

Japan International Cooperation Agency (JICA)

Dhaka Transport Coordination Authority (DTCA)

**The Project on the Revision and Updating of the Strategic
Transport Plan for Dhaka**

Urban Transport Policy

November 2015

Almec Corporation

Oriental Consultants Global

Katahira & Engineers International

Table of Contents

1. INTRODUCTION	
1.1 Overall Transport Policy	1
1.2 RSTP Overall Transport Development Policy	4
1.3 Key Policy Issues in STP	9
1.4 The National Integrated Multimodal Transport Policy	15
1.5 Revised Urban Transport Policies of RSTP	16
2. PROMOTION OF SOCIAL UNDERSTANDING ON PRESENT AND FUTURE URBAN TRANSPORT PROBLEMS AND ISSUES	
2.1 Introduction	18
2.2 Conduct of Consecutive Transport Campaigns	18
2.3 Expansion of Transport Education	19
2.4 Strengthening of Transport Studies	19
2.5 Information Disclosure	19
3. EFFECTIVE MANAGEMENT OF URBAN GROWTH AND DEVELOPMENT	
3.1 Introduction	20
3.2 Policy Coordination within Metropolitan Area	20
3.3 Integration of Urban Development M/P and Urban Transport M/P	20
3.4 Development of Hierarchical Road Network and Road Classifications to Guide Design	21
3.5 Promotion of Integrated Urban and Transport Development, Particularly Transit-Oriented Development (TOD)	22
3.6 Guidance for Ideal Urban Development	23
4. PROMOTION AND DEVELOPMENT OF ATTRACTIVE PUBLIC TRANSPORT	
4.1 Introduction	24
4.2 Development of a Hierarchical Public Transport System	24
4.3 Early Introduction of an Integrated Public Transport System in the Effort to Maintain Public Transport Share	25
4.4 Development and Improvement of Bus Transport System, Including Reform of Management Systems and the Business Model	25
4.5 Exploitation of Para-transit and NMVs	26
4.6 Use of Waterways for movement of Goods and Passengers	28
4.7 Promotion of public transport use and expansion of services	28
4.8 Providing an Affordable Public Transport System	30
5. EFFICIENT TRAFFIC CONTROL AND MANAGEMENT	
5.1 Introduction	33
5.2 Establishment of Comprehensive Traffic Management System Balanced with Better Facilities for Essential NMT Modes such as Cycling and Walking	33
5.3 Strengthening of Traffic Regulation, Enforcement and Management	33
5.4 Management of Freight Transport	35

5.5	Establishment of Parking Policy and Control.....	36
5.6	Development of Well-coordinated Traffic Control and Management System	37
6. EFFECTIVE TRANSPORT DEMAND MANAGEMENT (TDM)		
6.1	Introduction	39
6.2	Integrating Urban Development and Transport (TOD);	40
6.3	Providing Efficient Public Transport Alternatives;	41
6.4	Regulating Motorized Vehicle Access and Proper charging of Road Use and Parking. .	43
7. COMPREHENSIVE DEVELOPMENT OF TRANSPORT SPACE AND ENVIRONMENT		
7.1	Introduction	44
7.2	Management of Transport Corridors.....	44
7.3	Improvement of Transport Environment for All Persons in the City	44
7.4	Redistribution of Transport Space & Improvement of Traffic Environment in City Center	48
7.5	Alleviation of Air Pollution and Noise Pollution.....	48
7.6	Establishment of District Transport Development Strategy	50
8. ENHANCEMENT OF TRAFFIC SAFETY		
8.1	Introduction	52
8.2	Establishment of Traffic Safety Audit System	52
8.3	Elimination of Traffic Accident Black Spots	52
8.4	Improvement of Licensing and Vehicle Inspection System	53
8.5	Strengthening of Traffic Enforcement System	54
8.6	Strengthening of First Aid Response System	55
9. STRENGTHENING OF TRANSPORT SECTOR ADMINISTRATION AND MANAGEMENT CAPACITY		
9.1	Strengthening of Transport-related Organizations	56
9.2	Promotion of Private Sector Participation.....	56
9.3	Strengthening of Planning and Management Capacity of DTCA	57
9.4	Improvement of Infrastructure Development and Management System	58
9.5	Securing of Development Fund	58

List of Figures

Figure 1.1	Indicative Target for Modal Share for 2035.....	4
Figure 1.2	Main Features and Policies of RSTP.....	8
Figure 3.1	Relationship of Functionally Classified Highways	21
Figure 7.1	Air Pollution from Vehicles in Dhaka.....	49

List of Tables

Table 1.1	Compatibilities of with RSTP and RSTP	17
Table 6.1	Classification of TDM Measures	39
Table 6.2	User Services Defined by ITS Japan	40
Table 7.1	Number of Accidents by Year in DMP	45
Table 8.1	Periodicity of Vehicle Fitness Certification by BRTA.....	53
Table 9.1	The Projected Budget for Transport Sector in GDA	59

ABBREVIATIONS

ADB	Asian Development Bank
AFD	Agence Francaise de Developpement
BBA	Bangladesh Bridge Authority
BIWTA	Bangladesh Inland Water Transport Authority
BIWTC	Bangladesh Inland Water Transport Corporation
BR	Bangladesh Railway
BRT	Bus Rapid Transit
BRTA	Bangladesh Road Transport Authority
BRTC	Bangladesh Road Transport Corporation
BUET	Bangladesh University of Technology
C&B	Construction & Building
CASE	Clean Air and Sustainable Environment
CNG	Compressed Natural Gas
DAP	Detail Area Plan
DCC	Dhaka City Corporation
DF/R	Draft Final Report
DFID	Department for International Development
DHUTS	Dhaka Urban Transportation Network Development Study
DMA	Dhaka Metropolitan Area
DMDP	Dhaka Metropolitan Development Plan
DMP	Dhaka Metropolitan Police
DMTA	Dhaka Metropolitan Transport Authority
DMTC	Dhaka Mass Transit Company
DNCC	Dhaka North City Corporation
DPP	Department of Printing and Publications
DRTM	Directorate of Road Transport Maintenance
DSCC	Dhaka South City Corporation
DTCA	Dhaka Transport Coordination Authority
DTCB	Dhaka Transport Coordination Board
ECNEC	Executive Committee of the National Economic Council
EIA	Environmental Impact Assessment
EIRR	Economic Internal Rate of Return
F/R	Final Report
FIRR	Financial Internal Rate of Return
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GIBR	Government Inspector of the Bangladesh Railways
GOB	Government of Bangladesh
GOJ	Government of Japan
GPS	Global Positioning System
HIS	Household Interview Survey
IC/R	Inception Report
IT/R	Interim Report
JICA	Japan International Cooperation Agency
LDC	Least Developed Country
LGD	Local Government Division

LGED	Local Government Engineering Department
MOC	Ministry of Communication
MOHPW	Ministry of Housing and Public Works
MOR	Ministry of Railways
MRT	Mass Rapid Transit
NGO	Non-Governmental Organizations
OD	Origin and Destination
ODA	Official Development Assistance
PPPO	Public Private Partnership Office
PT	Project Team
RAJUK	Rajdhani Unnayan Karttripakkha
RD	Record of Discussions
RHD	Road and Highway Department
RTC	Regional Transport Committee
SC	Steering Committee
SEA	Strategic Environmental Assessment
SPA	Survey and Plan Area
STP	Strategic Transport Plan for Dhaka
TDM	Traffic Demand Management
TOR	Terms of Reference
UMRT	Urban Mass Rapid Transit
WB	World Bank
WG	Working Group

1. INTRODUCTION

1.1 Overall Transport Policy

(1) Current Urban Development Policy

The City Growth: In terms of population, urbanization, scale of economic activities and household income levels; it has been rapid in Dhaka. It is unlikely to slow down due to the unique position of the city as the economic engine of the entire Bangladesh. The prospective population in RAJUK area will be 26.3 million by the year 2035. Large percentage of this growth will be coming from immigration, as rural population will be attracted into the city due to expanded job opportunities and for the anticipation of better living. The household income is expected to increase by about four times comparing to the current level. As a result, some noticeable changes that will arise are as follows:

- **Expanding urbanization:** Although the central areas will retain their population size, suburbanization will occur through an expansion of medium to low density residential areas since households with higher income seeks for a larger living space, a better environment, and car ownership. The neighboring areas will be closely connected with the social and economic activities of the city.
- **Progressing motorization:** Household car ownership ratio will definitely increase as economy grows. In RAJUK area, the present rate of car ownership is 3.3% and the current rate of motorcycle ownership is 9.4%; the said rate will surely rise as the income by 2035 will also increase. Combined with the population growth and longer time of trip; it will be more stressful to road users due to congestion, uncomfortable commuting, long travel time and insufficient parking space.
- **Worsening living condition for low income group in the central areas:** Urban rehabilitation will be speed up in the central areas for the purpose of business and commercial activities, therefore; this applies pressures on property values and in the relocation of low income households.

Just like other cities in developed and in the developing countries had experienced, such scale of urban growth will involve painful adjustments on the residents of the city. The undisciplined and unregulated use of private cars should not be permitted to continue in a large city like Dhaka.

Dhaka and its neighboring areas would continue to be the main link of Bangladesh to the global economy. The country's global competitiveness will therefore rely on the efficiency of the transport system in Dhaka urban area.

1) Objectives

The future of the city should be worth living as well as competitive, and its transport sector should support and facilitate this objective. The overall goal of urban transport is to "Ensure mobility and accessibility to needed urban services for its people and society; through safety, amenity and equity towards the development of a public transport-based city with more than 60% share of the total urban transport demand."

Accordingly, eight specific objectives in the master plan are identified:

- Promotion of social understanding about urban transport problems and issues
- Effective management of urban growth and development
- Promotion and development of attractive public transport
- Efficient traffic control and management

- Effective management of transport demand
- Comprehensive development of transport space and environment
- Enhancement of traffic safety and reduced environmental impacts
- Strengthening of urban transport administrative and management capacities

2) Sector Constraints

Funding is the biggest constraint. There is simply no way for Dhaka by itself away from its existing and arising problems. Hence, it must turn more to the private sector especially in the provision of transport services, rather than for the government alone to assume the responsibilities. Although the city has unlimited resources, it cannot continuously expand the provision of roads without destroying the physical form of the city nor overcoming series of obstacles in a rapid manner. Besides, it is visible from other cities that in adding more roads will only lead to an intense cycle of more cars and more congestion.

Getting more commuters on public transport is a must; however, this has become a challenging issue to rapid motorization. Unlike many developing cities which struggle against the decrease of high share of public transport, the public transport of Dhaka is fortunate enough to have a high modal share at present. This advantage should be maintained and strengthened even further, requiring the involvement of Government.

The third constraint is the weak institutional capability to cope up with the urban and transport challenges under an uncertain and changing policy environment. One way to overcome the lack of funds is to improve the ability of the government to harmonize land use with transport development. This however, demands expertise and processes which are also insufficient in the public sector.

3) On-going Initiatives

Even before the completion of the overall master plan, some flyovers have been completed recently, and several feasibility studies and detail design works are ongoing for elevated expressway, BRT Line 3, MRT Line 6, bridges and other infrastructures. These projects have strategic and long term implications not only for the master plan but it has also impacts on the future of the city.

4) Revised Policies

Having a long term historical perspective and a deep awareness of sector constraints, the need for new policy direction becomes evident.

The key feature of this new direction is greater reliance on the private sector in the building of transport infrastructure and operation of major transport functions, which is consistent with the national policy towards a market based economy. Bangladesh is now moving towards this end, but success depends on the creation of acceptable partnership agreements in order to provide greater confidence among investors. This will require various policy reforms and public sector practices such as, in the method of procuring infrastructure projects, price regulation and in the operation of governmental or semi-governmental enterprises. Such reforms maybe motivated by privatizing existing enterprises (whether profitable or not) involve in activities where the private sectors can and should make a useful contribution.

In relation to this initiative is the development of commercial public sector which is essentially profit oriented and business- like in their operations. This will also allow the public sector to compete having an equal opportunity with the private sector and also between foreign and local companies.

The commercialization of public service provision ensures a better efficiency combined with private sector participation (PSP), will bring more sustainable projects. Pertaining to infrastructure projects, Dhaka needs a pro-active approach, conduct feasibility studies to establish the business case for PSP including the level of government support required in each project, and marketing these opportunities to the private sector.

For passenger transport services, the public sector also needs to increase its management role, while maintaining its regulatory role in the delivery and outcome of transport services. This involves for a more participatory approach in service delivery, taking greater responsibility and being more accountable for the transport outcomes. This also requires building skills and capacity in management; not giving much reliance on regulations alone to reach issues; instead taking a more commercial approach in the management of service delivery.

Specifically, this includes developing partnering relationships with the private sector to deliver transport services, with sustainable business models under franchise or PPP arrangement. The public sector may take partnership risks when it is possible and manageable. Sharing risk and supporting the industry with appropriate regulations will strengthen its participation and control.

Building the investor's trust in the regulatory framework is a key requirement and demands the public sector to set high standards of governance, eradicating conflict of interests and create a system of regulatory independence and fairness.

For the city expansion, better urban controls are needed to preserve the ROW (specifically, alignment and width) for future roads, rather than just planning neat and elegant arrangement of land uses alone. Designated ROW's will provide a clear signal to the private sector as to where the future growth shall be, and strategically define the future shape of the city. Taxes and other incentives can be used to encourage this kind of developments outside the CBD, rather than relying on the traditional instruments of administrative controls (such as grant or denial of building permits). This new policy direction involves among others, the following:

- (a) Adoption or promulgation by law of the future road network in undeveloped areas in a flexible rather than rigid sense in order to allow the minor changes lining up without altering the overall network.
- (b) Removing these future roads, at least the primary or major arterials, from the land market.
- (c) Preparation of an integrated urban development plan, with an urban transport development plan for Dhaka preferably on a GIS foundation

Inter-city and inter-agency cooperation will become increasingly necessary as the urban development spreads outside traditional city boundaries thus requiring more coordinated and integrated transport solutions.

Aside from the aforementioned three policy directions, a number of issues are possible to come up that would affect future policies. These are; sustainability, resettlement, and environmental issues which all requires a long-term point of view. Apart from economic and technical activity, transport projects need to be planned for sustainability (maintained, operated, and supported with funds over its life), minimum dislocation and environmental soundness.

1.2 RSTP Overall Transport Development Policy

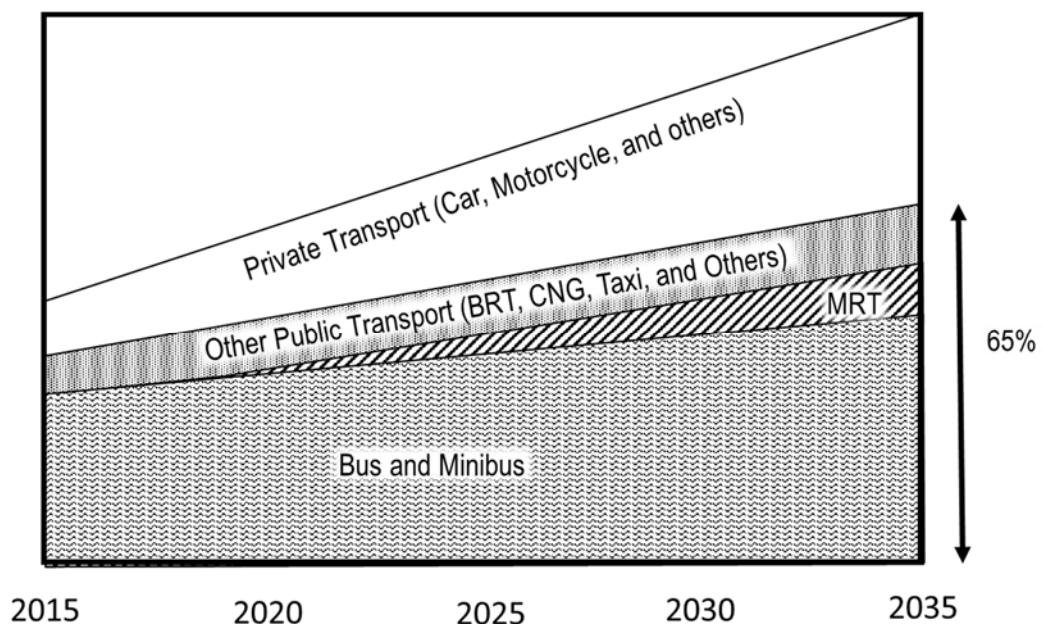
(1) Vision and Goal

A bleak future can be expected in the study area without making some strategic interventions. Over utilization of private cars is not justifiable in an urban place, with nearly 10 million inhabitants having heightened expectations, active social lives, and various activities. An aging urban population will also demand a different quality of transport services. Dhaka in the future should be habitable as well as globally competitive and attractive for industries, and leading Bangladesh's international trade; the transport sector must be designed to make this possible. The following are the overall goal of urban transport:

“Ensure mobility and accessibility to urban services that are vital for the people and the society, by providing a transport system characterized by safety, amenity and integrity sustained by an efficient public transport system”.

A combination of supply-type and demand-type policies is required to maintain the present advantage of high modal share of more than 65%.

It should be noted that the modal shift is indicative, as shown in Figure 1.1, if at least 60% share of public transport is not maintained, the resulting plan would overestimate the requirement for bus-rail capacity while underestimate vehicular volume on roads, thereby affecting feasibility of many road projects.



