CHAPTER 1

INTRODUCTION

1.1 Introduction

One needs to appreciate the fact that in order to keep pace with the fast expanding small and medium-sized towns in India, planners and administrators have now putting more emphasis on the proper development of the towns and cities (Report of Task Force for Developing Small and Medium Towns and Cities, 1976). For the purpose of planning, they are using the master plans or the comprehensive development plans under the respective State Town and Country Planning Acts. In the state of Assam too, preparation of land use master plans for a town is a common approach. As a result, many towns in the state have their own master plans. In general, these master plans describe, in narrative form and with maps, an overall concept of development, which includes both present property uses as well as future land development plans.

However, the scope, relevance and effectiveness of these master plans are often the subject matter of discussion. Regarding the transport, for instance, the master plans generally have a brief chapter on urban transport. But, despite having master plans, like most towns in the country, towns in Assam also are facing serious bottlenecks as far as road traffic is concerned, resulting in degradation of the environment. This makes it imperative to look into all the factors responsible for this state of affairs.

In the towns of Assam, road transport is the most widespread means of transport. But the continued growth of traffic on urban roads has led to unwanted traffic congestion as well as noticeable increase in road accident, urban air quality problems and noise pollution. Actually, traffic on urban roads has become a common concern in the urban centres all over the world and transport planning agencies are now focusing a good deal of attention on urban travel reduction policies. Some of the most discussed policy instruments include those which encourage fewer trip starts, shorter trip distances, shift to higher-occupancy vehicles and the timing of trips from more to less congested periods of the day or the week and so on. Again, the much-adopted planning tool has been the simulation models. These computer-based models combine theory, data and algorithms to arrive at an abstract representation of the character and functioning of the whole land use-transportation system.
Ideally, once a simulation has been calibrated against a known scenario, the model may be used to make predictions about the future state of that system. To this end, any measure or action taken to deal with the traffic planning process inevitably includes a consideration of the models, tools, and methodologies used by decision-makers.

Today, within the transportation planning process an entire set of transportation forecasting modelling tools are available. They have been developed on the computer software and are primarily based upon the four-step method of generation, distribution, modal split and assignment for traffic planning process (Iacono, et al., 2008). A look in to the literature on the development of these computer modelling tools, such as in Iacono, et al., 2008, refers to the fact that at the beginning they were based on the available expertise and the availability of data to test the approach. But, as expertise began to grow over time and the ability to reasonably collect data increased, the focus of model development shifted to incorporating more functionality into the model and better representation of the real-world systems. For example, the micro-simulation modelling approaches, which had occurred in parallel with increasing computing power and data storage. The rise of the activity-based models is another milestone in the transport planning process. However, there are also researchers and policy-makers who debate on the role and purpose of computer modelling tools to support urban planning.

Conflicts also occur regarding the type of computer modelling tools. While there are researchers who cite the need for more complex and large-scale modelling tools capable to include more functions with a higher degree of accuracy of the results (Badoe and Miller, 2000; Waddell, et al., 2007), other researchers and decision-makers, by indicating the high cost, difficulty of use, and large data requirements to run large-scale models, identify the need for simpler models (Fehr and Peers, 2007). This later group suggests that there is a need to incorporate the complexities of the dynamic urban process by way of simpler computer modelling tools that are more accessible to decision-makers (Sussman, et al., 2005). But, in practice, it is seen that while many resources have been devoted to the development of more complex computer modelling tools (e.g., UrbanSim and TRANSIMS), less attention is focused on simpler modelling approaches.

These literatures reveal that there lies a research gap between the simplified models and the models not based on computer software tools for the use of small towns. So, this
research builds upon the debate on complex and comprehensive tools and/or any type of 
computer modelling tools versus a simple yet a scientific way to solve the problem of traffic 
in the small towns of Assam and provides a practical study to suggest that a simpler 
approach can be a cost-effective approach to support certain aspects of the urban planning 
decision-making process. For the towns of Assam such an approach seems to be appropriate 

because of the fact that the Integrated Transportation and Land use Modelling (ITLUM) 
tools being created today are often complex in nature, requiring large amounts of detailed 
data, resources (time and money), functionality, and expertise (Abbas and Bell, 1994). In 
the case of the small towns of Assam, it is next to impossible to think for such a modern and 
sophisticated method of transportation planning, not only because they are too expensive, 
time consuming, but also from the view point of expertise and other managerial constraints. 

1.2 Statement of the problem 

It has been observed that as many as 27 towns of Assam like Guwahati, Nagaon, 
Tinsukia, Tezpur, Silchar etc. have adopted their respective master plans. These plans were 
formulated according to the guidelines of the Ministry of Urban Affairs and Employment, 
Government of India. But it seems that the transport sector has not been dealt with in proper 
depth. In this connection it may be mentioned that the Ministry of Shipping and Transport 
(Road Wing), India, had also published a guideline for urban traffic planning in 1984 
(Guidelines for Urban Traffic Planning, 1984). But most of the master plans stress on the 
buildings and give less attention to the lines of transportation in between them. This is 
probably one of the causes why transport has had negative implications as far as livability 
of the towns is concerned. 

