

Implementation of Bus Rapid Transit System for Aurangabad City

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Abstract: Transportation is the important one as far as growth of particular city is considered. Public transport in most of Indian cities is rapidly deteriorating because of increasing travel demand and insufficient transportation system. Aurangabad, important city in state of Maharashtra facing numerous problems related to public transport because of increase in population of both people and motor vehicles. Due to this there is tremendous increase in number of accidents, environmental degradation, traffic congestion, frequency of services and schedule is not adhered. Thus, there is great need to improve public transportation system and for this Bus Rapid Transit System is the appropriate solution. BRTS is superior to other transportation system which provides knowledge about automated vehicle location system and also being flexible, easily accessible and cost effective being able to transport large number of people. For implementation purpose to know there is need of BRTS or not, various data such as accident data, interview of people and driver for what problem they face, various traffic studies are carried out.

Keywords: BRTS, CBDs, HOV, ITS

1. Introduction

Nowadays traffic is increasing at higher rate because of high population growth rate. It is reason we need more numbers of road and bridges while considering Traffic Management issues. In such situations we engineers have to be more accurate at our own work. From the whole world's urban population who use other modes transportation or Personal vehicle for daily work schedule is willing to use Public transport but the public Transport availability and capacity of it to sustain present population is very low. Though we take care of smooth functioning of traffic operation in smart cities, there is need of smart Mode of public transportation like Bus Rapid Transit System which is proved as very beneficial in developed countries.

(1)Bus rapid transit system (BRTS) takes part of its name from "rapid transit" means which has very high carrying capacity with own right of way with an objective to provide faster, efficient mode of transport. This project mainly implemented by Jawaharlal Nehru National Urban Renewal Mission (JNNURM) which aims to encourage fast track planned development in 63 cities does projects in the field of urban public transport. Aurangabad is one of the important administrative districts in Marathwada region of Maharashtra state. Near about 219 Sq. Km urban sector with population 1228032 as up to year 2016. This creates increase in no of two-four wheelers on roads which leads to fatal accident on road .In this project I made an attempt to show Future BRTS system for this city and how it will prove superior to other modes of transportation. The future BRTS consists of broad elements such as running way, digital stations, subsumed.

1.1 Major Elements of Bus Rapid Transit System

The major elements of bus rapid transit are described below.

Running ways-running ways drive travel speeds, reliability and identity. Options range from general traffic lanes to fully grade separated BRT transit ways.

Stations –Stations, as the entry point to the system, are the single most important customer interface, affecting accessibility, reliability, comfort, safety and security, as well as dwell times, and system image. BRTstation options vary from simple stops with basic shelter to complex intermodal terminals with many amenities.



Fig 1.1: Attractive Stations for comfort of BRTS Passengers

1.1.1. Vehicle:-

BRTS system can utilize a wide range of vehicles, from standard buses to specialized vehicles. Options vary in terms of size, propulsion system, design, internal configuration, and horizontal/longitudinal control, all of which impact system performance, capacity and service quality. Aesthetics, both internal and external are also important for establishing and reinforcing the brand identity of the system.

1.1.2 Off-bus fare collection:-

Conventional onboard fare collection slows the boarding process, particularly when a variety of fares are collected for different destinations and/or classes of passengers. An alternative would be the collection of fares upon entering an enclosed bus station or shelter area prior to bus arrivals (similar to off fare collection at a kiosk prior to entering subway system). This system would allow passengers to board through all doors of a stopped bus. This also includes smart cards and payment through credit cards.



Fig 1.2: Improved and Attractive Vehicles for passengers

1.1.3 Intelligent transportation System (ITS):-

A wide variety of ITS technologies can be integrated into BRT System to improve BRT System performances in terms of travel times, reliability, convenience, operational efficiency, safety and security. ITS options include vehicle priority, operations and maintenance management operator communications, real time passenger's information, and safety and security systems.



Fig 1.3: Off-bus fare collection shows the efficiency of BRTS

1.1.4 Service and operation plan:

Designing service plan that meets the needs of the population and employment centers in the area and matches the demand for service is a key step in defining a BRT system. How it is designed can impact system capacity, service reliability, and travels times, including wait and transfer times.