Source: JICA Project Team

Figure 1.1 Indicative Target for Modal Share for 2035

(2) Objectives and Strategies

The overall goal has been developed into eight specific objectives and strategies as follows:

A. Promotion of Social Understanding about Urban Transport Problems and Issues

There is no transport policy and project that would work effectively unless a wide and intelligent understanding of the transport problems, issues and future directions is shared to the society. The following four policies are suggested to achieve this objective.

- A1. Conduct of consecutive transport campaigns;
- A2. Expansion of transport education;
- A3. Strengthening of transport studies;
- A4. Information Disclosure.

B. Effective Management of Urban Growth and Development

Defining a vision of the future is highly important in the study area because of the fast increasing population and economy that will have a huge impact on urban development as well as the lives of the people. The transport sector is a critical part of urban growth and management. To achieve this objective, the following five policies are suggested.

- B1. Policy coordination within metropolitan area;
- B2. Integration of urban development M/P and urban transport M/P;
- B3. Development of hierarchical road network and road classifications to guide design and parking provision;
- B4. Promotion of integrated urban and transport development, particularly Transit-Oriented Development (TOD);
- B5: Guidance for ideal urban development.

C. Promotion and Development of Attractive Public Transport

Without public transport, the city's future is untenable. The future public transport must be provided in sufficient quantity and quality. An attractive public transport system is the only solution in which both city authorities and the people are expecting. The following are the suggested policies:

- C1. Development of a hierarchal mass transit system;
- C2. Early introduction of an integrated public transport system in an effort to maintain public transport share;
- C3. Development and improvement of bus transport system, including reform of management systems and the business model;
- C4. Exploitation of para-transit and NMVs;
- C5. Exploitation of water transport system;
- C6. Promotion of public transport use and expansion of services;
- C7. Providing an Affordable Public Transport system.

D. Efficient Traffic Control and Management

The current road capacity is not efficiently utilized due to widespread on-road parking, various types of encroachments and poor traffic control and management. Infrastructure capacity is largely dependent on how it is operated, managed and maintained. Better traffic management will improve the capacity as well as improve safety, amenity, and environment of the city and its people. It also relies on better regulation, management and enforcement combined with facility improvement and ICT technology.

Suggested policies are as follows:

- D1. Establishment of comprehensive traffic management system balanced with better facilities for essential NMT modes such as cycling and walking;
- D2. Strengthening of traffic regulation, enforcement and management;
- D3. Management of freight transport;
- D4. Establishment of parking policy and controls;
- D5. Development of well-coordinated traffic control system.

E. Effective Transport Demand Management (TDM)

The problem of traffic congestion should not be addressed merely from the supply side, i.e. expansion of infrastructure capacity. In order to ensure smooth traffic as well as share in a more equitable manner, the cost and benefit of traffic and transport among stakeholders, various demand management measures (TDM) would need to be introduced such as;

- E1. Integrating urban development and transport (TOD);
- E2. Providing efficient public transport alternatives;
- E3. Regulating motorized vehicle access and proper charging of road use and parking.

F. Comprehensive Development of Transport Space and Environment

Transport infrastructure provides important public space for the use of traffic, comprising different modes including walking and for various urban services and activities. For this purpose, it is important to design and develop transport infrastructure and services effectively to enhance the quality of urban areas and activities. The suggested policies are as follows:

- F1: Management of transport corridors;
- F2. Improvement of a safe transport environment for pedestrians and cyclists;
- F3. Redistribution of transport space and improvement of traffic environment in the city center;
- F4: Alleviation of air pollution;
- F5. Establishment of township transport development strategy

G. Enhancement of Traffic Safety

The worsening traffic safety and increasing traffic accidents are threatening the well-being of the city and its inhabitants especially the pedestrians. Road safety is a priority issue at union government level. Suggested actions include:

- G1. Establishment of traffic safety audit system;
- G2. Elimination of traffic accident black spots;

- G3. Improvement of licensing and vehicle inspection system;
- G4. Strengthening of traffic enforcement system;
- G5. Strengthening of first aid response system

H. Strengthening of Transport Sector Administrative and Management Capacities

The tasks to be accomplished for the present and future of the city are great and require a comprehensive and coordinated approach which involves a wide range of players. The role of the concerned authorities in leading the process is very important. The suggested measures are:

- H1. Strengthening of transport- related organizations;
- H2. Promotion of private sector participation;
- H3. Improvement of infrastructure development and management system;
- H4. Strengthening of planning and management capacity;
- H5. Securing of development funds

(3) Main Features of RSTP

RSTP has identified a series of transport development policies as stated above. The main focuses or features of the Master Plan exist on the following points:

1. Strengthening of Public Transport: The development of sustainable public transport system, taking advantage of the present high share of public transport trips
2. Improvement of Regional Competitiveness of the City: Construction of Efficient Transport System that supports 10 million multi-core hub cities
3. Realization of Well-managed and Environment-friendly City: Introduction of innovative institutional/operational schemes that enables world-class transport integration with living environment.
4. Adoption of Immediate Congestion Mitigation Measures: Implementation of less expensive measures to solve traffic congestion that brings quick outcome.

The inter-relationship between these focuses and the identified policies is illustrated below:



Source: JICA Project Team

Figure 1.2 Main Features and Policies of RSTP

1.3 Key Policy Issues in STP

(1) General Introduction

The transport systems in Metropolitan Dhaka are not only below standard compared to many other capital cities, but they have reached the crisis point that requires an immediate attention. A joint effort is needed from all concerned to resolve the transport problem of the city. The Government has used a loan from the World Bank to undertake a study of these problems; and the Consultants who are responsible for the preliminary work have identified 15 key issues relating to the transport system. Each of these key issues are described in this section of the policy document, and all are considered both individually and collectively so that the policies can be identified and the processes will be made properly to remove the concerns, which are identified as follows:

ISSUE 1. Safety

The high frequency of deaths, injuries and property damage especially on roads is associated to loss of productivity. In return, this results to a great burden on the economy and a traumatic effect on the victims and their families. It is estimated that 3% of the Gross National Product is lost due to these occurrences, equivalent to an overwhelming figure of US\$700 million every year.

The high rate of accidents and injuries are caused by many factors including badly designed and maintained roads, poor driving capabilities, defective vehicles, lack of public awareness, lack of proper traffic management, minimal enforcement, frequent overloading of motor driving and many other causes. Legislation is not appropriate and the enforcement of the regulations practically does not exist.

Road collisions and casualties are directly related to the number and quality of vehicles on the road. If changes are not made, as the number of vehicle increase so is the number of casualties; improvements of the situation will not easily occur; nor will it take place right away. The mindset of the people has to change before there can be major improvements in the operating conditions. Much can be accomplished with the changes in licensing and vehicle checking. The real improvements will only result when the people themselves decide that it is already enough and that they will adopt a different and more responsible attitude. Policies will be written to ease the situation but improving the status of public awareness and the responsibilities of the individuals are the key issues.

ISSUE 2. Pedestrians

Pedestrians are the most helpless of all road users and require special facilities for their protection. Statistics in Dhaka shows that pedestrians are involved in two-thirds of all vehicle related accidents. The absence of a clearly defined priority system makes journeys by this mode of travel unpleasant and hazardous. Some of the important factors which need to be addressed are: the lack of a pedestrian priority policy, the absence of continuous footpaths on both main routes and neighborhood streets, poorly designed; badly located and unclear pedestrian crossings, offense on the footpath from traders and equipment, and the absence of facilities for the movement of disabled persons. All of these factors contribute to a dangerous situation.

ISSUE 3. Public Transport

Aside from walking and cycling, public transport is the only mean of travel for the majority of the city dwellers. From the recent surveys taken by the Revised Strategic Transport

Plan, it is found out that more than 60% of the travelers use public transport for their journey to work. However, in relation with the high fare cost places these modes out of the reach of many lower paid workers. The poor service provided makes these modes unpleasant to use. The average age of the people on a journey is difficult to obtain since it is changing constantly. The systems compete with each other for the patronage of the traveling public mostly with low standard and out of date equipment, and on the roads which are badly surfaced causing additional damage on the vehicles. Bus stops are badly located and routes are not advertised leading to the confusion on the part of the users. The increase of many owners operating single vehicles rather than larger companies or cooperatives operating travels is a hindrance to an organized and passenger-oriented system. The service to the public still suffers further because of the various types of vehicles without any standardization of design and also with regards to pedestrian access ramps and steps. Import rules are also not sufficiently strict leading to further variation of the travel types.

Waiting areas for rickshaws and CNGs are not properly located or designed leading to these vehicles standing on the traffic lanes. The links between different sub-modes are poorly designed with buses, rickshaws and CNGs stopping in the same areas causing congestion and disorder. Bus and ferry terminals and rail stations are poorly repaired although there are moves to improve some of these. There are almost no public transport priority measures in existence and public transport has to fight with other modes for road space.

All of these unfavorable conditions have a major impact on public transport services making it inefficient, uncomfortable and unreliable. Waiting times are not the critical issue since frequencies of 10-15 per hour are the norm. What is more critical is the fact that many units that pass by are full and waiting passengers cannot board.

ISSUE 4. Non-motorized Transport

The non-motorized transport (NMT) mode (primarily the rickshaw) has played a definite role in the overall transport system in Dhaka for many years. However, there is a lack of control on their quality, number and operations leading to inefficiencies and danger. There is a lack of encouragement from the authorities to this mode of travel and the fact that many smaller streets are in poor condition is harmful to their comfortable use within neighborhood areas. Bicycles also face hazardous conditions and there are basically no provisions for their operations. Dangerous conditions exist due to the combine of widely different speeds when rickshaws and motorized transport move on the same routes. It has been said that there are too many rickshaws in the city. Estimates of up to 500,000 have been posed against a figure of 80,000 official licenses. In addition to these operational difficulties, the rickshaw vehicle itself needs to have the design overhauled in order to improve the operations and reduce the effort required to move the vehicle.

ISSUE 5. Travel Demand Management (TDM)

At present, automobile ownership and usage is low due to the lack of available income. In the longer term and as the economy expands, the automobile ownership will increase although macroeconomic forecast shows that this increase will not be rapid and large. Nevertheless, expansion of the highway network cannot continue simply to meet the new demand. There must be a control placed on the usage of automobiles in order to control the growth of this mode. There is now an opportunity to plan for this unavoidable increase so as to protect the environment and improve the quality of life in the city. There is a need to resolve and balance the use of automobiles in the city compared with the use of other more efficient forms of transport.

Travel demand management measures can be used in order to create a balance between supply and demand of the different systems (public and private) and also to keep the demand at a level which can be served better. The measures will be used to reduce usage of some modes and travel moves, from inefficient modes (such as automobiles) to more efficient modes (such as public transport).

ISSUE 6. Urban Freight Transport

Urban freight transport is essential element of the transport system and the economy as a whole. Unfortunately, the sector has low priority in the planning approach. Truck vans exist currently on the city roads; this is the result of lower awareness of their activities. The unplanned growth of the truck terminals and the wholesale markets cause congestion following the break-bulk operations that takes place. For this reason, DCC has been planning the removal of these terminals to border areas of the city. The issue needs to be carefully addressed.

ISSUE 7. Mass Transit

As the Dhaka metropolitan area grows to its future population of over 35 million, there will be an increasing demand for public transport service. An efficient mass rapid transport system which the general public can afford to use will be necessary to transport people to work and also to their leisure activity.

The existing bus system as described in the above mentioned Issue 3 cannot be expected to provide this mass rapid transit system. What is needed is a modern, clean, efficient system which will create a high level of service covering the whole metropolitan area and reaching out to the new communities in an integrated manner. The technology will progress over time as the demand increases. There is a lack of experience of mass rapid transit system planning and operation in the country, the system planning will require advice and assistance from outside agencies. There is a complete lack of discipline on the arterial roads hindering the efficient bus systems and all vehicle types are free to use almost all links although some measures are being taken to restrict rickshaws from some highways.

If the rail systems are to be used for the mass rapid transport system, then the technology needs to be imported including cars, operating and control systems and knowledge on how the system should be managed. In addition, the implementation time for such rail-based systems could take as long as 15 years. These requirements result in a need to establish a lower cost and more easily implemented system for the immediate future, which can only lead later to more costly and higher capacity systems as the demand increases.

Likewise, if buses are to be used as the rapid transport system, the absence of priority lanes requires actions to create situations where buses have priorities over other vehicles. The traffic management and operation of arterials and other roads needs to be completely reviewed and re-designed. There are many small bus companies (sometimes with just one unit) and too few larger operators or cooperatives with limited capabilities making the creation of a new system from the existing systems difficult to implement. It is likely that a new company, probably a combination of public and private interests will be formed under a Concession Agreement to build and operate the new system.

ISSUE 8. System Integration

The greatest efficiencies in operating transport systems are achieved when all the sub-modes act together. In Dhaka, the existing modes and sub-modes act independently and often are competing with each other. While competition in itself is not bad, the idea of allowing the sub-modes to benefit together from each other is to be encouraged. This is definite in Dhaka where financial resources are limited. In the present systems, the passengers are suffering due to the lack of inter-connection of modes and poor integration of scheduling

If the systems are planned so that all modes of transport are integrated, there would be greater efficiencies, better service to travelers and increased patronage. People travel frequently in more than one mode (river to rickshaw, or walk to bus for example). At present, individual bus operators issue their own tickets; run their own schedules and stops anywhere at any time as they please. There are also disturbing reports of some practices of operators, refusing to pick up some passengers (women for example) due to discrimination of the individual operators or drivers.

ISSUE 9. Traffic Management

The management of the existing road space is inefficiently conceived. Basically there is no control over the vehicles' use of the lanes. There is no lane discipline that exists and there is irregular parking and stopping on the running lanes. The running lanes are hindered by various obstacles including street vendors, building materials, solid waste containers and bus ticketing booths. There is a lack of development coordination between the concerned agencies and the overlapping of functions among them. Together, this failure in communications and operational service has caused a substantial loss in available capacity. It is estimated that up to 50% of the arterial system capacity is wasted due to poor operating conditions. Proper traffic management measures need to be put in order to regain this capacity loss.

Other items that contribute to this lack of capacity include poorly controlled frontage development with storage of materials on the footpaths and road lanes. The widespread encroachment unto the highways and footpaths by street hawkers encourages people to stop on the highway to buy products and other goods.

One of the most critical aspects of this operational inefficiency is the lack of a proper functional classification of highways in the city. Without this classification, the designs of the highways are inconsistent; there is a lack of priority between different highways and these results to confusion. Steps have been taken to make this classification but the results are confusing and the implementation is lacking. There is almost a complete absence of the enforcement of traffic rules. The Police have a huge task in taking control of the violations which takes place constantly and this enforcement is not getting helped due to the reported corruption which exists within the force itself. There are inadequate designs for traffic signaling systems at intersections, poor signing and pedestrian crossings suffers from low visibility. An up to date traffic data base is missing resulting to a poor basis for highway design. In addition to this, there is a lack of trained manpower to manage this important source of information.

ISSUE 10. Parking

The haphazard parking of vehicles (both motorized and non-motorized) causes significant loss of road capacity. Parking on the running lanes obstructs visibility and creates a dangerous situation for pedestrian traffic. The provision of valuable road space for the parking of vehicles is a very inefficient use of space especially where there is a

limited road capacity available. Over the years, people have become get used to stopping where they choose and leaving the vehicle without thinking of the consequences of poor parking. The future city can no longer afford to accept this behavior.

There is a draft parking policy available but it has never been implemented. In part, this is due to the lack of a clear directive as to who is responsible for the implementation. The policy needs further review and revision before the implementation. The stock of public spaces available is currently unknown and inventory surveys will be required. The RSTP study has provided some information for the revision of the policy. A more detailed study of parking supply and demand is needed with the objective of identifying permanent and temporary parking areas for cars, taxis, bicycles, rickshaws and other vehicles. The distinction between long-term and short-term spaces is needed and some of the major building complexes should be required to provide operational parking spaces. It seems clear that the law has inadequate provisions to discipline violators of the parking policy. It is also evident that the Police force finds parking enforcement duties to be too burdensome in addition to their present workload on other law enforcement. A system of having Parking Wardens to be possibly managed by the private sector is under consideration.

ISSUE 11. Environment

Air and noise pollution particularly in the urban areas is a major concern not only due to the smell and nuisance but specifically regarding its ill-effects on health. It is also harmful to the quality of life of the city dwellers. Major steps have been made with the introduction of the mandatory use of CNG fuel for CNGs. It is evident at present that this action is extending to other vehicles and CNG powered buses are now becoming part of the fleet of buses. This trend needs to be encouraged.

From the viewpoint of the transport sector, the exhaust challenge can be addressed by looking into fuel technology, vehicle technology and planning interventions. The introduction of CNG is a successful example of the first action. Planning interventions which can be used to reduce harmful exhaust emissions are part of traffic management advances. The vehicle technology issue is perhaps one of the most critical, but if improved could give the most dramatic results. The lack of enforcement of motor vehicle emission standards is a critical issue that needs to be resolved. There is ineffective control of worn out vehicles coupled with an ineffective system of roadworthiness testing. This is one area of which examples from other countries can be usefully transferred into the condition of Dhaka and the private sector can play a significant role.

It has been observed that very few developments have a Traffic Impact Assessment, an Environmental Impact Assessment or a Social Impact Assessment before permission is granted for construction. The widespread consequences of this lack of control are localized congestion and badly design developments.

