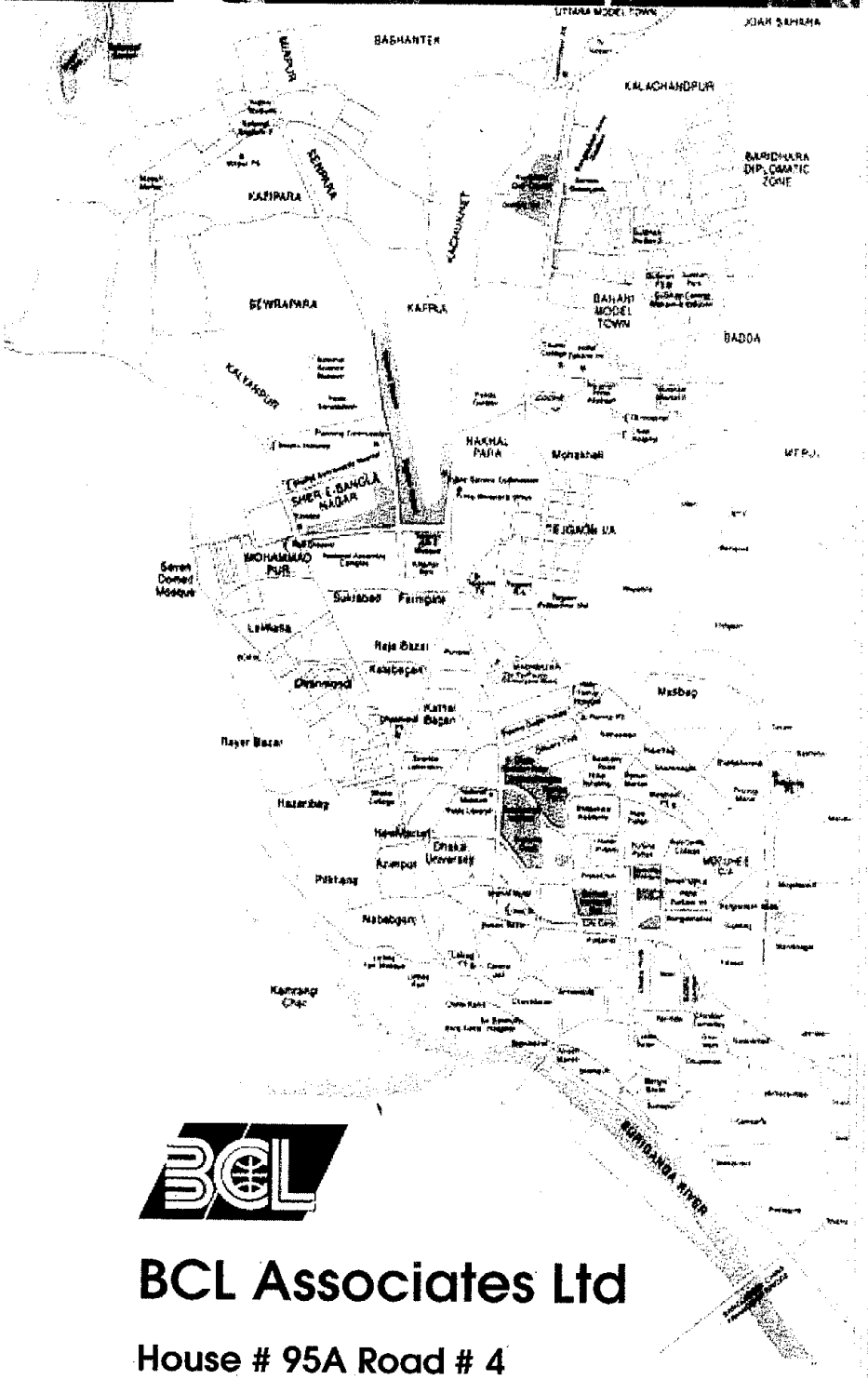
JICA Japan International Cooperation Agency

Sector Survey on Urban Transport



FINAL REPORT

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Sector Survey of Dhaka Urban Transport

1. BACKGROUND AND OBJECTIVES

1.1 BACKGROUND

Urban transportation in Bangladesh particularly in Dhaka, the capital city, is getting worse and worse day by day. The city is a mega city with more than 12 million people reflecting its economic, social, educational and cultural norms and activities but without adequate civic and transportation facilities. Dhaka is one of the great ancient cities of the sub-continent. The modern one is thriving through 400 years of age. Its expansion has started with becoming the Capital City of an independent Bangladesh after 1971.

The traffic situation is so bad that it needs attention by the government and donor agencies to improve keeping the city running. Some improvement was noticed immediately after implementation of Dhaka Urban Transport Project (DUTP) for the time being with the financial assistance of the World Bank which expired on 30th June 2005. Improvements of urban transport infrastructure and introduction of modern transport system is a continuous process. To this effect the government of Bangladesh has undertaken the STP study for long range planning during 2004-05 under the World Bank Finance. The report had been under process for approval for a long time and it was delayed for various reasons. Subsequently it has been finally accepted by the government in recent weeks.

The government of Japan, the largest single donor for the country is interested in the progress of STP approval and looking for possible cooperation in its implementation. JICA planned to undertake a review study and data collection survey of Dhaka transportation system mainly based on STP reports and documents. BCL Associates Limited was engaged to carryout the survey. An agreement was signed on 24th January 29, 2008 between JICA and BCL to carry out the review and survey.

The main purpose of the study and survey was to understand the current situation of Dhaka on the basis of reviewing and updating the data and information of STP. The STP study area was included the entire area the DMA within the control of RAJUK as well as district headquarters of adjoining Narayanganj, Munshiganj, Manikganj, Narsingdi and Gazipur including their urbanized areas. A Map of STP area is presented in **Figure-1.1**

1.2 OBJECTIVES

The study aimed at three primary objectives as under:

i. The survey team will review and grasp the whole picture of the STP prepared by the government under World Bank assistance for a coherent long-term Strategic Plan for next 20 year (2004-2024) based on integrating land-use planning mentioned in DMA plan (1995-2015). The consultants are required to update the STP with supplementary data collection.

ii. Select a couple of priority policies for intervention and collect more detailed information in those selected areas.

iii. The study team will select one policy and related issues potential for implementation and examine the possibility of Japanese assistance thereof.

A Japanese Project Preparation Mission will lead the study with the help of local consultants. The local consultants will gather necessary information prior to the arrival of the Japanese Team under their guidance. The Specific TOR for local consultants is prepared and handed

over to them during the contract negotiation. This Final Report describes the findings of the review in four major areas and clarifies the comments made on the Draft Final Report.

1.3 SCOPE OF WORK

The consultants will gather necessary information prior to the arrival of the Japanese team.

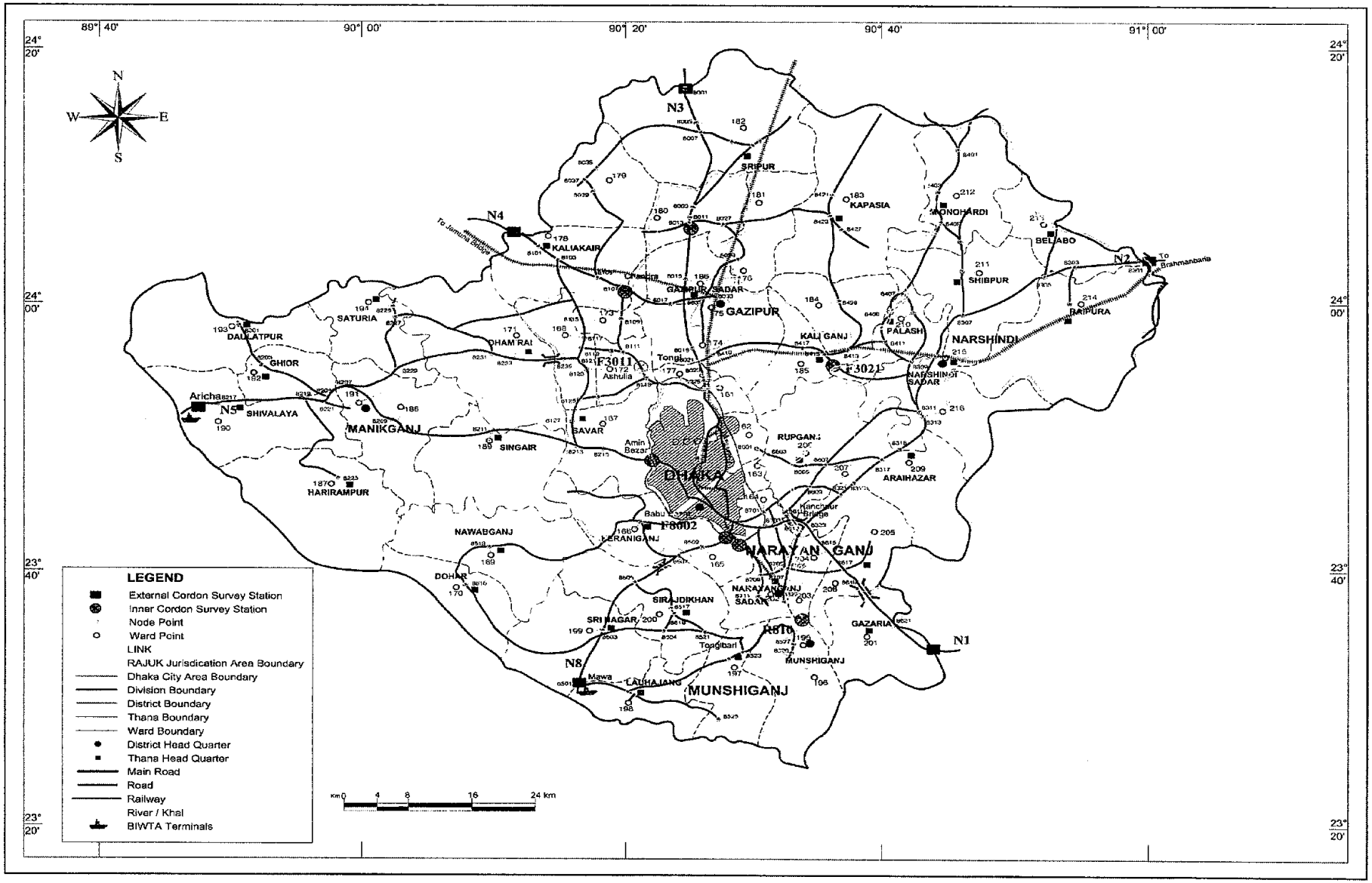
The specific TOR for local consultants included (1) to collect information listed as Appendix-1 of the ToR with consultation by the Japanese experts on e-mail basis before their arrival, (2) to make a report with all information collected, and (3) assist visiting mission with supplying /colleting required data and information and accompanying them during the site visits.

The study area for this survey is limited to the Dhaka division and six districts such as Dhaka, Gazipur, Narsinghdi, Manikganj, Munshiganja and Narayanganj Districts as same as the STP. The information or data to be collected could be secondary data or the data which was used in the STP.

- The population of DMA (greater Dhaka, 6 districts) will increase from existing 16 million (2004) to 36 million in 2024.
- The peak-hour motorized traffic will increase from existing approximate 0.15 million (2007) to 0.30 millions (2024) in main Arterial Network.
- The peak-hour movement of people will enhanced from existing 0.25 million (2004) to 0.75 millions (2024)
- The length of main arterial network at present is 350 km only (2004)
- The average speed in the city for motorized traffic is only 17km per hour (2005) in mixed traffic road and 22 km in NMT free road arterial roads and only 10-11 km in old part of the city streets (secondary and collector).
- Main arterial roads inside the dense city area remains choked most of the time during peak working hours.

The scope of the study covered several important areas of the urban transport and land use planning namely: (i) Review of Strategic Transport Plan (STP) to grasp the whole picture of the report prepared under the World Bank finance and guidance ; (ii) Present a status report of STP documents and its approval status; (iii) Collect, update and present existing Traffic situation of Dhaka including traffic growth, congestion and vehicle fleets; (iv) Analyse and present an over view of existing public transport system and progress made since the completion of STP; (v) Review and analyse the institutional and policy issues in urban transport planning, implementation and operation, and examine the roles and responsibilities of relevant organizations such as DTCB, DCC, RAJUK, BRTA and DMP; (vi) Review the proposed Land-use scenarios for urban and transport development strategy and report progress of land use planning and control since STP; (vii) Examine and analyse the social and environmental aspects of Dhaka Transportation and (viii) Select and recommend strategic policies and projects for Japanese assistance and possible collaboration.

Figure-1.1 Location Map of the Study Area



2. Review of Strategic Transport Plan

One of the objectives of Dhaka Urban Transport Plan (DUTP) was to address the long term transport planning and coordination issues of Dhaka Metropolitan Area (DMA). As a follow up action of this objective a long term (20 years) Strategic Transport Plan (STP) for DMA was prepared so that a sustainable policy frame work is established.

2.1 Identification and Justification of Priority Polices

In order to guide the development of transport system of DMA, a set of well defined polices based on the approved National Land Transport Policy have been formulated for their implementation over a 20 years plan period. These polices have been accepted by the Government in-2008. The priorities of the policy implementation depend on various considerations by the authority. However considering the acute traffic congestion in the Dhaka City, the following policy packages are identified for prioritized implementation:

(i) Institutional development and improvement of traffic management.

(ii) Establishment of connector roads (link roads) and widening of existing roads.

(iii) Development of Public transport system which includes: improvement of existing bus transport & development of Mass Rapid Transit (MRT) system which again includes Metro-rail, light railway and Bus Rapid Transit (BRT).

Justification of Priority Polices

i) A two tiers approach to address the issue is necessary to resolve the acute transport problem of Dhaka city. One is the creation of new infrastructures and improvement of the existing ones and the other is the institutional strengthening and capacity building, because among the most important reasons for accumulating the transportation problems in Dhaka city are: the lack of clearly defined responsibility for the planning and development of Metropolitan transport system, the lack of Co-ordination among the agencies involved; the lack of enforcement of traffic rules; poor safety regulations; poor traffic management and poor institutional efficiency of the existing organizations connected with the transportation system, besides the lack of an organized and efficient public transportation systems.

In order to improve this situation, the government of Bangladesh in the past initiated various studies including Dhaka Metropolitan Development Plan (DMDP) covering the period 1995 – 2015. Unfortunately neither the recommendations of these studies nor the intended integration of transport and land use planning were implemented. These conditions have adequately justified for the creation of coordinating, controlling, planning and monitoring body with proper authority and the strengthening of the existing agencies for making them efficient and effective in discharging their functions. The coordinating body may be called a Metro-government / or a Unitary Authority. A conceptual organizational set-up with its proposed functions have been given in the STP. Final Report – on "Institutional Strengthening & Capacity Building".

It has been estimated in the STP study that up to 50% of the existing capacity of the main arterial highways is being lost due to bad traffic management, poor driver behavior and encroachment. A major part of road accident in the city involving

about 50% pedestrians is also caused due to this reason. This is a serious disbenefit to the economy. The result is substantial congestion causing wastage of fuel, loss of time, health hazard and property damage. According to some experts economic costs of these losses will fur outweigh the cost of creating the appropriate transport system for easing the problems of the city. So this issue needs to be addressed on priority basis.

ii) Since Dhaka City is much dependent on five major (corridors) north-south roads, it is necessary on priority basis to improve the number of east-west connector roads to reduce dependence on the existing corridors and to ease the traffic flow in the city. The connector roads as identified in the STP for development are as follows:

North - South Corridors

1. Progati Sarani-DIT Circular-Kamalpur Road.
2. Airport-New Airport Road-Taazuddin Sarani College Road.
3. Begum Rokeya Sarani Mirpur 12 Road
4. Mirpur Road- Azimpur-Old City
5. Western Embankment till 2nd Buriganga Bridge.

East - West Corridors

6. Zia Colony-Mirpur 12-North Rupnagar
7. Madani Avenue-Kemal Attaturk-Mirpur-1-Darus Salam Rd. (Tunnel at Cantonment Golf Club)
8. Mohakhali-Agargaon Rd. (Old Airport Tunnel)
9. Ramura-Panthapath-via Hatirjeel Road.
10. Demra-Jatrabari-Gulistan-Azimpur Road

iii) At present population in DMA is around 17 million and the Dhaka City now-a-days has been experiencing a recurrent and acute congestion on the road. The population of DMA in 20 years is likely to increase about 36 million. According to STP based on household survey this population will collectively be making about 70 million trips everyday. The estimated trips are likely to be much larger when the trips created by the floating population which come into the city and go out of it every day are also taken into consideration. The present traffic situation will further deteriorate and come to a grinding halt if appropriate actions are not initiated now. In order to combat this problem effectively, Underground Metro, Elevated / at grade Light Railways (MRT), Bus Rapid Transit (BRT) and improvement and consolidation of the existing bus transport will be needed.

Other Issues

i) Non Motorized Transport

Recently the plying of rickshaws in the City has become a highly controversial issue. Some say to ban it from city roads and some other say rickshaw is environment friendly and can carry more passengers than Under Ground Metro of London, so it must have a bigger role to play. It is however, true that rickshaw has a role to play as an integral part of the transport system of the city. In fact an effective and a positive role for rickshaws has been recommended in the Strategic Transport Plan of DMA. In order to make rickshaw ride safe and comfortable, improvement of its design, to limit the number of its licenses and to encourage it operate as feeder services have been emphasized.

ii) Pedestrian Facilities

Walking is a commonly used mode of transport in Dhaka. In reality walking is a matter of economic necessity for many people. Despite this fact, suitable pedestrian facilities have been neglected and have, in most cases, been added as an after thought to road improvement .Even when footpaths have been built, they are encroached by hawkers, parked cars, solid wastes, skips, building materials, debris etc. So pedestrians can hardly use them. On the other hand Pedestrians deserve to have top most priority so that they can safely walk to work and home. This issue needs to addressed on priority basis.