1.3 Problems and Needs Addressed by the Project

In a developing country like India, transport nuances-planning follow development. The Various factors which lead to the selection of Bus Rapid transit system in the city of Aurangabad are as follows:

1. No strong CBD
2. Highly randomized development with localized trips
3. Urban pull – spreading out
4. Need for decongestion;
5. Flexibility in routing
6. Easily expandable
7. Scope for both low density and high density passenger movement;
8. Project implementation easier
9. Wider reach
10. Leverages the full scope for public space and accessibility improvement
11. Can be operated according to the city ethos
12. Environment friendly.

1.4. Objectives

1. The future BRTS for Aurangabad city was conceptualized with the objective of redesigning the city's structure and existing transport systems in order to make public transportation more accessible, efficient and environment friendly.
2. To carry out a detailed study for prevailing BRT system in Aurangabad.
3. To implement BRTS in Aurangabad city & observe whether it justifies or not
4. Reducing need for travel;
5. Reducing the length of travel;
6. Reducing automobile dependence.

2. METHODOLOGY

- BrtsDesign
- Case Study
- Literature Review
- Data Collection
- Study Area Selections
- Survey
- Brts Standards
- Evaluation
- Solution
- Implementation

2.1. Planning Schedule:-

I. Collection of Aurangabad maps:-

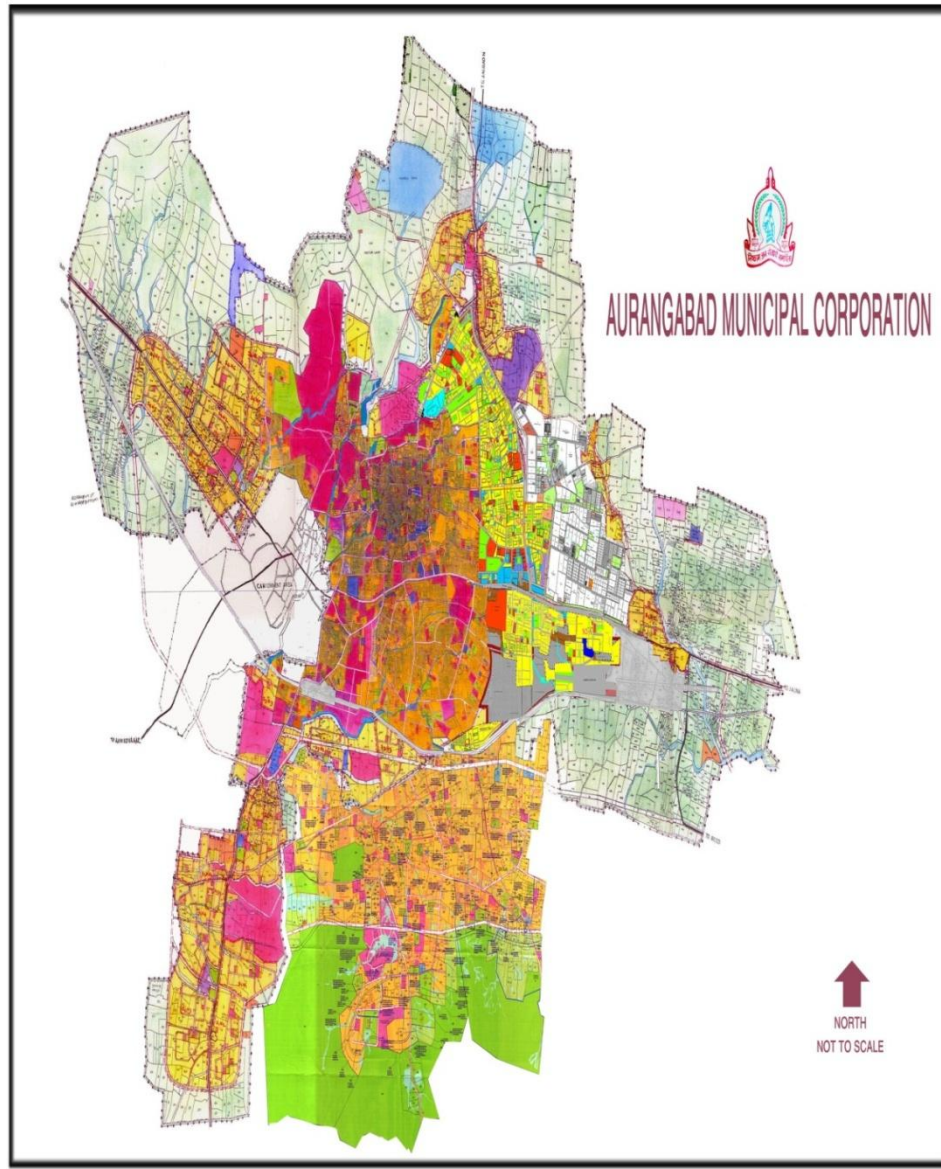


Fig. 2.1 Aurangabad City Map

We have collected maps of Aurangabad road development from municipal corporation office's town planning department.

