Feasibility Study of Mass Transport in Nasik City

[1]Dr B.S Shete, [2]Prof A.R.Bijwe, [3Prof] S.D.Thoke

[1]Professor, [2]Asst Professor, [3]Lecturer
[1]Civil Engineering Department,
Dr Sau. Kamaltai Gawai Institute of Engineering Technology, Darapur, Amravati 444814

Abstract: Population is increasing with time geometrically which results the expansions of the city as well as expansion in related infrastructure like traffic and transport. It is noticed that the mobility strength and mode is increased. So we felt need for a transport system which is able to transport maximum number of passengers in minimum duration of time.

Mass Rapid Transit System (MRTS) is the solution for this problem. MRTS which may base on rail or bus is appreciable among the world and must be a sustainable transport system. From 1863 to 2013 the MRTS is increasing with increase in tier of city in the hierarchy. Now 168 cities in 55 countries using this system.

Key Words: MRTS, Nasik Transportation Management, BRTS, Smart City, Sustainability.

1. INTRODUCTION

Mass rapid transit (MRT) is defined as publicly accessible transport in urban areas that can transport a large number of people from one place to another. The selection of appropriate MRT modes is driven by factors such as the potential passenger market for public transport, the trip patterns of prospective users, and other socio-economic criteria. When a municipal planning body has to make decisions regarding which mode should be utilized to serve a community, it must base this decision on the following criteria:

- Ability of the mode to meet demand;
- Implementation cost;
- Environmental impact;
- Social equity impact;
- Cost to user;
- Journey time;
- Travel safety;

Factors of comfort and convenience including:

- Number of interchanges
- System Accessibility
- Flexibility
- Reliability;

1.1 History of MRT modes

The need for MRT was realized when cities became major population centers and concentrations of economic activity during the industrial revolution. The London Underground, the first MRT system, started operations in 1864. In many cities, trams served as the main mode of public transport from the late 19th century to the early 20th century. Trams became prevalent after the widespread availability of electricity.

Practically every large city in the world, including Nasik, had trams. Nasik's tramway (constructed in 1889) originated from what is now the Old Municipal Corporation building located on Main Road, and terminated at the Nasik Road railway station (a distance of around 8–10 km).14 The tramway originally utilized horse drawn carriages and then switched to petrol-driven railcars under the Nasik Tramway Company in the later 1910s.

1.2 Aim of the Study

The aim of this mass transport feasibility study is to facilitate Nasik's sustainable development. That is, to provide a development strategy that meets the needs of present Nasik without compromising the ability of the city's future generations to meet their own needs. Nasik stands at a crossroad of history and development. It has the potential to become a commercial and cultural centre and afford its citizens the possibility to reap immense benefits in the form of jobs, opportunities and improved quality

of life. However, for this possibility to become a reality, Nasik will have to develop adequate infrastructure and services to facilitate the development and improve the quality of life of all citizens—rich and poor alike.

2. Literature Review

The literature is full of attempts to categorize these modes. They may be categorized in terms of:-

➢ Their technology (bus/rail based), which influences aspects of service, quality, capacity, the ability to segment the market, and cost.
➢ Right of way exclusively, which determines speed and reliability.
➢ Grade separation, which allows new alignments, and strong influences cost.
➢ Guidance which may offer new alignment possibilities and other impacts.

I have reviewed the MRT systems actually operating in developing cities and have categorized them by technology and degree of segregation which broadly translate into level of service, capacity and cost. Four generic forms of mass transit currently exist. These are defined for use in this study as follows:-

i) **Bus ways:-** These are unless otherwise stated at grade with horizontal protection from other traffic; often with priority over other traffic at junctions, which are signalized.
ii) **Light Rail Transit (LRT):-** This is unless otherwise stated at-grade, with similar horizontal protection.
iii) **Metros:-** These are fully segregated, usually elevated/underground. It is the segregation that is critical to providing a rapid service and the technology that allows a high mass ridership to be carried.
iv) **Suburban Rail:-** These services are physically part of a larger rail network, usually at grade and fully segregated by means of controlled level crossings.

I have limited the extent of my study to only one mode viz; Bus ways and have been discussed in the literature part.

3. Methodology

The study comprised the following phases:-

Phase I- Selecting Corridors: - Full analysis of metropolitan area including aspects such as population, socio-economic situation, urban layout & journeys in order to determine the corridors suitable for accommodating a public transport system.