2.2 Related Organizations, their regulations, financial positions, capacity and chart

(a) Related Organizations

The key organizations related to the transport system and involved in the implementation of the Strategic Transport Plan for Dhaka Metropolitan area are: (i) Ministry of Communications (MoC), the apex policy making and regulatory authority, (ii) Dhaka Transport Co-ordination Board (DTCB), (iii) Dhaka City Corporation (DCC), (iv) Dhaka Metropolitan Police (DMP), (v) Rajdhani Unnayan Kartipakhaa (RAJUK) and (vi) Bangladesh Road Transport Authority (BRTA). In addition, Inland Water Transport Authority (BIWTA), Bangladesh Railway (BR); Department of Environment (DoE); Road and Highways Department (RHD), Local Government Engineering Department (LGED), and the adjoining Municipal Authorities and others are also involved in the DMA transport related issues and development activities.

(b) General Information on Urban Transportation

The two key ministries of the government are responsible for policy making, planning, development and regulation of the land transport of the country. These are: Ministry of Communications for land transport (including roads and Highways and Railways) and Ministry of Shipping (including Inland and Maritime Shipping). In addition, Dhaka City Corporation (DCC)[1] under Ministry Local Government, Cooperative and Rural Development and Rajdhani Unnayan Katripakkha (RAJUK) under the Ministry of Housing and Public works are also responsible for the planning and development of city roads. Further, Dhaka Transport Co-ordination Board (DTCB) was set-up by the government in 2001 to undertake the overall transport policy planning and Coordination for the Dhaka Metropolitan Area (DMA). Other agencies called Dhaka Metropolitan Police (DMP) under the Ministry of Home Affairs and Department of Environment DoE under Ministry of Environment and Forest are respectively responsible for control and management of traffic and air pollution in DMA. So there are six ministries involved for policy and planning in the transport system of DMA. There are about eight agencies under them (DTCB, BRTA, RHD, BIWTA, LGED, DMP, RTC & DoE) involved in the implementation of policies and planning in respect of transportation. However, the major players involved in the transportation system for DMA are six organizations viz DTCB, DCC, RAJUK, BRTA, DMP and BIWTA. The DTCB is the Co-ordinating and planning agency but its present mandates do not provide legal authority to enforce and play its Co-ordinating and planning role. So this organization has become ineffective. **The STP study has suggested an effective role for DTCB to become a key stakeholder for transportation in DMA for the short**

[1] . DCC is responsible for regulation and registration of non-motorized transport in the city

term/medium term and to establish a Unitary Authority/Metro-government for the long term. A conceptual approach to an organization of a "Unitary Authority" is given in Annex..... (Exhibit 2.4 of the final report on Intuitional Strengthening and Capacity Building)

(c) Brief description and Regulatory Functions of the Key Organizations: (Sharing of responsibility and current statutory position)

(i) Ministry of Communications

Ministry of Communications (MoC) is the government authority responsible for policy, regulations, budget and other functions mainly related to Roads and Highways and Bangladesh Railway. It is headed by a Cabinet Minister/Minister of state. Recently MoC has developed and approved a National Land Transport Policy that has been incorporated into the broader Integrated Multi-modal Transport policy which is in the process of finalization. In practice however, the effects of these polices are not being felt on the ground. On the other hand an Urban Transport policy formulated under STP has been very recently accepted by the government and as such its implementation is yet to start.

(ii) Dhaka Transport Co-ordination Board (DTCB)

The Board is chaired by the Mayor of Dhaka City Corporation and its Chief Executive Officer (CEO) is the Executive Director (ED) of DTCB. The Board is currently limited under its statute to policy formulation and Co-ordination. The main functions of the Board are:

- To advise on the creation of a safe and integrated transport system for Dhaka
- To plan transport infrastructure, taking into consideration the structure plan of Dhaka
- To develop a strategic transport plan and ensure cooperation and coordination between the various transport related authorities and agencies.

The organizational strength of DTCB has been reduced from 120 officers and staff to 70 when its budget has been transferred from development budget to revenue (recurrent) budget. However, STP has suggested an improved version of the DTCB as an interim measures until the proposed Unitary Authority/Metro-government for Dhaka Metropolitan Area is constituted.

(iii) Dhaka City Corporation (DCC)

The DCC is headed by the Mayor of Dhaka. Apart from rendering the normal regulatory and service activities, the DCC has a limited role in public transport planning and regulation in Dhaka. It is particularly responsible for non-motorized transport. It is also responsible for public transport infrastructure items like bus shelters, bus turnouts and bus terminals.

(iv) Dhaka Metropolitan Police (DMP)

DMP is headed by the Metropolitan Police Commissioner. It serves the duel functions of criminal and traffic enforcement. In addition, DMP is currently discharging the functions of traffic management in the City under a provision of Police Regulation of Bengal (PRB) 1943 (adopted in Bangladesh). STP has suggested necessary amendments to this provision to relieve the police of the

responsibility of traffic management and to allow the DCC's traffic Engineering Department (after its necessary re-structuring and improvement as suggested in the STP) to take over this function.

DMP exercises a strong influence over public transport policy through their chairmanship of the Regional Transportation Committee (RTC) which is responsible for planning routes, establishing limits on the number of buses allowed on routes, allocating the number of vehicles to serve a route; and determining the number and configuration of routes. Its strong influence, however, does not include service planning.

(v) Rajdhani Unnayan Kartipakkha (RAJUK)

RAJUK is headed by the Chairman, and assisted by five full time Members of the Board. Dhaka Improvement Trust (DIT) was the predecessor of Rajdhani Unnayan Katripakkha (RAJUK) and came into existence under the Town Improvement Act - 1953. The major functions of RAJUK are:

- Preparation of Master Plan and Development of Plan for RAJUK Area;
- Land use planning and Zoning Control;
- Detail Area Planning;
- Planning and Construction of new major Roads, link roads, bridges and culverts;
- Planned housing areas within the City;
- Satellite Town Development;
- Approval of Building plans;
- Construction of markets and shopping centers and
- Implementation of special projects (such as NAM Apartment project etc).

(vi) Bangladesh Road Transport Authority (BRTA)

The BRTA is directed by a Board of Management comprising a Chairman who also serves as the full time Chief Executive Officer (CEO). This authority was created under the Motor - Vehicle Ordinance - 1983. The current responsibilities of BRTA include:

- Registration of motor vehicles;
- Issuance of driving licenses;
- Mechanical inspections and issuing road worthiness certificates;
- Issuance of route permits for buses and other commercial vehicles
- Collection of road user fees and taxes
- Negotiation with commercial vehicle owners and drivers

At present BRTA has limited personnel with planning capability and regulatory experience in the bus sector.

(vii) Bangladesh Inland Water Transport Authority (BIWTA)

BIWTA is responsible for planning, development and regulation of Inland and Coastal Waterways of the Country. Its involvement in the transportation of DMA includes the development, maintenance and operation of inland river ports and waterways surrounding the DMA. In particular, its scheme called, "the development of the Circular Waterways of Dhaka", is very much integrated with transportation of DMA.

(viii) Others

The other organizations and agencies involved and concerned with the transport sector of DMA have been mentioned in paragraph (a) above. In addition, the following Organization and a body are worth mentioning:

(a) Bangladesh Road Transport Corporation (BRTC) is a state owned corporation established under Government Ordinance No-7 of 1961. It operates bus services such as:

- International bus services (Dhaka - Kolkata and Dhaka - Agartala)
- City bus service
- Inter - district bus service
- Research and development
- Others including training of drivers

(b) Regional Transportation Committee

The Regional Transportation Committee (RTC) was established under section 54 of the Motor Vehicles Ordinance – 1983 to carry out public transport regulatory functions for the whole of the DMA. The RTC is responsible for Planning Routes, establishing limits on the number of buses allowed on routes, allocating the number of vehicles to serve a route, and determining the number and configuration of routes. The RTC is chaired by the Commissioner of Metropolitan Police, meets either monthly or bi-monthly and focuses on broad policy issues rather than detailed individual cases.

(c) Bus Operator's Associations

It is perceived that this Association mainly represent the interest of the fragmented mini-bus sector and exercise influence in such issues as detailed considerations of route permits, fare schedules and other policy issues effecting urban bus operations. The newer large bus operators either have not join the Association or are operating largely out of its influence.

(ix) Demarcation among Organizations

Each of the organizations including the major ones involved in transport sector of DMA is responsible to discharge their assigned functions individually and severally under their respective statutes. Their major functions have been mentioned above and the respective statutes of the key organizations are mentioned below:

a) Ministry of Communications (MoC). The Government Policy making and controlling authority of the land transport and railroads related matters including improvement, developments and operation of transport services in the country. It operates under its allocation of functions given in the Rules of Business of the government.

b) Dhaka Transport Co-ordination Board (DTCB): It has been created under an act of the Parliament called the Dhaka Transport Co-ordination Board Act,

2001. Its functions among others, are the coordination and planning of transport related activities of all agencies in DMA.

c) Dhaka City Corporation (DCC). The DCC has been created under an Ordinance called "The Dhaka City Corporation Ordinance - 1983". It functions under this ordinance. Urban transport related activities includes: (i) Construction and maintenance roads, (ii) Construction and maintenance of Bus terminals, bus stops, traffic signals, marking of street lanes etc.

d) Dhaka Metropolitan Police (DMP). It was set-up in the year 1976 under the Ordinance No. 3 of 1976. It also operates under Police regulations of Bengal (PRB) 1943, adopted in Bangladesh.

e) Rajdhani Unnayan Kartripakkha (RAJUK). This authority is the successor of Dhaka Improvement Trust (DIT) which came into existence in 1956 under the Town Improvement Act 1953. Its transport related activities include: Construction of roads particularly access roads and inside streets of residential areas and preparation of land use plan of RAJUK area.

f) Bangladesh Road Transport Authority (BRTA). This authority has been created under the Ordinance called the Motor Vehicles Ordinance, 1983. It regulates all transport activities on the city roads and highways in the country.

Limitation and overlapping of functions of the above key organizations. A few examples are as follows:

- At present many organizations are involved in the management of the transport sector in Dhaka and they have overlapping functions. For instance, DCC, LGED and RHD are responsible for construction and maintenance of the road network, BRTA is responsible for registration of new vehicles and using permits for roadworthiness without taking into account of the capacity and conditions of the roads and highways. STP has recommended to resolve this issue through Coordination at the level of DTCB.

- The Clause 17 (a) of Dhaka Metropolitan Police Ordinance - 1976 conflicts with the Clause 118 of the DCC ordinance - 1983. As a result DMP takes the responsibility of the traffic control and management whereas the DCC is responsible for road building, maintenance, signaling etc.

The STP has suggested in its report to streamline these limitations and overlapping through amendment of the said Clauses and effective co-coordination among the agencies concerned through DTCB.

(x) Existing Decision making process

The government of Bangladesh is run by a Parliamentary system of government, headed by a Prime-minister, who is supported by a cabinet of Ministers/Ministers of States. So any policy decision which involves the nation/country is taken by the cabinet and in some cases (as per requirement of the provisions of the Constitution of the country) this decision/policy is required to be finally approved by the Parliament. In regard to national economic policy and formulation of development plan, National Economic Council (NEC) headed by the head of the government and assisted by the Cabinet ministers and other concerned

authorities is the Authority. Under the NEC, there is an Executive Committee of National Economic Council (ECNEC) which is responsible for the preparation of development plan and approval of the sectoral development projects under the said program.

However, the decisions/policies relating to the sector issues such as Transport, are finally taken/made by the Ministry concerned as per its allocated functions provided under the Rules of Business of the government. In this case the Ministry of Communications is the concerned ministry. Each Ministry has got several regulatory and implementing agencies for implementation of its decisions. In the case of transportation in the DMA, several agencies are involved in the planning and development of transport infrastructure projects. These organizations are DTCB, DCC, RAJUK, R & HD, BRTA, LGED and BIWTA. **For planning and survey work for DMA, DTCB is the key organization to process the case and to get necessary approval of the authority to undertake the study/survey.** However, BIWTA under the Ministry of Shipping is responsible for all activities relating Inland Water transport in DMA. In this case DTCB is the Co-ordinating agencies for implementation of the decision. Existing functions of the agencies relating to planning and development of transportation infrastructure are given in **Exhibit-7.1** on page 60 of 61 of the STP final report: "Institutional Strengthening & Capacity Building".

(xi) Financial Position, Capacity and Organization

The financial positions: non-development and development budgets of the years - 2007-08 and 2006-07 for MoC; DTCB; DCC, DMP, RAJUK and BRTA are given below. The allocations against each organization are only grants/loan from the government to these organizations. Except the government departments, the autonomous bodies such as DCC and RAJUK have their separate budgets including these government grants. The organizational charts and manpower against the positions are shown in the charts (at Annexes-1 to 5) : Organogram of DTCB (Annex-A);, Organogram of DCC (Annex-B); Organogram of DMP (Annex-C); Organogram of RAJUK (Annex-D); Organogram of BRTA (Annex-E). These organizations except MoC, are likely to review their organizational positions for re-structuring and manning appropriately and adequately as per recommendations in the STP once this study report is implemented by the government. It is worth mentioning here that the STP has been recently accepted by the government.

(a) Financial Positions (Budget - government grants/loan)

Ministry of Communications:

(in Thousand Taka)

		Budget Years	Revised budget and year
		2007-08	2006-07
i)	Secretariat		
	Non-Development	155,01,02	100,94,85
	Development	154,10,00	58,00
ii)	Road and Highway Department (RHD)		
	Non-Development	915,96,22	626,41,60
	Development	2546,79,00	2250,39,00

		Budget Years	(in Thousand Taka) Revised budget and year
iii)	Bangladesh Road Transport Authority (BRTA)		
	Non-Development	33,58,00	19,97,65
	Development	1,08,00	45,00

Ministry of Home Affairs:

		Budget Years	(in Thousand Taka) Revised budget and year
		2007-08	2006-07
i)	Secretariat		
	Non-Development	366,07,46	415,06,30
	Development	34,86,00	50,00
ii)	Bangladesh Police Directorate		
	Non-Development	843,54,24	802,20,78
	Development	119,69,00	122,21,00
iii)	Metropolitan Police [2]		
	Non-Development	372,33,32	354,56,54
	Development (DMP included)	-	-

Ministry of Housing and Public Works:

		Budget Years	(in Thousand Taka) Revised Budget and Year
		2007-08	2006-07
i)	Secretariat		
	Non-Development	70,05,95	93,30,51
	Development	7,96,00	0
ii)	Autonomous Bodies and other Institutions		
	Non-Development	14,40,87	4,01,50
	Development	86,68,00	19,84,00
iii)	RAJUK		
	Non-Development	-	-
	Development	-	-
iv)	DCC		
	Non-Development	-	-
	Development	144,43,00,000	108,50,00,000

[2] No separate budget for DMP is available

(b) Procedure for Procurement under development budget

Procurement followed for implementation of development program is regulated by the Public Procurement Regulations-2003 issued by the Ministry of Planning, Implementation Monitoring and Evaluation Division in 2004. These regulations do not necessarily apply to concession contracts e.g. BOO/BOT/BOOT contracts. However, the government may at any time, if it so decides, apply the Regulations to concession contracts.

The said regulations have been formulated by adopting and adapting the procurement guidelines followed by the World Bank (IDA) and the Asian Development Bank (ADB). If the provision of any agreement signed by the government of Bangladesh with one or more countries or international organization(s) comes into conflict with any of the Regulations, the provisions of that agreement shall prevail over the Regulations. In regard to procurement, the key document is loan, credit or grant agreement itself, as this defines the rules and regulations that shall be followed in respect of procurement. In the event that specific requirements of the development partner's term and conditions for such loans, credit or grants contradict the Regulations and the Procedures, then a "Procuring Entity" shall follow the development partner's requirements in those areas where there is a contradiction.

Availability of Financial Resources

Availability of financial resources from the government funds or from the funds provided to the government by the development partners, is subject to their (resources) inclusion in the Annual Development Plan (ADP) either against an approved or unapproved (Dev. or TA) project. In such foreign aided project normally the government provides local currency component required for land acquisition and development and for meeting other local costs and the development partners provide project aid (Foreign Currency). On some occasion they also provide local currency fund in the form of counterpart fund to meet some specified local costs. In the case of foreign aided technical assistance project (TA project) the government prefers to obtain full cost (both foreign + local) from the development partners.

Availability of Resources for the STP projects.

So long STP had been under process for approval by the government. As a result the projects, proposed under the first phase for implementation were not included in the current Annual Development Program (ADP)-2007-2008, which is going to end on 30th June, 2008. The ADP for the coming year 2008-2009 will commence from 1st July 2008. It is learnt that STP has been accepted by the government recently. Considering the ongoing acute congestion of traffic on the city roads and related other transportation problems, it is expected that some priority projects and studies as recommendation in the STP will be taken in hand during the ADP-2008-2009. In consideration of this situation a few priority policy packages have been suggested in this report under the sub-head, "Identification and Justification of Priority Policies". It is expected that projects under these policy packages will be included in the coming ADP-2008-2009 and necessary funds will be allocated. However, their inclusion and expeditions implementation may, to same extent, depend the availability of donor's assistance.

2.3. Transportation Policy and Administration

From a present population of around 17 million in the Greater Dhaka area, it is anticipated that the population in 20 years (STP Plan period) will reach approximately 36 millions. In order to cater to the need of the increased number of commuters in DMA, a set of clearly defined objectives/polices have been formulated in the STP for consideration of the authority. These are briefly as follows:

(i) Institutional changes/improvements especially the creation of an effective planning co-ordination and controlling body such as the Unitary Authority/Metro-Government. (And strengthened and re-organized DTCB as an interim measure).

(ii) Establishment of MRT/BRT as a Public Private Partnership and put them under an Independent Authority (or similar to it) for administration and control. (such as Metro-Authority).

(iii) The implementation of a city wide traffic management program to increase capacity and safety.

(iv) The complete overhaul of the vehicle and driver Licensing system.

(v) Re-organization of the existing city bus services to complement the newly created BRT / MRT system.

(vi) Stronger control on noise and on pollution by incorporating environmental testing into the annual road worthiness certificates.