With this in backdrop, it is interesting to study that to what extent transport planning 
is made a part in the formulation of the urban master plans of Assam and, if it is not made, 
what is the way to arrest the problem. The practical problems related to urban traffic in the 
towns of Assam which are intended to be addressed in the present study, are of the 
following nature: 

(i) The urban road system has evolved from the antiquated and inherited roads, which 
were winding and narrow and, hence, unsuitable for modern traffic. And this leads 
to acute traffic problems like accidents, congestion etc.
(ii) Suitable database required for proper planning of traffic in small cities and towns has not been created. Similarly, the relation between population and employment, home-based trips and non-home based trips are also non-existent.

(iii) The local authorities of the urban areas, who, mainly due to financial constraints, lack expertise and/or rational methods, are addressing the problems mostly with ad-hoc measures. Such measures have certain produced results which are at variance from the results produced by more scientific methods.

Considering these problems the present study has been undertaken to examine the master plans adopted by different towns of Assam and to work out a somewhat rational transport planning, with a manageable database, for tackling road traffic problems.

1.3 Importance of traffic planning

The urban master plans in Assam are essentially a planning for land use. They are based on the notion that if the land use is done rationally, the problem will be less serious. But, as far as the traffic problem is concerned, the things are not happening as has been projected in these master plans. In this regards, and from the point of transport planning, the current science of traffic planning seeks an established relationship between land use and traffic to formulate analytical solutions. Here, mention may be made of R. B. Mitchell and C. Rapkin. In 1954, they made the statement that urban traffic is a function of land use. It had opened a new line of thinking in urban transportation and land use planning. However, the reciprocal statement that land use is a function of transport is also true. For instance, two studies which have proved the validity of the above two statements are: i) The early Detroit Area Transportation Study demonstrated the empirical validity of the proposition that transport is a function of land use and ii) The Penn-Jersey Transportation Study tested the reciprocal proposition that land use is a function of transportation (Kadiyali, 2004).

This reciprocal relationship suggests that the success of urban planning depends not only on planning the essential facilities (for its inhabitants as well as surrounding rural population, who depend on the city for certain needs such as higher education, hospitals, recreational facilities, etc.), but also on the access to them. While there is no doubt that the market forces operating in an urban area may help provide some of these facilities, it is crucial to note that they operate mainly with a profit motive. So, in the process, some of the
fundamental services may be neglected, resulting in the deterioration of the quality of life. As a result, environment may get polluted, slums may come up and the urban area may face many other bigger problems. So, planning is needed not only to earmark and develop the essential facilities but also the links to access them.

International evidences from cities like Shanghai, show that planners and administrators have realised the fact that transport planning (i.e. the physical plans for road networks and land use plan for transport facilities) is a major foundation for, and an important component of, urban master planning. In some cities, the budget for transport planning is higher than that of master planning, while some cities have integrated the process of master planning with transport planning (Xiaojiang and Li, 1995). It suggests that traffic planning should be an important part of overall urban planning, as it is linked with the transport network, an important channel for communication. But the present trend of master planning in Assam reveals that the transport system has been based on the layout of the land use instead of the other way round, where the land use plan should be formulated based on the transport forecast and analysis. For instance, it is seen in the collected master plans of Assam that the traditional planning process is based on the premise that capacity requirements of urban transport networks should be dimensioned to meet predicted demand resulting from changes in land use and socio-economic factors. This may probably be one of the causes why, despite having master plans, most of these towns face serious traffic and parking problems. So, traffic planning from modern perspectives becomes the need of the hour to arrest the existing and probable traffic problems in the towns of Assam. In order to achieve this, urban plans should integrate both land use and transport components. In fact, the urban master plans of the State should try to formulate the future land use development based on the projected transport demand.

1.4 The study area

The study areas for the present work include certain towns of the state of Assam. The state has an area of 78,523 sq. km (2.39 % of the country’s total) and a population of over 31 million as per 2011 Census. Although the process of urbanisation in this agro-based state has been slow, it has great potentiality to have more population in its urban centres in future. The number of towns in the state increased from 12 in 1901 to 23 in 1941 and 125 in
2001. In terms of urban population as percentage to the total population, it was 2.3 per cent in 1901, which increased to 3.10 per cent in 1941 and 12.90 per cent in 2001. Now, to cater to the demand of this huge population, a sound transport system is required. Unfortunately, it has been observed that despite having master plans, the capital city of Guwahati and many other towns have poor transport networks and the pace of their development is still very slow. Thus with the existing transport facilities the situation has already become unmanageable in many cases, including the capital city. So, the present work intends to undertake a critical assessment of the existing master plans of some selected towns of the State, as far as practicable, in order to find out the shortcomings, if any, and to suggest ways and means for a road traffic planning on the basis of the study.