ISSUE 12. Transport and Land Use Planning

For many years, transport planners and land use planners knows about the interaction between the two disciplines. Land use development results in a demand for transport and the provision of transport linkages encourages land use to take place in a planned way. In Dhaka, in spite of having a Structure Plan adopted by the government, there is still a lack of guidance on city planning. Most importantly, the control on land use development is not exercised. Planning applications are not correctly processed that leads to uncontrolled development which is not in accordance with the adopted Structure

Plan. There is little or no evidence of Traffic Impact Assessments being made for the new developments that result in localized congestion.

The inefficiencies in the transport system will result to longer distances between linked origins and destinations, such as between residential and work places and the need to provide long haul transport systems and other infrastructure to serve the land use developments. For shorter distances, where vehicular transport is not required, there is a lack of understanding in the local plans about the need to improve non-motorized transport and pedestrian facilities

ISSUE 13. Social and Political Aspects

The social impact on affected persons due to the implementation of any project particularly those encompassing the development of a transport system is largely ignored in current schemes. This is particularly true when the project has an element of land acquisition in turn resulting in resettlement of the project affected persons.

The government has an obligation to provide the services (including transport systems) which are required by its citizens. This obligation extends to all persons equally as well as the need to acknowledge the special needs of workers, lower income groups, women, the young, the aged and the disabled.

There is inequality between income groups resulting from many infrastructures and planning schemes. The higher income groups of society are able to afford the fares on most public transport systems. Also, expensive highway schemes tend to benefit a small section of the population who are independently mobile. It is an unfortunate fact that the inequality in this situation adversely affects the poor and needy more than the better-off sections of society. There is evidence of increasing crime on transport services. There is a lack of a system of transparent government subsidies for the poor and weak. In addition, there is a lack of equitable treatment resulting in the middle and high income groups and areas benefiting more from investments.

There is also a need to consider how proper transport service can be provided to some sections of the public so as to decrease insecurity and eliminate the harassment of women on public transport.

ISSUE 14. Institutional and Financial

The successful implementation of projects and innovative concepts resulting from the Revised Strategic Transport Plan will depend upon the application of effective enforcement and maintenance measures and a high standard of administration. Current investigations by the RSTP team reveal that many institutions are not fully capable of undertaking their mandated functions. There will be a need for considerable institutional development through training and the provision of increased resources. There is need to identify those institutions, which will be responsible for the implementation of the proposed infrastructure investments. At present the functions are split between agencies with overlapping responsibilities making coordination and actions confusing and inefficient. The allocation of responsibilities and resources among the different modes of transport and for institutional development of the various agencies involved is also not well defined and requires rationalization.

In order to finance the implementation of recommended projects required for the development of Metropolitan Dhaka, there will be a need to increase the amount of money which has been available in recent years. There are a range of possible options to realize this additional finance including creating a user charges system, encouraging loan financing from major international agencies and providing equitable subsidies in the

right manner and at a lower level as possible. The private sector will also need to play a vital role in the promotion of Private Public Partnerships in order to fund and organize project implementation in a sound manner.

ISSUE 15. Privatization, Deregulation and Subsidies

The participation of private organizations in the transport sector is not well organized and is limited to the operation of buses, trucks, taxis, auto-rickshaws and rickshaws. Although the private sector is deeply involved in the provision of bus services, the micro management is poor and the development of transport systems is not integrated. The current scene in terms of bus transport is one in which large numbers of small operators run stage carriage services with little control and monitoring. There is also a misunderstanding about who is allowed to obtain subsidies and on what basis. The National Land Transport Policy has clarified this by stating that all sectors may participate provided the evaluation is transparent.

The legislative background needs to be completely reviewed in order to create a business climate in which private sector investment may flourish. The area in which the private sector can become deeply involved will require careful definition and an open and transparent system of competitive bidding for projects will need to be introduced.

1.4 The National Integrated Multimodal Transport Policy

(1) General

The National Integrated Multimodal Transport Policy was approved as the highest transport policy in Bangladesh by the Government in 2013. This policy is the most important and new urban transport policies should be in line with this national policy.

The Government wants a transport system that meets the needs of people and business at an affordable cost and creates a better environment in which to live and work. It aims to reduce congestion, improve towns and cities to reduce the need to travel and avoid urban spread and excessive road building that consume precious agricultural land. Planning and coordination will be reformed to bring together thinking about better transport and a better environment at the planning stage. Multimodal transport operations that bring efficiency and enhance level of service will be fostered.

There are four main policies, (i) Integration within and between different modes of transport, (ii) Integration within the environment, (iii) Integration with land use planning, and (iv) Integration with policies for education, health, economic growth and social equity and poverty reduction.

(2) Objectives and Emphasis of the Policy

The primary objective of this policy is to emphasize the roles of rail, inland water transport, and aviation alongside road transport in order to ensure the development of the overall transport network. The objectives of this policy in relation with urban transport policy are to:

- Improve safety;
- Reduce accident rate;
- Reduce the worst environmental effects of transport;
- Ensure that transport meets social needs in terms of cost accessibility to all sectors of society;
- Improve integration of the overall transport network and foster measures to make interchange between modes easier;

- Reduce the need for travel by better land use planning;
- Use transport as means to assist poverty reduction;
- Increase alternative options for passenger and freight transport.

The policy emphases related with urban transport policy are the following:

- Adopting strategies for integrated transport policy;
- Ensuring best utilization and maintenance of existing assets and infrastructure;
- Adopting integrated and interchange between modes of transport;
- Setting specific targets for improving air quality, road safety, public transport provision and efficiency, and road traffic growth reduction;
- A firm commitment from the government to provide adequate levels of funding;
- Greater private sector participation in the sector;
- Upgrading traffic management;
- Innovative funding mechanisms, including road use charging and levies to fund road maintenance and proper and efficient use of Road Fund;
- Ensuring physical and operational integration between different modes of transport;
- Establishing a more rational regulatory framework;
- Meeting the transport needs of women and female children;
- Applying digital technology in the management of integrated transport policy
- Improved research, education, training and technology to support integrated transport objectives.
- Bringing navigability of rivers through enforcement, removing trespass of river banks, permanent stopping of river pollution, upgrading of river ports and ensuring an environment conducive to transportation through river ports.

1.5 Revised Urban Transport Policies of RSTP

Almost a decade has passed since the urban transport policies were formulated in STP. During this time, the environment surrounding urban transport has changed significantly, and a variety of issues have come to light.

Firstly, DTCA was established in 2012 as the coordination authority to meet the requirement with the suggestion of the project DUTP. The jurisdiction under DTCA is the outlined area by STP (2005) that covers districts of Dhaka, Narayanganj, Munshigonj, Mankgonj, Gazipur and Narsingdi. To manage these areas, DTCA follows its own act named as Dhaka Transport Coordination Authority Act, 2001.

Secondly, the National Integrated Multimodal Transport policy was approved by the Cabinet as the highest transport policy in Bangladesh. And this policy states that “Projects that are not consistent with ‘Strategic Transport Plan’ and approved by DTCA will not be considered for implementation by city corporations in Dhaka City or by any other agency”.

Thirdly, STP proposed a bus-based rapid transit system, BRT as the backbone of the service in the first ten years with the eventual service based on Metro rail systems as demand increases. And after ten years traffic demand in the study area has grown along with rising economy. Years after, traffic demand will overtake capacity of BRT network services.

For the aforementioned reasons, in the RSTP the Urban Transport Policies were revised and updated, but the revised urban policy share the same roots with the former urban transport policies.

And also, the revised new urban transport policies is in line with the National Integrated Multimodal Transport Policy,

Table 1.1 Compatibilities of with RSTP and RSTP

Issues of RSTP	Revised Objectives of f RSTP							
	Objective A	Objective B	Objective C	Objective D	Objective E	Objective F	Objective G	Objective H
Issue 1: Safety							O	
Issue 2: Pedestrians						O		
Issue 3: Public Transport			O					
Issue 4: Non-motorized Transport				O				
Issue 5: TDM					O			
Issue 6: Urban Freight Transport				O				
Issue 7: Mass Transit			O					
Issue 8: System Integration					O			
Issue 9: Traffic Management				O				
Issue 10: Parking				O				
Issue 11: Environment							O	
Issue 12: Transport & Land Use Planning							O	
Issue 13: Social & Political Aspects		O						
Issue 14: Institutional & Financial								O
Issue 15: Privatization, Deregulation & Subsidies								O

Note: Objective A. Promotion of Social Understanding about Urban Transport Problems and Issues
 Objective B. Effective Management of Urban Growth and Development
 Objective C. Promotion and Development of Attractive Public Transport
 Objective D. Efficient Traffic Control and Management
 Objective E. Effective Transport Demand Management (TDM)
 Objective F. Comprehensive Development of Transport Space and Environment
 Objective G. Enhancement of Traffic Safety
 Objective H. Strengthening of Transport Sector Administrative and Management Capacities

Source: JICA Study Team

2. PROMOTION OF SOCIAL UNDERSTANDING ON PRESENT AND FUTURE URBAN TRANSPORT PROBLEMS AND ISSUES

2.1 Introduction

Transport systems play a crucial role in urban development by providing access for people to education, markets, employment, recreation, health care and other social and economic key services. Urban transport services and infrastructures are closely related with urban citizens. But many people are unconscious of the fact that traffic congestions, traffic accidents and other transport issues are caused by human error or lack of knowledge.

In the RSTP, many urban transport measures are proposed to reduce traffic congestions and improve the urban transport environment; not only RSTP, many other transport projects and studies have been proposing many useful urban transport measures. The Government has been working on those issues for a long time, and was not able to get very far with those aforementioned issues. One of the reasons is that people have a lack of understanding toward urban transport policies and measures.

Transport policy and project would not work effectively unless a wide and profound understanding of transport problems, issues and future directions is shared by the society. The formulation of the most efficient plan and the intervention by the Government in the planning process will not be enough to ensure successful implementation. What is needed is the political will and determination of the Government supported by the people's commitment to achieve the objective.

2.2 Conduct of Consecutive Transport Campaigns

Since the number one cause of traffic accidents and traffic congestions is human error, it is a must to establish a concrete mechanism to educate drivers and other road users. The education program will be conducted in many ways; for instance, safety education oriented towards school children and communities, safety education at the time of application and renewal of driver's license, and safety campaign through the media. The Government should encourage their involvement with better training and payment to the participants.

Various aspects related to safety and manner need to be communicated to the public constantly; such as laws and regulations, accident causes, and driving manners. Actions include safety campaigns through media, organization of community volunteer groups, publication of traffic rules and regulations, and initiation of various model programs involving relevant sectors.

The National Integrated Multimodal Transport Policy mentions that traffic safety campaigns should be implemented on regular basis to improve awareness of drivers and road users about speeding of vehicles, and in the media to improve awareness of the potential dangers of road traffic and high speeds.

Policy 1 The Government will identify stakeholders on key transport policies (traffic safety, bus promotion) and establish the implementation system in coordination with NGOs, civic groups and communities.

Policy 2 The Government will conduct consecutive transport campaigns on key policies and its monitoring and establish the transport information system by website and mass media.

2.3 Expansion of Transport Education

In recent years, having understood the serious effects of traffic accidents on society at large, scientific researchers, traffic engineers and policy makers have developed many projects and conducted research in the field of traffic safety. The human factor is also considered to be the central element in the whole system.

The importance of human factors in transport policy discussion is growing. There is a realization that policy options that appear beneficial in principle have to be checked for their feasibility of implementation. Understanding and describing driver's behavior become a challenge in identifying the errors of drivers in determining accident/conflict causal factors and countermeasures.

Transport education for driver is very important; on the other hand transport education of traffic safety and transport rule is effective for the children and the young. While safety education in primary schools has been introduced recently in some areas, the program should be expanded citywide.

Policy 3 The Government will implement a traffic safety education at primary/secondary schools and also conduct a traffic safety campaign at community level. Traffic educations to drivers are also needed.

2.4 Strengthening of Transport Studies

The RSTP assumes that "normal" situation will continue for a long period of time (20 years). If abnormal situation occurs, such as long financial panic and war, the RSTP cannot be used and will lose its validity. On the contrary, the RSTP could be updated periodically if normal situation continues and a series of traffic surveys are conducted again (except for the person-trip survey, in principle). The conclusion and methodology of the master plan could be handed over to the future with periodical updating (basically every 10 years). But minor updates of RSTP will be required within 10 years.

Hence, many urban transport projects without an adequate study, evaluation, analysis and coordination will be submitted to the Government through DTCA. But those inadequate proposals will disrupt more important project implementation. Initially, DTCA can evaluate and coordinate those projects, but traffic demand, transport environment and technology will be changed easily, dramatically and speedy. DTCA needs to be strengthened in its own activities and coordinate with transport studies in colleges and research institutes.

Policy 4 The Government will create systems such that the climate will be amenable to encourage the public to participate in the policy drafting and comment on the Policy as drafted. Continuity with the RSTP will be ensured by the existence of a Steering Committee which will monitor developments and advise the DTCA.

2.5 Information Disclosure

Various aspects related to safety and manner need to be communicated to the public constantly, such as laws and regulations, accident causes, and driving manners. Actions include safety and manner campaigns through media, organization of community volunteer groups, publication of traffic rules and regulations, and initiation of various model programs involving relevant sectors.

Policy 5 The Government will establish the transport information for promoting traffic safety and traffic manner by website and mass media.

3. EFFECTIVE MANAGEMENT OF URBAN GROWTH AND DEVELOPMENT

3.1 Introduction

The integration of transport planning and land use planning in the context of the development of metropolitan Dhaka is critical. It is considered that the only realistic approach for the successful control of growth of development involves an active commitment to policies integrating transport and land use planning. It is essential to recognize that the size, growth and distribution of the density of activity in metropolitan Dhaka have a crucial impact on the dependence on transit. Policies for increases in density around transit nodes and along transit corridors can achieve reductions in congestion and pollution and can maximize the use of the investment in transport infrastructure. Unfortunately, the pro-active commitment to such policies and the recognition of the importance of the integration of land use and transport planning has been lacking in the Dhaka area in recent years.

3.2 Policy Coordination within Metropolitan Area

How to define vision of the future is highly important in the study area because a fast increasing population and economy will have a huge impact on urban development and in the people's life. The transport sector must be a critical part of urban growth and management.

Ten years ago, the metropolitan area was DMA (Dhaka Metropolitan Area) including Dhaka City Corporation (DCC). But recently, DCC was divided to Dhaka North City Corporation (DNCC) and Dhaka South city corporation (DSCC) and metropolitan area was expanded to RAJUK area. In RAJUK area there are 4 city corporations, DNCC, DSCC, Narayanganj City Corporation (NCC) and Gazipur City Corporation (GCC), GCC and NCC are new city corporations in the study area.

Policy 6 The Government will coordinate not only with the central government agencies but also to related city corporations for the integration of urban transport policies and regional transport policies.

3.3 Integration of Urban Development M/P and Urban Transport M/P

Land use planning and transport planning interact with each other to determine the development patterns. The two are interconnected that they need to be considered simultaneously. Old Dhaka earlier developed the motorcar as a complex network of pedestrian oriented passageways, reflecting walking as the predominant means of transport at that time. The new town areas reflect the land use planning principles of their time evolved on the basis of vehicular transport. The future provision of infrastructure coupled with a parallel emphasis on control of development and accessibility will help to regenerate the economic activities in highly congested areas like Old Dhaka.

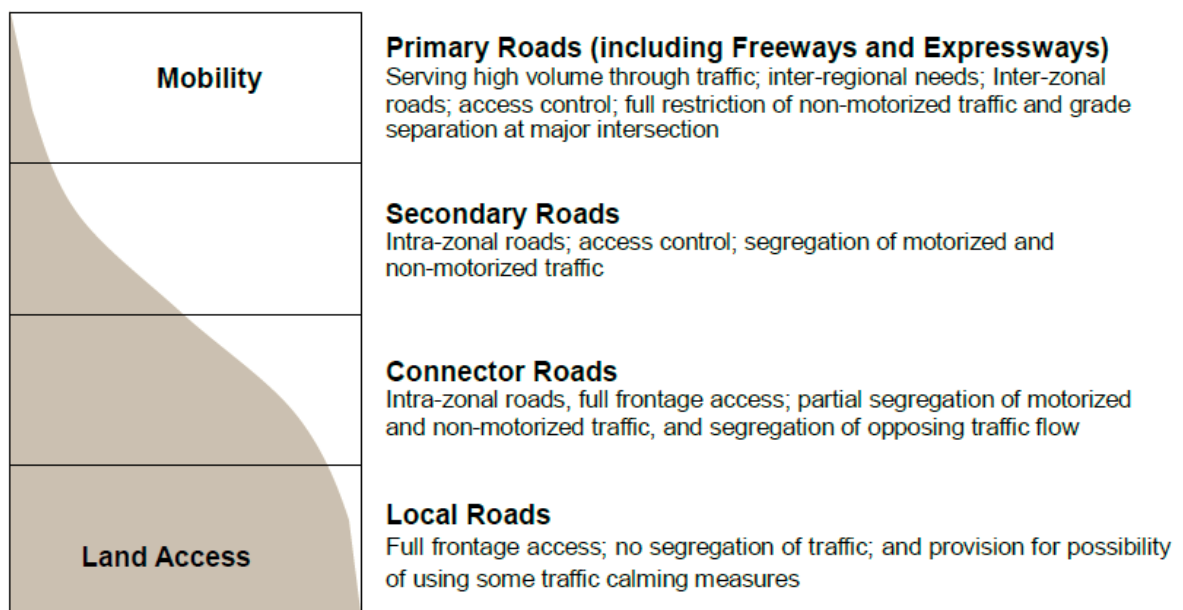
The most significant changes in land use patterns over the last few decades have resulted from major changes in the densities of residential areas, causing changes in the characteristics of transport demand. In order to stop this densification, or at least slow it down to controllable levels, there is a need to have a strong government intervention in the land use/transport planning process.