The administration and management of the transport system of DMA are being carried out by various authorities and agencies. Their functions and areas of control have been briefly described in the above paragraphs - (c) (i to viii). (Page 3-5)

Among the most important factors for accumulating the problems of the transport system has been identified as the lack of coordination among the agencies involved. The other reasons affecting this system are: the lack of enforcement of traffic rules; poor safety regulations; poor traffic management; poor institutional efficiency of the concerned organizations and the lack of the functional road classification system. In order to improve this situation the GoB has taken various studies in the past but the recommendations of those studies were hardly implemented. In the STP, thorough recommendations and actions plan for improving this situation were made.

i) <u>Public transport promotion</u>

(a) Privilege which bus companies are given such as bus dedicated lane, preferential tax and duty treatment etc.

The concept of public transport includes both non-motorized and motorized transport including taxi services, although taxi services have not yet been fully organized and developed. So the existing practice relating to taxi should be reviewed to improve the situation and to encourage companies to organize themselves into Co-operatives. The STP has suggested to review the existing taxi policy to ensure compliance with the provisions made in the National Land Transport Policy of the government.

Bus transport is a very important mode of transportation in Dhaka. It has been found in STP-study that bus passengers represent 60% of all traveling people whereas in terms of vehicles, buses accounted for 10% of all vehicles in the city. A significant change that has been noticed in recent past is the increase of large buses.

There are currently more than 100 CNG buses in operation in Dhaka and this figure is growing as new CNG bus operators enter the market. **The CNG buses are given priority in the award of route permits.** This is a part of government policy to encourage the use of CNG buses.

The import duties and taxes on vehicles vary according to the size of the engine. The bigger the engine, the higher the rate of duty and taxes. **However, the CNG buses are charged with reduced taxes and duties in order to encourage the CNG operated buses.**

Existing Bus Operation

At present the operation of buses within the city is in turmoil and the service to the public is very poor. Buses fight for road space with other vehicles and usually come off second best as there is no dedicated bus lane or no preferential treatment of bus services is provided. For immediate action, it is recommended that a series of priority and bus only lane schemes be provided on the main arterial roads in the city. What this means is that some lanes will be dedicated to buses and use by other vehicles will be restricted and some intersection will have lanes given over to bus transit with priority green times at signals.

One of the primary recommendations of the STP is a re-structuring of the bus industry to transfer ownership from a large number of small operators into a smaller number of large operators. This a recognized, long standing need that has remained unchanged during the past decade. Government, through the efforts of the RTC, has achieved some success in the effort of consolidation of the industry into larger operating units operating under a Company rather than individual basis. The measures initiated by RTC are described below (in para-b).

(b) Measures to promote public transport

The government's moderately successful, on going recent effort to promote bus industry consolidation into larger operating units has not resulted from major changes to legislation or large scale bus route re-organization but rather a range of approaches including:

- Discouraging route permit application by individuals;
- Reducing the span of permits from 3 years to 1 year for the more fragmented diesel minibus and human haulers;
- Encouraging through less formal means, at meetings of the Road Transport Committee (RTC);
- Shifting human haulers and diesel minibuses off the main arteries to the side roads.

It is recommended that further measures that the government should consider implementing, either immediately or as part of the integrated mass transit system include:

- Encouraging bus operator consolidation in conjunction with the implementation of the BRT system. Operators would be required to raise capital for new bases and, in order

to participate in bidding for contracts to operate trunk or feeder services in the new system, they would be required to form operating companies or cooperatives or Company with the regulations set down by overall BRT franchise operator.

- Announcing in advance the policy that BRT will be implemented in Dhaka as part of the mass rapid transit system and that route permits on affected routes will not be renewed. This step will encourage industry consolidation, because the buses being displaced are largely under individual ownership, whereas new buses are being introduced as part of a fleet of an operating Company.

- Combining the purchase of new buses ideally as part of the new BRT system elements - with a requirement to scrap a specified number of dilapidated human haulers or mini-buses or to divert these elements to district town/less congested areas, if they have left over useful life.

2.4 Traffic Management

A fairly good traffic management is practically not existing in the city. As a result it is causing a chaotic disorder that prevails in many areas of Dhaka today. The reasons for such a chaotic condition are briefly as follows:

- Encroachment by vendors and hawkers who illegally occupy public land causing severe negative impacts to traffic operations or roads;
- Pedestrian walkways that are either non-existent or in poor physical condition or blocked by various obstacles, thus forcing pedestrians to walk on the road.
- Buses that stop to take on passengers at will without using recognized bus stops, and often blocking two or three travel lanes;
- Motor vehicles drivers who do not abide by basic driving rules and regulations because they do not understand them, or do not care;
- Poor road surface conditions and inadequate drainage that cause disruption to the smooth flow of traffic as well as safety hazards;
- Little or no effective enforcement of traffic laws;
- Vehicles of all types park on the road side thereby reducing the road capacity;
- Wide spread lack of concern for the rule of law undermining any attempt to improve enforcement;
- Blockage of through travel lanes by right turning vehicles; due to poor driver knowledge and absence of proper channelisation;
- Haphazard crossing of roads by pedestrians at uncontrolled crossings.

It has been suggested in the STP based on experience that about 50% additional road capacity could be achieved through removing the above mentioned hindrances by improved traffic management. The measures recommended in the STP for improvement of traffic movement by addressing the following issues.

- Traffic Engineering: Enhancement of road marking; signs; traffic signals; channelisation at intersections, turn rounds and separation barriers; space for bus stops and parking or waiting areas for public transport.
- Driver Training: Improving testing and licensing procedures for all drivers and re-training for offending drivers;
- Roadside interference: Reclaiming the full potential of the existing roads by relocating or removing inappropriate and illegal non-transport related activities;
- Public awareness: Initiatives to improve the ability of road users (motorist and pedestrians alike) to adopt proper behavioral patterns;

- Enforcement : Increased level of enforcement of traffic rules to ensure a greater compliance

Other physical infrastructural facilities such as improvement of existing roads, construction of new roads particularly connector roads etc. will be needed for better management of traffic in the city.

Though drainage problems (particularly water logging of major roads during the rainy season) is not directly related to traffic management, yet it causes acute traffic congestion on the city roads when the major arterial roads are water logged due to heavy rain fall and traffic is diverted from these roads to other roads in order to avoid the water logged roads. Thus water logging of city roads becomes a serious traffic management problem during rainy season. This problems needs to be addressed to improve traffic movement.

a. Traffic Demand Management

In reality there has not been an organized traffic demand management plan in Dhaka. It has been forecast in the STP that Greater Dhaka Area (DMA) will have a population of 36 million at the end of the plan period i.e 2024. This population will collectivity be making about 70 million trips every day. The STP has dealt with this expected situation in the Final Report at length under Travel Demand Model and Assumptions (Chapter-5 of the Final Report).

The STP study survey information has revealed various factors relating to proportions of vehicles moving throughout the day. It was found that 80% of the daily traffic moved in the 16 hours period from 0600 to 2200, and 48% moved in the 8 hours period between 0800 and 1600.

However, some traffic demand management has occurred organically rather than by design. The concept of living close to ones place of work in order to be able to walk to work is one such example. The level of use of non-motorized transport is another example. The concept of spreading a portion of the peak hour volume to periods of the day when traffic volumes are lower is well established as reflected in the surprising consistence in traffic volumes through out the 07.00 to 2200 period of each day. In addition to these, Dhaka Metropolitan Police imposed the following restrictions to reduce the pick hour traffic volume:

- Prohibition of trucks for entering into city roads during 0600 to 2000 hours
- Prohibition for inter city buses to ply on the city roads between 0800 and 2200 hrs.
- Prohibition for pick up trucks, non-motorized vehicles such as rickshaw vans and push carts (Thala) to use main city roads between 0800 and 2000 hours.

On the other hand Dhaka City Corporation (DCC) has taken a decision to relocate some of the city's wholesale kitchen markets in the less congested areas. This decision is in the process of implementation by DCC.

b. Organization of traffic management (Signal light, sign board, road marking etc.)

As regard transportation related activities the Dhaka City Corporation (DCC) is responsible for the traffic management under Clause -118 of DCC - Ordinance - 1983 in addition to its normal activities including the construction and maintenance of the city roads. The traffic management includes control of traffic, installation, maintenance and operation of street signals, road marking, sign board etc. However, DCC at present does/could not operate and control the traffic mainly because, it does not have adequate number of trained personnel and partly because, the DCC has not yet formulated the

necessary rules and regulations under the Clause-118 of the Ordinance, as required for this purpose. In absence of DCC's activity in this respect, the Dhaka Metropolitan Police (DMP) is filling the vacuum and as such their staff is overstretched for performing enforcement duties effectively.

(c) Decrease Plan for Private Vehicle, if any

Available figures indicate that the number of private automobiles has been increasing by about 12,000 each year. It is observed in the STP that Dhaka is one of the least motorized cities in the region with approximately 32 vehicles per 1000 residents.

In reality there has been no decrease plan for private automobiles in the city. However, the existing conditionalities applied for acquisition of automobiles by owners are briefly as follows:

(i) Import duties and taxes are levied at the port entry and the taxes and duties vary depending on the size and capacity and landing cost of the vehicles.

In addition to this, the owners are to pay the following taxes and fees:

- Registration Fee: A one time fee that varies from 14,000 ($200 US at present rate) to Tk. 100,000 ($ 1,500 US) depending upon the type of vehicle and size of the engine.

- Road Tax: Annual fee that varies with the number of seats in the vehicles Tk. 4,500 ($ 70 US) for a regular size car, and Tk 6,000 ($ 90 US) for a medium size van.

- Fitness Fees:

  (i) Annual fee that depends upon the vehicle classification Tk 600 ($90US) for heavy vehicles and Tk 300 ($4.5 US) for all over vehicles

  (ii) Annual fee - Tk 300 ($4.5 US) for checking registration, ownership change, fitness etc.

In order to achieve a balance between the public and private transport system the STP has recommended at set of Polices (Policy numbers: 26, 27, 28, 29, 30 and 31) in the Urban Transport Policy- Final Report which has been recently accepted by the government.

Heavy Weight Control

(a) The regulation of heavy weight control is an on-going concern in Dhaka. General consensus is that heavy vehicles such as truck are frequently overloaded but currently there is no apparent means or effort to control it. The overloading contributes to increased numbers and severity of accident as well as causing serious damage to roads and bridges. But currently there exists no heavy vehicles restriction in Dhaka except the Axle load limitations which are applicable to highways all over the country.

(b) The operation of heavy vehicles (trucks) in Dhaka is regulated by administrative orders of the Metropolitan Police Commissioner. Regulations restricts trucks and other heavy vehicles from moving within the city between the hours of 0700 and

2000 and covered heavy vehicles are prohibited between 0700 to 1000 and 1600 and 2000 hours.

However, there is no restriction on the movement of trucks within the city on weekly and other holidays, which in effect means that these heavy vehicles were partially restricted mainly on the consideration of traffic congestion rather than on the consideration of their heavy weight.

(c) Endorsement of the zone restriction

There does not exist any endorsement of zone restriction in the city.

Over axle weight control

Existing Motor Vehicle - Act and the rules under it are applicable to all motorized vehicles plying on the roads and highways of the country and as such there is no separate rules for the city roads. The problems causing by heavy weight vehicles visa-viz over axle weight originate primarily from out of the city areas. So it is pertinent to understand country's road transport network which is characterized by five main transport corridors. They are as follows:

- Dhaka - Chittagong Corridor
- Dhaka - Northwest Corridor
- Dhaka - Khulna Corridor
- Dhaka - Sylhet Corridor
- Khulna - Northwest Corridor

Four corridors of the five centre on Dhaka, reflecting the Dhaka-centric nature of economic activity. The other corridors of the country centering the Chittagong and other divisional cities are, in fact, subsumed within the five corridors and as such have traffic impact on the Dhaka city roads. The heavy vehicles plying on the national highways are to use and/or pass by the city roads. Thus any control measures taken for the over-axle weighted vehicles are considered to be effective in the case of city roads.

Over axle weight control on the highways including the city roads was a long concern with the authorities responsible for the construction and maintenance of highways. As a result over axle weight studies were carried at different times to find out the impacts of over loaded vehicles on the roads. All studies indicate that the problems of overloading are getting worse and in economic terms the resultant damages to road pavements and structures represent a considerable cost.

A summary of ESA values obtained from different studies is presented in the following table. This will give some idea on the existing over axle-loading problem on the highways.

Corridor	Year of Study	Sample No of Vehicles	Average Vehicles Weight (GVW)	Average ESA
Dhaka - Chittagong, N1	1998	551	14.00	5.17
Dhaka - Khulna, N7	2002	1187	15.08	6.75
Tongi - Kaliganj, R355	2003	232	18.05	14.18
Bogra - Dinajpur, N5	2003	119	15.66	10.02
Dhaka - Mymensingh, N3	2003	556	15.39	8.33
Dhaka - Khulna, N7	2003	2653	18.44	18.74
Chittagong - Cox's Bazar,	2005	250	16.03	10.40

N1				

(a) Maximum axle loads allowed for single axle and tandem

The government of Bangladesh through a notification published in Bangladesh Gazette dated the 6th, November 2003 has raised the existing single axle load limit from 8.2 tons to 10.0 ton and re-fixed the maximum permissible laden/train weight limit of vehicles higher than 20.0 tons and the maximum permissible weight for single axle and group of axles and also the maximum permissible laden/train weight of motor vehicles or combination of vehicles (rigid or articulated) for use in Bangladesh as specified in the **Annexure-B1**

(b) Law or decree that stipulates axle loads:

The current laws or decrees that regulate vehicle axle and gross vehicles weight (GVW) are provided in the Motor Vehicle Ordinance – 1983 and the Motor Vehicle Rules- 1984. In addition to the amendments of the rules stated above (annex-6), the said rules under MV - Ordinance - 1983 provide following Special Rules applicable to goods vehicles and trailers. These rules are applicable to vehicles plying in the DMA as well:

Goods Vehicles (Extracts from Motor Vehicle Rules 1940 as adopted in Bangladesh)

163. **Body and loading platform** - Every goods vehicles including a trailer shall be equipped with a strong platform or body so constructed as to be capable of carrying the load for which it is used without danger to other road users and such that the load can be securely packed within or fastened to the body or platform.

164. Driver's seat - Rule 144 relating to the driver's seat shall apply to every goods vehicle other than a delivery van.

Provided that the Provincial Government may (local authority) by order exempt, subject to such conditions as may be specified in the order, any goods vehicles or class of goods vehicles from the provisions of sub-rule (a) of rule 144.

165. Overall length - (1) The overall length of a trailer (excluding any draw-bar) shall not exceed 22 feet.

(2) This rule shall not apply to-

(i) a trailer constructed and normally used for the conveyance of indivisible loads of abnormal length.
(ii) any agricultural or road making implement,
(iii) the trailing part of an articulated or otherwise disabled motor vehicle which is being drawn by a motor vehicle in consequence of the disablement.

(c) Effectiveness of Traffic Police Control and Check axle loads

Roads and Highways Department, a government agency under the ministry of communications has installed five weighbridges at different places on the national highways. These are as follows:

- At Auskandi on the Dhaka-Sylhet road
- At Sitakunda on Dhaka-Chittagong road
- At Manikganj on Dhaka-Aricha road
- At second Sitalakaya Bridge on Dhaka-Mawa road
- At Jamuna Bridge both ends

The installed weighbridges are reported to the operational. However, how effective they are in controlling overweight vehicles is difficult to establish because over loading of trucks and heavy vehicles on the highway has become a regular malpractice. Effectiveness of police control to check over-axle loads on the road is minimized for various reasons such as (i) it is difficult for a law enforcing personnel to understand the regulations as there are several components in the regulations like GVW, axle limit by weight, axle limit by tyre size etc by a non-trained/un-skilled person; (ii) pressures from vested interest groups for non-enforcement of the regulations; (iii) collusion with the operational personnel for making the weighing machines non-functional etc.

Some 18 (eighteen) more weighbridges have been proposed to be installed at different stations of the country. They are at: Gazipur; Ashulia; Postogala; Savar; Meghna bridge; Banapole; Mymensingh; Jayantia; Bhairab bazaar; Thakurkona; Barisal; Shibganj; Chittagong, Hathajari; Ramu; Hili; Panchagar and Lalmonirhat.

(d) Existence of weighing stations in Dhaka city with automatic weighing devices.

At present there does not exist any weighing station in Dhaka but out of the proposed eighteen weighing machines stated above, six of the machines; when installed, will have direct positive impact on the city roads. These are at Postogola; Ashulia, Gazipur, Savar, Meghna bridge and Mymensingh.

Road Safety

At present there has been no special committee or task force dealing with road safety issues in Dhaka city. However, in order to co-ordinate road safety activities in the country, the National Road Safety Council (NRSC) was established in July, 1995. This council is chaired by the Minister, for Ministry of Communications and in order to provide secretarial services to NRSC, the its secretariat was established in 1997 within BRTA. This Secretariat has been converted to the Road Safety Cell in 2001, which has been subsequently reduced to a very small unit consisting of a few data collection staff under an Enforcement offer of BRTA. It is learnt that there has not been any meeting of the NRSC during the last two years. So it is crystal clear that Road Safety aspect, although deserves to be given serious attention by the authority has become a victim by itself. This aspect needs to be looked into seriously.

(b) Traffic rules education, by who to whom and what timing

Road safety education with a clear structure within a recognized curriculum with a planned, sustained and coherent program of learning, based on sound educational principles has not been existing in Bangladesh. However, the movement, operation, control of road transport system is the responsibly of the Ministry of Communications. So this Ministry and its relevant department such as BRTA (as regulatory authority) is primarily responsible for road safety education

for drivers in particularly and to general public and children in general. Recently Ministry of education has included various safety aspects in the formal primary education curriculum for imparting education and awareness among the children in the matter. On the other hand BRAC, the largest non-government organization (NGO) along with other NGO's of the country has also introduced in their non-formal primary education curriculum the road safety aspects for children of the rural areas. In addition these NGO's organize public awareness campaign on road safety on the national highways. It is learnt that they receive foreign donors' assistance for this purpose. As a law enforcing authority Dhaka Metropolitan Authority (DMP) is also responsible for creating awareness on rules of the roads, their safety aspect and the penalties for violation of traffic rules.

