PPP model (Table-1). Kolkata Multilevel Parking is a PPP based project and this approach is being replicated in many cities such as Pune, Mumbai etc. Therefore, we have included it as a best practice.

Table 1.1: Urban Transport Initiatives-Case Studies

S. No.	Case Studies	Nature of Projects	PPP Based / Non-PPP Based	Status of the Projects
1)	Ahmedabad Bus Rapid Transit System	BRTS Project	PPP based	Implemented
2)	Jaipur Public Transport Service through BRTS and Modern City Buses	BRTS Project	Non-PPP Based*	Partially Implemented
3)	Jalandhar City Bus Service	Modern City Bus Service	PPP based	Implemented
4)	Jabalpur City Transport Service	Modern City Bus Service	PPP based	Implemented
5)	Surat City Bus Service	Modern City Bus Service	PPP based	Implemented
6)	Pimpri-Chinchwad Bus rapid transit System	BRTS Project	PPP based	Under progress
7)	Vadodara City Bus Service	Modern City Bus Service	PPP based	Implemented
8)	Jalgaon City Bus Service	Modern City Bus Service	PPP based	Implemented
9)	Kolkata Car Parking System	Parking Project	PPP based	Implemented
10)	Vishakhapatnam Bus Rapid Transit System	BRTS Project	PPP based	Under progress

**Private Sector would be involved in future for constructing bus stops / bus shelters.*

Methodology

The whole study is based on the information obtained from primary as well as secondary sources. As per the objectives of the study, the required information on the selected projects were collected mainly by administering the 'Best Practice Format', which included information mainly on situation before the implementation of the initiative / project; description of the initiatives / project / best practice, indicating problems / needs addressed by the best practice, reasons for the adoption of the particular system and preparation of feasibility report; factors of success, budgetary implications and sustainability and impact of the initiatives / best practices.

This format was sent to the selected transport agencies or organizations to furnish the requisite information of their projects. After receiving the feedback on the format along with the supporting documents, the information was analyzed and worked-out gaps, which were to be discussed with the concerned authorities. Field visits were undertaken by the study team of the Institute, during which the concerned officials were contacted. The required information for the study was collected through discussions. Finally, the study team compiled the information and incorporated their observations and findings in the study.

1.3 Conceptual Framework

Before documenting various case studies, it becomes imperative to understand the following:

Need of a Public Private Partnership

The concentrated growth of urban population in large and metropolitan cities of India leads to increase in their area and consequently results in substantial increase in transport, in total number of trips per person per day, average trip length, trip costs etc. Hence, there is a dramatic increase in demands for various modes of urban transport, which are efficient, economical and adequate.

The rail and road based mass transport system are supposed to be the efficient transport modes to meet the increasing demand. The task of providing road based mass transport service is the responsibility of either the State Government or Urban Local Bodies. Public services, however, are often run not with a profit motive but keeping in view the socio-economic benefits of the commuters.

The fare is pegged at low level and does not cover even its operating costs from the fare box. Nevertheless, these have to provide a series of free and concessionary passes, which are not compensated by any agency or authority. Hence, the public transport systems incur heavy and mounting losses. In such situation, it becomes very difficult for a public transport to maintain even its existing level of service what to talk of increasing their fleets to meet the rising demand for urban transport. As a result, a number of private vehicles increase many folds leading to congestions on roads. This congestion not only make the movement of people difficult but results in road accidents, high levels of noise and air pollution, wastage of time, fuel etc.

In order to check the proliferation of private modes of transport, it becomes essential to make the public transport system financially strong so that they can provide quality services to meet the transport demand. For doing this a level of investment is required. However, in the past, the external agencies have offered much support for public sector and management improvement schemes. In this context, a question comes again and again whether the investment, provided by the external agencies, gives benefits to the citizens to the level it should be. This may be one of the reasons for urban transport authorities to look more towards private sector as a source of investment and improved efficiency of transport services.

Generally, the method in which public and private sector cooperate and partner with each other to provide infrastructure and / or improved public services is known as *Public Private Partnership*. It has no universal definition, however, the nature of partnership contingent on the type of project, scope of services, duration of the project, responsibilities of sectors and risks between the private as well as public sector. Generally, 'Public' is represented by SPV, State and Central Governments, Local Government, Transport Authority, Transport Committee etc. 'Private Sector' is represented by Private Sector Organizations / Companies, Resident Welfare Associations, Non - Government Organizations, Community groups etc.

In case of water supply, sewerage and solid waste management, PPP is being used for last many years but in the field of urban transport it is a new concept. There is a range of PPP models varying from simple service contract (which may be renewed every year) to long term concessions contracts, which may be extended up to 25-30 years. Service Contract, Management Contract, Concession and Lease, Built-Operate-Transfer(BOT) / Built-Own-Operate and

Transfer (BOOT), Design, Build, Finance, Operate and Transfer (DBFOT) are the PPP models, which are used depending upon the scope of project, project costs, project duration, allocation of roles and responsibilities, risks involved etc.

In order to maximize the benefits of PPP to the public and ensure long term sustainability of the project, some guidelines should be there to follow the PPP route - lifecycle. The lifecycle of a PPP is referred to a set of activities starting from project identification and initiation to construction / implementation and commencement of operations.

It consists of seven stages, viz. project initiation and assessment, feasibility analysis, project structuring, detailed project preparation, bidding process project construction and monitoring and commencement of regular operations. The details of the lifecycle have been given in a 'Toolkit for Analysis of Urban Infrastructure Projects for Public- Private- Partnerships under JNNURM (2008)', prepared by the JNNURM Technical Cell, Ministry of Urban Development.

In the field of Urban Transport, the National Urban Transport Policy (NUTP), 2006, suggests that the priority should be given to the use of public transport. It is in favor to adopt such measures that discourage the use of personal motor vehicles and encourage using public transport for daily trips to work or school etc. In this connection, the Central Government promotes investments in public transport as well as measures that make its use more attractive than that of personal motor vehicles.

For this purpose, the Central Government encourages high capacity public transport systems being set up through the mechanism of SPV and offer financial support either in the form of equity or one time viability gap financing, subject to a ceiling of 20% of the capital cost of the project after examining various parameters, viz. extent of resources likely from private participation, willingness to involve the private sector in operations under the overall supervision and coordination of a public agency, willingness to introduce premium public transport systems that are priced high but offer better quality with a view to limit the subsidy requirements in normal services etc.

There are many activities for which private sector can be engaged, saving financial resources for activities that public organizations can best do. The Central Government encourages the state

Government to involve the private sector in providing transport services under the structured procurements contracts.

There are many options in which the public organizations / agencies can involve private sector, such as hiring buses from private sector without crew, hiring buses from private sector with crew, tenders routes or areas to private sector (gross cost contract or net cost contract), BOOT contract for bus stops / shelters and GPS, concession agreements with bus operators / supplier and pass issuance operators etc. Each option has some advantages and some disadvantages but the SPV has to decide as per its requirements. Besides the above, Public Private Partnership is also being used for urban transport infrastructure projects such as underground or multilevel parking, traffic improvement schemes etc.

Options Available for Efficient Urban Transport System

In the field of urban transport, Mass Rapid Transit System (MRTS) is an innovation around the globe that can broadly be classified into 'rail system' and a 'bus system'. The rail based MRTS is capital intensive and includes systems like metro, monorail, Light Rapid Transit (LRT) etc. The bus based system includes Bus Rapid Transit System, commonly known as BRTS. The BRTS is not a technology but an organized way of operating buses on dedicated corridors with high tech information system. Selection of a particular type of system depends upon many characteristics of the city. The present study has documented BRTS of four cities, namely, Jaipur, Ahmedabad, Pimpri-Chinchwad and Visakhapatnam. Amongst these, Ahmedabad BRTS has been implemented and operating successfully.

Another option is to operate modern and intelligent transport systems enabled buses. As mentioned earlier, the Government of India has funded 15,260 such buses in 61 JNNURM cities as a part of the economic stimulus package. A 'Handbook on Service Level Benchmarks for Urban Transport', Ministry of Urban Development, 2009, has mentioned the formula to calculate the presence of public transport system in urban areas (%) in terms of city buses under the ownership of State Transport Undertaking / Special Purpose of Vehicles or under Concession Agreements.

Success Stories – Best Practices¹

It is true that every success or failure conveys some message as to what we should do or not do. If a project is successful, it can be replicated in other cities. Problems / challenges or constraints alert the planners, implementing agencies and managers to take care of them for future planning and implementation of the projects. In a nutshell, one can learn from success and mistakes of each other.

In general, if a project achieves its objectives / targets within a given time frame work, it is said that the project is successful. The success of any mass transport system is judged by its operational performance. The operational performance is largely contingent upon financial performance which itself is subject to management efficiency and fare structure. It is expected that the system should initially recover at least its operating cost from its fare box, which is known as a breakeven point. Capital investments should also be recovered in a fixed time period either by the main stream of revenue (fare box) or by other revenues, like, revenue from advertisements, rents etc.

In other words, a good financial performance improves the operational performance of a mass transport system to a greater extent. A transport system having good operational performance attracts people and the ridership is increased. An increase in ridership means that the commuters, who were travelling by other modes of transport (especially personal vehicles) earlier, have switched over to public mass transport system.

This process not only improves the financial performance of the system but reduces the congestion on roads which occurs due to the operation of personal vehicles. Moreover, if the congestion is reduced, air pollution, noise pollution, wastage of fuel, wastage of time, rate of accidents etc. are also reduced. Thus, the mobility of people increases, which finally affect the economic growth of the country.

1.4 Limitations of the Study

This study has following limitations:

- 1) The PPP based Metro Rail Projects, under the Mass Rapid Transit System (MRTS), belong to an organized sector and are at initial / implementing stages. Therefore, the present has not documented them. Nevertheless, the highlights of PPP based Metro Rail Projects of Hyderabad, Mumbai and Delhi (from New Delhi Railway Station to IGI Airport and from IGI Airport to Dwarka Sector 21), along with their Funding Pattern (Funding Models), have been given in Annex II.
- 2) As mentioned earlier, all case studies (projects) are based on the information which was shared with us by the transport agencies / organizations. As a result, some parameters for the projects could not be compared in the study.
- 3) A case study on ‘Thane Railway Station Area Traffic Improvement Scheme’ does not fall in the criteria chosen for the selection of a sample but it has been documented in addition to our commitments (Annex- V). The reason this being is that this is a success story in the field of urban transport infrastructure. It has been awarded by MoUD in the Conference & Exhibition on Urban Mobility India – 2009.
- 4) The Indore City bus Service – Indore City Transport Services Ltd is the first Public Private Partnership (PPP) model in India. The present study has not documented the same because it has already been documented and disseminated extensively. However, for purpose the purpose of ready reference, Annex VI of the study deals with its description. The information given in this Annex is based on the information gathered from Internet and from researchers’ papers.

Report Outline

Detailed case studies are described in Chapter 2 to 12 and Chapter 13 provides Summary and Conclusions of the study.

¹ The UN defines best practices as successful initiatives which have a demonstrable and tangible impact on improving people’s quality of life; are the result of effective partnerships between the public, private and civic sectors of society; and are socially, culturally, economically and environmentally sustainable. Best Practices often incorporate active solutions for problem solving based on effective partnerships and institutionalized interface with stakeholders and citizens.

AHMEDABAD BUS RAPID TRANSIT SYSTEM



2.0 Ahmedabad Bus Rapid Transit System

2.1 Context

The city of Ahmedabad, founded in 1411 AD as a walled city on the eastern bank of the river Sabarmati, the commercial capital of Gujarat is now the seventh largest metropolis in India and the largest in the state. With a population of 6 million (2001) within an area of 466 sq. kms, the city is preparing for the emerging challenges, more importantly in terms of sustaining its contributions to the growth of Gujarat State. It accounts for 25% of the State's urban population; 20% of the State's GDP (2001), and also has one of the largest informal sectors. Ahmedabad with its strong industrial base continues to be an attractive destination for investments. Its population is likely to rise to 11 Million by 2035. While the area is likely to increase from the present 440 sq. kms 1000 sq. kms by 2035, sustenance of this growth is possible only with the development of an efficient rapid mass transit system

2.2 Situation before Implementation of the Project

2.2.1 Transport System before the Start of the Project

Ahmedabad is a compact city characterised by mixed land uses, high density development and balanced street network system with well developed 5 ring and 17 radials. Total road length is about 2400 kms. There are 7 bridges to connect the eastern part of the city with west. Sixteen rail-over/under bridges enable crossing the railway lines at appropriate places.

Two wheelers, both motorised and bicycles dominate the traffic on the streets of Ahmedabad. The city has 22 lakh registered vehicles of which two wheelers are about 73%. As per the household survey (CEPT, 2006), 8 lakh bicycles are in operation in the city accounting for 19% of the total trips. The share of four wheelers is still low. They constitute to about 12.5% of the total vehicles and 3% of total trips.

The culture of organised public transport operations dates back to pre-independence era. The Ahmedabad Municipal Corporation (AMC) has been running a well organised public transportation system known as Ahmedabad Municipal Transport Service (AMTS). However, due to resource crunch and operational inefficiencies of the system, the fleet size got reduced

to 450 in the year 2005. As a result, significant loss in patronage was experienced. Average daily ridership in 2005 was 3.5 lakh. While the share of public transport declined, the share of Auto rickshaw increased. In the city, there were about 35000 auto rickshaws operating catering to 10% of total trips. As most of these were using adulterated fuel, air quality was affected significantly. As a result the city of Ahmedabad figured as one of the top 3 cities in the list of 88 critically polluted cities of India.

AMTS with a fleet of about 1000 caters to about 8.29 lakh passengers every day. AMC undertook a restructuring exercise during 2006 and invited private operators to operate on gross contract basis leading to doubling of fleet size, with half owned by AMTS and the remaining half hired on gross contract basis. Through concerted efforts AMC undertook fuel switch operations. Today all buses and auto rickshaws in the city are operated on CNG, contributing to significant lowering of pollution load from transport sector.

The compactness of the city, mixed land use and balanced road network appear to have succeeded in keeping trip length short (average trip length in Ahmedabad is 5.5 kms). Further the balanced transport network and predominance of two wheelers limits excessive concentration at any one part making city relatively less congested. It is important to recognise that short trips and less congested streets appear to make city streets safe without compromising on mobility.

Average travel times are in the range of 15-20 minutes. The road fatalities, in the year 2009, are 202. This is comparable to those observed in the world cities of similar size. The city has also made significant gains in the air quality status. Being a part of 88 critically sensitive lists of cities as identified by the Central Pollution Control Board (CPCB), topping the list in 2003, today the city has managed to reach a position where it is reported that this year CPCB is considering taking the city out of the list.

While these initiatives have had slight dampening effect on the traffic, the rate of motorisation being rapid (every day 430 vehicles are added to the city vehicular register) and slow but steady increase in the share of cars will lead the city onto a grid lock unless persistent efforts to improve public transport, promotion of non-motorised vehicles and introduction of demand management measures are made. These are essential for achieving the goal of sustainable city and good quality of life.

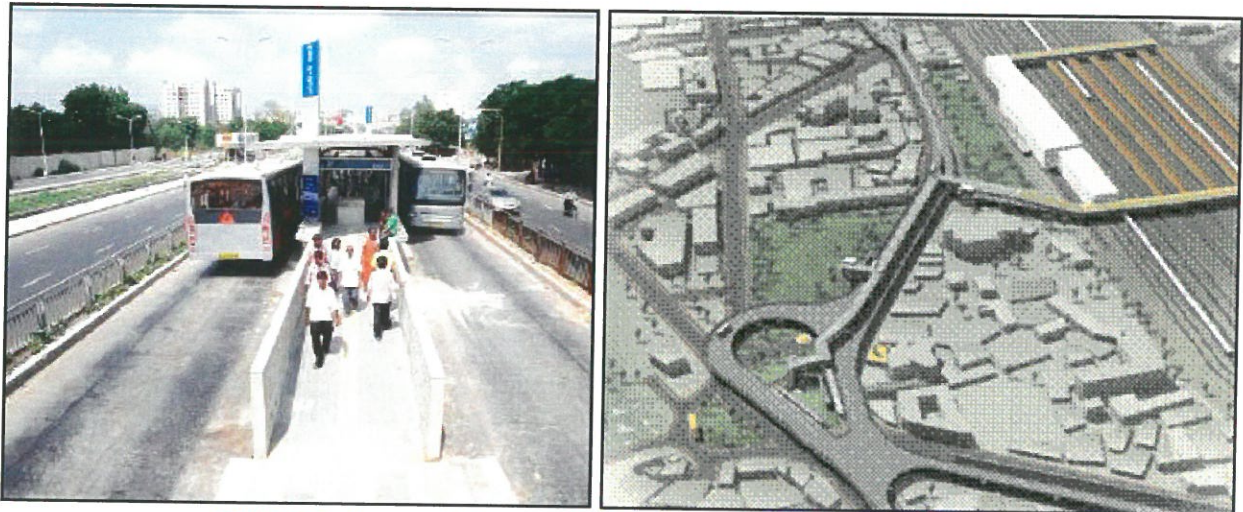


Figure 2.1: Ramp and Access to Bus Station and Elevated BRT at Kalupur

BRT Stations:

38m long 3m wide median bus stations, closed with necessary access controls, at level boarding-alighting, off-board ticketing system, IT enabled & Passenger Information System, security systems & pedestrian crossings & grade separated.

Bus Features:

Stylised buses designed for passenger comfort, wide central doors (1.2m+ 1.2m- entry and exit), (900+/- 40 mm floor height), 90 person-capacity and clean fuel Euro-III Diesel.



Figure 2.2: Side Elevation Showing Bus Graphics

Intelligent Transportation System (ITS)

- Operations Control

- Automatic Vehicle tracking system
- Electronic Fare Collection
- Real-time Passenger Information System
- Traffic Management (ATCS)

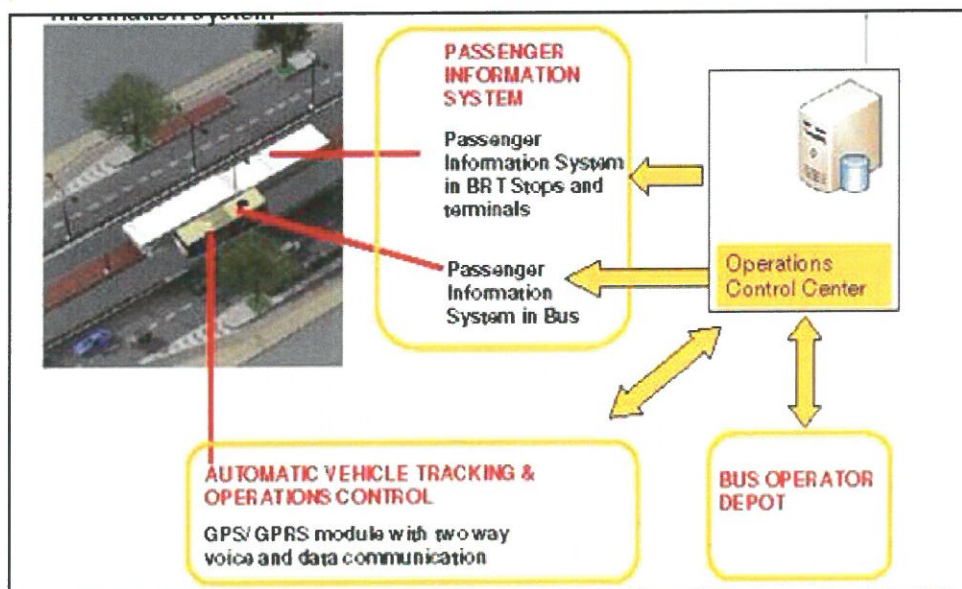


Figure 2.3: IT System in Ahmedabad BRTS

For detailed technological applications / innovations used in the BRTS, refer Annex VII.

2.3.2 Goals of the Project

The trans-vision of Ahmedabad captioned as ‘**Accessible Ahmedabad**’ is to **redesign the city structure and transport systems towards greater accessibility, efficient mobility and lower carbon future**’. Main objective of project is to:

- Reducing need for travel;
- Reducing the length of travel; and
- Reducing automobile dependence.

2.3.3 Strategy Used to Achieve the Desired Goals

Ahmedabad transport strategy is focused on moving people and not on vehicles. The Urban Mobility strategy is based on the understanding that all people should be able to move around in Ahmedabad with comfort and efficiency. They must feel safe and secure. Travel must be

affordable. They must have choices for their mobility in terms of walking, bicycling, rickshaw, bus, BRT or any other form of transport depending on where they are going. To emphasize this, the system has been named as Janmarg, meaning peoples way.

The concept of BRTS is to encourage more people on the public transit system, which with high quality service is delivered. It is about equal access and equal sharing of road space for people. By providing a dedicated corridor within the street for BRTS vehicles, more people can travel to destination in a time that is comparable to single occupancy vehicles such as cars, two wheelers.

2.3.4 Activities Implemented to Achieve the Desired Goals

Several activities were undertaken and accomplished to implement BRTS –initial phase in Ahmedabad. BRTS phasing was done based on where right of way was available and where ridership could be achieved from early months. Brief study was done to look at travel time characteristics, demographics.

BRT corridor selected was done based on the set criteria. BRTS characteristic was adopted and a key decision to make the ‘closed’ system was taken early on.

Table 2.1: Travel Characteristics & Project Brief

Travel Characteristics	2006	Item	Phase-1	Phase-2
Gross Density (p/Ha.)	106	Number of corridors	5	6
% HHs with personal Vehicles	82	Length approved (Kms)	58	30.5 (4.5 kms elevated)
Avg. Monthly Income (Rs)	8728	Approved Cost (₹ Crores)	493	488
Trip Rate (Tot-> 1 km)	1.14	Cost per km	8.5	15
Avg. Trip Length	5.6	Date of Approval	11-08-2006	19-08-2008
		Year of Commissioning		
% Bus trips	15	October 24, 2009 – 12.5 kms December 25, 2009 – 05.5 Kms March 25, 2005 -08.0 kms Balance over the next 18 months		
% IPTS Trips	9	Road Width: < 24 m – 5.2 %, 24-30m – 22.4%, 30-45m – 28%, 45-60m – 47% Pavement Type: Bitumen, Mastic at some Bus Stations		
%Bicycle Trips	18			

Source: CEPT University, 2010

The city of Ahmedabad has a well organised road network with 5 rings and 17 radials. The BRT plan consisted of development of 217 km of BRT corridors in three phases. The corridors selected as part of phase 1 were mainly the rings in Ahmedabad. This included the 132 feet ring road on the western side and the Mani-Nagar railway station and Narol-Naroda highway on the eastern side. More difficult corridors for implementation, but having higher demand, were included in subsequent phases. The idea is to develop BRT on these critical links, in phase 2, so that optimal utilisation of the system is achieved. The attempt is to consolidate on the gains.

The project is to be undertaken in 3 phases. The first stretch of the phase-1 between RTO-Pirana covering a distance of 12.5 kms is open for public since 14th Oct, 2009. The second stretch was inaugurated on 25th Dec 2009 which got added to the existing corridor increasing the length to 18 kms.

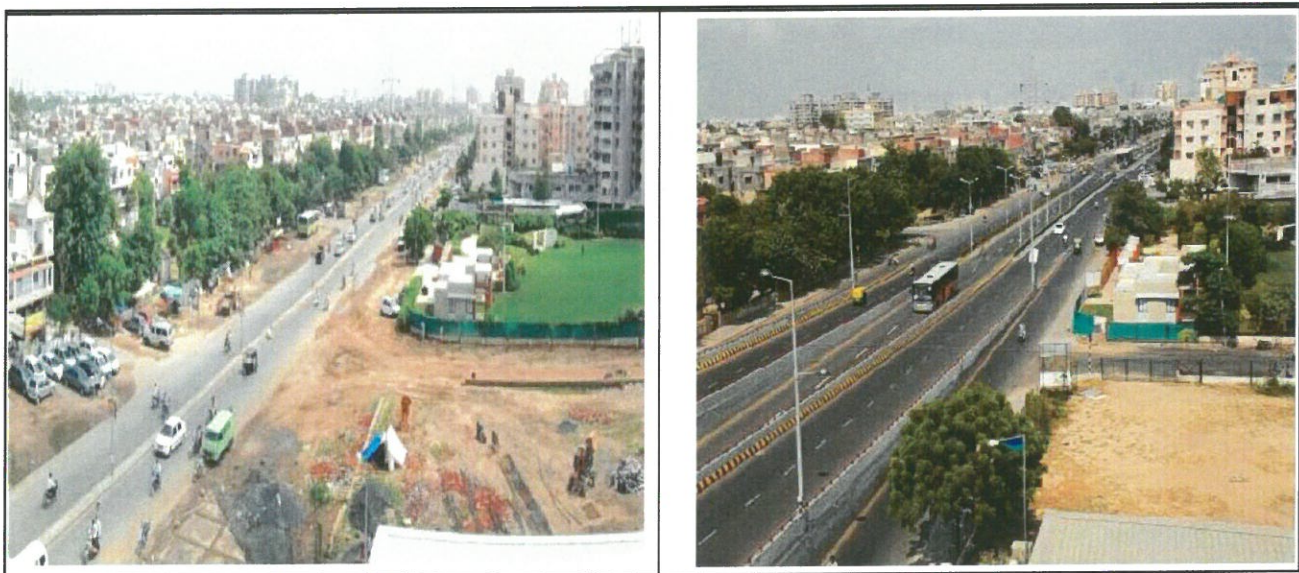


Figure 2.4: Building Split Flyovers (Before and After at AEC)

2.3.4 *Expected Outcome of the Initiatives*

Connectivity to important origins and destinations

The proposed BRT network connects the important origins and destinations and transit points like Railway stations, regional bus terminals, university areas, industrial areas, residential (LIG, MIG, EWS), commercial hubs of the city and recreational public spaces like Kankaria

lake front that is recently pedestrianised. The idea is to increase mobility and accessibility to these points through a well connected network of BRT.

Catalyst for Area Development

During phase-1, while existing and potential demand were prime considerations for selection of the corridors, BRT infrastructure with a projected future demand was considered as a critical part of the corridor selections. The corridor passes through areas having many vacant mill lands on the eastern part of city, with a scope for future development.

The transformations have begun to occur and the BRT acted as a catalyst for future development as shown in the images below. The open lands of university areas and major junctions on the 132 feet ring road have transformed into University convention hall, commercial malls and buildings. Hence, it can be said that supply creates its own demand. After four months of BRT operations, around 42, 500 passengers use BRT every day on this corridor from RTO to Kankaria (18 kms).

Low Income and Low Accessibility Zones

The corridor also provides connectivity to the lower income housing areas and increases accessibility for the lower and middle income groups. The system is for the poor as much as it is for the rich and the elite class of people. The stretch between Pirana to Shah-Alam that connects the western part to the eastern part of the city was recently opened up for operations and was well received by the citizens. People's acceptance and respect towards the high quality infrastructure gets reflected.

Availability of Right of Way

As the concept was being implemented for the first time, often the availability of RoW and ease of implementation took precedence over demand. The different right of ways available on BRT roads were 60 m, 45 m, 40 m, 36 m, 30m, 24 m and 18 m (in Kalupur area).

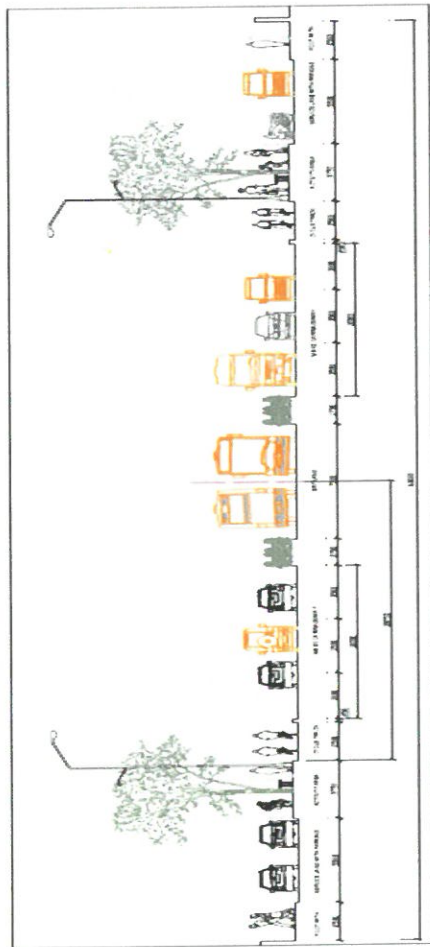


Figure 2.5: Typical cross section for 60 m cross section

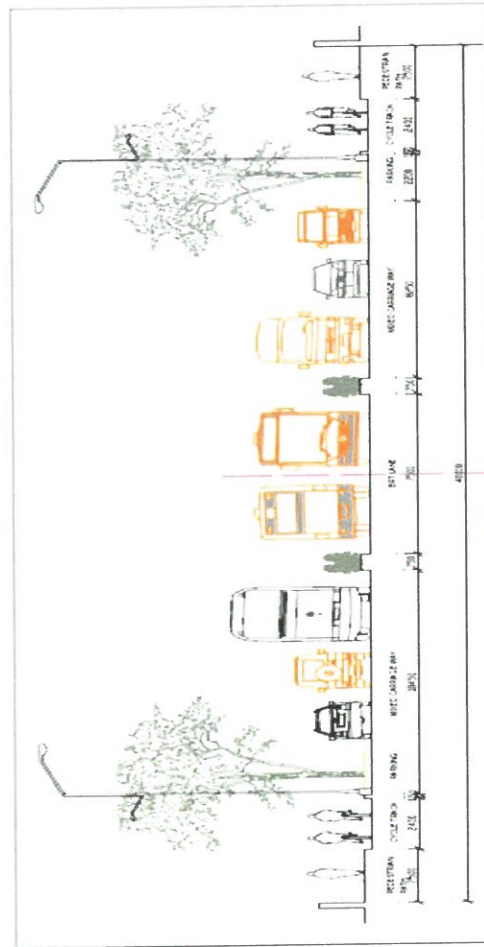


Figure 2.6: Typical 40m RoW cross section

Figure 2.5: Typical Cross-Section of Right of Way (ROW); Source: CEPT University, 2010

Connect Busy Places but Avoid Busy Roads

Connecting inner city areas with BRT network meant creating bottlenecks on the already congested roads. The aim was to connect the busy public destinations and hence while selecting roads along potential BRT corridor, 'Connect busy places but avoid busy roads', has been the policy. Figure below shows a BRTS route connecting like law garden, C.G. road, Gujarat College but avoiding busy and congested roads (shown in dotted lines).

2.3.5 Status of the Project

The system has been in operation for the past one year and carries about 90,000 passengers daily with deployment of 45 diesel buses (30 AC buses out of 45, 12 meter long, 900mm floor height), with commercial speeds greater than 24 Kms per hour.

2.3.6 *Role and Activities of the Partner*

New Management Culture- Creation of Janmarg a company (SPV) to manage BRT

Board of SPV

1. Municipal Commissioner, AMC;
2. Hon. Mayor;
3. Chairman Standing Committee;
4. Leader of Opposition Party;
5. Dy. Commissioner BRTS;
6. Chairman, AMTS;
7. Additional Commissioner of Police (Traffic);
8. Chairman/CEO, AUDA;
9. Director, Urban Transport, MOUD, Government of India;
10. One Member of Legislative Assembly representing AMC area;
11. Principal Secretary or his representative, Urban Development Department;
12. Principal Secretary or his representative, Department of Finance;
13. Two urban Transport specialists; and
14. Two directors from private sector (With contribution to capital).

2.3.7 *Important Stakeholders Involved and Communication / Networking Procedure for the Project*

Ahmedabad Janmarg Limited (AJL), a SPV has been established under the Companies Act as a fully owned company of AMC. AJL is chaired by the Municipal Commissioner with representatives of political and administrative wings as board of directors. The board has provision for two experts and also 2 directors from private sector coming with equity.

Dedicated Urban Transport Fund has been set up. Parking Policy is in place and pay and park tender has been put in place for



Figure 2.6: Newspaper Articles on Ahmedabad BRTS

spaces along BRTS corridor. Advertisement policy is under finalisation. Formation of Urban Mass Transit Authority (UMTA) is under process.

Municipal area has been enlarged to include developing areas. Adopting consultative planning process, comprehensive plan has been out in place. Transit Oriented Development (TOD) is an integral part. Setting up of Urban Mass Transit Authority (UMTA) is under consideration. Dedicated Urban Transport Fund is being formalized. Parking Policy is in place. Advertisement policy is under preparation.

Role of Ahmedabad Janmarg LTD includes planning of services, selection of operators, monitoring of service quality, fare revisions, coordination with relevant departments and future BRTS expansion plan.

The private sector has been involved for Nine PPP Arrangements (Contracts):

- Bus Procurement, Operations and Maintenance;
- Integrated Information System including Automatic Ticketing and Vehicle Tracking System;
- Supply & Service Contracts for Bus Station Sliding Doors, Turnstiles;
- House Keeping & Cleaning of Bus Stations;
- Management of Pay & Park facilities;
- Lease of Advertisement Rights;
- Development of Foot Over Bridges on DBFOT;
- Development & Maintenance of Landscape;
- Maintenance Contracts for Bus Stations (Civil Works), Lighting of Bus Stations & Corridor; and
- Monitoring and Maintenance of BRTS Corridor (Civil works), Signage.

It is to be mentioned that private operators will be procuring buses as per the specifications decided by the authorities and operating services under the overall supervision and regulation of the SPV. A kilometer scheme is being contemplated for the system.

Janmarg Management

Janmarg will have various departments to manage its key responsibilities. The new proposed structure has all the departments placed under three clearly demarcated divisions (Operation,

Maintenance and Finance/Administration). Deputy General Manager, head of each division has to report the General Manager who will further report to the Executive Director.

Operations Division – Like arms and legs, this department will manage day to day management of bus operations. This department shall be the largest in terms of manpower. It will manage the Central Control Centre, perform quality control checks on bus fleet and infrastructure, and oversee fare collection activities at terminals and in the system in general. This department also advises the Administration and Finance department regarding payments to be made to bus operators and all other external contractors. They will liaise directly with the bus operators, fare collection agency, infrastructure maintenance agencies and all other groups involved with operations.

The Operations Division is charged with delivery of service to the community. Its function is to provide on time, dependable, transportation services to the citizens of this city. It is responsible for overall BRTS operations, safety & security and information technology and related work.

Planning - Planning department is akin to the heart of the system. It will work in the area of demand management. Its role will be to conduct passenger surveys, compile and analyse data pertaining to passenger demand, not just on the BRT system but in the whole city on other relevant modes. It will plan medium to long term changes in operations. It will assess possible extension to the system, when required, and take necessary approvals from relevant authorities. Fare structure, fare incentives, economic and business model are areas that it shall study and develop for the operations management group to implement.

Maintenance - The Maintenance division is responsible for maintenance of the vehicles and the facilities of AJL like BRTS stations, depots as well as feeder bus stops (in future) etc. The division will have a manager who will be stationed at a Depot. The division will work closely with the operations division in oversight, enforcement and management of system operator contract related to the maintenance of the vehicles.

Administration And Finance – It shall be responsible for making all payments based on the information it receives from the operations management cell. It will also be equally responsible for internal administration. The Finance and Administration Division is responsible for employment, employee services, employment and testing, training the

workforce, contracts and marketing & advertising of AJL services. The division has two departments. It is also responsible for revenue and general accounting, smart cards and fare media, organization budget, grants and financial reports.

2.3.8 Details of Public-Private Partnership*

There are a total of **nine PPP arrangements** which Ahmedabad Janmarg has entered into to ensure efficient operations of Janmarg BRTS. Depending on the elements each of these has been structured appropriately to reap the advantages of PPP. The responsibility matrix is presented below:

PPP Responsibility Matrix

Component	Solution/Design	Construction / Supply	Operations	Management	Maintenance
Bus Stations/ Corridor/ Flyovers	AJL/CEPT	Fixed Time / Fixed Rate Contractor	-	-	Presently under Defect Liability Period
Buses	AJL / CEPT	Buses hired for 7 years from Operator	Bus Operator	Janmarg / Operator	Bus Operator
Ticketing, CRNT Systems	AJL/CEPT	Service Provider	Service Provider through annuity	Service Provider through annuity	Service Provider through annuity
Sky Walks	Conceptual Design: CEPT / Detailed Design by Concessionaire	Concessionaire	Concessionaire	Concessionaire	Concessionaire
Component	Solution Design	Construction / Supply	Operations	Management	Maintenance
Parking	AJL / CEPT	Parking constructed as part of corridor	Pay and Park Operator	Operator overseen by Janmarg	Pay and Park Operator
Hardware elements: Sliding doors / turnstiles	AJL / CEPT	Supplier	Janmarg / Service Provider	Janmarg / Service Provider	Supplier through AMC
Advertisement Rights	AJL / CEPT	Licensee	Licensee	Janmarg	Licensee
Bus Keeping	AJL / CEPT		-	Janmarg	Service Provider
Landscaping	AJL / CEPT	Licensee	-	Janmarg	Licensee

Source: AMC, 2010

*All information (including tables) in the PPP section has been given by Ahmedabad Municipal Corporation (AMC), 2010.

The highlights of each of the above have been presented below:

Bus Procurement and Operation and Maintenance

- Fleet Strength of 250 buses envisaged to be provided during phase-1 and phase-2 of operations covering 90 kms through 3- 4 operators. At present 45 buses are operational and another 45 will come into operation during the next 4 weeks. Of these, 30 will be AC buses. Diesel Buses of Floor Height of 900 mm have been selected based on the technical and financial parameters. Regular Diesel Buses selected for operations owing to cost advantages over articulated / CNG Buses was designed for the BRTS and Specifications were detailed in the bid¹.
- Bus Service Providers to purchase, operate and maintain buses of given specifications on specified routes under AJL supervision for a per kilometer charge.
- Bus depot cum workshop is built by AMC and given to the operator for exclusive use during the contract period. All equipments are procured by the operator.

A) Key Terms and Conditions of Bus Contract

- Bus operator contract is for 7 years.
- Selection of Bus Provider through a two stage bidding process:
 - *Qualifying Criteria*
 - ✦ Had to visit and study Bogota system before bidding to visualise the expectations.
 - ✦ Ownership of 40 buses or 200 taxis.
 - ✦ Rs 300 lakh turnover.
- Bidding Criteria – Quoted Per kilometer charge.
- Traffic Risk retained with Municipal Body since the Bus Operators industry is yet to develop. Ticket revenues to be determined, charged and retained by AJL. Further it is necessary that services respond to the growing demand and keeping revenue risk through gross-cost contract ensures varying schedules during the day. Early morning

¹ Bus operator built the bus on a TATA chassis as this type of bus with 900mm and right side door with 180 hp was not readily available in the market. The bus operators have diversified into bus coach building activity.

headways are 15 min, which change to 10, 8 and 6 minutes during the day and come down to 2½ minutes during peak hour. Seasonal and weekly variations are also accommodated in designing the schedules.

- Bus advertisement revenues to be shared between operator and AJL in ratio of 20:80.
- No permanent route allocation. Only kilometer contract. This allows changing the number of buses allocated on each route on a regular basis based on change in passenger movement patterns.
- No minimum km guarantee per day. Guarantee of km only over a longer period of time (annual). This allows variation in allocated km from day to day to optimize operations. Minimum of 72000 km / bus promised to the operator in a year's time without any monthly/daily commitments. The kilometers operated are calculated on total fleet. In case excess kilometers are to be operated, rate reduction is done as adjustment against fixed costs sharing.
- Rate per kilometer is fixed based on formula which is adjustable on external factors like fuel cost, inflation indicators etc. Rate per kilometer would be sufficient for bus operator to provide good maintenance but not so high that the system has to be heavily subsidized (₹ 34/kms @ 2009 prices).
- Penalties are charged in **number of payable kilometers for the operator**. Money collected from fines would be redistributed amongst good performers as and when a second operator is put in place to bring competition among the operators.
- Penalties for non performance in terms of availability, punctuality, cleanliness of buses, maintenance, safety of operations etc.
- Contract awarded for 70 buses in first phase to local operator who has been trained exclusively for operations at the rate of Rs 34 per bus km.
- The operator is expected to train drivers from time to time.
- All drivers and other staff (depot manager, operations manager) have to be in uniform designed by Janmarg.

B) ITMS Contracts

- **Integrated Information Technology provision.**

✦ Integrated Contract with Automated Fare Collection System, Passenger Information System and Central Control Centre.

- ✦ Payment per bus, per bus station and for Central Control Centre operations.
 - ✦ Ticketing responsibility with service provider.
- **Challenges in terms of deciding whether to adopt BOT method for certain components**
 - ✦ The first bid issued followed a mix of Supply cum maintenance and BOT.
 - ✦ Second bid issued follows a pure Supply and Maintenance removing BOT part.
 - ✦ Other Challenge in terms of finding capability, termination payment, IPR, defining output.
 - BRTS in Ahmedabad operates as a closed system. External ticketing is the key to reduce waiting time and over delay. The system serves about 90,000 passengers every day.

C) Turnstiles on Bus Stations – Key Terms of Procurement Contract

Purchase and Installation Procedure	Purchases could be made through orders placed anytime during a price validity period of 180 days. Delivery and installation to be made in 15 days from order. If the installation is delayed, damages payable @0.5% of value of delayed units per every week of delay capped to 5% of the value.
Warranty Period	Three years during which full repair and maintenance responsibility with Supplier including 99% uptime.
AM Period	Four years after AMC period for which price pa would have to be quoted separately.
Payment Terms	90% on successful installation. 10% after 3 months of successful operation.
Insurance	Suppliers all risk insurance, comprehensive and third party insurance to be taken and maintained by the supplier at his own cost during warranty period.
Service level Conditions	Damages payable for delay in repairs beyond 2 hours @0.02% to 0.04% of value of unit not repaired as per service level matrix. For overall performance levels below 99% uptime, proportionate deduction per unit per time lost would be made in the Performance Guarantee/Annual Maintenance Contract Fees.
Performance Guarantee	5% of tender value up-to end of Warranty Period. AMC payment being at the end of the year, acts as security during AMC period.
Status	Purchases and installation completed for 19 bus stations of Phase I. Purchases from German Brand Magnetic Auto

D) Sliding doors – Key Terms of Procurement Contract

Procurement for	Laminated Glass Automatic Sliding Doors
Purchase and Installation Procedure	Purchases can be made through orders placed anytime during a price validity period of 365 days. Delivery and installation to be made in 15 days from order. If the installation is delayed, damages payable @0.5% of value of delayed units per every week of delay capped to 10% of the value.
Warranty Period	Two years during which full repair and maintenance responsibility with Supplier including 99% uptime.
AMC Period	Five years after AMC period for which price pa would have to be quoted separately. (Rs 11250 pa per unit in previous tender)
Payment Terms	50% on successful installation & commissioning, 40% after 3 months of successful operation, 10% on 5 months of successful operation.
Insurance	Suppliers all risk insurance, comprehensive and third party insurance to be taken and maintained by the supplier at his own cost during warranty & AMC Period.
Service level Conditions	Damages payable for delay in repairs beyond 4 hours @0.02% to 0.04% of value of unit not repaired as per service level matrix. For overall performance levels below 99% uptime, proportionate deduction per unit per time lost would be made in the Performance Guarantee/Annual Maintenance Contract Fees.
Performance Guarantee	5% of tender value up-to end of Warranty Period
Status	Each Door purchased and successfully installed at a price of around Rs 2 lakh approx inc alarm.

E) Pay and Park System

Procurement Arrangement	3 different bids invited for selection of Licensee for management of Pay and Park on Phase 1 route of BRTS: 1) 337 Auto rickshaws – to be allowed to park free of cost; 2) 2722 two wheelers; 3) 210 cars; and 4) About 400 bicycles.
Tenure of License	One year, extendable to two more years, separately for each year, at the sole discretion of the Authority.
Performance Guarantee	5% of the Total Bid Value of the successful bidder. In event of the contract being renewed for next year, same to be increased @ 7% pa.
Payment of License Fees	Upfront within seven (7) days of issuance of LoA. In case of extension of License period, same shall be paid in advance for each year, within 7 (seven) days of the start of the year.

Scope of Wk	<ol style="list-style-type: none"> 1) Guiding the vehicle owners to park their vehicles systematically in the area demarcated for the same. 2) Collect Stipulated Parking Charges from the vehicle owner against issue of parking ticket/receipts and to retain this income. 3) Maintain the parking place infrastructure in clean and organized condition including housekeeping of the designated area and keeping it free from encroachments and obstructions. 4) To install proper signage, markings, additional lightings, demarcations, etc. as required and as guided or approved by the Authority.
Special Conditions of the License	<ol style="list-style-type: none"> 1) Ensure the complete safety and security of the vehicles in the parking area and protect the parked vehicles against damages/ theft 2) The delineation on the ground within the parking stretches for auto-rickshaws, 2-wheelers and 4-wheelers shall have to be done by the Licensee. 3) No other type of vehicle, except bicycles, shall be allowed by the Licensee to be parked in the area demarcated for specific other type of vehicle. 4) Licensee shall charge only such rates for parking as decided by the Authority.
Penalties/ Fine	If the Licensee violates the material terms and conditions of the License, damages of ₹ 1000/- will be imposed for every instance of "repeated non-compliance or breach of terms and conditions of the License beyond a reasonable remedy period."
Parking Charges	<p>For Bicycle- Minimum ₹ 1 up to 4 hrs and ₹ 2 for more than 4 hrs</p> <p>For 2 Wheelers- Minimum ₹ 2 for less than 4 hrs and up to ₹ 10 for 8 hrs or more</p> <p>For 4 Wheelers- Minimum ₹ 10 for less than 4 hrs and up to ₹ 20 for 8 hrs or more</p> <p>Free parking for Auto rickshaws</p>
Status	Bid out

F) Bus Station Housekeeping

Number of Bus Stations	54
Tenure of Service Contract	2 years
Performance Guarantee	5% of the Final Bid value
Payment Terms	Payment shall be made to the Service Provider on a monthly basis
Scope of Wk	<ol style="list-style-type: none"> 1) Completely clean the Bus Stations including cleaning of all the electrical appliances and other components of bus stations using the materials and appliances as specified by the Authority 2) Cleaning of baskets, wastepaper baskets, cobwebs, etc 3) Waste Disposal 4) Making good the damages caused due to the performance of its services

Penalties/ Fine	₹ 300/- for every instance of repeated non-compliance of scope of work livable at the discretion of the Authority
Qualification Criteria	1) Experience in housekeeping as demonstrated through aggregate contract value of ₹ 5 lakh 2) Bidder shall be registered in terms of being an incorporated company, partnership, proprietorship, and cooperative society, trust or society
Status	Rajdeep Enterprise was awarded the work at a price of ₹ 5000/- per month per Bus Station

G) Advertisement Rights – Key Terms of Contract

Tender Brr	Advertisement rights on 2 Main Locations: 1) BRTS corridor- 6 elements 2) 19 BRTS Bus Stations (16 elements for each Bus Station) The bidder could quote separately for corridor elements and each Bus station individually
Tenure of License	2 years
Performance Guarantee	5% of the Total Bid Value of the successful bidder.
Special conditions	1) Design for the Ads shall have to be approved by Authority 2) Licensee shall have freedom to changing ads 3) Adhere to design specifications 4) Ads shall Maintain standards of decency and uphold public moral
Penalties/ Fine	Any violation from design will attract fine of ₹ 5000/- per location per day if not rectified on notice from Authority
Binding Order on termination of Contract	1) The Licensee shall keep all elements in original condition 2) Replace any damaged element 3) All non-display items shall be property of the Author
Status	Awarded

2.3 Factors of Success

The ultimate sustainability of the BRT system depends as much on its software (regulatory structure, management and business model) as on its hardware (infrastructure and rolling stock). A good institutional structure should.

- Maximise the quality of service to the end user and sustain it over the long term
- Minimise the cost of such service over a long term
- Maximise public benefit from public sector investment
- Maximise opportunities for private investment to cash in on private sector enterprise.

With these core objectives, the principal components of the institutional structure are:

- Regulatory environment in which private sector operates the system with strong public oversight in the interest of the citizens
- Cost sharing using a PPP model
- Multiple operators chosen through bidding process to encourage competition but limited to such numbers that provides low cost of operations
- Remove competition for passengers on street by making payments to operator based on kilometres operated and quality of service parameters. There should be no route contracts, exclusive or competing.