Significant in this process is the fact that Dhaka has limited road space compared with many other major cities in Asia. This comparison does not lead to the automatic conclusion that large amounts of additional road space are required. Rather, it illustrates the need to manage the land use and transport systems more efficiently.

Policy 7 The Government will strengthen the DTCA that will be responsible for the planning of both land use and transport systems in order to achieve integration between transport and land use development. Whereas, the two functions are currently separated, this new DTCA will have responsibility for both functions and will also be empowered to grant or refuse planning permissions in accordance with the RSTP and Structure Plan.

3.4 Development of Hierarchical Road Network and Road Classifications to Guide Design

The primary purposes and functions of any road network are to provide for the movement of traffic and to provide access to properties. While most roads provide some measure of each, the two functions are in reality often competing rather than complementary. Roads with high levels of access to adjoining properties do not function particularly well in terms of traffic movements. Roads that do function well in terms of traffic movement normally provide very limited access to connecting properties. But in urban areas, both functions are important. One approach to meet this dual but sometimes conflicting need is to have all roads serve both functions. However, in this situation neither function, movement or access works well. A generally accepted approach is one that establishes a hierarchy of roads wherein the primary purpose of one category of roads is the movement of traffic and the primary purpose of another category of roads is access to properties. Intermediate categories are created that have varying levels of emphasis for the two functions of movement and access.



Source: JICA Study Team

Figure 3.1 Relationship of Functionally Classified Highways

Therefore, roads are often classified according to the relative importance of the movement and access functions assigned. This permits the establishment and application of design and operational standards that reflect the particular function of a road in terms of the balance and trade off between movement, access and safety.

Policy 8 In order to improve the operational efficiency of the road network of the City and to facilitate its orderly development in the future; the Government will, through the DTCA initiate actions to create a proper functional classification of highways

in the city and will impose consistent design standards based on their functional requirements.

- Policy 9 The Government will establish hierarchical road system, strategic development of arterial road system (RRs, expressways, primary and secondary roads), and effective development method for road projects

In the RSTP, three ring roads are proposed for connections between each satellite regional centers outside CBD and eight radial roads and 7 MRT/BRT lines are proposed for strong connections between each satellite regional centers and CBD. There were a number of strategic links which showed importance and require investigation. These included: Dhaka by-pass to Narsindi, International Airport to Gazipur, Chittagong Road and others. In addition, many missing links in the city road network and some new east-west road construction are included in the Revised Strategic Transport Plan. These new highways will ensure better distribution of traffic. These measures will not only provide more accessibility within the city but will also provide better facilities for the traffic to leave and enter the city.

- Policy 10 The Government will provide high quality transport systems to encourage and serve the preferred land use development as recommended in the RSTP report and will strengthen the process of land use control and approvals of planning permissions to make this happen by vesting approvals procedures with the DTCA.

- Policy 11 In order to provide better accessibility and distribution of the traffic within the city and also to provide connecting routes from Dhaka to the satellite regional centers, the Government will encourage the construction of the link roads and the strategic highways identified under the Revised Strategic Transport Plan and will improve public transport services serving these communities.

3.5 Promotion of Integrated Urban and Transport Development, Particularly Transit-Oriented Development (TOD)

To enhance the development effects of the MRT/BRT projects, construction of urban facilities at and around the stations for the improvement of inter-modal connectivity is important. The guidance of the government on future development of specific areas along the MRT/BRT line will be critical because land prices will soar and uncontrolled development may occur after the completion of MRT/BRT. When they are properly developed, it will provide an opportunity for the GOB and Dhaka to gain potential benefits from integrated urban redevelopment including higher tax revenue that can be utilized as additional resources to fund other infrastructure projects around the stations.

A transit-oriented development (TOD) is a compact area of mixed use residential and commercial designed to maximize access to public transport, and also frequently encourage transit ridership. A TOD area typically is composed of a center with a transit station or stop (train station, metro station, tram stop, or bus stop), surrounded by relatively high-density development with progressively lower-density development spreading outward from the center. TODs are generally located within a radius of 400 to 800 m from a transit stop, or 600 m in average as a comfortable walking distance (around 10-minute walk).

- Policy 12 The Government will establish a development method and integrate urban development and mass transit development, for example the Urban Redevelopment System including the Land Readjustment System.

3.6 Guidance for Ideal Urban Development

As it has been well documented, urban development and urban transport development interact between themselves to determine development patterns. Old Dhaka developed before the motorcar as a complex network of pedestrian oriented passageways reflecting walking. On the other hand, new town areas reflect the land use planning principles of their time develop on the basis of vehicular transport. The future provision of infrastructure coupled with a parallel emphasis on control of development and accessibility will help to regenerate the economic activities in highly congested areas such as Old Dhaka.

At the new town area, housing and land development needs to be controlled strongly for keeping the ROW of public transport systems by the Government. And at the developed area like Old Dhaka, Motijheel, and National Stadium, re-urban development systems need to be established by the Government. Specifically, the development permission system needs to be established and controlled.

Policy 13 The Government will improve the development permission system and establish the method to improve residential environment in high density built-up area. In order to maintain accessibility into the most congested areas in the city, all projects which may be likely to affect the smooth flow of traffic will be subjected to a Traffic Impact Assessment (TIA) before they will be approved by the DTCA on behalf of the Government. The DTCA will specify the levels of development for which TIAs will be a pre-requisite.

4. PROMOTION AND DEVELOPMENT OF ATTRACTIVE PUBLIC TRANSPORT

4.1 Introduction

Because of its comparative advantages in terms of speed, flexibility and accessibility; road transport has emerged as the most popular mode of transport in Bangladesh. The Dhaka metropolitan area is no exception to this trend. As a result, inland water transport and the railways have been facing limitations with respect to the carriage of passengers and goods for many years. Consequently, the approaches to transport system development followed in the past decades need to be reviewed to create a balanced and multimodal transport system in Dhaka. Although there have been a number of transport studies in recent years, no serious effort has been made to establish a functional integration of different modes of transport. However, it is well known that without effective integration of transport systems; economic benefit, convenience and comfort from transport services cannot be derived. Dhaka is one of the least motorized cities in the world with a figure of about 127 motorized vehicles per 1,000 populations. As an example, saturation levels in western cities are around 500/1,000 and Bangkok as an example of an Asian city that has a motorization rate of 300 per 1,000 populations.

Carefully throughout measures must be adopted for the automobile society that inevitably will come in the near future. Without public transport, the future of the city is unsustainable. Future public transport must be provided in sufficient quantity and quality. An attractive public transport system is the only solution which both city authorities and the people expect.

4.2 Development of a Hierarchical Public Transport System

For large urban areas, such as Dhaka, the only way to effectively meet transport demand is to provide the city with a high-quality and hierarchical public transport system which must be developed in integration with urban development. The core network will be composed of MRT and BRT. Secondary and feeder services will be by buses, Tempos, CNGs and Rickshaws with different sizes and types of services. MRT will need a tremendous amount of money and time thus, long term policy of the Government is very important.

Policy 14 The Government will formulate the long-term mass transit development plan and establish the modal policy and the development method of mass transit system.

Although automobile ownership and use will rise, the predictions of income are such that there will not be a sudden or dramatic increase in Dhaka. In fact, there needs to be a control on the permitted use of automobiles. It is intended to providing a reduction of automobile access in favor of increased public transport access to sensitive areas. There are good examples from newly planned areas as to how other cities have controlled the use of different transport modes in different circumstances. But one particular aspect is common to almost all of them. This is the development of a public transport system which has precedence over automobile access.

Policy 15 The Government will identify those areas of the city and the expanded development where there will be a policy of emphasizing public transport access over private vehicle access in order to preserve the built environment and the character of these historic and commercial areas.

4.3 Early Introduction of an Integrated Public Transport System in the Effort to Maintain Public Transport Share

The Study surveys analysis showed that in Dhaka the public transport (PT) mode share is around 60% depending on the corridor and time of day. It is significant to note that many Asian cities are spending hundred millions of dollars to achieve even 10% PT mode share. In Dhaka, public transport system could be vastly improved, at no great cost to the public purse, and simultaneously subsidy could be reduced or removed once and for all. This has been done in other big cities of Asia and the World. In view of the high mode share of buses this could be done in Dhaka. But if there is no efficient and useful measures, PT share will be reduced easily and number of private vehicles will be increased.

Policy 16 The Government will implement the short action plan proposed in the RSTP to maintain public transport share as soon as possible.

4.4 Development and Improvement of Bus Transport System, Including Reform of Management Systems and the Business Model

Based on the experiences of other cities, bus operation is better accomplished by the private sector, rather than by the government. However, there are too many private operators and they are not fully managed by government. And they are operating buses without timetable, fixed route and bus stops, agreeable environment and others. The reason for such construction may probably have been caused by the cheap rate. So private operators use the unmaintained and old buses and passengers are being forced to use current bus services.

There are huge numbers of private bus operators that need to be abolished or merged, because the public transport strategy for Dhaka requires three to five large bus fleet companies operating in exclusive transport corridors. These companies are expected to manage 500 to 1,000 standard buses each in the course of time. However, no existing operator in Dhaka has the track record or the resources to handle such a task. The external advisory assistance is meant to assist in the formation of large fleet operators and assist these companies in adapting modern transit practices, and advise the government on policy reforms conducive for long-term private sector participation.

Policy 17 The Government will upgrade the present bus system, establish the bus operating business system, develop bus corridors and strengthen bus operation and management capacity based on the Dhaka Bus Network and Regulatory Reform Implementation Study and Design Work, funded by WB.

The privatization and franchising of bus services

The privatization and franchising of bus services is already happening in Dhaka with the first franchised route being opened up between Uttara and Azimpur, the franchise being awarded is to operate the route for 7 years. Further, such services will be developed and the ultimate objective will be to create an overall system which will be more passenger-friendly and will afford the private sector opportunities to participate in profit making enterprises. In this connection, small bus operators will have the opportunity to merge in order to form cooperatives so as to participate in the process of route franchising.

The recently completed RSTP, which provides the basis for this policy document, has recommended the construction of an integrated, multi-modal mass rapid transit system initially based on high quality buses running in special lanes and finally developing into MRT as demand increases. The systems will be integrated and will connect into revitalized ferry

terminals. This integrated mass rapid transit system is a clear candidate for private sector participation with the Government.

Policy 18 The Government will continue the process of preparing more bus routes for franchising and will provide an open and transparent bidding procedure to create fair competition within the bidding procedures.

Policy 19 The Government will begin the process of developing an integrated, multi-modal Mass Rapid Transit System in order to provide a modern high quality system at an affordable fare structure and will actively encourage the involvement of the private sector in this venture.

4.5 Exploitation of Para-transit and NMVs

Non-motorized transport and Para-transit play an important role in the transport system of Dhaka. The use of rickshaws has a long history and although the origins are not precisely known, it is possible that they began operating in the late 1940s, gradually replacing the horse driven cart. At present the rickshaw is one of the primary travel modes in the city. There is a maximum level of under 80,000 rickshaws licenses set by the City Corporation. The exact number actually operating is not known but it is estimated that about 600,000 rickshaws work at for hire in the city. In addition to rickshaws, there are at least six other types of non-motorized transport operating in Dhaka. These are bicycles; flat-topped rickshaws; handcarts (known locally as “thela garis”); hand trolleys; bullock carts and horse-drawn carriages.

It has been debated whether there should be a numerical control on the numbers of rickshaws permitted to use for hire in the city. It is the view of the RSTP study that the control should be on the basis of market forces and quality. If there are too many rickshaws then the fares collected will not be sufficient to supply the operators’ needs and some will cease to operate. In terms of quality, there needs to be a much more careful system enacted for the control and licensing of drivers and vehicles. When this system is enforced it will automatically have the effect of reducing the number in operation due to the increased costs associated with keeping the vehicle in acceptable condition.

Role of Rickshaws

Due to the inadequate and disorganized public bus transport service, the rickshaw has filled the vacuum created and has become a popular transport mode among the middle and lower middle class population. Previous studies showed that the cost of trips by rickshaws is significantly cheaper than the auto-rickshaw (CNG), but considerably more expensive than buses. However, the cycle range of rickshaws is limited with 90% of journeys within 4 km from the origin. For longer journeys, the auto-rickshaw is preferred. Interestingly, at times of flooding, most of the motorized vehicles become ineffective and a large number of the city dwellers depend on rickshaws for transport. It is clear that the rickshaw has a definite role to play in the city’s transport system. However, their slow speed is not compatible with the faster moving motorized traffic which moves on the main arterials. Speed differentials are also a major contributor to accidents.

In order to develop an efficient and safe transport system for all, it is important to separate motorized and NMT or remove NMT on the main arterials. This could be parted by the creation of separate rickshaw lanes and partly by encouraging them to serve neighborhood areas and to provide a more formalized feeder service to the main line rapid transit system. Improvements to side roads will encourage smoother operations of the rickshaws. Where new communities are planned, local transport systems should be designed with rickshaw lanes and routes as an integral part of the system.

- Policy 20 Recognizing the continued need for the rickshaw in the city transport system, the Government will support studies for the network of the rickshaw so that less effort is required for its operation and to ensure that improved safety standards can be introduced to protect both the rickshaw pullers and their passengers.
- Policy 21 Non-motorized transport will be gradually encouraged to operate as feeder services and to avoid many sections of arterial highways, especially on those sections designated for Primary Bus, BRT and MRT operations. Rickshaws will be encouraged and assisted to serve local travel demands and, where feeder services are provided from the neighborhoods to the main line mass rapid transit stops, special parking areas will be provided.
- Policy 22 The Government will design and encourage a program of training and an awareness campaign for the rickshaw pullers in order to improve their knowledge of traffic rules and road behavior. For rickshaw employees wishing to cease working in the business, the Government will design a re-training program to encourage diversification of employment.
- Policy 23 The Government will launch a rigid program of investigation into the present system of licensing of rickshaw pullers in order to prevent non-approved pullers from operating vehicles. And the Government will launch a demanding program of investigation into the present system of licensing of the rickshaws themselves in order to prevent non-approved vehicles from operating with a view to increasing the quality of the fleet and reducing the number of badly maintained vehicles.

Role of CNG (Auto-Rickshaws)

On the lead, there are many ill-serviced CNGs and Tempos and those ill-serviced vehicles often cause accidents and traffic congestions. The methods and procedures for testing of vehicles and the issuance of licenses to motor vehicle drivers are also considered to be inadequate and have become inappropriate. On the other hand, inadequate manpower, lack of expertise and training, shortage of equipment and logistical support etc. have created an environment which allows scope for misuse of resources and unfair means in the issuance of fitness certificate for the vehicles and licenses for drivers. This situation has contributed to making roads unsafe for both passengers and vehicles. CNGs and tempos fall within the concept of the motor vehicle ordinance and these are required to fulfill all the requirements of the ordinance like automobiles.

On arterial roads both before and after the withdrawal of rickshaws, the CNGs have been observed to create problems due to their uncontrolled operation. In order to develop an efficient, comfortable and financially reasonable bus service; the role and operation of the CNGs will be reviewed especially on those road sections where the mass rapid transit routes will be introduced. In the short term for the next ten years, the CNGs will be gradually reorganized as well as the rickshaws. They will be encouraged to serve neighborhood movements and also serve as feeder services to the rapid transit and bus services.

- Policy 24 CNGs will be gradually encouraged to reorganize their services so as to reduce the operations on many sections of arterial highways and especially on those sections designated for Primary Bus, BRT and MRT operations. CNGs will be encouraged and assisted to use on the lanes and neighborhood roads to serve local travel demands and to provide feeder services from the neighborhoods to the main line mass rapid transit stops, where special parking areas will be provided.

- Policy 25 The Government will undertake a review of the Motor Vehicle Act and will revise it to change the method of licensing and fitness testing of CNGs and tempos so that both drivers and vehicles will be required to pass Government prescribed regulations before being permitted to operate.

4.6 Use of Waterways for movement of Goods and Passengers

Dhaka is endowed with pleasant characteristics because of its numerous canals and khals crisscrossing the city, thus creating naturally attractive environmental features. Despite this fact, the city is now left with just a few navigable water bodies such as Dhanmondi, Banani and Gulshan lakes, and the Begunbari khal up to Rampura inside the city. The deteriorating situation has arisen due to the undirected infill of lakes and khals way back from the partition in 1947. These lakes and the Begunbari khal do not carry any significant passengers or cargo traffic.

However, the city is surrounded by a circular waterway system consisting of the Buriganga, the Balu, the Turag, the Tongi and the Sitalakhya rivers even though the sub-standard clearance of the railway bridge at Tongi affects the through routing of some vessels. These waterways carry a sizeable amount of freight traffic from the adjoining areas bound for Dhaka. The BIWTA under its scheme called "The Development of the Circular Waterways of Dhaka", is improving the navigability of the rivers and is also building landing stations along the waterways. It is expected that after the improvement of the circular waterways, freight and passengers will move more conveniently through the waterway system. Under the RSTP, these landing stations will be integrated with the land transport system of the city so that the freight and passengers from the waterways can move more easily into the city.