The National Road Safety Council (NRSC) has been created to take care of all aspects of road safety, but unfortunately it has become ineffective. Only visible action on this issue is the occasional public awareness campaign on road safety and regulations conducted by the traffic police and BRTA jointly in Dhaka City and other major cities of the country. The traffic police become active on this issue particularly on "Police Week", organized by them occasionally.

Drivers License

It is compulsory for every one to acquire a driving license to drive a motor vehicle in a public place. Driving license is of two categories: (i) professional driving license containing numbers in **red** and (ii) non-professional license containing numbers in **green.** There is another category of driving license called, 'Learner's driving license' required for any person driving a motor vehicle in a public place during the course of receiving instruction or gaining experience for presenting himself for the test required under the rules for acquiring a driving license.

(a) Authority to issue driver's license

Under the Motor Vehicle Ordinance 1983 and Motor Vehicles Rules 1984, amended under Motor Vehicle Amendment Rules - 1988 and thereafter from time to time, the government has authorized Bangladesh Road Transport Authority (BRTA), **"The Authority"** to issue drivers' license. BRTA has authorized some of its officers from the traffic department to issue driver's license in Dhaka and other places in the country on being satisfied that the applicant has fulfilled all the requirements under the rules to acquire a driving license.

(b) Requirement for applicants to acquire drivers license

(i) The Authority upon receipt of an application shall ensure that:

- The applicant is not disqualified or liable to be disqualified for holding a driving license;
- he is in possession of a valid learner's driving license issued by a competent authority and is likely to complete not less than three months immediately before the date of test;

(ii) Age limit required for a driving license:

- Any one below 18 (eighteen) years of age is not competent to drive a motor vehicle in a public place;

- Subject to the provision of clause-15 of the Vehicle (amendment) Rules, 1988 (which is meant for the driving license required to drive defense departments' vehicles) any one below 20 (twenty) years of age is not competent to drive a motor vehicle in a public place as a professional driver.

(iii) Driver's License to Drive a Transport Vehicle:

- The applicant must apply for such a license in Form LTA (**Annexure-B2 LTA - Form**) which shall be accompanied by the driving license of a light vehicle of the applicant having at least three years experience

- The Authority will ensure the identity of the applicant and ascertain that the applicant is not disqualified or liable to be disqualified for holding a driving license;

- The Authority shall summon the applicant to appear before the driving test board as constituted under rule 6, of Motor Vehicle Rules, 1984 and require the applicant to pass the test as set forth in the Third Schedule to the Ordinance. (Annex-8) Test of Competence to Driver Schedule 111 of the MV Ordinance-1983).
- The practical driving test as specified in Part-1 of the Third Schedule to the Ordinance shall be conducted in two phases such as:

  (i) the first phase of the practical driving test shall be carried out on a specially arranged spot reserved and forbidden to all candidates and driving instructors before the examination to judge if the candidate is perfectly in a position to maneuver his vehicles faultlessly in all situations;

- A candidate who satisfactorily completes the first phase shall be taken for second phase of the test on the public roads as well as inside localities to judge if the candidate is able to fit in the movement of traffic, to observe, to anticipate, to behave correctly, to observe precautionary measures, to drive with a smooth motion of nearly thirty miles per hour on a rapid traffic road, to accomplish safe overtaking and to negotiate leads without skidding.

(iv) Educational Qualification

A candidate unless he is a foreign national, must read and write either Bangla or English.

(v) Medical Fitness

A medical fitness certificate in Form-C as set forth in the First Schedule to the Ordinance shall be firmly affixed with the applicant. The certificate must be obtained from a registered medical practitioner. The licensing Authority may decline to accept a medicate certificate if it was given more than one month before the date of application.

(vi) Additional requirement for driving heavy or public vehicles

A candidate for driving license of heavy weight and public service vehicles is required to fulfill some additional requirements as follows:

(i) The duration of test for drivers of heavy weight vehicles shall be longer with double number of questions and the judgment more severe than that for drivers of light or medium weight vehicles and the test shall be conducted only a heavy weight vehicle with at least 42 seats (including the conductor).

(ii) A candidate for the driving license of heavy weight vehicles or the public service vehicles shall undergo a supplementary theoretical examination both written and oral, on general knowledge and technical matters.

Vehicle License and registration

Figures available indicate that the number of automobiles[3/4] has been increasing around 12,000 each year in Dhaka and the total number has increased from 1,30,000 in 1999 to 2,11,000 in 2006. It is however difficult to estimate the number of automobiles removed from operation in absence of reliable information.

(a) Authority to issue and register vehicles

According to Motor Vehicle Ordinance 1983 with its subsequent amendment from time to time, Bangladesh Road Transport Authority (BRTA) is responsible for registration of motor vehicles, issuance of driving licenses, route permits for buses and road worthiness (fitness) certificates. It is also responsible for road safety, overload control, and setting up emission standards.

(b) Interval for renewal of vehicles license and registration.

(i) A registration certificate for a motor vehicle is issued for an indefinite period subject to the condition that the vehicle shall remain road worthy while it is in operation in the public place. In order to ensure the compliance of this condition, BRTA issues a road worthiness (fitness) certificate for each vehicles for a period of one year effective from the date of registration. This road worthiness certificate has got to be renewed by the owner every year from BRTA after the vehicle is tested by the authorized technical people. Then a vehicle fitness certificate is renewed for another year. Meanwhile, traffic police is authorized to stop any vehicle on the road to check the road worthiness of it and imposed penalty on the owner of the defaulting vehicle and/or ask the BRTA to temporally suspend the registration of the vehicle. On the other hand BRTA can also temporally suspend the registration of the vehicle during annual road worthiness test, if a vehicle fails to satisfy the requisite conditions of fitness. On fulfillment of the given condition, the registration of the vehicle is restored.

Traffic regulation

(a) Law and regulation on traffic

[3]. *Automobiles includes cars, jeeps, station wagons, pick-up trucks and small vans.*

[4]. *26, 429 Two - Stroke Three Wheeler (Auto-rickshaw/Auto tempo) removed from Dhaka.*

All types of motorized road transport in Bangladesh including that in the Dhaka Metropolitan Area (DMA) is controlled and regulated by Motor Vehicle Ordinance-1983 and the rules and regulations under the said ordinance issued by the government from time to time. Motor Vehicle Rules-1984 and Motor Vehicle (Amendment) Rules – 1988, among them are worth mentioning.

BRTA created under the said Motor Vehicle Ordinance-1983, is the primarily responsible for regulation of motorized road traffic. In order to assist BRTA, a few other agencies / institutions are involved in the regulation of traffic. They are Dhaka Metropolitan Police (DMP) and the Regional Transportation Committee. Their regulatory functions have been described in paragraphs above.

(b) Traffic police mission and activities

With the gradual expansion of Dhaka City area, caused not only by national growth but also by in-migration of people from all over the country, maintenance of law and order and control of traffic become extremely difficult for the police authority. The need to set up a separate organization for the city area was felt, which lead to the creation of Dhaka Metropolitan Police (DMP) in the year, 1976 under the Ordinance No. 3 of 1976. The main functions of DMP are stated below:

i) Control of crimes and maintenance of law and order in the city area;
ii) Control of traffic movement in the city;
iii) Enforcement of traffic rules in the city area to ensure road safety;
iv) Investigating road accidents and storing them in the Micro-Computer Accident Analysis Package (MAAP) followed by the analysis of the accident area

An over lapping of functions regarding traffic control and management exists between the Dhaka City Corporation (DCC) and the DMP due to the fact that the clause - 118 (Traffic Control) of the Dhaka City Corporation Ordinance - 1983 and the clause - 17 (a) of the DMP Ordinance, 1976, both provide for the "Control of Traffic" on the road. This overlapping of functions has not been removed although the STP Consultants have recommended a measure to resolve this issue. At present DCC install traffic signals at street intersections, mark the street lanes and undertake new construction and maintenance of city streets. The remaining functions of traffic management such as management of movement of traffic, determination of the direction of traffic flow, traffic signal control, parking control, stoppages of the vehicles on the street etc. are being performed by DMP, in addition to their main duties of enforcing traffic rules and regulations.

2.5 Related Plans and Plans by other Development Partners

i. Economic development plans

In the past Economic development plan used to be prepared for a five year period and was called Five Year Development Plan and based on the sectoral projects. That project based development concept has been changed to achieve faster economic growth for creation of employment opportunities, removal of infrastructural constraint, improvement of law and order situation, establishment of fiscal discipline, unfettered development, social sector improvement, further widening of social safety net and strengthening of financial management. In order to achieve these objectives, the government has adopted "Poverty Reduction Strategy (PRS)" embodied in the document entitle "Unlocking the Potential - National Strategy for Accelerated Poverty Reduction" to achieve the Millennium Development Goals (MDGs). PRS articulated the development strategy of the

government. Its key implementation instrument is the Annual Development Programme (ADP). The ADP 2007 - 2008 has been prepared with the aim of rapid poverty reduction in consonance with the policies and strategies of PRS. Accordingly, some guidelines have been followed in preparing the Annual Development Programme 2007 - 2008. Among them the important ones are:

a) Priorities have been given to the sectors with direct bearing on poverty reduction and human resource development;

b) The projects which are targeted for completion in the year 2007 - 2008 have been given higher preference in resource allocation;

c) Emphasis has been given to claim / proposal for Matching Taka Cover for utilizing available foreign aid in the year 2007 - 2008

d) For including new projects, issues like availability of resources, national economic importance, sectoral priority, regional balanced development, women empowerment, expansion of ICT, number of projects targeted for completion, implementation progress, trend of expenditure etc. have been taken into consideration

The total size of the approved ADP 2007 - 2008 is Tk. 26,500 (Twenty six thousand five hundred) crores of which Tk. 13,525 crores (51%) will be financed from internal resources and the rest, that is, Tk. 12,975 crores (49%) from external resources. The amount of local currency is Tk. 16,700 (Sixteen thousand seven hundred) crores (63%) and project aid is Tk. 9,800 (Nine thousand eight hundred) crores (37%)

It is worth mentioning that the crisis situations created due to recent occurrence of severe floods and cyclone Sidr in the country, the total size of the ADP for the current financial year (2007 - 2008) has been reduced by Tk 3000 (Three thousand) crores to Tk 23,500 (twenty three thousand five hundred) crores.

Bangladesh's economy now closely integrated with the global economy. So the world economy and the accelerated economic growth in China and India and in other South Asian countries will have direct impact on the economic growth of Bangladesh. In this context the growth rate for the economy during the financial year 2007 - 2008 has been projected at 7 percent. But due to the occurrence two incidents such as severe floods and Cyclone Sidr in the country current projected growth is likely to be reduced to around 6 percent.

ii) Transportation Development Plans

All the sectoral development plans in the National Development Plan such Annual Development Plan (ADP) for a year cover the whole country and as such transportation development plan is no exception to this practice. The road development plan which includes construction of bridges and culverts on the highways is implemented by the Roads and Highways Department (RHD) of MoC. Bangladesh Railway (BR) under MoC is responsible for railroad development, its maintenance and operation. On the other hand the construction and development of the city roads are the responsibility of the two organizations such as DCC and RAJUK. However, the maintenance of the city roads is the responsibility of DCC. It is worthwhile to mention here that the RHD and Local Government Engineering Development (LGED) are normally given the job for the construction of city roads, bridges and flyovers by the goverment as these two organizations have developed expertise in this field. Apart from MoC, the Ministry of

Shipping and Ministry of Civil Aviation and tourism are respectively responsible for Inland and Maritime Shipping and Air-transport.

In ADP 2007-2008 (Current Financial Year), RHD has got 121 (One hundred and twenty one) On-going and 4 (Four) new projects for construction and improvement of Highways / Bridges / Culverts having an total estimated cost of Tk 18,13,0,90, lac including 716465 lac in foreign exchange. Expenditure incurred up to December, 2006 against these projects is Tk. 5,21,562 lac with a the Taka component of 4,04,082 lac. Among them only 10 projects are foreign aided. These projects are shown separately under the head "Existing Projects and future plans by donors".

(iii) Agricultural Development Plans

The agricultural development plan includes:

Sub-sectors such as : (i) Crops; (ii) Food; (iii) Forest; (iv) Fisheries; (v) Live-stocks and (v) Irrigation

Crops

Crops sub-sector plays an important role for a long term socio-economic development of the country through attainment of self-sufficiency in food, production of cash crops, production of industrial based agricultural commodities, etc. In the ADP 2007-2008, Ministry of Agriculture (MoA) has taken up 15 new projects and these have been included in ADP without any allocation of funds. Funds for these new projects will be allocated gradually as they are approved. An amount of Tk. 561,62 lac including a Taka component of 432,18 lac has been allocated in ADP 2007 - 2008 for the ongoing projects.

Food

The main objectives of development projects of food sub-sector are to collect and distribute food grain in the public sector to face emergency situation, control of food grain prices etc. These projects have been taken to establish food prices under the existing food management system.

Forest

To alleviate poverty through creation of employment, to protect pollution and to improve environment, some plantation projects have been undertaken under this sub-sector. In the ADP 2007 - 2008 an allocation of Tk. 9698 lacs for 28 projects has been made for implementation of the projects.

Fisheries

The main objective of Fisheries sub-sector is to reduce projects by increasing income and creating employment opportunities through increasing fish production and to meet the protein demand of the country. Besides government activities, some NGO's and private sectors are also involved in the different projects for sustainable economic and social development of the fishermen.
There are 14 government funded projects (Investment - II and Technical - 3) in the ADP 2007 – 2008. A total of Tk 7260 lac (GoB fund 6110 lac & foreign aid 1150 lac) has been allocated for implementation of these projects.

Livestock

Livestock is considered as an important sub-sector for alleviation of poverty through creating employment opportunities specially for destitute and widows. A total of 24 projects including 8 new projects are included in ADP 2007 - 2008 and an allocation of Tk 13392 lac has been made (GoB fund Tk 9250 lac & foreign aid Tk. 41,42 crores) for this sub-sectoral projects during the current ADP.

Irrigation

Irrigation facilities are essential for increasing agricultural production. During the current ADP there are 31 projects under this sub-sector and by implementing these projects it is expected that 3% additional cultivable land will come under irrigation facilities. An allocation of Tk. 542,50 core (GoB Tk 466,70 crores & foreign aid Tk 75,80 crores) has been make in the ADP 2007 - 2008 for implementation of these project.

iv) Industrial Development Plans

Industries have 5-sub-sectors viz (a) Small and Cottage Industries; (b) Jute and Textile; (c) Chemical and Mineral Industries; (d) Sugar, Food and Allied Industry and (e) Engineering and Electronics.

(a) Small and Cottage Industries

The objectives of this sub-sector are consistent with those of PRS in respect of achieving the objectives of MDGs. The main purpose of these objectives is to encourage entrepreneurs with experience in industrial development to create self employment through manufacturing of export oriented and import-substitute products by setting up small agro-based industries.

There are 7 ongoing development projects in the ADP 2007 - 2008 for this sub-sector with an allocation of Tk 6376 lac. Besides, 5 new projects are proposed to include in the current years ADP in order to strengthens the activities of this sub-sector

(b) Jute and Textile

In the ADP 2007 - 2008 two (2) investment and two (2) T.A. projects are included with an allocation of Tk. 1448 lac.

(c) Chemical and Mineral Industries

In the ADP 2007 - 2008 an allocation of Tk 86,07 lac has been allocated for two fertilizer factories now under construction. Besides, Tk.68,00 lac has been allocated for enhancement of production capacities and another two fertilizer factories. Moreover, 8-new projects have been included in the ADP 2007 - 2008 without any allocations.

(d) Sugar, Food and Allied Industries

There are (3) three on-going projects in the ADP 2007 - 2008 of this sub-sector, for which an allocation of Tk. 1290 lac has been made. Besides, an allocation of Tk 82,13 lac has been made in the current years ADP for converting Chittagong Steel Mill and Adamjee Jute Mill into Export Processing Zone (EPZ).

(e) Engineering and Electronics

One investment and 10 technical assistance projects with an allocations of Tk 106,17 lac has been provided in the ADP 2007 - 2008

(v) Housing Development Plans

Housing development plan is subsumed in the sector viz Physical Planning, Water Supply and Housing. The two key agencies involved in the housing sub-sector are: a) Urban Development Directorate (UDD); b) National Housing Authority (NHA). There is another agency involved and its is called: Housing and Building Research Institute (HBRI). The development projects under these agencies are as follows:

a) Urban Development Directorate (UDD)

It has one on-going development project namely : Preparation of Structure Plan, Master Plan and Detail Area Plan for Sylhet and Barisal Divisional Towns with an allocation of Tk 357 lac in the ADP 2007 - 2008. The estimated cost of this project is 552 lac, of which Tk 103 lac is the cumulative expenditure upto 2006 - 2007 ADP

b) National Housing Authority (NHA)

This agency has got an on-going and approved project namely Construction of 600 Flats for Limited Income Group of People of Dhaka City on Hire Purchase basis. The estimated cost of this project is Tk. 5449 lac of which cumulative expenditure of Tk. 3424 lac was incurred upto ADP 2006 - 2007. The ADP 2007 - 2008 allocation for this is Tk 650 lac.

c) Housing Building Research Institute (HBRI)

This organization has got one new project in ADP 2007 - 2008 with an estimated cost of Tk 100 lac and an allocation of Tk 100 lac in the current year's ADP. The name of the project is : Study on Eco-Housing Ferocement Floating House and Polymer in cement concreate using indigenous materials.

(vi) Tourism Development Plans

The government agency responsible for the development of Tourism Industry in the public sector is - Bangladesh Parjatan Corporation (BPC). Apart from this, the private sector is visibly involved in this sub-sector for its development and operation. However, the information and data from the private sector in this respect is not available. The BPC has one on-going and approved project namely: Construction of Motel and Youth Inn Development of Buddhist Temple at Kuakata and Procurement of A.C. Coach for Tourism Department. The estimated cost of the project is 1510 lac of which expenditure incurred upto 2006 - 2007 ADP is 375 lac. Allocation provided for this project in the ADP 2007 - 2008 is Tk. 202 lac.