Phase II- Selecting Technologies: - Study of four public transport technologies for the purpose of determining the two most suitable once (Mass Rapid Transit, Transit Oriented Development (TOD), Cycle Sharing, BRTS)

Phase III- Assessing the alternatives:- Comparative study of the technologies per corridors as regards investment costs, running costs, environmental impact, social advantages in terms of time savings for users or reduction of vehicle operation costs, one technology and one alignment were recommended for each corridors at the end of this phase.

4. Study area and data collection

Under a Memorandum of Understanding with NMC, the Institute for Transportation and Development Policy (ITDP) is assisting with the planning and implementation of sustainable transport systems and urban development practices in Nasik. This report aims to provide a clear analysis of Nasik's potential for implementing a high-capacity mass rapid transport system. It will provide a detailed description of how high quality transport systems can play a key role in meeting existing and future transport demand in the city. The ultimate goal of the paper is to be a useful reference for decision-makers to serve as the basis for applying for central government funding for advancing Nasik's urban development.

To assess potential demand for MRT service in Nasik, Institute for transportation and development policy (ITDP) completed a detailed analysis of Nasik traffic at strategic locations in the city (Figure 01). Frequency-occupancy surveys of MSRTC bus and shared auto rickshaw passengers were conducted to estimate passenger volumes on major corridors. In addition, existing bus routes and shared auto routes were mapped.
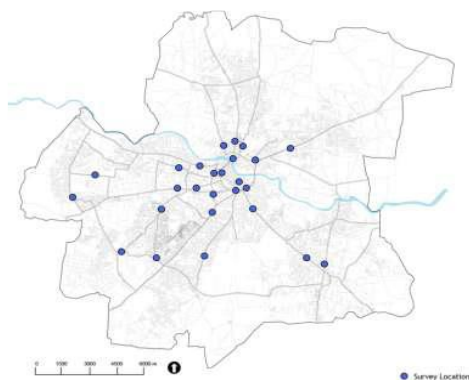

Figure 01: Traffic count and frequency occupancy surveys

The traffic and frequency occupancy counts yielded a significant amount of data related to the way that Nashikars are currently mobile (See Figure 02). It was observed that per each survey location, the majority of travelers were either using bus (in yellow) or two wheelers (in orange). Across all locations, approximately 10 per cent (in blue) utilized shared and private auto rickshaws.
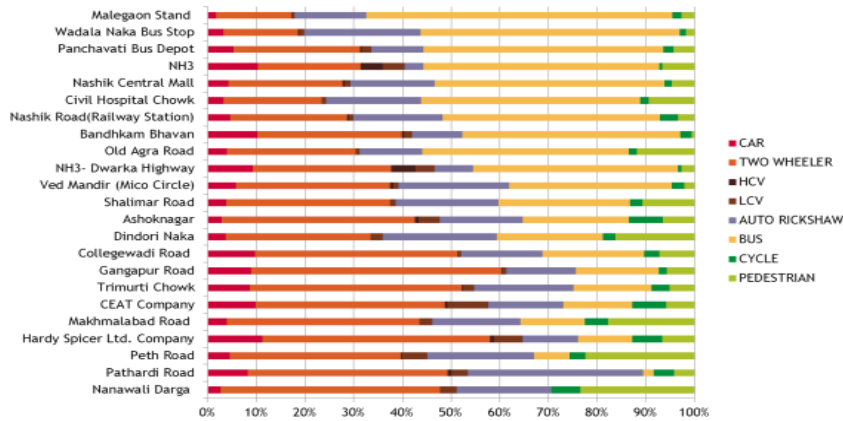

Figure 02: Observed mode shares at select traffic / frequency occupancy survey locations