- Policy 26 The Government will implement thru DTCA and BIWTA actual condition survey and database development. the Government will also improve water transport infrastructures and river environment.

- Policy 27 The Government will authorize further study to encourage the integration of the inland waterways (circular waterway around Dhaka and canals/khals in the Eastern Fringe Area) with the city land transport system so that the movement of freight and passenger traffic between motor launch landing stations and the city road network will be made more efficient.

4.7 Promotion of public transport use and expansion of services

The Need for Integration between Modes

The main challenge in Dhaka area is to identify and link together the most appropriate modes for any journey. With automobile usage limited to 20% of the population, the vast proportion of mechanized trips is by public transport modes. Unfortunately, the existing modes and sub-modes (bus-water-rail-taxi-NMT) are acting independently from each other. As a result the passengers suffer due to the lack of inter-connection and scheduling, and freight traffic faces delays and increased costs particularly when it is carried by waterways from outstations to destinations inside the city. There is an urgent need for integration between modes for economic reasons and for the convenience and comfort of the passengers. However, an element of competition will always exist and the policy will have to reflect competition in an equitable manner ensuring fairness in bidding for franchises and in the setting of fares.

By integrating systems and sub-modes, the result provides a number of benefits. Amongst these are:

- Service Continuity – in which travelers can buy a single ticket valid for a number of services and can transfer between mode and lines just like from ferry to bus;
- Increase Service Coverage – due to the fact that duplicated services can be removed and resources spread more widely;
- Tariff Streamlining – efficiencies derived from integration can be spread back to the traveler, either by increased service or by reduced fares.

The National Integrated Multimodal Transport Policy mentions that many journeys include an interchange from one mode to another. Hence, quick and easy interchange is essential. The adequacy and quality of an interchange within the existing transport infrastructure will be assessed based on the following criteria: (i) Reliable, punctual and adequate services to provide minimal waiting times at interchange, (ii) Short walking distances and clear directional signs at interchanges; (iii) Adequate staff availability; (iv) Well maintained infrastructure including public conveniences; (v) Good personal security; (vi) Accessibility; (vii) Better protection from outdoor weather; (viii) Instantly readable and relevant information on routes and frequencies; (ix) Better directional signs between bus stops and between rail and bus stations; and (x) Regular cleaning and maintenance.

Policy 28 The Government will make a policy of removing the inefficient competition between modes in order to encourage the selection of the most efficient mode or series of modes for each journey. This will be achieved by identifying the correct blend of modes, integrating the most efficient and putting in place, publicity campaigns to advertise these interactions between modes by the Government.

Minimizing Transfer Time

The present deficiencies in the inter-modal integration of the transport system are economically unsustainable in the long run. The current systems are time consuming when there is a need to travel by more than one mode. Integration of the physical infrastructure development and the institutional coordination between the various agencies involved is needed to minimize transfer times for passengers and freight traffic. In addition, the national transport system is not integrated with the city-wide system resulting in delays and mismanagement in the handling of traffic. Dhaka International Airport has few direct bus connections and a long walk to the rail station. This problem of interfacing between the modes has been addressed under the Revised Strategic Transport Plan by providing physical facilities and encouraging development at traffic generating centers like transit stations, bus and truck terminals, railway stations, inland river ports, ferries and the airport.

Policy 29 The Government will make a thorough investigation of the current mode routes and services and will provide funds to ensure that connections are made efficiently and safely. The physical planning of services (for example road-based bus and NMT systems and river-based ferry services) will be made so that there will be a minimal separation between services.

Integrated Ticketing

As part of an efficient bus use, introduction of a common ticket system using “ICT Fare System” that can be used by bus operators is expected as one of the effective alleviation measures for traffic congestion. Moreover, ICT Fare System can be expected to improve the level of service by introducing discount services and timely/demand responsive operation.

Furthermore, it is also expected to increase fare revenue of bus operators through automatic fare collection and by eliminating leakage and mishandling of ticket sales.

Operation of BRT is expected to start until 2020 with financial assistance of WB and ADB, while the operation of the 1st phase of MRT Line 6 is expected in 2019 with the Japanese fund. Considering the convenience of the users, introduction of ICT Fare System is expected for the new mass transit systems.

However, it is important that the ICT Fare System must be fully operational prior to the opening of new transportation systems to avoid any troubles of the system operation with the following measures:

- (1) The fare distribution system (Clearing House, CH) must be established,
- (2) The established Clearing Houses must be tested and system errors be eliminated,
- (3) Trainings of the related personnel must be conducted.

Therefore, necessary preparatory works including establishment of Clearing House must be started the earliest time possible for the opening of MRT or BRT.

Policy 30 Effective and efficient public transport system with variety of transport modes in Dhaka Metropolitan Area will be established through ICT Fare System to facilitate transport in Dhaka by the Government.

The Re-planning of Stations, Stops and Terminals

Bus stations, ferry terminals and stops have been unexpectedly established and are unsuitable to a modern megacity with a growing demand for transport. Due to improper planned bus routes and poorly located bus stops; buses stop and load/unload passengers on the road close to the intersections, causing unnecessary congestion and creating a serious risk of accidents to the passengers.

Policy 31 The Government will build upon the public transport plan established under RSTP in order to re-plan and re-site the locations of bus stations, stops, rail stations and ferry terminals so as to ensure better coordination and passenger safety.

4.8 Providing an Affordable Public Transport System

Meeting the demand for transport in the city both immediate and in the future will rely heavily on public transport. The demand for, and usage of automobiles will increase from its present low figure as available income increases but the base numbers of vehicular demand will remain comparatively low. The multi-faceted approach for the development of the transport system in RAJUK area has been defined under the Revised Strategic Transport Plan. This study has identified the need for a mass transit system to respond to the travel demands of the population. STP proposed a bus-based rapid transit system, BRT as the backbone of the service in the first ten years with the eventual service based on Metro rail systems. And after 10 years, RSTP has recommended a mass rapid transit system (MRT and BRT), along with a reorganized and improved bus transport system, as the backbone of the urban transport network. The bus system will run with exclusive lanes and priorities on the primary roads. In addition, there will be a series of secondary systems in the neighborhood areas serving as feeders to the main rapid transit lines.

The main feature of the systems to be put in place is that they are to be built to serve the people of the city. Primarily, the residents of the city are poor and poverty alleviation is a

national goal of the government of the utmost importance. In terms of transport, this objective translates into making the systems affordable to the majority of those wishing to use it.

Setting Fare Structures

The Government of Bangladesh has approved a National Land Transport Policy, which states that the transport users should pay for the costs of services. To a great extent, the provision of public transport services is in the hands of the private sector. Private operators with a few exceptions control stage carriage bus services, rickshaws, CNGs and inland waterway services. As a result, it can be said that public transport users do already pay for the cost of the services. If they will not, the operator will go out of the business. In the future, as new and more modern systems are introduced, there will be more central control, although by larger private operators with the probability of higher fares. There is a need to protect the public by regulating tariffs for passengers in road, rail and river transport.

The new systems which will be brought into service will be modern and more costly than the current services. The setting of fare structures needs to be studied very carefully. In the case of new BRT services, it is possible that the fares can cover the costs of operations. When the Metro system is introduced, it is not likely that fares will cover the costs of operations; the Government needs to consider subsidization. However, in order to create a sustainable system, the fare structures should be based on the need for fare boxes to recover operating cost and if possible, meet asset replacement cost.

- Policy 32 The Government will identify a reasonable fare structure in consultation with the operators and with the agreement of the DTCA. The fare structure will take account of the length of trip and the type of service provided.
- Policy 33 Where Public-Private Partnerships are concerned, the Government will provide Concession Agreements with adequate provision for profit while at the same time ensuring an equitable fare structure for the passengers.

Financial Constraints

Acknowledging the need for investment in the future modern systems, there should be a realistic acceptance that there is a limitation on financial resources. The preferred strategy issued by the Revised Strategic Transport Plan shows that there are heavy restrictions on the types of mass rapid transit systems which are affordable. These constraints have led to the conclusion that at least for the first 5 to 10 years, the mass rapid transit system will be largely MRT because of high demand.

The MRT system will require investment in infrastructure to improve the existing roads, and underground. All of this requires the fare structures to be set accordingly. At the same time, the DTCA needs to recognize the balance which needs to be placed in providing a service to the community and making the service sustainable.

- Policy 34 Bus transport remains an important and significant part of a multi-modal transport system for Dhaka during the first decade of the RSTP. Even so, the Government will authorize an immediate study to establish the feasibility of MRT/BRT to cater the increased demand. These two systems will be designed to act as an integrated service.

Subsidizing the Poor and Needy

In Dhaka, low income forces the poor to live close to their work place, often in unsanitary conditions. The future public transport system will be designed to serve the needs of the poor and will afford them with increasing opportunities for work.

One main goal of the Government is to reduce poverty over a period of time in a planned manner. In order to achieve this objective, the Government has recently developed a plan called "Poverty Reduction Strategic Plan 2011-2015" (PRSP). As a result, all development plans and policies including those of the transport sector must address this priority aspect of the country. As a follow up to the Revised Strategic Transport Plan, there will be a need for a separate Poverty Impact Assessment resulting from the adoption of the proposed strategy. The future public transport systems will require substantial investments and the fare levels will be set accordingly. This may place a heavy burden on some sectors of the population. With further reference to the PRSP, the National Land Transport Policy has provided statements whereby subsidies for transport services can be shared by the private sector provided the claims for subsidies are transparent and fair.

Policy 35 The Government will investigate means whereby subsidies can be allocated to the poor and needy in order to make the transport system affordable to all. Amongst others, ideas already existing will be examined to develop a method of subsidy to benefit the poor.

5. EFFICIENT TRAFFIC CONTROL AND MANAGEMENT

5.1 Introduction

The current road capacity is not efficiently utilized due to widespread on-road parking, various types of offense and poor traffic control and management. Infrastructure capacity is largely dependent on how it is operated, managed and maintained. Better traffic management will improve capacity as well as improve safety, service, and environment of the city and its people. It is also reliant on better regulation, management and enforcement combined with facility improvement and ICT (Information and Communication Technology).

5.2 Establishment of Comprehensive Traffic Management System Balanced with Better Facilities for Essential NMT Modes such as Cycling and Walking

The study for the development of a pedestrian friendly city includes the improvement and the accessibility for the vulnerable road users. The Old Dhaka area should be studied in detail and also the practical road improvements, junction improvements, traffic circulation in coordination with NMTs movements, landscaping and NMTs user friendly facilities should be planned and designed. Certain areas could be planned as pedestrian areas only depending on the requirement. This includes the detailed traffic management plan for the non-motorized traffic which includes pedestrians, bicycles, and wheelchairs. Areas should be designed with road access design, walkways and traffic relieving measures.

Policy 36 The Government will implement the planning and design study for non-motorized traffic modes, and construct non-motorized traffic facilities, road geometric design, junctions design improvement, walkways, bicycle paths construction, and other proposed measures for handicap people.

Newly developed housing communities in the last few decades; like Purbachal, Jhilmil, Uttara North areas do not include pedestrian or bicycle facilities at all. Traffic is moving at high speed comparing to densely mixed areas. Pedestrians and cyclist are always at risk as they are forced to mix with fast moving traffic in the same road space. The objective is to study and design facilities for pedestrians and cycles to make the transport system more sustainable and environment friendly.

Policy 37 The Government will study to provide segregated or mixed NMT path network with full connectivity, commercial centers, and communities. This project will include the implementation of the proposed measures.

5.3 Strengthening of Traffic Regulation, Enforcement and Management

Traffic enforcement is the best way to control traffic violations, improve traffic safety of NMTs and other vehicles, stop reckless driving, and streamline traffic flow. Automatic traffic violations central database should be established which would assist in interactive traffic enforcement in the field and detecting vehicles with repeated violations. It would be necessary to do the capacity development of traffic police for efficient enforcement of traffic laws. The traffic regulation and management and strengthen the capacity of traffic enforcers; these should be improved.

Motorcycles

Several years ago motorcycles were not common which is different at present. There are around 30,000 bikes registered every year in the city. The demand is being encouraged by

cheap credits and a growing middle class in Dhaka. Motorcycles are not only affordable but it is also fast and more usable than public transport. Thus, it is easy to imagine that motorcycle will be a big issue on traffic congestions in urban area. There is also a need to give continuous attention to the safety aspects and behavior enforcement just like the wearing of crash helmets. In Indonesia, motorcycles are very common mode used by both men and women in all major cities. The number of motorbikes has nearly 3.5 times (2 million to 7 million) in the past seven years.

Within the next decade, if the Government doesn't take any appropriate countermeasures against soaring number of motorcycles, most roads in Dhaka will be overrun by many motorcycles and all vehicles on roads will get involved in a traffic jam.

Policy 38 The Government will take some effective transport measures to control the use of motorcycles. For example, the Government needs to establish more affordable and comfortable bus services, enhance traffic safety rules (helmet use, ban on motorcycles with 2 seats, etc.) and some other measures.

Taxis

Decade ago, the income of a large number of middle income group people was expected to increase in Dhaka. As a result, there was an increased demand for taxis for private use. The size of the fleet was around 12,000 vehicles. There were about 60 companies which own taxis although they didn't operate them directly. It was customary for owners to lease out the taxis to drivers or other persons or companies who actually operate the vehicles. And now, the number of taxis is around 1,000 vehicles and there are only several taxi companies. There are some reasons for the decline in taxis and operators, like an unfair taxi fare system, lack of safety and comfort, and others. But in recent years, as economic grows; there will be an increased demand for taxis for private use again.

Consequently, the quality of service and the security of the passengers are largely dependent upon the drivers and operators. It is therefore, important that the drivers are well trained and are reliable in the provision of services. Before issuing driving licenses to taxi drivers and leasing out the vehicles to the operators, it is obligatory upon the licensing authority to ensure that the passengers can enjoy safe journeys. For this to happen, the present practice of issuing driving licenses will be reviewed and modernized and the companies who operate the vehicles will be properly checked.

The taxi fare structure has been established by the Government and varies depending upon whether or not the vehicle has air- conditioning. Actual fares are determined by meters installed in each taxi. The fare structure was established in 1997 and remains the same today. However, the cost of operations has increased considerably since the present fare structure was established. Therefore, the Government will need to review the fare structure in the light of present conditions. It is reported that some taxi drivers tamper the meters in order to charge increased fares resulting in a need to control this malpractice thru a close supervision from vehicle inspectors.

In order to organize the taxi services, the Government intends to review the present requirements of forming companies requiring them to have adequate capital fund reserves and a minimum of 20 taxis in their fleet. Most of these companies are not well organized and do not control, train and supervise their drivers. Nor do they maintain the vehicles properly. The existing practice should therefore be reviewed to improve the situation and to encourage companies to organize themselves into cooperatives. The companies should also be in contact with their drivers through radio or telephone communications in order to identify their locations and protect the passenger's security during the journey.

- Policy 39 The Government will review the existing taxi policy in the light of the performance of taxi service and the experiences gathered and will ensure compliance with the provisions made by the National Land Transport Policy of the Government.

5.4 Management of Freight Transport

Freight transport is sometimes neglected in the planning and development of urban transport in which the emphasis normally focuses on passenger transport. Goods transport in developing cities like Dhaka can be an important employer of the poor by providing laboring jobs, hauling goods on hand carts or rickshaws. Efficient goods transport also affects the poor through its indirect impact on the prices of essential goods. In order to avoid congestion on the roads, freight traffic, particularly trucks are restricted from moving in the city during the daytime in order to reduce congestion. As the efficient movement of goods has an economic impact particularly on the prices of the consumable commodities needed by the city dwellers, it is necessary to ensure the efficient handling of goods in the metropolitan area. One strong relationship in the future of efficient freight planning is the need to have close cooperation with land use planning and freight movements. A dialogue between the public and the private sector will be of advantage in this respect.

Urban Freight Movement

The freight industry comprises two main segments, which complement each other. These are;

- Mechanized freight vehicles primarily trucks and
- Non-mechanized vehicles like rickshaws and “Thela Gari”.

Throughout the city there is an abundance of non-motorized vehicle stands which consume valuable road space and contribute to congestion, accidents and a general lack of orderliness on the road. The freight industry is very fragmented and trucks have a low use rate with large trucks achieving about 70 km/day operating for about 4 hours. The use rate drops below this level for smaller trucks.

Truck operation within the city is not an organized trade. The business is conducted by face-to-face contact leading to inefficiencies and time wastage. In order to improve the movement of goods and use of freight vehicles there is a need to introduce a communication system for truck operators to enable vehicles to be parked at off-road depots and called into service when needed. This efficiency is only likely to take place when truck operators merge themselves into larger groups.

- Policy 40 The Government will encourage small truck operators to organize themselves into larger groups or cooperatives so as to operate the freight industry more efficiently and introduce a communication system between them and truck drivers so that the operations can be made more efficient.
- Policy 41 The Government will promote more efficient types of multi-axle trucks for efficient movement of freight traffic and thus also ensure less damage to the city roads due to the movement of trucks.
- Policy 42 The Government will implement the actual condition survey and database preparation, and also formulate the measures of overloaded trucks

Improvement of Truck Terminals

In Dhaka there are six operating truck terminals located at Tejgaon; Amin Bazaar; Pagla; Dayaganj; Mohammadpur and Gabtali. These terminals are in operation with the knowledge of DNCC/DSCC although they are not yet formally recognized and granted official status. The locations were not identified as a result of any traffic management scheme for adjacent areas and this lack of planning results in confusion and conflict with surrounding land uses and between local and longer distance movements. While the need for these terminals is not questioned, their development as spontaneous actions means that they need to be reorganized and developed.