Existing projects and future plans by other donors

The development programme of Bangladesh is largely financed by the government of Bangladesh and partly by the development partners. Government contribution consists of local currency component and cash foreign exchange and the donors provide project aid, of which a part is given in form of reimbursement of some parts of local currency component of the projects.

A lion share of foreign assistance comes from the JBIC, The ADB and the World Bank (IDA). The other development partners involved in the development activities are: DFID, Kuwait Fund, DANIDA, Netherlands, China, India, Norway, UNDP, EC etc. The participation of the major development partners in the desired development sectors with

their respective financial assistance for various projects are given in the following matrices: Sheet No. 1 to 4 enclosed.

3.0 TRAFFIC DEMAND FORECAST

3.1 STP REVIEW INFRASTRUCTURE

The STP is organized in three main work streams and presented in three volumes: (i) Strategic Transport Plan (STP), contained description of the main activities leading to the selection of the long term strategic plans and programs for the greater Dhaka area; (ii) Urban Transport Policy, a separate transport policy for the greater Dhaka guided to improve the transport services in consistent with the Land Transport Policy prepared by the government; and (iii) Institutional Strengthening and Capacity Building for DMA organizations particularly DTCB, RAJUK, DCC, DMP and BRTA. In addition to the main volumes there were 10 separate volumes of working papers dealing with technical issues including Terms of Reference (TOR) for the first phase priority projects.

This chapter reviews the recommendations of the STP main activities leading to selection and prioritization of projects. The main objective of the study was to guide the development of transportation infrastructure in greater Dhaka over next 20 years. Main purposes of the STP were: (i) to provide the nucleus of data base for Dhaka and begin the process of common standards and control for infrastructure and design; (ii) to demonstrate a method for defining and evaluating alternative transportation strategies such that future strategies can be evaluated with the same common approach; (iii) to list the actions required to be taken in a systematic manner such that the ultimate strategic plan can be realized within a logical framework. The main STP report was developed in 10 chapters; first and second containing the overview and present land use and socioeconomic conditions of the study area including population density and physical constraints. The third chapter contains the current conditions of transportation system that draws on the data and information collected from the surveys undertaken as a part of the STP study and chapter 4 contains the future options for land use development scenarios and growth forecast. Chapters 5 and 6 describe the formulation and calibration of travel demand computer model and transport planning for future strategy and identifying appropriate strategy based on goals and objectives. Chapter 7 and 8 describe the possible alternative strategies and their testing procedures and evaluation methodology. Chapter 9 contains the selection, description and prioritization of projects, solicited consensus on strategies and recommendations. The Chapter 10 develops the Action Plan for phased implementation.

3.1.1 The STP Study Area

The STP area primarily includes the DCC and DMDP areas of RAJUK approximately 320 and 1,500 sq km respectively. This also includes 6 neighbouring districts HQs and adjoining urban areas under greater Dhaka district spread over 7,400 sq km. The present population of the STP area is 17 million (2004) which is projected to increase to 36 million in 20 years time. Rapid growth of population during last decades has had consequence on the ability of the transport sector to provide mobility for all people as they seek to take the advantages of employment, education, health and social opportunities. Description of the areas under different authorities and existing and proposed land use plan is presented in Chapter-4.

Transport system composed of motorized and non-motorized vehicles sharing the same road space congesting the system all day long and yielding operational disorder. The lake of discipline significantly reduces the effectiveness of the existing transport system. Perhaps Dhaka is the only city of this size in the world without organized public bus operation or mass rapid transit system. Under the circumstances the challenge of STP was to establish an over all framework for a multi-modal transport system that effectively serve the transport demand of the people.

National and regional road corridors connecting different regions, ports and important cities of the country converge on or radiate from Dhaka. Out of 8 national highways 6 originate from the city areas. Two railway lines connecting the city by northwest-southeast linking up to Chittagong and Sylhet in the east and north - western regions of Rajshahi, Jessore and Khulna via Jamuna Bridge. A short north-south link extended up to Narayanganj.

The topographic variation determines the physical expansion and growth of Dhaka as well as its road and rail infrastructure. The economic growths were modest between 5-6 percent during last decade. About 40% of the population in the area is poor and dependent on subsistence farming and informal sectors. But major cause of population growth in Dhaka is migration of large number of people from different areas of the country for working in factories, in the government, in business enterprises. With the growth of population the number of vehicles particularly motorized vehicles will increase complicating the system with more congestion, environmental pollution and longer waiting time, etc if the present situation prevails. Vehicle ownership assumed will not increase in proportion to population growth due to low wage rates. As a result most of the population will remain depended on current modes of transport.

3.2 Road Network in Dhaka:

Dhaka city transport mostly depends on its road network and road transport system. All major highways connecting regional centres and sea and land ports are originated from Dhaka. Due to topographic reasons and existence of big rivers and low laying flood plains on the east and west sides the roads and highways are built north-south ward direction. At least six major national highways out of eight and connected important regional roads are originated from Dhaka Metro Areas. The road network can be segregated into three layers according to the perimeters of the DCC, DMDP and STP areas. The six national highways originated from Dhaka are:

i) Dhaka-Chittagong-Cox's Bazar Highway, N1
ii) Dhaka- Maulvibazar- Sylhet Highway, N2
iii) Dhaka-Mymensingh - Netrakona Highway, N3
iv) Dhaka- Khulna Highway (via Mawa ferry), N8
v) Dhaka- Jamuna Bridge- Bogra Highway, N4
vi) Dhaka - Aricha- Bogra- Dinajpur- Banglabandh Highway, N5

The road network in Dhaka City under DCC comprises about 1,286 km of roads of different types and specifications but most of them are narrow and built during old days to meet the needs of non-motorized and pedestrian traffic. Substantial narrow roads are constructed in the densely populated areas of the city without keeping provision for widening to meet future traffic demand. As a result most of the roads are not suitable for introduction of bus service and automobile ownership is also limited.

Under Dhaka Urban Transport Project (DUTP), a World Bank financed project, improvement and widening of existing road network within DCC area had been undertaken to meet the short run needs of the traffic in local areas. Long term economic, traffic and engineering consideration were given hardly any emphasis. Policies related to planning, design, construction, maintenance of different categories of roads under DCC had been formulated but very little of them were implemented.

3.2.1 Road Classification:

The roads of the city are classified in different way by different studies as follows:

Dhaka Metropolitan Development Plan (DMDP), 1995:

- Main Roads
- Arterial Roads
- Connector Roads
- Access Roads

Dhaka Integrated Traffic Study (DITS), 1996:

- Primary Roads
- Secondary Roads
- Connector and Local Roads

Dhaka Urban Transport study (DUTP), 2001:

- Primary Roads
- Secondary Roads
- Connector Roads
- Local Roads
- Non-motorized Traffic Roads

Strategic Transport Plan (STP), 2005:

- Primary Roads
- Secondary Roads
- Feeder/Collector Roads
- Narrow Roads

3.2.2 Road Network Maps

Road Network Maps by Zone and circle are available for Roads and Highways Department (RHD) for national, regional and zilla roads for main arterial networks (21.000 km). Road maps for rural roads particularly upazila and growth centre connecting roads (35,000 km) are available in Local Government Engineering Department (LGED). The city map prepared under different projects shows the inner city roads exclusive of narrow lanes and by lanes. STP produces proposed road maps for different options for inner city roads, major road corridors and regional corridors based on Mappa prepared maps.

The national arterial, feeder, and link roads branching out from the main national highways within the STP area are presented in **Map - 3.1**. The major corridor roads under DMDP outer area network is presented in **Map-3.2** and the inner road network including narrow roads under DCC area is presented in **Map 3.3**.

3.2.3 Road Inventory Report

The road network of DMA area is inclusive and bigger than DCC network comprises of primary, secondary, feeder or collector and narrow roads and lanes. Total length of existing network stands to be 3,002 km of which some are proposed alignments. This constitutes approximately 8% of the DMA areas. Among the total about 200 km is primary roads (national and regional highways), 110 km secondary (arterial roads), 152 km feeder or collector and 2,540 is other narrow roads and lanes. Most of the DMA areas are urbanized or potential for urban settlement area and densification. DUTP study prepared road inventory reports for the DCC areas including narrow roads and presented in several volumes. Most of the local roads called Mahalla roads are very small in length usually varied between few hundred meters to one-two km. **Table 3.1** presents the road network by type and proportion:

Table 3.1: Road Length in DMA Area

Type of Road	Length (km)	Percentage	Width of Road (M)	Number of Lanes	Remarks
Primary	200	6.70	10.5-11.0	3-lanes (each)	
Secondary	110	3.70	5.50-7.50	2-lane (standard)	Definition differs
Feeder/Collector	152	5.12	3.50-5.49	2-lane (narrow)	Definition differs
Other Narrow	2,540	84.60	> 2.00	One lane	
Total	**3,002**	**100.00**			

From the above table it is evident that road space in Dhaka is grossly inadequate in relation to the requirements for the urban transport needs for movements of 12 million people. STP has undertaken road network inventory survey as a requirement for EMME/2 Model Calibration. The study surveyed 1,219 km of road in DCC area and approximately 1,800 km in DMA area outside DCC. Road classification, length and lane capacity surveyed within DCC area is presented in **Table 3.2.**

Table 3.2: Road Classification, Length and Percentage of DCC

Type of Road	Length (km)	Percentage	Width of Road (M)	Number of Lanes	Remarks
Primary	175	14.30	10.5-11.0	3-lanes (each)	
Secondary	210	17.30	5.50-7.50	2-lane (standard)	Definition differs
Feeder/Collector	152	12.50	3.50-5.49	2-lane (narrow)	Definition differs
Other Narrow	682	55.90	> 2.00	One lane	Not determined
Total	**1,219**	**100.00**			

The list of road surveyed under STP is provided in Working Paper- III and Interim Report of this study.

The purpose of the inventory survey was to collect physical characteristics, functional data and information to understand the existing condition of the road. Data and information were collected using standard design format includes:

i. Physical identification and verification of roads according to assigned node numbers.
ii. Identification of Lanes (one way/two way)
iii. Road width; shoulder to shoulder
iv. Pavement width, curb to curb
v. Pavement characteristics
vi. Median type and width
vii. Intersection control
viii. Footpath width
ix. Bus bay and its width
x. Traffic characteristics including vehicle restriction, roadway occupancy, parking, etc.

3.2.4 Road Surface Roughness

The surfaces of the most of the roads are bituminous black topped. Majority of arterial roads within the city is maintained by RAJUK and feeder/collector roads as well as narrow roads are maintained by DCC. Roads and Highways Department roads starts from the edge of the core city area and has roughness data collected regularly at certain intervals. The road roughness in the city roads are varying with the seasons of the year. After every monsoon road conditions become very bad and rough due to damages by heavy rain, water logging and in some cases flooding. The agencies do not have technology to collect and use roughness data and HDM. Therefore, it is customary that agencies usually prepare maintenance plan for road repair after expiry of every monsoon season.

Road roughness data for RHD roads are available for 2005. They collect road network data every year for running HDM model for maintenance planning. From the report it shows that the highways in the periphery of the city were better managed and roughness was within normal tolerable limit and in some cases it was very good. For example: average roughness value in Jatrabari-Katchpur-Mainamoti Section (50 km) of N1 and Katchpur- Bhairab Bazar of N2 was IRI 3 (RHD Road Network Database, Annual Report 2005). From the report it was found that RHD maintains average IRI 3-3.5 for national highways, IRI 5-6 for regional highways and IRI 9-10 for zilla roads.

3.2.5 Major Bottleneck Sections

Except few sections in the newly developed areas under DCC/RAJUK and RHD sections whole of the city road network suffers from severe bottlenecks. The main bottlenecks are capacity constraints all through in respect of ever increasing traffic, motorized and non-motorized, narrow roads in capable to accommodate motorized traffic, frequent signals, illegal occupancy of roads for goods staking, lack of flyovers and over passes, lack of turning facilities, poor traffic management, etc. As mentioned earlier that only 7-8% of space is available for roads which will be much less in old city. Lack of adequate number of east-west corridors pushing all vehicular traffic to use few selected north-south roads causing congesting the corridor particularly at traffic points.

The road sections from Kamal Ataturk intersection in Banani to Gulistan, Progati Sarani-Rampura –Malibagh- Gulistan, Progati Sarani-Kamalapur-Saidabad, Mogbazar-Malibagh, Mirpur road- Newmarket- Azimpur, Gulistan-Motijheel-Kamalapur, Phulbaria-Saidabad-Jatrabari- Kantchpur, Central City Areas including Gulistan, Phulbaria, Motijheel, Kamalapur, Paltan, Bijoynagar, Fakirer Pool, etc remains congested and crowded whole day long. The whole of old city is congested and almost paralyzed with overwhelming NMT vehicles where bus services are not available and vehicle speed is less than 5-6 km an hour. The Jatrabari-Katchpur section is a nightmare for returning passengers from N1 and N2. Every evening there has been traffic congestion which causes 2-3 hours delay to cross 10 km of distance due to parked cargo vans and trucks waiting to enter the city.

Lack of Parking space both for motorized and NMT creates huge bottlenecks occupying most of the road ways by standing vehicles particularly in busy commercial districts. As a result whatever be the lanes constructed in a corridor in fact only one effective lane is available for traffic movement in each side.

Lack of pedestrian facilities, walking through the road ways and occupying footpaths by shop keepers, hawkers and vendors, etc are creating huge congestion problems. Political, social and cultural programs are often organized on the road blocking traffic which creates blockade in all neighbouring roads and streets.

However, all such major problems and bottlenecks are addressed in STP study particularly in urban transport policy report.

3.2.6 On-going Road Construction

During implementation of DUTP till 1998- 2006 various road widening and improvement of existing national corridors arterial, internal and narrow roads were completed around Dhaka. No new road corridors were planned to construct rather tried to recover the existing right-of -ways and constructed two flyovers under different authorities. After the completion of DUTP improvement works major road projects were supposed to be undertaken in line with the recommendations of STP. At the time of STP consultation meetings the government and the planning commission decided to accept STP as a framework for transport development of the city. Major donors also subscribed to the decision. But after October, 2006 everything was halted due to present political impasse and lack of proper authorities to approve STP. Some of the on-going works undertaken during STP financed under donors and GoB are still continuing such as 3-bridges over Buriganga, Mokhtarpur Bridge over Sitalakhya, maintenance and widening of Ashulia Road, widening and maintenance of few narrow roads near old part of the city and maintenance of Dhaka-Mymensingh road under RHD. Some of the minor projects included in STP on-going project list have been completed. Please see the STP highway project list.

3.2.7 Proposed or Committed road construction projects and those phasing by priority

After the DUTP the STP has been the Planning Documents in the hands of the Government for development of urban roads and highways in Dhaka where as many as 78 highway projects were identified and prioritized with recommended implementation phases. The Cabinet has recently accepted the STP report and constituted a Task Force to examine the priority projects recommended by the consultants. Shortly the Task Force may submit its report and recommendations for priority projects including road construction to the Interim Government.

3.2.8 Long-term Road Development Plan

The STP recommendations for long-term road development projects included in the highway project list. The important of them are several east-west connecting roads, radial roads along flood control embankment surrounding the City areas and Narayanganj along side the circular waterways, construction of Eastern Bypass, Dhaka Bypass, new north-south connections through newly filled areas of eastern part of Dhaka, Western Bypass from Savar to Dhaka-Mawa Road and proposed Padma Bridge approach, Western road link connecting N4 at Kashimpur to N5 at Hemayetpur extended to Hazratpur. **Map 3.3(b)** represents the long-term recommended projects in outer boundary of Dhaka for implementation.

3.3 RAILWAY OPERATIONS:

Railway related services are provided by the Bangladesh Railway (BR) as an agency of the Ministry of Communications. It provides about 25 services to inter-regional and inter-district routes extending to Chittagong, Sylhet, Rajshahi, Khulna and northern districts. Also provides 2-3 services to inter-urban commuter routes to Brahmanbaria, Mymensingh and Narayanganj. Narayanganj is the terminus point on the southern corridor of Dhaka while Tongi is the major connecting points to north, west and south of Bangladesh. Kamalapur Railway Station is the main station for Dhaka and serves about 28,000 passengers per day. It has an inland container depot (ICD) that handles 70,000- 100,000 containers per annum. Two trains per day operate between Chittagong and Dhaka. The segment between Dhaka and Tongi is 23km in length with two meter gauge tracts. One is now being replaced by Broad gauge tracts to facilitate Broad Gauge trains via Jamuna Bridge. There are 16 at grade crossings of important city roads

which cause considerable delay and congestion for vehicular traffic. In such a situation STP identified following certain issues as they affect the STP concept proposed for Dhaka:

- Relocation of the existing Inland Container Depot (ICD)
- Relocating of railway to an alignment east of Progati Sarani.
- Terminating the rail line, and all rail services, at an appropriate northern point and relying on intra-urban modes to distribute and collect passengers and goods through out Dhaka.
- Elevating the railway along the existing alignment and substantially upgrading the services.
- Re-use the existing railway alignment for some type of mass rapid transit system.

In 2005 BR initiated to commission to undertake a feasibility study in order to assess the options for (a) curtailing (b) removing or (c) grade separating of the existing line. But finally this was postponed till to-date. A map of railway network is presented in **Figure-3.7**.

3.3.1 Long-term Railway Development Plan

Bangladesh Railway has prepared several reform proposals a perspective plans under different donor assistance in recent years. But as the railway has always been a losing concern since 1970s and the amount of subsidy growing every year no donor was interested to invest in the sector. As a result no major assistance was received from the donors unless it changed to become a Corporate Body. For long time BR could not decide on the issue of Corporatization of its activities. Now government agreed to the ADB proposals to Corporatization the activities according to line of business (LOB). Several reforms are now going on both under GoB as well as under ADB finance. The on-going projects are:

- Railway reform Project: investment project, ADB
- Railway reform Project: Financial and governance
- Branch line improvement study
- Feasibility study of extending Noakhali line up to Char Bhatta.
- Feasibility Study of Jamtail-Bogra Rail link

Bangladesh Planning Commission has been undertaking to prepare a Railway Master Plan under the assistance of DFID which will include a comprehensive plan for railway improvement and identified numbers of improvement projects. Existing on-going and proposed projects and programs of railway are presented in the following Tables.