II. Collection of topographical information:-

Table .1 Topographical Information of Aurangabad

Area	219 Sq km
Elevation	568 m
Population (2016)	1228032
Density	5400

III. Collection Of Accident Records:-

We have collected total accident numbers of last two years from Regional Transport Office, Aurangabad. Total no of accidents = 1346.

Accident Record of Aurangabad City

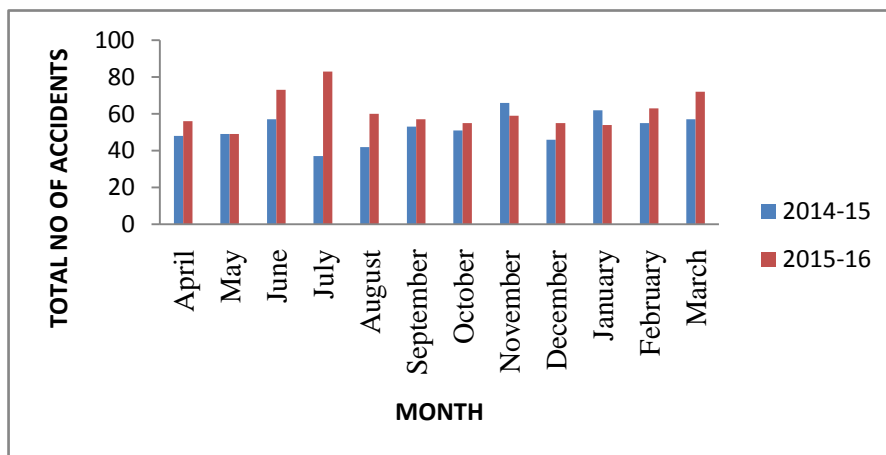
Following data are the accident data of Aurangabad city collected from R.T.O office, Aurangabad.

Table No.2 Accident Record for year
April 2014-March 2015

Month	Two wheeler	Light weight vehicle	Heavy weight vehicle	Bus	Other vehicle	Total
April	14	13	9	5	7	48
May	13	12	13	5	6	49
June	18	15	15	4	5	57
July	9	9	9	4	6	37
August	17	9	9	0	7	42
September	15	9	14	9	6	53
October	22	10	6	4	9	51
November	27	13	12	5	9	66
December	19	7	9	5	6	46
January	24	19	10	0	9	62
February	13	17	13	5	7	55
March	15	12	13	7	10	57
Total	206	145	132	53	87	623

Table No.3 Accident Record for
April 2015-May 2016

Month	Two wheeler	Light weight vehicle	Heavy weight vehicle	Bus	Other vehicle	Total
April	16	11	9	6	14	56
May	19	10	8	6	6	49
June	29	12	16	8	8	73
July	29	15	21	7	11	83
August	19	12	13	7	9	60
September	20	12	9	7	9	57
October	20	11	8	8	8	55
November	23	12	12	6	6	59
December	23	13	9	0	10	55
January	25	10	10	0	9	54
February	27	9	10	8	9	63
March	23	6	12	8	8	72
Total	273	133	137	71	107	736



Graph1. Increasing Accidents in particular year

IV. Collection Of Current Information About Current Road Networks:-

Road Width of Some Important Road in Aurangabad City Measured At Site

1. Baba Petrol Pump To Cidco Bus Stand-**45M**
2. KrantiChowk To Railway Station-**40M**
3. Railway Station To Bus Stand To Jubli Park To Rangeen Gate-**35M**
4. Collector Office To Salim Ali Sarovar-**24M**
5. Delhi Gate To Harsool Gate-**30M**
6. Cidco Bus Stand To Harsool-**60M**
7. Seven Hill To Aakashvani-**30M**
8. Salim Ali Sarovar To Jalgaon Raod-**30M**
9. Hotel Amarprem To Beed Bypass-**24M**
10. Aakashwani To Trimurthy Chowk-**24M**
11. Seven Hill To Beed Bypass-**24M**
12. Gajanan Maharaj Mandir ToMukundwadi Railway Station Rd -**24M**.