An Insight into the Two Months of BRT Experience

Route R.T.O. to Chandranagar (12.5 kms):

- Total 18 buses are running with total 132 round trips in a day.
- Operational Timings: Between 7:00 AM to 10:30 PM.
- Peak hours are: 8:30 AM – 11:30 AM and 5:00 PM – 8:00 PM
- Frequency of buses is 5 minutes during peak hours and rest 10 minutes
- Total Revenue in 1 month: ₹ 25,11,888 Avg. Revenue/day: ₹ 81,029
- Total passengers: 5,36,841 Avg. pax/day: 17,317
- Avg. pax./bus/day: 962, Avg. pax./round trip/day: 131
- Last week Avg. passengers/day: 19,593 and max. was 21400 pax./day
- Average speed of buses:
 - ✦ Overall: 26 – 29 km/hr
 - ✦ During peak hours: 25 – 27 km/hr
- Total km traveled by each bus:
 - ✦ 10 buses: each 200 km daily,
 - ✦ 8 buses: each 214 km daily

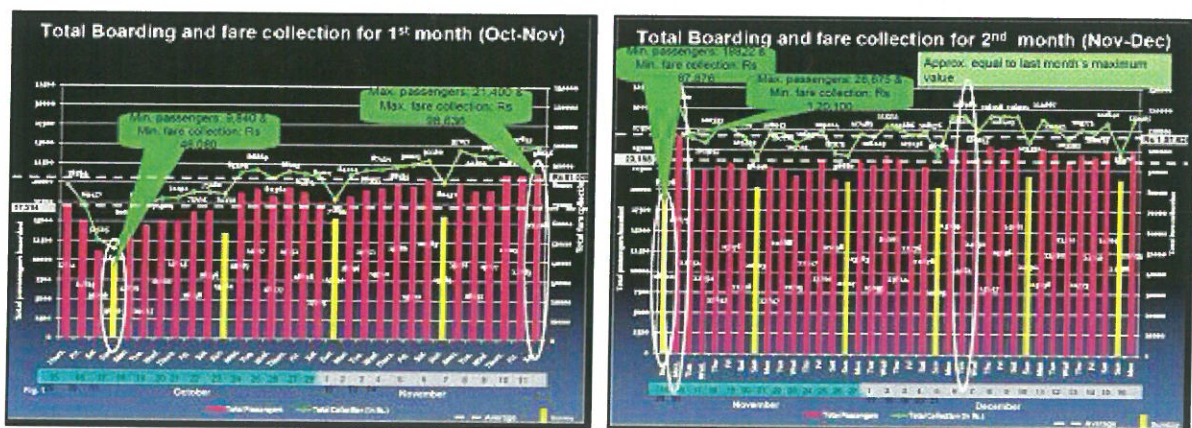


Figure 2.7: Total Boarding and Fare Collection for 1st and 2nd Months

Table 2.2: Comparative Indicators for 1st and 2nd months

	1st Mnth (15 Oct – 14 Nov '09)	2nd Mnth (15 Nov – 14 Dec '09)	Total (15 Oct – 14 Nov '09)
Total buses operate / day	18	18	18
Total Passengers	536749	715653	1252402
Total fare collection	₹ 2511888	₹ 3333705	₹ 5845593
Avg.pax/day	17315	23086	20531
Avg.collection /day	₹ 81029	₹ 107539	₹ 95829
Avg.pax bus/day	962	1283	1141
Avg.collection / bus / day	₹ 4502	₹ 5974	₹ 5324

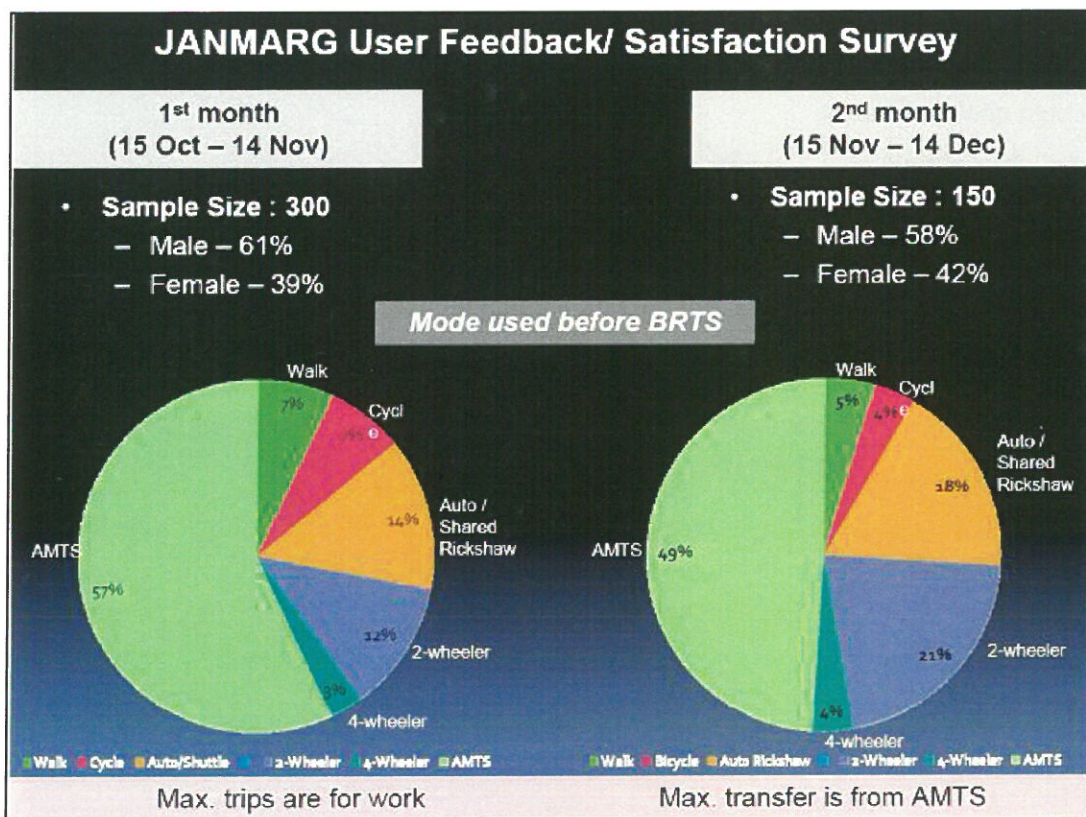


Figure 2.8: User Feedback / Satisfaction Survey

Rating for BRTS by Users

- Avg. Rating given to BRTS by users for 1st month: 8.34 out of 10
- Avg. Rating given to BRTS by users for 2nd month: 8.88 out of 10

Table 2.3: Operations of BRTS Users

	1 st Mnth		2 nd Mnth	
	Yes	No	Yes	No
Feel Safe to cross road	76%	24%	79%	21%
Good Frequency of buses	100%	0%	100%	0%
Buses are clean	100%	0%	95%	5%
Drive safely	97%	3%	96%	4%
Time is consistent	82%	18%	90%	10%
Stops are Clean	96%	4%	99%	1%
Payment is easy	87%	13%	88%	12%
Breakdown of any Bus	0%	100%	0%	100%

Source: CEPT University, 2010

2.4 Budgetary Implications and Sustainability

2.5.1 Total Cost of the Project

The project has been sanctioned under the JnNURM project in 2 phases. In line with the scheme, 35% of the fund comes from the central government under JnNURM. Another 15% is shared by the state government and the balance 50% is borne by the local body.

Table 2.4: Project Cost in Phase-I

Project Phase	Date of Sanction	Cost In ₹ lakhs
Phase-1		
Stretch1 of First Phase Construction of 12 Km. long stretch	11 th Aug '06	8,760
Stretch2 of First Phase Construction of 46 Km. long network	6 th Oct '06	40,572
BRTS Phase II	19 th Aug '08	48,813
Construction of 30 Km. long network	19 th Aug '08	48,813
Total	₹ 98,145 lakh	

Source: CEPT University, 2010

2.5.2 Source of Finance for Sustainability of the Project

In addition to the above, there are several elements of the project which are undertaken on PPP mode. They include:

- Bus Procurement and Operations through gross cost contract;
- Integrated Automatic Fare collection and Passenger Information System;
- Landscape development and maintenance along the corridor against advertisement rights on railing;
- Foot Over Bridges to provide access to bus stations;
- Housekeeping of Bus stations through service contract;
- Operation and maintenance of Pay-and-Park system; and
- Advertisement Revenue to form part of Urban Transport Fund.

2.6 Impact of the Initiatives

Within four months of start of operations, positive impacts of the system have been visible.

Increase in Ridership: Ridership has increased consistently through eleventh month by 305%. Average daily passengers have increased from 17,315 (first month) to 69,759 (eleventh month). Frequency of service is at 2.5 and 4 minutes peak during weekdays at eleventh month, up from 5 minutes peak at first month. Ridership has gone upto 85-90,000/day.

Improvement in travel speed: Peak hour speed- 24kmph as opposed to 16-18 kmph of Ahmedabad Municipal Transport Service. Average speeds of mixed traffic same as BRTS on most stretches.

Dependable Service/Reliability: Over 95% of departures are on time (+/- 90 sec time). 65% of arrivals were on time. 22% arrived before time and 13% delayed.

Increase in Revenues: As a result of increased numbers, with 23 buses operating, revenue per bus increased from ₹ 4500 to ₹ 8700 per bus per day during the first four months. This covers the entire sum paid to bus operator and leaves a small surplus. However, the costs towards ticketing, administration etc. are yet to be recovered. These are expected to be

covered through revenues from advertisements and parking facility revenue. Shortfall, if any, will be met by AMC.

Modal shift: Every month about 300 passengers are interviewed to assess the satisfaction level. During the first month, of the total BRTS users, 57% were AMTS bus users. Now this has come down to 40%. Major shifts are from 3-wheelers (25%), 2wheelers (20%) and Cars (10%). Shifts from bicycles are not significant.

Environment: Due to expansion of bus system, both through AMTS and BRTS and conversion of AMTS and Auto Rickshaws to CNG, significant improvements in air quality have been observed. From a position 3rd most polluted among the 88 critically polluted cities monitored by CPCB, the city has come down to a level of 66th rank.

Economic Social Impacts: Two types of social impacts are visible. The routes of BRTS network went through the areas inhabited by the poor. Improved accessibility would not only contribute to widening of the employment market of the poor and also add to physical upgradation of the area. There are visible signs of these impacts in certain localities. System wide impacts, to become visible, will take some more time. Land value impacts are also visible. Several project schemes now advertise their location in the BRTS corridor as major marketing strategy.

User Satisfaction: BRTS User surveys are taken every month by distributing surveys at the station. Every month surveys are collected and user satisfaction rating is calculated. BRTS got average rating of 9.0 out of 10 in the eleventh month from its users, which is in tune with the past months of commercial operation. Survey asks for input on safety while crossing the streets, operator driving, frequency of service, ease of fare payment and cleanliness at stations.

Information Availability: Real Time passenger information is made available at the stations. Announcements are in English and Gujarati.

Other co-benefits: It has been observed that on the BRTS corridor, there has been only one fatal accident and significant reduction in serious accidents has been observed. There have been 6 incidents involving BRTS bus of which one was fatal. Other impacts such as supporting compact city, reduction in travel effort (trip length) etc., are yet to be measured.

Trial Runs

The system was on a trial mode running free of charge from 15TH of July to 14th October. About twenty thousand people per day used to take a ride on the system and during Navratri time the number of passengers had raised upto thirty five thousand per day. Experts, having seen the system and its plan have described it as: ‘already a BRT Best Practice (Dario Hidalgo: <http://www.embarq.org/en/node/1399>)’, ‘country's first bus rapid transit system and could draw high end crowd (S.K. Lohia: http://www.dnaindia.com/india/report_historic-brt-could-draw-high-endcrowd_1280826) and Ahmedabad on modernity bus, says BRTS pioneer (Enrique Penalosa: http://www.dnaindia.com/india/comment_ahmedabad-on-modernity-bus-says-brtspioneer_1280614).

- Series of Drivers’ training (practical and theoretical) program along with yoga programs for mental and physical health.
- Practical training of drivers for appropriate docking at bus stations and safe and comfortable driving.
- Allow people to understand the system and how to use it and helps improving the system based on their critical feedback
- Testing of scheduling and bus operations and signal interface

The system was named by Hon. Chief Minister of Gujarat Shri. Narendra Modi as ‘Janmarg’ which means people’s way, a system that would carry all the citizens of Ahmedabad, in safety, comfort and high speeds.

Sharing Documents, Presentations, News Letters

As a tool for branding Janmarg, a catalogue was prepared which briefs the project, its design principles and characteristics. Apart from this, brochures, illustrative cartoon strips, yearly newsletters etc were also prepared and distributed to help spread the idea of a dedicated bus transit system in the city. Bus stop models and Jana Marg branded pens were also specially made and gifted as souvenirs. A set of working papers were also prepared in the initial phase of the project on various topics related to the system like:

- Land-Use Restructuring;
- Vehicle technology;

- Roadway design;
- Bus stop design and location;
- Environment Impact Assessment;
- Road utilities;
- Pavement design;
- Fare collection;
- Traffic volume characteristics;
- Travel demand and route plan;
- Economic and financial analysis;
- Route rationalization;
- Institutional Aspects; and
- DPR, Presentations.

International Visits

Learning from visits to BRT cities worldwide - Delegates from AMC, Standing committee and members of Planning and Design and Municipal Councillors visited various cities around the world to know more about their inner workings. The various cities visited include Bogotá, Pereira, London, Beijing, Hongzhou, Jakarta, Singapore and Seoul.

Workshops, Seminars, Meetings

Various workshops and seminars were conducted

Stakeholders Consultations

- Bus manufacturers and experts consultations, 2006
- International workshop on BRT held in Ahmedabad, September 2007
- Directors Forum

Prototype & Trials

A prototype bus stop design was constructed to understand the implications and to gain public understanding and opinion.

Visits

- Bus rides for school children
- Visits by eminent citizens like doctors, industrialists, religious people etc.
- Visits by experts in the field helped in understanding and refining the system.

Media Response

News media as a publicity mode e-Interviews and articles on BRT were promptly encouraged and data provided for publicity.

MoUD Awards: The Best Mass Transit Project under JNNURM for the Year 2008-09 goes to Ahmedabad for “Janmarg – Ahmedabad BRTS Project”.

Implementation of any mass transit project, especially at the same grade as the existing roads, is an extremely challenging task. Ahmedabad Municipal Corporation as the lead agency for planning and implementation of “Janmarg - Ahmedabad BRTS project”, duly assisted by CEPT University, implemented the project with highest standards. The project has been designed with segregated bus ways, 900 mm floor height modern Intelligent Transport System enabled buses, level boarding and alighting, off board ticketing with Smart Card, accessible bus stops and audio visual Passenger Information System.

The roads have been completely re-engineered to provide for dedicated path for pedestrians and cyclists with adequate light on the footpath, street furniture and complete signage system with trees at every 8 meters. AMC and CEPT not only planned and implemented the project immaculately but also launched a very effective and noble awareness campaign for the project which has won it accolades from all sections of the society.

Sustainable Transport Award 2010

Within a span of one month of national recognition, the city got international recognition. On January 12, 2010, the city of Ahmedabad, India for the Janmarg Bus Rapid Transit (BRT) system was given 2010 Sustainable Transport Award for visionary achievements in sustainable transportation and urban livability in a function held at Washington.

Each year, the Sustainable Transport Award is given to a city or major jurisdiction that has a profound impact on lessening the impact of climate change and enhances the sustainability and livability of its community or region through innovative transportation strategies that increase mobility for all, while reducing transportation greenhouse and air pollution emissions, and improving safety and access for bicyclists and pedestrians. In the past, New York City and Paris have won this award.

The award selection process is organized by the Institute for Transportation and Development Policy (ITDP), Environmental Defense (ED), the US Transportation Research Board (TRB) Committee on Transportation in Developing Countries, the regional Clean Air Initiatives (CAIs) for Asia, Latin America, and Africa; Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), EMBARQ – the World Resources Institute Center for Sustainable Transport, ICLEI Local Governments for Sustainability, UITP – International Association for Public Transport and the United Nations’ Centre for Regional Development (UNCRD). All these organizations are members of the award selection committee.

2.7 Summing Up

Ahmedabad BRTS is a PPP based project. Public sector is represented by Ahmedabad Janmarg Limited (AJL), a Special Purpose Vehicle, chaired by the Municipal Commissioner along with the representatives of political and administrative wings as board of directors. Dedicated Urban Transport Fund has been set up. The role of AJL includes planning of services, selection of operators, monitoring of service quality, fare revisions, coordination with relevant departments and future BRTS expansion plan. CEPT University was assigned the work of preparing detailed project Report for the implementation of the project.

Private sector involvement is for nine PPP arrangements, viz. bus procurement; operations and maintenance; integrated information system including automatic ticketing and vehicle tracking system (BOT); supply and service contracts for bus station sliding doors, turnstiles; housekeeping and cleaning of bus stations; management of pay and park facilities; lease of advertisement rights; development of foot over bridges on DBFOT; Development & Maintenance of Landscape; Maintenance Contracts for Bus Stations (Civil Works), Lighting

of Bus Stations & Corridor, Monitoring and Maintenance of BRTS Corridor (Civil works), Signage etc.

The system with new technological applications / innovations has been in operation for the past one year. It carries about 90,000 passengers daily with deployment of 45 diesel buses (30 AC buses out of 45, 12 meter long, 900mm floor height), with commercial speeds greater than 24 Kms per hour. A review of the two months progress of the Ahmedabad BRTS project (in terms of various parameters) indicates that the system is running successfully. Average passengers per day, average collection per day, average passenger per bus per day, average collection per bus per day have increased considerably during two months period. During the period, average rating given to BRTS by users is 8.61 out of 10.

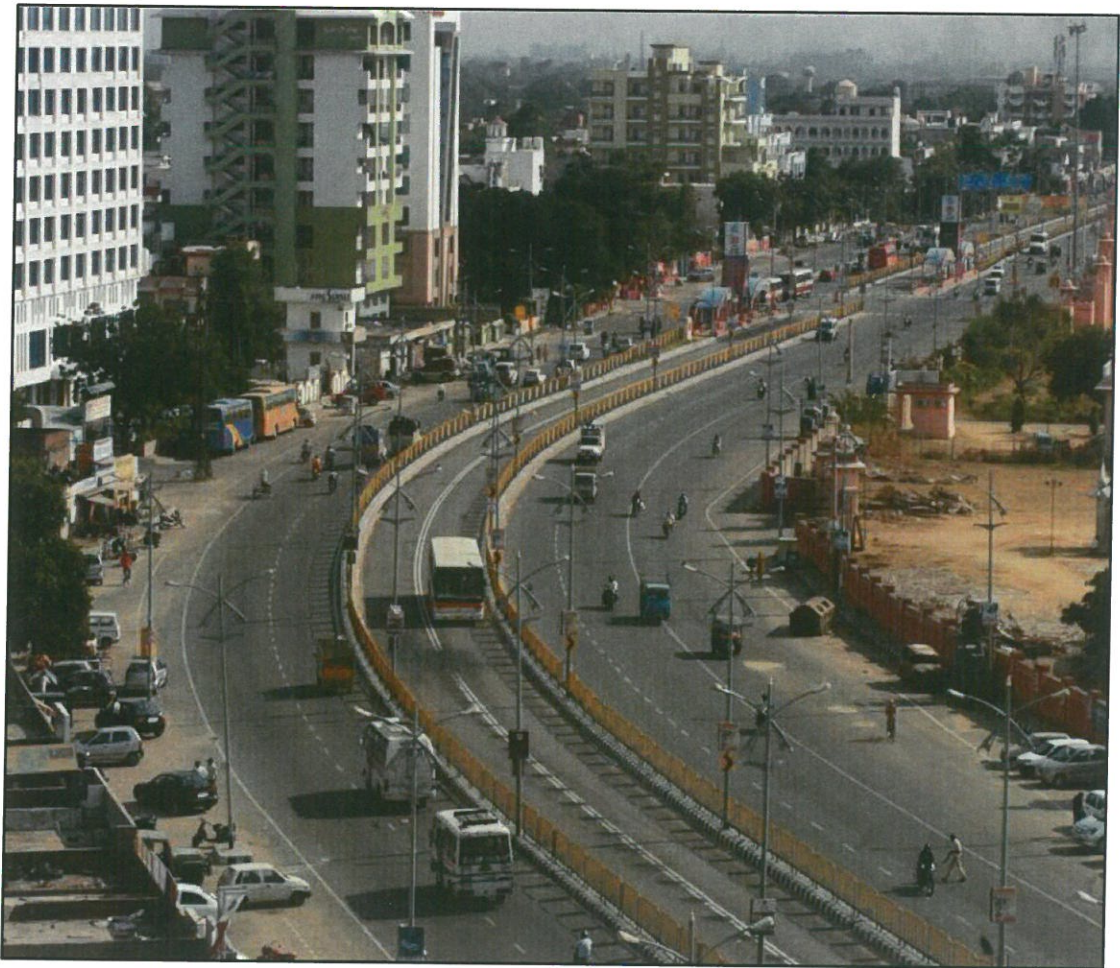
Besides the above, the operation of 23 buses during first four month reflects positive impacts, such as an increase in ridership (from 17, 315 in first month to 69, 759 passengers per day in eleventh month), increase in revenue (from ₹ 4,500 to ₹ 8,700 per bus per day), modal shift(shift of passengers from motor cycles, cars and 3-wheelers, which is about 50% of the total BRTS users), dependable service / reliability (95% departures are on time, 65% of arrivals were on time), improvement in travel speed (peak hour speed-24Kmph against 16-18 Kmph of AMTS), improvement in the level of air pollution due to CNG buses, decrease in accidents rates etc.

The reasons for the success (factors of success) of Ahmedabad BRT may be attributed mainly to its good institutional structure, which maximize the quality of service, minimize the cost of service, maximize public benefit from public sector investment and maximize opportunities for private investment to cash in on private sector enterprise. Moreover, the software (regulatory structure, management and business model) and hardware (infrastructure and rolling stock) used makes the project successful and sustainable.

The project was awarded by MoUD as the Best Mass Transit Project under JNNURM in the year 2008-2009. It was given 2010 Sustainable Transport Award for visionary achievements in sustainable transportation and urban livability in a function held at Washington.

Over all, the project may be treated as a success story in the field of public transport and it may be replicated in other cities also.

JAIPUR PUBLIC TRANSPORT SERVICES THROUGH BUS RAPID TRANSIT SYSTEM AND MODERN CITY BUSES



3.0 Jaipur Public Transport Services through Bus Rapid Transit System (BRTS) and Modern City Buses

3.1 Context

Jaipur, the ‘pink city of India’, is the capital of Rajasthan. It is situated in north-eastern part of the State is surrounded by the districts of Alwar, Sikar, Bharatpur and Dausa. Jaipur is known as one of the first planned cities of India. Sawai Jai Singh in 1727 decided to move his capital to the plains from Amber. Jaipur City was not only planned but its execution was also coordinated by Sawai Jai Singh II. His reign was probably the most glorious phase in the growth of the city. Post independence, planned development of the city was taken up after the city became the capital of Rajasthan. It had a population of 2.32 million in 2001.

3.2 Situation before Implementation of the Project

3.2.1 Existing System

The increased social and economic status of the residents coupled with the inadequacy of public transport system has encouraged the residents to own personalized mode of transport.

The data on growth trend of vehicles show that personalized modes such as two wheelers and cars are growing at a much higher rate. Growth of cars is found to be 11.6 % and growth of buses 2.3% in 2003-04. Overall vehicular growth has been observed as 9.4%. The public transport system in Jaipur comprises only 6.32% of the total number of vehicles; and caters to only 13% of person trips. When compared with the desirable level of modal split, it was found that the share of mass transport in Jaipur is well below the desired range (50-60 %) as per a 2007 MoUD study.

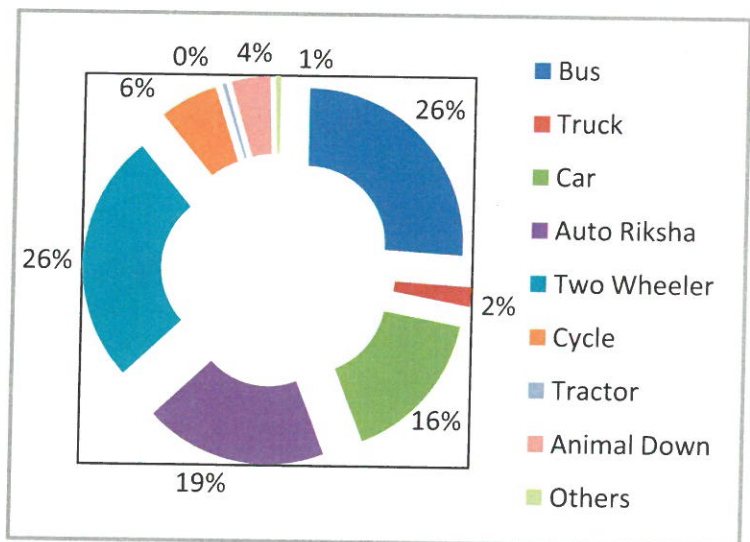


Figure 3.1: Composition of vehicles traced from Volume survey, Jaipur 2005

The share of personalized transport and Para-transit is already well above the optimal range creating big constraint for achieving the desired development profile of the city. It works as a catalyst for air quality deterioration, road congestion and reduced journey speeds, wastage of scarce fuels, besides sub-optimal utilization of infrastructure and other resources.

3.2.2 Problems

- Being the only metropolitan city of Rajasthan, the city of Jaipur has a 2.32 million population as per 2001 census, an average annual growth rate of 4.35% and load on transport infrastructure under distress.
- The share of personalized vehicles (2-wheelers, cars and jeeps) increased from 76% in 1985 to 85% in 2003.
- Existing public transport system is characterized by overcrowding, poor reliability, and long journey / waiting period. Also this system is not able to cater to the population and routes of the city.
- There is only a public transport system in the city, which has a fleet of 260 buses of standard size. Most of them are old buses, which are operated by Rajasthan State Road Transport Corporation (RSRTC). Private transport companies are operating mini buses numbering over 1800, which are unsafe, uncomfortable and unreliable, apart from having an ad-hoc operating method.
- 10% annual growth rate of private vehicle ownership in city.
- Pre-feasibility study has estimated the travel demand by 2017 to 4.6 lakhs trip per hour with Public Transport (PT) share of 25-42%.
- Most of the city arterial roads have reached their capacity and have no scope of further widening.

In view of the above, the State Government has planned Bus Rapid Transit System (BRTS), Modern Bus Service and Metro Rail project as Mass Rapid System (MRS) projects for Jaipur.

Jaipur Development Authority is the nodal agency for planning and implementation BRT infrastructure in Jaipur. The BRTS project in Jaipur is been developing and implementing through a Special Purpose Vehicle i.e. Jaipur City Transport Services Limited (JCTSL). M/s PDCOR Jaipur is the overall Project Management Consultant for the project and M/s

Consulting Engineering Services Private Limited is technical consultant for infrastructure design.

3.2.3 Preparation of Feasibility Study

In order to plan for an efficient and sustainable public transport system in the city, the Rajasthan Urban Infrastructure Development Program (RUIDP), funded by ADB, had initiated a study in August 2005. The study was carried out by PDCOR Ltd with an objective to plan and develop an Urban Mass Transit System for Jaipur.

The scope of work at the study was as under:

- Conducting various primary surveys including traffic surveys, household surveys, road inventory and willingness to pay survey;
- Establishment of the Urban Travel Demand Model;
- Evaluate Alternative Alignments options;
- Recommend suitable Transit System;
- Estimate the Ridership on the Proposed Corridor;
- Examine the Sensitivity of Ridership; and
- Suggesting an implementation framework.

The Final Report of the Study was submitted to RUIDP in March, 2006 and the project was transferred to Jaipur Development Authority in May 2006. As a part of the study, an Urban Travel Demand Model for the city was developed to forecast the trip pattern of the city residents. The traffic forecasts generated from the model, developed for this study, indicate that in case of do-nothing scenario, the traffic conditions will only worsen in future years. The total daily-motorized passenger trips generated in Jaipur in year 2005 is about 27 Lakhs out of which only 18 percent are performed on Public Transportation.

More than half of the total motorized trips are performed on two wheelers. The projected travel demand, after taking in to consideration the future settlement pattern and employment clusters, showed significant passenger movement in the east-west and North-South direction. The total travel demand in the study area by 2021 will be about 62 Lakhs Trips. The road network of Jaipur cannot carry such a large volume of trips as the major arterial roads are

presently operating beyond their capacities. The existing level of services across major roads is presented below:

Table 3.1: Existing Level of Services across Major Roads in Jaipur

S. No.	Name of the Road	Ratio of Existing traffic Volume / Road Capacity	Level of Service (LOS) ¹
1.	Tonk Road	1.32	F
2.	Sahkar Marg	1.29	F
3.	MI Road	0.96	E
4.	Ajmer Road	1.3	F
5.	Sikar Road	0.97	E

Source: Detail Project Report (DPR): Jaipur BRTS, 2006.

In light of all this, it was proposed that there is an urgent need to plan and develop an efficient transportation system in the city which will be safe, comfortable, cost effective, sustainable and also blend with the existing heritage character of the city and will not adversely affect it.

3.2.4 Reason for Adoption of BRTS

The Mass Rapid Transit Systems (MRTS) available around the globe can be broadly grouped into a 'rail system' and a 'bus system' classification. The rail based MRTS includes systems like metro, monorail, Light Rapid Transit (LRT) etc. The bus based system includes Bus Rapid Transit, commonly known as BRT. Selection of a particular type of Mass Transit System for the city of Jaipur depended on the performance characteristics of the options.

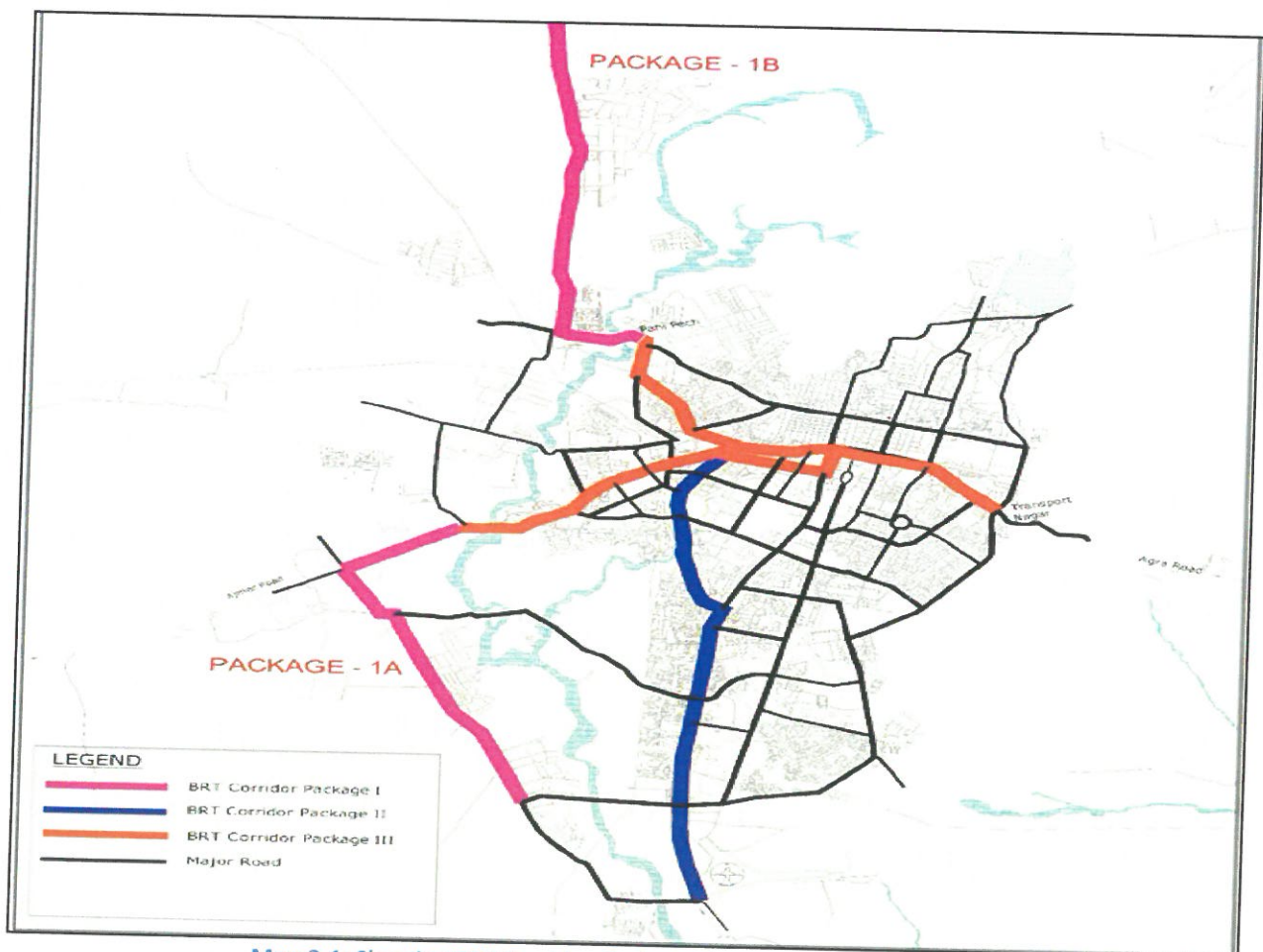
The traffic projections from the Traffic Demand Model have given a picture about the future Person per Hour per Direction (PPHPD) in Jaipur. A detailed reconnaissance of these corridors had determined the practical feasibility of introducing the type of transit system considered. Looking at the ridership numbers (which was in the range of 2000-6000 PHPDT), and considering the average trip length, (which is about 9 kms), and the bare

minimum requirement of land acquisition, it was found that a suitable BRTS should be planned along the selected mass transport corridors.

3.3 Project Description

As per the Master Plan of BRTS total 138 km of corridor length has been identified for the system. The project is proposed to be taken in three phases. In first phase, a corridor length of 46.7 km has been selected on priority basis for implementation purpose. Phase-I corridors connect North-South and East-West ends of the City and fulfill major transport needs of the city.

The estimated cost towards the development of road infrastructure for the first phase of BRTS, Jaipur was Rs 587.00 crores (block cost). MoUD, GoI on September 2006, approved the project in principle, for funding under JNNURM. As per the approval given on 20th July 2007, the estimated cost was ₹ 479.60 crores.



Map 3.1: Showing BRT Corridor Package First, Second and Third; Jaipur



Figure 3.2: Aerial View of North-South Corridor, Jaipur

North-South Corridor

Package I (C-Zone Bypass to Pani Pech via Sikar Road) of 7.1 km length, having 22 bus stations and Right of Way (ROW) of 40-50 m, with low to medium side friction and light street parking, 9 major intersections with low congestion level, 22, 1 religious structure, connects large residential, and industrial areas and thus have potential for high traffic generation. The construction of this passageway was completed in late 2009 and recently buses have started plying on this corridor.

Package-II (Pani Pech to Sanganer Airport via Tonk Road) of about 16 km length has row of 20-40 m, 17 major intersections and medium to high side friction, with 1 existing ROB and 1 existing flyover.

An additional length of 2.2 km was added later from Laxmi Mandir Crossing (Tonk Road) to Bais Godam via Ram Bagh Circle. Package –II is divided into Package-IIA and Package-IIB.

Package-IIA has 13 Staggered Bus Stops, 3 Island Bus Stops and one Island Bus Station. However, **Package-IIB** has 21 Staggered Bus Stops, 1 Staggered Bus Station, 1 Island Bus Stop and 2 Island Bus Stations. The study is to cover how best to connect BRTS with Railway Station and Sindhi Camp bus stand.

East-West Corridor

Package-III Transport Nagar to Ajmer bypass crossing via Ajmer Road, of about 13.35 km (sanctioned length), having row of 18-35 m and 14 major intersections on route has very high congestion level along the corridor. This Package is also divided into **Package-IIIA** and **Package-IIIB**. **Package-IIA** has 31 Staggered Bus Stops while **Package-IIB** has 8 Staggered Bus Stops and 2 Island Bus Stops. It serves institutional, commercial, walled city, and residential areas of the city. JDA is developing the corridor. The BRT lanes being in the center of carriageway, the existing overhead electrical lines in the median of the roads have been relocated.

Considering the parking demand and adequacy of ROW along the BRT corridors, on the street parking has been proposed at a number of locations. Service roads of 5.5 m width have been proposed depending upon the ROW available. Spacing the bus stops at an average distance of 500 – 700 meters has been proposed on the BRT corridor (Annex II). In addition to above, bus shelters handling large commuter volumes and feeder bus services have been planned. The shelters will provide additional facilities, viz. Off-board ticketing, passenger information etc. besides those at the stops.



Figure 3.3: View of Bus Station / Stop on BRTS Corridor



Figure 3.4: BRTS corridor having side lanes and footpath on both the side

(a) Salient Features

- Low floor buses with manual transmission and inbuilt PIS System;
- Route rationalization for mini buses;
- NMV tracks along the BRT route;
- FoBs provided at mid-block bus stops;
- No exclusive phases for buses and NMV at junctions;
- Free left turns at crossing for pedestrians;
- Separate contracts for bus operators;
- Advertisement cum corridor Management;
- Closed System with direct services;
- Railing has been provide on both sides of the BRT corridor to avoid accidents; and
- Rumble strip has been provided to segregate the BRT, up and down bus movement (wherever the median cannot be provided).

(b) Intelligent Transport System (ITS)

- Passenger information system (PIS) is planned for 'on-board' application, GIS based system is suggested for vehicle tracking, operations monitoring, 'off-board' PIS0.
- System used for data acquisition and process, bill payments and MIS.
- The service quality attributes like punctuality, reliability, vehicle productivity, etc. are also monitored.
- Manually steered and optically guided system is planned to be used for bus guidance and alignment with the platform.
- Automatic Fare Collection.

(c) Bus Stops / Shelters / Stations

Bus stops/shelters on the BRT corridor have been constructed on By JDA. The details are given below:

- Bus Stops are 35.0 m long and 3.0 wide.
- Bus Stations are 54.0 m long and 3.5 M wide.
- These bus stops are planned in such a manner, by which both, up and down lane of BRT Buses can be served with ease.
- Bus stops are planned aesthetically beautiful with adequacy of light and ventilation. The structures are made of Mild Steel Circular Pipes.
- Lots of space is provided in these bus stops for advertisement, which can be a source of collection of revenue.
- Bus-Queue-Shelters, on PPP format, would be constructed in the city through the loan assistance under Rajasthan Urban Development Fund, Government of Rajasthan.

(d) Services and Operation

Considering all relevant factors and for providing universal accessibility, the destination oriented service design (Direct) is envisaged where the BRT vehicles, are proposed to operate beyond the BRT corridor up to the high traffic nodes in mixed traffic. The railway station and the bus terminal and other major traffic generating points are planned to be serviced by direct

BRT services. The BRT operations are spread over a period of nearly 18 hrs (0530 hrs to 2330 hrs) with on an average; the operational headway is 2 to 4 minutes.

Table 3.2: Width of Bus, Motorized and Non-motorized Vehicle Lanes

Bus Lane	Motorized Lane	NMV Lane
Middle side 3.5m wide	7.0 m to 9.0 m	2.0 to 2.5m

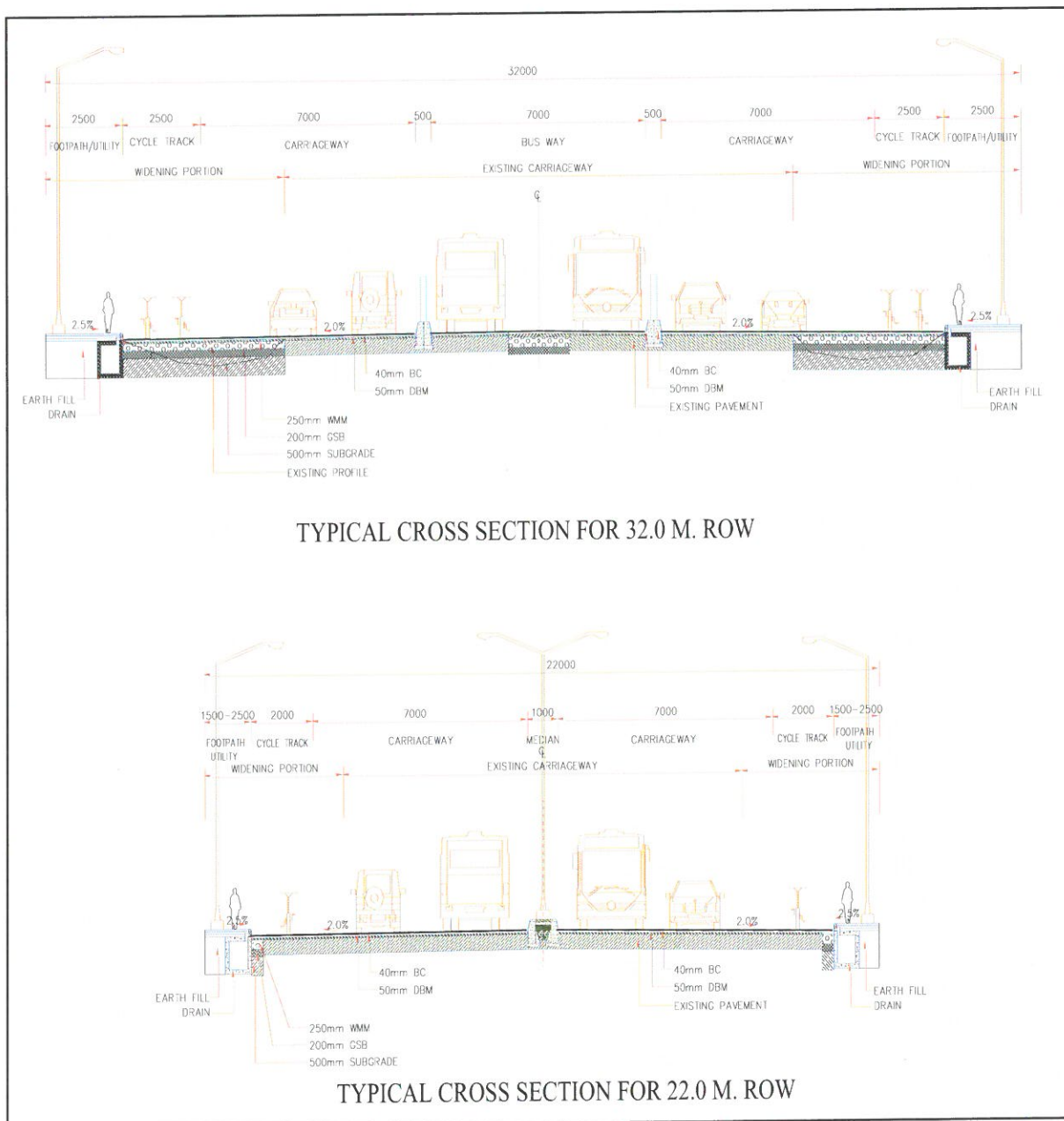


Figure 3.5: Cross Sections of 32.0 M and 22.0 M ROW



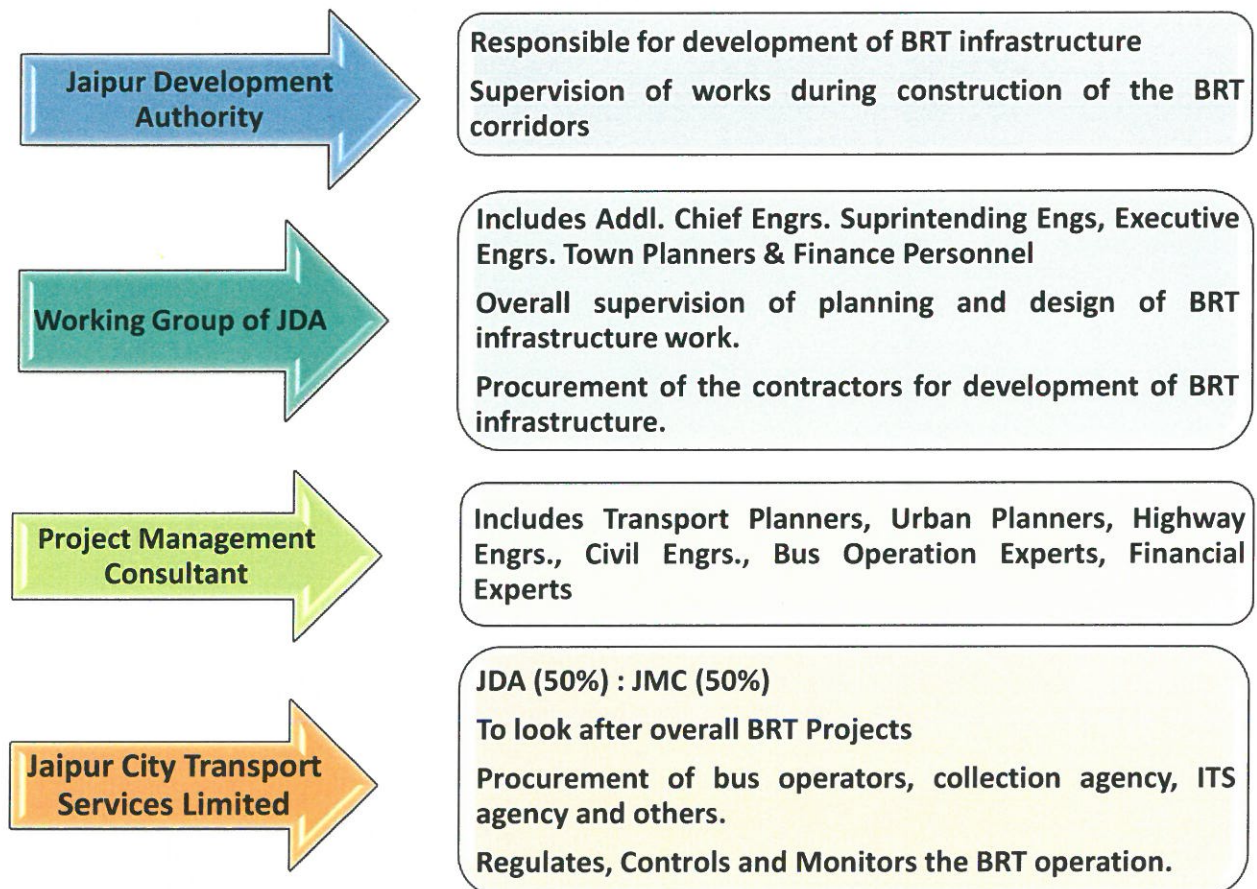
Figure 3.6: Bus and Bus Station

3.3.1 Goals of the Project

- Provision of bus based public transport system in the city.
- Bus priority initiatives: Priority at the junctions, dedicated lanes for the buses.
- Operation of the state of the art and commuter friendly low floor buses.
- Provision of passenger information system through various applications of Intelligent Transport System (ITS).

3.3.2 Strategy Used to Achieve the Desired Goals

The State Government has already constitution of Unified Metropolitan Transport Authority (UMTA) under the chairmanship of Hon'ble Chief Minister on 16th August 2008. Role of different agencies in Jaipur BRTS is as follows:



3.3.3 Activities Implemented to Achieve the Desired Goals

- Conduct of feasibility study for identification of an Efficient Transport System (ETS) for Jaipur.
- Securing approval of DPR from MoUD, GoI under JNNURM.
- Formation of dedicated teams in JDA for design and implementation of BRT corridor.
- Packaging of the total corridor length for implementation purpose.
- Formation of a Special Purpose Vehicle “JCTSL” to control, regulate and operate the BRT buses.
- Challenges/Constraints Encountered and how it was conquered.
- Required RoW is not available in old city. Most of the roads have less than 30 m. width and corridor requirement is more than 30 m. width.

- The average speed of traffic within Walled City is a low of 15-20 kmph. Its lead to environmental pollution, accidents and parking problems in City.
- Fears of accident and lack of awareness may lead to unacceptability of the project amongst the public.
- Already existing mini buses are operating on 36 routes and carry about 4.5 lac passengers daily. Fear of losing passengers and profits, mini bus operators and their Route Associations are opposing BRTS.
- Multiplicity of function of government and other working authorities.
- Expanding economic growth is providing a base for the development of newly emerging upper and middle income classes, demanding access and mobility.

3.3.4 *Expected Outcome of the Initiatives*

- The BRTS operating on all road corridors having a demand ranging between 2000 Person per Hour per Direction (PPHPD) and 20,000 pphpd and also its lead to considerable reduction of journey times in order to carry out commuters productive activities.
- At large level use of public transport system lead to less air pollution in the city and further it will reflect in the citizen's health.
- Cost effectiveness in terms of saving in fuels, affordable for users, profitable for private operators, and economically feasible for state.
- Promote continuous improvement in service and guarantee of service quality.
- The study has estimated share of Private Vehicles, Public Mass Transport and IPT will be respectively 30%, 60% and 10%.

3.3.5 *Role and Activities of the Partner*

- JDA: It is responsible for development of BRT infrastructure and supervision works during construction of BRT corridors.
- Jaipur City Transport Services Limited (JCTSL): It is responsible for procurement of bus operators, collection agency, its agency etc. It will also regulate, control and monitor the BRT operation.

- STUP Consultant Limited, Jaipur: It is responsible for supervision on engineering works.
- Unified Metropolitan Transport Authority (UMTA): It deals with the policy level decisions, which are related to land use and transport.
- Rajasthan State Road Transport Corporation (RSRTC): It is an existing agency responsible for operating the buses in the state as well as in the city. GoR has decided to handover the new BRT buses to RSRTC for operation.
- PDCOR Ltd: It is the Project management consultant including infrastructure design and bus operation.

3.3.6 Stakeholders Consultations

Projects discussed at the level of:

- Unified Metropolitan Transport Authority;
- Traffic Control Board (MLAs, NGO's, JDA, JMC and citizen groups); and
- Traffic Police.

3.3.7 Challenges Faced

- Re routing of 1800 mini buses;
- Lack of understanding of BRT elements by contractor;
- Inadequate RoW on few sections;
- Land acquisition delays the implementation process and land acquisition issues;
- Unavailability of lands for provision of parking near bus stops;
- Unacceptability of one way traffic movement;
- Shopkeepers / property owners habitual to free on-street parking (as they consider it as their right);
- Shifting of existing utilities services;
- Monopoly of bus manufacturers;
- Low floor buses are costly to operate and procure; and
- Financial sustainability of overall operational.

3.4 Factors of Success

- Corridor Planning and Design part;
- Technological Inputs like:
 - a) Low floor Buses;
 - b) AC Buses;
 - c) Next Vehicle display Board/System;
 - d) Automatic Vehicle Location Information System through GPS;
 - e) On Board Stop Announcement;
 - f) Signal Priority on specific signals; and
 - g) Ticket System-prepaid / Automated.