LIST OF ON GOING PROJECTS			
SL NO.	**NAME OF THE PROJECTS**	**APPROVED STATUS**	**SOURCE OF FUND**
1	REHABILITATION OF MAIN LINE SECTIONS OF B.R. (WEST ZONE) (2nd Revised) (01-07-1995 to 30-06-2008)	Approved	
2	PROCUREMENT OF 47 (41 MG & 6 BG) D.E. LOCOMOTIVE (01-07-1996 to 30-06-2007)	Approved	
3	REPLACEMENT & MODERNISATION OF SIG-NALLING & INTERLOCKING SYSTEM AT 14 STATIONS IN WEST ZONE OF B. RAILWAY (01-07-1999 to 30-06-2008)	Approved	

4	PROCUREMENT OF 13 NOS. OF LOCOMOTIVES & 453/906 NOS. SPL. TYPES OF WAGONS FOR MADHYAPARA HARD ROCK AND BARAPUKURIA COAL MINE PROJECT. (01-07-1999 to 30-06-2007)	Approved	
5	REHABILITATION OF 258 MG & 110 BG PASSENGER CARRIAGES - PHASE-II (01-07-2000 to 30-06-2008)	Approved	
6	CONVERSION OF DHAKA-JOYDEBPUR MG SECTION INTO DUAL GAUGE (01-07-1999 to 30-06-2007)	Approved	
7	CONSTRUCTION OF A RAILWAY LINE FROM TARAKANDI TO JAMUNA BRIDGE (01-07-1999 to 30-06-2007)	Approved	
8	MODERNIZATION AND EXPANSION OF 10 STATIONS OF AKHAURA-SYLHET SECTION (01-07-2003 to 30-06-2008)	Approved	
9	IMPROVEMENT & REMODELLING OF 16 STATIONS IN EAST & WEST ZONES OF BANGLADESH RLY. (01-07-2003 to 30-06-2007)	Approved	
10	PROCUREMENT OF 50 MG & 50 BG PASSENGER COACHES.(01-07-2003 to 30-06-2008)	Approved	

UN APPROVED GOB		
SL NO.	UN APPROVED GOB AME OF PROJECT	IMPLEMENTATION PERIOD
1	Procurement of 100 Nos. MG flat bogie wagon and 5 Nos. bogie brake vans for transportation of container.	01-07-2007 to 30-06-2009
2	Rehabilitation of Dhaka-Narayanganj Railway line.	01-07-2007 to 30-06-2010
3	Rehabilitation of Rajshahi-Rohanpur border and Amnua-Chapai Nawabganj section of BR.	01-07-2007 to 30-06-2009
4	Rehabilitation of Lalmonirhat-Burimari section of BR.	01-07-2006 to 30-06-2008
5	Remodellingof Khulna Rly. Station and yard including improvement of operational facilities in Benapole Rly. Station.	01-07-2006 to 30-06-2008
6	Rehabilitation of Gouripur-Jariajamnjail and Shamganj-Mohanganj section of BR.	01-07-2006 to 30-06-2008
7	Supply and installation of road monitoring device on rail track at both ends of Jamuna Multipurpose Bridge.	01-07-2007 to 30-06-2009

8	Rehabilitation of 200 MG and 60 BG passenger carriages.	01-07-2007 to 30-06-2010
9	Balance works of "Rehabilitation of main line sections of BR (East Zone)" Project	01-07-2007 to 30-06-2010
10	Rehabilitation of Bhairab Bazar-Mymensingh section of BR.	01-07-2007 to 30-06-2010
11	Procurement of 2 Nos. MG 60 ton capacity and 2 Nos. BG 80 ton capacity crane for accident relief train.	01-07-2007 to 30-06-2010
12	Rehabilitation of Mymensingh-Jamalpur- Dewanganj Bazar section of BR.	01-07-2007 to 30-06-2010
13	Rehabilitation of laksam-Chandpur section of BR.	01-07-2007 to 30-06-2010
14	Rehabilitation of Chinki Astana - Feni and Laksam - Akhaura section in Dhaka-Chittagong Corridor.	01-07-2007 to 30-06-2010
15	Construction of a `B` class station at Elenga in between Tangail-Ibrahimabad stations.	01-07-2007 to 30-06-2009
16	Construction of Transshipment yard at Muladuli Station of BR	01-07-2007 to 30-06-2009
17	Provide railway facilities at Birol landport.	01-07-2007 to 30-06-2010
18	Technical assistance for feasibility study safeguard polity sutudy, detailed engineeing design and tendering service for project under World Bank funding for BR	01-07-2007 to 30-06-2009
19	Rehabilitation of Branch Lines of BR	

N.B : Listed in ADB 2007-2008 Book at green pages(page no. :- 609 & 610)

UNAPPROVED PA			
		IMPLEMENTATION PERIOD	SOURCE OF FUND
1	Bangladesh Railway Sector Improvement Project		ADB Loan
2	Construction of Dhaka-Laksam chord line.	01-07-2006 to 30-06-2014	ADB Loan
3	Strengthening of Jamuna Bridge for higer excel load	01-07-2007 to 30-06-2010	ADB Loan
4	Line capacity improvementbetween Dhaka and Tongi by introducing intermediate block signallibng.	01-07-2007 to 30-06-2009	ADB Loan

5	Procurement of 100 MG & 50 BG carriages.	01-07-2007 to 30-06-2010	ADB Loan
6	Upgrade signalling in 14 stations between Ishurdi-Darsana.	01-07-2007 to 30-06-2010	ADB Loan
7	Rehabilitation of yards and extension of loops at different stations between Khulna and Parbatipur.	01-07-2007 to 30-06-2009	ADB Loan
8	Construction of MG line from Bogra to Jamtoil.	01-07-2007 to 30-06-2011	ADB Loan
9	Dhaka Chittagong Railway Development Project	01-07-2007 to 30-06-2014	JBIC Loan
10	Procurement of 100 Nos. MG bogie tank wagon and 5nos. MG bogie brake van for carrying jet fuel	01-07-2007 to 30-06-2010	Any Donor Agency
11	Modernization of signaling & Interlocking system in 18 stations between Abdulpur and Parbatipur section of BR	01-07-2007 to 30-06-2009	World Bank
12	Modernization of signaling & Interlocking system in 19 stations between Chittagong – Akhaura section of BR	01-07-2007 to 30-06-2010	World Bank
13	Modernization of Saidpur Carraige & Wagong Workshop	01-07-2007 to 30-06-2010	Korea
14	Construction of 3rd & 4th Line between Dhaka-Tongi and double line between Tongi-Joydevpur & Dhaka-Narayanganj section in order to introduce Computer trains.	01-07-2007 to 30-06-2010	Any Donor Agency
15	Replacement of 101 Nos. (31 BG & 70 MG) locomotives	01-07-2005 to 30-06-2008	Any Donor Agency
16	Feasibility study for construction of Rail link on both end of Padma Bridge	01-07-2007 to 30-06-2009	Any Donor Agency
17	Feasibility study for construction of Underground Rail Line at Dhaka, the Capital City of Bangladesh	01-07-2007 to 30-06-2009	Any Donor Agency
18	Feasibility study for construction of circular Railway line around Dhaka, the capital of Bangladesh.	01-07-2007 to 30-06-2009	Any Donor Agency
19	Feasibility study for construction of Khulna-Mongla Rail link	01-07-2007 to 30-06-2009	Any Donor Agency
20	Feasibility Study for Extension of Railway Line from Noakhali to Char Bhata (Steamer Ghat).	01-07-2007 to 30-06-2009	Any Donor Agency

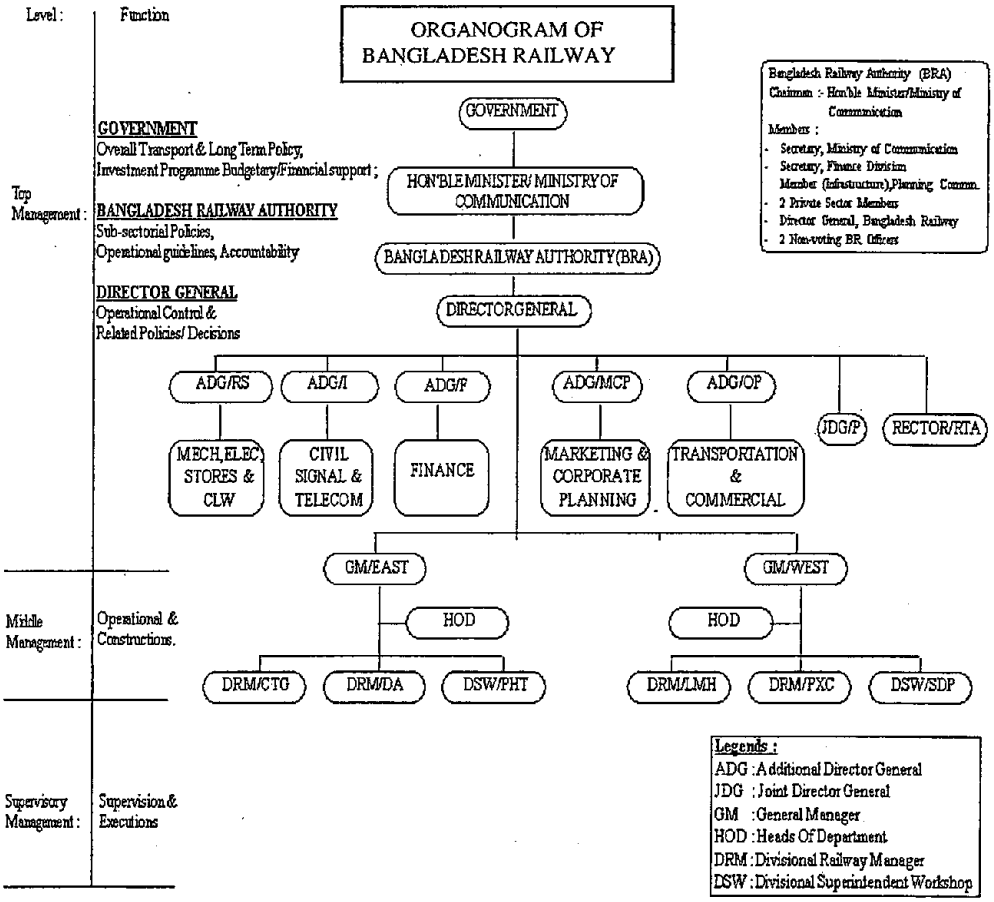
N.B.: Listed in ADB 2007-08 Book at green pages (page no. - 661 to 663).

3.3.2 Procedures for approval of railway development

The BR is running under the administrative control of the Ministry of Communications as the Roads and Highways Department (RHD), BRTA and DTCB. The procedure for approval of the development projects are same as laid down in the standardized procedures formulated by the Planning and Finance Ministries separately for donor aided or GoB projects. Project approval procedure can be presented in the following flow chart:

3.3.4 Organization and Operation Chart of Railway

Organization Chart of Railway is presented in Exhibit 3.2.1



3.4 EXISTING PUBLIC TRANSPORT SYSTEM

3.4.1 Introduction

The existing public transport system for passengers comprises with motorized and non-motorized transport mode. Motorized modes comprised of half a million motorized vehicles of different types and makes such as Double Decker Bus, Large CNG Bus, Large non-CNG Bus, Mini-bus, Human Haulers, Auto-Tempos, Taxi Cabs, CNG Auto-rickshaw and Misuk (smaller version of auto-rickshaw based on motor cycle engine). Among the non-motorized traffic rickshaw dominates with more than half a million.

For freight transport the city has different models of trucks (covered, uncovered), pick-ups and jeep based conversion of small trucks, delivery vans and rickshaw vans and push cart operated

by human beings (Thela gari). Supplies from Ports and rural areas are carried by two-axle trucks up to the market end. But internal distribution of goods and commodities in small quantities are always problems. Due to restriction of rickshaw vans plying in the main corridors without alternative arrangement the freight movements internally has become hazardous.

Small number of capacity in relation to peak period demand, age old vehicles, poor management practices, unorganized and in disciplined operators, restricted entry and exit, route permit bugler and passengers made the sector chaotic, inefficient and ineffective. For example Mirpur is a huge residential as well as commercial area populated by more than 1.5 -1.7 million people. But the bus capacity provided is only for 0.03-04 million most of them are by small minibuses which do not have standing comfort. As a result there has always been rush and full with standing passengers on those small buses. Due to city centre based economic and commercial activities a well as seat of the government and agencies the traffic rush is always balanced towards one ended morning rush from the periphery and evening rush from the centre. Supplementary traffic data collection under this review study has just been completed and processing is on. The analysis of results of survey will reveal the worsening situation of the traffic management since the STP study completed.

3.4.2 Bus Transport

1) Services

a) Number and name of the organization who provide bus services:

Bus transport is very important in Dhaka and provided by both public sector's Bangladesh Road Transport Corporation (BRTC) and the private sector operators. BRCT provides only 1-2% of the total shares while private operators provide 98% of the total services. There are hundreds of small operators owning 1-2 vehicles. They don't have any trade name to mention. The government is trying to consolidate the bus system in Dhaka but with little success. Bus and minibus routes are concentrated along the limited number of arterial roads, generally in north-south direction. Human haulers and auto-tempos routes are more dispersed penetrating narrower roads and include more east-west routes. However, government effort had some impacts on bus consolidation as a result some of the bus companies formed consolidating small owners with sizable fleet. The major operators are:

- Sino Dipon started operation in early 2003 with 105 CNG buses in four routes
- Green Express started in April 2004 with 20 CNG buses which increased to 50 by 2005 operating in two routes
- Bevco commenced operation with 20 large CNG air conditioned buses in 2004
- Dhaka Paribahan replaced minibus with 50 large CNG buses in 2005
- Ekusey started operation with 70 large CNG buses in 2006
- Satabdi started with 30 CNG buses in 2006
- Myline started with 46 CNG buses in 2006
- Discovery started with 30 CNG buses 2007
- Taranga Paribahan started with 70 CNG buses
- Minibus associations are: Jatri Seba, Dul Dul Paribahan,

The cheaper CNG buses imported from China by Sino-Dipon failed to maintain the fleet because of high rates of breakdown. Among the bus routes old and dilapidated minibuses are dominated. Their number was increasing since 2000 and estimated to be 5000 operating in Dhaka Routes.

b) Number of Bus Routes and Bus stops

The systematic bus route planning based on cycle of planning, monitoring and implementation adjusting to the network demand is not in place in Dhaka. Rather network changes are made on an arbitrary basis by the RTC influenced by operators. From the STP studies it was found that there are 50 city and 80 sub-urban routes in city and DMA areas.

c) Map of Bus routes and bus stops

City bus routes are presented in map (2004) in **Exhibit-3.8** and that of (2008) is presented for bus routes in **Exhibit-3.9.**

d) Time Table and frequency of each route

For inter-district operation the city has three bus terminals at Gabtali, Mohakhali and Saidabad. BRTC has its own depots at several places in the city such as Motijheel, Pallabi, Kamalapur and Tejgaon. The bus terminals are improved under DUTP funded by the World Bank.

2) Bus Passenger

Bus transport is very important in Dhaka. STP survey revealed that 77% of the passengers using transport vehicles use bus. It accounted for 11.5% of all vehicles and 17.5% of motorized vehicles. The bus fleet comprised of large buses (32 and above seats), minibuses (15-32 seats) and Human Haulers (9-15 seats). The bus route statistics given above includes the average passenger capacity provided by the services. But during the passenger occupancy counts it was revealed that in many routes the buses carry more than double passengers per trip during peak hours and operate with less than capacity in off-peak hours. The introduction of seating service bus enhanced the comfort of some passengers but push others to crowded non-seating services. There no authority to collect and compile data for such information. Most of the terminals don't have time table. As soon the seat capacity is full they start they are journey. During peak hours several buses of the same route starts in same time. The average trip length within the DCC areas was found 5.37 km and outside DCC but within DMA areas it was 17 km. Within the city routes the origins and destinations are defined generating and terminating points along the routes. STP surveyed the Inter-district bus terminal for understanding passengers' origins and destinations.

3) Inventory

STP did not collect the bus inventory data as it was not required by the EMME model. However, BRTA will be approached to provide such data if available which can be annexed in Draft Final report. There has been significant improvements happened in the Dhaka Bus System due to introduction of high quality buses, bus number increased, shifting to cleaner air condition buses and more organized operation. However, the bus services have huge deficiencies and are still poor and inefficient. Lots to be done to improve the city bus system provide little better services to the passengers.

4) Issues Related to Fare and Subsidy

From observations and discussions with the industry, there does not appear to be any urgent requirement for changes in the bus fare policy at the present time. Since 2001, the intense competition on the major travel corridors has led to a drop in bus fares and, as a result, operators are charging less than the officially prescribed bus fare. This is especially true for trips longer than around 10 kilometres. However, such low fares are only sustainable due to the poor quality and condition of the vehicles and the service being provided. The low fares also have the adverse affect of precluding and/or discouraging investments in better vehicles.

However, bus fares are determined by the BRTA at regional road transport committee (RTC) level where most of the members are from fragmented bus operators association influencing the government in favour of their interests. The fare for extra-ordinary luxury and air conditioned services are fixed by the discretion of the owners association which was informed to BRTA for notification.

The issue of fares will require more detailed attention when a BRT system is introduced or even an improved regular bus system is planned. The financial viability of a new or improved bus system and the affordability of fares to users should be considerations of paramount importance throughout the planning process. Along with the design parameters of the system and associated rolling stock options, the fare charged to users will be a major determinant of financial viability, profitability, and remuneration of operators. It will also be a primary determinant in the success of attracting private sector investors.