Thus, to implement a mass rapid transport system the existing network of services must be identified and analyzed. First, Institute for transportation and development policy (ITDP) completed interviews with MSRTC staff who provided a comprehensive listing of all MSRTC local routes and stages (319 total) as well as a specific number of the local routes that were the most heavily utilized. The key routes and public transport passenger volumes were mapped to determine existing patterns of use and travel demand (Figure 03).
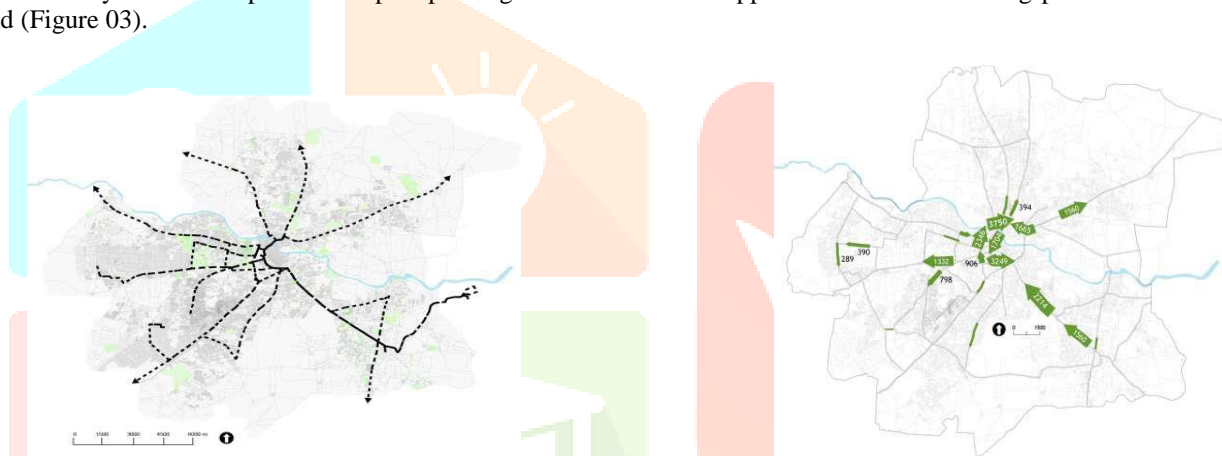

Figure 03: Key MSRTC routes (left) and observed peak period passenger volumes (right).

Next, the following diagram (Figure 04) from the 2008 CMP was reviewed. It is the result of a modeling exercise with travel demand data that were gathered through household surveys.

NOT TO SCALE
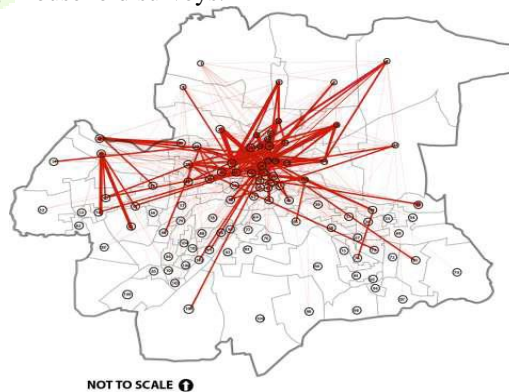
Figure 04: Origin-destination chart with traffic analysis zones (TAZ) and desire lines (2008 Nasik CMP)

Figure 04 represents the demand for travel between different locations in Nasik, represented by traffic analysis zones (TAZ). This theoretical set of origins and destinations shows a high concentration of travel demand from the periphery to the city core. As well, there is increased demand for travel between peripheral points on the western edge of the city. After reviewing the MSRTC and shared auto data, as well as the 2008 travel demand data, the following network of potential mass rapid transport corridors was developed.
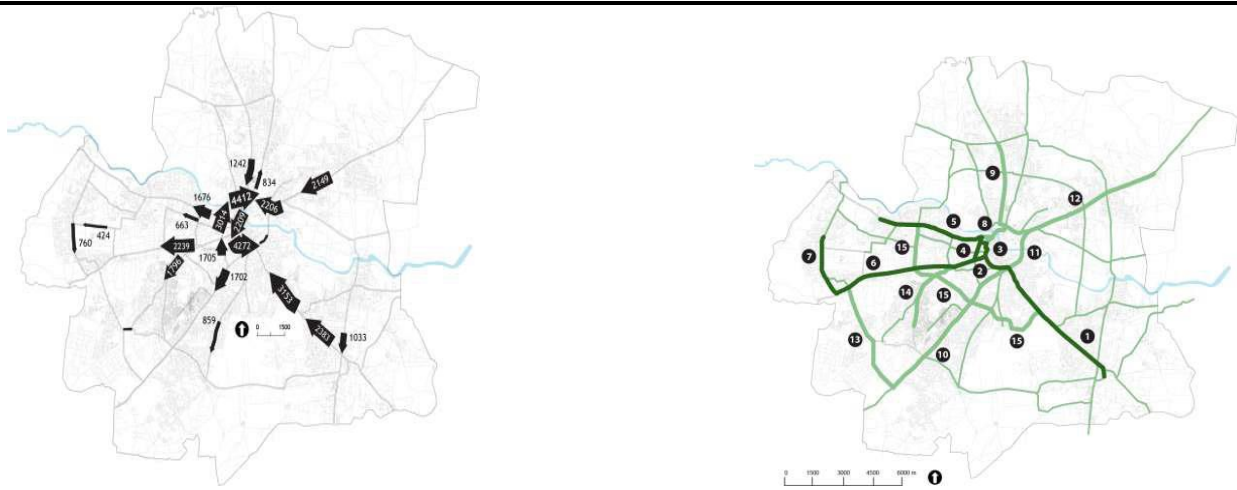
Figure 05: Total MRT demand (top) and MRT corridors highlighting the highest demand / priority phase sections (bottom). The location of each corridor is indicated by the ID number in Table 1