3.5 Budgetary Implications and Sustainability

3.5.1 Total Cost of the Project

The project *'Improvement of Public Transport Services in Jaipur through Creation of BRTS Corridor and Introduction of Modern City Buses under JNNURM'* comprises of investment under the following two heads:

- Development of dedicated corridor of 46 km. in length for Bus Rapid Transit System (BRTS) under JNNURM - Capital expenditure of ₹ 480.00 Cr.
- Purchase of 400 nos. of Semi Low Floor/Low Floor AC and Non AC Buses under JNNURM – Capital expenditure of ₹ 142.00 Cr.

3.5.2 Source of Finance for Sustainability of the Project

Financial partners are MoUD, GoR, JDA and JCTL. Total capital cost in terms of input (funding pattern): Central Government–50%, Government of Rajasthan–20%, JDA (BRTS Corridor) and JCTSL (purchase of buses)–30%. In order to meet the operational losses from new buses, GoR has constituted a dedicated Urban Transport Fund (UTF) which includes the Advertisement charges, fare charges and property development cost. The Government has also decided to fund an amount of ₹ 10 Crore per annum to City level Transport Fund. In the meantime, the State Government is actively considering other possible streams for this fund.

3.5.3 Operation of Buses

Semi-low floor and low floor modern city buses are plying on 10 radial and circular routes covering the entire city. These buses also operate on 7.1 km Pilot BRTS corridor which is exclusive for these buses. RSRTC, the State owned unit has been roped in to operate the buses on mutually agreed terms and conditions.

3.6 Impact of the Initiatives

The successful execution of project has resulted in a paradigm shift in urban transport scenario of the city. Slowly but gradually the required changes in the urban transport pattern of the city can be observed.

The project has led to improvements, which are summarized below:

- **Improvement in Travel speed**

The bus travels 7 km in about 18 min, leading to a speed of about 25 km /hr.

- **Reduction in accident**

The statistics shows that number of accidents has been reduced by 12.65%.

- **Reduction in green house gas emissions**

The engines of the Modern City buses are complying with BS-III emission norms, which resulted in significant reduction in pollution.

- **Reduction in noise pollution**

Buses with rear engine are purchased which reduces noise pollution.

- **Service Frequency**

Buses are operating at a frequency ranging from 7 to 15 minutes. Consequently commuter satisfaction is greater.

- **Geographical Coverage**

The grid system of Jaipur covers the entire urban area for the BRTS corridor. On JCTSL routes, with one change only, passenger can reach any part of the city.

- **Reduction in energy consumption**
Savings in energy (fuel) consumption on account of less no. of vehicles on road and decongestion.
- **Increase in Overall Capacity of Public Transport Services**
220 rear engine semi low floor (650mm) buses have been introduced in the city for the commuters.
- **Color Coding:**
Each route is assigned a particular shade of color for ease in identification.
- **Flat Fare**
✓ It is the first city to introduce single flat fare system. The cost per passenger trip is reduced.
- **Shifting Pattern of Users**
Since July, 2010 ridership on buses has been considerably increased from 55,000 to 200,000.
- **Level boarding into city buses from 400mm height BRTS bus stops.**
- **Staggered BRTS bus stops reduce the effective walking distance for bus commuters.**

3.6.1 Intermodal Connectivity

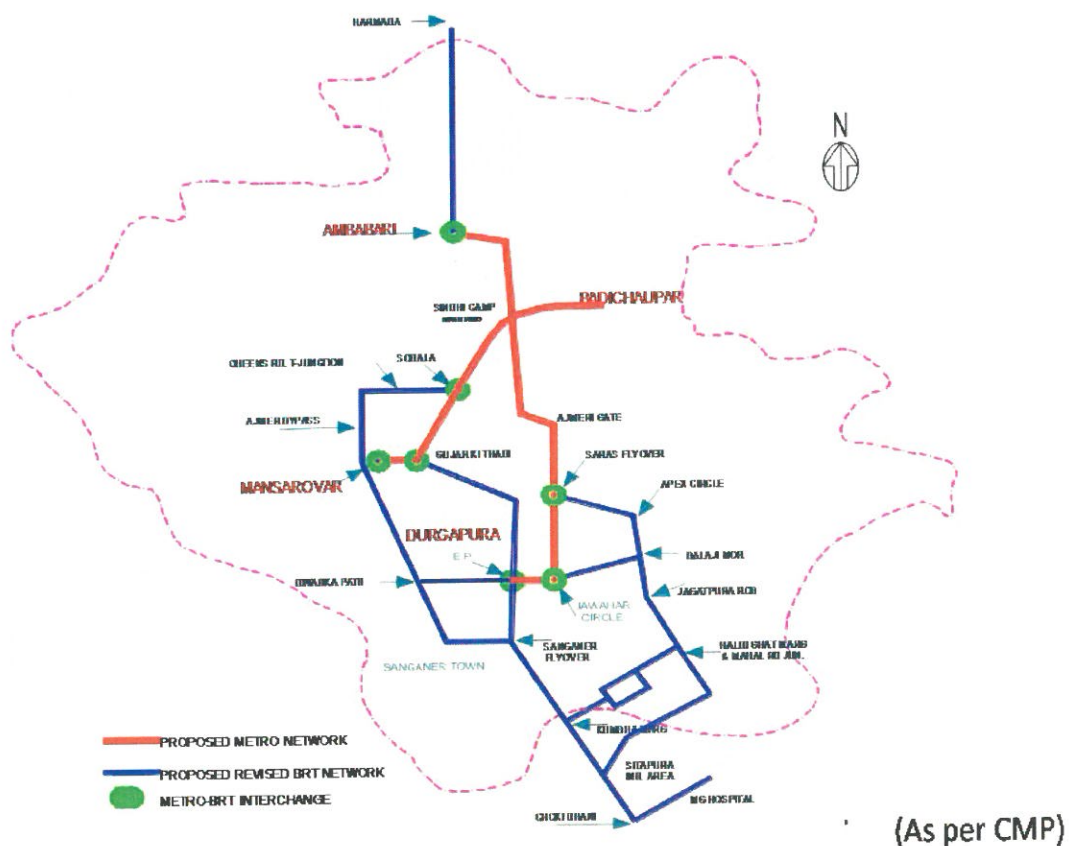
In the Master Plan 2025 a provision has been kept for integration of land use with public transport system. Proposed transport system (BRTS, city bus system and Metro) will also strengthen the connectivity of future growth area and satellite towns.

The Government of Rajasthan has approved the Jaipur Metro Rail Project to be executed by SPV called Jaipur Metro Rail Corporation Limited incorporated on 1st January 2010. The DPR has been prepared by DMRC Limited. Phase-I of the project is proposed to be implemented in two Stages:

Stage-I: The civil work including the Permanent way and electrification for the Line from Mansarovar to Chan pole of about 9.25 Kms to be done by DMRC Limited on turnkey basis. An agreement for this has been executed on 05-08-2010 between JMRC and DMRC.

Stage-II: Proposed to be executed on PPP basis. A total work of about 25 Kms metro rail line and the operation and maintenance of the entire project will be executed. The process of selection of consultants for the purpose, on the guidelines of the Ministry of Finance and Planning Commission – GOI, has been started.

SCHEMATIC REPRESENTATION OF BRT & MRT INTERCHANGE



3.7 Summing Up

It may be seen from the above that in the project has been executed successfully and resulted in paradigm shift in urban transport scenario of urban areas of Jaipur. The project has initiated some changes, viz. improvement in travel speed (17 Km in 18 minutes at 25 Km/hr), reduction in accidents (reduced by 12.65 %), reduction in green house gas emission (complying with BS-III emission norms), reduction in noise pollution (as engine is fitted at rear of buses), increase in service frequency (7 to 15 minutes), more geographical coverage (grid system for route designing), reduction in energy consumption etc.

All these changes make the project successful. The reasons for the success are attributed to planning and design: technical inputs like, low floor buses, AC buses, next vehicle display board / system, GPS, on board stop announcement, signal priority on specific signals and ticket system-prepaid / automated.

The project has been planned and executed by the public entities, viz. Jaipur Development Authority, Jaipur City Transport Services Limited, Urban Metropolitan Transport Authority. PDCOR Limited is the project management consultant for infrastructure design and bus operation. STUP Consultant Limited is responsible for supervision of engineering works.

It is to be mentioned that no private sector was involved for constructing bus stops / shelters and Information Technology means. It was reported that Bus-Queue-shelter / shelters etc shall be constructed on PPP format through the loan assistance under Rajasthan Urban Development Fund, Govt. of Rajasthan.

Major challenges encountered during the implementation of the project, are mostly related to availability/acquisition of land, shifting of existing utilities, road side parking etc. In order to address these challenges, the ULB or other concerned departments should take action.

Table 3.3: Jaipur BRTS at a Glance

S.No.	Components		Jaipur
1)	Consultant		PDCOR as PMC, CES is associated with MAUNSELL, AECOM as technical consultant.
2)	Population of City (Million) - Present		2.3
3)	No. of Corridors		
	A)	Total	
	B)	Sanctioned	05
4)	Length (km)		
	A)	Total	138
	B)	Sanctioned	7.1 (Package I), 19 (Package II) and 13.35 (Package III)
5)	Type of Operation (open/closed)		Closed with direct services
6)	Buses		
	A)	Floor Height	650mm and 400mm
	B)	Bus Capacity (Seating and Standing)	90
	C)	Fuel Type (CNG/Diesel)	Diesel
7)	Type of Road Surface		
	A)	BRTS Lane	Flexible Pavement
	B)	Other lanes	Flexible Pavement
	C)	Bus Station	Flexible Pavement with Mastic Surface
8)	Expected year of Commissioning		July, 2010 (Package-I)
9)	No. of Bus Stations		Package I-22 nos., Package IIA- Staggered Bus Stops -13, Island Bus Stop-3, Island Bus Station-1, Package IIB- Staggered Bus Stops -21, Staggered Bus Station- 1, Island Bus Stop-1, Island Bus Station-2, Package IIIA- Staggered Bus Stops 31, Package IIIB- Staggered Bus Stops-8, Island Bus Stop-2

10)	No. of Bus Terminals	04
11)	Spacing of Stations (m)	400-700
12)	Special Purpose Vehicle	
	A) Name / Constitution	Jaipur City Transport Services Limited (JCTSL)
	B) Partners	JDA-JMC-RSRTC
13)	Public-Private Partnership	
	A) Bus Terminals	Y
	B) Parking	Y
	C) Bus Operation	Y
	D) Bus Stops	N
	E) Road Infrastructure	N
14)	Cost (₹ in Crores)	
	A) Total	479.6
	B) Cost per Km.	12.15

JALANDHAR CITY BUS SERVICE



4 Jalandhar City Bus Service

4.1 Context

Mentioned in the Puranas and Upanishads, Jalandhar is said to have derived its name from the vernacular term 'Jala-Andar' means area inside the water, i.e. tract lying between the two rivers Satluj and Beas. Jalandhar was the capital of Punjab until Chandigarh was built in 1953. The city, which has major road and rail connections, is a market for agricultural products.

Presently, Jalandhar is known as highly industrialized centre being India's foremost producer of world-class sports equipments, apart from excellent textiles, leather goods and wood products. Jalandhar is situated 146 kms from Chandigarh and 350 kms from Delhi. It is surrounded by Ludhiana district in East, Kapurthala in West, Hoshiarpur in North and Ferozepur in South. Nearest Airport is Raja Sansi International Airport, Amritsar at a distance of 90 kms.

4.2 Situation before Implementation of the Project

4.2.1 Existing Transportation System

Efficient and reliable urban transport systems are crucial for major cities in Punjab to sustain a high growth rate and alleviate poverty. The Urban transport problems in Jalandhar are growing everyday essentially because of rapid motorization. The major challenge for Government of Punjab is how to improve the current urban transport situation, or at least prevent it from deteriorating further while providing differentially priced services. Cheaper fares can be introduced for those who cannot afford higher prices; and premium services for those who would shift from personal vehicles if they get quality services.

4.2.2 Problems and Needs Addressed by the Project

- Illegal and overloading autos plying like stage carriage.
- Starting route is not as much viable for the profit of Bus Operators.



Figure 4.1: Jalandhar City Bus Service

4.3 Description of the Project

4.3.1 Project Description

The Department of Local Government has undertaken implementation of a very prestigious project of the Government of Punjab to improve the quality of the Public Transport in the cities by providing cheap, environment friendly, efficient and convenient public transport system. In order to address these lacunae, Government of Punjab constituted a company by name of Jalandhar City Transport Service Limited (JCTSL) incorporated under the Companies Act, 1956 on 26th December 2006. The objective was to operate and manage the public transport system of Jalandhar and provide differentially priced services, with cheaper fares for those who cannot afford higher prices. Premiums and premium services for those who would shift from personal vehicles if they get quality services were also provided.

Special Purpose Vehicle as a Public Company

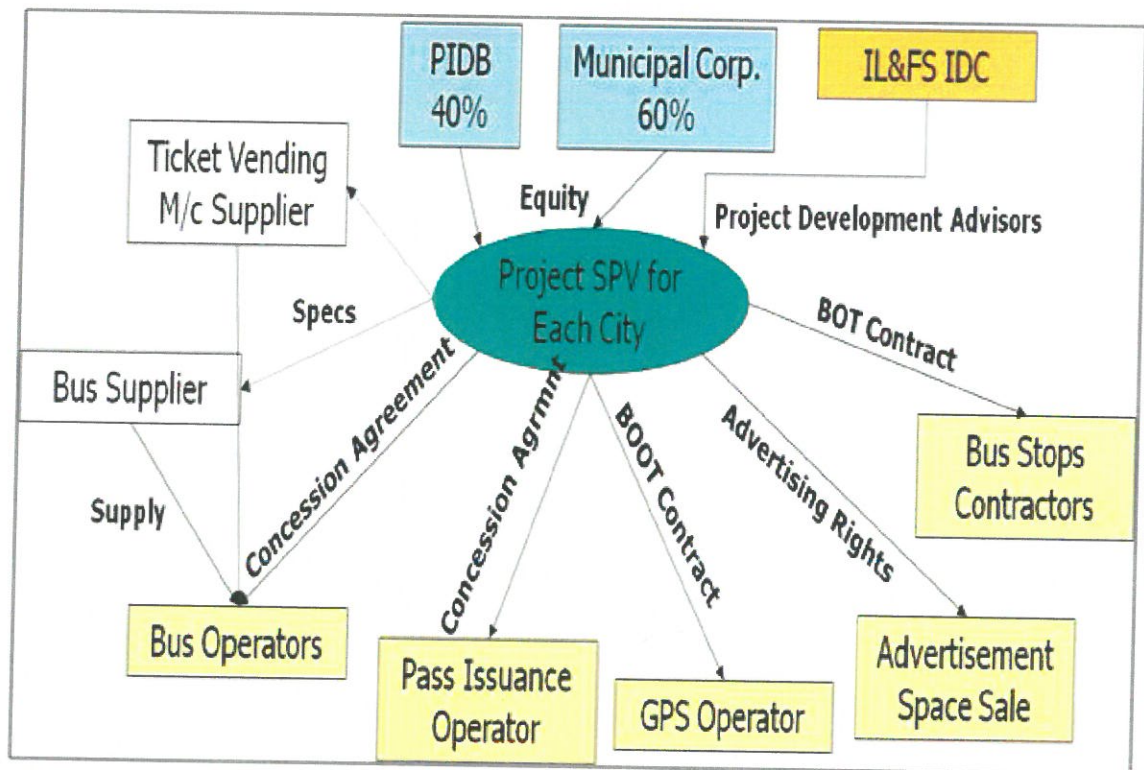


Figure 4.2: Project Structure for City Bus Services project on PPP format in Punjab

The Registered Office of the company is situated at Municipal Corporation, Jalandhar. The authorized capital of the company is ₹ 50 lakhs divided into 5 lakhs equity shares of ₹ 10/- each. The initial paid up capital of ₹ 30 lakhs is being held by the Municipal Corporation, Jalandhar and ₹ 20 Lakhs by Punjab Infrastructure Development Board, Punjab.

Management

The management of the company will be entrusted with the Board of Directors. There are Five members on Board of Directors with District Commissioner, Jalandhar as its Chairman and Commissioner of Municipal Corporation, Jalandhar as its Executive Director who has been entitled to exercise all powers for effective management of the new transport system under Public Private Partnership model.

The company chose ultra-modern low-floor TATA Starbus to run on the roads of Jalandhar. The beauty of the bus was a spectacle and the practicality provided is unmatched. In the first phase, JCTSL has 16 buses, which will expand very soon. A fully automated vehicle

tracking system will ensure that the city buses reach the stop at fixed time. Any deviation from timing would be corrected and controlled using GPS and real time tracking solutions.

The very purpose for this city bus service is to offer better civic facilities and JCTSL is determined to ascertain that the service level is duly monitored. A GPS based System will be used as a tool to ascertain the service levels. For this, JCTSL plans to establish a control room for Online Tracking System and every bus will be fitted with GPS based tracking device with online data transfer facility.

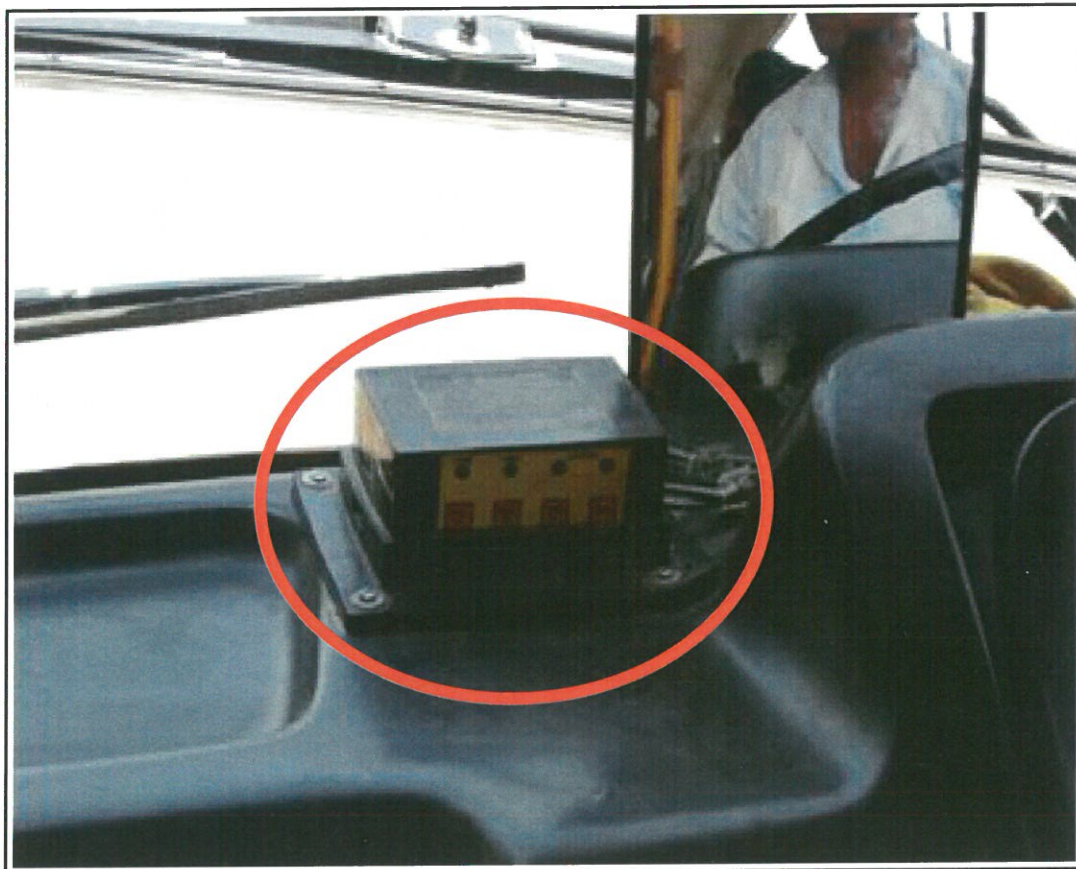


Figure 4.3: GPS System fitted in the City Bus, Jalandhar

Development of vehicle tracking system solutions will help us monitor our own performance against people's expectations. This would help our team to give better services to people and enable the buses in reaching the stops at scheduled times with the help of Passengers Information System (PIS). JCTSL has already installed ultra modern international level stainless steel framed Bus Queue Shelters on BOT Basis.

M/s Ambica Cards is an Amritsar based organization with a vision of creating excellence in the field of smart cards, smart card applications, custom software development and thermal printing etc. M/s Ambica cards boast a team of professionals who have handled the marketing and manufacturing of monthly bus passes.



Figure 4.4: Passengers Information System (PIS), Jalandhar

4.3.2 Goals of the Project

The main goals of the company are to:

- Create specialized and effective regulatory agency to monitor cost effective and good public transport services within the city of Indore with private partnership;
- Establish and maintain line of passenger coaches to transport passengers;

- Develop support system for improving transport infrastructure; and
- Provide premium services for those who would shift from personal vehicles to public vehicles if they get quality services.

4.3.3 Strategy Used to Achieve the Desired Goals

- A SPV incorporated to provide quality service;
- Public Private Partnership (PPP) concept introduced;

4.3.4 Activities Implemented to Achieve the Desired Goals

- Ultra modern low floor buses introduced;
- Tickets are being issued through Hi-Tech Electronic Machine;
- For the facility of daily passengers, bus passes at economical rate; and
- Global Positioning System (GPS) monitors buses and the information is displayed through the Passenger Information System (PIS) installed on each Bus Queue Shelters for status of buses.

4.3.5 Challenges / Constraints Encountered and how it was addressed

Challenges:

- Competitions with existing transport modes in cities;
- As the size of city bus is big, the operation of such buses on internal roads of the city is not smooth, due to narrow roads having inadequate turning radius;
- At present, existing routes are not viable for profit to the Bus Operators and sometimes they avoid to operate buses especially during lean hours; and
- Opposition faced by local public at the time of the construction of Bus Shelters in city.

Solutions Provided:

- Strict action against overloading and illegal autos by District Administration;
- Modification in existing routes for more revenue;
- Introduce Mini buses in next phase for narrow roads in city; and

- SPV may have strict monitoring on the buses which are operating on uneconomic routes.

4.3.6 *Expected Outcome of the Initiatives*

- Huge demand from different location to start City Bus;
- Approximately 8000 passengers to travel in a day; and
- Satisfied passengers with quality service.



Figure 4.5: Running with Full Occupancy

4.3.7 *Role and Activities of the Partner*

- Department of Local Govt., Punjab and Punjab Infrastructure Development Board, Punjab introduced this City Bus Project;
- IL&FS is the project consultant for implementation of this project;
- Municipal Corporation, Jalandhar providing space for City Bus Depot and Bus Queue Shelters in Jalandhar city at very nominal rates on lease basis; and

- JCTSL in execution of the project under the guidance of Municipal Corporation, Jalandhar.

4.3.8 Important Stakeholders Involved and Communication / Networking Procedure for the Project:

Bus Operators:

- M/s Poornima Travels, Udupi, Karnataka;
- M/s Sri Anantha Padmanabha Motors, Udupi, Karnataka;
- M/s R.K. Travels, Mangalore, Karnataka; and
- M/s Nava Ganesh Logistics, Mangalore, Karnataka.

Bus Queue Shelters (on BOT basis):

- M/s Laqshya Outdoors Pvt. Ltd. (A division of M/s Laqshya Media Pvt. Ltd.), Mumbai.

Electronic Ticketing Machine:

- M/s R-Square Solution, Pune.

Monthly Bus Pass:

- M/s Ambica Cards, Amritsar.

Global Positioning System:

- M/s HCL Infosys.

Factors of Success

- Comfortable buses having 2 x 2 seating facility with a total capacity of 84 passengers [44 seating and 40 standing (Approx.)].
- Low fare rates for quality service to the passengers.

4.5 Budgetary Implications and Sustainability

4.5.1 Total Cost of the Project

₹ 10 million (approx.)

4.5.2 Financial Partners Involved

Two Financial Partners of Jalandhar City Transport Services Limited:

- Municipal Corporation, Jalandhar.
- Punjab Infrastructure Development Board, Punjab.

4.5.3 Source of Finance for Sustainability of the Project

Capital investment of JCTSL

- 60% capital invested by Municipal Corporation, Jalandhar.
- 40% capital invested by Punjab Infrastructure Development Board, Punjab.

Bus Depot:

- Constructed and maintained by Jalandhar City Transport Services limited.

Buses:

- Investment in Buses by four private operators.
- Bus Queue Shelters:
- Bus Queue Shelters constructed on BOT basis.

4.6 Impact of the Initiatives

The study team interacted with the commuters who were traveling by these buses. It was found that the commuters, who were using Intermediate Public Transport (IPT) modes earlier, have switched over to these buses. The commuters were found satisfied with the services of these buses. They mentioned that these buses are time efficient but the frequencies

of these buses are very low. They usually get the bus after half an hour. They have requested the authority to increase the frequencies of these buses so that their waiting time for city bus could be minimized. They also requested to ply these buses on more popular and demanding routes.

The team of researchers also interacted with the officials of the Jalandhar City Transport Services Limited. They mentioned that the operating cost is being covered by fare revenue (from fair box). Further, they mentioned that they require some grant or funds for the maintenance of the buses along with up-gradation of the Bus Depot. This City Bus Service Project is constituted under PPP concept, in this regard if Government provides some grant for maintenance of the buses and up-gradation of Bus Depot; in that case private service provider will be encouraged.

4 Summing Up

Jalandhar city bus service is a PPP based project. The Government of Punjab constituted a company by name of Jalandhar City Transport Service Limited (JCTSL), a SPV, to operate and manage the public transport system and provide differentially priced services. The management of this is entrusted with Board of Directors under the Chairmanship of the Municipal Commissioner, its Executive Director who has been entitled to exercise all powers for effective management of the new transport system under PPP model.

The Municipal Corporation of the city has provided space for city bus depot and bus queue shelters on Lease basis. Private sector have been involved for operating buses, constructing bus queue shelters on BOT, GPS and PIS on BOOT, ticketing through Hi-Tech electronic machine etc.

The total cost of the project is ₹ 10 million (approx.) and 60 percent of the capital investment of JCTL is by the Municipal Corporation. The Punjab Infrastructure Development Board has invested 40 percent of the capital cost.

Ultra-modern low floor TATA Star buses are running on the roads of the city. These buses have encountered some challenges / constraints, viz. competition with other modes of transport in the city, buses facing turning problem on narrow roads of the city due to their big

size, some route are not economically viable and operators sometimes avoid operating their buses especially on lean time etc. In order to solve these challenges, rerouting of the existing routes, monitoring of the operation by the SPV and operation of Mini Buses may suggested.

The study team of the institute interacted with the commuters who were travelling by these buses. It was found that the commuters, who were using Intermediate Public Transport (IPT) modes earlier, have switched over to these buses. The commuters were found satisfied with the services of these buses. They mentioned that these buses are time efficient but the frequencies of these buses are very low. The study team also interacted with the officials of the Jalandhar City Transport Services Limited. They mentioned that the operating cost is being covered by fare revenue (from fare box).

JABALPUR CITY TRANSPORT SERVICE



5.0 Jabalpur City Transport Service

5.1 Context

Jabalpur is located in the Mahakoshal region in the geographic center of India. Jabalpur is one of the largest cities in Madhya Pradesh. It was the 27th largest urban conglomeration in India in 2001 with population of 12.76 lakhs. Jabalpur is the first district in India who has been obtained the comprehensive ISO-9001 certificate. This has come into force from 1st April 2007. The numerous gorges in the neighbouring rocks surround the city with a series of lakes, which are shaded by trees and add much greenery to the suburbs. Jabalpur is located at 23°10'N 79°57'E / 23.17°N 79.95°E / 23.17; 79.95. It has an average elevation of 411 meters (1348 feet).

5.2 Situation before Implementation of the Project

i) Existing Transport System in the Jabalpur City

Jabalpur city is the heart of Madhya Pradesh and located on the banks of Narmada River and has an urban population of 10 lakh and a rural population of 15 lakh making it a third largest city in Madhya Pradesh.

As per the RTO records the total registered vehicles is about 4.5 lakh in which the major share is of two wheelers amounting to 3.4 lakh followed by jeep / cars at 33 thousand. As far as the public transport system is concerned the registered Auto / 3 wheelers are 1000 whereas busses are 1400 approx.

As per the rough estimates a total of 4.5 lakh people travel in the city by various modes of transport in which major chunk (about 2 lakh) travels by 2 wheelers followed by 2.2 lakh who prefer to travel by tempo / auto / rickshaw. This does not take into account the tourists who visit Jabalpur to see marble rocks and other pilgrimage centers on the banks of holy river Narmada. This creates a lot of congestion in terms of traffic jams resulting in delays, street fights and accidents. To add to the woes the tempo / auto / rickshaw charge exorbitant fares which again leads to discontentment among the public.

ii) Problems and Needs Addressed by the Project

The first and foremost need addressed was a prompt and timely public transport will encourage the commuters to leave their 2 wheelers at home and adopt the safe and cheap mode of mass transport. The public at large will stop using by tempo / auto / rickshaw if a dedicated mass transport system which covers all the routes within the city & surrounding areas and run at a predetermined route and adheres to the laid down timings and reasonable fares.

iii) Reason for Adoption of Particular System

To provide a dedicated, dependable, sustainable mass transport system for the masses at an affordable price, ease the traffic congestion resulting in less pollution, and thus live up to our motto of "My City Green city".

iv) Preparation of Feasibility Study

In the feasibility study, a survey was carried out to find out the needs of the public, routes which needs to made based on the public demand, cost and size of the buses, their operating costs, repair & maintenance of the fleet, Number of staff and their wages, route charts and the bus timings, type & costing of bus passes, etc.

5.3 Description of the Project*i) Project Description*

Comfortable & efficient public transport is now the need of every big city that is in queue to become a metropolitan city. Jabalpur is a fast growing city in areas like Industrialization, Tourism & Education etc. but the most important feature missing here was efficient public transport service.

With the aim to provide the people of the city reliable, safe & efficient mode of transportation at an affordable price the city administration decided to launch 'Jabalpur City Transport Services Limited' (JCTSL) a company incorporated under the Companies Act 1956.

Jabalpur city transport services limited has been designed to operate & manage the public transport system in a Public-Private Partnership (PPP) model to benefit the company,

operators, government & general public at large. This company is supported by the Jabalpur Municipal Corporation (JMC) and the Jabalpur Development Authority. The company is looking ahead for a bright future aiming at developing and modernizing infrastructure needed for the betterment of the mass transport services.

In this project, it is envisaged that the JCTSL will have 150 Metro buses (44 seats) and 20 mini Metro Busses (16 seats) covering 16 routes. In the first phase 36 Metro buses covering 6 routes and 16 Mini metro will be put covering 4 routes.

ii) Strategy Used to Achieve the Desired Goals

To start with the municipal corporation floated a tender for the construction of 110 Bus stops on a BOT Basis. For the Metro bus operation 3 bus operators were short listed and were asked to procure 12 busses each. Agreements were signed with the parties for the bus operation.

Similarly for the pass making a service provider was selected to make passes on commission basis and the company has four types of passes (metro, mini metro, combined & route passes for 7 Km & 12 KM) under three categories viz General, student & handicapped. These passes are made and renewed monthly or quarterly.

To ensure that the busses maintain their route and time a contract was signed for the "On line Vehicle Tracking System" (OLVTS) which provides the real time information of the bus through GPS called a 'Bus Unit' and the same information is displayed on the 'Passenger Information System' (PIS) installed in the bus stops. The entire activity is web enabled and can be monitored from anywhere but a dedicated control room with necessary infrastructure has been incorporated.



Figure 5.1: Side View of Jabalpur Metro Bus, JCTSL 2010

To add and support the bus operation an additional revenue source in terms of advertisement was thought about and thus tenders were floated for the "advertisements on buses" and 3 agencies were short listed.

iii) Activities Implemented to Achieve the Desired Goals

Tenders were floated for all the above activities and work orders awarded. 60 Bus stops have been constructed on BOT Basis. 28 metro Busses & 9 Mini metro buses have been procured by our operators and running successfully on 6 and 4 routes respectively. 2 GPS equipment has been installed and the testing Phase is on.

iv) Challenges Encountered and how it was Conquered

- To ply Metro buses on all the routes;
- To decrease the vehicle load on the city roads;
- To bridge the gaps in the route network by plying Metro Taxies;
- To make public transport accessible to the rural population;
- To bring all tourist spots of Jabalpur in the Metro route network;
- To increase the frequency of buses on each of the bus stops so that the waiting time can be reduced; and
- Problem of driving buses as the engine fitted at the rear side of the bus and there is no automatic transmission system in them.

v) Expected Outcome of the Initiatives

In this regard, it may be stated that the Jabalpur City Transport Services Ltd is operating city buses successfully. These buses are attracting commuters and their passenger carrying capacity is being fully utilized. It may be seen that most of the daily commuters are using these services that were using other modes of transport before operating these services.



Figure 5.2: Metro Bus Service Shelter, JCTSL 2010

vi) *Role and Activities of the Partner*

- The entire BOD in place is from state government, transport, traffic and law & order departments.
- The entire state Government machinery works at its own level to keep this mode of transport sustainable, working and betterment.
- For the betterment of the service all partners agree to the suggestion and proposals were put forward by its members.

5.4 Factors of Success

The traditional mode of public transport in Jabalpur is autos, cycle rickshaws and two wheelers. This system of transport is costly as there was no regulatory body to monitor the fares charged by the owners. Secondly the owners of this mode of transport dictated as to where & when they will operate which puts the public in lot of inconveniences.

To overcome these difficulties JCTSL was incorporated in Dec 2006 and since there was a void in the public transport system, the running of Metro busses was welcome change for the citizens of Jabalpur.

The expenditure in operation of the Metro buses was found to be ₹ 24 per km whereas the income was found to be ₹ 26 per km thus proving that the Metro bus operation in Jabalpur is profitable under the PPP mode.

5.5 Budgetary Implications and Sustainability

i) Total Cost of the Project

10 Crore approximately.

ii) Source of Finance for Sustainability of the Project

The company has received Rs 25 lakh as a corpus fund from both the major share holders while the vehicle being operated by private partners are being financed by various banks in the city.

5.6 Impact of the Initiatives

The study team of NIUA interacted with the commuters (who were using these buses) and the concerned officials of JCTSL. It was found that the commuters were satisfied with the services. They mentioned that these buses are very comfortable having good seating arrangements at different levels, which made better view for them. However, they stated about the frequency of these buses as they have to wait for a bus for sometimes more than half an hour. They mentioned that these buses are not cleaned properly.



Figure 5.3: Jabalpur Metro Buses - Seating Arrangement at Different Levels inside the Bus, JCTSL 2010

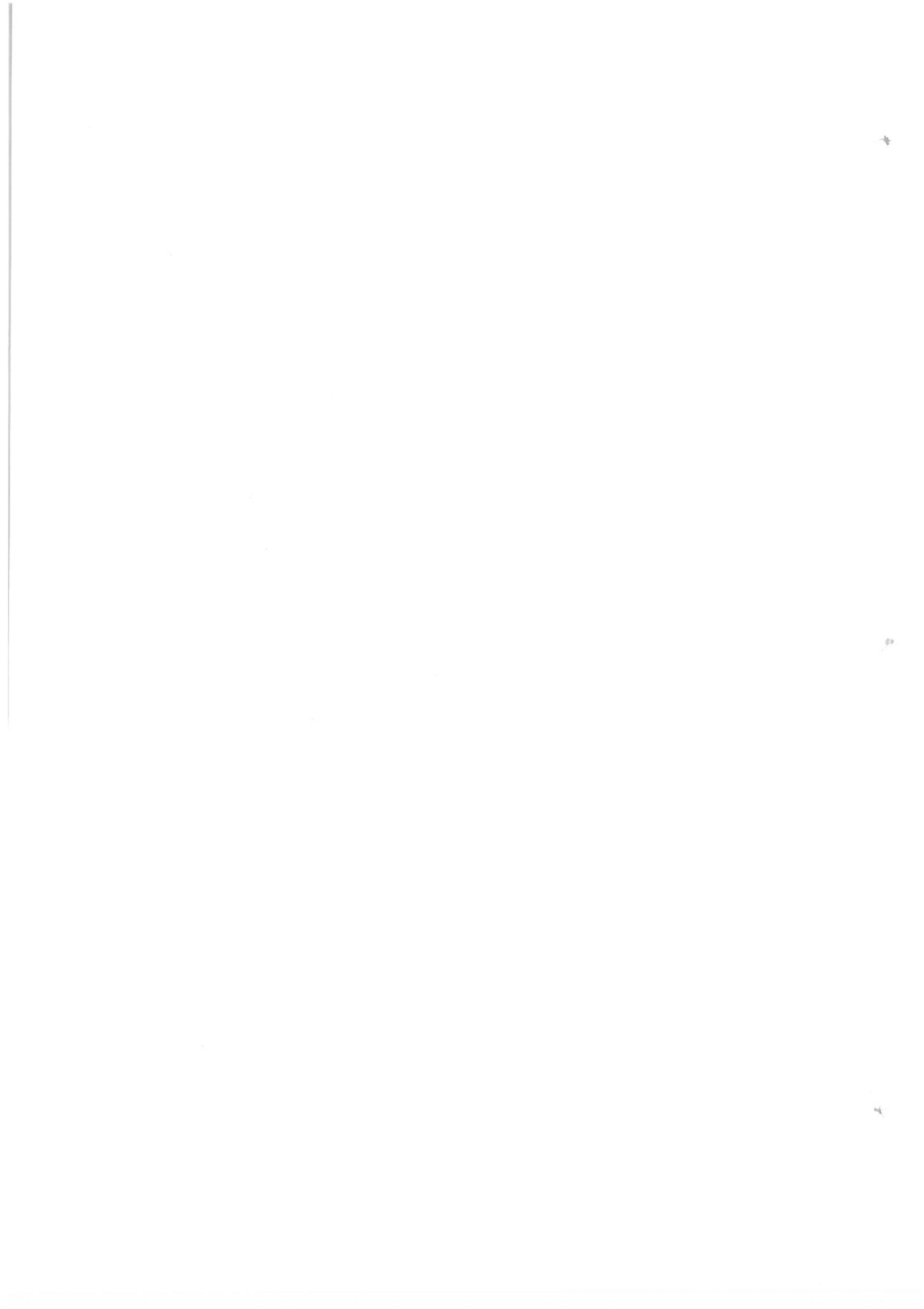
The officials of JCTSL mentioned that the drivers of these buses are facing problem in operating these buses because the engine of these buses are fitted at the rear side of the bus and there is no automatic transmission system. They suggested that these buses should have automatic transmission system for operating these buses smoothly. They also mentioned that they have to run these buses on some economic routes which might be one of the reasons of revenue losses. However, they are displaying advertisements on the bus stop / shelters, which is a source of non traffic revenue.



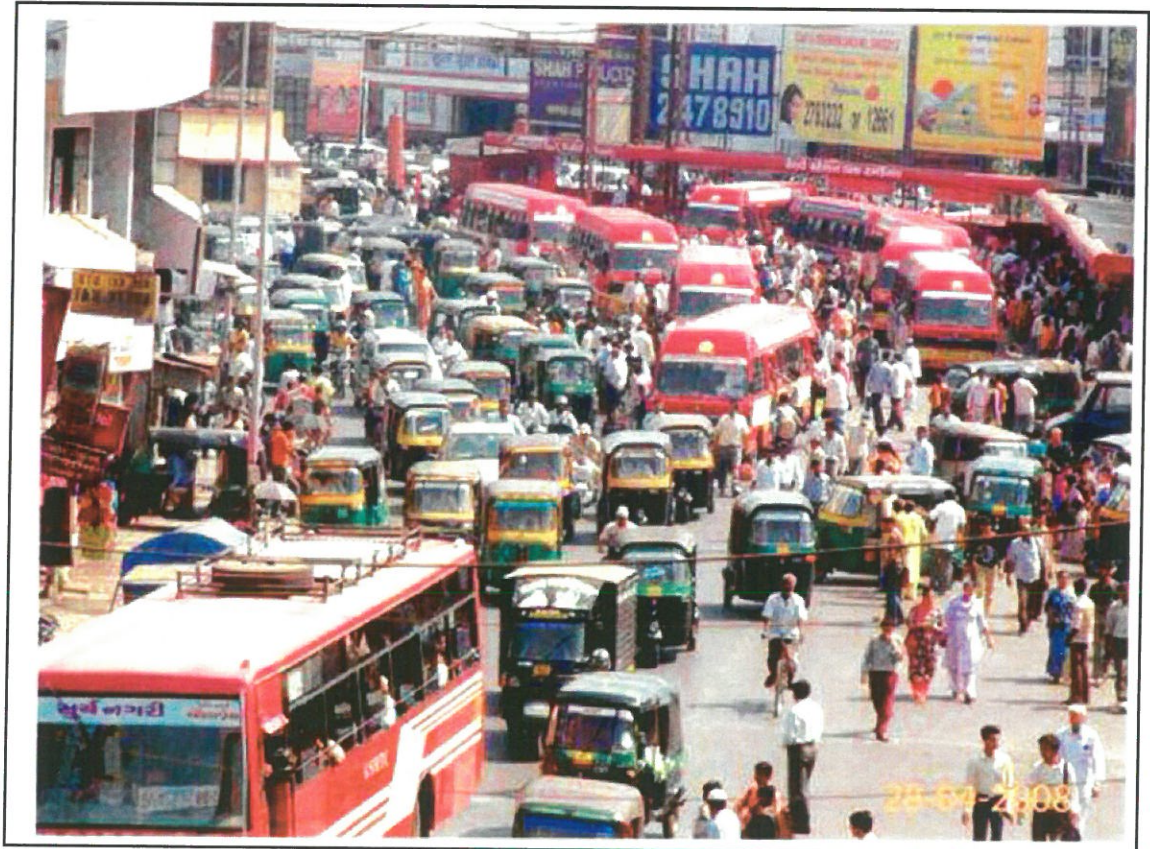
Figure 5.4: Jabalpur Metro Bus – Picture Showing the Engine Fitted Rear Side of Bus, JCTSL 2010

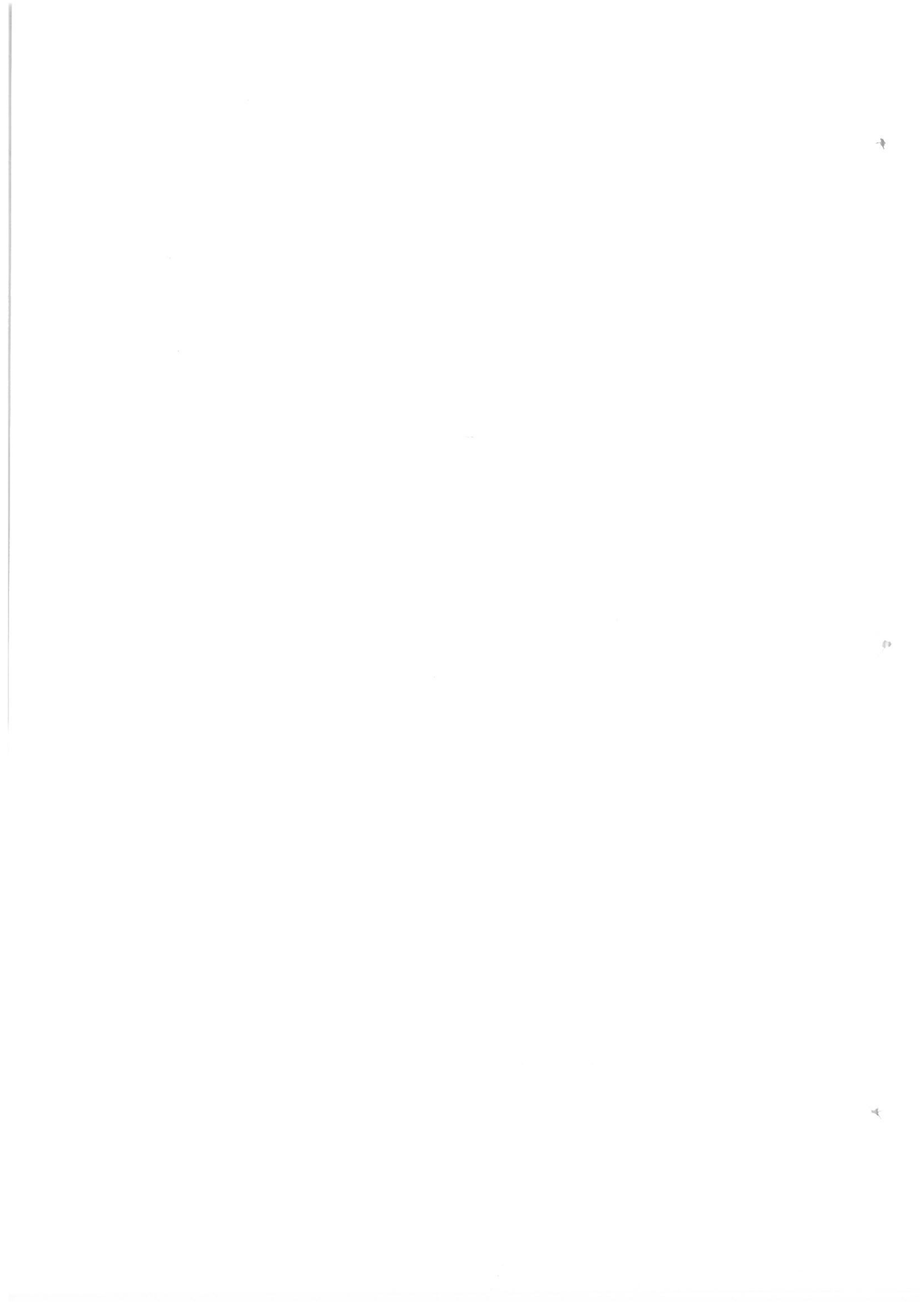
5.7 Summing Up

The city bus service of Jabalpur was running 28 Metro and 9 Mini Metro buses on 6 and 4 routes successfully (July 2009). The financial performance of it was up to mark. Revenue was being collected as ₹ 26 per kms against operating cost of ₹ 24 per kms. Moreover, commuters found satisfied with the service (NIUA's study team interviewed with the commuters).



SURAT CITY BUS SERVICE





6.0 Surat City Bus Service

6.1 Context

Surat, formerly known as Suryapur or Khubsoorat, is the eighth largest city in India. The city is the seventh most populous city in India and 49th in the world. Surat is the administrative capital of Surat district. With population approaching 3 million as indicated by census 2001, growth rate as well as GDP growth rate is highest in India at 85 % and 11.5 % respectively (as of 2008). The sex ratio is as low as 760, owing to migration of single laborers to work in industries in Surat. Labour intensive industry dominates, with diamond, textile and chemical industry employing a large number of migrant workers. Heavy industries like ONGC, KRIBHCO, NTPC, Shell, Reliance, etc. make the city nationally important.

6.2 Situation before Implementation of the Project

It was clear that only providing traffic dividers, roundabouts, signals and flyovers could not solve traffic problems. It required an integrated mass transportation system. This system should be such that it can work in co-ordination with the city's existing transportation system. An efficient mass transportation system was very much needed for sustainability of not only the economy of the city but also for reducing stress due to pollution on the environment.

6.2.1 *Problems and Needs Addressed by the Project*

The City Bus Service was intended to overcome the following issues:

- Increasing vehicular pollution;
- Growing number of vehicle ownership;
- Increasing number of auto-rickshaws on the roads;
- Lack of affordable and reliable city buses; and
- Lack of public transport system.

6.2.2 *Reason for Adoption of Particular System*

Travel characteristics salient features:

Trip Rate- Per capita trip rate has increased from 1.0 to 1.3. Increase in motorized trips is more significant and is around 0.8.

Modal Share- Significant shift from NMV and public modes to private mode are observed.

- Walk- trip share is around 40%;
- Bus patronage is almost 0%;
- Two wheelers share 30%; and
- A steady increase in dependence on auto-rickshaws has been observed.

Trips Purpose-

- 50% work trips (high work participation rate)
- 30% education trips
- 90% trips performed daily.

Trip Length - Average Trip length is 5 km.

Public Transit Choice -

- 59% respondents from surveys are willing to shift to public transport system for work purpose;
- 74% respondents from surveys are willing to shift to public transport system for education purpose; and
- And 90% respondents would prefer starting such a transit service in Surat and are willing to pay up to ₹ 1 per km.

Travel Pattern-

Movement is largely along 7 major radial corridors. A considerable amount of traffic moves along the river. Bicycle movements are shorter and concentrated more in the central part of the city. With high participation rate, overall work related travel is high, most of which is around the walled city. Modal shift in favor of personalized and IPT modes have been observed, which is due to lack of public transport. People are willing to shift to public mode of transport if it is made available to them. The fare levels have to be reasonable if such a shift has to be made realistic.

6.3 Description of the Project

City Bus Service System has got approved from government of Gujarat with PPP model. Overall monitoring has been done by the Surat Municipal Corporation. In this model, private investment has come in buses, operation of buses and decision with reference to tariff; Routes and frequency of buses has been decided by the SMC.

6.3.1 Goals of the Project

- 1) Privatisation is to aim at relieving the financial and administrative burden of the government undertaking and maintaining a vast and constantly expanding network of city bus services.
- 2) Privatisation would promote competition, improve efficiency and increase in adequacy of services. It would assist in reduction of administrative and overhead expenses of the public sector and improve its resource position. The private enterprises may have lower operating cost and greater capacity and freedom to obtain and maintain necessary bus fleet.