Policy 43 The Government will enact regulations and rules for establishing the formal status of these and other terminals, and will initiate actions for their development in a planned manner.

Improvement and Replacement of Major Bazaars

There are many major markets in Dhaka, Kawaran Bazar, Fish Market at Jatrabar, Bangladesh Dhaka Mawa Fish Market and others. Kawran Bazaar is the biggest and most famous wholesale general market in Dhaka City. All kinds of vegetables, fish, rice and other commodities are supplied to small markets from major bazaars in urban area. Many trucks and pick-ups carry and bring commodities from the major bazaars in different places. And many shops, bans, and people are overflowing on the street and create massive traffic danger.

Policy 44 The Government will make a plan for improvement and replacement of major markets.

5.5 Establishment of Parking Policy and Control

One of the most important ways in controlling access to specific areas by some vehicles and hence, to contribute to the demand management, is to control the amount and type of parking spaces available. Clearly, if there are no parking spaces at the destination of the journey, then vehicles cannot stop. This is an extreme case and a balance has to be achieved. The need for a parking policy is clear and some attempts have been made in the past.

In order to favor public transport and discourage automobiles, many countries have amended their planning rules. Originally it was mandatory in these countries for building complexes to provide parking areas to accommodate vehicles belonging to the residents, employees and clients occupying and visiting those complexes. The amended rules then limit the parking spaces in the buildings, resulting in some clients switching to public transport. As a result congestion on the road and consequent pollution levels were reduced.

Policy 45 The Government thru DTCA will conduct the actual condition survey and database preparation before establishing provision mechanism for parking space and policy on parking fee

Policy 46 The Government will review previous parking policies as drafted and will either amend or approve the required policy. The policy will ensure that the correct balance is reached between long-term and short-term space provision and will enforce the restrictions and parking areas clearly.

Policy 47 The Government will encourage the private sector to engage in the monitoring of the parking behavior. Parking control will remain the responsibility of the

Government who will administer it through a central parking control office. The Government will set rules regarding parking and the private sector will employ parking wardens to monitor space usage and issue tickets to violators.

5.6 Development of Well-coordinated Traffic Control and Management System

The Dhaka metropolitan area will soon embark on road development following the completion of the Master Plan. Building roads is important; managing traffic on the built roads is even more in order to achieve productive use of road infrastructure and safe traffic operation. Traffic management functions in Dhaka are shared by DMP, BRTA and City Corporations. However, the existing traffic management capacity is relatively weak both in terms of technical skills and staffing. Effective traffic management requires a capable team of transport planners, engineers, and traffic police from the involved agencies to carry out traffic studies, engineering designs, and enforcement. The traffic management capacity improvement project is designed to strengthen knowledge and skills in traffic management from the short to the long term.

Establishment of Traffic Police training programs

Policing traffic in Dhaka is essential in maintaining the order on urban roads particularly in the absence of sophisticated traffic control techniques and equipment. Training for the Traffic Police aims to provide practical knowledge and skills that are most useful for day to day operations. Training elements include professional appreciation, knowledge of traffic laws and legislation, enforcement, prosecution procedure, traffic control and surveillance.

- Profession appreciation: Appreciation of responsibilities and upholding of morals are fundamental to Traffic Police performance. Their diligence and fairness in traffic control will gain the respect of road users and thus exert impact on the voluntary observance of traffic rules.
- Traffic laws and legislation: This training targets reinforcement of laws and regulations, orientation of new traffic rules and clarification of sanctions.
- Enforcement and prosecution procedures: Proper following of enforcement procedures ensures effective discipline on the road users violating traffic rules. Understanding road user physiology is an inseparable part of this training.
- Traffic control and surveillance: Introducing basic traffic engineering concepts and measures to Traffic Police will assist in their performance in traffic control. Traffic surveillance, on the other hand, will allow them to detect violations of traffic regulations, for example, excessive speeding, drunk driving and driving in the opposite traffic lane.

Manual management of traffic operations can no longer keep up with the requirement of an expanding road network and the growing traffic. The city has recognized this trend and is in the process of implementing two control systems.

It is important to build a core team of technical professionals at the police headquarter who are literate with advanced traffic control systems. Staff in this field would need substantial training to understand technologies, and more importantly, to be capable of utilizing and modifying technology in response to changes in traffic pattern. Hands-on experience with traffic software shall be emphasized in the headquarters.

Policy 48 The Government will improve the capacity of the headquarters into short, mid and long terms through two channels: staff recruitment and advanced training programs, with the latter possibly pursuing ODA technical assistance.

Strengthening capacity of the city's traffic engineers

In recent years, several traffic flow management schemes were proposed. Nonetheless, the concept of traffic management and the broad range of measures associated with it have not been fully understood and opportunities in roadway utilization improvement are yet to be worked on. For example, road space reconfiguration to accommodate bus priority lanes is a low-cost approach and access control and multiphase signal could smooth out traffic conflicts in critically congested areas.

Policy 49 The Government will improve the capacity of traffic engineers by training them in the areas of design techniques and application of traffic analysis software. The transport planners would also be given participation in such training.

6. EFFECTIVE TRANSPORT DEMAND MANAGEMENT (TDM)

6.1 Introduction

The problem of traffic congestion should not be addressed merely from the supply side that is, the expansion of infrastructure capacity. To ensure smooth traffic as well as share in a more equitable manner the cost and benefit of traffic and transport among stakeholders, various demand management measures (TDM) would need to be introduced.

Traffic demand management (TDM) is a restrictive measure to be applied to private modes of transportation. The purpose of TDM is to discourage the use of private modes and encourage the use of public transportation. TDM measures can be classified into two types, namely economic measures and regulatory measures. They can be applied either to the use or ownership of vehicles. The table below classifies various TDM measures.

Table 6.1 Classification of TDM Measures

Restriction	Economic Measure	Regulatory Measure
Vehicle Ownership	<ul style="list-style-type: none"> • Various taxes levied upon purchase • Annual registration fee • Quota system 	<ul style="list-style-type: none"> • Garage requirement • Restriction by domicile
Vehicle Use	<ul style="list-style-type: none"> • Fuel price • Parking fee • Area license 	<ul style="list-style-type: none"> • Area license • High occupancy vehicle (HOV) • Number plate control

Source: JICA Study Team.

Intelligent Transportation Systems (ITSs) refers to a wide range of applications of Information and Communication Technologies (ICTs) to the transportation system. They are intended to make road traffic more efficient, safer, and user-friendly. Development of ICTs in the recent years has made it possible to realize a system which was considered before as a dream.

Development of ITSs has been active in USA and Japan, where a national ITS council has been established to formulate ITS development policy and support research and development activities. Coordinated development across the continent is underway in Europe to take advantage of the geographical nature of Europe where many vehicles travel beyond boundaries of countries.

Various ITS applications are called user services and they are grouped into several development categories. There are small differences between user services and their grouping in the countries mentioned above. The user services defined by ITS Japan are shown in Table 6.2 as example. It must be noted that user services are at different development stages, some user services such as real-time route guidance systems, are already in commercial use while automated highway systems are still at the research and in the development stage.

Table 6.2 User Services Defined by ITS Japan

	Development Area		User Service
1	Advances in navigation systems	1	Provision or route guidance traffic information
		2	Provision of destination-related information
2	Electronic toll collection systems	3	Electronic toll collection
3	Assistance for safe driving	4	Provision of driving and road conditions information
		5	Danger warning
		6	Assistance for driving
		7	Automated highway systems
4	Optimization of traffic management	8	Optimization of traffic flow
		9	Provision of traffic restriction information in case of incident
5	Increasing efficiency in road management	10	Improvement of maintenance operation
		11	Management of specially permitted commercial vehicles
		12	Provision of roadway hazard information
6	Support for public transport	13	Provision of public transport information
		14	Assistance for public transport operations and operations management
7	Increasing efficiency in commercial vehicle operations	15	Assistance for commercial vehicle operation management
		16	Automated platooning of commercial vehicles
8	Support for pedestrians	17	Pedestrian route guidance
		18	Vehicle-pedestrian accident avoidance
9	Support for emergency vehicle operations	19	Automated emergency notification
		20	Route guidance for emergency vehicles and support for relief activities
		21	Utilization of information in the advanced information and telecommunications society

Source: ITS Japan

6.2 Integrating Urban Development and Transport (TOD);

In the National Integrated Multimodal Transport Policy, integrated public transport system is the high priority policy. The policy emphases are (i) Introduction of thorough tickets for a complete trip by passengers; (ii) Better facilities at interchanges; (iii) Better connection and coordination between different services; (iv) Wider availability and provision of information on time tables, route planning and fares; and (v) Introduction of a national public transport information system. Based on these perspectives, TOD is the most useful measures to achieve the government policies.

In the road of CBD area, traffic congestion mainly by passenger vehicles is daily observed. However it will be difficult to expand the road capacity (widening of existing roads or construction of new roads) in this densely developed area. To regulate or prohibit the current on-road parking will be important to enlarge the capacity of the roads. In addition, TOD (Transit Oriented Development) policy shall be introduced developing the new transportation system (BRT and/or LRT network) to control the vehicle volume inside CBD area. So land-use planning is integrated with mobility, with the aim of managing travel demand; mitigating traffic congestion and promote transit-oriented development (TOD)

Policy 50 The Government will establish the legal framework to conduct the TOD project in CBD area.

6.3 Providing Efficient Public Transport Alternatives;

Although the government attempts to promote the use of public transportation by way of controlling or regulating the private mobility, these may not automatically result in a fast modal shift from the private to public modes due to the convenience of using private cars which provides “door-to-door” transfer of passengers. Purbachal, Jhilmil, Uttara North and other new development area sub-urban areas have limited or no public transport system. So those residents need to use private modes or illegal transport systems.

By providing efficient public transport alternatives are aimed to deploy private modes or illegal transport systems in the outskirts with defined routes. This would also provide feeder service to MRT, BRT, and Bus transport system.

Policy 51 The Government will implement feasibility study for public transport service routes to be integrated with the city urban transport system in the outskirts to provide public transport to rural areas.

Provision of Public Transportation Information

If information on public transportation is easily available, it can attract more passengers. Two types of public transportation information will be given by the system; static information and dynamic information. The former includes the information regarding bus route, time table, fare, transfer, etc., while the latter refers to real-time bus operating information.

Static information is relatively easy to collect and disseminate. But timely updating must be made so as not to provide obsolete information. They can be given as brochures and posters, and through the internet. Two versions of an internet web site will be prepared; one for viewing by personal computers and another for web-enabled mobile phones.

Real-time bus operating information refers to the location of the buses on the route and expected travel time to a destination. In order to collect real time information, bus operation must be monitored in real-time. All buses must be equipped with a GPS (global positioning system)-based transmitter, which sends the bus location at regular intervals.

The bus location information is sent to the bus management center and processed into bus operation data. The location of the next bus by bus route will be displayed at bus stops as a service to passengers to inform them about waiting times for the next bus. If expected waiting time is too long, potential passengers can take other modes of transportation, or use the waiting time for other purposes and come back to the bus stop in time for the next bus.

Policy 52 The Government through DTCA and BRTA will implement the feasibility study or pilot project of the public transport information systems with private companies. Because private companies have an advantage knowledge and experience than the government.

Assistance for Public Transportation Operations and Operations Management

Two systems are envisioned in the user services; transit signal priority and bus operations information.

Transit signal priority is a function of a traffic signal system that offers preferential treatment to buses. It detects bus approaching a signalized intersection and adjusts the signal timing

so as to minimize the delay that the bus incurs at the intersection. Thus effective running speeds of buses can be increased. Real-time bus location data collected for the information of bus passengers are also very valuable information for bus operators. They provide bus operators with information that can help in bus scheduling, fleet management, maintenance management, staff management, and cost management. If data are effectively utilized, bus service levels can be upgraded, while the operation costs can be reduced.

Policy 53 The Government through DTCA, BRTA, DMP and City Corporations will implement the feasibility study or pilot project of the ITS' signalizing system and information systems with private companies. Because private companies have an advantage knowledge and experience than the government.

Provision of Route Guidance Traffic Information

Currently, drivers in Dhaka operate their vehicle, whether it is motorcycle or passenger car, without any knowledge about traffic conditions. They choose their route based on past experiences only. Such situation is not efficient as they could face traffic congestion that could have been avoided if they knew there is congestion. Route guidance system provides real-time traffic information to drivers already on the road or have plans of doing so. The system is capable of displaying on the in-vehicle unit the suggested route to a destination, taking congestion locations into consideration. It has been proved very useful by the fact that sales of in-vehicle units have been very vigorous. There are now more than 10 million units in use in Japan.

It must be pointed out that the key to success of any route guidance traffic information is the precise information on traffic condition in the whole area to be covered by the system. If information is not correct or old, drivers would not use the system. Area traffic control (ATC) system is a very important source of such information, as it collects traffic condition data using vehicle detectors. Thus an ATC system is a prerequisite for a real-time traffic information system to function effectively.

Traffic flow can be managed more efficiently if intelligent traffic signals are introduced. An ATC system is the system that realizes this. It collects traffic condition data at many points in the control area and controls signals in real-time with the optimum timing to minimize delay and congestion.

Policy 54 The Government by way of DTCA, BRTA, DMP and City Corporations will implement the feasibility study or pilot project of the route guidance system using GPS and ATC systems with private companies. Because private companies have an advantage knowledge and experience than the government.

Electronic Toll Collection

Electronic toll collection system can be used in two ways; toll collection at expressway and toll collection for area licensing system. For both applications, toll collection technologies have been already established and there are international standards for major system components such as DSRC (Dedicated Short Range Communication) system between vehicle and toll gate. Thus from the technological point of view, area licensing system can be introduced without much development. Study and preparation work are however required for the non-technical aspects of the system such as applicable area, amount of fee to be collected, alternative mode of transport, social acceptance, institutional set-up for operation and maintenance, etc.

- Policy 55 Electric Toll Collection system will be installed easily for expressways and bridges. So the Government will establish the guidelines of the Electric Toll Collection System in order to organize the systems.

6.4 Regulating Motorized Vehicle Access and Proper Charging of Road Use and Parking.

Based on the experience of other nations, it has become obvious that congestion on the roads cannot be resolved by providing more road space. New roads simply beget more traffic. Instead, maximum use should be made of the existing infrastructure before new roads are contemplated. In moving towards areas of vehicle restrictions and the management of demand a number of measures will be necessary in order to reduce congestion and pollution in the city.

- Policy 56 The Government will encourage the designation of some areas and streets as “motorized-free zones”. These areas may be designated for specific times or days and the built environment will be developed and improved to encourage walking and NMT services.

- Policy 57 For the more distant future, the Government will investigate the potential for the introduction of a Congestion Charging System for specific areas of the metropolitan area in order to control vehicular traffic at specific hours of the day. At the same time a parallel public awareness program will be introduced to inform the public that revenues from the Congestion Charging System will be re-invested in the public transport system.

Area licensing is a traffic management scheme that restricts the use of private vehicles in a designated area to alleviate traffic congestion and at the same time promote the use of public transportation. The basic idea is that when an area is restricted at certain times of the day, a charge is levied on vehicles entering that area during this restriction period. The charge works as a disincentive for using private vehicles. People may choose to use other mode of transportation to avoid the charge, or change the time of travel to off-peak hours when the charge is smaller or none.

Road pricing adopts an economic rule which is the bigger the impact the higher the charge, resulting in more reductions in the traffic entering restricted areas. Collected charges could be used for improvement of transportation. But it could have adverse effect on the people’s mobility, accessibility, and social and economic activities. Thus careful study, planning, and design are required.

It is not too early for Dhaka to study the feasibility of an area licensing system. Because the success of the system depends not only on technical adequacy but also on social consensus as to the necessity of the system, all this takes time to develop.

An initial idea for area licensing in Dhaka is the designation of Gulshan and Old Dhaka as restricted areas. Vehicles, including motorcycles, entering these restricted areas will be charged. As a future step, the restricted area can be expanded to CBD. To complement the area licensing system, parking on public areas will be charged with higher parking fees.

7. COMPREHENSIVE DEVELOPMENT OF TRANSPORT SPACE AND ENVIRONMENT

7.1 Introduction

Transport infrastructure provides important public space for the use of traffic comprising different modes including walking and for various urban services and activities. For this, it is important to design and develop transport infrastructure and services comprehensively to enhance the quality of urban areas and activities. Suggested policies are as follows:

7.2 Management of Transport Corridors

The MRT/BRT Project is meant to provide a high-capacity mass transit service on heavily congested transport corridors connecting the city center and suburban areas. It would be designed using the best of both rail and bus way technologies to reduce the initial capital cost and correspond with growing passenger demand. The load profile along a line is usually uneven and begins to diminish at the suburban fringe. Thus, rail at those sections would not be economical. On the other hand, demand on the inner sections of the line closer to the city center could be so high so as to exceed bus capacities. Hence, demand forecast will be crucial in determining the transition from bus to rail and the corresponding line lengths. Aside from economics, the bus-rail combination also reserves in advance the ROWs for future rail extension. Thus, the radius of curvature for the bus way should observe the more rigid standards required by rail (vertical and horizontal) curves. Furthermore, as the first system to be introduced in Dhaka, the MRT would influence subsequent standards for other urban railway lines in terms of track gauge, electrical system, signaling system, station plaza, and the like. Otherwise, maintenance and integration would become major headaches.