Table 1: MRT Corridors and ID Number (Report location key)

	MRT Corridors
1	Nashik Road (from Khadkali Signal to Nashik Road Railways Station)
2	Shalimar (Khadkali Signal) to Trimbak Naka (CBS)
3	MG Road (Meher Chowk) to Shalimar (Khadkali Signal)
4	Old Agra Road (From Ashok Stambh to CBS)
5	Gangapur Road (from Serene Meadows to Ashok Stambh)
6	Trimbak Road (from CBS to Shaneshwar Nagar)
7	Vishwatmak-Jangali Maharaj Road (from Shramiknagar to Shaneshwar Nagar)
8	MG Road to Nimani (via Malegaon Stand)
9	Peth Road (from Nimani to Ozar)
10	NH-3 (from Garware to Dwarka Circle)
11	NH-3 (from Dwarka Circle to Panchwati)
12	NH-3 / State Highway 17 (from Nimani to Adgaon)
13	Ambad-Sathpur Link Road (from Garware to Ambad Police Chowki)
14	Untwadi Road (from Mico Circle to Uttamnagar)
15	Proposed Inner Ring Rd (from Jehan Circle to Ambedkar Nagar via ABB Circle & Indiranagar)

5. Conclusion

Traffic congestion has been increasing in Nasik city due to use of more private vehicles on road. Due to lack of public transport facility people switch to private vehicles such as rickshaw, two wheelers and car. Being selected in smart city mission as per norms the city should have Bus Rapid Transit System (BRTS) kind of public transport but looking at the present situation it seems very unlikely in the city where not even a city bus system is planned. As education facility has been increasing in Nasik city, the number of education trips are also increasing on high rate as now a day's mostly student prefer bikes or other two wheeler for education trips because of that traffic congestion also increase in city and moreover students of colleges and government employees, and District Court usually travel by rickshaw, diesel auto or their own private vehicles which also increase traffic problems in peak hours in Nasik city. The pollution level of Nasik city is on curse due to more use of private vehicle so to reduce pollution and sustainable development, city bus system is required. The population of Nasik city is increasing rapidly, as population is growing requirement of city bus service is necessary.

MRT as proposed in this report has the capacity to transform public transport in Nasik into a truly world class system. By providing citizens with high quality and environmentally and economically sustainable public transport, NMC can ensure that the city's is able to provide convenient access to all as the city grows The MRT,BRT system can integrate the city core with expanding areas in the periphery, helping to structure growth along corridors with good public transport access. Sustainable transport is key to securing a vibrant and prosperous future for Nasik.

6. References

1) Nashik Rapid by the Institute for Transportation and Development Policy.

2) Urban Transport: Planning and Management- A.K.Jain

3) National Urban Transport Policy- Government of India

4) Ishfaq Majid Wani, Er Parveen Singh June 2018 IJSDR Volume 3 – Mass Rapid Transit System (MRTS)-A Sustainable Transport System.

5) Phil Fouracre, Christian Dunkerley & Geoff Gardner November 2010 Transport Reviews 2003, Vol 23 No. 3-
Mass Rapid transit system in the cities of developing world.

6) Anal Sheth Debasis Sarkar December 2020 Journal of Construction in Developing Countries, 25(2) 129-151 2020
Socio Economic Feasibility Analysis for Sustainable Mass Rapid Transit Project in Western India.