6.3.2 Strategies Used to Achieve the Desired Goals

An innovative PPP model will be used to reach the above goals.

6.3.3 Activities Implemented to Achieve the Desired Goals

The technical duties performed by the SMC to realize the above vision are as under:

- Traffic and transportation survey;
- Overall regulations and control of vehicles, pedestrians, traffic and transportation and to provide safe and un-delayed travel trips to the citizens;
- Installation of traffic signals on the road junctions;
- Construction of channelisers on road junctions;
- Construction of road dividers either with RCC pardi of guard stones with provision for plantation;
- Installation of automatic night blinkers at critical vehicular gaps, accident-prone points, etc;
- Construction of traffic islands, rotaries; and
- Running the city bus service in PPP basis.

6.3.4 Challenges / Constraints Encountered and how it was conquered

The overwhelming amount of rickshaws and poor traffic sense of the citizens have created difficulties in day to day traffic despite efforts towards high standards of traffic engineering in the city.



Figure 6.1: The City Bus of Surat

SMC has allotted 2 plots measuring 4000 sqm to the concessionaire for setting up workshops / fuel stations/ depots/ daily cleaning system, etc at Re. 1/- token rent / sqm.

6.3.5 Expected Outcome of the Initiatives

- Reducing dependency on personal vehicle; encouraging use of NMV and public transit;
- Long term sustainability, strategy development to lesser the burden on public budgetary resources through PPP;
- Accessibility to all user groups incorporating local economic activities within the design;
- Effective maintenance of traffic island for overall pleasing effect and desired traffic benefits; and
- Maintenance and excellence in design of bus stops.

6.3.6 Role and Activities of the Partner

The Surat Municipal Corporation is the lead implementing agency of the project.

Public Partner

- SMC has defined the bus routes, bus stops and fare structure. It has also defined the quality of service in terms of frequency and has determined that buses should be run on CNG fuel. Regional Transport Authority is responsible for sanction of stage carriage permits under Motor Vehicles Act for city bus service, providing statutory sanction to these terms; and
- The bus stands are made by SMC on BOT basis. In lieu of the rights given to the operators for collecting fare, SMC gets a premium on yearly basis from the operators.

Private Partner

- Buses are procured, owned, operated and maintained by the private operator thus expenditure on rolling stock and operation and maintenance is done by the operator. This includes cost of driver and conductor, supervision of operations, fuels, repairs and maintenance, etc.

The drivers and conductors have been given uniforms, which carry logo of SMC and the concessionaire. The corporation has not made any cash investment either on the fleet or on the staff, and in return has generated revenue from the licensed operators (concessionaires).

6.3.7 Important Stakeholders Involved and Communication / Networking Procedure for the Project

The contract given to the private operators for running and maintaining the city bus service is for 5 years. RTA gives the carriage permission for city bus service.

All buses are provided with vehicle tracking system for monitoring the frequency and timely operation from the control room, which will also be set at the SMC main office, presently it has been set up at the concessionaire's office.

6.4 Factors of Success

SMC has provided PPP based public bus service to the citizens of the city, which is efficient (in terms of frequency), cost effective and eco-friendly. It issues daily passes, students'

passes and allow free travel to freedom fighters. A system of weekly review by the traffic department of the corporation has been put in place.



Figure 6.2: Surat City Bus Service Gaining Popularity amongst Commuters

6.5 Impact of the Initiatives

The citizens have obtained an increase in transport facility through the introduction of city buses. To date, around 116 buses are running on 41 routes and on an average 50, 000 passengers travel by bus services daily. The revenue to the Urban Local Body for the next five years is estimated to be around ₹ 18,000 per bus per year as premium from operators. Revenue of ₹ 32,000 per bus stand per year from advertisement is estimated to be obtained from 461 bus stands in the next five years. The Ministry of Urban Development (MoUD), Government of India, gave Best PPP initiatives in Urban Transport award to SMC for its PPP initiative in the city bus service in the Conference and Exhibition on Urban Mobility India in Delhi.

6.6 Summing Up

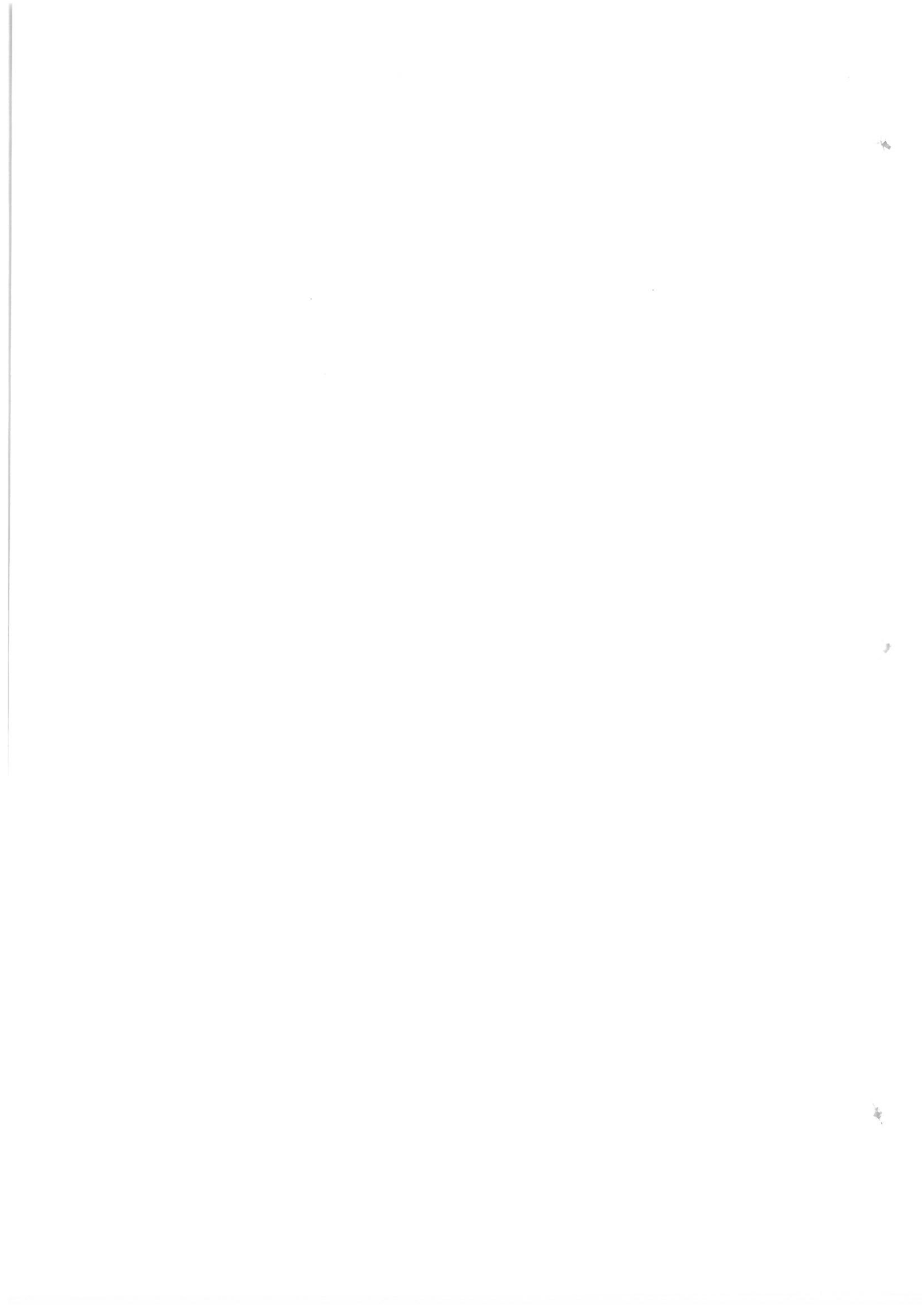
The city bus service of Surat is being run by SMC in public private partnership. It is having a fleet of 116 buses, which are operating on 41 routes. These buses are efficient (in terms of frequency), cost effective and eco-friendly. Around 50,000 commuters travel by these buses daily. SMC represents the public sector, which has defined the bus routes, bus stops, fare structure quality of service in terms of frequency and has also determined that buses should be run on CNG fuel. The Regional Transport Authority is another public sector responsible for the sanction of stage carriage permits under motor vehicles act for city bus service, providing statutory sanction to these terms.

Buses are procured, owned, operated and maintained by the private sector (private operators) thus expenditure on rolling stock and operation and maintenance is done by the operator. Besides, bus stands have been constructed by SMC on BOT basis and in lieu of the rights given to the operators for collecting fare, SMC gets a premium on yearly basis from the operators.

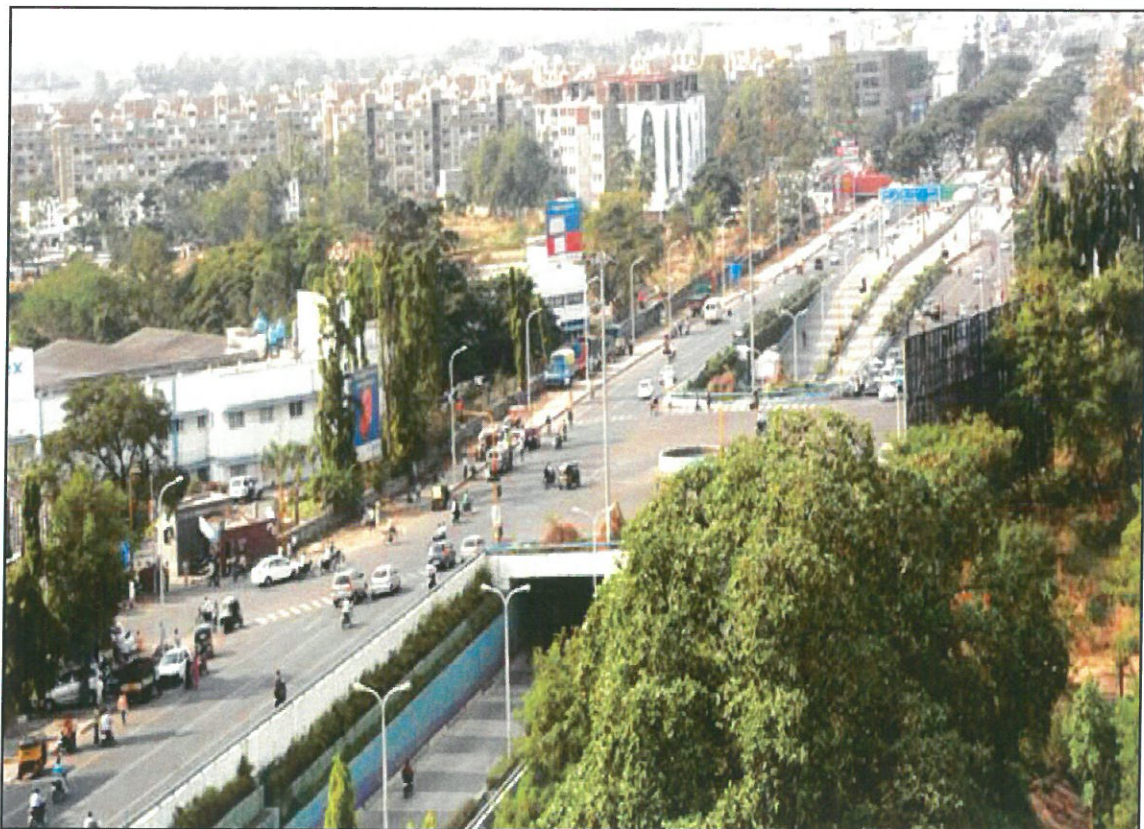
It is to be noted that the corporation has not made any cash investment either on the fleet or on the staff, and in return has generated revenue from the licensed operators (concessionaires). The city bus service of Surat has been running successfully as it is efficient (in terms of frequency), cost effective and eco-friendly. It issues daily passes, students' passes and allow free travel to freedom fighters. Besides, a system of weekly review by the traffic department of the Corporation has been put in place to make the system more effective and efficient.



Figure 6.3: Award of Best PPP Initiatives in Urban Transport to SMC in the conference and Exhibition on Urban Mobility India, 2008.



PIMPRI-CHINCHWAD BUS RAPID TRANSIT SYSTEM





7.0 Pimpri-Chinchwad Bus Rapid Transit System

7.1 Context

The city of Pimpri-Chinchwad is situated northeast of Pune, 160 kms from Mumbai, the capital city of Maharashtra. It is predominantly an industrial area, which has developed during the last four decades. Industrialisation in Pimpri-Chinchwad area commenced with the establishment of Hindustan Antibiotics Limited in 1956. The establishment of the Maharashtra Industrial Development Corporation (MIDC) in 1961-62 considerably facilitated industrial development in the area.

The establishment of large-scale core industries has led to the growth of ancillary and small-scale industries in and around this industrial belt. As the city continues to grow, the Pimpri-Chinchwad Municipal Corporation (PCMC), which is responsible for the provisions of all municipal services to the citizens, has been preparing itself to provide quality services to its citizens. Many projects have been taken up towards this objective. With a current population estimated at 13.35 lakhs in Pimpri-Chinchwad, it is expected to reach about 15.07 lakhs by 2011.

7.2 Situation before Implementation of the Project

7.2.1 Existing Transport System in the Pimpri-Chinchwad City

The city has seen tremendous growth in the last few years owing to its proximity to the IT hub of Pune. The existing road network is unable to address the expected future growth of city. Currently there are more than five lakh registered vehicles plying on the roads of PCMC. A steep increase in the ownership of private vehicles has been observed over the last five years.

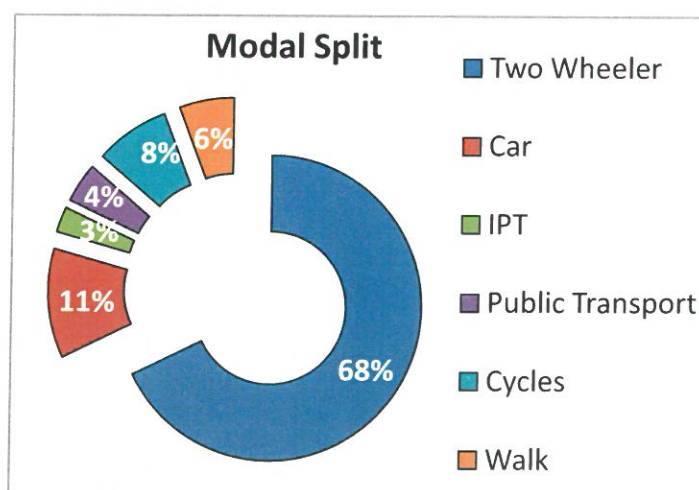


Figure 7.1: Model Split Share in Pimpri-Chinchwad

According to a norm by Central Institute for Research in Transportation (CIRT), there should be about 40 public transport buses for every one lakh population. Before the formation of Pune Mahanagar Parivahan Mahamandal Ltd. (PMPML, the agency responsible for public transport in Pune and Pimpri-Chinchwad), there were about 202 buses in PCMC area catering to about 12 lakh population. This is only 50% of the required norm of 480 buses.

Moreover, the current public transport (buses) is not able to address immediate as well as future demands of commuters within the city as well as those traveling to nearby Pune city. With two-wheelers having a modal share of 68%, roads are congested in many important locations. For example, PCU count on Old NH-4 ranges from 6,000 to 10,600 PCU's on Old NH-4.

Presently, the use of roads in PCMC is driven by the industrial clusters in the area. This might change with the development of IT sector in the overall region, along with the Pune area. It has also been observed that some industries are moving out of the city limits leading to a change of the land-use of their estates from industrial to residential or commercial. All these factors impact the transportation profile of PCMC.

7.2.2 Problems and Needs Addressed by the Project

The public transportation system in Pimpri-Chinchwad has not been able to provide the best services to its citizens. This has led to steep increase in private ownership of vehicles, especially motorized two wheelers. Poor connectivity and poor frequency of public transport has also encouraged large size auto rickshaws (seven-seater) to ply along the main corridors in the city, which has led to a thriving para-transit mode of transport. These factors are leading to congestion of roads in the city. In order to have an efficient public transport system, it has become necessary to also have physical infrastructure with high levels of service.

There is urgent need to address the main issues of patronage of public transport, poor level of service of the road network in PCMC and future traffic congestion on city roads caused by private vehicles. To address most of these urban transport problems being faced by PCMC currently and those anticipated in the future, a Comprehensive Mobility Plan (CMP) has been

undertaken, which proposes a bus based rapid transit system spread across the city of Pimpri-Chinchwad along a road network with high levels of service.

The two main components of the CMP were – Traffic study and Land-use study. By integrating the traffic study along with the land-use planning and undertaking a detailed analysis of demand on high-density corridors, the following information was arrived at using the traffic model. It presents the demand for a public transit system along important road corridors in PCMC area.

Table 7.1: PPD and PHPDT at different corridor in Pimpri-Chinchwad

Corridor	Corridor Peak Traffic-number of Bus-passenger Trip			
	2008		2021	
	PPD	PHPDT	PPD	PHPDT
Aundh-Ravet Road	57381	3682	-	-
Old NH-4	189427	12156	-	-
Dehu Alandi	16051	1030	36540	2345
NH – 50 (Nashik Phata to Moshi)	40629	2607	101374	6505
Kalewadi to Delhu-Alandi	33219	2132	56112	3601
Pune to Alandi	3057	196	6492	417
Nashik Phata to Waked	41532	2665	83662	5369
Kiwale to Bhakti Shakti	10355	664	23243	1492

Source: Detailed Project Report on Improvement of Road Corridor with Bus Rapid Transit System, Pimpri Chinchwad Municipal Corporation, Maharashtra

A bus-based rapid transit system suits the above magnitude of demand (about 2,000 PHPDT), and therefore, a BRT system has been proposed in the CMP. The proposed BRT system addresses immediate needs of reduction in traffic congestion at many locations in the city. It also addresses long term needs of an efficient public transport system for the growing city of Pimpri-Chinchwad.

7.2.3 Reason for Adoption of BRTS

The city is still in the growing phase and a transportation and land-use study was undertaken which recommended a well-planned public transport system. This includes improvement of existing road network of the city. Based on the PHPDT arrived at from the traffic study, a bus-based public transport system has been proposed.

The road structure within PCMC was also analysed as part of this study for its hierarchy, continuity and topology and it was observed that the existing road network of PCMC is highly fragmented at primary and secondary levels. Through this study, PCMC is proposing to improve its existing road network and also provide a public transportation system in the form of a BRT system along its major roads. The proposed BRT system consists of a network of corridors across PCMC area. The corridors have been selected based on criteria such as travel demand, hierarchy of road, existing bus-routes.

7.2.4 Preparation of Feasibility Study

A detailed feasibility report was prepared which was approved by MoUD for grant of funds to the project under JNNURM. The report uses a transit-oriented city development planning approach where the transportation needs of the city have been integrated with urban planning.

7.3 Description of the Project

7.3.3 Project Description

The project envisages improvement of the road network in the city. The road network from east-west corridor is given in following table:

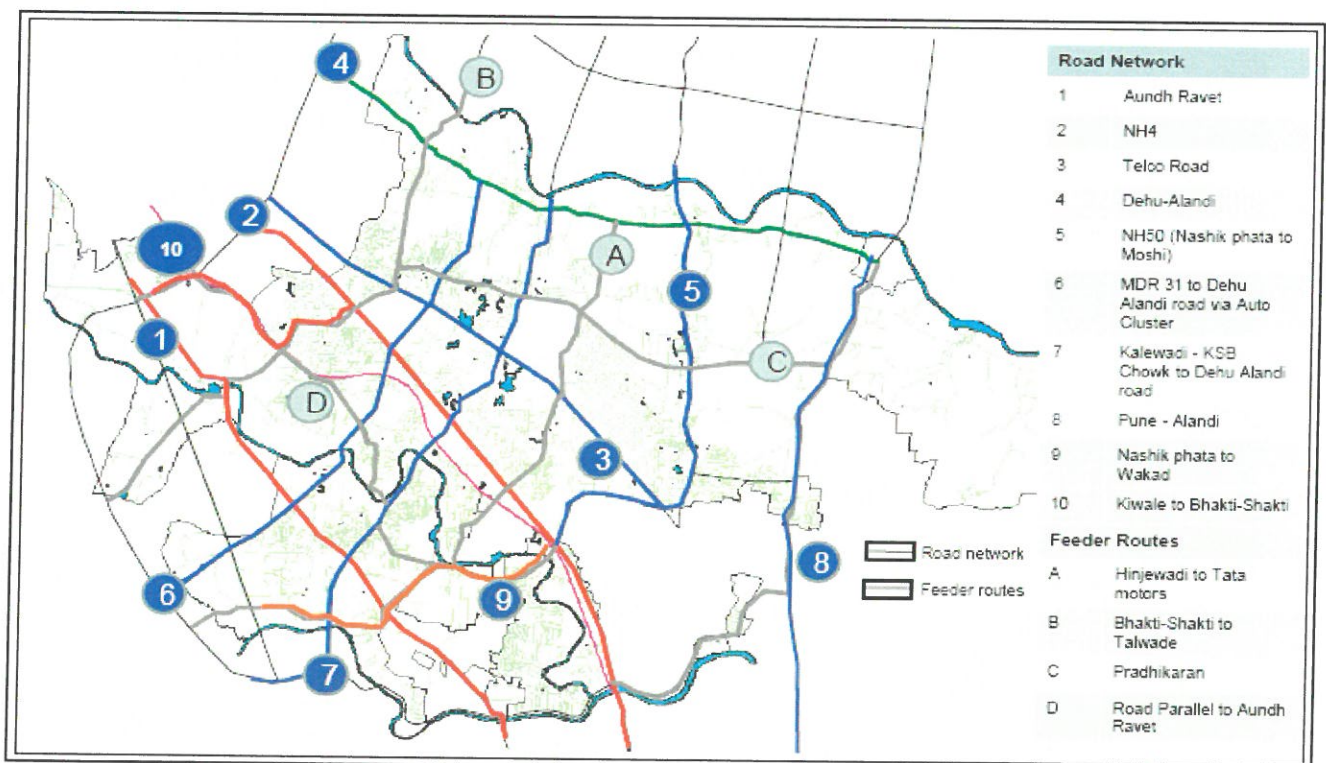
Table 7.2: Road Network Details, Pimpri-Chinchwad, Maharashtra

S. No.	Road Name	Length Proposed (km)	Proposed RoW
Level 1 Corridors (Trunk Routes)			
1)	Aundh-Ravet Road	14.4	45.0
2)	Old NH-4	14.6	61.0
3)	Telco Road	12.0	61.0
4)	Dehu-Alandi Road	14.5	45.0
5)	Nashik Phata to Moshi Road	10.4	61.0

6)	Hinjewadi to Dehu-Alandi Road	13.3	30.0
7)	Kalewadi-KSB Chowk-Dehu Alandi Rd	13.2	45.0
8)	Vishrantwadi/Pune-Alandi	11.6	60.0
9)	Nashik Phata to Waked	7.8	45.0
10)	Kiwale to Bhakti Shakti	11.8	30.0
Level 2 Corridors (Feeder Routes)			
A.	Hinjewadi to Tata motors	10.3	30.0
B.	Bhakti Shakti to Talwade	11.3	45.0
C.	Pradhikaran	10.6	45.0
D.	Road Parallel to Aundh-Ravet	8.4	30.0

Source: Urban Mobility Plan, Pimpri-Chinchwad, Maharashtra

PCMC has a road network of about 1300 kms and proposes a high quality public transport system in the form of BRTS. These corridors will have road widths of 45 m-60 m and will comprise dedicated lanes for bus-based mass transit, separate lanes with grade separators for through traffic, service lanes for local traffic, underpasses, walkways for pedestrians and separate lanes for bicycles. State-of-the-art buses of international standards will ply on the dedicated bus lanes with five minute frequencies during peak hours.



Map 7.1: Map Identified road corridors in Urban Mobility Plan for improvement

An area of 100 m on either side of the above corridors has been designated as BRT corridor zone. No street-side parking will be allowed in the BRT corridor zone. The Development Control Rules in this zone have been modified to provide 100% extra parking, which includes 25% provision for public parking to be managed by PCMC. In addition, hawker zones will be designated; transit interchanges and wireless Internet connectivity will be provided. Work has been completed for NH-4 Corridor (Mumbai–Pune highway). Work is under progress for Aundh-Ravet Road, Kalewadi-KSB Chowk- Dehu Alandi Road and Nashik Phata to Waked.

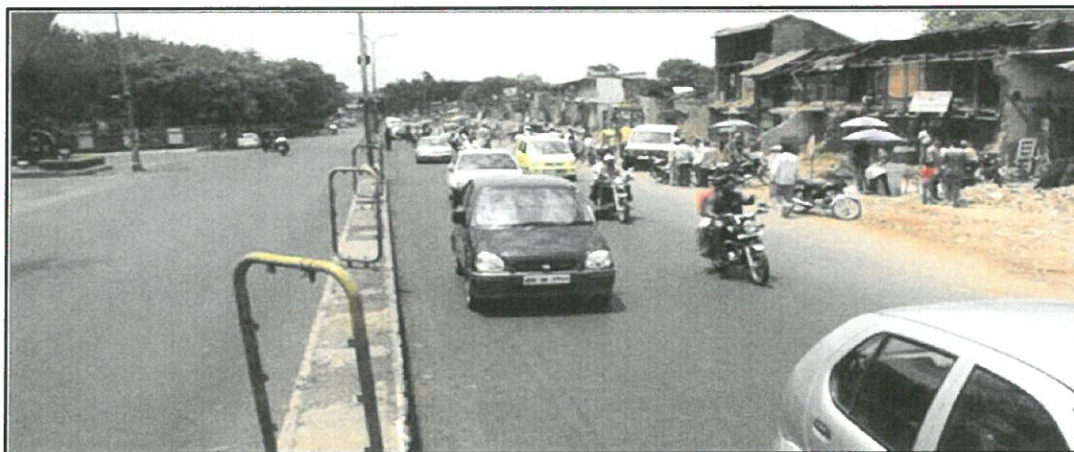


Figure 7.2: Before implementation of Mumbai-Pune BRT Corridor at Dapodi NH-4



Figure 7.3: After Implementation of Mumbai-Pune BRT Corridor on NH-4

7.3.4 Public Private Partnership for Road Furniture

- 1) Awarded contract on PPP basis for road furniture:
 - a) Bus stops;
 - b) Public toilets;
 - c) Landscaping; and
 - d) General Maintenance.
- 2) Advertising rights offered for 5 years on specific locations on Mumbai Pune road – 12 kms
- 3) Total benefit of ₹ 14.65 Crores to PCMC

7.3.5 New Approach of Revenue Generation

Pimpri Chinchwad Municipal Corporation (PCMC) has developed a unique financing model for the development of BRTS corridors. Through this model, PCMC has created a new revenue stream along with dovetailing of specific incomes into an Urban Transport Fund (UTF) that is managed by PCMC Infrastructure Company Limited (PCIC). PCIC will construct, operate and maintain the BRTS corridors through funds generated by the UTF.

PCIC has been formed to construct BRTS corridors in a focused manner and to leverage the UTF to borrow from The World Bank – Sustainable Urban Transport Program, Asian Development Bank's non sovereign funding and term loans from domestic financial institutions for funding the construction of BRTS corridors (Annex VIII for Innovative Funding Model of PCMC).

A zone of 100 meter on either side of the corridor designated as BRT influence zone / BRT Corridor Zone. Revenue sources accorded to the UTF from BRT Corridor Zone:

- 1) Revenue Ceiling FSI raised to 1.80 from existing 1.0.
- 2) Allowed Transfer of Development Rights (TDR) from other zones to BRT corridor on payment of premium.
- 3) Other incomes like advertisement, incremental property tax, lease rentals on utilities.
- 4) Total Income potential of BRT Corridors – ₹ 2945 Crores.

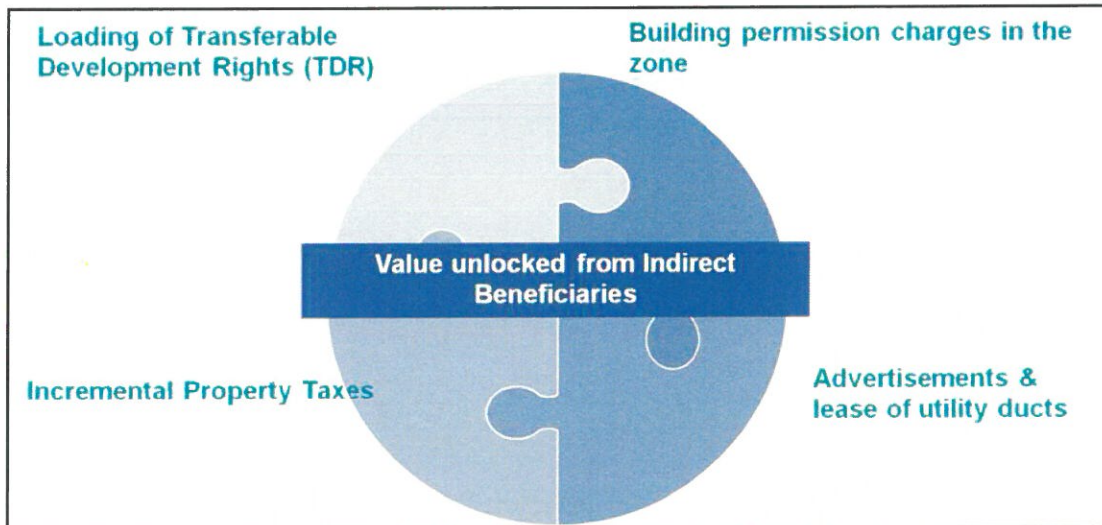


Figure7.4: Revenue Sources from Indirect Beneficiaries

7.3.6 Main Features of Approach:

- 1) Does not release additional FSI in the city; only realigns the FSI from other zones to BRT Corridor.
- 2) Will protect the value of TDR and make it more attractive hence encourages implementation of DP.
- 3) PCMC can plan higher order infrastructure in BRT corridor and facilitate focused service provision by densification.
- 4) Ensures the attractiveness of mass transit and protection to environment.

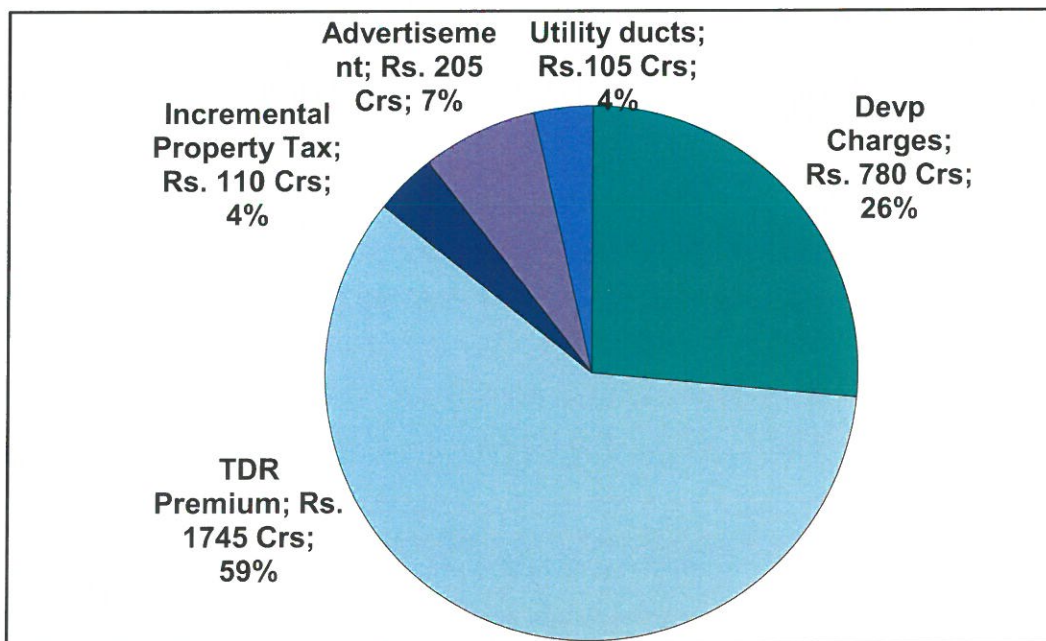


Figure7.5: Total Income Potential of BRT Corridors

i) Goals of the Project

- 1) To provide better public transport facilities to commuters through a BRT system
- 2) To improve service levels of road infrastructure in the city
- 3) To address requirements of next 30 years

ii) Strategy Used to Achieve the Desired Goals

- 1) Increasing carrying capacity through widening and improve riding quality through strengthening of existing roads.
- 2) New roads to cater to missing links and developing areas and present the urban face of the city.
- 3) Efficient, safe and accessible mass transportation system for entire region.
- 4) PCMC plans to interact with operators of intermediate public transport modes (auto-rickshaws).
- 5) Higher order infrastructure for attracting densification in 100 meter either side of zone :
 - a) 24/ 7 water supply
 - b) 100% sewerage provision
 - c) Dust Bin free zone
- 6) Road design in identified zone:
 - a) Service lanes for mobility of local traffic
 - b) Provision for pedestrians – under pass, walk ways
 - c) Provision for non motorized vehicles – cycle track
- 7) Facilities for vehicle parking in zone:
 - a) 100% extra parking;
 - b) 25% to be handed over to PCMC for public parking
- 8) Others facilities:
 - a) Wi-Fi connectivity
 - b) Hawker zones

9) Awarded contract on PPP basis for road furniture through advertising rights offered for 5 year on specific period:

- a) Bus stops
- b) Public toilets
- c) Landscaping
- d) General Maintenance

iii) *Activities Implemented to Achieve the Desired Goals*

Detailed Project Reports have been prepared for improvement of road corridors, which include dedicated lanes for a BRTS. A number of experts in the field were consulted before designs were finalized. One of the project corridors has already been commissioned while the others are under implementation. PCMC has also formulated an Urban Transport Fund (UTF) which will ensure that the ULBs contribution to capital expenditure is addressed smoothly.

iv) *Challenges / Constraints Encountered*

The project is under initiation and the completed BRTS is not yet fully implemented. One infrastructure road corridor completed with lots of financial constraints with cost escalation.

v) *Expected Outcome of the Initiatives*

Hassle free travel on the roads and effective transportation system with easy access to everyone. Exact Outcomes are yet to be measured.

vi) *Role and Activities of the Partner*

PMPML is the agency responsible for public transport systems in Pimpri-Chinchwad. It was formed through the merger of PCMT (Pimpri-Chinchwad Municipal Transport) and PMT (Pune Municipal Transport) and is responsible for the managing facilities and services in both the cities of Pimpri-Chinchwad and Pune. PMPML will start the bus operations of the BRTS after the procurement of buses in Pimpri Chinchwad Municipal Corporation.

vii) ***Important Stakeholders Involved and Communication / Networking Procedure for the Project***

Pimpri Chinchwad Municipal Corporation along with various consultants have worked together to undertake the studies required to finalise the plans. This is in co-ordination with Pune Municipal Corporation and PMPML.

7.4 Factors of Success

- 1) Financial sustainability exists in the project.
- 2) Project linked with the Urban Mobility Plan and will lead to future development of the city.
- 3) Detailed planning and design concept / plan have been considered by Municipal Corporation.

7.5 Budgetary Implications and Sustainability

i. ***Total Cost of the Project***

Total cost of Phase-I of the project is around ₹ 1500 crores.

Table 7.3: Funding Shares of Different Sources

Funding Model	Share Amount (₹ in Crores)
JNNURM(GoI and GoM)	475
PCMC Internal Sources	100
Debt from DFI, Multi laterals, Banks	650
Internal Accruals and Exploitation of Land	275
Total	1500

Source: Pimpri-Chinchwad Municipal Corporation, 2010

ii. ***Source of Finance for Sustainability of the Project***

- 1) The road network designed to cater to future growth patterns of the city.
- 2) Grants from Government of India and Government of Maharashtra.
- 3) PCMC's own sources of finances.

- 4) PCMC has created Urban Transport fund – Revenues from advertisement, parking and revenue from additional development rights (TDR) are part of the urban transport fund.
- 5) PCMC has approached World Bank for borrowing funds and the same has been sanctioned.

7.6 Current Status of the Project (as on August 2010)

- 1) One corridor has been completed for NH-4 (Mumbai – Pune highway) in October 2008.
- 2) Work is under progress for Aundh-Ravet Road.
- 3) Work orders have been given for Kalewadi-KSB Chowk-Dehu Alandi Road and Nashik Phata to Waked.
- 4) The urban transport fund is operational and it is budgeted to earn an income of ₹ 80 crores in the current financial year 2010 – 11.
- 5) PCIC is operational and it is currently augmenting its operations.
- 6) PCMC has tied up 43.703 Million US\$ of borrowings from the World Bank under the Sustainable Urban Transport Program.
- 7) PCMC is in an advanced dialogue with the Asian Development Bank for a line of credit aggregating to 100 Million US\$ under the Non Sovereign funding route for the PCIC.
- 8) PCMC along with PCIC is currently constructing 60 kms of BRTS corridors, forming the first phase of urban mobility projects as per PCMC's Comprehensive Mobility Plan. About four BRTS corridors have been approved by the JNNURM.

7.7 Summing Up

In view of the inadequate public transport, increasing number of private as well as para-transit transport modes leading to congestion on the roads of the city, a Comprehensive Mobility Plan was prepared, which proposes a bus rapid transit system along a road network with high level of services. This system / project envisages road network from east –west corridors in two level corridors, i.e. level 1 Corridor having 10 trunk routes and level 2 has four feeder routes.

These corridors will have road widths of 45 to 60 meters and will comprise dedicated lanes for bus-based mass transit, separate lanes with grade separators for through traffic, service lanes for local traffic, underpasses, walkways for pedestrians and separate lanes for bicycle.

The project is PPP based in which public is represented by PCMC Infrastructure Company, a SPV, to prepare plan, construct, operate and maintain the BRTS corridor. The funds are generated by the Urban Transport Funding which premium on loading of Transfer of Development Right (TDR) is a robust source of revenue. Pune Mahanagar Parivahan Mahamandal Ltd. (PMPML) is responsible for managing facilities and services (operating buses).

Contracts on PPP basis have been awarded for road furniture, viz. bus stops, public toilets, landscaping and general maintenance. Advertisements have been offered for 5 years on specific locations on Mumbai-Pune road (12Kms).

At present, the project is under implementation stage, one corridor has been completed for NH-4 in October 2008, with lots of financial constraints with cost escalation. It is expected that the city will have hassle free travel on the BRT corridors with effective transportation system.



VADODARA CITY BUS SERVICE



5.0 Vadodara City Bus Service

5.1 Context

Vadodara lies on the Ahmedabad-Mumbai route which is known as the Golden Corridor. As per census 2001, the population in the Vadodara Mahanagar Seva Sadan (VMSS or the Vadodara Municipal Corporation) jurisdiction is 14.11 lakhs which in 2009 has grown to 15.8 lakhs as per projections.

5.2 Situation before Implementation of the Project

5.2.1 Existing System of Bus Service

The City Bus Service was primarily run by the Gujarat State Road Transport Corporation (GSRTC). The bus fleet operating within the city declined from 200 in 2003 to 85 in 2005. The frequency of buses also reduced to hourly during the daytime. Buses were inefficient and used diesel fuel. The operation had inadequate coverage and hence the consumers suffered. There was high non-revenue component due to wastage, pilferage, and ticket-less riders and thus suffered from unaccounted-for losses. There were no plans to increase the fleet or plans to hand over the city-bus operations to VMSS, as it was initiated in other cities of Gujarat.

On the other hand, the private vehicle ownership was increasing at a high rate of 8 to 9 % per year. The modal split of the populace shows a dependence on motorcycles (60%) followed by private four wheelers (25%) and auto rickshaws (15%). There was a high demand of efficient public transport system from local councilors, citizens, media and students of schools.

VMSS took up the initiative of organizing a city bus service on the basis of public private partnership. They felt that an efficient mass transportation system was needed for sustainability of not only the economy of the city but also for reducing pollution stress on the environment.

5.2.2 Problems and Needs Addressed by the Project

The City Bus Service was intended to overcome the following issues.

- Increasing vehicular pollution;
- Growing number of vehicle ownership;
- Increasing number of private vehicles (e.g. auto rickshaws, two wheelers and cars) on the roads;
- Lack of affordable and reliable city buses; and
- Lack of public transport system.

5.2.3 Reason for Adoption of City Bus Service

VMSS adapted public-private partnership initiative since it promised to generate revenues for the city without any investments or expenditure. Additionally, all the buses run on CNG (Compressed Natural Gas) which is an environment friendly fuel.

5.2.4 Preparation of Feasibility Study

VMSS studied the models of Surat, Bhavnagar, Rajkot and other City Bus Services of India and accordingly selected the best model for VMSS City Bus Service privatization. The private contractor also conducted a feasibility study based on the routes and bus stops provided by the VMSS, before floating the tender. A feasibility study of any public service agency should conduct cost benefit analysis. This is done to evaluate and match the additional / differential costs against not only revenues but social benefits, like benefits to of passengers and increase in the routes etc.

The study assessed the financial viability of the proposed bus system for first five years, and identified the fleet requirements, ticketing rates, maintenance etc.

5.3 Description of the Project

5.3.1 Project Description

As per the directives of the State Govt. Dated: 22/09/2006, Municipal Commissioner proposed the privatization of City Bus Service which was approved by the Standing Committee Resolution – 538 / dated: 24-03-2005 and General Board Resolution – 34 / dated : 16-05-2005 with the following highlights:

- It was decided that VMSS does not have to bear any economic load with the privatization of the City Bus Service;
- VMSS has to follow guidelines for City Bus Service as per Urban Development and Urban Housing Development Department;
- VMSS had to take NOC from Divisional Controller, GSRTC for stoppage of current transport services and starting of privatization;
- VMSS had to send commitment to RTA for private route; and
- Private operator selection and stage carriage, rent, etc. should be handled by RTA.

VMSS studied the model of Surat, Bhavnagar, Rajkot and other City Bus Services of India and accordingly selected the best model for VMSS City Bus Service privatization.



Figure 8.1: Vadodra City Bus and Pick up stand / Q-shelter

Pick up stands / Q- shade: It was quite necessary to have sufficient numbers of pick up stands to provide adequate access to citizens. Therefore VMSS decided to incorporate advertising based revenue generation model in the tenders for the Pick-up stands/queue-shades. VMSS invited tenders for designing and maintaining 124 pick-up stands without any financial load on the corporation. The contract was awarded to the contractor – M/s.

Proactive In & Out Advertise Pvt. Ltd., Bombay on a BOT basis. The maintenance would be under the scope of work of the contractor for a period of five years.

Initialization of the Service: The City Bus service was started from 18th May, 2008 by initially 25 CNG buses after completion of all standard requisite approvals. The rate was kept at ₹ 2/- per route initially for 3 months to attract the citizens to make use of newly introduced City Bus Service. Gradually the fleet increased and at present 120 CNG buses are plying; target is to reach 250 buses till March 2010. Passengers traveled by city CNG buses are 1, 50,000 per day which will increase by 3, 50,000 in March 2010.

VMSS has taken care of different classes who make use of City Bus Service in which students are given 50% concession and handicapped and Service class people get 20% on prevailing ticket rates. Ticket rate tariff is kept on the basis of GSRTC's Fare Notification No. GG / 2006 / 19STC / 1099 / 830(1) / GS, Dated: 14 / 07 / 2006. At present 10% of total population is making use of this service and ticket rates are kept the same since initialization even after increase in ticket rates by GSRTC. All Buses are CNG fuel based and GPS system will be implemented for vehicle tracking. There are no complaints due to good frequency of buses, cheap rates and punctuality.

Benefits To Environment And Users: The buses runs on CNG fuel which is proven environment friendly and causes no health hazards to the citizens unlike vehicles operated by diesel fuel. It also makes improvement in ambient air quality, reduced health costs due to reduction in air pollution & better utilization of natural gas resources.

8.3.2 Goals of the Project

- 1) PPP module was introduced as proven mechanism with a clear objective to ease the city government from handling operational and administrative issues to run public transport system, apart from income generation.
- 2) PPP is also helping to promote competition, improve efficiency and increase in adequacy of services. It is also assisting in reduction of administrative and overhead expenses of the public sector position. The private enterprises have lower operating cost and greater capacity and freedom to obtain and maintain necessary bus fleet.

8.3.3 Strategy Used to Achieve the Desired Goals

Use of an innovative PPP model has been thought of to achieve the desired results.

8.3.4 Activities Implemented to Achieve the Desired Goals

The feasibility study conducted included the following sub-activities:

- Visit to Anand and Bhavnagar to understand how the city bus service systems is being operated;
- Traffic and transportation survey of Vadodara;
- Preparing technical documents such as proposal to put forth before the Standing Committee and General Body of the Corporation, tenders to invite quotes for operating city bus service and BOT based pick up stands etc.;
- Installation of traffic signals on the road junctions;
- Planning routes and deciding pick-up stands;
- Designing of pick up stands;
- Running the city bus service in PPP basis; and
- Developing website <http://new.vtcos.com/> to help citizens to download timetable and bus routes, register the complaints, provide feedback about the service and contact operator etc.

8.3.5 Challenges / Constraints Encountered

The phenomenal growth in the number of rickshaws and poor traffic orientation of the citizens have created difficulties in day to day traffic despite efforts towards high standards of traffic engineering in the city.

8.3.6 Expected Outcome of the Initiatives

The Outcomes of these exercises are the basis for a comprehensive integrated set of transport sector strategies to transform the city towards sustainability.

- Reducing dependency on personal vehicle; encouraging use of Non Motorized Vehicles and public transit;

- Long term sustainability, strategy development to lessen the burden on public budget resources through PPP;
- Accessibility to all user groups incorporating local economic activities within the design;
- Effective maintenance of traffic island for overall pleasing effect and desired traffic benefits;
- Maintenance and excellence in design of bus stops;
- Annual revenue income of ₹ 18, 55,000/- for the VMSS from the City Bus Service.
- Annual revenues of ₹ 82,58,400/- from the advertising at pickup stands / Q – shades as per BOT; and
- Revenue to the Corporation, for the next five years is estimated to be around ₹ 18,000 per bus per year as premium from operators. Revenue of ₹ 66,600 per bus stand per year from advertisement is estimated to be obtained from 214 bus stands in the next five years.

8.3.7 Role and Activities of the Partner

Public Partner: Vadodara Mahanagar Seva Sadan is the lead implementing agency of the project. VMSS has defined the bus routes, bus stops and fare structure. It has also defined the quality of service in terms of frequency and has determined that buses should be run on CNG fuel. Regional transport authority is responsible for sanction of stage carriage permits under Motor Vehicles Act for city bus service, providing statutory sanction to these terms. The bus stands are made by VMSS on BOT basis. In lieu of the rights given to the operators for collecting fare, VMSS gets a premium on yearly basis from the operators.

Regional Transport Authority: provided technical assistance to VMSS in preparing proposal and tenders etc.

GSRTC: GSRTC provided route maps where city buses of the GSRTC were plying before 2005. This route map helped VMSS to devise route plan for the present requirement.

Private Partner:

- M/S Vtcos Private Limited - procured, owned, operated and maintained the buses; took care of expenditure on rolling stock and operation and maintenance (including

cost of driver and conductor, supervision of operations, fuels, repairs and maintenance);

- Provided uniforms (with logos of VMSS and the VTCOS Pvt. Ltd.) to drivers and conductors; and
- M/S Proactive In & Out Advertise Private Limited, Bombay – Built and Operate 124 Pick- up stands / Q-shades to give support to the City Bus Service of Vadodara.

8.3.8 Important Stakeholders Involved and Communication / Networking Procedure for the Project

All buses are provided with vehicle tracking system for monitoring the frequency and timely operation from the control room, which is currently set up at the concessionaire's office and which will be set at the VMSS main office.

8.4 Factors of Success

The citizens have access to an improved transport facility through the introduction of city buses. Presently, approximately 101 buses are running on 41 routes. This city bus service provides cost effective and eco-friendly public transport options for the citizens; innovative features such as daily passes, students' passes and free travel for freedom fighters have been introduced.

There are a number of benefits to VMSS through Privatization, which are as follows:

- Income of VMSS increased with the offer premium of ₹ 18,55,000/- yearly from City Bus Service;
- Income of VMSS increased with the offer premium of ₹ 82,58,400/- for pickup stands / Q – shades as per BOT;
- Total income of VMSS increased by ₹ 1 crore / year with 70 nos. of bus services & 124 nos. of pickup stands / Q shades; and
- This amount would be utilized in the infrastructure development of the city.

The highlights of the success in the operation of the City Bus Service System include:

- Necessary approvals from Government of Gujarat within short time;
- Private investment by operators for buses, infrastructure and operation;

- Sharing of returns with operators against expenditure incurred;
- Decision with reference to tariff, routes and frequency of buses reserved to be done by the VMSS;
- Overall monitoring by VMSS;
- Transparent methodology for selecting the operator;
- Consultation with stakeholders for deciding the modalities (operators / traffic police / citizens / NGOs); and
- VMSS has allotted 2 plots measuring 4000 square meter to the concessionaire for setting up workshop / fuel stations / depots / daily cleaning system, etc at ₹ 1/- token rent / sq m.

A system of weekly review by the traffic department of the corporation has been put in place. The city bus service has been initiated and covers the entire spread of the city and an initial three month trial period was given for the citizens to give their feedback about the system and also to encourage them to use the service.

Citizen of Baroda city have given very good response and are very much pleased with the city bus services. In connection with this, VTCOS has taken initiative to start instant response facility i.e. SMS system for information and complains and suggestion from the citizen. Due to facilities and punctuality of city bus, National Award 2008 was awarded to VTCOS.