Urban expressways will play an important role in the most urbanized sections of the study area in relieving traffic congestions on at-grade primary and secondary roads caused mainly by private transport modes such as cars and trucks. An elevated structure for urban expressways with four lanes surrounding the city core and stretching its branch routes to connect with major radial transport corridors and ring roads is proposed to shift heavy through traffic between the city center and suburban areas. This has also the advantage of utilizing the vertical spaces above the existing roads, where widening is rather difficult due to resettlement and expropriation issues.

Policy 58 The Government will prepare the planning manual, regulations of roadside use and development and corridor management system.

7.3 Improvement of Transport Environment for All Persons in the City

With the expansion of urbanization and the associated growth in motorized travel there has been a dramatic growth in road-based traffic collisions. The “accident” record in Dhaka Metropolitan Area shows in the following table. The total numbers of accidents quoted in the last five years were in 2009 (525), in 2010 (458), in 2011 (400), in 2012 (372), and in 2013 (341) respectively. There are some traffic accident data of different sources, and some data is question as to the validity of those information and sources. There is also likely to be considered under-reporting of incidents. However, from analysis of the composition during 13 years, it is seen that while total numbers have reportedly reduced during the period fatal and serious injuries have changed. Experience shows that the risk endangers pedestrians and NMT passengers far worse than other road users since they are the most vulnerable road users. The urban poor mostly travel on foot and therefore face higher risks than the rest

of society. It is essential to take appropriate measures to address this and improve the situation.

Table 7.1 Number of Accidents by Year in DMP

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
852	519	876	828	668	496	603	565	642	525	458	400	372	341

Source: Accident Research Institute (ARI) Report, 2014

Pedestrian First

In the absence of a clearly defined system of pedestrian priority together with the lack of good facilities for walking; pedestrians are forced to walk on the road and are therefore subjected to unnecessarily high risks of injuries. There are many factors contributing to this situation including absence of continuous footpaths; badly designed pedestrian routes and crossings; low visibility of crossings; encroachment on the footpath; absence of arrangements for the easy movement of disabled persons; lack of pedestrian education and poor driver awareness of the rules of the road; lack of recognition that transit passengers are also pedestrians at both the beginning and the end of their trips; lack of coordination between different agencies before undertaking development works on the roads. In order to address these problems, a “Pedestrian First Policy” is needed to encourage walk trips and safeguard pedestrians.

Policy 59 The Government will enact a Pedestrian First Policy to ensure the construction of properly designed and continuous footpaths with well-defined and maintained pedestrian routes in the city, the provision of pedestrian crossing facilities giving the pedestrian priority over all other traffic and the prohibition of unauthorized trespass on the footpath by street vendors and others. In particularly busy pedestrian areas, the Government will consider introducing car-free zones and/or pedestrian overpasses or underpasses.

Policy 60 The Government will support the launching of a comprehensive city-wide awareness program as a part of the implementation of a road safety campaign with special emphasis targeted at children, women and disabled persons. Safety instruction for school children will be included in the school's syllabus.

Providing Properly Designed Pedestrian-ways

Dhaka city has few properly designated and maintained pedestrian routes and those that exist are not continuous. Previously, it has been recommended that the government should adopt a “Pedestrian First Policy” and under it, all necessary facilities should be provided for the pedestrians. It must be appreciated that the provision of pedestrian routes alone will not suffice. In a well-planned city, properly designed pedestrian ways must be integrated closely with other transport elements so that walking becomes a recognized mode; it should become a pleasure and footpaths should be places for brief social gatherings for the city dwellers.

Policy 61 The Government will, through the DTCA, amend the construction standards for the city roads based on their functional requirements and will include provisions in their design for properly planned footpaths particularly on the primary and the secondary roads and in the denser urban centers.

Ensuring Provision for the Disabled

At present, disabled persons find it very difficult to move in Dhaka because of the lack of facilities suitable for them. Except in a few good hotels, practically no disabled facility exists either on the roads or in other places like bus stations and terminals, bus stops, rail stations, motor launch landing stations and in the vehicles and they launch themselves.

The city footpaths are not continuous, there are frequent changes of levels and their surface is not smooth and even. These conditions result in the creation of difficulties for disabled persons to move along the roads. The counters and platforms of the terminals and stations do not provide proper facilities such as low counters, ramps and special toilet facilities for disabled persons. In addition public transport such as buses, trains and motor launches do not provide any special seating arrangements inside. These deficiencies in the city transport system create impediments for the disabled and should be removed on a priority basis. On humanitarian grounds, and on physical and medical considerations, the sick and disabled are also entitled to special treatment. They should not be subjected to noise and pollution, which is injurious to the health of the people in general and the sick and disabled in particular. Society has the obligation to provide such services that are suitable for such people. However, for Bangladesh, the question of affordability on the part of the society to provide such services arises. In order to resolve this issue, society should attempt to provide such facilities as it can afford for the sick and disabled.

- Policy 62 All the city roads will be re-planned to contain continuous footpaths and, where it is feasible and necessary, the footpaths will be provided with built-in ramps so that disabled persons can move conveniently.
- Policy 63 The bus stations, terminals, railway stations and motor launch landing stations will be re-planned to provide proper facilities for disabled persons so that they do not encounter any impedance to movement.
- Policy 64 Public transport of all kinds will be re-planned and re-designed or adapted so as to provide some facilities in the vehicles so that disabled persons can access the vehicles and ride on them in comfort.

Providing Transport for Children

Children are entitled to special treatment, as they are the future of the nation. The quality of future leadership and the country's well-being and prosperity are dependent on proper protection of children. In order to safeguard their financial position, they should be provided with fare reductions while travelling on the public transport system. Moreover, the Government should also provide adequate security measures on the roads and in transport so that unaccompanied children can travel to school safely.

At present, neither public transport vehicles nor the roads of the city provide any special facilities for children. The city roads do not have bicycle routes and lack continuous footpaths. As a result children can neither go to school on foot and in bicycle nor by bus since bus routes are not now generally designed that way. As a result parents send their children by private automobiles or by rickshaws or accompany them to schools on foot. This situation not only creates unnecessary journeys back and forth but also creates congestion on the roads, particularly near schools and colleges.

- Policy 65 The Government will examine measures provided for children considering also the examples of operating measures in other developing countries in the Asian region, and will introduce a targeted system to provide fare reductions to children for travel on public transport systems.

- Policy 66 The Government will encourage school authorities to arrange owner-operated transport facilities for children and students, and in the future will relocate these institutions as much as possible, close to rapid transit and feeder routes.
- Policy 67 The Government will ensure safety and security on the roads so that children can walk and use bicycle to school without fear.

Making Suitable Provision for Women

According to some statistics, women are estimated to account for 70% of those living in poverty worldwide (UNDP-1995). The growing literature on women and transport has clearly shown that they tend to have different needs deriving from the multiple tasks they must perform in their households and in their communities. Low-income women tend also to be dramatically less mobile than men in the same socio-economic groups. Efforts to increase the mobility of low-income women may face difficult resistance from those who feel threatened or offended by such direct empowerment of women. However, it has been pointed out that harassment of women in the street and on public transport in Dhaka is rampant. This is reported particularly common with female garment workers and illiterate women. All these proven facts make urban transport planning a difficult assignment. However, the efforts to promote meaningful public transport require special attention to allow the voices of women to be heard.

- Policy 68 As the main mode of transport for many low-income women is walking, the Government will enhance the safety and security of women in the street acting on a priority basis by strengthening law enforcement measures.
- Policy 69 The Government will review the existing provisions for women in public transport in order to improve such provisions so as to respond positively to the demand of women's' special needs such as security and safety in transport systems.

Provision for Bicycles

In the 1950s and earlier, the bicycle was a major component of the city's transport system particularly among students, teachers and the younger generation of middle class people. With the increase of traffic flows and more dense development, the danger to cyclists from motorized vehicles has increased. Reluctance has grown to the use of bicycles for status reasons. Significantly, there have been no provisions made on highways or smaller roads for bicycle paths or crossings thereby increasing the danger to these vulnerable road users.

In many cities of the world (such as Amsterdam, Copenhagen) the bicycle is a major component of the urban transport system. The bicycle has many advantages over other modes of transport and also has a proven medical advantage in the exercise provided. It is also one of the cheapest forms of urban transport – only one quarter the cost of bus travel per passenger/km, and one-tenth the cost of rickshaw travel. Bicycles take very little road space, are pollution free and are affordable to much of the population. There could also be a positive impact on the domestic economy by encouraging the manufacture of bicycles by local industries.

- Policy 70 Bicycles will be recognized as a mode of transport and separate lanes and crossings will be provided within the city in order to make bicycle journeys safe and pleasant.
- Policy 71 The Government will support local industries in the manufacture of bicycles so that new designs can make bicycle purchase affordable to the poorer sections of society. And the Government will implement the actual condition survey and

prepare the database. And also the government will submit the specification for facility and design standards

7.4 Redistribution of Transport Space & Improvement of Traffic Environment in City Center

CBD area is already densely developed and the increase of the traffic demand in the future will be limited. The mode of the current road traffic in and around CBD area is broadly classified into two types such as “passenger vehicles” inside the road grid of CBD area and “logistic vehicles” near the markets.

The objectives of traffic management in the CBD are to secure good mobility for pedestrians and non-motorized transports (NMTs) and to provide good accessibility to incoming and outgoing public transportation. To achieve these, the use of motorcycles and four-wheel vehicles in the area must be restricted to a minimum, so as not to hamper the safety of pedestrians and NMTs. At the same time, the pedestrian environment must be enhanced. There is also a need to give proper attention to the logistics requirements of businesses in the area.

Since there is very limited space for parking, not to mention cars, access to the area must be made by public transportation. In order to enhance the attractiveness and convenience of buses, measures, such as transit malls and circular bus system, must be introduced.

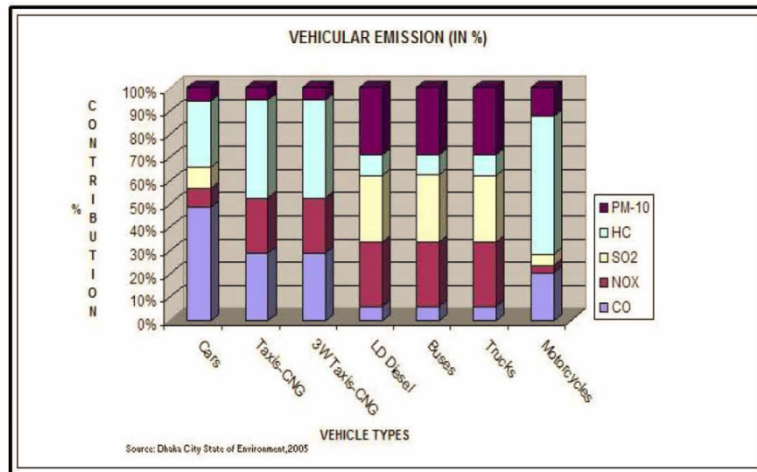
Policy 72 The Government will establish the transport management system for the city center

7.5 Alleviation of Air Pollution and Noise Pollution

Protecting and Enhancing the Built Environment

Like other major metropolises in developing countries, deterioration of air quality in the Dhaka area is a key environmental concern. The main air pollutants in Dhaka are Nitrogen Oxides (NO_x), Sulfur Dioxide (SO₂), Particulate Matter (PM), usually expressed as PM with diameter of 10 microns or smaller: PM₁₀, or PM_{2.5} microns or smaller: PM_{2.5}, Carbon Monoxide (CO), Ozone, and Lead. The motor vehicles and traditional brick kilns contribute predominantly to the air pollution. The motor vehicles are major source of PM pollution that contributes to the risk of developing cardiovascular and respiratory diseases, as well as lung cancer. Most of the PM pollution comes from the diesel-run vehicles. Hundreds of brick kilns operate during the dry season from November to April in the low agricultural land surrounding Dhaka City and generate smoke dust including SO₂, NO_x and hydrocarbons that contribute to worsening the ambient air and damage of public health.

Analysis of the emission inventory presented in the following figure indicates that the diesel vehicles contribute approximately 80% of the air pollution from mobile sources. The ageing fleet of diesel vehicles along with the high sulphur content in diesel is considered as prime reasons for such high levels of air pollution. CNG Taxis and three-wheelers also contribute to the NO_x load. Poor maintenance coupled with poor fuel quality, traffic congestion, poor transport infrastructure planning and lack of coordination between the agencies involved in planning and executing of land use and transport planning add to the vehicular air pollution in the city.



Source: Dhaka City State of Environment 2005

Figure 7.1 Air Pollution from Vehicles in Dhaka

The most serious pollutant from the health point of view in Dhaka is Particulate Matter (PM). Usually in the dry seasons the pollution level reached highest peak and gradually decreases during wet season. The 24-hour average for both PM10 and PM2.5 concentrations were found noncompliance with the national standards during the dry season, i.e., from November to May. The gaseous pollutants except NOx measured at different CAMS (Continuous air quality monitoring station) did not exceeded limit values of the national air quality standards. Since NOx have only annual standard, so for this pollutant daily 24-hours average concentration levels were compared with the annual average. Maximum 24 hours NOx concentration at some stations found exceeded the annual average of standard value during the dry season.

In order to protect and enhance the quality of environment of Dhaka City, various interventions relating to the planning, vehicle quality control and use of alternative fuels are needed. In terms of planning intervention spatial planning, road and inter-section planning and demand management all contribute to reduced congestion and hence improvements in exhaust emissions. Within the context of spatial planning, the RSTP study has provided a long term transport plan linked to land use with the objective of creating more efficient travel patterns and hence reducing environmental impacts. In the same study, new road links and the re-organization of existing ones together with improvements to inter-sections, linkages with other transport modes, development of more energy efficient public rapid transport systems and the minimizing of travel needs are part of the recommended plan.

Policy 73 In pursuance of the Environmental Conservation Act 1995 and Rules 1997 and as a follow up action of the Air Quality Management Project, the Government passed new Vehicular Emission Standards on December 31, 2014 which will help improve the countries overall air pollution problem. The Government needs to undertake and to coordinate the findings and put in place the necessary measures to enhance and protect the quality of the environment in metropolitan Dhaka.

Policy 74 In the light of the recommendations from the Air Quality Management Project, the Government will review the existing environmental rules and regulations from

the Department of the Environment and will bring in new, stronger standards so as to reduce pollution from vehicle exhausts.

- Policy 75 The annual certificate given by BRTA to prove the roadworthiness of all vehicles wishing to operate will include test of exhaust emissions. The testing station will assess the exhaust emission and if the vehicle is found to have emissions which exceed the standards, the test certificate will not be issued and the vehicle be prevented from operating within metropolitan Dhaka until suitable repairs have been made.

Reducing pollution from Noise

Level of noise in Dhaka City is now a major concern for the general people because it has exceeded the tolerance level. According to WHO survey at 45 locations of Dhaka City, most of the traffic points and many of the industrial, residential, commercial, silent and mixed areas are suffering noises exceeding the standard limits of Bangladesh. WHO found noise levels of 70 dB in Dhaka Medical College, 75 dB in Shakhari Patti, 90 dB in English Road, 88 dB in RAJUK avenue and 85 dB in Tejgaon, though the standard limit for those area are 50, 55, 60, 70 and 75 dB(A) respectively. These are mainly due to vehicular horns and movement, loudspeakers from processions and meetings, high volume of audio players from roadside small business enterprises and others. Noise exposure, in fact, causes an extreme threat to human health, especially for elderly people and children. Moreover, the traffic personnel, rickshaw pullers, open vehicle drivers, road side workers, small scale business enterprise workers etc. are exposed for long-term noise pollution which might cause severe mental and physical health problems.

- Policy 76 The ban on the use of aerial horns by vehicles within metropolitan Dhaka will continue and will be further strengthened. Fines will be increased for violations. The indiscriminate use of horns particularly near clinics, hospitals and other noise sensitive establishments and after 23.00 hours will be prohibited. The necessary rules will be established by DOE and powers will be given to the police to enforce the bans and prosecute violators.

Implementing an Environmental Project Control

At present, there is no provision in the scope of an infrastructure project design for the proper assessment of impacts on the environment. This is particularly true in projects relating to road construction and maintenance, and in the construction of residential and commercial complexes. The lack of such adequate environmental-related provisions creates adverse effects on the environment. Deterioration of the environment due to these factors reduces the quality of life of the people and it has become necessary to enforce more tight environmental controls on the projects.

- Policy 77 All projects in metropolitan Dhaka most of all shall be established in consultation with the Department of Environment and will be subjected to an Environment Impact Assessment [EIA] before they are approved for implementation by DTCA.

7.6 Establishment of District Transport Development Strategy

Considering the rapid urbanization of RAJUK area, the urban issues in RAJUK will not be solved within the area in the near future. Therefore, it is advisable to prepare a plan for a wider area that is, the Greater Dhaka Area (GDA). The same concept of developing urban centers and corridors can be applied for GDA. In RAJUK area, due to existing traffic

congestion, introducing mass transit system along with urban corridors is essential. On the other hand at GDA level, developing the road network to include expressways is needed.

Policy 78 The Government will recognize the Greater Dhaka transport problems as a national issue and will supplement previous levels of investment by attracting other sources of funds and will actively involve the private sector in infrastructure development and operations.