It is recommended that in elaborating a fare policy the following guiding principles be adopted in order that the policy should:

- Maximise income while maintaining a low fare for users,
- Allow the system to cover its own costs without external funding,
- Facilitate understanding of the system by the citizens of the city,
- Ensuring that the special needs of some sectors of society (e.g. Women, Children and the Infirm) will receive special attention and will be subject to differential fare structures (targeted subsidies).

Issues, which will require detailed attention, many of which are interrelated, include:-

- Whether fares will be distance based, zonal, or flat (regardless of distance),
- Fare collection technology,
- Method of fare verification,
- Avoiding excessive queuing at fare payment or verification points,
- How collected cash will enter a bank account,
- The role of a fare collection company,
- How information will be distributed to the public (users),
- How the resulting data about system usage will be collected and managed,
- How fare integration with feeder services will be established.

5) Company/ Bus Operators Association

The bus operators are not organized companies practicing corporate principles. They are more sort of informal association for controlling the route operation under a banner but each individual owner is virtually controlling his crew and staff and running his vehicle for all purposes. They are historically highly influential in the bus sector, largely reflecting fragmented nature of the industry. The associations influence the government in such issues as consideration of route permit allocation, fare scheduling and other policy issues effecting urban bus operation. The government policy of liberalization in terms of import duties and income tax payment has encouraged them to remain as informal organizations. They are not required to submit income statement to the tax authorities but pay a fixed amount of minimum negotiated income tax per vehicle in service. Therefore, preparation and submission of Annual Report, Audited Accounts, Income Statements, Balance Sheet, etc are uncommon to them. The newer large bus operators either have not joined the association or are operating largely outside its influence

The dependence upon bus transit by a large majority of people in the city requires that this mode should have a prime place in the immediate and longer term future of the area's transport strategy. The considerations concentrate upon Immediate Action, Short Term and Long Term approaches. At present, the operation of buses within the city is in turmoil and the service to the

public is very poor. Buses fight for road space with other vehicles and usually come off second best. For Immediate Action (identified as from now until the end of the year 2, it is recommended that a series of bus priority and bus-only lane schemes be provided on the main arterials in the city. What this means is that some lanes will be dedicated to buses and use by other vehicles will be restricted and some intersections will have lanes given over to bus transit with priority green times at signals. This gradual program of introducing bus lanes will be coordinated with the traffic management improvements. It is to be noted that, by making such improvements in the bus systems, congestion for buses will be reduced and the services will move more efficiently thereby increasing the operators' profits.

STP has provided Short Term and Long Term recommendations for Bus Service improvement in Chapter-9 in addition to introduction of BRT.

6) Bus Operator Consolidation

One of the Primary Recommendations of the STP is a restructuring of the bus industry to transfer ownership from a large number of small operators into a smaller number of large operators. This is a recognized, long standing need that has remained unchanged during the past decade. Unchanged in the dual sense that (i) little has occurred in terms of consolidation and (ii) little has changed regarding the importance of consolidation. In 1994, the Dhaka Integrated Transport Study (DITS), stressed the importance of restructuring and consolidation in order to achieve improved quality of service, increased productivity, and effective regulation.

While precise figures are not readily available, it is estimated that there are around 10 private bus operators with fleets of 30 or more buses, predominantly in the large-bus sector but including some large minibus operators. Aside from these larger operators, buses are under individual rather than collective ownership, although some individuals own several buses. Microbuses are generally held under individual rather than collective ownership. The overall level of fragmentation of the industry remains high.

Regulators acknowledge that it is very difficult to control bus operators on an individual basis. Following recent efforts and coinciding with the entry of several new large bus operators, the Government, through the efforts of the Road Transport Committee, has achieved some success in encouraging consolidation of the industry into larger operating units operating under a company rather than an individual basis. The policy has been applied using a range of approaches including:

- Discouraging route permit applications by individuals and encouraging applications from companies
- Reducing the duration of permits from 3 years to 1 year for the more fragmented diesel minibuses and human haulers
- Informal encouragement at meetings of the Road Transport Committee
- Shifting human haulers and diesel minibuses off the main arteries and on to the side roads

The Road Transport Committee is instructing small operators to form cooperatives. Individual applications for route permits are discouraged, with company applications given preference. In terms of route permits, new bus operators are given a 3 year permit following an initial trial period. Minibuses and human haulers (except for the small number of CNG buses) are being issued only 1 year permits. Gradually fleets are being upgraded with newer vehicles. It is recommended that the Government continues with these policies and actions that encourage industry consolidation and fleet renewal.

7) Replacement of Small Buses with Larger Buses

Bus frequency survey data indicates that there is a strong potential for replacing many smaller buses with larger buses. Minibuses and human haulers have an important role to play in Dhaka in providing a local services in areas difficult to access with larger buses providing a feeder service to the main trunk bus lines operating on arterial roads, and serving areas where demand may be too low to justify higher capacity buses. The current arrangement however, whereby minibuses and human haulers provide a very high frequency service on routes along major corridors of the city, is highly inefficient.

The survey data and commonsense observations show great potential for rationalising urban bus services on major roads by shifting from smaller to larger vehicles and thereby:

- Reducing the cost of provision of services on a per passenger basis,
- Reducing congestion,
- Promoting bus industry consolidation from individual to collective ownership,
- Improving the level of service to passengers.

3.4.3 Taxi Services

The introduction of taxi service in Dhaka has been relatively recent dating back to 1998. At present there are about 12,000 taxies in operation. This includes 2,000 which were added during a period in 2004. At present there are 60 companies operating taxi in Dhaka. According to STP the largest taxi operator was Cab Ex with 4,000 taxies in 2005, the second largest was Anudeep with 2,200 taxies, then comes Navana with 1,200, Nipun with 500 and so on. The taxi service is now in difficult situation because of low quality low specification imports by the Association. The lack of good drivers is a chronic problem since it was started in 1998 due to readily available fake licenses. As a means to try and improve the quality of taxi services and improve driver conduct and discipline the Cab Association requested BRTA to introduce a separate licensing system for taxi drivers which is under consideration.

3.4.4 The STP surveys revealed that

- Buses comprise a small proportion of vehicles (11.5%) but carry about 77% of the vehicular passengers
- Autos including car comprise 18% of the fleet carrying about 10% of the passengers
- Rickshaw comprises 28% of the vehicles carrying 12% of the passengers.
- The average number of persons per households was 4.12 persons and they make 8.5 trips per day combining modes.
- Walking: It is a common mode of transport in Dhaka and for many it is the economic necessities. The survey revealed that about 22% of the people walk to their work place and back. Walking facilities are poor and inadequate and tend to causing road accidents.
- Bicycle: it is not a significant mode only about 2% people use bicycle in Dhaka.
- Rickshaw: It represents the 28% of the vehicles plying on the roads but carrying only 34% of the passengers. The average trip length by rickshaw is only 2.34 km.
- Car/Taxi: the survey revealed that only 3% of household have cars. But similar numbers of government vehicles are used for officials and employee transport. In addition to this Dhaka have 12,000 Taxi cabs. It carries about 5% of the vehicular passengers.
- Auto-rickshaw: Commonly known as baby-taxi is a two stroke petrol fueled engine providing individualized, motorized, point to point transport. Before December 2001 it was 40,000 in number because of serious air pollution those are withdrawn replacing 12,000 CNG 4-stroke engine. The number of which also increasing to nearly 25,000 by now.

- Automobiles: The current number of automobiles including car was 128,000 and motorized vehicle 316,000 which results ownership of approximately 13 vehicles per 1000 population (including buses, trucks, cars, and others).

3.5 TRAVEL DEMAND FORECAST

3.5.1 URBAN TRANSPORT PLAN (UTP) MODEL

Over the next 20 years, the population of STP area is expected to be more than doubles to 36 million 2024 majority of whom will live in Dhaka Metropolitan area. In the normal pursuit these 36 million people collectively make more than 70 million trips each and every day comprised of work trip, shopping, education, healthcare and recreational trips. Where these people will live and how they will make 70 million trips daily will be determined by a large part by the transport options available to them. Good transport means better choice, more opportunities and more prosperity. UTP forecasting and behavioral model EMME-2 was employed to assess the future travel demand and peak hour demand flow per hour per direction based on existing data and information on traffic analysis zone (TAZ), population growth as well as household predictions. Different traffic demand scenarios are projected for 2014 and 2024 based on infrastructure system provided. Working Paper 8 and 9 provides the Dhaka UTP Model Development & Calibration and Assumptions used. Factors and sub-factors item considered in developing the model are:

1. **Data input Factors:** input data obtained from surveys and other sources
2. **Area-wide Factors:** Traffic analysis zones, population prediction and household by TAZ
3. **Household Interview –Derived Factors:** income groups, trip rates, household size, trip purposes and trip length
4. **Land Use Scenario Factors:** land use control, methods of dispersal/concentration, structure plan, future scenario assumptions
5. **Road Transport Network Factors:** designation of nomenclature and model run series, strategy definitions, project type definitions, existing and base networks assumptions, volume-delay functions, public transport congestion effects, NMT effects, intersection turning penalties, average travel time, free-flow speed, capacity in pcu, pcu values, peak period daily flows, at-grade railway crossing delays
6. **Public transport System Factors:** transit line factors, boarding and transfers, headway and frequencies, waterway lines, railway lines, transit modal split, and other transits
7. **Trip Distribution Factors:** trip purpose definitions, trip length frequency distribution
8. **Travel Demand Factors:** definition of a trip, peak hour conversion ratios, origin/destination matrix,
9. **Travel Mode Factors:** description of modes, form of mode split model, NMT and pedestrian factors and cost per kilometre
10. **Traffic Assignment Factors:** multi-modal equilibrium assignment, peak demand traffic assignments

On the basis of above factors and sub-factor items the UTP model for Dhaka was developed and calibrated. The UTP model estimates the peak hour demand scenarios under different transport system options available in future. **Table 3.6** presents the summary of results of UTP model run. This show how travel demand increases or decreases with and without different transport strategy options available and changes in travel speed per hour by transit options and automobiles. The table presents the results in person trips in peak hour, person kms per peak hour, person hours, vehicle trips, vehicle kms and travel speed in peak hours under different infrastructure strategies.

The report on Strategy Assessment and Portfolio of Assignment Plots presents the traffic assignment in peak hour vehicle traffic in passenger car units (pcu) for roads, peak hour flow of transit passenger volume for mass transit routes, BRT and MRT. Traffic assignment was

evaluated for each strategy and for base case. The report is supplied to the Mission members for review.

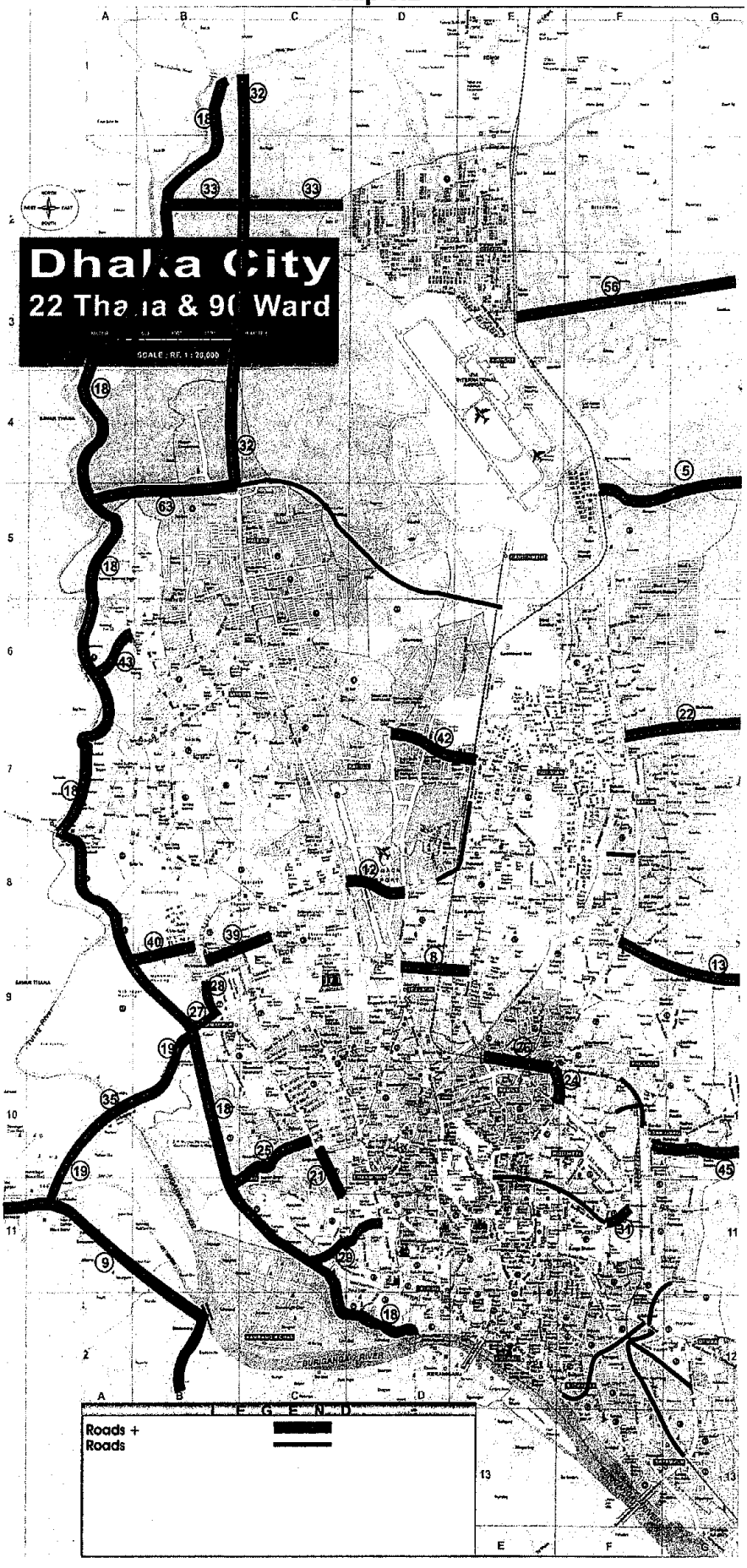
3.5.2 RECENT TRAFFIC SURVEY

Traffic data collected from classified counts in 8 road sections in the city area in February 2008 is presented in **Table 3.7**. A comparison of data was made to see the variation in traffic growth between 2004 and 2008. The results show significant increase in motorized traffic in some corridors free from NMT. Traffic survey in external cordon areas at 4 points was carried out. **Table 3.8** presents the results of outer cordon survey and suggests that annual traffic growth was significant in all points. It was highest at 50% at Bhulta in Dhaka-Sylhet road, followed by 17% in Dhaka –Mawa and Dhaka-Chittagong Highways.

It is observed that motorized traffic has been growing at more than 10% rate between the periods. The growth is mainly pushed up by the increasing number of car and light vehicle i.e. autos. In public transport area number of minibus has been declined where large bus increased to tackle the increased pressure of travel demand and balancing the shortfalls due to minibus reduction. Vehicle fleet registration statistics **Table 3.9** shows the number of vehicles registered in Dhaka grew at more than 12% during 2004 and 2007.

Origin-destination survey was done at selected places of the outer cordon areas, national highways following the STP survey both for passengers and commodities. The results show that Dhaka remained the most attractive destination for most of the passengers and commodity trucks intercepted. The O-D results are presented in **Annexure-A.**