8.5 Budgetary Implications and Sustainability

8.5.1 Total Cost of the Project

Cost involved – bus procurement, regular maintenance of buses, staff, office infrastructure.

- M/S Proactive Advertising In and Out Ltd, Mumbai – Approx ₹ 2.8 Crore.
- M/S Vtcos Private Limited is not willing to share the cost of the project

8.5.2 Source of Finance for Sustainability of the Project

- 1) M/s. VTCOS Transportation Private Limited, Bhavnagar;
- 2) M/s. Proactive In & Out Advertise Private Limited, Mumbai; and
- 3) Vadodara Mahanagar Seva Sadan.

8.6 Impact of the Initiatives

In consideration of the unmatched efforts of VMSS of providing City Bus Service without disturbing ecosystem and by generating revenue without investing or spending, the Institute of Urban Transport, India of Urban Development Department, Government of India conferred an Award for Excellence in Urban Mobility, in the conference on Urban Mobility India-2008 at New Delhi. VMSS gained this award by competing with some 50 entries from various cities of India.

8.7 Summing Up

VMSS took up an initiative of organizing a sustainable city bus service on the basis of public private partnership since it promised to generate revenues for the city without any investments or expenditure. Moreover, all buses run on CNG, which reduce pollution stress on the environment.

The public partner is VMSS and the lead implementing agency to define the bus routes, bus stops and fare structure, quality of service in terms of frequency. The Regional Transport Authority is responsible for sanction of stage carriage permits under Motor Vehicles Act for city bus service, providing statutory sanction to these terms. The bus stands are made by VMSS on BOT basis. In lieu of the rights given to the operators for collecting fare, VMSS gets a premium on yearly basis from the operators.

The private partner is M/S Vtcos Private Ltd to procure, own, operate and maintains the buses; took care of expenditure on rolling stock and operation and maintenance (including cost of driver and conductor, supervision of operations, fuels, repairs and maintenance). M/S Proactive In & Out Advertise Private Limited has constructed 124 Pick- up stands / Q-shades on BOT basis.

The cost of the project is ₹ 2.8 crore, which involves bus procurement, regular maintenance of buses, staff, office infrastructure etc. Annual revenue income of ₹ 18, 55,000/- to VMSS is from the City Bus Service, while, annual revenue of ₹ 82, 58,400/- from the advertising is received at pickup stands / Q – shades as per BOT.

The city bus service of Vadodara is running successfully. Presently, approximately 101 buses are running on 41 routes providing cost effective and eco-friendly public transport with innovative features such as daily passes, students' passes and free travel for freedom fighters. On an average, 100,000 passengers travel by bus service. The total income of VMSS has increased by ₹ 1 crore per year with 70 nos. of bus services & 124 numbers of pickup stands / Q shades and this amount would be utilized in the infrastructure development of the city.

VITCOS has initiated SMS system for information, complaints and suggestions. In view of unmatched efforts of VMSS for providing City Bus Service without disturbing ecosystem and by generating revenue without investing or spending, the Government of India confer an Award for Excellence in Urban Mobility, 2008 on 5th December, 2008.

The major reasons for the success of the project are attributed to the necessary approvals from Government of Gujarat within short time; private investment for buses by operators, infrastructure and operation; sharing of returns with operators against expenditure incurred; Decision with reference to tariff, routes and frequency of buses reserved to be done by the VMSS.

VMSS has encountered challenges like the phenomenal growth in the number of rickshaws and poor traffic orientation of the citizens, which have created difficulties in day to day traffic despite efforts towards high standards of traffic engineering in the city.

JALGAON CITY BUS SERVICE



9.0 Jalgaon City Bus Service

9.1 Context

Jalgaon is a city in western India, to the north of the Maharashtra state in Jalgaon District, which itself is located on the northern Deccan Plateau. Located within the productive, irrigated agricultural region of Khandesh, Jalgaon is a municipal corporation. Jalgaon is also the hometown of the Smt. Pratibha Patil, President of India. Modern Jalgaon now boasts of vast industrial areas, educational institutes and good hospitals. The city is well developed with good roads, shopping centres, and residential areas, and also has good communication and transport infrastructure.

Jalgaon is near the world famous Ajanta Caves and is one of the key attraction places for tourists all around the World. Jalgaon has a diverse climate. It is exceptionally hot and dry during summer with temperatures reaching as high as 47 degrees Celsius. Jalgaon receives about 700 mm rainfall during monsoons, which is followed by pleasant temperature in winter. The city is served by several major rail lines with routes to Mumbai, Nagpur, Delhi and Surat. It lies on National Highway-6 connecting it to Surat and Kolkata. The Ajanta Caves are located about 64 km (about 40 mi) to the south of Jalgaon, and the Yaval Wildlife Sanctuary is about 32 km (about 20 mi) to the north. As of 2001 India census, Jalgaon had a population of 3.68 lac.

9.2 Situation before City Bus Service

a) *Existing System*

Before implementation of the eco-bus service in Jalgaon city, the city-bus services were provided by the Maharashtra State Road Transport Corporation (MSRTC) which was not as per the increasing demand for transport services. The financial performance of the MSRTC was not good to cope-up with the citizen's demand and could not augment its fleet. As a result Intermediate Public Transport (IPT) like Auto-Rickshaws, private vehicles, etc. came on the roads of the city, creating congestions, air and noise pollutions, etc. Traffic situation became bad and it led to major accidents.

b) *Problems and Needs Addressed by the Project*

- i) The number of buses plying on the routes was inadequate and quite old.
- ii) Frequency of buses was inadequate.
- iii) The over-all quality of services provided by MSRTC was extremely poor.
- iv) The MSRTC was not responding to the growth of the city by augmenting services. On the contrary it declined to start additional services.

c) *Reason for Adoption of City Bus Service*

- i) MSRTC has communicated to the Jalgaon Municipal Corporation (JMC) that since the city bus service provided by them incurred huge losses, they wanted to close the city bus service.
- ii) JMC was also not in a position to invest huge amount of money required for purchase of buses, recruitment of staff and providing infrastructure.
- iii) Hence the Municipal Corporation took a conscious decision Vide Resolution No. 40 dated June 2008 to appoint an agency for providing public transport service on PPP basis.

d) *Preparation of Feasibility Study*

A detailed feasibility study was not called for as the MSRT Corporation was already providing city services though they were inadequate. Prasanna Bus Links Private Limited (PBLPL), as an operator of JMC Unit only continued to operate city services (as a successor to MSRT Corporation).

9.3 Description of the Project

i) *Project Description*

PBLPL has partnered with JMC to offer well-maintained, high frequency, and safer services for meeting the demand of public transport in Jalgaon. The project was launched on 15 August 2009.

JMC has constituted Transport Committee (TC) under section 25 of the Bombay Provincial Municipal Corporation Act, 1949. The committee constitutes of 13 members in which 12 member are appointed by the corporation. The committee is headed by the chairperson who is appointed for tenure of one year. Under chapter XX, section 342, the transport manager shall manage the transport undertaking and perform all acts necessary for the economical and efficient maintenance, operation, administration and development of the undertaking.



Figure 9.1: Front and Side View of Jalgaon City Bus

Levy of fares and charges of transport services has been decided by the TC with the approval of the JMC and Regional Transport Authority Besides, routes, stages of fare (fare structure) is also done by the TC. The Corporation provides infrastructure and monitors the bus transport system, whereas the buses are procured, owned, operated and managed by the PBLPL.

However the JMC has transferred the rights to the above mentioned Transport Company, in lieu of the royalty of 85 Paise per km. The Corporation has also taken ₹ 25, 000 per vehicle from the Operator as a guarantee in the form of bank deposit. In case, the operators withdraws their services it is mandatory to give six-month notice period to the Corporation. However there is no guarantee for loan repayment from the Corporation.

It is important to note that escrow account is maintained by the transport agency. The revenue collected from the tickets, advertisements is deposited in the account and same is used on the following heads:

- 1) Government taxes;
- 2) Salary to the staff;
- 3) Bank loan installment;
- 4) Fuel and Maintenance;
- 5) Accident Insurance (vehicle and employ);
- 6) Royalty; and
- 7) Amount of fine (if imposed).

The transport agency is deploying Bharat II (Euro-II) standard buses which are economically viable, and support hi-tech IT facilities like the GPRS system, for real time information on the display board on the buses and shelters.

These buses have 200 mm ground Clearance and their turning circle radius is in the range of 7100 to 8000 mm. Besides these salient features, modern ticketing and pass system would also be one of the important features of the bus services. In a nut shell these buses are economical, eco-friendly and electronically sound. The ticket rates are ₹ 3/- for first 2 Km and 60 Paise per km thereafter.



Figure 9.2: GPS Fitted in Bus, Jalgaon

The PBLPL is operating 30 buses on 11 routes.

However 26 routes (15 routes on which the MSRTC was providing services and 11 new routes have been identified) have been identified to operate the eco-buses. It has been proposed to increase the number of buses upto 200 as per the CIRT norms i.e. 40 buses per 100, 000 populations.

The frequency has been increased by providing buses up to 5 minutes where traffic density is high and after every 10 minutes where the passenger load is moderate. At present new bus stops and bus shelters are being erected and the IT facilities are being installed.

ii) Goals of the Project

To provide the best possible public transport service at affordable rates to the citizens.

iii) Strategy Used to Achieve the Desired Goals

In order to achieve the above goal it was decided to adopt PPP for the entire project.

iv) Activities Implemented to Achieve the Desired Goals

- 1) Identification of routes, stages and fixation and fares and charges.
- 2) Approval of appropriate authorities.
- 3) Appointment of an agency after a competitive bidding process.
- 4) Procurement of buses
- 5) Appointment and training of staff.



Figure 9.3: Student Showing his bus pass

v) Challenges / Constraints Encountered

- 1) Resistance of local auto-rickshaw operators which was overcome by intervention by the Police Authorities.
- 2) Acquisition of land for construction of a depot workshop and bus terminus.

vi) Expected Outcome of the Initiatives

- 1) Benefits to the commuters
 - a) Increased frequency
 - b) Clean and eco friendly buses
 - c) Fast and safe travel
 - d) Issue of Student Concession Passes.
 - e) Issue of monthly and tri-monthly passes to daily commuters.

f) Concession in fare to senior citizens, freedom fighters and Journalist.

2) **Benefits to the Government:** Timely payment of government taxes.

3) **Benefits to the Corporation:** Royalty of J.M.C. @ 85 Paise per K.M.

vii) Role and Activities of the Partner

1) Transport Committee

a) Policy decisions.

b) Levy of fares and charges of transport services has been decided by the transport committee with approval of the Municipal Corporation and R.T.A.

c) Approval to the Routes Stages and Fare structures.

2) Transport Manager

a) Identification of Routes stages and fares and charges.

b) Submission of proposal to Appropriate Authorities

c) Management of Undertaking.

d) Execution and overall implementation of PPP Model

3) Operator

a) Procurement of buses.

b) Appointment and Training of Staff.

c) Erection of Bus shelters.

viii) Important Stakeholders Involved and Communication / Networking Procedure for the Project

The Passengers Association in the city is proposed to be involved for improvement of the city bus services. Passenger information system is proposed to be used in the bus and at the shelter in order to:

1) Gives information about the routes and schedules.

2) Inside the bus to commuters to alight at the desired bus stop.

- 3) About the passenger, especially the school / collage going children to their parents regarding the boarding and alighting time to ensure safe travel.
- 4) To communicate any delay or any technical problem to avoid passenger hassle.

9.4 Factors of Success

- 1) Kind of support given by Transport committee and Municipal Corporation.
- 2) State support from RTA/RTO.
- 3) Speedy procurement of buses, appointment and training of staff by the operator.
- 4) Acceptance by public.



Figure 9.4: Over Crowded Jalgaon City Bus

9.5 Budgetary Implications and Sustainability

i) Total Cost of the Project

Total cost of project is ₹ 15 crores, out of which ₹ 3 crore have been invested so far (2010).

ii) Sources of Finance for Sustainability of the Project are: (a) PBLPL and (b) HDFC Bank. The Transport Committee has not provided any finance in the budget. The entire cost of the project is to be borne by the operator.

9.6 Impact of the Initiatives

The study team of NIUA interacted with the commuters and found that the overall impact of the introduction of Eco Bus services on general public and daily commuters is positive.

Commuters using IPT modes earlier were switching over to these buses. Commuters were satisfied with the buses which are comfortable having good sitting arrangements.

9.7 Summing Up

The Jalgaon city bus service, based on PPP, was launched on 15 August 2009. The corporation of Jalgaon has constituted a Transport Committee, which is responsible for making policy decisions, and levy of fares and charges of transport services with the approval of the Corporation and R.T.A. The transport manager is responsible for identification of routes, fares and charges; submission of proposal to appropriate authorities; management of undertaking; and execution and overall implementation of PPP model.

Buses are procured, owned, operated and managed by the private sector, namely, PBLPL. It is also responsible for erection of bus shelters.

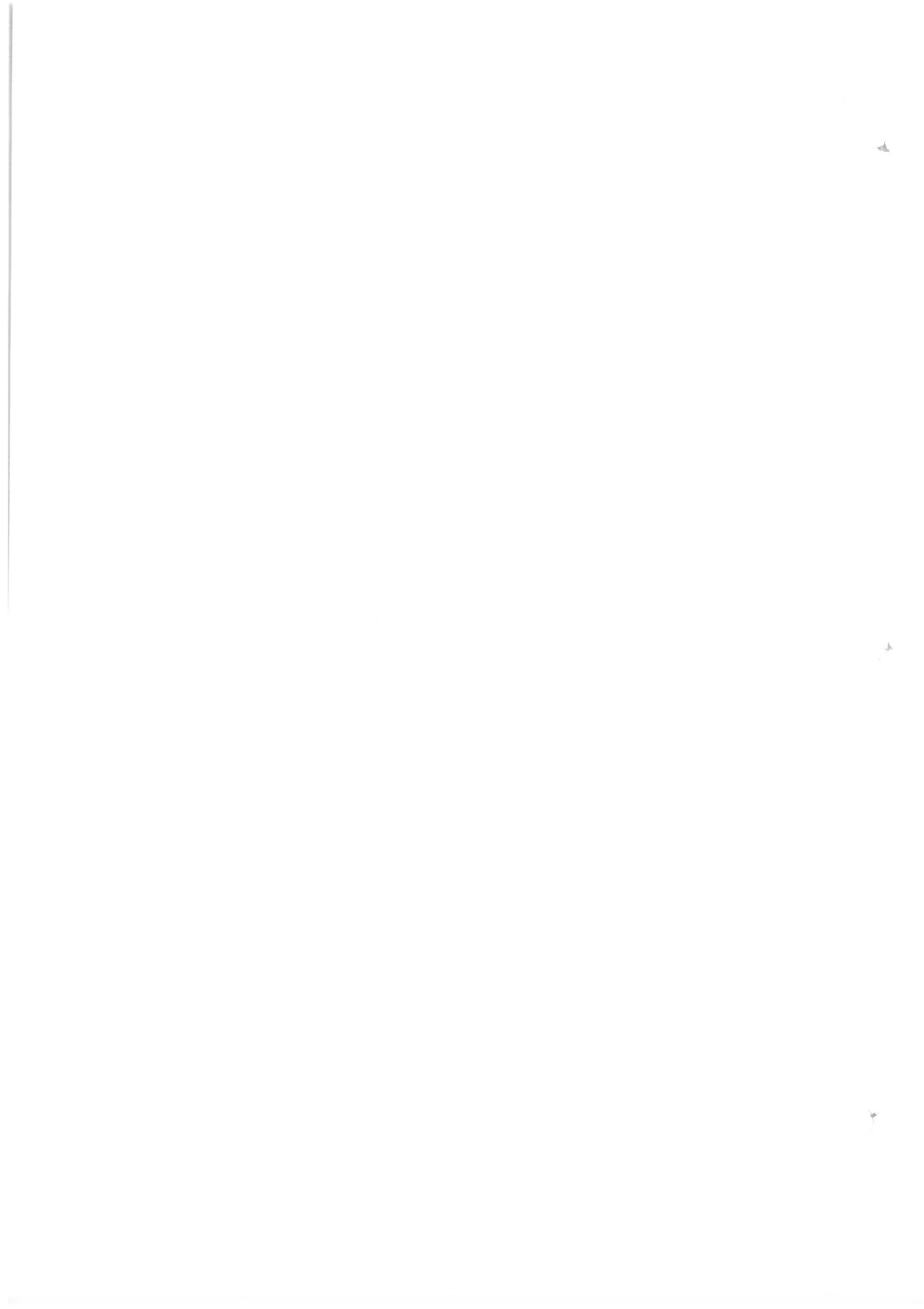
As on December 2009, it was operating 30 Eco buses (Bharat II) equipped with GPS, PIS, modern ticketing and pass-system etc. The frequency of these buses is 5 minutes where the traffic density is high and after 10 minutes where the passenger load is moderate.

It is to be noted that JMC has transferred the right to the private sector, in lieu of the royalty of 85 Paise per km. JMC has also taken ₹ 25,000 per bus from the operator as a guarantee in the form of Bank deposits.

Factors of success of the project / system are attributed to the support given by the Committee and JMC; State support from RTA / RTO; speedy procurement of buses and acceptance by the operator. However, challenges / constraints faced during the implementation period are resistance of local auto-rickshaw operators and delay in acquisition of land for the construction of depot, workshops and bus terminus. The satisfaction of the commuters is higher than ever since the introduction of new bus system since IPT.

KOLKATA CAR PARKING SYSTEM





10.0 Kolkata Car Parking System

10.1 Context

Kolkata is the capital of the Indian state of West Bengal. It is located in eastern India on the east bank of the River Hooghly. As of 2001, Kolkata city had a population of 4,580,544, while the urban agglomeration had a population of 13,216,546. The Kolkata Municipal Corporation (KMC) area has registered a growth rate of 4.1% during 2001-11, which is the lowest among the million-plus cities in India. When referred to as Calcutta, it usually includes the suburbs, and thus its population exceeds 15 million, making it India's third-largest metropolitan area and urban agglomeration as well as the World's 8th largest agglomeration.

10.2 Situation before Implementation of the Project

10.2.1 *Problems and Needs Addressed by the Project*

Central Kolkata, particularly the New Market area near the KMC Head Office, is a very busy commercial zone with narrow streets and roads. The Lindsay Street, part of this locality and a very busy place with a market, shops and vegetable vendors around, is one of the most congested roads in terms of traffic. The problem was further aggravated by haphazard, unruly parking that led to serious traffic jams sometimes even resulting in brawls.

10.2.2 *Reason for Adoption of Particular Parking Project*

Parking in central Kolkata, the heart of this mega city, has always been a hassle as is the case with most inner city areas. The traffic woes are a source of concern, not only for the owners of vehicles but also the pedestrians. In an attempt to mitigate the situation, the KMC decided to utilize the rights to the space underground and undertake the parking project as a PPP (Public-Private Partnership) project on a Build, Own, Operate and Transfer (BOOT) basis.

The project benefited all the stakeholders – the KMC, the construction company/contractor (also known technically as the concessionaire) and most of all, the car owners and the harassed pedestrians – all in a most sustainable manner. The uniqueness of the project lies in the two direct car lifts for drivers to take their cars to and out of the parking lot.

10.3 Description of the Project

i) Project Description

There are two levels of basement in the system, of which the upper basement (Level-1) has been utilized for the purpose of commercial development while the lower basement (Level-2) is exclusively used for the car parking. This was a double-concession BOOT project, one for Level-1 and the other for Level-2.

Underground Level - 1: Commercial Development

To make the project self-sustaining and as part of BOOT arrangement, the KMC granted permission to Simplex to construct and lease out the commercial blocks on a long term basis on mutually agreed terms and conditions. Simplex pays the lease rent as well as basic rent. It was granted the right to enter into a lease agreement with the prospective trader ('lessee') for an initial period of 60 years during which it will collect the lease rent (the lease agreement is renewable in blocks of 30 years). The KMC collects the basic rent directly from the lessee for the period of the lease.



Figure 10.1: Underground Shopping Arcade Simplex Mall on Level-1

Underground Level - 2: Parking Lot

On the basis of entry and exit to the parking area, the mechanics of movement of vehicles from the surface to the parking bays is of two categories: shuttle dolly system and palette shifting system. Each palette is 6 meters in length and 2.5 meters in width.



Figure 10.2: Movement of vehicles from surface to Level-2 parking bays

The type of elevator also varies accordingly, blocks 1-3 and 5 have hydraulic elevator, while block 5 has provision for an electric elevator. The movement of vehicles, from the time it is set on the palette at the ticketing counter on the surface to being taken to level 2 and placed in the parking bay is fully automated and works more or less on the principle of a jigsaw puzzle. The ticketing is also done with the help of SCADA (Supervisory Control and Data Acquisition) software, where each entry of vehicle is marked with a Unique Identity Number given in a card to the vehicle owner. Database of every car is maintained by feeding in the car and license number. This is used daily to check revenue generation.

At the expiry of the concession period of 20 years, the parking system will be handed over to the KMC. After the expiry of such a period, Simplex may undertake to execute an annual maintenance and operation contract with the KMC on mutually agreed terms and conditions. At that point of time, and as per the agreement, Simplex shall train, free of costs, a maximum of 4 Engineers or qualified personnel nominated by the KMC to manage and maintain the system. This will be done during the period of 12 months prior to the expiry of stipulated period (notified in advance to KMC) to enable smooth hand over of the system.



Figure 10.3: Types of Parking: a) Palette Shifting and b) Shuttle

Goals of the Project

- To provide multi level underground car parking system at Lindsay Street on BOOT basis.
- To provide commercial complex at same place.

ii) Strategy Used to Achieve the Desired Goals

The PPP parking project was conceptualized as a two-part BOOT project with two concession periods – one for the parking system and the other for the commercial complex (both underground). The overland portion was converted into a pedestrian plaza.

KMC is the owner of the stretch of land along Lindsay Street Opposite New Market, with all underground rights thereof. It offered the concessionaire, Simplex projects, the right to construct the parking system including the shopping complex at that location.

iii) Activities Implemented to Achieve the Desired Goals

The KMC has allowed Simplex to impose and collect the parking charges for all the vehicles parked within the system on a mutually agreed terms and conditions. Simplex pays the KMC, 5% of the gross annual revenue earned from parking for the concession period of twenty years.

If Simplex makes any profit after meeting its expenses towards loan servicing, debt obligations, provision for all liabilities, contingencies, including the operation and maintenance cost but excluding payment of all dividends, then on availability of cash profit, the KMC would be given an extra bonus of 10% of the said profit.

Simplex has been given the right to put up advertisements in the form of show-windows, kiosks and other such formats of advertisement at no extra costs. The KMC has prohibited 'on-street parking' in the 'zone of influence' around the system and within a radius of 100 meters. This ensures that the people use this parking facility and in order to decongest the Lindsay Street locality.

iv) Role and Activities of the Partner

The KMC and Simplex Projects entered into a BOOT agreement for a period of 20 years for the parking system. All architectural designs and drawing were approved by the KMC. The technical design was from Holland from where engineers from Simpark took training.

v) Important Stakeholders Involved and Communication / Networking Procedure for the Project are

- KMC
- Simplex Pvt. Ltd.

10.4 Factors of Success

- 250 parking slots in the underground parking system at L-2 level.
- Market complex at L-1 level with 200 shops on lease; the premium goes to the Concessionaire as charged by him.
- The pedestrian plaza on the ground is a bonus for the pedestrians.
- Street parking is no longer allowed on Lindsay Street, the traffic jams have become a thing of the past.

10.5 Budgetary Implications and Sustainability*i) Total Cost of the Project*

The Cost of Project is ₹ 36 crore (approx.) and is to be borne by the Concessionaire (Simplex Projects).

ii) Source of Finance for Sustainability of the Project

Parking Fee: Rs 10/- per hour (with a provision of discount for long-term parking) – to be collected by Simplex. KMC will get 5% of the parking revenue from Simplex Projects for 20 years until handing over of the project to KMC. This will generate estimated annual revenue of Rs 5 lakh for KMC. Besides, the KMC will get Secondary Basic Rent @ Rs 60/- per sq m per quarter (subject to upward revision by 10% after every five years) from the commercial space. This will generate an annual revenue of Rs 9, 20, 000/-.



Figure 10.4: Underground Parking Bay that can accommodate 250 cars in 5 blocks

10.6 Impact of the Initiatives

A public-private partnership model on BOOT basis has many advantages. Over a long concession period, both the BOOT operator and the KMC are bound to earn revenues and even profits. More importantly, a very sensitive issue of traffic has been resolved on a particularly busy street.

- 1) PPP models of partnership in infrastructure development form the most sustainable approach for a city government that most often has a resource crunch both, in terms of finance and in terms of engineering staff.
- 2) Public service provided by a local government can also become an alternative source of additional revenue.
- 3) Underground development can be an alternative where ground level space is scarce, especially in all mega cities.

10.7 Summing Up

In order to solve haphazard, unruly parking of vehicles at the Lindsay Street of Central Kolkata, KMC decided to utilize the rights to the space underground and undertake the parking project as a PPP (Public-Private Partnership) project on a BOOT (Build, Own, Operate and Transfer) basis.

There are two levels of basement in the system, of which the upper basement (Level-1) has been utilized for the purpose of commercial development while the lower basement (Level-2) is exclusively used for the car parking. This was a double-concession BOOT project, one for level 1 and the other for level 2. The overland portion was converted into a pedestrian plaza.

To construct and lease out the commercial blocks on a long term basis, KMC has granted the right to Simplex Pvt. Ltd (private sector) to enter into a lease agreement with the prospective trader ('lessee') for an initial period of 60 years. During this period, it will collect the lease rent (the lease agreement is renewable in blocks of 30 years). The KMC collects the basic rent directly from the lessee for the period of the lease.

The KMC and Simplex Projects entered into a BOOT agreement for a period of 20 years for the parking system. KMC has allowed Simplex to impose and collect the parking charges for all the vehicles parked within the system on a mutually agreed terms and conditions. Simplex pays the KMC, 5% of the gross annual revenue earned from parking for the concession period of twenty years.

The aforesaid PPP based model has many advantages as over a long concession period, both the BOOT operator and the KMC are bound to earn revenues and even profits. It may be treated as most sustainable approach for a local government that has a resource crunch both, in terms of finances and in terms of technical / engineering means. Moreover, underground parking can be one of the alternatives where ground level space is scarce, especially in megacities.

VISAKHAPATNAM BUS RAPID TRANSIT SYSTEM



11.0 Visakhapatnam Bus Rapid Transit System

11.1 Context

Visakhapatnam (Vizag) is second largest city of Andhra Pradesh with an area of 550 km². It is primarily an industrial city, apart from being a port city. It is also home to the Eastern Naval Command. Vizag is a cosmopolitan mix of people from various parts of the country. From a population of a few thousand locals during the 18th century and early 19th century the population grew steadily every decade. The city doubled its population from 1990–2000 owing to a large migrant population from surrounding areas and other parts of the country coming to the city to work in its heavy industries. As of 2001 India census, Visakhapatnam had a population of 1, 329, 472.

11.2 Situation before Implementation of the Project

Currently, about 4.5 lakh registered vehicles ply on the city roads in Vizag City, 90% of which are cars and motorized two-wheel vehicles (MTWVs). The present travel demand in the City is about 12 lakh trips per day; a significant 65% of these trips are catered by private modes. The current modal split studies indicate that only 20% favour public transport. According to the NUTP, cities with one million-plus population must target a minimum public transport mode split of 50%. The demand for travel is predicted to grow to 16 and 28 lakh trips per day by 2011 and 2021 respectively.

Therefore, a higher modal split of above 50% has been recommended for Vizag to be achieved in phases. This can be attained by giving impetus to public transport to arrest the trend of personal modes. Equally, NMT modes and pedestrian traffic management has to be accorded due priority for integration and accessibility by keeping in view the safety aspects identified by the National Urban Transport Policy (NUT). The salient features of travel demand in the city are illustrated below:

11.2.1 Problems and Needs Addressed by the Project

Similar to other UAs, in the near-future road capacity is going to be a major constraint for mobility in Visakhapatnam. Transport network in the city will not only require expansion but

widening and strengthening of the existing road network. The city's transport master plan has identified and planned a phase-wise implementation of mass public transport systems.

As a precursor to the detailed corridor design effort, a Detailed Project Report (DPR) was prepared which identified eight corridors of about 100 km for BRTS implementation. Given the rate at which the city is growing as a commercial, industry, and tourism hub set along the coastline of the Bay of Bengal, the proposal to develop and implement a comprehensive BRT system is justified.

The available travel trends from the past studies and the 'Feasibility Study of BRTS in Vizag' convened by ASCI has been studied. The trends suggest that the traffic volume on roads has been growing at the rate of about 5% p.a. It is expected that the traffic will, generally, continue to increase at the same rate for the next 20 years.

The maximum motorized vehicles volume expected in 2021 is 2800 PCU/hour/direction. The capacity for two lanes (one way) is over 4000 PCU/hour, after the buses and slow vehicles are segregated from the mixed traffic. There is provision of two lanes for motorized vehicles in each direction along the BRT corridor.

The volume capacity ratio will be less than 0.8 and therefore, we can expect 'level of service 'C' most desirable in urban conditions. The extraction / separation of buses and motorized vehicles will improve the capacity of MV lanes. The provision of 2.5 m non-motorized vehicles (NMV) lane is quite sufficient to handle 2000 bicycles per hour in both directions.

The maximum passenger loads on the bus stops along PTC and STC corridor have been found to be approximately 200 inclusive of boarding and alighting. The bus stops along PTC and STC corridor have been designed with sizes 20 X 3.4 meter (for low passenger volume) and 30 X 3.4 meter (for high passenger volume). These platforms can handle the passenger loads of 240 (4 passengers per square meter) and 360 passengers respectively.

11.2.2 Reason for Adoption of BRTS

While several mass transport options are available, BRT systems are chosen with the specific intent to balance the cost aspect with the appropriate method of delivering quality public transport services in the city. Amongst the domain of high capacity public transport systems available world-over, it has been concluded that the transport demand forecast on the major

travel corridors in Visakhapatnam can be managed by a medium capacity public transport system such as a Light Rail Transit System (LRTS) or BRTS with dedicated bus lanes. Market estimates peg LRTS costs at about Rs 200 crore per km as compared to BRT systems costing about ₹ 20 crore per km. LRTS or MRTS projects being capital intensive are considered financially unviable. BRTS has been recommended considering the following key drivers:

- i) BRT promotes high-quality transit services on a cost-effective basis and will allow the management of Vizag city to develop a high-quality mass transport with affordable infrastructure cost and ability to operate without subsidies. The internal rate of return for BRTS in Vizag is fairly high and sustainable / achievable by public funds even after considering expenses to be incurred for procurement and operation of rolling stock.
- ii) BRTS can be implemented within shorter periods (1-3 years after conception) – a significant advantage over rail based mass transport in addition to the cost effectiveness.

11.2.2 Preparation of Feasibility Study

- i) Greater Vishakhapatnam Municipal Corporation (GVMC) has all possible efforts to address the development of public transport in Vishakhapatnam. A detailed feasibility study was convened by GVMC through Administrative Staff College in India (ASCI) in 2007. This study appraised a BRTS network of 100 km consisting of 6 BRTS corridors. It was recommended to take 2 corridors between RTC complex to Pendurthi (20.00 km) and Simhachalem (18.50 km) in the 1st Phase. The study was approved by MOUD and aid was granted through JNNURM programme.
- ii) Subsequently, Srei Infrastructure Finance Limited in association with CRAPHTS Consultant (I) Private Limited and McCormick Rankin International, Canada (MRIC) were deputed as DEPR consultants to prepare detailed designs and ensure quality supervision and assurance for the project. The implementation of the project commenced in Dec 2008 and till date progress on providing fixed infrastructure has been going on with 2 separate contractors assigned with 1 corridor each.

11.3 Description of the Project

Given the rapid growth of the country and increasing urbanization of UAs, strengthening of traffic and transportation systems in the nation and especially UAs will be a key challenge. Visakhapatnam is also experiencing immense growth and is on the horizon of launching itself as a major economic and commercial centre in the state and the nation. Keenly aware of the growth aspects, GVMC have been proactively addressing the needs of the city by adopting a comprehensive approach to plan, augment and streamline transport demand and supply.

Consistent with its philosophy to develop a viable and sustainable transport system for the city, GVMC has endeavoured to augment the supply of mass transport services at an affordable cost, and provide impetus to riding on public transport thereby encouraging personalized vehicles to shift modes. The city has been actively working towards creating a sustainable inter-modal transportation system.

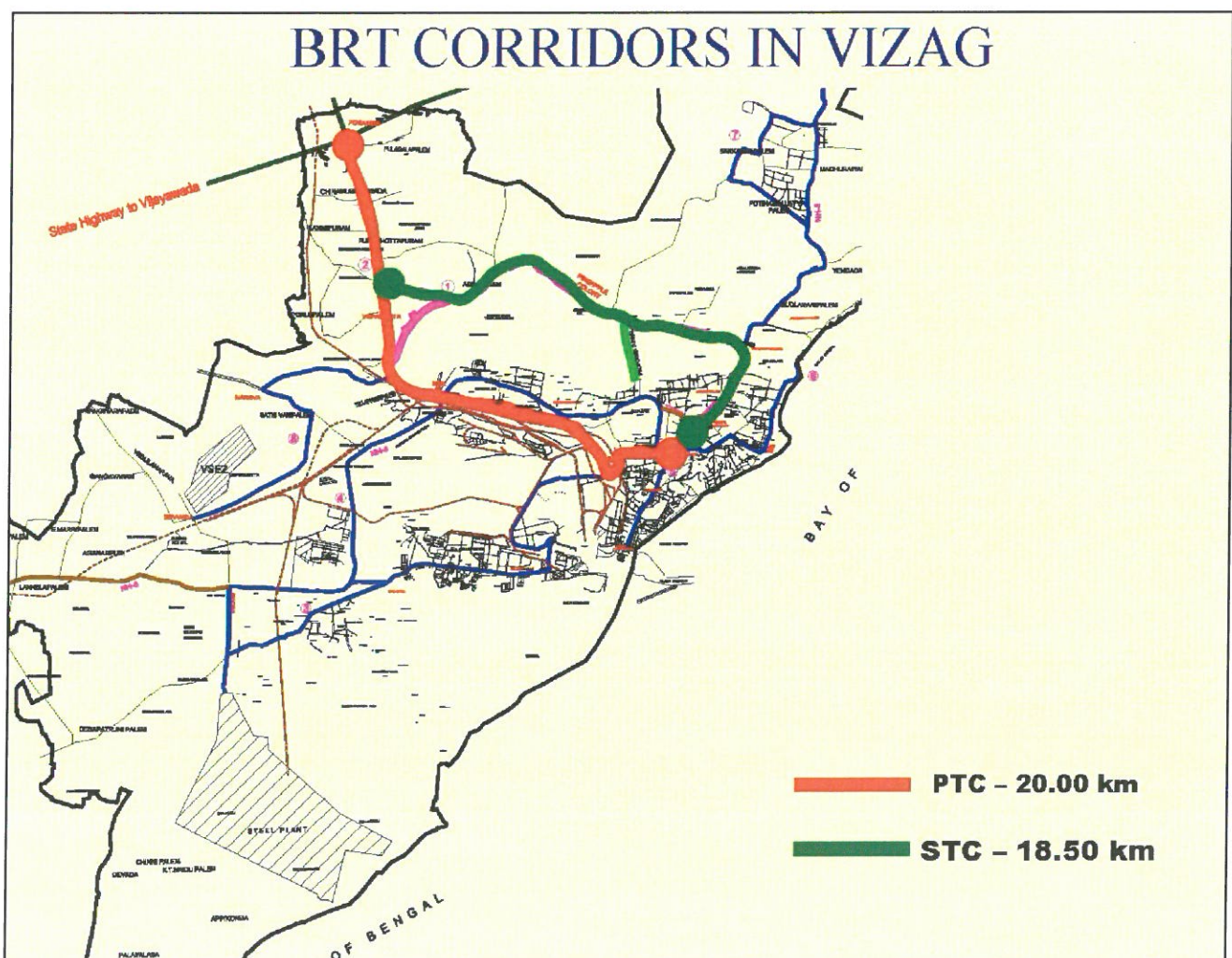


Figure 11.1: BRT Corridors in Visakhapatnam

i) Goals of the Project

- a) To provide all possible options to plan the system with the commuter's perspective a decision has been made not to compromise with space requirements for dedicated bus, MV, NMV lanes and safety aspects of pedestrian traffic.
- b) To augment transport supply at an affordable cost to the citizens.
- c) To prepare a comprehensive parking plan in place and will be implemented with control on demand and fiscal measures.

ii) Strategy Used to Achieve the Desired Goals

Project design features are detailed below:

- ❖ Min 30 m section at mid-block section;
- ❖ 36 section at stations / junctions;
- ❖ Dedicated bus lane, 7.0 m (2 x 3.5 m);
- ❖ 3.4 m. wide passenger platform with shelter;
- ❖ 2 x 3.25 m motorised vehicle lane (MV), 2 x 2.5 m non-motorised vehicle lane (NMV), minimum 2.0 m wide sidewalk on both sides;
- ❖ Placement of stations – mostly near side junctions, few at mid block sections based on demand and spaced at a distance of 500 to 700 m;
- ❖ Additional right turning (MV) lane at junctions;
- ❖ Provision of bus passing lane at some stations;
- ❖ Safe crossing facilities of bus passengers along zebra crossings and foot-over-bridges;
- ❖ Adequate depot and terminal facilities; and
- ❖ Safe dispersal and integration measures.

Cross Sections of the Corridor including Flyover

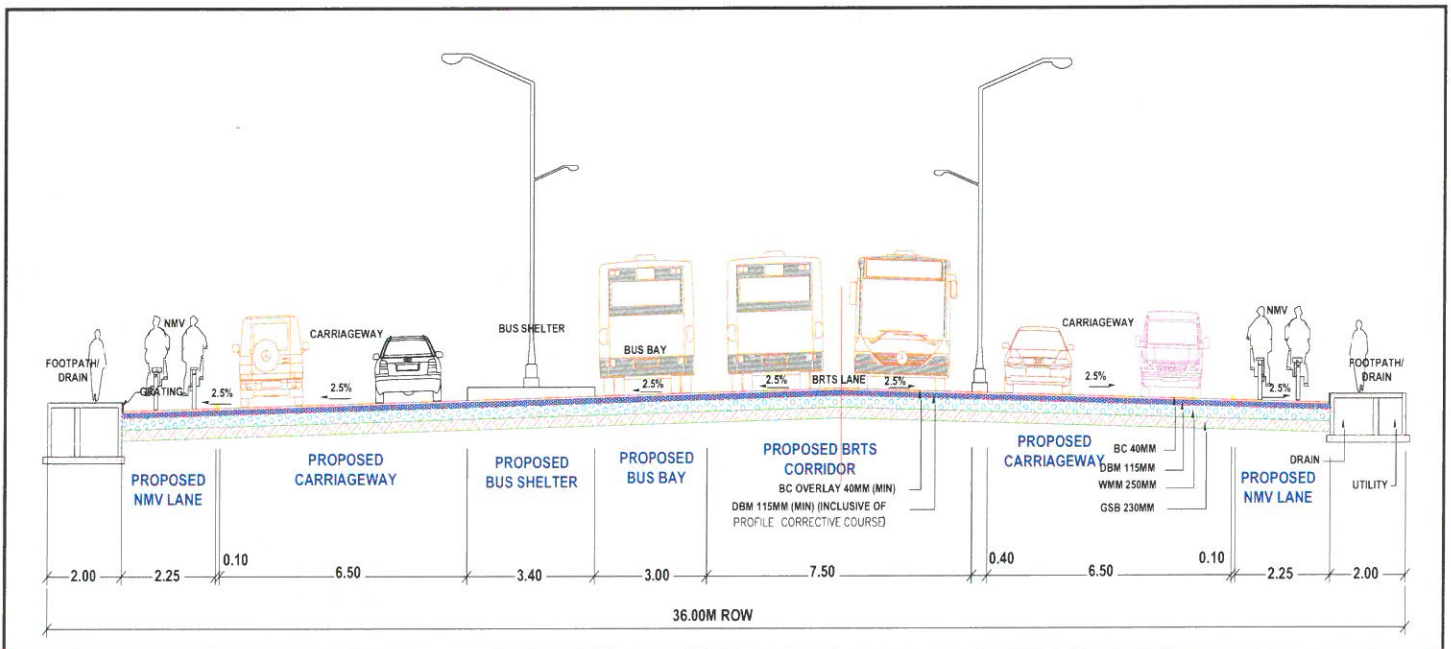


Figure 11.2: Typical Cross Section at 36.0 M Row (With Bus Bay)

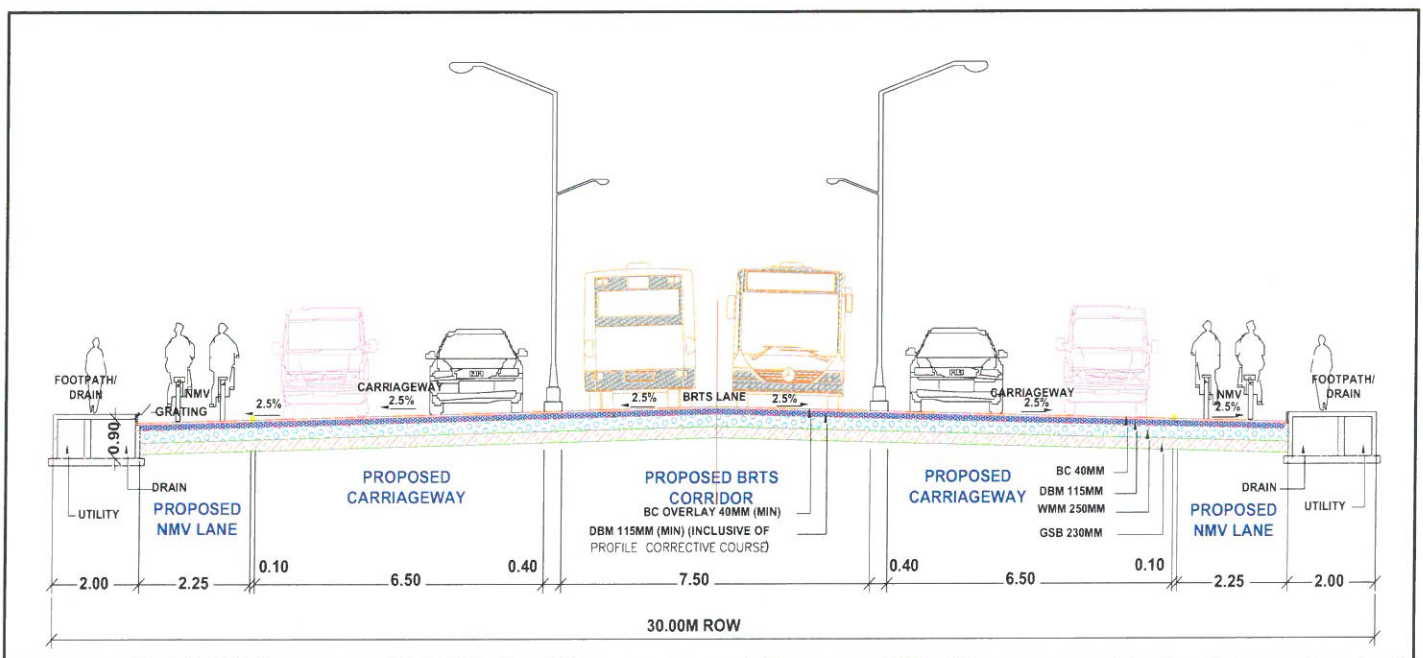


Figure 11.3: Typical Cross Section at 30.0 M Row

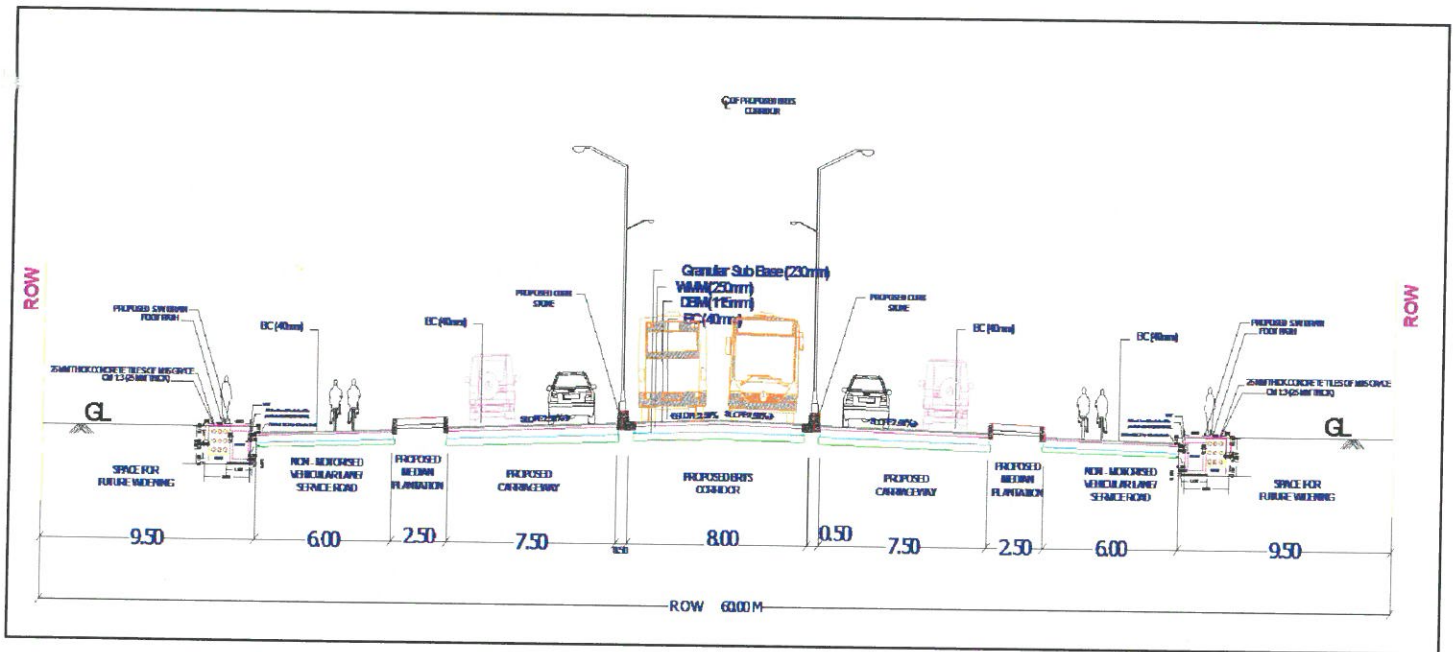


Figure 11.4: Typical Cross Section at 60.0 M Row

Flyover

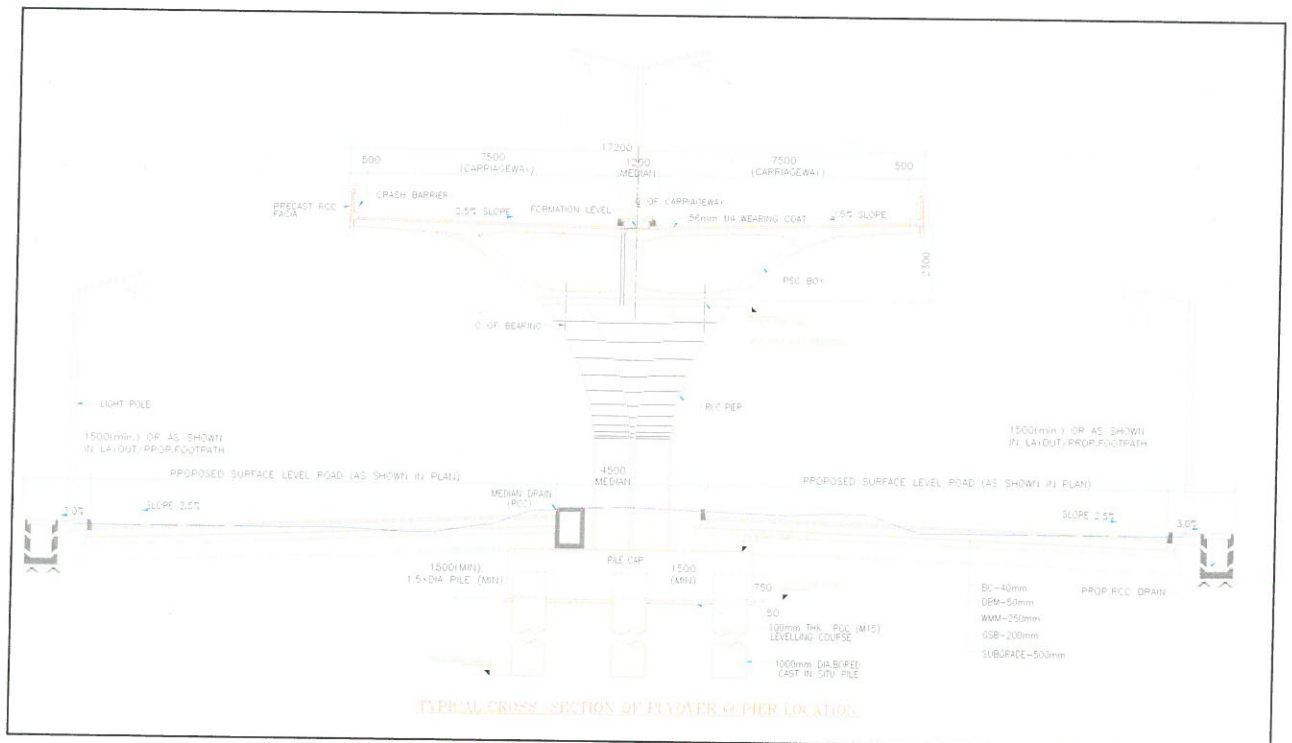


Figure 11.5: Typical Cross Section of Flyover, Pier Location

The key aspects of the bus rolling stock and technology features are outlined below:

- ❖ Standard 60 seat low floor urban bus (12 m length) is recommended to be introduced gradually and initially existing fleet of APSRTC will be utilized.
- ❖ To save cost, partial low floor buses may be introduced.
- ❖ Outline of Information Technology and Automatic Fare Collection System identified and is planned to be introduced later after sufficient trials are conducted.