V. Collection of information about signal systems in Aurangabad city:-There are total 71 no. of signals around Aurangabad city. Out of which 50 signals are in working condition.

VI. After collecting information about transportation services I have carried out origin and destination survey just to know passengers choice about location of bus stops, their origin of work ,whether they have got any public transportation facility on track and their opinion about future BRTS system if implemented for Aurangabad city. After this I have carried out traffic volume count as follows:

VII. Traffic Volume Count:-

Sr no	Location	Morning peak hour			Evening peak hour		
		2 wheeler	3 wheeler	4 wheeler	2 wheeler	3 wheeler	4 wheeler
1.							
2.	KrantiChowkToAakashwani	2893	671	375	3025	692	455
3.	AakashwaniToCidco Bus Stand	2366	771	278	2672	891	325
4.	Cidco Bus Stand To Mukundwadi	1393	231	178	1528	242	226
5.	Gajanan maharaja mandir To Jay Bhawani nagar	1893	245	233	2089	325	310
6.	Delhi Gate To Harsool Jail.	2555	340	167	2735	365	226
7.	Garkheda To Beed Bypass	1956	232	166	2126	258	245

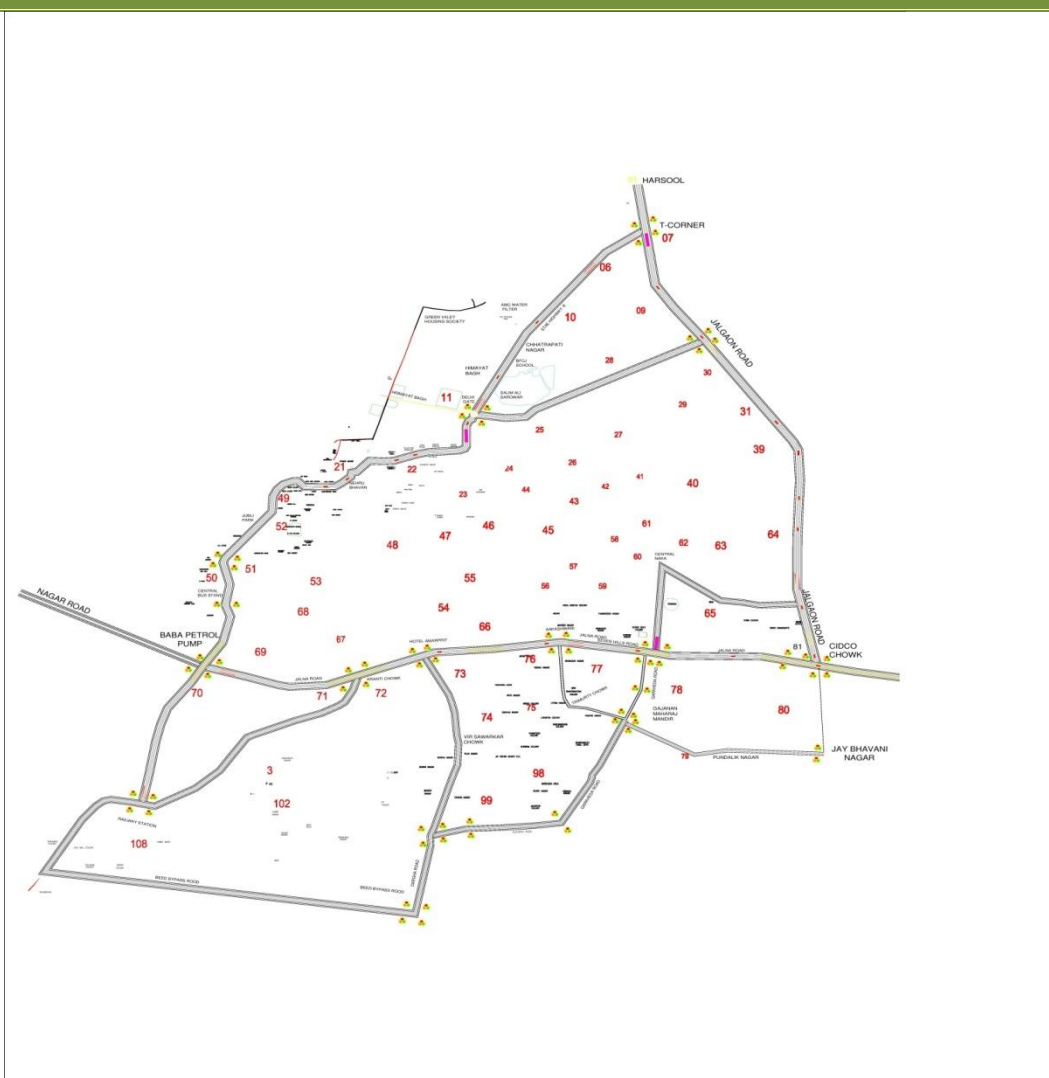


Fig.2.1 Future BRTS track for Aurangabad city

(2) Future track for different road width of Aurangabad city, i.e. for 60m, 45m, 30, 24m as follows