1.5 Objectives and research questions

The main objectives of the study are -

(i) to study the road systems in the existing master plans adopted by different towns of Assam under reference and to know the provision of land use and transportation under these master plans;

(ii) to examine whether the reciprocal influence between land use and transport was taken into account in the master plans or not;

(iii) to explore how the vital element of the reciprocal influence between land use and transport should be incorporated in the master plans; and

(iv) to study the transportation pattern in the selected town following the approach adopted by Buchanan (1963) in his “The Traffic in Towns”, which is considered to be a suitable approach for modern road traffic planning for the small cities and towns.

To meet these objectives the following research questions are formulated:

(i) Whether the master plans adopted for different towns of Assam have considered transport planning as an integral part, and if so, then to what extent?

(ii) Whether the issue of reciprocal influence between land use and transportation is adequately addressed in the master plans or not?

(iii) Despite having master plans, why do unmanageable traffic and parking problems still occur in the urban areas under study?
(iv) As the small towns of Assam cannot afford the highly sophisticated and cost-intensive approach of modern transport planning, is it possible to formulate some transport plans with the available and affordable information as indicated by Buchanan to streamline the future growth and development of these urban areas?

1.6 General approach and structure of the work

For the present work, master plans of different towns of Assam were collected. After having studied their general characteristics, the provisions of land use and transportation planning in these master plans were examined.

As the present work aims at improving the road traffic planning in the towns of Assam, it is required to search for a suitable methodology that can be adopted for road traffic planning for these urban centres. This has been done by reviewing the literature on the present state-of-the-art in road traffic planning. Then, after examining the applicability of some of the methods applied elsewhere in the case of the present study area, a simple, non-computer software based and yet scientific methodology was chosen from the established work of Colin Buchanan, popularly known as ‘The Buchanan Report’. However, the present study would try to incorporate some ingredients of land use-transport relation, while adopting the approach. The basic variables and parameters in this regard are taken in the manner as done by Buchanan to formulate plans for Newbury, a small town in the UK. Finally, a considerable work has been undertaken on the applicability and/or validity of the method adopted. This has been done by taking the Tezpur town as a case study. This town is selected as (i) it is the home town of this researcher and hence he is conversant with its basic characteristics and (ii) this town fulfills almost all the general criteria of the towns of the state.

The work is divided into four parts. The first part is an introduction to the study. The second part deals with the main features of the master plans under study with special reference to transport planning, current state-of-the-art in transport planning and the methodology adopted for the small urban centres of Assam. The third part is the main analytical part dealing with the town selected for detail study. The final part is the summary and conclusion of the study.
The general outline of the chapters of the dissertation is as follows:

Chapter 1 introduces the urban master plan – its necessity, various aspects and importance of traffic planning in a master plan. It also states the research objectives and questions, and provides the structure of the dissertation.

Chapter 2 deals with the history of master planning in the state of Assam, towns that have master plans, general characteristics and shortcomings of these plans. It also discusses the ‘Zoning Regulations’ as the chief tool in the master plans. It also deals with the study of some of the master plans regarding the road network and tries to answer two vital research questions set in this research i.e. Whether the master plans adopted for different towns of Assam have considered transport planning as an integral part, and if yes, then, to what extent? And whether the issue of reciprocal influence between land use and transport gets reflected there or not?

Chapter 3 is a critical appraisal of a few master plans under study with reference to road traffic planning.

Chapter 4 presents a review of the techniques of transport planning. It highlights the general four-stage method of generation, distribution, modal split and assignment for traffic planning; a discussion on land use transport models and a review of some of the operational models. After analysing the pros and cons of the above models, as an attempt to reach a suitable transport planning technique for the towns of Assam, it presents the views of Buchanan on the transport planning in Britain.

Chapter 5 discusses the methodology adopted for the formulation of transportation plans for the towns of Assam.

Chapter 6 presents the case study of Tezpur town to illustrate how the adopted approach can be used as a strategy for certain town planning decision-making categories.

Chapter 7 summarises the study.

1.7 Significance of the study

The results of this research appear to be important which will contribute to the contemporary research in the following two ways:

1. It provides confidence about a simpler scientific approach that can be used in supporting transportation planning decision-making and that transportation planning can be used as the basis for the entire master planning process.
2. The result of this research, particularly in the context of Tezpur, may be an operational model that can be used by the town authorities for its proper planning. This case study provides scope to create a simple scientific study to support the decision-making process for any kind of transportation planning for other such small towns also. Future research will be able to assess the validity and utility of this simpler approach in urban transport planning.