Figure 11.6: Bus to be operated on BRTS corridors

First Phase, 2 corridors were prioritised i.e. PTC & STC.

- ❖ The Combined cost of prioritized 2 corridors (PTC & STC, Tunnel) is ₹ 452.93 Crores.
- ❖ The Project was approved by the Central Sanctioning and Monitoring Committee (CSMC), MoUD, GoI on 18-05-2007.
- ❖ The Detailed feasibility report was proposed as per the guidelines of NUTP, MoUD, and GoI.
- ❖ Administrative Sanction was accorded by the Govt. of AP vide G.O No: 1390 MA&UD (UBS) Dept. DT: 22-11-2007.
- ❖ GVMC invited Project Management Consultant (PMC) for BRTS exclusively in two phases in June, 2007: Phase 1: Detailed Engineering report along with the tender process i.e. bid process management; and Phase 2: Construction supervision and Quality Assurance.

- ❖ Consultancy for PMC was finalized on 29-08-07 with M/s. SREI Infrastructure Finance Limited (Lead Consultant), and LOA was issued with M/s McCormick Rankin International, Canada and M/s CRAPHTS Consultant (India) Pvt. Ltd, Haryana.
- ❖ The consultant submitted the Estimates, BOQ and Tender Documents for the prioritized corridors (PTC & STC) for getting approval of NIT from the Committee headed by the Engineer-in-Chief.
- ❖ The tenders were floated for the above corridors under EPC system with 2 years defect liability period. The tenders for the above corridors were finalized in Committee headed by the Principal Secretary MA&UD.
- ❖ PTC corridor was approved by the Govt. of AP. vide G.O.Rt.No:1384 MA&UD(UBS) Dept. dt:01-10-2008 for the M/s. Sadbhav Engineering Ltd with GKC Projects Ltd (JV) and STC Corridor was approved vide G.O. Rt.No:1397 MA&UD(K1) Dept. dt:03-10-2008 for the M/s.GVR Infra Projects Ltd, Hyderabad. Agreements were concluded with GVMC by the said firms.

Field Surveys, Investigations, Designs have been completed and construction work is in progress for 10 km segments each on PTC and STC.

iii) Activities Implemented to Achieve the Desired Goals

Right from conceptualisation and detail design of the BRTS in Vizag, GVMC has been proactively considering and promoting all important aspects for successful completion of the project. Be it the stakeholder consultations, public advisory and quality assurance – all aspects have been dealt with in detail. GVMC has BRTS cell in place and consultants, engineers, contractors all work in a healthy atmosphere to find the best possible solutions for achieving the ultimate objective of producing a world class mass transport system.



Figure 11.7: Pendurthi Transit Corridor at Visakhapatnam

The EPC contract modes has paved the way for PMC consultants to have a close look at the design offered by the contractors' and these are being debated, discussed, fine tuned to be more useful in terms of implementation, operational ease and practicality. The design process is vetted through quality assurance procedures embedded in the design and built contracts through clearly demarcated deliverables and timelines.

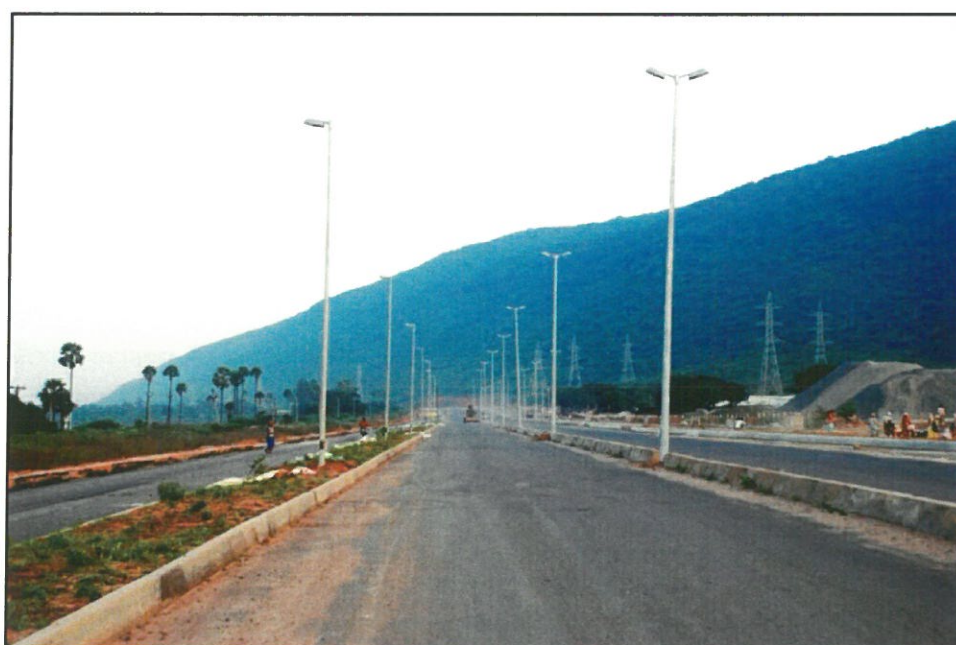


Figure 11.8: Simhachalem Transit Corridor at Visakhapatnam

The GVMC has laid emphasis on project quality and plans have been made to make the project a true success as perceived by the riding community and the general public. The city is best suited for BRTS. The services of Project Management Consultants have been taken to ensure successful implementation. Quality Assurance and Quality Control of all aspects (road design, BRT elements, construction, integration & operations) including management of project construction and execution are being perceived with great detail. A qualified team of professionals is in place to serve as GVMC's extended arm in ensuring project success.



Figure 11.9: Flyover in Progress at Visakhapatnam

iii) Challenges / constraints encountered and how it was conquered:

The key concerns in the project are the land and property acquisitions required to produce a ROW of 30 m especially on PTC. At the bus stations along the PTC and STC we will require about 36 m ROW to construct bus bays. Therefore, primary issue is to availability of minimum ROW to achieve segregation of traffic on the corridors. Nature of compensation and re-settlement issues have been finalised first in consultation with affected public and their representatives. The co-ordination of various civic agencies and departments including GVMC, Vishakhapatnam Urban Development Authority (VUDA), APSRTC, BSNL, Traffic Police etc. is essential for effective implementation. The major issues to be reckoned are utility diversions and addressing the drainage. The traffic management and diversion during construction will need the services of Local Traffic Police in Vizag. The major constraints on

STC are the strategic locations of village settlements at Simhachalem, where property acquisition is rather difficult. Alternatives will need to be addressed and frozen.

These concerns have been addressed with minute's details at the ground zero level. Environmental and social issues have been addressed in the detail. Promotion of public understanding and fruitful solutions of developmental problems such as local needs and those of road users were discussed. In addition to discussing problems and prospects of resettlement, several stakeholders were consulted through focused group discussions and individual interviews.

Discussions were also held to understand their local transport needs and to achieve speedy implementation of the project with involvement of people. Nature and loss of structures, which are likely to be affected, were identified. It was this effort that took the project forward towards successful implementation. The main reason being the minimum land availability was ensured for bus lanes, MV, NMV and pedestrian sidewalks.

Experts from a wide spectrum of the society began discussing the concerns of some BRTS implementations in the country. While every new project is expected to experience some level of friction during initial stages, adequate efforts are underway to mitigate any adverse effects from the implementation of Vishakhapatnam BRT system for the following reasons:

- ❖ In a majority of instances across the world, project 'success' or 'failure' can quickly begin as a perception and soon turn into a reality. Such a perception is created due to the ability of the implementing agency to properly and adequately publicize information about on-going projects. Technically better projects have failed in many instances due to not providing adequate project information to the general public.
- ❖ It is anticipated that Vishakhapatnam, BRTS will not experience concerns because GVMC has been actively engaging the public through the social assessment study and wide publication in the news media.
- ❖ A second issue is with regard to proper planning of projects such as BRTS. Vishakhapatnam has been actively conceptualising, planning, and designing the project for over 2 years and is pursuing the implementation aspect with diligence. It is recommended that GVMC continue to brief the elected representatives and provide

information that the project had been thoroughly planned by taking into consideration the current and projected travel demand in the city.

- ❖ Projects that have ‘take-away’ lanes from the general purpose traffic, i.e., from the ‘existing’ lane geometry for BRTS dedication – mostly 7 meters – are considered an inappropriate strategy. Such an action is considered not only negative in terms of further constraining currently depleted capacity but also invites public anger. Vishakhapatnam BRTS does the opposite by not only widening the roadway for dedicating two lanes to BRTS but also improving opportunities for pedestrianisation and junction improvements. It is suggested that GVMC use this as a reason for seeking added right-of-way, thereby not taking away lanes from the general public but adding to public convenience, while removing buses out of general purpose lanes.
- ❖ Projects where the proposed BRT systems are for short lengths / short segments experience concerns. Any BRT system should be a multimodal effort with several interchange points to feeder services. Vishakhapatnam BRTS is proposed along 20km and 18km continuous stretches and therefore, provides a viable length of road segment for effective implementation. It is recommended that GVMC mention this key aspect since such a proposition is not only financially sustainable but also physically implementable.
- ❖ Systems that have developed in a very short duration may have caught the people by surprise thus adding to the syndrome ‘we did not hear or know about this problem.’ Vishakhapatnam BRTS is likely to not experience this problem because GVMC has already been informing the media and the general public about project progress; and social assessments have been educating the directly impacted citizens about project issues including seeking feedback and opinion; and above all, construction activity will invariably raise public awareness about project aspect.

iv) Expected Outcome of the Initiative / Project / Best Practice:

The progress of the implementation can be deemed satisfactory since its inception. The construction of BRTS infra commenced by Dec 2008 and since then we have been able to complete about 10 km each on PTC and STC corridor.

Development of Modern Bus Shelters and Foot Over Bridges on the BRT Corridors

As part of development essential infrastructure facilities on the corridors, GVMC proposes to develop about 25 Foot-over Bridges integrated with modern Bus Shelters (a total of 76 shelters) for the safe movement of commuters at crossings, interchanges, boarding and alighting.

Development under PPP

In order to leverage limited resource of GVMC it is proposed to develop the above Fob's and Bus Shelters on Public Private Partnership (PPP) Model dividing them in to three to four bid packages. The other advantages of the PPP model include:

- i)** The development under PPP model will provide a quality infrastructure with state of the art facilities and bring substantial saving in the capital investment of Government / GVMC.
- ii)** Construction, operation and maintenance risks will be transferred to the selected developers.
- iii)** GVMC would get the revenue share from the selected developers during concession period, in case a particular bid package works out to be commercially viable proposition.

Proposed Methodology for PPP

- i)** As per the PPP model, the scope for the selected developer(s) would include the following major project components/activities:
 - a)** Implementing (financing, designing and executing) the proposed Modern Bus Shelter and Foot Over Bridges on BRTS Corridor on BOOT model, Vishakhapatnam
 - b)** Operating and maintaining the facilities for the given Concession Period.
 - c)** Transferring the facilities to GVMC after Concession Period.
- ii)** The selected developer(s) will have advertisement rights on the project facilities they create during the entire concession period. Capital cost (debt servicing) and O&M costs would be met from the revenues they receive from the advertisement.

- iii) Based on requirement, locations of the Bus Shelters and Foot Over Bridges are finalised.
- iv) Based on the traffic intensity including pedestrian movement, the project components of the facilities (i.e. with lift or without lift) are decided.
- v) Based on advertisement potential, the facilities (locations) are grouped in to individual bid packages.
- vi) Request for Proposals (RFP) would be invited from short-listed bidders for selection on competitive basis. The bid parameter for selection would be concession period quoted.

Present Status of RFQ

- i) Request for Qualifications (RFQ) invited from the prospective leading business houses, entrepreneurs, advertising agencies, media houses, developers.
- ii) Seven firms submitted their applications and based on evaluation of their credentials vis-à-vis the stipulated financial and experiential qualification criteria, these firms would be short listed for issue of RFP documents.
- iii) Draft RFP documents are under discussion.
- iv) Typical design of Bus Shelter and FOB is being done for inclusion in the RFP document.

Roles / activities of the partners at each stage of the Initiative / Project / Best Practice:

GVMC has been very active in pursuing the goals and objectives with which the project was conceptualised. Being the main civic agency in Vizag, GVMC has discussed the project with elected representatives, multi-political party and public forums. With the formation of SPV, the final shape of the project is being formalised on operational, ITS and maintenance issues.

v) Important Stakeholders Involved and Communication / Networking Procedure for the Project

The project will be implemented by a Special Purpose Vehicles (SPV) with equity stakes through GVMC, APSRTC & VUDA. Working group has been constituted with Local Government Representatives. Government have already approved the formation of Special Purpose Vehicle (SPV) named “Visakhapatnam Urban Transport Company Limited” and company has been registered with the Registrar of Companies for registration of the SPV

under name VUTCL for implementation and operationalisation of the BRTS. As per the Government approval APSRTC will be the major stakeholder with 51% equity and the Greater Visakhapatnam Municipal Corporation with 25 % equity & VUDA with 24% equity as other stakeholders.

OBJECTIVES OF SPV

The main objectives of proposed SPV Company are as follows:

- ❖ To provide bus rapid transit system to public by way of planning, designing, financing, developing constructing, maintaining, marketing operating and enabling BRTS.
- ❖ To provide and/or facilitate provision of multi model transport services including owning, licensing and operating bus routes, passengers and other modes of transportation.
- ❖ To serve as a single agency which will facilitate, coordinate, control and monitor the activities of various public and private partners that are an integral part of the BRTS planning, implementation and operational functions.
- ❖ To engage in and/or to facilitate development and operation of mass transit system.

Status of SPV

- Formed as per G.O.Ms.No.817 of MA&UD Dated: 26th November 2008.
- VUTCL name registered with 'Ministry of Corporate Affairs'.
- DIN (Directors Identification Number) for 6 Directors out of 7 including Chairman & CEO Obtained. DIN of ED RTC is to be obtained.
- APSRTC - 51% equity, GVMC equity -25% and VUDA equity - 24%.
- Authorized share Capital ₹ 2.50 Cr. - ₹ 10 /- per equity share.
- GVMC Body adopted by G.O. on 29-12-2008
- MoA and AoA finalised
- Co-ordination committee for implementation / execution of BRT project vides G.O. Rt. N. 1808 of MA&UD Dated: 19-12-2008.
- Revised order issued vides G.O Ms. No. 77 MA & UD (H Dept) Dt17.02.2010 forming VUTCL with 7 Board of Directors with Collector , Vsp as Chairman ,

Commissioner GVMC as CEO and Executive Director APSRTC as Managing Director.

11.4 Factors of Success

The success of public transport initiative in Vizag will result in large number benefits accruing to public directly or indirectly, when the project is made operational in about one year's time. In all cities in India supply effective public transport has been a forgone and travel and mobility needs are exclusive in the hands of private vehicles and para-transit services. We are largely unprepared to tackle severe traffic congestion, air pollution, accidents and loss of sense of community.

BRTS Vizag will create a high quality public transport to enhance the mobility pattern and demonstrate that people and community come first. It will increase the modal split in favour of public transport – being the ultimate strategy of the Government of India (MOUD) to promote public transport in the country. The other benefits can be quantified at a later date when the system is operational. BRTS will reorganise road space with the segregated MV, NMV and dedicated bus lanes and will enhance road capacity utilisation factors. Dedicated bus lanes will promote public transport & discourage use of private vehicles.

BRTS corridor will cater to all modes of road transport. Also systematic movement of traffic in dedicated lanes ensures smooth flow, frictionless travel, and savings in travel time / cost, minimise accidents & enhances safety. The provision of exclusive segregated NMV lane will promote safety to slow moving vehicles and planned & protected sidewalk facilities will guide the pedestrian safely. The key sustainability indicators will be protection of environmental conditions, energy savings, readiness of people to shift to PT, reduction in road accidents etc.

11.5 Budgetary Implications and Sustainability

i) Total Cost of the Project

The BRTS corridors PTC & STC has been planned for the various improvements / enhancements needed to construct dedicated bus lanes, segregated MV and NMV lanes including footpaths and foot over bridges at different locations. Accordingly, construction packages were devised by GVMC for various sections of the project corridors.

It is envisaged that the project would involve widening of project road, construction of new pavements for bus transit, MV lanes, NMV lanes, construction of cross and longitudinal drainage, footpaths and foot over bridges, street lighting, traffic signs and road markings etc. The detailed cost estimate has been worked out using detailed quantities of different items of works derived from the detailed design, drawings and unit rates.

- ❖ The estimated cost for providing fixed infrastructure for civil and electrical infrastructure is estimated at ₹ 339 crore which has provision of ₹ 1.5 crore as contingencies. The cost shifting of utilities has been estimated at ₹ 26.5 crore.
- ❖ The specification of Automatic Vehicle Tracking System and Passenger Information System has been outlined for the project. The cost estimate for producing ITS related facilities for 300 buses, 50 bus stops, 8 terminals, 3 depots and a Control Centre has been provisioned. The total cost is estimated at INR 6 crore. The O&M cost shall be about 15% of capital cost.

Financial partners involved:

The funding is given partly by Government of India (Funding through JNNURM initiative), partly Government of Andhra Pradesh and GVMC in the ratio of 50%, 20% and 20% respectively. GVMC is planning to achieve its share by accessing loans form FI / Bank up to 50% of its contribution in the project.

ii) Source of Finance for Sustainability of the Project

The annual operational and maintenance cost of the system per annum will be about Rs 25 crore by year 2011 and 39 crore for year 2021. The expected ridership on the PTC and STC corridor will 1.85 lakh by year 2011 & 3.15 lakh by year 2031 passengers daily. The estimated bare box revenue will be about 73 crore per annum by year 2011 and will increase to 125 crore by year 2021. In addition to this about Rs 5 crore per annum can be generated through advertisement rights. Being the Government funded capital intensive project, the operational viability is expected to be sound as the project IRR comes to healthy 41%. This implies that project is operationally quite viable and not only the rolling stock (buses), but other systems (fare collection system and intelligent transportation systems) can also be financed from the fare box revenue and even after that there will be enough in the kitty of SPV - VUTCL to maintain the fixed infrastructure efficiently.

Since an IRR of 15% is considered a reasonable proposition to attract investors for financing rolling stocks, a proportion of total revenue is enough to give this kind of return for successful rolling stock concession and maintaining the BRTS infrastructure in efficient conditions.

The profitability of the project was critically analysed based on variation in the rolling stock cost – impact of +20% and the variation in the project revenue (on account of ridership, fare level and other incomes) of the project. The operational would not be effected even with negatively side sensitivity of key variables under reasonable scenario. The project IRR will off course be very sensitive to the revenue fluctuations. GVMC has taken advance actions on implementing the part of BRT infra like bus stations; grade separated pedestrian facilities, ‘off-street’ parking on PPP mode.

11.6 Impact of the Initiatives

- ❖ The project has been discussed in the MOUD progress review meetings and seminars many times. The project was presented in the international seminar conducted by Indo-German Institute of Advance Technology (IGIAT) and Gayatri College of Engineering, Vizag - promoted and sponsored by;
- ❖ Federal Transit Administration (FTA), Washington;
- ❖ German Technology for Technology Cooperation (GTZ);

Since the venue was Vizag, the delegates visited the BRTS corridors and showed keen interest in the project. The project was discussed in many forums in the seminar and received wide publicity and attention.

11.7 Summing Up

As feasibility study, convened by GVMC, appraised a BRTS network of 100Km consisting of 6 BRTS corridors. In first phase, 2 corridors between RTC complex to Pendurthi (20.00 Km) and Simhachalem (18.50 Km) were recommended. The study was approved by MoUD and aid was granted through JNNURM programme. Visakhapatnam BRTS is also a PPP based project. ‘Public’ is represented by a SPV named ‘Visakhapatnam Urban Transport

Company Limited' (VUTCL). The project will be implemented by a Special Purpose Vehicles (SPV) with equity stakes through GVMC (25% equity), APSRTC (51 % equity) and VUDA (24 % equity).

The main objectives of SPV are to provide BRTS by way of planning, designing, financing, developing and constructing etc.; facilitate multi modal transport services including owning, licensing and operating bus routes; and serve as single agency to facilitate, coordinate, control and monitor the activities of various public and private partners.

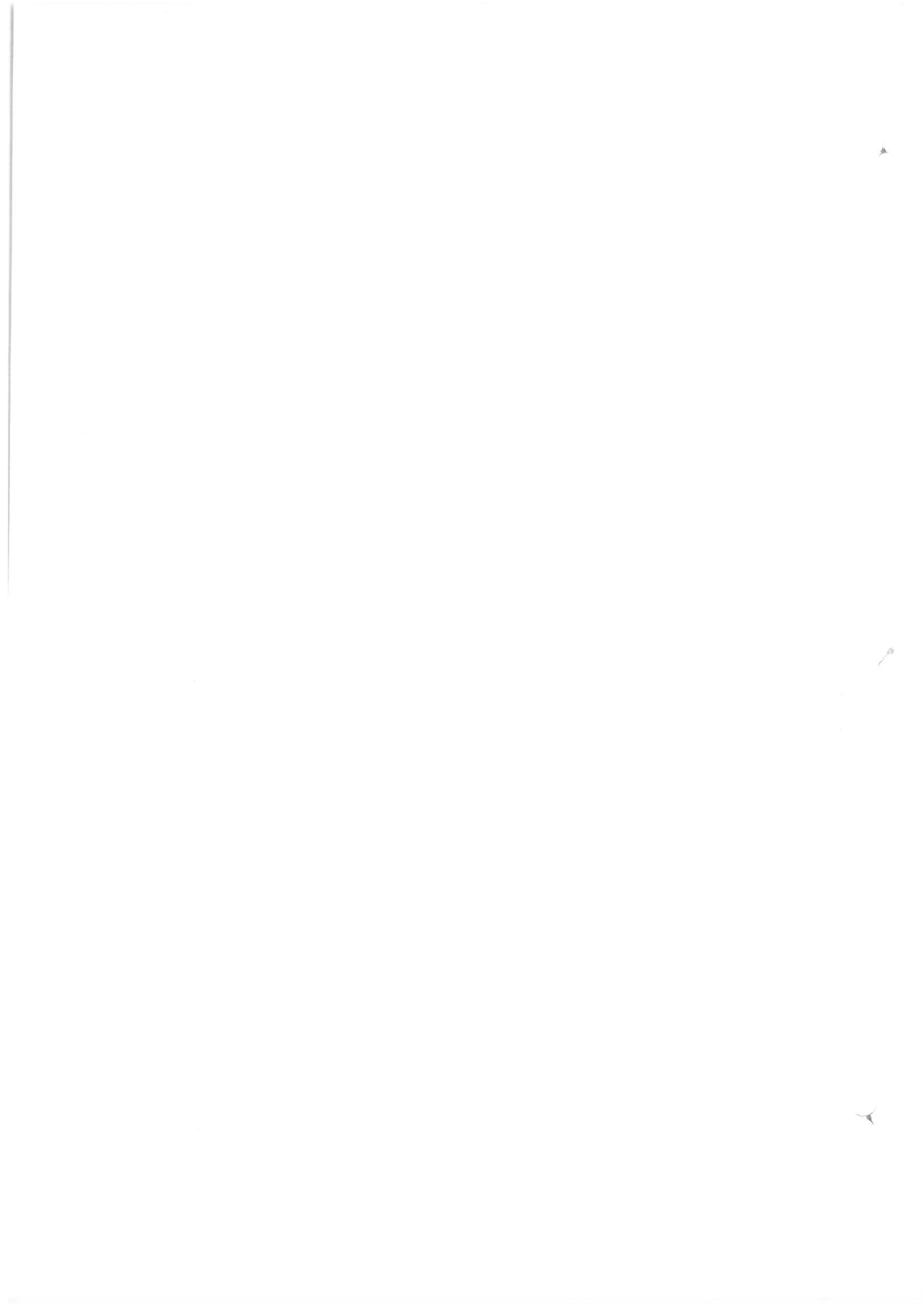
As per PPP model, the scope for developer (private sector) would include implementing bus shelters, foot over bridge on BOOT, operating, maintaining and transferring the facilities to GVMC after concession period; having advertisement rights etc.

Challenges / constraints faced during the construction of corridors are related to land and property acquisition for RoW, utility diversions and addressing the drainage, traffic management and diversion of traffic, strategic location of village settlements, environment and social, problems and prospects of resettlements etc.

The projects are progressing as per the schedule. The construction of BRTS infrastructure had commenced by December 2008. About 10 km of BRT corridors, on PTC as well as STC, have been completed.

Summary & Conclusion





12.0 Summary and Conclusions

As mentioned in the ‘Introduction’ chapter, the present study documents ten urban transport initiatives/projects undertaken in ten cities of India. It covers four BRTS projects of Ahmedabad, Pimpri-Chinchwad, Visakhapatnam, Jaipur; five Modern City Bus Services (MCBS) of Jalandhar, Jabalpur, Surat, Vadodara and Jalgaon; and multilevel underground parking project of Kolkata. Apart from Jaipur Public Transport (through BRT and Modern City Bus Service) project, the remaining are PPP based projects. For each the study documents mainly description of the project including situation before implementation of the initiative, factors of success, budgetary implications, performance and impact of the project. Besides, it also identifies challenges / constraints, lessons learnt, and provide suggestions.

12.1 PPP in Case studies

PPP is the method in which public and private sector cooperate and partner with each other to provide infrastructure and / or improved public services. ‘Public’ is represented by SPV in the projects of Ahmedabad, Pimpri-Chinchwad, Jaipur, Visakhapatnam, Jalandhar, Jabalpur; Municipal Corporation in case of Surat, Vadodara, Kolkata; and Transport Committee in Jalgaon. ‘Private’ is represented by Private Sector Organizations / Companies involved in financing the project or for technical / engineering means or for management purposes. There are many PPP models available in which public and private sectors enter into the partnership such as Service Contract, Management Contract, Concession and Lease, BOT, BOOT, DBFOT etc.

12.1.1 BRTS Projects in Selected Cities

Ahmedabad Janmarg Limited is a SPV, constituted by the Ahmedabad Municipal Corporation, to manage the BRT project. It is responsible for planning, selection of operators, monitoring of service quality, fare revisions, future BRTS expansion plan etc. There are nine PPP arrangements (contracts), for bus procurement, operation and maintenance; ITS on BOT, development foot over bridges on DBFOT; supply and service of bus stations, sliding doors; management of pay and park facility; lease of advertisement rights; housekeeping and cleaning of buses; development and maintenance of landscape; and maintenance contract of bus stations (civil works), etc.

Table 12.1A: Highlights of Public Private Partnership in BRTS Projects of Selected Cities

Cities	Public-Private Partnership	
	Public Sector	Private Sector
Ahmedabad	<p>Ahmedabad Janmarg Limited, a SPV, for:</p> <ul style="list-style-type: none"> • Planning of services; • Selection of operators; • Monitoring of service quality; • Fare revisions; • Coordination with relevant departments; and • Future BRTS expansion plan. 	<p>PPP Arrangements(Contracts):</p> <ul style="list-style-type: none"> • Bus Procurement, Operations and Maintenance; • Integrated Information System including Automatic Ticketing and Vehicle Tracking System(BOT); • Supply & Service Contracts for Bus Station Sliding Doors, Turnstiles; • House Keeping & Cleaning of Bus Stations; • Management of Pay & Park facilities; • Lease of Advertisement Rights; • Development of Foot Over Bridges on DBFOT; • Development & Maintenance of Landscape; and <p>Maintenance Contracts for Bus Stations (Civil Works), Lighting of Bus Stations & Corridor, Monitoring and Maintenance of BRTS Corridor (Civil works), Signage.</p>
Pimpri -Chinchwad	<ol style="list-style-type: none"> 1. Pune Mahanagar Parivahan Mahamandal Ltd. (PMPML) responsible for managing facilities and services (operating buses). 2. PCMC Infrastructure Company, a SPV, to: <ul style="list-style-type: none"> • Plan, construct, operate and maintain the BRT corridor through funds generated by the Urban Transport Fund. Premium on loading of Transfer of Development Right (TDR) is a robust source of revenue. 	<p>Private Sector for Road Furniture:</p> <ul style="list-style-type: none"> • Bus stops; • Public toilets; • Landscaping; • General maintenance; and • Advertisement rights offered on Mumbai Pune road of 12Kms.
Jaipur	<ol style="list-style-type: none"> 1. Jaipur Development Authority responsible for: <ul style="list-style-type: none"> • Development of BRT infrastructure; and • Supervision of construction works of BRT corridors. 2. Jaipur City Transport Services Ltd., a SPV to: <ul style="list-style-type: none"> • Look after overall BRT projects; • Procurement of bus operators, collection agencies, ITS agency; and • Regulate, control and monitor BRT operation. 3. Unified Metropolitan Transport Authority deals with the policy level decisions, which are related to land use and transport. 4. PDCOR Ltd and STUP Consultant Ltd. are responsible for infrastructure designing, bus operation and supervision of Engineering works. 	<p>No private sector involved.</p> <p>In future, JDA would construct bus stops / shelters / stations in the city through PPP.</p>
Visakhapatnam	<p>Visakhapatnam Urban Transport Company Limited, a SPV, (with equity stakes through GVMC, APSRTC &VUDA) responsible for:</p> <ul style="list-style-type: none"> • Planning, designing, financing, developing constructing, maintaining, marketing operating; • Providing multi model transport services including owning, licensing and operating bus routes, passengers and other modes of transportation; and • Serving as a single agency which will facilitate, coordinate, control and monitor the activities of various public and private partners. 	<p>Private Sector is for:</p> <ul style="list-style-type: none"> • Implementing (financing, designing and executing) the bus shelters and foot over bridges on the corridors on BOOT model; • Operating and maintaining facilities for given Concession period; and • Transferring facilities to GVMC after Concession period.

In Pimpri-Chinchwad BRTS project, PCMC Infrastructure Company is a SPV to plan, construct, operate and maintain BRT corridor through funds generated by UTF. Premium on loading TDR is a robust source of revenue. Private sector is being involved for road furniture, viz. bus stops, public toilets, landscaping, general maintenance etc. Advertisement rights have been offered on Mumbai Pune road of 12 Km.

Visakhapatnam Urban Transport Company Limited has been constituted as a SPV, along with equity stakes through GVMC, APSRTC and VUDA, for implementation and operationalisation of the Visakhapatnam BRTS. Private sector is being involved for implementing bus shelters and foot over bridges on BOOT; operating and maintaining facilities on given concession period.

In case of Jaipur public transport (through BRT and modern city bus service), JDA is responsible for development of BRT infrastructure and supervision of construction works on BRT corridor. JCTSL is a SPV to look after BRT projects; procurement of bus operators, collection agencies, ITS agencies; and to regulate, control and monitor BRT operations. However, UMTA deals with policy level decisions. No private sector has been involved. It was reported that the private sector would be involved for constructing bus stops/shelters in the city areas (Table 12.1A).

12.1.2 Modern City Bus Services in Selected Cities

Surat and Vadodara are the two cities of Gujarat in which the Municipal Corporations represent the public sector and are responsible for identifying routes, bus stops, fixing up of fare structure and ensuring the quality of service. Private sectors are involved for procuring, owning, operating and maintaining buses; constructing bus stops / pick-up stands / queue shades on BOT, taking care of expenditure on rolling stocks etc.

In case of Jalandhar and Jabalpur, public sector is represented by SPVs to operate and manage public transport system. The SPV of Jalandhar city bus service provides differentially priced services and the Municipal Corporation of Jalandhar provides space for city bus depots and bus queue shelters on lease basis. In both the cities, private sectors are involved for operating buses, construction of bus queue shelters / bus stops on BOT; ITS system (GPS and PIS) etc.

Table 12.1B: Major Highlights of Public Private Partnership in Modern City Bus services of Selected Cities

Cities	Public Private Partnership	
	Public Sector	Private Sector
Jalandhar	<ol style="list-style-type: none"> Jalandhar City Transport Service Limited, a SPV, to: <ul style="list-style-type: none"> Operate and manage Public Transport system; Provide differentially priced services; and Municipal Corporation of Jalandhar to provide space for City Bus Depot and bus queue shelters on lease basis. 	Private Sector is for: <ul style="list-style-type: none"> Bus Queue shelters on BOT; GPS on BOOT; Monthly bus passes; Electronic ticketing machine; Five bus operators; and Public Information System (PIS).
Surat	<ol style="list-style-type: none"> The Surat Municipal Corporation is to: <ul style="list-style-type: none"> Identify routes, bus stops and fixing up fare structure; and Quality of service in terms of frequency and CNG fuel. Regional Transport Authority for sanctioning carriage stage permits providing statutory sanctions to these terms. 	Private Sector is for: <ul style="list-style-type: none"> Procuring, owning, operating and maintaining buses; Expenditure on rolling stock; Construction of bus stops on BOT; and Rights given to operators by SMC for collecting fares.
Jabalpur	Jabalpur City Transport Services Limited, a SPV, to operate and manage the public transport system in a PPP model.	Private Sector is for: <ul style="list-style-type: none"> Procuring and operating buses; Making passes; Constructing bus stops on BOT; and On line Vehicle Tracking System – GPS and PIS.
Vadodara	<ol style="list-style-type: none"> Vadodara Mahanagar Seva Sadan is the lead implementing agency to: <ul style="list-style-type: none"> Identify bus routes, bus stops and fixing of fare structure; Define quality of service in terms of frequency Determine the buses should run on CNG Regional Transport Authority for: <ul style="list-style-type: none"> Sanctioning stage carriage permits providing statutory sanctions to these terms. Providing technical assistance to VMSS in preparing proposal and tenders etc. Gujarat State Road Transport Corporation for providing route map. 	Private Sector is to: <ul style="list-style-type: none"> Procure, own, operate and maintain the buses; Take care of expenditure on rolling stock and operation and maintenance; Provided uniforms (with logos of VMSS and the VTCOS Pvt Ltd) to drivers and conductors; and Construct Pick- up stands / Queue shades on BOT.
Jalgaon	<ol style="list-style-type: none"> A Transport Committee, constituted by Jalgaon Municipal Corporation, for: <ul style="list-style-type: none"> Policy decisions; Levy of fares and charges of transport services has been decided by the transport committee with approval of the Municipal Corporation and R.T.A.; and Approval to the Routes Stages and Fare structures. Transport Manager for: <ul style="list-style-type: none"> Identification of routes stages and fares and charges; Submission of proposal to Appropriate Authorities; Management of Undertaking; and Execution and overall implementation of PPP Model. 	Private Sector is to: <ul style="list-style-type: none"> Procure, own, operate and manage buses; Erection of Bus shelters; Appointment and Training ; <p>Note: Municipal Corporation of Jalgaon has transferred the rights to the above mentioned transport company, in lieu of the royalty of ₹ 0.85 per km. The Corporation has also taken ₹ 25,000 per vehicle from the Operator as a guarantee in the form of bank deposit.</p>

In Jalgaon, a ‘Transport Committee’ represents public sector and is responsible for policy decisions, levy / fixing of fares / fare structure, identification of routes, execution and over all implementation. Private sector is to procure, own, operate and manage buses; erection of bus shelters, providing ITS etc. It is to be noted in this context that the Municipal Corporation has transferred the aforesaid rights to the transport company and in lieu of the royalty of ₹ 0.85 per Km. Moreover; the Municipal Corporation has also taken ₹ 25,000 per vehicle from the Operator as a guarantee in the form of bank deposit (Table 10B).

In Kolkata Multilevel Underground Parking Project, the Kolkata Municipal Corporation is representing ‘Public’ and has land rights but it may not have sufficient finance and engineering means to develop the project. It involved private sector, Simplex Private Limited to construct and lease out the commercial blocks (at Level-1) and car parking system on a double - concession BOOT basis (Table 10 C).

Table 12.1C: Major Highlights of PPP for Kolkata Multilevel Underground Parking at Lindsay Street

Public Private Partnership	
Public Sector	Private Sector
<p>Kolkata Municipal Corporation to:</p> <ul style="list-style-type: none"> • Offer the concessionaire, Simplex Pvt. Ltd. (private sector), the right to construct the parking system and commercial complex. Architectural designs and drawings were approved by the Corporation; and • Collect the basic rent directly from the lessee 	<p>Private Sector to:</p> <ul style="list-style-type: none"> • Construct commercial complex (at Level -1) on BOOT; • Construct underground car parking (at Level-2) on BOOT; and • Impose and collect parking charges and pay the Corporation.

After going through the above mentioned analysis, one can infer that public and private sectors enter into Public-Private Partnership through various types of agreements, contracts or concessions to meet their requirements. Public sector (SPV, ULBs, TC) usually do not have sufficient finances or technical expertise / means due to which they have to depend upon private sector for procuring, operating and maintaining of buses; erection of bus shelters / bus stops; providing ITS and other infrastructures.

However, the role of public sector, as mentioned above, is planning, designing, identification of routes, fixing of fares, over all supervision and monitoring of the project. In nutshell, this is all done for providing efficient and better quality services to the citizens.

It is expected that the PPP arrangements may help in making the project successful in terms of operational performance. As mentioned earlier, the operational performance largely depends upon financial performance, which itself is subject to management efficiency and fare structure. The system should initially recover its operating cost from its fare box (achieving breakeven point).

Capital cost is recovered in a fixed period of time either from fare box or revenue from other sources, like revenue from advertisements, rents etc. The following section of this chapter tries to identify success stories – best practices by evaluating overall performance of the case projects with the available data / information on the projects.

12.2 Success Stories – Best Practices

Out of ten urban transport projects, eight have been implemented and running successfully. However, Jalgaon City Bus Service has recently been started. Amongst eight implemented projects, two are the BRTS of Ahmedabad and Jaipur; five are City bus services of Jalandhar, Surat, Jabalpur, Vadodara, Jalgaon; and Kolkata Multilevel Underground Parking Project.

Following case studies may be treated as success stories in terms of their overall performance and impacts of the project:

Ahmedabad BRTS with new technological applications / innovations has been in operation for the past one year. It carries about 90,000 passengers daily with deployment of 45 diesel buses (30 AC buses out of 45, 12 meter long, 900mm floor height), with commercial speeds greater than 24 Kms per hour. A review of the two months progress of the Ahmedabad BRTS project, in terms of various parameters, indicates that the system is running successfully. Average passengers per day, average collection per day, average passenger per bus per day, average collection per bus per day have increased considerably during two months period. During the period, average rating giving to BRTS by users is 8.61 out of 10.

Besides the above, the operation 23 buses during first four month , reflects positive impacts, such as an increase in ridership (from 17,315 in first month to 69,759 passengers per day in eleventh month), increase in revenue (from ₹ 4,500 to ₹ 8,700 per bus per day), modal shift (shift of passengers from motor cycles, cars and 3-wheelers, which is about 50% of the total BRTS users), dependable service / reliability (95% departures are on time, 65% of arrivals were on time), improvement in travel speed (peak hour speed-24Kmph against 16-18 Kmph

of AMTS), improvement in the level of air pollution due to CNG buses, decrease in accidents rates etc.

The major reasons for the success (factors of success) of Ahmedabad BRTS may be attributed mainly to its good institutional structure, which maximize the quality of service, minimize the cost of service, and cost sharing using a PPP model. The project has been awarded by MoUD as the Best Mass Transit Project under JNNURM in the year 2008-2009. It was given 2010 Sustainable Transport Award for visionary achievements in sustainable transportation and urban livability in a function held at Washington.

Table 12.2: Overall Performance / Impacts of the Projects of Selected Cities

Performance / Impacts of the Projects							
Cities / Projects	Increase in Ridership	Increase in Revenue	Improvement in service frequency	Information Availability (ITS)	Reduction in Pollution	Reduction in Accidents	Users Satisfaction
Ahmedabad BRTS	✓	✓	✓	✓	✓	✓	✓
Jaipur Public Transport	✓	NA	✓	✓	✓	NA	NA
Vadodara City Bus service	✓	✓	✓	✓	✓	NA	✓
Surat City Bus Service	NA	NA	✓	✓	✓	NA	✓
Jalandhar City Bus Service	✓	✓	NA	✓	NA	NA	✓
Jabalpur City Bus Service	NA	✓	NA	✓	NA	NA	✓
Jalgaon City Bus Service	✓	NA	✓	✓	NA	NA	✓

NA – Not available

Jaipur Public Transport Service through BRT and modern city bus service is not a PPP based project. However, it may be treated as success story due to some changes, viz. improvement in travel speed (17 kms in 18 minutes at 25 Km / hr), increase in ridership (from 55,000 to 2,00,000), reduction in accidents (reduced by 12.65%), reduction in green house gas emission (complying with BS-III emission norms), reduction in air and noise pollution (complying with BS-III norms and engine is fitted at rear of buses), increase in

service frequency (7 to 15 minutes), more geographical coverage (grid system for route designing), reduction in energy consumption etc.

The reasons for the success of this project are attributed to planning and design: technical inputs like, low floor buses, AC buses, next vehicle display board / system, GPS, on board stop announcement, signal priority on specific signals, ticket system-prepaid / automated.

The **City Bus of Vadodara** is running successfully. Presently, approximately 101 buses are running on 41 routes providing cost effective and eco-friendly public transport with innovative features such as daily passes, students' passes and free travel for freedom fighters. The buses runs on CNG fuel which is proven environment friendly and makes improvement in ambient air quality leading to reduction in air pollution & better utilization of natural gas resources.

Passengers traveled by city CNG buses are 1, 50,000 per day which will be increased by 3, 50,000 in March 2010. There are a number of benefits to VMSS by Privatization, viz. income of VMSS increased with the offer premium of ₹ 18,55,000/- yearly from City Bus Service; income of VMSS increased with the offer premium of ₹ 82,58,400/- for pickup stands / Q – shades as per BOT; and the total income of VMSS has increased by ₹ 1 crore / year with 70 numbers of bus services and 124 nos. of pickup stands / Q shades and this amount would be utilized in the infrastructure development of the city.

The major reasons for the success of the project are attributed to private investment by operators for buses, infrastructure and operation and sharing of returns with operators against expenditure incurred. The Government of India has conferred an Award for Excellence in Urban Mobility on 5th December, 2008.

The **City Bus Service of Surat** is having a fleet of 116 buses, which are operating on 41 routes. These buses are efficient (in terms of frequency), cost effective and eco-friendly. Around 50,000 commuters travel by these buses daily. It issues daily passes, students' passes and allow free travel to freedom fighters. Besides, a system of weekly review by the traffic department of the corporation has been put in place to make the system more effective and efficient. Its success is attributed to the PPP model used for providing the service. It has received Best PPP Initiatives in Urban Transport award, by MoUD in the year 2008.

Jalandhar City Transport Service Limited (JCTSL), a SPV, to operate and manage the public transport system and provide differentially priced services. In the first phase, JCTSL have 16 buses having GPS and PIS system, which will expand very soon. Since it has started recently in the beginning of 2009, the operational as well as financial performance was not available.

However, the study team of the Institute interacted with the officials of JCTSL to know about its performance. They mentioned that the operating cost is being covered by fare revenue (from fair box). The team also interacted with the commuters who were traveling by these buses. It was found that the commuters, who were using Intermediate Public Transport (IPT) modes earlier, have switched over to these buses. The commuters were found satisfied with the services of these buses.

The **City Bus Service of Jabalpur** is running 28 Metro and 9 Mini Metro buses on 6 and 4 routes (July 2009) successfully. The financial performance of it is up to mark. Revenue is being collected as ₹ 26 per Km against operating cost of ₹ 24 per Km thus proving that Metro bus operation in Jabalpur is profitable under the PPP mode. Moreover, commuters were found to be satisfied with the service.

In **Jalgaon City**, around 30 Eco buses (Bharat II), equipped with GPS, PIS, modern ticketing and pass-system were being operated by Prassan Bus links Pvt Ltd under the overall supervision of Transport Committee constituted by Jalgaon Municipal Corporation (as on December 2009). The frequency of these buses is 5 minutes where the traffic density is high and after 10 minutes where the passenger load is moderate.

It was reported by the authorities that the ridership was increasing as it was attracting commuters who were travelling earlier by other modes of transport. Most of the commuters found quite satisfied with services in terms of frequencies and quality of the service (NIUA's study team interviewed with the commuters).

Kolkata Multilevel Underground Parking Project, having 250 parking slots in underground parking system at Level 2 and market complex at Level 1 with 200 shops on lease, may also be treated as successful project. The pedestrian plaza on the ground is a bonus for the pedestrians. Street parking is no longer allowed on Lindsay Street, the traffic jams have become a thing of past. This project is being replicated in many cities such as Mumbai, Pune etc. In this case also, the success of the project is attributed to PPP models used in it.

Performance parameters / assessment indicators of aforesaid projects are given in Table 12.2 for ready reference.

12.3 Major Challenges / Constraints and Lessons Learnt

It is to be mentioned that the aforesaid case studies are success stories in many respect but these have encountered many challenges or constraints, either at the time of planning or at the time of implementation. Challenges / constraints indicated in the case studies may be classified in following categories:

1) Related to Finance

- Financial constraints due to cost escalation (Pimpri-Chinchwad);
- Financial sustainability of overall operation (Jaipur).

Lesson Learnt: Financial viability of the project should be worked out keeping in view the trend of inflation rate.

2) Related to Planning

- Inadequate RoW in some areas (Jaipur);
- Availability of minimum ROW to achieve segregation of traffic on the corridors (Vishakhapatnam);
- Land acquisition of properties to produce RoW (Visakhapatnam);
- Acquisition of land for construction of depot, workshop and bus terminals (Jalgaon);
- Unavailability of lands for provision of parking near bus stops (Jaipur);
- Land acquisition delays the implementation process & land acquisition issues (Jaipur);
- Lack of interagency coordination (Jaipur and Vishakhapatnam); and
- Shifting of utility services (Jaipur) addressing drainage (Visakhapatnam).

Lesson Learnt: Land use planning should be integrated with transport planning in newly developing areas. NUTP also suggests the same.

3) Related to Operation of Buses

- Low frequency of buses (Jabalpur);

- Buses are time efficient but the frequencies of these buses are very low (Jalandhar); and
- Existing routes are not viable for profit to the Bus Operators (Jalandhar).

Lesson Learnt: Travel demand on different routes should be reviewed periodically.

4) Related to Technical Issues

- Problem of driving buses as the engine fitted at the rear side of bus and there is no automatic transmission system (Jabalpur); and
- Buses are big in size, operation on narrow road is not smooth having inadequate turning radius (Jalandhar);

Lessons Learnt:

- ❖ Automatic transmission is must not only to improve maneuvering but also to reduce the wear and tear of the buses; and
- ❖ Minibuses should be operated on such roads where widening of roads is not possible.

5) Socio-Economic Issues

- Agitation by auto rickshaws drivers;
- Poor knowledge of traffic sense of the citizens have created difficulties in day to day traffic despite efforts towards high standards of traffic engineering in the city (Surat and Vadodara); and
- Strategic locations of village settlements at Simhachalem, where property acquisition is rather difficult (Vishakhapatnam).

Lesson Learnt: Awareness Campaign should be organized to provide knowledge about the project as well as traffic rules.