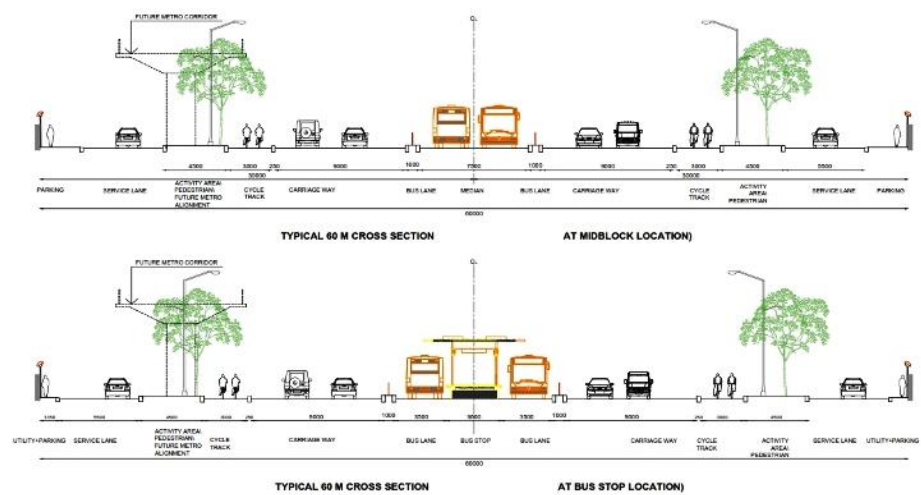


Fig2.2 BRTS track for 60M road width

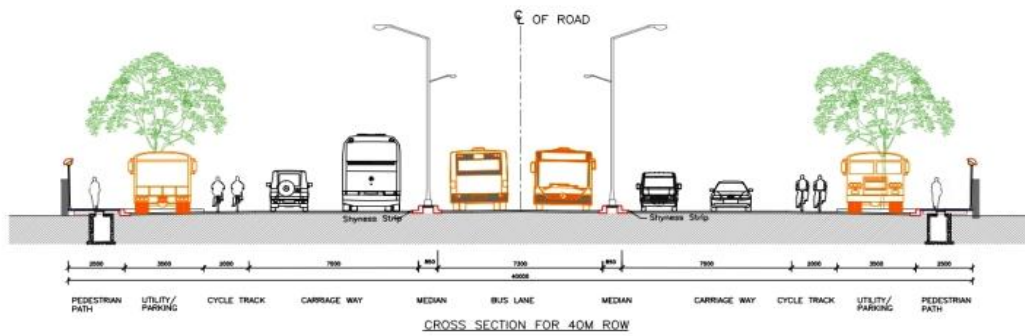


Fig2.3BRTS track for 40M road width

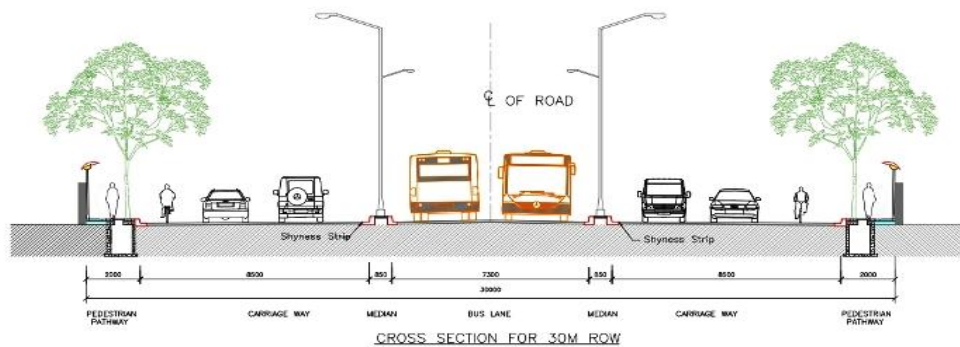


Fig2.4BRTS track for 30M road width

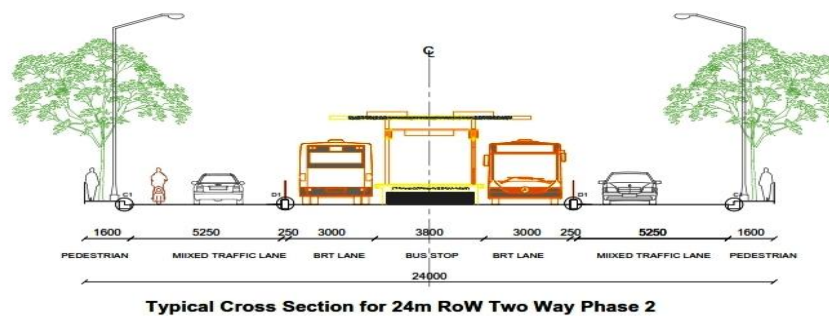
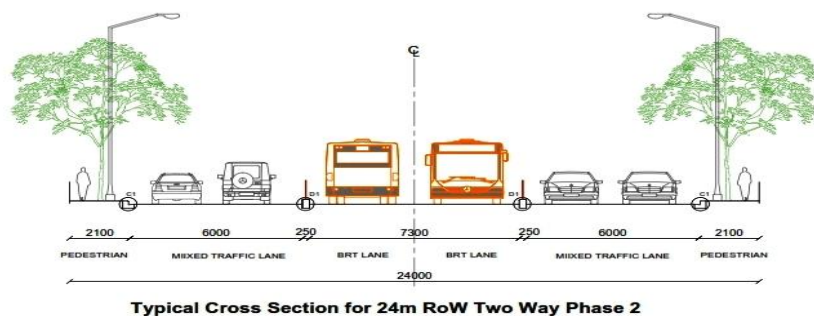


Fig2.5BRTS track for 24M road width

Result and Conclusion

(3) To get clear idea about new system of public transportation or for information of dimensions of new system a two dimension model of system is prepared on computer software named AUTO CAD. At first map of the existing road network is taken from Google map. By setting this as background the total road network is drawn with exact dimensions in autocad2014. This file is imported in AUTO CAD 2DMODEL and whole model is drawn with exact

Dimensions, position of bus station, intersection and end condition.

The future BRTS at Aurangabad will come out to be a successful way of meeting the increasing transit demand as well as sustainable mode of public transport since it has better management.

Also it will edge over the other modes of transportation due to its safety, comfort ability, easiness. A city like Aurangabad is coming forward as successful model to implement BRTS under JNNURM.

Though there are some risks and challenges like lack of public support, blaming of auto-rickshaw & taxi association to Govt. For going ahead and implementing BRTS without explaining them how it will work, all these negative impacts can be overcome by using proper design construction techniques.

Aurangabad is growing at a rate, which will set its berth as one of the developed cities, alongside Mumbai and Pune. Due to this fast growth Aurangabad Municipal Co-operation will find it difficult to distribute so many infrastructures in all directions and planning a better transport system.

Thus BRTS will prove the best solution and is what is needed ideally in present times in a massive country like INDIA where transit demand is always on the hype. Around the study done before a statement can be made that Aurangabad city fulfills the required parameters to establish a BRT system. The parameters such as population, physical parameters of road network and the frequency of public transport users observed in origin destination survey provides the strong weightage of need of BRT system in Aurangabad.

It is clearly seen from above study that if width of road increases with proper priority of lane for different traffic categories then load of traffic on urban routes automatically decreases with remarkable benefits and useful results can be found.

Acknowledgement

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