Policy 79 The Government will establish the District Transport Plan and also develop and manage intra-district transport infrastructures. And the Government will establish the provision system for intra-district transport services

8. ENHANCEMENT OF TRAFFIC SAFETY

8.1 Introduction

Traffic accidents have profound socio-economic impact as they result in traffic congestion, loss of personal productivity, and health care cost which are all borne by the society. In Dhaka, road-based traffic accidents have steadily increased. The accident rate already ranks high comparing with other Southeast Asian cities. Immediate remedy of traffic safety problems in Dhaka should be limited in order to avoid, such serious personal, social, and economic consequences.

There are opportunities to improve traffic safety and road infrastructure. Many of the preventive measures can be undertaken at marginal costs within a short time, including road safety planning, elimination of black spots, enforcement, and education.

High priority should be given to the revival of the computerized accident database and the elimination of accident-prone locations. Accurate accident data directs attention to traffic safety and assists the formulation of remedial and preventive solutions. In eliminating accident-prone locations, common traffic engineering measures, such as the use of median barriers, signalization, and geometry modification, are implemented.

It should be borne in mind that traffic safety improvement, while critical for the short term, requires long-term commitment especially in the areas of traffic police enforcement and road user education.

Worsening traffic safety and the increase in traffic accidents are threatening the well-being of the city and its inhabitants especially the pedestrians. Road safety is also a priority issue at union government level.

8.2 Establishment of Traffic Safety Audit System

Traffic safety audit should be institutionalized in the design process of roads, bridges, and other traffic facilities. When traffic safety audit is carried out prior to construction, the chances of traffic accidents at the new facilities could be limited or even prevented. For existing traffic facilities, a safety review would identify areas for improvement.

Policy 80 The Government will prepare the guidelines and traffic safety audit system

8.3 Elimination of Traffic Accident Black Spots

Reliable data and statistics on accidents are the bases in understanding how the Dhaka transport system works. There must be wholehearted commitment to improve traffic accident investigation, reporting and analysis. Complete reporting of traffic accidents and better use of accident records will prove very useful in planning preventive activities.

A model road accident database was developed to illustrate the process of computerizing accident database and reporting. This database is patterned after the existing traffic accident report form and is primarily intended for the use of the Traffic Police. The program is organized into three steps, from accident investigation, data input, to analysis and reporting.

In parallel to the revival of the accident database, improvement of analysis and planning capacity is also necessary, which can be obtained through training of personnel and provision of facilities.

- Policy 81 The Government will establish the traffic accident database; identify black spots and improve guideline preparations. And after improvement, monitoring of black spots will be required.

8.4 Improvement of Licensing and Vehicle Inspection System

The Need for Driver Licensing Control

Road crashes are a major cause of loss of life and property and the major factor in such crashes is the driver. Researchers estimate that 85% of all causative factors of accidents involve the drivers. The training, education and medical fitness of the drivers are necessary elements and should be evaluated before issuing any license to a driver. These controls are seriously lacking in Dhaka. It is said, that 20-30% of drivers in Dhaka are holding fake driving licenses.

- Policy 82 The Government, through BRTA and the DTCA, will review the existing system of issuance of driving licenses in order to amend it in favor of an improved and modern system.

- Policy 83 The Government will ensure that the drivers are trained, skillful, aware of traffic rules, literate and medically fit to obtain a driving license. The private sector will be encouraged to establish modern driving schools to train drivers in the rules of the road and the control of his vehicle.

The Need for Improving Vehicle Inspection Control

According to the statistics of BRTA, a total of 145,000 private cars, 20,000 trucks, 14,000 buses and minibuses are currently registered in Dhaka Metropolitan Area. And the present annual growth of motorized vehicles in the city is about 34% compared with an average growth in GDP of 6.5%. With the increase of economic activity the ownership and use of motor vehicles will experience a modest gradual increase. This will likely to change the modes of travel and could further alter the land use pattern to a more dispersed structure. The BRTA has the following schedule of fitness certification.

Table 8.1 Periodicity of Vehicle Fitness Certification by BRTA

Vehicle type	Vehicle age before fitness certification becomes due	Subsequent fitness Certification frequency
Motorcycles	10 years	1 year
Cars and other private vehicles	5 years	1 year
Taxis and 3-wheeled passenger vehicles	3 years	1 year
Buses	1 year	1 year
Trucks	1 year	1 year

Source: BRTA

However, BRTA has a limited capacity (in terms of manpower only since no inspection instrumentation is used) to check vehicle fitness. Hence, BRTA is planning to outsource fitness certification. It was informed that BRTA has already asked through a newspaper notification that all the automobile repair workshops/garages are to register with BRTA under the Motor Vehicles Rules, 1984. However some vehicles are not always tested rigorously before they are allowed to operate in the city.

While several years ago motorcycles were uncommon this is different at present. There are around 30,000 bikes registered every year in the city. The demand is being encouraged by cheap credit and a growing middle class in Dhaka. Because motorcycles are not only relatively affordable it is also faster and more usable than public transport. So it is easy to imagine that motorcycle will be a big issue of traffic congestions in urban area.

An improvement in inspection program is required in order to ensure that only vehicles which have passed a roadworthiness test can operate. Once vehicles have been tested they should be entered into a secure data base which is then maintained constantly and are accessible to relevant agencies. In the absence of a properly maintained database, the authorities in Dhaka face another special problem in respect of the assessment of actual number of registered motor vehicles and the identification of ownership of these vehicles. As a result, the law enforcing authority finds it difficult to locate and penalize the owners and drivers of the vehicles who violate the traffic rules.

Policy 84 The Government, through BRTA and the DTCA, will revise and improve the present system of vehicle inspection in order to eliminate the possibility of vehicles which are non-roadworthy obtaining a certificate to operate. To facilitate this, the Government will provide the funds and other measures which will be needed to establish and maintain an up to date data base of both vehicles and drivers. The data base will be managed by BRTA but is accessible to law enforcing agencies and safety engineers. The vehicle testing program will include test of brakes, steering, tires, windscreens and lights.

Policy 85 The Government will encourage the private sector to establish trained technicians to undertake the vehicle inspection program under the license from the BRTA.

Policy 86 The Government will conduct actual condition survey and improve licensing system and vehicle inspection system.

8.5 Strengthening of Traffic Enforcement System

The achievement of better control and improved safety on the roads depends on many factors. Among these factors, the effective enforcement of traffic rules and regulations is the most important. The enforcement of traffic rules and regulations has been very poor due to many reasons including:

- a. Lack of suitably qualified and trained police personnel;
- b. Lack of a reliable up to date data base of licensed vehicles and drivers;
- c. Lack of proper equipment and tools for enforcement;
- d. Lack of coordination between various departments involved in the traffic and transport system;
- e. Inadequate penal provisions and enforcement procedures;
- f. Highly mixed vehicular traffic on the road controlled under separate rules and authorities.

In order to make the enforcement of traffic rules and regulations effective, RSTP has recommended necessary measures particularly in the parallel Institutional Strengthening and Capacity Building document. Those recommendations deserve special consideration in order to improve enforcement levels.

Policy 87 In order to ensure effective enforcement of traffic rules and regulations the Government will initiate actions to update the relevant acts, rules and regulations. The Government will also strengthen BRTA and DMP with the necessary tools, equipment and trained personnel to enable the better enforcement to occur.

Policy 88 The government will improve enforcement skills and strengthen penalty, fine systems and coordination with NGOs and NPOs.

8.6 Strengthening of First Aid Response System

In case of an accident the immediate help of bystanders can save lives and reduce health damage. Providers of first aid can also significantly cut down the time before the professional medical assistance arrives by calling the professional help immediately. Therefore, a proper first aid constitutes one important aspect of road safety.

But due to traffic jam the ambulances cannot get a way to reach scene of the accident and hospital quickly. To make matters worse, there is no right of way of emergency vehicles, fire engines and ambulances, so the drivers block ambulances.

The NRSC (National Road Safety Council) has the National Road Safety Strategic Action Plan (2014 – 2016). There are many actions for medical services in this plan to improve the emergency assistance, hospital care and rehabilitation available for road traffic accident victims, in addition of having medical professionals actively promote road safety and help identify the true incidence of road accident casualties. But with the current state of affairs proposed actions functions less well.

Policy 89 The NRSC will conduct actual condition surveys. And after that they will strengthen the first aid system including emergency contact and communication system, and transport and receiving system for emergency patients by emergency care service.

9. STRENGTHENING OF TRANSPORT SECTOR ADMINISTRATION AND MANAGEMENT CAPACITY

The tasks to be accomplished for the city's present and future are enormous and require a comprehensive and coordinated approach involving a wider range of players. The role of the related authorities in leading the process is very important.

9.1 Strengthening of Transport-related Organizations

The roles of the government and transport-related organizations will be largely unchanged. Their functions will still be to provide essential services for the population including in the transport sector, public transport, traffic management signal systems, parking control and management and street lighting. The development of transport systems and infrastructure within the municipalities will be in accordance with the Structure Plan and the RSTP and the strategic level projects will be coordinated by the DTCA. The transport-related organizations will implement projects within their jurisdiction which are designed to complement the overall structure plan for greater Dhaka.

The main infrastructure provided within the greater Dhaka area planning will be coordinated and prioritized by the DTCA. The actual implementation and supervision of construction will be the responsibilities of the line agencies such as RAJUK, LGED, RHD and City Corporations at present. As much as possible the responsibilities will not change but the planning control will be switched to the DTCA.

Policy 90 The Government will strengthen the capabilities of the line agencies so that they can perform the functions allocated to them. This strengthening will take the form of personnel training, equipment provision and other relevant issues.

9.2 Promotion of Private Sector Participation

At present the private sector is already involved with the provision and management of transport systems. Primarily in the form of public transport in which private operators own and control the majority of trucks, buses, taxis, CNGs, ferries and rickshaws. It is anticipated that this private operation will continue and in fact will expand. There will be a need for more control on operations and this would be made possible by merging the many single unit operators into cooperatives.

There are two primary advantages gained by involving the private sector in the provision of infrastructure and operations. Firstly, the provision of new capital being injected into the system can either increase the building program allowing more projects to be implemented with the new financing or the Government's own contributions can be reduced allowing the surplus funds to be used on other sectors which may not be suitable for private investment. Secondly, the private sector has a reputation for managing systems and organizations in a more efficient and profitable way than the public sector.

Policy 91 The Government will actively enter into a dialogue with the private sector and will create a regular coordination forum to inform the private sector of the upcoming projects and discuss openly and transparently where possible cooperation can be mutually beneficial.

Policy 92 The Government will improve current competitive conditions and expand project areas for private sector.

Under normal circumstances, infrastructure is owned by the Government; partially this is to protect sensitive areas such as airports and major expressways. Consequently, when

involving the private sector, the Government needs to protect its long term interests although in the early years, the facility is sometimes perceived being owned by private developer. To combat any doubts about ownership; the normal way for the private sector to be involved with the provision of infrastructure is to create some form of partnership between the public and the private sector. This Public Private Partnership (PPPs) takes in many forms and each is specific to a project, companies and the country.

Probably the most common form of PPP is the BOT system in which a private investor builds the scheme, operates it for a number of years and after the agreed term it will be transferred back into Government ownership. The agreement between the Government and the developer will be governed by a legal contract normally referred to as a Concession Agreement. In this Concession Agreement, all the terms and conditions will be spelled out to protect and encourage both parties.

Policy 93 Although each scheme will differ according to its function and cost, the Government will begin the process of preparing the way for PPP schemes by drafting a typical Concession Agreement for use in negotiations and will use this basic agreement to negotiate the participation of the private sector in infrastructure development and operations.

The Need for Legislative changes

There is a need to ensure that the current legislative conditions are suitable for the encouragement of private sector investment. There should be an independent review of current laws to ensure fairness on behalf of the private investor and protection for the Government.

Policy 94 The Government will initiate a comprehensive review of the existing laws and regulations as they apply to private sector investments and will amend the laws such that they provide equitable ways to enter into contracts between the parties. A business environment will be created so that involvement of the private sector will become attractive and financially rewarding.

9.3 Strengthening of Planning and Management Capacity of DTCA

At present, the land use planning functions are separated from the transport planning functions. Whereas RAJUK has developed the Structure Plan and is responsible for its implementation, DTCA has transport functions as a coordination authority among RHD, BBA, LGED, BIWTA, BRTA, City Corporations, DMP and other stakeholders. The planning control function which should be part of the overall planning process is apparently being looked after by RAJUK but there is little evidence that this function is being exercised. The lack of a close relationship between land use planning and transport planning is evidenced by the somewhat disorganized types of development which takes place often out of accordance with the Structure Plan. This leads to poorly served developments since the transport infrastructure is not available when the development is opened. The situation is made worse when uncontrolled development happens seemingly without the will and ability to control it.

The DTCA may undertake feasibility studies of the identified projects and it may review draft tender documents and participate in the evaluation of tenders. It will also organize consultations with the stakeholders in the course of formulation of projects and programs by agencies for implementation. However, it will not be responsible for carrying out construction works and supervision. Implementation will remain with the line agencies as at present.

The National Integrated Multimodal Transport Policy mentioned (i) The Government will strengthen concerned institutions for transport (City Corporation as well as Dhaka Transport Coordination Authority (DTCA) and Bangladesh Road Transport Corporation (BRTC)) to facilitate more coordinated planning and take more effective measures in the light of ground reality; (ii) Strategic Transport Plans will be drawn up for all major cities, in which the role of public transport will be emphasized. Such plan will also make recommendations for institutional reforms to enable successful implementation of plans; (iii) Projects that are not consistent with 'Strategic Transport Plan' approved by DTCA will not be considered for implementation by city corporations in Dhaka City or by any other agency. This is the most important policy to implement urban transport projects effectively and successfully.

Policy 95 The Government will write a mandate to the DTCA specifying its powers and its establishment and allocating funds necessary to carry out the duties assigned in the National Integrated Multimodal Transport Policy.

Policy 96 The Government will conduct transport surveys and update of Karte and foster transport planners in the DTCA.

9.4 Improvement of Infrastructure Development and Management System

The street of Dhaka urban area is paved with asphalt, in fact, the road density in Dhaka is one of the highest in Asia. However, inefficient and underfunded maintenance program along with disasters accelerate deterioration of the road network requiring urgent rehabilitation. Lack of adequate allocation for maintenance leads to wastage of money and on the other hand deprives people of road use. When maintenance works are deferred, the road network require costly and difficult maintenance plan. Due to poor traffic management, quality use of road network is also affected. Low cost traffic management measures can aid safety, and avoid costly investment in new roads.

Policy 97 The government will attach the highest priority on improved road maintenance. And also will allocate road projects for private sector participation.

Policy 98 Transport related institutions will ensure that adequate coordination is accomplished between rails, water and road based modes of city transit systems and these institutions will engage in frequent public consultation so that public opinions are reflected in transport planning.

9.5 Securing of Development Fund

Bangladesh as a nation is experiencing modest economic growth. This is expected to continue for some time but the growth is at a level which is hardly able to sustain the present needs. There is a large expansion in population which makes worse the situation causing the major economic expansion difficult to achieve.

Over the past years, there has been a significant progress in the revenue collection. During this time, revenue collection has been increasing at the rate of 15.88 percent and this created an additional fiscal space for the Government, Therefore, the budget deficit remained stable and within the target. The foreign assistance and project assistance is increasing at the rate of 10.77 percent and 17.70 percent respectively but non-project assistance shows declining trend, which means loan assistance is increasing in the country. On the other hand, the costs of increasing subsidies were met by borrowing from the banking system; the government burden is also increasing so as to keep SOEs in operation. However, the Government needs more financial flow to maintain transport infrastructure asset which had been constructed for

the past years and to implement large projects such as sea ports, long bridges and to improve transport network including mass rapid transit in Dhaka City.

According to the Strategy for Infrastructure Sector for 7th Five Year Plan, transport Sector accounts for about 23% of total ADP. Base scenario is the current ratios of Revenue, Development Expenditure and Annual Development Plan budget to GDP is the value in 2014-15 projected by Bangladesh Government. And GRDP of GDA is almost 25% in Bangladesh, so urban transport development budget in GDA will be 25% of all transport sectors. According to the Strategy for Infrastructure Sector for Seventh Five Year Plan, transport sector accounts for about 23% of total ADP in 2015 which has been increasing from around 15%. The rate is assumed to keep the same level for a few years and gradually decrease with the range between 15% and 20%. Annual budget for transport sector among ADP based on the assumption is summarized in the following table. But available fund for transport sector is not enough to cover the required investment cost of RSTP, particularly in the short/mid-term.

Table 9.1 The Projected Budget for Transport Sector in GDA

(Unit: million USD)

	Phase 1 2016-20	Phase 2 2021-25	Phase 3 2026-30	Phase 4 2031-35
% of ADP	25%	25%	20%	20%
Case 1	19,776	19,392	22,208	28,416
in GDA (25%)	4,944	4,848	5,552	7,104

Source: JICA study Team

Policy 99 At this moment, the ratio of revenue to GDP is very low compared with other developing countries such as Cambodia, Vietnam, Philippines, Nepal and Sri Lanka and so on. Therefore, the total budget allocated to transport sector is not sufficient to meet the demand. Government efforts to increase tax revenue and other kind of revenues are essential as well as seeking new financing sources such as private involvement.

Policy 100 The Government has a keen interest to attract the private sector involvement in transport infrastructure, and adoption of private sector infrastructure policies and guidelines. The Government needs to consider more practical approach to attract private sector finances in infrastructure projects, such as measures of financial risk reductions and particularly in the roads and highways, as well as in urban transport mainly in Dhaka City.