12.4 Suggestions

Keeping in view the review of the case studies / projects, in terms of overall performance and impacts of the projects, PPP arrangements / models used, challenges / constraints encountered at the time of planning or implementation of the project and lessons learnt, some suggestions can be given to improve future planning and implementation of the urban transport projects:

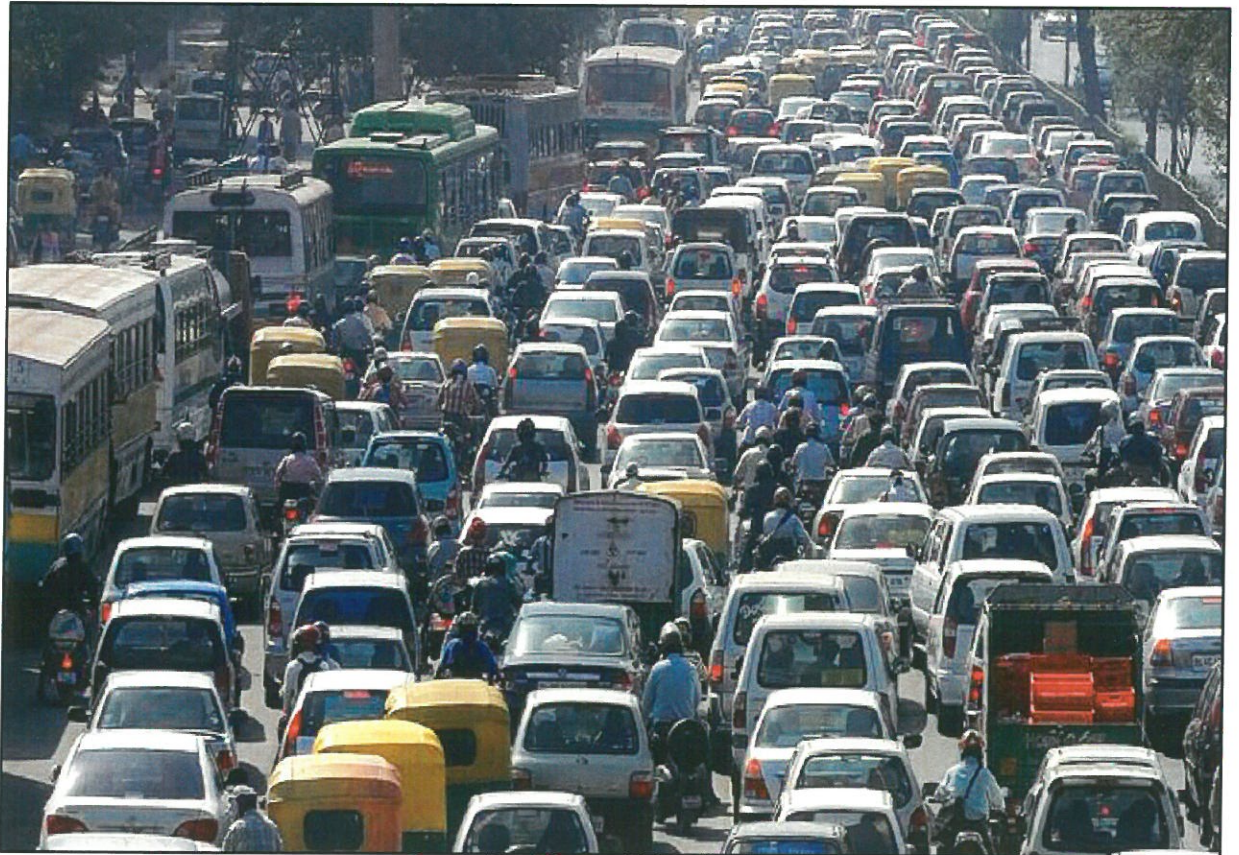
- 1) The analysis of various case projects reveals that PPP is one of the factors, which is responsible for making the project successful. In the case projects, public sector has been represented by Municipal Corporation (Surat, Vadodara and Kolkata), SPV (Ahmedabad, Pimpri-Chinchwad, Jaipur, Visakhapatnam and Jabalpur) and Transport Committee (Jalgaon). The aforesaid Municipal Corporations have been performing their roles efficiently, however, it may be suggested that there should be a dedicated body, like SPV or TC, which could concentrate only on transport activities to make the project more successful.
- 2) The public sector should be responsible for planning, designing, identifying routes and locations of bus stops / bus queue shelters, fixing of fares etc (as indicated in many case projects). Moreover, it should be responsible for monitoring the operation of buses to ascertain as to whether the operators are operating buses as per the schedule or time table. It has been pointed in case of Jalandhar that the operators were operating their buses only on profit making routes and avoided operations on uneconomic routes. In such cases, the public authority should assess the commuters' volumes on uneconomic routes and fix up the frequency of buses accordingly.
- 3) As indicated earlier, the revenue from the fares or fare box is the major source of revenue, therefore, fixation of fares or preparing fare structure should be done by the public authorities. It is one of the important responsibilities of the public sectors as indicated in case studies also. In this context, it may be suggested that the fares should not be pegged at levels lower than that required to cover the cost. Moreover, the fares should be revised periodically to meet the operating cost. It has been reported that the operators in the some case projects provide concessional passes to certain sections of the citizens. In this regard, it may be suggested that the operator should not be forced to provide concessions. If special fares or concessions are given, the departments / local bodies concerned should compensate the operators. For example, the revenue loss as a result of issuing passes to students should fully be reimbursed by the Ministry of Education or any other concerned departments.
- 4) The authorities should explore alternative ways to generate revenues besides the fare box. PCMC has developed an innovative financial model (Annex VIII of the study) to create a new revenue stream to UTF to construct, operate and maintain BRT corridors. It has allowed TDR from other zones to BRT corridor on payment of premium, which

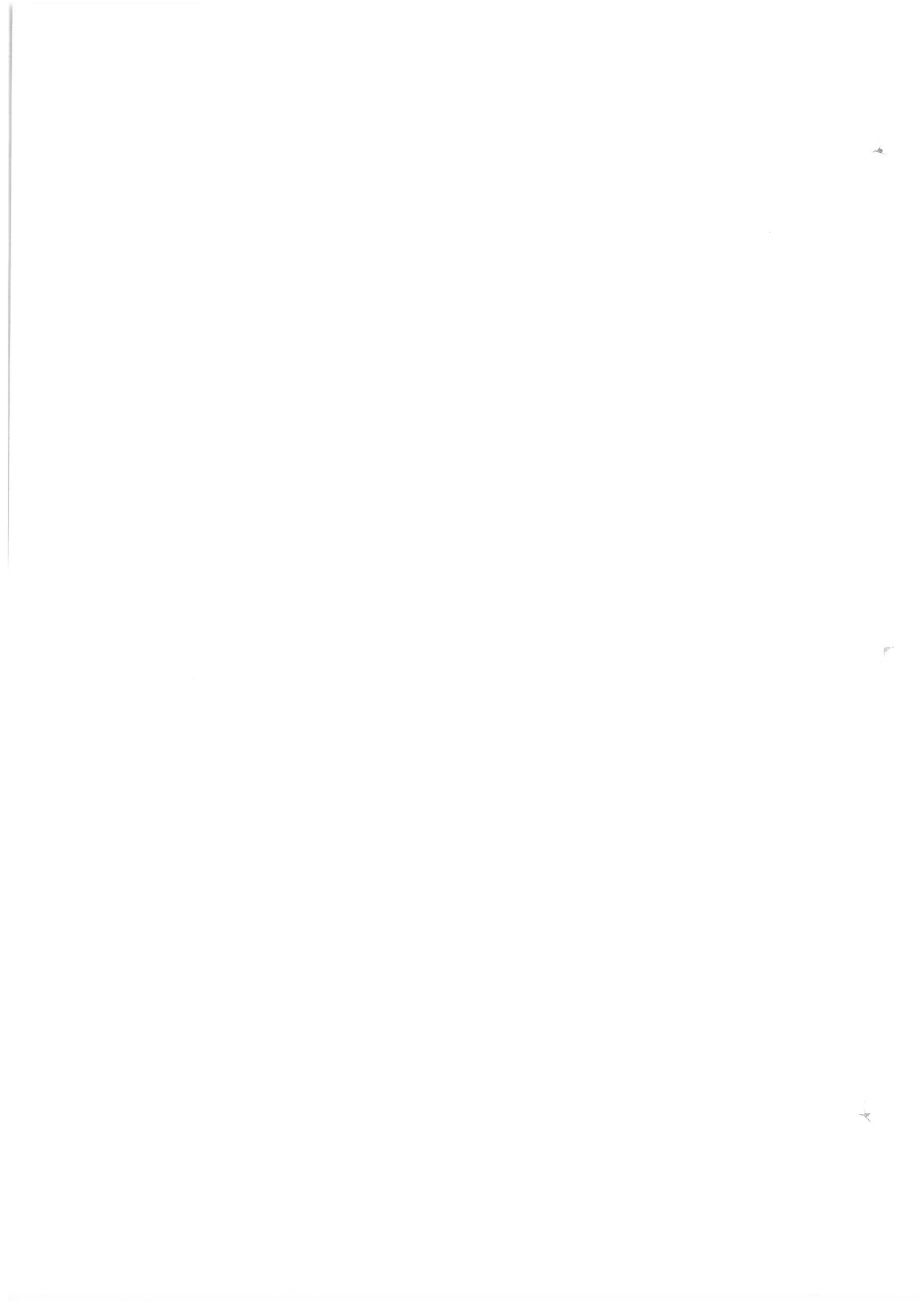
makes 59% of the total income potential of BRT corridor. The same model may be replicated in the BRT projects of other cities.

- 5) The analysis of various PPP arrangements / models, used in the case studies, reveals that the PPP depends upon the requirements of the public sector. The financial health of most of the Municipal Corporations / Municipalities or Urban Transport Undertakings is not sound to provide urban mass transport services as per increasing demand. In such cases, public sector should enter into PPP and engage the private sector (private companies) through service contract to procure, operate and maintain the buses (as in case of Ahmedabad, Jalandhar, Vadodara, Surat, Jalgaon, etc).
- 6) If a public sector does not have technical and engineering means, it may involve the private sector for specific purposes, viz. construction of bus queue shelters / bus stops on BOT (as in case of Jalandhar, Surat, Jabalpur, Vadodara and Jalgaon), construction of foot over bridges on DBFOT (Ahmedabad) or on BOOT (Visakhapatnam); and ITS - GPS, PIS etc on BOT (as in Jabalpur, Surat, Vadodara, Jalandhar, Ahmedabad). The Ahmedabad BRT project has introduced latest technological applications, which are classified in three broad areas, viz. wireless station and bus door operations by driver, RFID based Docking System; Integrated Transit Management System; and Area Traffic Control System. This system is operating successfully and may be replicated in other BRT projects of other cities.
- 7) In order to make the BRTS more successful, it may be suggested to identify nodal points at BRT corridors and provide 'feeder' services from these nodal points to important city areas. The alternative modes of transport, viz. mini buses, battery vans, tempos etc. may be used to provide feeder service. This practice is being done in case of Ahmedabad BRTS.
- 8) As indicated in some case studies, land acquisition for providing RoW in city area had become one of the major constraints. In such cases, the government should take a quick decision to release the land by giving appropriate compensations to the property owners. In newly developing areas of the cities, land use planning should be integrated with the transport planning (NUTP also suggests the same). The selection of public transport modes should be done keeping in view the characteristics of the city. For large cities metro is advisable while BRTS suits for medium size cities. Modern city bus service, equipped with ITS, is also one of the alternative modes for medium sized cities.

- 9) In case of Jaipur and Visakhapatnam, coordination problems have been faced with the agencies involved. In this regard, it may be suggested that the public body- SPV or transport committee should intervene to solve the coordination problem with the relevant departments or agencies involved. The NUTP has suggested constituting Unified Mass Transit Authority (UMTA) for the purpose.
- 10) As in case of Jalandhar, drivers are not driving buses smoothly as they find difficulty in changing the gears (from lower to higher or from higher to lower) because of the rear side fitted engine in the buses. Generally, the gears are changed by hearing the sound of engine, which is not possible in the aforesaid buses. It may be suggested that these buses should have automatic transmission not only to improve the maneuvering but also to reduce the wear and tear of the buses;
- 11) Technically sound projects are not successful in many instances due to not providing adequate project information for the general public. As indicated in Visakhapatnam BRT project, it is imperative to engage the public through the social assessment study and wide publication in the news media. In other words, the co-operation of citizens is imperative to make the project successful in real sense. Awareness Campaign should be organized to provide knowledge about the project. Moreover, citizens should be consulted at the time of planning of the project for seeking their feedback and opinion. They should be aware about transport service, which is to be given to them. People's participation in implementation of the project should also be encouraged.

Reference & Annexes





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ANNEXURE

Annex-I

List of Metro rail Projects approved by the Government of India and those under process/consideration (As on July 1, 2009)

<u>List of Metro Rail Projects approved by the Government India and those under process/consideration</u>				
S. No.	Project	Length (in km)	Cost (Rs.in crore)	Status
National Capital Region				
1.	<u>Delhi MRTS Phase I</u>	65.05	10571	Project was sanctioned on 12.11.1996 and has been fully commissioned and made operational.
	Shahdara-Rithala	22.06		
	Vishwavidyalaya-Central Secretariat	10.84		
	Indraprastha-Dwarka	25.65		
	Dwarka sub-city (Dwarka- Dwarka VI)	6.5		
2.	<u>Delhi MRTS Phase II</u>	54.675	8605.36	Project was initially sanctioned on 30.3.2006 and revised sanction order issued on 7.3.2008. Project is under implementation. <u>Target/Completion date</u> Commissioned on 3.2.2009 (9 months ahead of schedule) 30.6.2010 Commissioned on 30.6.2008 (6 months ahead of schedule) 30.6.2009
	Vishva Vidyalaya - Jahangir Puri	6.36		
	Central Secretariat - Qutab Minar	12.525		
	Shahdara - Dilshad Garden	3.09		
	Indraprastha - New Ashok Nagar	8.07		

	Yamuna Bank - Anand Vihar ISBT	6.16		31.12.2009
	Kirti Nagar - Mundka (along with operational link to Inderlok)	18.47		31.3.2010
3.	Extension of Delhi Metro from Ambedkar Nagar in Delhi to Sushantlok (Gurgaon)	14.47	1581	The project was sanctioned on 4.12.2006 and is under implementation. It is targeted for completion by 31.7.2010.
4.	Extension of Delhi Metro from New Ashok Nagar in Delhi to NOIDA Sector-32	7.0	827	The project was sanctioned on 19.3.2008 and is under implementation. It is targeted for completion by 30.6.2009.
5.	High Speed Express Link from New Delhi Railway Station to IGI Airport	19.2	3076	The project was sanctioned on 17.5.2007 and is under implementation. It is targeted for completion in June, 2010.
6.	Central Secretariat to Badarpur	20.16	4012	The project was sanctioned on 17.5.2007 and is under implementation. It is targeted for completion in June, 2010.
7.	Express link from IGI Airport to Dwarka Sector-21	3.50	793	Project has been sanctioned on 29.1.2009 and is targeted for completion by 30.9.2010.
8.	Metro link from Dwarka Sector-9 to Sector-21	2.76	275 + 81.11 (cost of rolling stock to be met by DMRC)	The project was sanctioned on 25.4.2008 and is under implementation. It is targeted for completion by December, 2009.
9.	Extension of Delhi Metro to Faridabad	13.875	2028	Matter is under process by Delhi Metro Rail Corporation Ltd. for obtaining approval of GNCTD and thereafter for submission of agenda note for consideration of Empowered Committee. Government of Haryana (GoH) has also been

				requested to submit Comprehensive Mobility Plan (CMP), improvement of city bus service, setting up of special purpose vehicle, etc. GoH and GNCTD reminded at the level of Secretary(UD).
10.	Extension of Delhi Metro from Anand Vihar ISBT to Vaishali, Ghaziabad	2,574	320	It is understood that DMRC has undertaken construction of the project as deposit work of Ghaziabad Development Authority. DPR and formal proposal are awaited from Govt. of Uttar Pradesh.
11.	Metro link from Jahangirpuri to Badli	3,425	394	Brief Project Report was submitted by DMRC to Chief Secretary, GNCTD on 18.5.2006 for 'in principle' approval, which is awaited. Meanwhile, DMRC has undertaken other priority projects mentioned above to be completed before Commonwealth Games, 2010.
12.	Extension of Delhi Metro to Bahadurgarh (Haryana)	11,781	1432	GoH has submitted DPR to GNCTD on 10.3.2009 for approval. Copy of letter has also been sent to MoUD for processing
13.	Delhi MRTS Phase III	138.9	24,303	Proposal discussed by Secretary(UD) on 26.3.2009 with concerned Ministries and Planning Commission. Sub-Committee constituted to recommend viable financing options.
Other Than National Capital Region				
13.	Bangalore Metro Rail Project	33	6395	Project sanctioned by the Govt. on 11.5.2006. Project is targeted for completion by 31.12.2011.
14.	East-West Metro corridor, Kolkata	13.77	4676	Project sanctioned by the Govt. on 30.7.2008. Project is targeted for completion by 31.01.2015.
15.	Varsova-Andheri-	11.07	2356	MoUD has proposed to provide

	Ghatkopar Line-I, Mumbai			equity/Viability Gap Funding (VGF) for this project as a Special Central Assistance (SCA) of Rs.650 crore outside JnNURM on similar lines, as was given to BRIMSTOWAD project. Secy.(UD) has written a D.O. letter dated 12.9.2008 to Secy., Deptt. of Expenditure in this regard. However, Secy., Deptt. of Expenditure vide letter dt. 24.10.2008 do not favour the proposal for funding the VGF for the ongoing Varsova-Andheri-Ghatkopar corridor of Mumbai Metro Project outside JnNURM.
16.	Charcop-Bandra-Mankhurd Line-2, Mumbai	31.87	7660	Empowered Committee in its meeting held on 25.8.2008 has recommended in principle for giving 20% VGF as per project cost of Rs.7660 crore under the VGF scheme of Ministry of Finance.
17.	Colaba-Mahim-Bandra Line-3, Mumbai	19.95	10571	Proposal awaited from State Govt.
18.	Chennai Metro Rail Project, Tamil Nadu	50	14600	Draft Cabinet Note duly approved by the Hon'ble UDM sent by Ministry of Finance for comments/ approval.
19.	Kochi Metro Rail Project, Kerala	25.3	29915	The matter is presently under consideration by the Planning Commission for in principle approval.
20.	Hyderabad Metro Rail Project, Andhra Pradesh	71.29	11892	The concession for Hyderabad Metro Rail Project has been awarded by Govt. of Andhra Pradesh to consortium led by M/s Nav Bharat based on concession agreement approved by Empowered Institution and Empowered Committee of Ministry of Finance,
				GoI. No VGF is envisaged. The lowest bidder has quoted negative VGF of Rs.30311 crore spread over 34 years.

Source: Ministry of Urban development, Government of India

Annex-II**Metro Rail Projects through Public Private Partnership (PPP)****A. II.1 Mumbai Metro Rail Project**

Mumbai Metro Master Plan has identified a 146.5 kms network to provide a rail based mass transit connectivity to people within an approach distance of 1 to 2Km; to serve the areas not connected by existing Suburban Rail System and to provide proper inter change facilities for connectivity for neighbouring areas like Thane, Navi Mumbai and Vasai - Virar etc.

Table II.1: Mumbai Metro Rail Project

Phases	Length (in Km)
Phase I	
Varsova – Andheri – Ghatkopar	11.07
Charkop – Bandra – Mankhurd	31.871
Colaba – Bandra	19.75
Total	62.69
Phase II	
Charkop – Dahisar	7.50
Ghatkopar – Mulund	12.50
Phase III	
BKC – Kanjur Marg Via Airport	20.50
Andheri (East) – Dahisar (east)	18.00
Hutatma Chowk – Ghatkopar	21.8
Sewri – Prabhadevi	3.5
Total Length	146.50

Source: Mumbai Metropolitan Regional Development Authority

In Phase I, Varsova-Andheri-Ghatkopar corridor (Line I) of 11.07 km will be commissioning by 2010-2011. The cost of the project is ₹ 2356.00 crore. The Viability Gap Funding (VGF) grant

from the Central Government is ₹ 471 crore (Special Central assistance), while the VGF from the government of Maharashtra is ₹ 179 crore.

The Charkop – Bandra – Mankhurd corridor (Line- II) is planned as an elevated corridor for its entire length of 31.871 kms. The completion cost of the project is ₹ 7660 crore. VGF grant from the central Government is ₹ 1, 532 crore. The Corridor has 27 stations, all stations are elevated. Depot and stabling facilities have been planned at both ends of corridor at Charkop and Mankhurd. The concession agreement was signed on 21st January 2010 and expected to be commissioned by the year 2013-14.

Table II.2: A Funding Pattern of Metro Rail Project of Mumbai

	Project	Length (kms)	Commissioning Schedule	Cost (₹ in crore)	Funding Plan (₹ in crore)
1)	Mumbai Metro Line-I Varsova-Andheri-Ghatkopar	11.07	Commissioning By 2010-11	2356.00	Equity Concessionaire -379 (74%) Equity MMRDA - 134 (26%) Debt - 1194 VGF grant GoI - 471 (SCA*) VGF GoM - 179
2)	Mumbai Metro Line-2 Charkop-Bandra-Mankhurd	31.87	Concession Agreement signed On 21.01.2010 Commissioning by 2013-14	7660.00	Equity Concessionaire- 1609 Equity of MMRDA-NIL Debt – 3753 (*DE Ratio=70:30) VGF GoI- 1532 VGF GoM- 766
3)	Mumbai Metro Line-3 Colaba -Bandra	20	Approval awaited	-	Not applicable.

Source: Ministry of Urban Development (MoUD) [*SPA - Special Central Assistance; *DE – Debt Equity]

The Government of Maharashtra has designated Mumbai Metropolitan Region Development Authority as the project implementing authority. The project is being implemented on Build, Operate and Transfer (BOT) through Public Private Partnership (PPP). The Concessionaries of the project implementation is the SPV comprising M/s Reliance Infrastructure LTD, SNC Laval in (Canada) and Reliance Communications.

A.II.3 Hyderabad Metro Rail Project

The Hyderabad Metro Rail Project covers three high density traffic corridors of the city, viz. Miyapur-LB Nagar (28.87 Km, 27 stations); JBS- Falaknuma (14.78 Km–16 stations) and

Nagole-Shilparamam (27.51 km, 23 stations). Thus, the total length is 71.16 km with 66 stations. The project is in PPP mode on Design, Build, Finance, Operate and Transfer (DBFOT) basis. Cost of the project, as approved by the Government of India is ₹ 12, 132 crore. Up to 40 % of the project cost, i.e., a maximum of ₹ 4, 853 crore can be given as VGF by the Central and State Governments together, subject to competitive bidding. The Government of India has sanctioned ₹ 2, 363 crore as its share under the VGF scheme for this purpose. This amount forms 20% of the estimated cost of the project of ₹ 12, 132 crore minus the State taxes component of ₹ 318 crore.

The previous Concessionaire M/s. Maytas Metro Ltd. failed to achieve financial closure by the due date, the Concession Agreement with them was terminated by the Government in July 2009. Their bid security of ₹ 60 crore along with ₹ 11 crore paid by them was forfeited and the Government of Andhra Pradesh invited global bids through fresh pre-qualification. Financial bids for the Project were opened on July 14, 2010. Three of the six pre-qualified firms participated in the bids.

Table II.3: Firms Participated in the Bids

	Firms	Amount (₹ in crore)	Percentage of Project Cost
1.	Larsen & Toubro Ltd	1,458	12
2.	Transstroy India-OJSC Transstroy Russia-CR 18G Consortium	2, 200	18
3.	Reliance Infrastructure Consortium	2, 991	25

Source: MoUD

The Government of Andhra Pradesh has selected the successful lowest bidder M/s Larsen & Turbo Ltd as the Concessionaire for the Hyderabad Metro Rail Project at their quoted grant amount of ₹ 1458 crore (12% of Total Project Cost) and awarded the Project to them. The Mo UD facilitated sanctioning of the VGF grant of ₹ 2,363 crore for the Project.

A.II.4 High Speed Express Link from New Delhi Railway Station to IGI Airport and Extension from IGI Airport to Dwarka Sector 21

(A) Link form New Delhi Railway Station to IGI Airport

In order to address the growing road traffic congestions and need for fast evacuation of passengers and visitors at the Airport, the Delhi Metro Rail Corporation Ltd. (DMRC) had submitted a proposal to the Government of India to provide a High Speed Express Link from New Delhi Railway Station to IGI Airport. The Government of India (GoI) gave sanction to implement the High Speed Express Link from New Delhi Railway Station to IGI Airport of length 19.2 Km. at a total estimated completion cost of ₹ 3076 crore including taxes on 17 May 2007. The details of the sanction are given below:

i) Alignment

The alignment will be from New Delhi Railway Station via Baba Kharak Singh Marg, Ram Manohar Lohia Hospital, Mother Teresa Crescent, Sardar Patel Marg, Dhaula Kuan and National Highway No.8 to IGI Airport.

ii) Length

The length of the alignment shall be as under:

Underground length	5.5 km
Elevated length	11.6 km
Switchover ramp	2.1 km
Total	9.2 km

iii) Stations

The stations will be located at New Delhi City Terminal, Shivaji Stadium (Baba Kharak Singh Marg), Dhaula Kuan and IGI Airport Terminal.

iv) Gauge

The Express link has been approved on standard gauge. The coaches with proven designs are available worldwide on standard gauge. Adoption of standard gauge has been accepted as it will

be more economical and will also need lesser time in supplying and commissioning to suit the completion of the link before Common Wealth Games i.e. by June, 2010.

v) Rolling Stock

The rolling stock required for the Express link will be of different design than normal metro due to higher speed (135 kmph or more), different sitting arrangements, luggage carrying arrangements, etc. The link shall, therefore, be a standalone system.

vi) Train Maintenance Depot

Train maintenance depot is proposed to be located at T-Junction where NH-8 and road to domestic airport meets. Approximately, 5 hectare land is required for this purpose, which is under occupation of the Defence Authorities, but at present lying vacant.

vii) Land Requirement

The land belonging to various Ministries / Departments as well as autonomous / statutory bodies / agencies of the GoI / GNCTD, which is required for the project, will be taken over by GOI / GNCTD at inter-departmental transfer rates notified by the MoUD, while the Railway land required, if any, will be made available on lease rates based on the market price of the land to be agreed upon between the MoUD and the Ministry of Railways (MoR).

viii) Cost Estimates

The overall capital cost for the line at March 2006 price level comes to ₹ 2541.81 crore (including taxes and duties). The completion cost is ₹ 3, 076 crore (including taxes and duties).

ix) Financing Plan

Under Concessionaire approach approved, the civil works outside the Airport i.e., cost of land, alignment, stations are to be shared by Government of India (GoI) and GNCTD equally as equity contribution. The cost of civil works within the airport will be borne by Airport Operator (Rs.350

crore) as grant to DMRC. The balance cost including rolling stock is to be borne by the concessionaire. The break-up of the financing plan is given below:

Table II.4: Funding Arrangements for High Speed Express Link form New Delhi Railway Station to IGI Airport

	Particulars	₹ (in crore)	Percentage
1.	Grant by Airport Operator to DMRC towards civil jobs inside the airport (To be provided upfront)	350	12
2.	Equity by the Government of India (GOT) towards civil jobs outside airport	599	19
3.	Equity by GNCTD towards Civil Jobs outside airport	599	19
4.	Equity by Concessionaire to maintain debt to equity ratio of 7:3	461	15
5.	Domestic Debt @10% by Concessionaire	1067	35
	Total	3076	100

Source: MoUD

x) Additional Investment to be made by the Concessionaries as traffic increases

Additional investment cost ₹ 768.00 Crore with taxes at completion cost has been provided in the year 2021-2022 to be provided by the concessionaire. These costs have been provided to take care of increased requirement of rolling stock and related equipment on account of the increased traffic since the existing rolling stock would be insufficient to carry out the traffic estimates in these years. This cost shall be fully borne by the concessionaries.

xi) Operation & Maintenance Costs

The total O&M cost shall be borne by the concessionaries.

xii) Taxes

Taxes and duties livable for this project have been incorporated in the total completion cost of ₹ 3, 076 crore.

xiii) Implementation of the Project

The civil works of the project shall be executed by Delhi Metro Rail Corporation Ltd. as per detailed project report (DPR) and revised project profile on PPP mode. Concessionaire shall also be fixed by DMRC and concessionaire agreement to be finalized in consultation with Ministry of Urban Development.

This project shall be part of an Integrated Transport Master Plan (ITMP), which will also include the plan for the feeder routes, etc. check-in facilities for passengers by all airlines at New Delhi Terminal, Shivaji Stadium (Baba Kharak Singh Marg) and Dhaula Kuan and baggage handling at New Delhi terminal and Shivaji Stadium shall be planned and provided by DMRC Ltd., Ministry of Civil Aviation and its affiliated agencies. Feeder / Intermodal transport and adequate parking facilities at all the stations shall be provided by Government of National Capital Territory of Delhi (GNCTD) and DMRC Ltd. The project shall be completed by June 2010.

(B) Extension Metro Rail from IGI Airport to Dwarka Sector 21

In continuation of the afore said order, GoI has considered the need for extension of this Express Link from IGI Airport to Dwarka Sector-21, which is being developed as a big transport hub having Metro line, Integrated Rail-cum-Bus Transport (IRBT) and Inter State Bus Terminal (ISBT). The sanction, for implementing the above mentioned extension, was given on 29 January 2009 through Order No. L-14011/1/2002-MRTS. The details of the above sanction are given below:

i) Alignment

The alignment from IGI Airport to Dwarka Sector-21 of length 3.5 km approx. will be completely underground.

ii) System

All the system / sub-systems (i.e. traction, signaling, telecommunication, automatic fare collection, air-conditioning and tunnel ventilation system), including standard gauge, will be the same as that of High Speed Express Link from New Delhi Railway Station to IGI Airport. At

Dwarka Sector-21, there will be facility of passenger interchange with Dwarka Metro line. No check in facility for air Travellers is proposed at Dwarka Sector-21 Station.

iii) Train Maintenance Depot

No separate depot will be necessary.

iv) Land Requirement

The land belonging to various Ministries / Departments as well as autonomous / statutory bodies/agencies of the GoI / GNCTD, which is required for the project, will be taken over by GoI / GNCTD at inter- departmental transfer rates notified by the MoUD, while the Railway land required, if any, will be made available on lease, the charges of which will be worked out on the basis of commercial market prices available for that area, as fixed by L&DO of Ministry of Urban Development, in case the land so given is commercially exploited / proposed to be exploited by Delhi Metro Rail Corporation (DMRC) Ltd.

This will be applicable for only that part of the land commercially exploited/proposed, In case the Railway land given to DMRC is not used / proposed not to be used for commercial exploitation, the land rate applicable for the surrounding land based on the existing use will be considered for working out lease charges.

v) Cost Estimates

The overall completion cost of the project is estimated at ₹ 793 crore (including taxes and duties) as under: Cost of civil works - ₹ 534.64 crore; Cost of system - ₹ 258.36 crore

vi) Financing Plan

The extension of Airport Express line from the Airport to Sector-21 will also be funded on Public Private Partnership (PPP) basis with the civil works alone to be completed by DMRC and the systems and rolling stock being provided by the Concessionaire. The cost of civil works will be shared by Government of India (GoI), Government of National Capital Territory of Delhi (GNCTD) and Delhi Development Authority (DDA). the latter's contribution being as a grant

and the contribution of GoI and GNCT as equity to DMRC. The funding arrangement will be as under:

Table II.5: Funding Arrangement for Extension of the High-Speed Express Link from IGI Airport to Dwarka Sec-21

S.No.	Particulars	Rs. (in crore)	Percentage
1.	Equity by Govt. of India towards civil works	158.60	20.00
2.	Equity by GNCTD towards civil works	158.60	20.00
3.	Grant by DDA	217.40	27.42
4.	Concessionaire's investment	77.50	9.77
5.	Domestic debt by Concessionaire	180.90	22.81
	Total	793.00	100.00

Source: MoUD

vii) Implementation of the Project

The implementation of the project shall be on PPP basis with the civil works alone to be completed by DMRC as per detailed project report (DPR) and the system and rolling stock being provided by the Concessionaire. The project is targeted for completion by September 2010, in time for the Commonwealth Games in 2010. Civil works within the Airport premises have to be completed for this link early to enable the Airport Operator to complete their works. This project shall be part of an Integrated Transport Master Plan, which will also include the plan for the feeder routes, etc. Feeder / Inter-modular transport and adequate parking facilities at all the stations shall be provided by Government of National Capital Territory of Delhi (GNCTD) / DDA and DMRC Ltd.

Annex-III**BRTS Projects Sanctioned Under JNNURM (As on January 31, 2009)****BRTS PROJECTS SANCTIONED UNDER JNNURM**

Total – 422.35 kms at Rs 4770.966 crore (ACA Rs 2195.668cr)

Pune	101.77 km	Rs 1051.00 crore
Pimpri Chinchwad	42.22 km	Rs 738.16 crore
Indore	11.45 km	Rs 98.45 crore
Bhopal	21.71 km	Rs 237.76 crore
Ahmedabad	88.50 km	Rs 981.35 crore
Rajkot	29.00km	Rs 110.00 crore
Surat	29.90 km	Rs. 469.00 crore
Jaipur	39.45 km	Rs 479.55 crore
Vijaywada	15.50 km	Rs 152.64 crore
Vizag	42.80 km	Rs 452.93 crore
# Delhi	14.6 kms (implementing with own funds)	

Source: Ministry of Urban Development, Government of India

Annex - IV**Initiatives / Best Practices Format**

FORM I	
General information about your Organisation (Fill the following queries and provide one page write up about your organisation and project as well)	
Project Contact Person:	
Submitter (if different from above) and submitter's affiliation:	
Detailed Address of the Organization/Agency	
Telephone No.	Office:
	Residential:
	Fax:
	E-mail:
Type of the Organization- Government Individual NGO Co-operatives Other	
Partnering Agencies/Individuals	
INFORMATION ABOUT INITIATIVE/PROJECT / BEST PRACTICE (Illustrative)	
A: Context	
1. Title of the Initiative/ Project / Best Practice:	
2. Geographic Location:	
3. Focus Area:	
B: Situation before implementation of the Initiative/ Project/ Best Practice	
1. Describe in brief (not more than 200 words), the situation as it was before the start of the project: (Describe in narrative form rather than in bullet form-(no. of vehicles or p.c.u)	
2. What were the problems/needs addressed by the best practice?	
3. Reason for the adoption of particular system?	
4. Preparation of feasibility report?	
C. Description of the Initiative/ Project/ Best Practice	
1. Describe the Initiative/ Project/Best Practice in narrative form (in 500 words)	
2. Goals of the Initiative/ Project/ Best Practice	

3. Strategy used to achieve the desired goals
4. Activities implemented to achieve the above goals
5. Challenges/constraints encountered and how it was conquered
6. Outcome of the Initiative /project/ best practice
7. Roles/ activities of the partners at each stage of the initiative/ project/ best practice
8. Important stakeholders involved and communication/networking procedure for the initiative/project/ best practice
D. Factors of Success
1. Describe the main successful (positive and sustainable) results/factors/conditions for the initiative/project/ best practice
E. Budgetary Implications and Sustainability
1. Approximate total cost for the initiative/project/ best practice
2. Financial partners involved
3. Source of Finance for the sustainability of the initiative/ project/ best practice
F: Impact of the Initiatives / Best Practice
1. Have the best practice been disseminated in any forum and have received any recognition
2. Documentation and Research work/References for the best practice, if any
3. Please enclose any photographs and resource products, paper clippings along with the entry.
4. Has the project achieved the set targets/objective?

PLEASE SEND THIS FORM AS AN ATTACHMENT TO:

dghosh@niua.org or rchandra@niua.org

OR Post / Fax A Copy to:

Coordinator Transport Project

National Institute of Urban Affairs (NIUA)

I & II Floor, Core 4B, India Habitat Center, Lodhi Road, New Delhi – 110003, India

Telephone: +91-11-24643576(Director), 24617517, 24617543, 24617769, 24643284

Fax: +91-11-24617513, **Website:** www.niua.org

Annex-V

Thane Railway Station Area Traffic Improvement Scheme

V.1 Context

Thane City is located about 19 m inland from the coast on the north-eastern edge of Greater Mumbai and about 34 kms from Central Business District (CBD) of Mumbai. It serves primarily as dormitory town. Thane has been experiencing a rapid growth. Thane's present (2009) population is about 1.8 to 2.0 million, which is expected to grow to about 3.4 millions by the year 2031.

Thane Municipal Corporation is one of the largest municipal corporations in Mumbai Metropolitan Region (MMR). Per Capita income of Thane City is Rs. 58,22,400. It is about 140% of per capita income of Maharashtra (Rs. 41,331) The Thane City contributes about 19% of employment among the employments in MMR excluding MCGM. Thane, till the last decade, was an industrial town. However, due to its proximity and connectivity with Mumbai and excellent civic facilities provided by Thane Municipal Corporation (TMC), people are opting to stay in Thane. This has increased the demand for housing and basic infrastructure.

Thane city is socially vibrant and culturally very balanced. The City is witnessing big growth all around. The physical development of Thane is circular, as the city has grown around the CBD in western area adjoining the Railway station. Thane Railway Station is one of the Railway stations on the very first rail link in Indian subcontinent. Presently it is one of the major stations on suburban section of Central Railway.

V.2 Situation before Implementation of the Scheme

V.2.1 Existing System

The major mode of intra-city transport is Railways. The Thane Municipal Corporation has four suburban railway stations within its limits. Major modes of inter city traffic are Public Transport

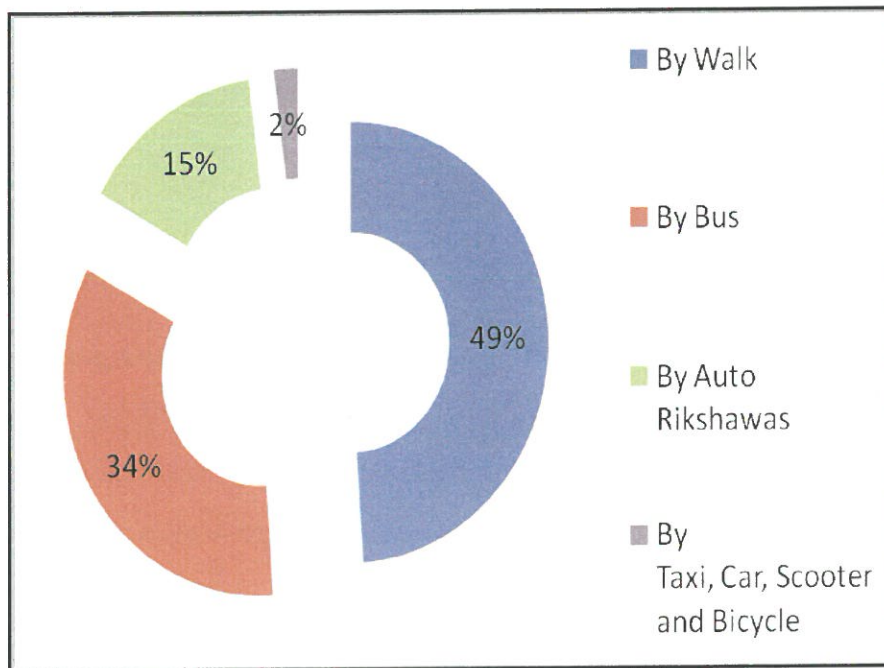


Figure V.1: Modal split-up of traffic at Thane Railway Station

Buses (Thane Municipal Transport, State Transport, Company buses), other IPT modes (Auto Rickshaw, Taxi etc.), Two wheelers and by walk. The bus mode acts as a major feeder service to the sub-urban trains.

Out of the four Railway Stations in TMC limits, Thane Railway Station is the busiest station handling about six lakhs of commuters per day. The CBD of Municipal limits are also located around the Thane Railway Station. Hence, the origin and destination of major portion of inter city trips is Thane Railway Station.

Available transport infrastructure in Thane Station Area was inadequate to cater to tremendous traffic demands. It is pertinent to mention here that; bus mode acts as a major feeder service to the sub-urban train. The Thane Municipal Transport alone had been operating 4000 daily trips from Thane Railway Station. In addition, the State Transport Corporation operates about 1500 trips.

Owing to tremendous overload on available transport infrastructure, the commuters had been facing great distress due to frequent traffic jams, delays in travel time, rising pollution levels

while reaching in and out of Railway Station. The situation had been causing arterial block in the mobility of the City.

Congestions outside most of the Railway Stations in major metropolitan cities in India are well known. The Thane Municipal Corporation had therefore undertaken Thane Railway Station Area Traffic Improvement scheme by splitting various modes of IPT traffic.

V.2.2 Problems and Needs Addressed by the Scheme

The Thane Railway station is one of the Stations on first Rail link in Indian subcontinent. The station came into existence in 1853. Since, then the area outside station had developed in non-planned manner. The available circulation area, about 8000 sq m is inadequate to cater to cater to present traffic demands.

The commuters travelling from Thane Railway station are facing great distress owing to following reasons:

- Congested Station Area with frequent traffic jams;
- No safe passage for pedestrians (about 3 lac travelers prefer to walk to and from station);
- Haphazard and crisscross movement of vehicles and pedestrians;
- No proper and adequate pickup points for autos, taxis and buses;
- Queuing of buses in approach road network because of lack of space in front of Station;
- No streamlined movement of traffic;
- Inadequacy of space for traffic movement;
- Demands for Additional Space as well as Segregation of traffic; and
- Need for planning for effective traffic dispersal.

V.2.3 Reason for Adoption of Particular System

- a) **Pedestrian:** - Pedestrian form about 49% of the total commuters. Due to particular arrangement of suburban Railway Station, Railway commuters from eight out of ten platforms have to use Railway Foot Over Bridges. Hence, by extending these FOB by

175 m and 225 m respectively on North and South side of Railway Station, the pedestrian are provided with safe and unobstructed path to disperse out of busy Railway Station Area. Thereby about 80% of the pedestrian will now disperse without entering already inadequate circulation area.

- b) **Low Level Deck and Flyover for buses:** - The buses contribute about 34% of the IPT mode. Low level deck for bus stops and connecting flyovers has been constructed in front of railway station for buses. As seen above, about 80% of the Rail commuters at Thane Station have to use Railway FoBs. By connecting these FoBs to the Low Level Deck for buses in front of Railway Station and by provision of dedicated corridor to buses, the Public Transport system has been prioritised.
- c) **Other IPT modes:** - Proper pick up points for other IPT modes (Autos/ Taxis, Private vehicles) have been provided at ground level below deck.



Figure V.2: Traffic condition at Thane railway station before SATIS

V.3 Description of the Scheme

V.3.1 Project Description

Thane Railway Station is the origin and destination of around six Lakhs of commuters each day. Hence, all the modes of inter city traffic viz. TMT, ST buses, auto rickshaws, taxis, private vehicles and pedestrians approach the railway station simultaneously. Previously, this resulted in high intensity of mixed traffic in front of Thane Railway Station as well as the approaching road network. The approaching road network and the limited circulation area in front of Thane Railway station were inadequate to handle such huge flow of mixed traffic. Mixed flow of traffic crisscrossing each other's right of ways resulted in frequent and very high traffic congestion. In addition to this, the over saturation at pick-up points for different inter city modes of transport aggravated the problems.

There has been no proper pedestrian facility to almost half of the commuters who walk on foot to and from Railway Station. The approaching road network could not be augmented simply by widening of roads due to the restrictions of Row as per Development Plan. Hence, the improvement proposal had to be envisaged considering the available road widths only. The present scheme has been envisaged accordingly.



Figure V.3: Transition through Station Area traffic Improvement Scheme

V.4 Major Components

- a) **Low Level Deck and connecting Flyover:** Low Level deck admeasuring about 2700 sq m has been provided in front of Thane Railway Station with clear height of 4.0 m. Well-planned bus stops for IPT Public Transport Buses have been erected on the deck. An exclusive flyover for buses of about 860m in length having two down ramps on different roads in station area connects the low level deck. Thus the buses can disperse out of station area over this flyover quickly.
- b) **Concourse Area:** A concourse area admeasuring 1200 sq. m. connects the Railway FoBs, new extended skywalks and the low level deck for buses. This area shall also be used for Railway ticket counters and additional commuter facilities viz. food court etc.

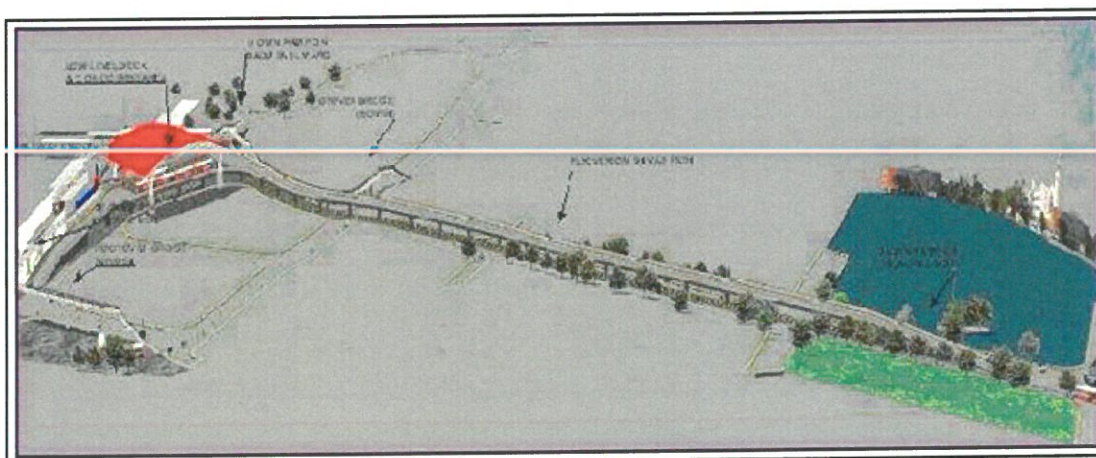


Figure V.4: Major components of the scheme

- c) **Extension of Foot Over Bridges on North and south side of Railway Station:** two skywalks of length 225 m and 175 m have been constructed respectively on south and north side of Thane Railway station. This helps in dispersing the pedestrian commuters from crowded station area safely and quickly without crisscrossing any motorized modes of traffic.
- d) **Area below Low Level Deck in front of station:** The area below the low level deck has been exclusively provided for pick-up points of other IPT modes viz. Auto Rickshaw and Taxis. The pick-up points for Auto-Rickshaws towards different part of city have been separated.

As seen earlier from the modal split-up of commuters travelling from Thane Railway Station, 49% of the commuters prefer to walk on foot. Hence, to provide excellent pedestrian facility, two skywalks of length 225 m and 175 m have been constructed respectively on south and north side of Thane Railway station. This helps in dispersing the pedestrian commuters from crowded station area safely and quickly without crisscrossing any motorized modes of traffic. Next important IPT mode is Public Transport buses. About 34% of the commuters use public transport buses. Other IPT modes of traffic viz. Auto Rickshaw and Taxi and private vehicles ply below the Low Level Deck in front of Railway Station. Proper segregation has been made for different modes at ground level also. Exclusive Space has been provided for emergency vehicles in front of Railway Station.

Before implementation of the scheme, the circulation area in front of Railway Station had been limited to 8000.00 sq m only. All the modes of traffic collectively used the same area. After implementation of SATIS, the available circulation area at two different grades has increased to 12150.00 sq m. Thus an additional circulation area of about 4150.00 Sq m has been created through the scheme in addition to segregating the different modes of traffic. By construction of flyover, the area of approaching network has been augmented by about 3500 Sq m will help in streamlining traffic flow on approach road network.

V.4.1 Goals of the Project

- 1) Elimination of crisscross movement of traffic in station area, grade separation of various modes of traffic and thereby improvement in travel speed.
- 2) Considerable savings through VoT and VoC [The calculated EIRR (Economic Internal Rate of Return) tunes to 29.60%]
- 3) Providing dedicated passage to pedestrian movement to encourage Non-Motorized mode of transport (in conformity to NUTP-2006)
- 4) Providing dedicated passage to public transport to improve functioning and thereby encouraging use of public transport system (in conformity to NUTP-2006)
- 5) Providing additional space for traffic in Station Area
- 6) Avoiding conflicting movements at junctions
- 7) Bringing down the pollution levels in Thane Railway Station Area.

V.4.2 Strategy Used to Achieve the Desired Goals

The desired goals have been tried to be achieved through provision of additional circulation area by constructing infrastructures in the form of flyover, Foot Over Bridges and concourse area.

V.4.3 Activities Implemented to Achieve the Desired Goals

a) Identification of the reasons behind the problem

In order to find the reasons behind the persistent traffic hassles in the Thane Railway Station area, the TMC carried out Traffic Studies in the central zone of Thane City in Year 2004

b) Evolving suitable alternative measures to eliminate the problem and selecting the best suited alternative: Based on the findings through the traffic studies, various alternative measures were evolved to eliminate the traffic problems in Station Area. The feasibility of the alternatives was verified and best suited option was decided on the following considerations:

- Technical feasibility;
- Financial feasibility;
- Commercial viability;
- Environmental compatibility;
- Social and political acceptability; and
- Legal and regulatory feasibility.

c) Getting approval from competent authorities: The proposed best suited option was put forth in the General Body (G.B.) of TMC, the authority competent to accord administrative approval Hon'ble G.B. approved the proposal vide Resolution no. 14 dated 16.06.2004

d) Public Hearing: The proposal was given large local publicity and suggestion and objections of the citizens of Thane were invited.

e) Getting approvals from the other stakeholders: Since, the project had to be implemented partly on the land belonging to Central Railways; the proposal was

submitted to them for approval. A memorandum of Understanding was signed between Central Railways and Thane Municipal Corporation on 08.02.2006 regarding implementation of the Project.

The proposal was then submitted to Central and State government for funding under the Jawaharlal Nehru National Urban Renewal Mission. The Central Sanctioning and Monitoring Committee sanctioned the project on 8th December 2006:

- a) **Getting statutory approvals from Heritage committee:** Part of the project was to be implemented near Kopineshwar Mandir, a heritage structure. Hence, necessary statutory approval from the Heritage Committee was taken.
- b) **Appointment of agency:** Lump sum Tenders on Design-Build basis had been called for the project. Work order to commence the work has been placed on contractor on 9th March 2007.
- c) **Public Interest Litigation (PIL):** After the issue of work order, some citizens had filed Public Interest Litigation No. 20 / 2007 in Hon'ble High Court of judicature at Mumbai. The petitioners had raised various objections regarding the General Arrangement Drawing and usefulness of the project. The Thane Municipal Corporation successfully vindicated the project and Hon'ble High Court dismissed the PIL on 20th September 2007.
- d) **Shifting of monuments:** A statue of Bharat Ratna Dr. Baba Saheb Ambedkar infringed the construction activities of foundation of Flyover Bridge. Hence, shifting of the same was necessary. Since, the issue had been socially sensitive and could have caused threat to the law and order situation, the shifting was arranged after proper coordination with concerned groups, political parties, individuals, local administration and Police. Number of common meetings, hearings etc. were arranged in the effort and finally the statue was shifted peacefully to the better location on 22nd March 2009.
- e) **Completion of the project:** The project was completed on 22nd August 2009.

V.5 Challenges / Constraints Encountered and how it was overcome

- a) **Handing over land from Railways:** About 33% of the worksite under the project belongs to Central Railways. Hence, Memorandum of Understanding including plans of the project had been signed with Railways well in advance. However, at the time of execution of work, the Central Railway insisted upon getting the General Arrangement Drawings approved from them. The approval procedures took around ten months. Persistent follow-up had to be kept with Railway for the same and then after for removal of infringing structures.
- b) **Restrictions on working hours due to traffic:** Being in the busiest area of the city, there have been huge flow of traffic at the work site and it hadn't been possible to divert the same. Hence, the work had to be carried out within the moving traffic. Additional safety measures had to be taken for the same.
- c) **Problems of local residents:** Due to the heavy traffic during day hours, the work had to be planned during nights. However, the local residents used to stop the work after 10 pm due to sounds of working machinery. The problem was addressed through regular coordination with the local residents and with the help of pollution control department to convince the noise compliance of machinery as per CPCB / MPCB norms.
- d) **Shifting of monument:** A statue of Dr. Baba Saheb Ambedkar was infringing the construction of flyover. Being socially sensitive issue involving law and order situation, the issue of shifting the same was tackled through coordination with the concerned groups, political parties, individuals and the local administration and police department.

V.6 Outcome of the Initiatives

a) Improvement in travel speed

Traffic flow in Thane Railway Station Area has been streamlined. The crisscross movements of different IPT modes of traffic have been eliminated by grade separation. The travel time of buses from Thane Station to Talaopali (about 1 Km from Thane Station) has reduced to about two minutes as compared to earlier 15-20 minutes.

b) Reduction in accidents

Pedestrian Traffic: With the provision of two skywalks, the pedestrian traffic has been provided guarded and exclusive path. Hence, the vulnerability of pedestrians to accidents with moving vehicular traffic has been minimized.

Vehicular traffic: The vehicular traffic flow has been streamlined by defining corridors and eliminating crisscross movements. Hence, the possibility of accidents has also been minimized.

c) Reduction in green house gas emission

With the tremendous traffic flow and frequent traffic jams and idling of vehicles in Railway Station area, the pollution levels have been rising alarmingly. With the implementation of project, the traffic jams and idling of vehicles in the area shall be avoided. This will help in bringing down the green house emission and air and noise pollution levels in the area.

d) Reduction in energy consumption

There will be high savings in energy consumption due to elimination of frequent traffic jams and idling of vehicles in Railway Station area due to implementation of Scheme.

e) Other benefits:

- Encouragement of non-motorized modes of transport by provision of dedicated corridors to pedestrian (FOBs).
- Dedicated bus corridor will help in encouraging mass transport of passengers from Station to rest of city. Thereby encouraging economic mode of public transport by bus. This is the need of the city and the country.
- Large savings on account of VoT and VoC. The estimated EIRR of the project is 29.60%, which is far more than the acceptance norms of funding agencies like World Bank, ADB etc.
- Before the implementation of scheme, there had been no earmarked space for emergency vehicles and private vehicles in the station Area. Now, proper space for

emergency vehicles has been earmarked. The private vehicles have been provided exclusive lane for drop down and pick-ups.

- The project is pro-economical, pro-environmental and pro-poor and conforms to National Urban Transport Policy-2006.

V.7 Role and Activities of the Partner

- Funding the project as per the limits specified under Jawaharlal Nehru National Urban Renewal Mission (JNNURM).
- Taking regular review of the progress of work.

V.8 Important Stakeholders Involved and Communication / Networking Procedure for the Project

The project was implemented under Jawaharlal Nehru National Urban Renewal Mission. The Central Government and Government of Maharashtra were the stakeholders other than Thane Municipal Corporation. Both the Governments took regular periodic review of the progress of work through the nodal agency M/s Mumbai Metropolitan Region Development Authority.

V.9 Factors of Success

The yield from the project shall be through:

- Saving in the travel time for vehicular traffic and pedestrian traffic, i.e., Value of Time (VoT).
- Saving in the vehicle operating costs due to improvements, i.e., Vehicle Operating Costs (VOC).

Economic Analysis has been carried out for an analysis period of 25 years. The benefit stream in the analysis is through the savings on account of VoT and VOC as seen above.

Table V.1: Economic Analysis

S. No.	Parameter	Nature of variation	EIRR (In %)
1)	Base case		29.60%
2)	Cost of Construction	Increase by 20%	24.90%
3)	Benefits	Decrease by 20%	23.84%
4)	Combined effect of Sr. No. 2 and 3	Cost of construction increase by 20% and benefits decrease by 20%	19.99%

Source: Thane Municipal Corporation, Thane

It may be seen from the Economic Analysis that the EIRR for critical case is 19.99% which is far above the acceptable limits (12%) for infrastructure projects as per the policies of funding agencies like World Bank/ Multilateral Development Banks etc.

V.10 Budgetary Implications and Sustainability

The Total Cost of the Project is ₹ 2936.00 Lakhs.

V.10.1 Financial Partners Involved

The project has been approved under Jawaharlal Nehru National Urban Renewal Mission. Approved DPR cost under JNNURM is ₹ 2325.00 Lakhs. Equity Share contribution:

- Central Govt.: - 35%
- State Govt.: - 15%
- ULB: - 50%

V.11 Impact of the Initiatives

This is first of its kind project implemented outside major metropolitan Railway Station area in country. This will prove to be a pilot project for many other busy stations. All the transport departments in the country will have role model for observing its benefits and efficiency before the model will be taken-up elsewhere. It has been one of the most challenging projects undertaken by the Thane Municipal Corporation.

Annex-VI

Indore City Bus Service Profile*

VI. 1 Context

Indore, the largest metropolitan city of the state of Madhya Pradesh, is fast emerging as a centre of trade and commerce. Indore has a population of 2.72 million in 2001. There was an increase of almost 50 percent during the period 1991-2001. It has estimated 3.30 lakh workers in 1991 with 63.4% of the workforce in the tertiary sector. The workforce has increased at a growth rate of 3.64% per annum during the period 1961-91. The workforce participation rate was 28.9% in 1991. A population size of 42 lakh is estimated for the city by the year 2025. For employment, it was estimated that 13.44 lakh workers would comprise the workforce in the study area by 2025 giving a work force participation rate of 32%. Further, it is assumed that by the year 2025, nearly 63% of the total workforce would be in the tertiary sector while the secondary sector will account for 33%.

VI. 2 Situation before Implementation of the Project

VI. 2.1 Existing Transportation System

It had a registered vehicle population of 0.48 million in 2000 increasing at an average annual rate of 8.8 percent. Currently total vehicle population is 732893. The intra-city public transport system is essentially road based with an estimated 550 private minibuses and 500 tempos and 10000 auto rickshaws.

An estimated 62, 85,950, passenger trips have been forecasted, for the year 2025, comprising 55, 03,000 intra-city trips while the rest comprise of inter-city passengers. An estimated 27, 51,825 trips by public transport have been forecasted for the horizon year.

*Based on information gathered from Internet and PowerPoint presentation on 'Bus Service Operation in Indore' by Mr. Amit Bhatt, Centre for Sustainable Transport.

By year 2025, at modal split of 50% and with an estimated average trip length of 6.02 km, it is estimated that 16.5 million passenger km would be performed daily by public transport. According to traffic estimates, a total of 5.5 million person trips would be generated every day by 2025, of which the share of public transport trips would be 2.75 million trips.

Travel Demand: The passenger demand per day, on the Bus System, in 2025, has been estimated as under:

Direct Service: 5, 97,330

Feeder Service: 6, 25,580

Total: 12, 22,910

The average trip length by bus is 5 kms. In order to overcome the traffic problem of future, it was decided to introduce a better public transport system in the city.

VI. 2.2 Problems and Needs Addressed by the Project

In the context of rapid growth of the city, increasing mobility, high travel demand, increasing intensity of traffic, congestion, delays, accidents and other such problems, public mass transport system of the city stands out as the most critical issue.

VI. 3 Description of the Project




A special purpose vehicle in the form of public limited company 'Indore City Transport Services Limited' (ICTSL) was set up to operate and manage the public transport system in Indore on 1st December 2005 with private sector participation to overcome financial constraints. The new SPV is ideally constituted as a Public Limited Company incorporated under the Companies Act, 1956. This is the first Public-Private Partnership (PPP) model in India. ICTSL is carrying 1 lakh passengers' trip per day after its incorporation.

ICTSL is responsible for planning, infrastructure, management control and monitoring. There are four operators, namely, Dayajeet Nimay Logistics Pvt. Ltd, M/s Rama Jyoti Travels, M/s Anam Travels and M/s Priyadarshani Transport Service. These are responsible for operation and fare collection. Giriraj Advertising & Marketing Services is the agency authorized by ICTSL for the

purpose of booking Advertisement Space on the City Buses. The company has already started operation of its 37 ultra-modern low floor buses. These city buses with 2 broad doors are allowing passengers to board and alight quickly and easily, save time and fuel, and give better run-times and improved economy to the bus operators. Real time vehicle tracking and fully computerized ticket vending system are some other highlights. Operations and Management (O&M) and other regulatory measures are being exercised by the company.

The city bus route network system has been planned and designed in a scientific manner. Direction oriented Hub and Spoke pattern of routing has been adopted. Routes have been planned to ensure that besides the regular city transport users, office goers, students and employees should also avail the services. It has been ensured that proposed routes caters to the requirement of places of residence as well as places of job. Eighteen high travel demand routes have been identified.

Company has taken permit for these routes from R.T.A. After due testing of routes and time scheduling ICTSL has initially started operation of 37 buses on these identified routes and later on add to its fleet of coaches to improve the frequency of buses at particular bus stop or intersection. Colour coding of routes and buses and their numbering has been carried out in such a manner that a commuter may easily identify the bus stop and intersection for convenient commuting. All routes follow these general principles:

		
<p>All Blue buses move towards Rajwada and will definitely touch MG Road at any moment of time.</p>	<p>All Magenta buses move along the AB Road and will definitely touch AB Road at any moment of time.</p>	<p>All Orange buses move towards Airport along the Bond Road and will definitely reach Bada Ganpati Square.</p>

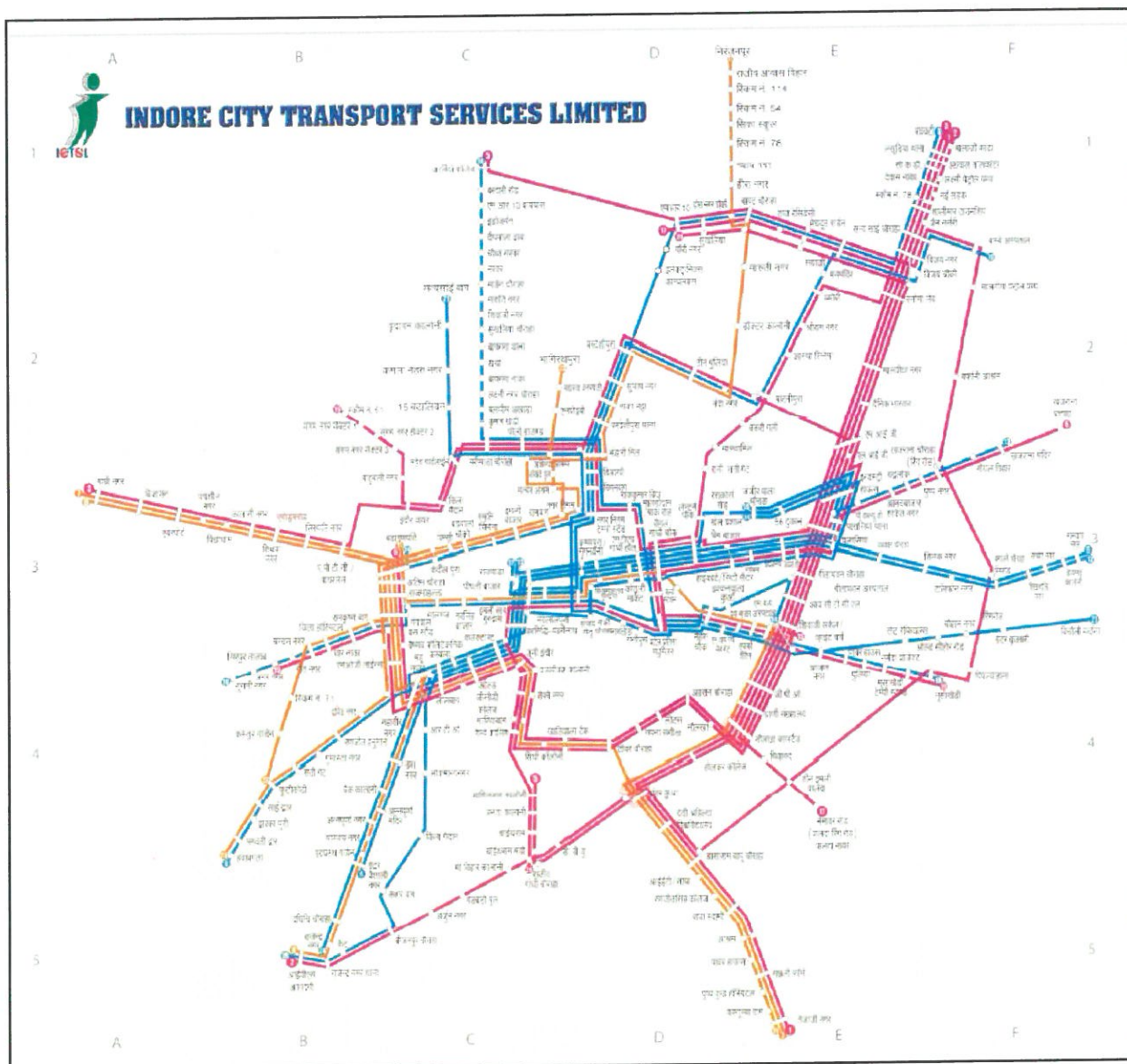


Figure VI.1: Route Map of ICTSL

The main sources of revenue for the system are the fare box collection, advertising, passes revenue, monthly premium by operators, revenue from bus stops, revenue from PIS display screens and bidding amount by private participants. Around 60% of the advertisement revenue and 80% pass revenue goes to operators. Fare collection fully remains with the operators.

The optimum fare structure is decided to meet twin objective of Equity access to poor and incentive for upper middle class to prefer these buses over their own vehicles. The fares are kept reasonable to give healthy competition to existing minibuses and tempos, low enough to secure fullest utilization and high enough to ensure viability of the system within the government

norms. System of monthly, weekly, employee and student passes ensure the fullest utilisation of the new system.

Financial evaluation of the project is carried out with the objective of determining its financial viability and assessing its potential for implementation on a commercial format. At this stage, projected financial analysis estimates the likely returns to the operators, company and people at large.

VI. 3.1 Online GPS Based Bus Monitoring & PIS Solution

A fully automated vehicle tracking system will ensure that the city buses reach the stop at fVied time. Any deviation from timing would be corrected and controlled using GPS and real time tracking solutions. The very purpose for this city bus service is to offer better civic facilities and ICTSL is determined to ascertain that the service level is duly monitored.

GPS based On Line Bus Tracking System (OLBTS) is identified as a tool to ascertain the service levels. For this ICTSL plans to establish a control room for OLBTS and every bus will be fitted with GPS based tracking device with online data transfer facility. ICTSL provides Passenger Information System (PIS) for the convenience of the commuters at all bus stops which shows on a LED monitor the exact time of arrival of the next bus.

- ICTSL desires to avail following advantages by implementing OLBTS:
- Estimated time of arrival that could be flashed on display screens at bus stops;
- Schedule & itinerary adherence;
- Log of exact kilometre travelled by bus ;
- Punctuality and improvement in driving pattern;
- Control over unauthorized and unscheduled stoppages;
- Better KMPL & EPKM;
- Better analysis; and
- Migration to Passenger Information system including IVRS.

In the first phase the OLBTS will have 37 buses, which will expand to 100 buses in 6 to 8 months. Development of vehicle tracking system solutions will help us monitor our own

performance against people expectations. This would help our team to give better services to people and enable the buses in reaching the stops at scheduled times. ICTSL has already tendered for GPS system on BOT Basis.

In order to ensure tracking of city buses a detailed GPS-enabled digital mapping of the city is being done which will enable the staff at central control room to direct the driver to maintain the schedule and timings.

VI.3.2 Ticket Vending System

Fully computerized Electronic Ticketing Machines are used for issuing daily passenger tickets. Ticketing system has been finalized by company to ensure the common ticketing system for all operators. The software used in these machines is owned by ICTSL. This eliminates the risk of passengers being ever charged more than the specified fares by the operators. The computerized ticketing system also helps in effective monitoring and control of conductors and management of ticketing data. With the hi-tech Electronic Ticket Issuing Machines, it is easy for the conductor to issue tickets generated through the machine and to collect the money from passengers.

The stages on the route and respective fares are fed to the machine. For example, if a passenger boards the bus at stop number four and intends to get down at 10, the driver will press the buttons 4 and 10. A ticket will come out and the corresponding fare will be displayed on the machine and the ticket, for which the money will be collected by the conductor.

VI.3.3 Management of Passes

One of the important sources of revenue to the company and the operators is system of various kinds of passes. Project envisages sharing of pass revenue in the ratio of 80:20. Operators will get 80% i.e. 200 Rs against the denomination of 250 Rs monthly pass. ICTSL will save an amount Rs.30.50 on new pass and Rs.42.50 on renewed passes. Remaining amount will go to the vender for processing, marketing and delivery of passes.

System of issuing passes is being done through 15 instant pass centers and a network of distributors and retailers. Company has taken a minimum guarantee of issuing at least 15000

passes every month from the agency. This minimum guarantee of passes ensures an assured income of Rs.40 lakhs per month to be shared between the ICTSL and operators.

Our Pass system is complete modular, web based solution specially designed for Public Transport Systems. It aims at reducing the strenuous workload involved in managing passes by seamlessly integrating the various aspects of running a large system.

System is based on Client-Server architecture. It provides central database which can be updated from several clients simultaneously. This system reduces the error / faults of manual system by providing bar code (which reduces duplicity), pass centre number, shift number, date and pass number are encoded in the barcode. It also has a specially designed hologram to root out any scope of duplicity. The centralized server located at the ICTSL Head Quarters and is attached with several clients at different locations.

VI.3.4 Management

The management of the company will be entrusted with the Board of Directors. There are sVI members on Board of Directors with Collector District Indore as its Executive Director who has been entitled to exercise all powers for effective management of the new transport system under Public Private Partnership model.

VI.3.5 Goals of the Project

The main objects of the company are:

- a) To create specialized and effective regulatory agency to monitor cost effective and good public transport services within the city of Indore with private partnership;
- b) To establish and maintain line of passenger coaches to transport passengers and;
- c) To develop support system for improving transport infrastructure.

VI.3.6 Strategy Used to Achieve the Desired Goals

- A SPV incorporated to provide quality service.

- Public Private Partnership (PPP) concept introduced.

VI.3.7 Total Cost of the Project

The authorized capital of the company is Rs 25 lacs divided into 2.50 lacs equity shares of Rs. 10/- each. The initial paid up capital of Rs. 25 lacs is being held by the Indore Municipal Corporation and Indore Development Authority in equal proportion.

VI.3.8 Procurement of Buses under JNNURM

JNNURM approved procurement of 175 buses (standard buses – 125 and low floor buses- 50) for city operations. The central Government funds cover 50% of the bus cost, the State Government share is 20% and ICTSL has to pay remaining 30%.

VI.3.9 Impact of the Initiatives

ICTSL is carrying 1 lakh passenger trips per day. ICTSL having limited infrastructure and fleet size has increased the public transport share from 16.4% to 21% within a short span of one year since its incorporation in January 2006. Indore city has been benefitted by the operation of ICTSL in following terms:

- (a) Considerable change in travel pattern within the city;
- (b) Savings in travel time for ICTSL users;
- (c) Reduced congestion on roads;
- (d) Reduction in road accidents; and
- (e) Reduction in environmental pollution.

Annex - VII

Technological Innovations / Applications in Ahmedabad Janmarg BRTS

Janmarg is the first full BRTS system in India operated as a closed system. With technology applications, Janmarg emulates Metro experience without compromising on the advantages of bus in terms of flexibility, cost and convenience. Comprehensive planning of the usage and type of technology has ensured the system to be successful in providing rapid mobility for the people of Ahmedabad. Technology applications are in three broad areas:

- A) Wireless station and bus door operations by driver, RFID (Radio-Frequency Identification) based docking system;
- B) Integrated Transit Management System; and
- C) Area Traffic Control System.

The three technology applications in detail are:

A) Wireless Station and Bus Door Operations by Driver, RFID Based Docking System

There are 62 bus stations located on the median with an average spacing is of 600 meters apart. The stations have been provided for external ticketing, display, audio systems and other support infrastructure. The stations are accessed at-grade through signalised zebra crossing. They are accessible to the physically challenged. Off-board ticketing system is in place.

- i) The stations have facility for docking 4 numbers of buses (2 up and 2 down). The bus stations are designed such that docking is perfect with the gap between bus and station is minimal (less than 4 inches). This has been achieved through design of a projection near the station doors.
- ii) Identification of the stop line for bus is achieved through aligning the bus front side with the RFID Sensing System on the station. The RFID system ensures safe distance alignment with station doors and once the bus is aligned with the tag placed on the driver

door, audio-visual indicators through beeps and red light enables driver with the decision to operate door.

- iii) A switch connected with RFID based controller to the bus door and station door is placed on the dash board of the bus. The station doors are synchronised with bus doors and are operated through a switch under the control of bus operator (driver). RFID based signal enables driver to locate the stop line and through RFID based controller the bus and bus stations are opened by the driver by pressing the button inside the bus.

Buses stop at all the stations. Bus deceleration, docking, opening of the bus door, then the station door and the steps repeated in reverse order takes about 12-15 seconds depending on the number of passengers.

RFID and RF based 'Remote Door Docking And Operations Mechanism', implemented for the first time in any system in India is an innovative solution which allows bus docking / alignment, operated by a driver only in event of safe to open door for operations brings in safest mechanism for station service operations. The system has built in service redundancy and in case of one system failing the other allows the service continuity.

Additionally RFID as a technology allows multiple end use by way of assigning priority to buses at junctions in future, bus maintenance data check in future etc. The system is highly scalable and shall lead to a highly sustainable operating environment. While it took some time to develop the technology application, the impact both as a safety and security feature and also as an identity of a modern transit has gone a long way in building Janmarg image.

B) Intelligent Transit Management System

ITMS allows transit managers to operate transit system in a highly productive manner by providing real-time analytics and decision support system by way of alerts and in-line analytics. The system intelligently prompts the managers to take quick and accurate decision based on the pre-set operational parameters and threshold limits. The system offers analysis services based on the legacy data and allows transit managers to perform service requirement analysis which leads to better understanding of operational parameters and allows insight into improvement opportunities within the system. This approach brings in a factor of long term sustainability

factor based on scientific methods and allows to bridge service gaps and requirements in an ever changing urban environment.

Ahmedabad Janmarg Limited (AJL) with its aim to provide world class transit experience embarked on the project to implement Integrated Transit Management System which would provide stakeholders and operations with a system to bring in world class operational efficiency and automation for its transit operations. ITMS is expected to meet the corporate objectives of enhancing service standards, bring in commuter market approaches, better organization of planning and operations; integration of Para-transit, capital improvements, marketing, and automate collection and payment of transit fares.

ITMS is aimed at enabling AJL to automate its Financial Characteristics, Operational Characteristics, and better insight into Passenger profiles, Route Analysis to optimize on operational efficiency, Service Consumption, functional area productivity analysis and thereby creating AJL Bus service a user choice. The ITMS solution landscape consists of the following components:

i) Automated Fare Collection System (AFCS):

AFCS is an automated revenue collection system which facilitates purchase of pre-paid tickets and their subsequent use through electronic systems to permit access to/ from the transit stations and buses. Integration with parking is also planned.

Ticket counters are located at both the ends of the 62 bus stations operational today, facilitating easy access to transit services. Station area is a closed area and only passengers with valid travel credentials are allowed to access the secure area and the travel amenities. Currently paper tickets are issued by Station Operators at the stations, however the implementation of electronic travel card system is in progress and the same shall allow travellers to access transit system using smart card.

The infrastructure includes POS machines, station server and network connectivity to control room. Additional equipments include turnstiles which control entry and exit at the stations. Smart card based system shall be made operational in December 2010. In addition to bus

stations, the provisions are being made to dispense smart cards and related services like top-up etc through city civic centres. The system will have payment options that suit passenger needs and to further facilitate travel for all types of travellers, single journey tickets through RFID tokens and 2-D bar codes as options are being considered by Janmarg.

The system provides rich information dissemination capabilities like, information on passenger flows by each station, time wise ticket type wise is available instantly as this information is collected in real-time by the central server located at the control centre. Passenger origin-destination data is being used for assessing and modifying schedules from time to time. Fare stage wise information is a useful input in altering fares. As ticketing is automated, revenue leakages is totally avoided. This is also an easy way of revenue collection.

The Operations Plan developed not only provides route structure for BRT operations but also the rationalised routing plan for AMTS operations. This is necessary so that the two systems complement each other rather than compete with each other. In terms of routes following three types of routes are structured to operate transit services. Three types of services are planned.

- BRTS Trunk Routes;
- AMTS Complimentary Routes; and
- BRT Feeder Routes.

Fare Integration with AMTS and also with parking have been planned and to be undertaken in the next phase (March 2011).

- ii) **Passenger Information System:** Advance information on arrivals, departures, next vehicle, next station display announcements are integral part of Janmarg operations. All the bus stations are equipped with two LED (Light-Emitting Diode) panels providing route and next bus information. Similarly buses are equipped with LED and audio systems and announcements on current station, next station and other operations' information including warning messages are announced. Next bus information is obtained from AVL system.
- iii) **Automated Vehicle Location System:** Specially designed buses equipped with GPS device and GPRS technology allows the vehicles to be tracked while in operations. This

enables operations of PIS, vehicle kilometer count and speed monitoring. Control centre monitors all the buses on time and instructions are given to slow down/go fast depending on the status of bus schedule.

iv) Other ITS information sub-systems include:

- Vehicle Scheduling and Dispatch System
- Bus Depot and Terminal Management System
- Financial Management and Central Clearing House System: Partially operational
- Incident Management System: Operational at basic level

Infrastructure Landscape of ITS includes Data Centre, Disaster Recovery Site, Control Centre, Training Centre, Bus Station Infrastructure, Bus Infrastructure, Communication Infrastructure, Operations, Management & Maintenance Services, Ticket Operators, Control Centre operators, Depot Management System. Depot management system is being implemented.

The integrated systems allow transit managers to plan and manage transit services in a highly efficient manner. This is primarily achieved by the analysis of data carried out at central control centre through specialized reporting structures which analyses data in multiple dimensions leading to feedback and decision support capabilities extended to transit management.

C) Area Traffic Control System

Encumbrance free operation of BRTS buses in exclusive lanes is a predominant feature of this system. Physical barriers of BRTS lanes by means of median, railing and landscaping is providing necessary segregation but faster mobility is possible through advance engineering technology.

For this purpose BRTS corridors and specially intersections are managed by Traffic Signals. All the bus shelters and pedestrian crossings are also having similar signal system to increase safety of bus commuters and pedestrian. All installed signals differ with customary traffic signals as it has intelligent system for operation and it is known as AREA TRAFFIC CONTROL SYSTEM –

ATCS. Ahmedabad Municipal Corporation has introduced such system for 93 (65 BRTS and 28 non BRTS) intersections.

i) Intersection Management

Geometrics of all intersections of BRTS corridor are designed based on traffic pattern, available RoW, location of intersections in overall road network and phase-wise execution of BRTS corridors. As mentioned above all have traffic signals to control and manage BRTS Buses and mix traffic too.

Principal aspects of designing these traffic signals system are to increase mobility and reduce delay at intersection. This is possible only if number of phases in each signal cycle are minimised. For the same purpose segregated phase of BRTS buses in signal cycle has been eliminated for the intersections having BRTS for two arms only (i.e. Intersections where two BRTS corridors are meeting each other, separate signal phase for BRTS buses will be there). This will also provide lesser delay for mix traffic. For each intersection signal cycle length, nos. of phases is designed by using state of the art technology SYNCHRO 6.0.

ii) Components of ATCS

Model use in operation of ATCS is simpler. Each individual intersection is provided with loop detectors, which are installed beneath pavement layers on each arm. These detect the traffic plying on them with a gap time of 3 seconds only. All detectors are connected with traffic controller located on one corner of the intersection. Each individual traffic controllers are connected with master control centre (Located at Victoria Garden) through Managed Lease Line (MLL) of BSNL. These MLL lines of BSNL play vital role for collection of data, signal coordination, connectivity with server.

There are 93 BRTS (65) and NON- BRTS (28) junctions covered with intelligent traffic signal system. All major junctions under the ATCS enable better control and vigilance and monitoring through the control room (operational). The complete installation of a comprehensive Area Traffic Control System (ATCS) has led to an improved traffic movement and decreased junction delay.

The components of ATCS are:

- Traffic Signal Controller
- Vehicle Detectors (Through Embedded sensors)
- Communication Network
- ATCS Application Software
- Central Control System (operational)

iii) Signal Synchronization

Signal Synchronization is defined as a coordination of signals at junctions to reduce the junction delay and to improve the level of service for a system as a whole. Generally, synchronization is done for the main corridor of the city where the maximum traffic can run with minimum delay. The affecting parameter for the co-ordination is average speed of a vehicle on that stretch and proportion of various vehicle mixes. However the green time is the important parameter at the junction to prefix the efficient co ordination.

In co ordination of signals for BRTS corridor it has been considered that traffic platoon is running at an average speed and that platoon of vehicle when released from one junction must have minimum red on the next junction. Special features have been introduced in BRTS Signal Co-Ordination in Bus Shelters and pedestrian crossings. As all bus shelters located near to the intersections, pedestrian movement at nearby shelter and intersections will be very high. Safety of pedestrian and reduce delay for vehicles approaching intersections is possible through such co-ordination only. All pedestrian crossing of Bus shelters have separate signals for pedestrian and some are co-ordinate with nearby signals of intersections in such a way both have same signal phase (i.e. red or green) which provides continuous movement of traffic platoon and safety of pedestrian too.

Annex-VIII

Innovative Funding Model of Pimpri-Chinchwad Municipal Corporation

Pimpri Chinchwad Municipal Corporation (PCMC) is developing 130 km of bus-based mass transit road corridors across Pimpri-Chinchwad city, based on its comprehensive mobility plan. These ten roads will have dedicated corridors for a bus rapid transit system (BRT), for pedestrians and cyclists along with infrastructure amenities to support high population densities. PCMC will catalyse spatial development of the city through this project and planned investments in improving mobility, rather than catch up with rapid-city development.

Urban Transport Fund to Capture New and Incremental Revenues

PCMC has set up an Urban Transport Fund (UTF) to fund this ₹ 1,500 crore project. The fund will be managed by a wholly-owned Special Purpose Vehicle (SPV) of PCMC, named PCMC Infrastructure Company. The UTF has been structured to capture the incremental benefits arising from the development of the BRTS corridors, as a long-term means of financing.

The UTF has identified 100 m on either side of the BRT corridors as BRT influence zone. The zone will be densified as per the Ministry of Urban Development's policy of corridor densification. PCMC provides 80% higher Floor Space Index (FSI) of 1.80 in the BRT influence zone. The UTF has been assigned revenues viz., premium for loading Transfer of Development Rights (TDR), development charges for building permission, incremental property tax, advertisement rights, lease on utilities ducts, etc. This funding model for the UTF is dedicated and secure through an escrow-like arrangement that ensures that the BRTS project is sustainable on a stand-alone basis with limited recourse to the PCMC budget.

PCMC has leveraged this UTF to raise debt funds from The World Bank, ADB and other lending agencies. Four project corridors have been supported by JNNURM. PCMC has also requested lesser grants from JNNURM as against permissible norms for the latter two corridors due to UTF's mode of project structuring.

Premium on Loading of TDR is a Robust Source of Revenue

The model for densification of PCMC is unique and very different from the FSI bank or sale of incremental FSI schemes of other cities in the country. PCMC's model allows loading of Transfer of Development Right (TDR) into the BRT influence zone. TDR is a development right given to a land / property owner in lieu of land that is acquired from him for municipal purposes. Previously, whenever TDR was generated, the TDR could only be used in outer city areas. This resulted in lower income to the TDR holder and many issues related to acquiring land for developmental purposes were faced by PCMC. This also increased the urban sprawl and had its impact on provision of infrastructure services.

The TDR loading concept followed by PCMC allows the TDR to be loaded onto the BRT corridor, thereby increasing density along the high capacity zones. PCMC charges a TDR loading premium to the property developer in the BRT corridor as a source of income for the UTF. This model ensures that additional FSI is not released in the market (which is the case in incremental FSI or the FSI bank model) but only realigns the FSI in the city into high-density corridors.

Attractive rates for TDR are also assured as there is no excess supply of FSI in the market. PCMC benefits by planning high-end services infrastructure in the BRT influence zone with excellent connectivity to these zones and at the same time ensures that land acquisition is not a bottleneck for its development activities elsewhere in the city.

Diversifying Incomes to the UTF

The other incomes accorded to the UTF include building permission development charges, incremental property taxes, advertisement revenues, lease rentals on utilities ducts, etc. PCMC also regulates advertisement rights on its BRT corridors and leverages the same on PPP basis. Through this regulation it has been able to substantially increase its advertisement incomes to fund the UTF.

PCMC is developing a Central Business District in one of the land parcels owned by TDR holders. This land parcel is on the intersection of two BRT corridors. The development is structured on PPP basis. PCMC has received offers from leading real estate developers of the

country for the development of the Central Business District on PPP basis and will generate cash income for the UTF.

Aligning Other Infrastructure Making BRTS Corridors Attractive

Along with efforts to densify the BRT corridors, PCMC has already increased capacities for water, sewerage and other municipal services to cater to the high demand. PCMC is marketing these corridors, offering 24 hours of water supply, availability of high capacity mass transit and amenities for conducting business as well as for residential usage. These efforts will build demand for real estate, thereby increasing the demand for TDR and improving the financial viability of the UTF.

Implementing BRTS Corridor Projects

PCMCs BRTS project comprises 10 trunk BRT corridors recommended by the comprehensive mobility plan. Of the ten corridors, five corridors are under development in the first phase. Four corridors, viz., Old NH4, Aundh-Ravet, Kalewadi to Dehu Alandi Road and Nashik Phatak to Moshi are being supported by JNNURM and the fifth corridor, Telco road, is being funded through PCMC's sources. The World Bank and the proposed ADB funding will ensure that the mobility needs of PCMC for the next 10 years are catered to.

The first phase BRTS corridors will provide mobility to the citizens of PCMC and also provide important linkages to fast-developing areas and will substantially optimize the traffic flow in the city.

Ensuring Success through Holistic Approach to Development

The success of the development model hinges on the timely construction of the corridors. The PCIC will be responsible for construction and syndication of funds for the projects. The SPV will be managed by a Board of Directors comprising elected representatives and key officials of PCMC. Professional staff, either nominated from PCMC or appointed from external sources, will manage the day-to-day operations of the company relating to the construction, operations and maintenance of the BRT corridors, financial management and management of UTF. PCMC will provide a good level of autonomy to the PCIC to help it discharge its obligations.

Potential to Scale up the Model

In the future, PCMC will also explore the option of developing one or more corridor on PPP basis after the UTF model matures. This PPP may be designed in a manner that a PPP developer will be assigned/ given the right to collect and retain the revenues from a particular corridor in lieu of development of the BRT corridor. Alternatively, roads in the outskirts or new city areas can also be developed through a PPP by offering TDR earned from the road corridors to fund the construction. The models envisage transfer of market / real estate risk to a PPP developer, these models are possible only after PCMC stabilizes and operates the UTF structure successfully.

The key challenge for PCMC is to manage cash flows and timing mismatches as the incomes to the UTF are linked to vibrancy in the real estate markets. Grant support from JNNURM, debt funding from multilaterals and banks, and recourse to PCMC's budget in the event of shortfall of funds will ensure success of the model.

Annex-IX

Media Report on the Visit of NIUA Study Team to Jalgaon Municipal Corporation



■ जळगाव मनपाच्या परिवहन उपक्रमासंदर्भात माहिती जाणून घेताना राजेश चंद्रा व सर्वेश व्यास. उपास्थित लक्ष्मीकांत चौधरी, चंद्रशेखर तुसे, रामनाथ सोनवणे, आर.आर.काळे, मगर, ठाकूर आदी.

महानगरपालिकेच्या परिवहन उपक्रमाचे राष्ट्रीय नगर कार्य संस्थानकडून कौतुक

विनागुंतवणूक उत्पन्न मिळवून देणारा उपक्रम देशात अन्यत्र कुठेही नाही : चंद्रा

जळगाव, दि. २१ - मनपाच्या परिवहन उपक्रमांतर्गत सुरू असलेल्या शहर बसवाहतुकीची राष्ट्रीय नगर कार्य संस्थानच्या अधिकाऱ्यांनी आज पाहणी केली व त्याची माहिती घेतली. गुंतवणूक न करता मनपाला उत्पन्न मिळवून देणाऱ्या या उपक्रमाचे त्यांनी कौतुक केले.

देशातील १० निवडक शहरांमधील परिवहन उपक्रमांची माहिती संकलित करण्याचे काम संस्थानच्या माध्यमातून सध्या चालू आहे. अहमदाबाद, सुरत, जालंदर येथील माहिती घेतल्यानंतर संस्थानचे प्रकल्प समन्वयक राजेश चंद्रा व सर्वेश व्यास हे आज येथे आले होते.

या दोहोंनी जळगाव मनपा परिवहन

समितीचे सभापती लक्ष्मीकांत चौधरी, आयुक्त रामनाथ सोनवणे यांची भेट घेतली आणि त्यांच्याकडून परिवहन उपक्रमाची सविस्तर माहिती जाणून घेतली. खर्च न करता उत्पन्न मिळवून देणारा असा उपक्रम देशात अन्यत्र कुठेही नाही. सेवेतील बसचा दर्जा चांगला आहे. या उपक्रमात मनपाला कुठेच तोटा नसल्याचा अभिप्राय चंद्रा यांनी याप्रसंगी नोंदविला आहे.

महापालिका व बससेवा अभिकर्ता यांच्यातील करारात प्रत्येक बसमागे घेतलेली बँक गॅरंटी, राज्य शासनाच्या धोरणांन्वये विद्यार्थी, ज्येष्ठ नागरिक, अपंग, अधिस्वीकृतीधारक पत्रकार यांना

भाड्यात सवलत, करार जर खंडित करायचा असेल तर सहा महिन्यांची पूर्वसूचना बंधनकारक असणे आदी अटीचीदेखील चंद्रा यांनी प्रशंसा केली. जळगाव मनपा जो उपक्रम राबवित आहे त्याचा अन्य ठिकाणी स्वीकार व्हावा, असा अभिप्रायदेखील त्यांनी नोंदविला आहे.

मनपाकडून उपक्रमाची जी माहिती मिळाली आहे ती केंद्र सरकारकडे सुपूर्द केली जाणार आहे. यावेळी परिवहन समितीचे सदस्य चंद्रशेखर तुसे, उपायुक्त आर.आर.काळे, परिवहन अभिकर्ता प्रसन्न बसलिकस प्रा.लि.चे प्रतिनिधी मगर व ठाकूर आदी उपस्थित होते.

Annex - X**General Information of the Organization dealing with Urban Transport Project**

Ahmedabad	
General information about your Organisation (Fill the following queries and provide one page write up about your organisation and project as well)	
Project Contact Person:	Municipal Commissioner, Ahmedabad Municipal Corporation; Pr. H. M. Shivanand Swamy, Director Centre of Excellence in Urban Transport
Information Contributed by:	Ms. Swapna Ann Wilson
Detailed Address of the Organization/Agency	Centre of Excellence in Urban Transport, CEPT University, Ahmedabad
Telephone No.	Mob:
	Fax:
Type of the Organization	CEPT University (BRTS Consultancy), Supported By Ahmedabad Municipal Corporation
Partnering Agencies/Individuals	-----

Jaipur	
General information about your Organisation (Fill the following queries and provide one page write up about your organisation and project as well)	
Project Contact Person:	Ms. Preeti Mathur (Dy. Commissioner, BRTS, J.D.A)
Information Contributed by:	Mr. Ashok Chaudhary (Zonal Engineer, J.D.A)
Detailed Address of the Organization/Agency	Jaipur Development Authority (JDA), Near Lal Kothi, Jaipur, Rajasthan.
Telephone No.	Mob: 9460186538 and 9829017473
	Fax: 0181 – 5053070
Type of the Organization	Company Registered with shares under Company Act, 1956 with the name of 'Jaipur City Transport Service Limited (JCTSL).'
Partnering Agencies/Individuals	<ol style="list-style-type: none"> 1) Jaipur Development authority (JDA); 2) Jaipur City Transport Services Limited (JCTSL); 3) STUP Consultant Limited, Jaipur; 4) Unified Metropolitan Transport Authority (UMTA); 5) Rajasthan State Road Transport Corporation (RSRTC);and 6) PDCOR LTD.

Jalandhar	
General information about your Organisation	
Project Contact Person:	Sh. Vinay Bublani, PCS, Executive Director cum Commissioner, Jalandhar City Transport Services Limited
Information Contributed by:	Manish Agrawal, Project Manager, Jalandhar City Transport Services Limited.
Detailed Address of the Organization/Agency	R.O.: Municipal Corporation, Nehru Garden, Jalandhar.
Telephone No.	Office: 0181 – 2227015
	Fax: 0181 – 5053070
	E-mail: citybusjalandhar@gmail.com
Type of the Organization	Company Registered with shares under Company Act, 1956 with the name of “Jalandhar City Transport Services Limited.”
Partnering Agencies/Individuals	Two Partners of Jalandhar City Transport Services Limited: 1) Municipal Corporation, Jalandhar. 2) Punjab Infrastructure Development Board, Punjab.

Thane	
General information about your Organisation	
Project Contact Person:	Project Contact Person: Sh. K. D. Lalla, City Engineer, Thane Municipal Corporation, Thane
Information Contributed by:	
Detailed Address of the Organization / Agency	Mahapalika Bhawan, Dr. Almeida Road, Chandanwadi, Panchpakhadi, Thane (W) – 400 602
Telephone No.	Office: +91 22 2534 77 14
	Fax: +91 22 2534 77 14
	E-mail: kd-chief@yahoo.co.uk
Type of the Organization	Urban Local Body
Partnering Agencies/Individuals	Govt. of Maharashtra, Govt. of India

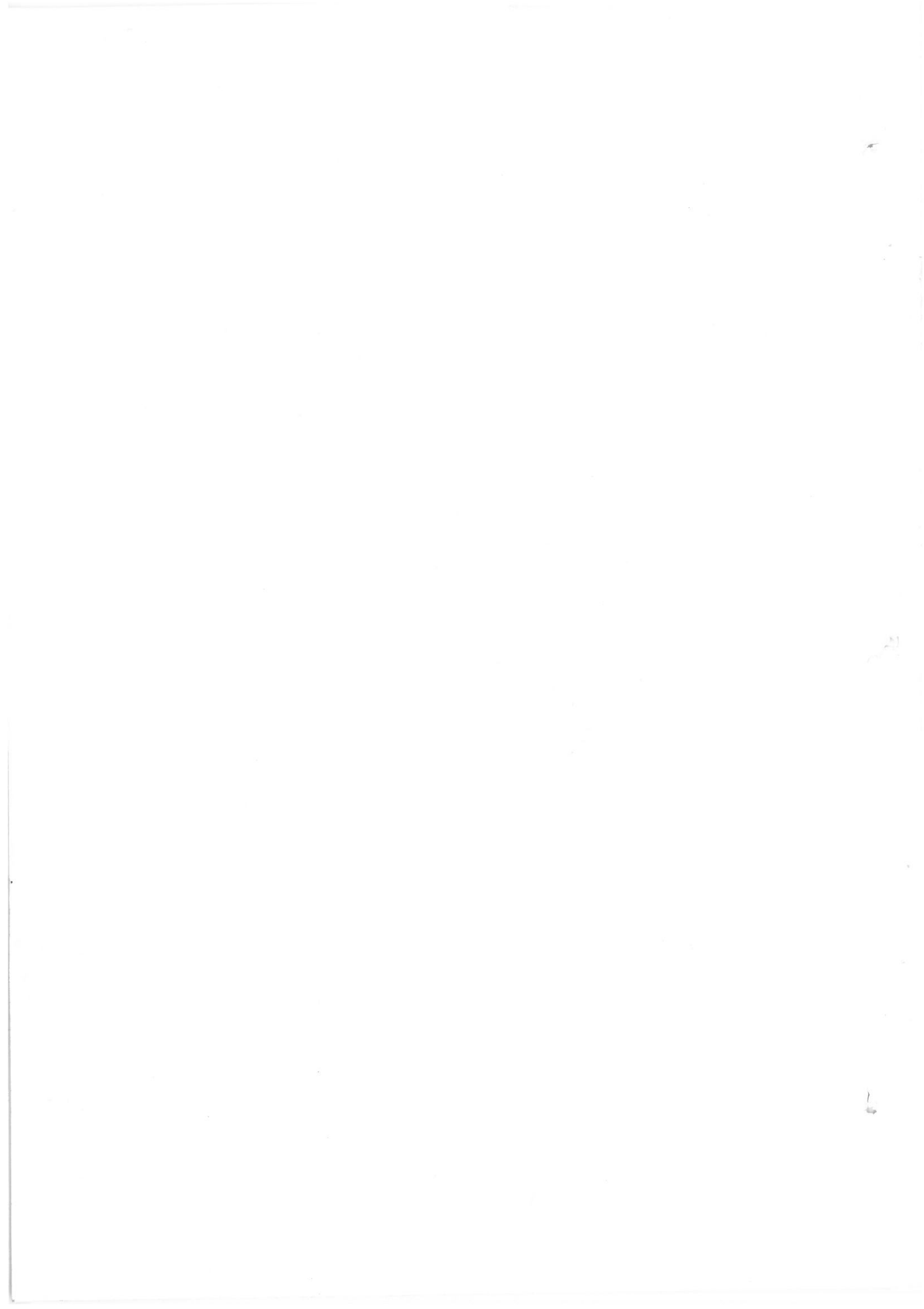
Jabalpur	
<p>General information about your Organisation (Fill the following queries and provide one page write up about your organisation and project as well)</p>	
Project Contact Person:	Mr. Hari Ranjan Rao, Executive Director
Information Contributed by:	
Detailed Address of the Organization/Agency	Jabalpur City Transport Services Ltd (JCTSL) 1 st Floor, Red cross Building, Collectorate campus Jabalpur- 482 001
Telephone No.	Office: 0761-4014501,4082786
	E-mail: jcs1_2006@yahoo.co.in
Type of the Organization	A Company, supported by Jabalpur Municipal Corporation and Jabalpur Development Authority
Partnering Agencies/Individuals	Jabalpur Municipal Corporation and Jabalpur Development Authority

Surat	
General information about your Organisation	
Project Contact Person:	Ms. S. Aparna, IAS, Municipal Commissioner, Surat Municipal Corporation
Information Contributed by:	
Detailed Address of the Organization/Agency	Surat Municipal Corporation Mahanagar Seva Sadan, Mughalsarai, Surat-395003
Telephone No.	Office: 0261-2423750-56
	Fax: 0261-2422110
	e-commissioner@suratmunicipal.gov.in / commissionersmc@hotmail.com
Type of the Organization	ULB
Partnering Agencies/Individuals	

Jalgaon	
General information about your Organisation	
Project Contact Person:	Mr. R. K. Sonawane, Municipal Commissioner
Information Contributed by:	Mr. Prasanna Patwardhan, MD, PBLPL
Detailed Address of the Organization / Agency	Jalgaon Municipal Corporation, Jalgaon
Telephone No.	Mobile: +91 9967 440 222
	Fax: +91 257 2222260
	Email: rksonawane2007@yahoo.co.in
Type of the Organization	ULB
Partnering Agencies / Individuals	Prasanna Bus Link Pvt. Ltd.

Kolkata	
General information about your Organisation	
Project Contact Person:	Mr. Arnab Roy, Municipal Commissioner
Information Contributed by:	Mr. Md. Salidul Islam, Joint Commissioner
Detailed Address of the Organization/Agency	Kolkata Municipal Corporation, Jalgaon
Telephone No.	Website: www.kolkatamycity.com
	Phone: +91 33 2286 1234, 2286 1034, 2286 1000
	Fax: +91 33 2286 1334/1434
	Email: kmc@vsnl.net / mc@kmcgov.in
Type of the Organization	Urban Local Body
Partnering agencies/individuals	Simplex Pvt. Ltd.

Pimpri-Chinchwad	
General information about your Organisation	
Project Contact Person:	Mr. Ashish Sharma, Municipal commissioner
Information Contributed by:	Mr. Dilip Kudale, JNNURM Coordinator, PCMC Mr. B. Gaikewad, Ex. Engineer
Detailed Address of the Organization/Agency	Pimpri-Chinchwad Municipal Corporation
Telephone No.	Mobile: +91 9922 501 502
	Phone: +91 20 2742 6331
	Fax: +91 20 2742 5600
	Email: pcmc@vsnl.com, b.gaikwad@pcmcindia.gov.in, d.kudale@pcmcindia.gov.in
Type of the Organization	ULB
Partnering agencies/individuals	-----



URBAN TRANSPORT INITIATIVES IN INDIA

BEST PRACTICES IN PPP

Submitted to

Ministry of Urban Development
Government of India



National Institute of Urban Affairs

March 2011