Map 3.2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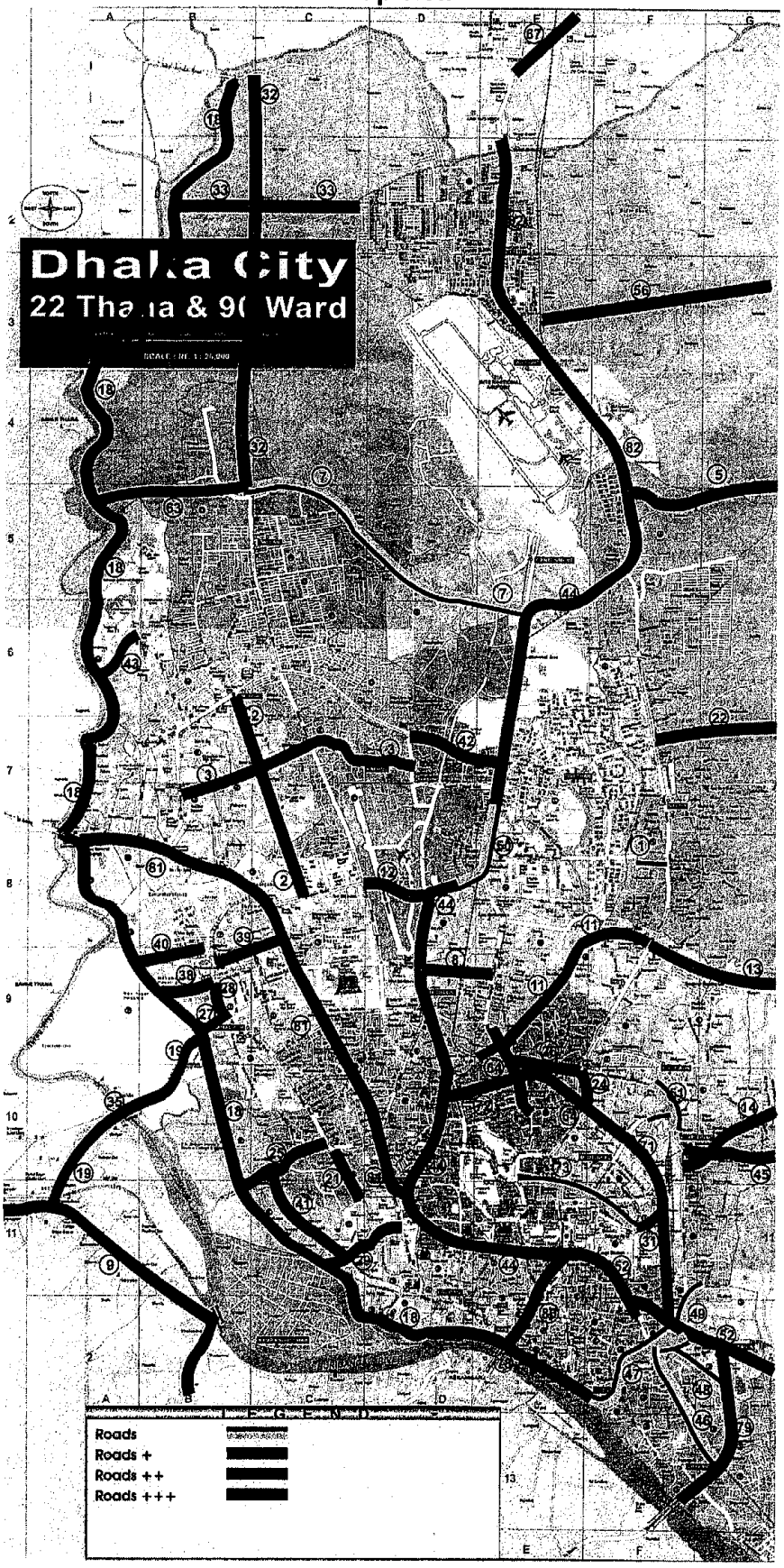
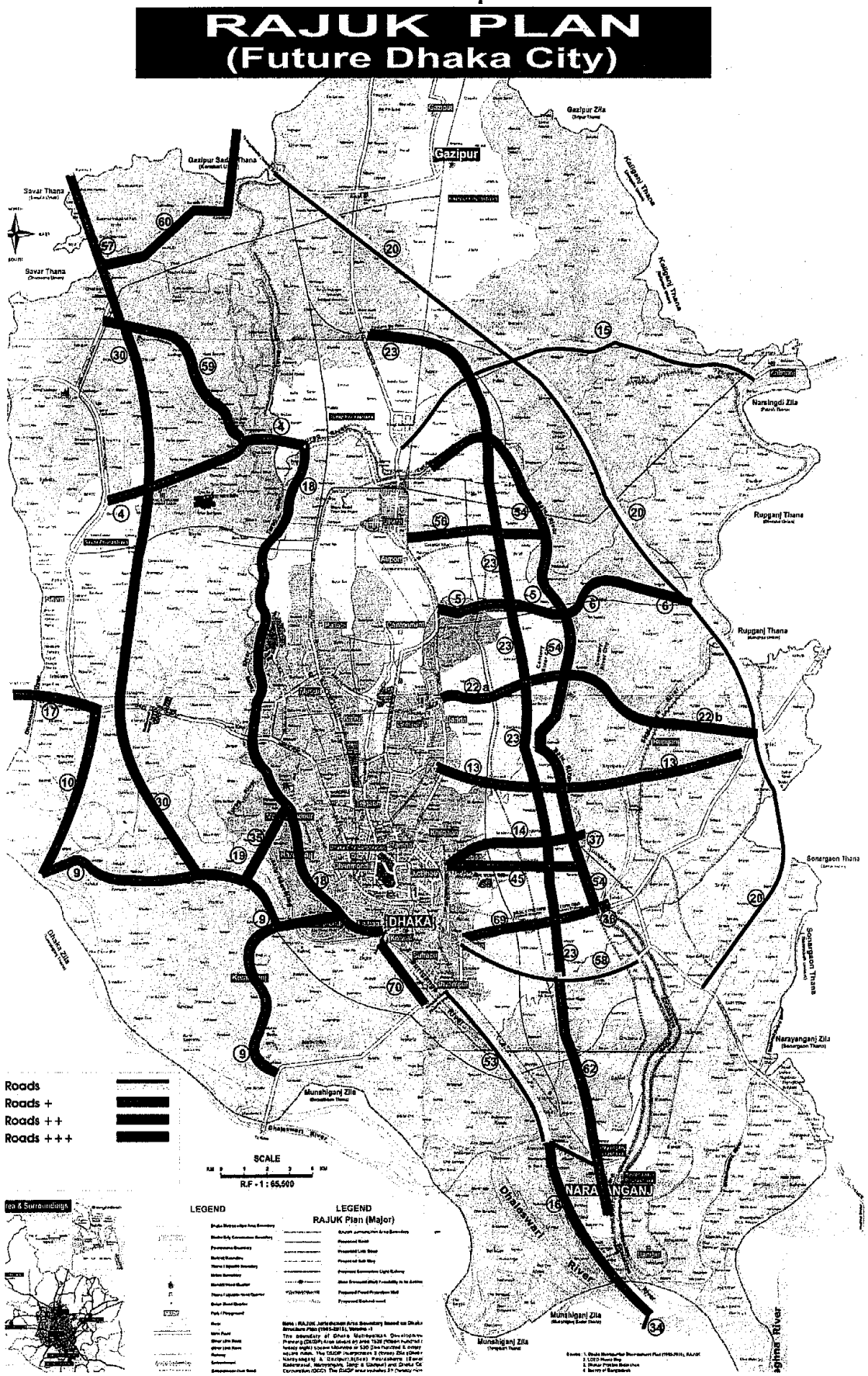
Map 3.3a



Map 3.3b


RAJUK PLAN
(Future Dhaka City)
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DHAKA
NARAYANGANJ
Roads
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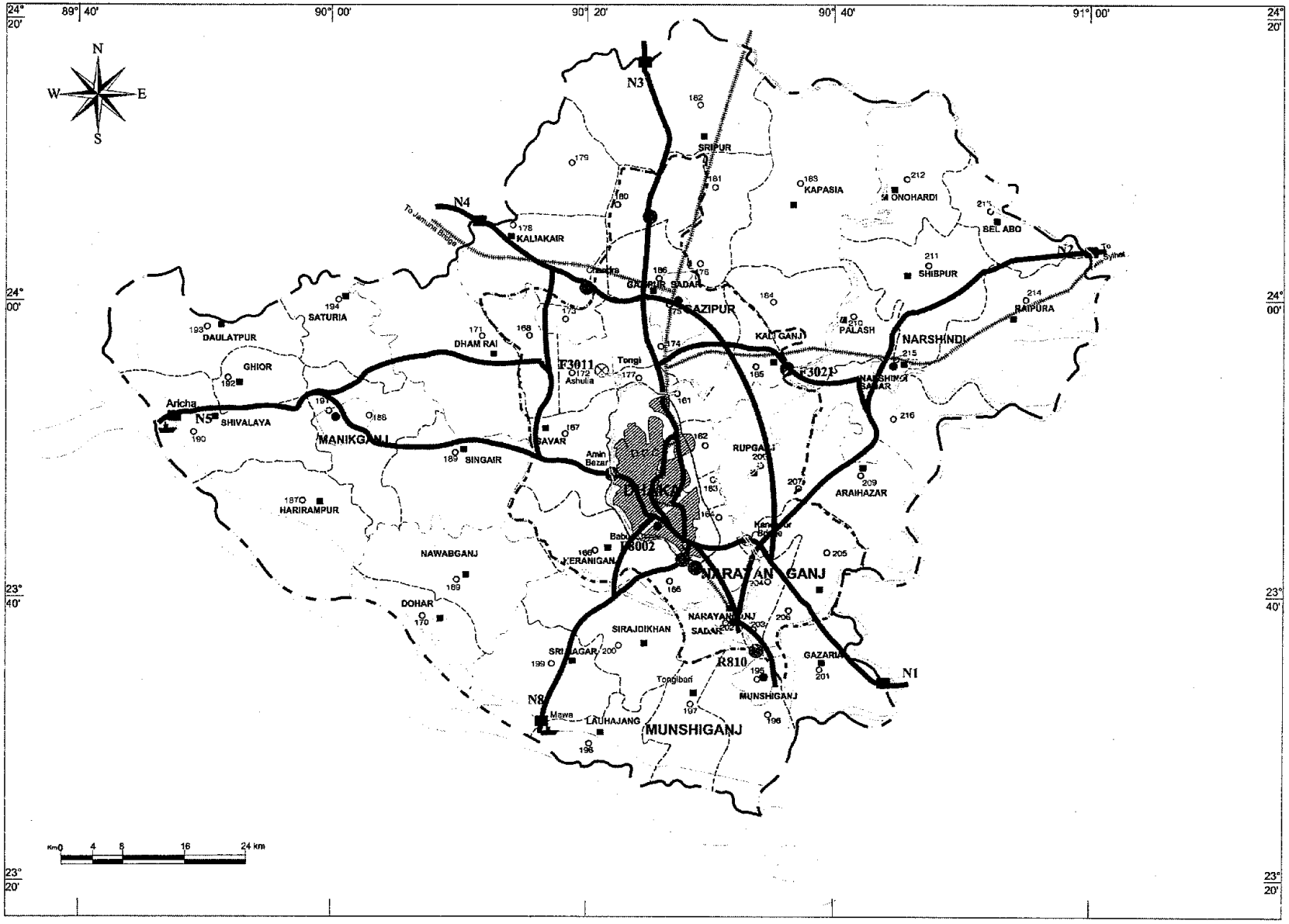
RAJUK Plan (Major)

Map 3.1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R3002
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KAPASIA
SONOHARDI
BEL ABO
SHIBPUR
RAIPURA
KALIAKAIR
GAZIPUR SADAR
GAZIPUR
PALASH
KALI GANJ
NARSHINDI
NARSHINDI SADAR
SATURIA
DAULATPUR
GHIOR
DHAM RAI
Tongi
Ashulia
Aricha
SHIVALAYA
MANIKGANJ
SINGAIR
SAVAR
Amin Bazar
RUPGANJ
ARAIHAZAR
HARIRAMPUR
NAWABGANJ
KERANIGANJ
DOHAR
NARAYAN GANJ
NARAYANGANJ SADAR
SIRAJDIKHAN
SREENAGAR
Tongibari
GAZARIA
MUNSHIGANJ
Mawa
LAUHAJANG
MUNSHIGANJ
To Jamuna Bridge
To Sylhet
Km 0 4 8 16 24 km

3.7 STP MODIFIED 2B STRATEGY: UNANIMOUS RECOMMENDATION

3.7.1 Introduction:

The STP study investigated a wide ranging series of issues including population, poverty, economic growth patterns, industrial development and visions for likely growth of settlement patterns in greater Dhaka over next 20 years up to 2024. Land use pattern (growth pole pattern of satellite communities) and densification of population will accommodate the increased population from existing 17 million to 36 million within the planning horizon. Series of satellite communities would be developed on the fringe of the Dhaka built-up areas. To provide connections within these communities and the geographical regions the STP investigated different alternatives and presented transport strategies and scenarios for meeting future traffic demands. On the basis of consensus among the members of the high powered advisory committee represented by planners, administrators, engineers, professionals and participation of numerous general stakeholders the modified strategy 2b was recommended for implementation.

3.7.2 Main Features of Modified 2b Strategy:

The main feature of modified strategy 2b includes integrated and multi-modal mass transit system such as regional highway improvements, several city by-passes, construction of east-west connections, construction of missing links, adequate drainage facilities, safety provisions, required flyovers, underpasses, overpasses, improvements and widening of city streets, etc. The strategy included and emphasized construction of mass rapid transit lines to solve existing congestion problems as well as accommodating ever growing passenger traffic demand up to 2024. Two types of mass transit systems were recommended for inner city areas i.e. Bus Rapid Transit (BRT) system and Metro Rapid Transit (MRT) System. Three at grade BRT lines and three MRT lines of which two underground and one elevated were recommended. The strategy also included major interchange development for mass transit transfer, elevated expressway options, major city highway corridors improvement and intersections improvements. The strategy also envisaged and recommended several institutional and policy related action plans. Each of the recommendations will be elaborated in some details in following sections.

3.7.3 Description of Mass Rapid Transit Lines:

Dhaka is the only mega city in the world with a population of 12 million (inner city) without any mass transit system. The existing traffic demand, expanding economic growth, existing and planned road space availability and growing congestion and reduced travel speed justify the construction of Mass Transit System in Dhaka. The construction and operation of mass transit lines are definitely expensive, complex and involved sophisticated technology. The following sections described the characteristics and salient features of six Mass Transit Lines recommended with route plans. The implementation of MRT is a multi-phased activity and consultants have identified the activities under different phases. Exhibit -6.1 (Exhibit 9-3 of STP) presents the routes map and Table -6.1 below presents the salient features of MRT components and interchanges recommended under STP.

The Feasibility Studies scheduled for Phase 1 of the STP implementation Action Plan will define the alignments and station locations for all of the mass rapid transit lines. However, to begin focussed discussions, the project Consultant has been able to consider all the various options and study the computer outputs. This has enabled the STP team to devise a system which serves the major generators and provides good coverage of the travel demand. In the Preferred Strategy (2b Modified), there are 3 BRT lines and 3 Metro lines as described below. Due to the lead-in time for design, financing, appointment of a contractor and operating consortium and the construction period, it is unlikely that the Metro lines can be implemented before a minimum of

10 years. Therefore, it is essential that the BRT lines move ahead in the early years whilst the Metro system is being developed. Of course, the schedule shown in the Action Plan (see Chapter 10) can be speeded up if finance and other details can be arranged earlier.

In the descriptive sections that follow, the numbers quoted for passenger flows are in terms of the final flows which would be reached in the year 2024 as a result of running the computer model for the Modified Strategy 2b. As noted before, there will be growth in trips of about 2.5 times the 2004 flows over the 20 year period. This translates to a compound growth rate of just below 5% per annum so that in 10 years the traffic is likely to be 60% higher than at present. As a result of this figures are also quoted from time to time for the year 2014 as an interpolation between present day and the end date of 2024. This interpolation exercise is of particular interest since it is not anticipated that the Metro lines would be in place before that time. Hence the mass rapid transit flows would need to be carried by the BRT system.

TABLE 1: MRT COMPONENTS OF STRATEGIC TRANSPORT PLAN (STP)

Component	Project Name	Description	Activities Recommended	Comments
Bus Rapid Transit (BRT)	BRT Line -1: The Red Route Length: 15 km (approx.)	Tongi-Uttara-Progati Sarani-Rampura-Kamalapur-Saidabad Bus Terminal	BRT Study and line Construction	In the first 5 year phase, the first two lines of the mass rapid transit system are planned to be opened. These are recommended as BRT Line 1 and Line 2 (subject to the satisfactory operations of BRT Line 1). Opening of these two BRT lines will provide fast public transport connections between the Airport and Saidabad along the eastern corridor and between Gabtali, the central area and Saidabad via the Mirpur Road Corridor. The total distance for both these lines is 30.0kms. The traffic management study (see Exhibit 10-2) will be a major contributor and support to this work. The Design Guidelines produced above will provide the control on design and performance specifications. It is envisaged that the transit system will be run by a PPP organization which will need to be carefully organized. The study will need to address the issue of how the operating company will be formed and how the project will be financed. Concession Agreements need to be produced and consortia invited for bidding and negotiations. It is anticipated that, subject to satisfactory operations, the first two lines should be operational by the fifth year of this first phase. The construction costs have been estimated at $5m per kilometer and a further 15% has been added for initial studies, financing and Concession

Component	Project Name	Description	Activities Recommended	Comments
				Agreement negotiations.
	BRT Line -2: The Blue Route Length: 12 km approx.	West Gabtali – Shyamoli-Dhanmondi-Fulbaria-Saidabad Bus Terminal	BRT Line-2 Study and Construction	Line 2 construction is subject to the satisfactory operations of BRT Line 1 suggested by the Advisory Committee. Opening of these two BRT lines (line-1 and 2) will provide fast public transport connections between the Airport and Saidabad Bus Terminal along the eastern corridor and between Gabtali on the western corridor to Saidabad through central area via the Mirpur Road Corridor.
	BRT Line -3: The Yellow Route Length: 18 km approx.	Airport – Mohakhali-Ramna-Fulbaria-Old City (Mitford/ Sadarghat)	BRT Line-3 Extension	In the second phase, Line 3 of the mass rapid transit system is planned to be opened provided that satisfactory operations of the previous two BRT Lines is seen to be achieved. BRT Line 3 is 16kms in length at a cost estimated at US$80m. An extension of Line 3 penetrating into the Old Town and increasing Line 3 by a distance of 3kms would cost and additional US$15m. In order to provide a good bus shuttle service in Old Dhaka a study should be commissioned to include traffic management, pedestrians and parking control in preparation for introducing the bus loop system. This will eventually complement the BRT Line 3 scheduled for this and the next phase and may evolve into a BRT system itself. A length of 5kms of street has been chosen at a cost estimated at $300,000 per kilometre. The system will also provide an improved land-based connection to the Ferry Terminal at Sadar Ghat.
	Metro Line Study and Design Length: 53 km approx.	Three Metro-line studies one elevated and two underground lines	Metro System Study	Phase 1 will be an intensive period for the development of the Metro system. Exhibit 10-10 is an approximate schedule for the implementation of the MRT system for Dhaka. Some people believe that the schedule is optimistic; others are of the opinion that the implementation program can be accelerated. If it can be implemented more quickly that is all to the good.

Component	Project Name	Description	Activities Recommended	Comments
				However, for the purposes of the phasing discussion, the schedule as shown has been used. Thus in Phase 1 the Metro development will use the Guidelines from above to support the following tasks: • Drafting the Concession Agreement and Issue of tenders to Concession Consortia • Feasibility Study and Preliminary Design • Negotiation of Concession Agreement and appointment of Concessionaire to facilitate starting of construction in the beginning of Phase 2. Costs to Government are estimated at US$1m per year.
Metro Line	Metro Line-1: The Green Route (Underground)	Uttara – Airport – Mohakhali-Tejgaon-Kamalapur-Saidabad	Metro System Design and Construction	The second phase should include the last efforts needed to establishing the Concession Agreements, the operating company and the financial package for the construction and operation. The work should include the completion of studies on station location, interchanges, supply and operations. The relationship with the company already in existence operating the BRT lines should be agreed. The Detailed Design for the first Metro Line should be complete and construction work can start at the beginning of Phase 2. Although ground conditions are to be investigated thoroughly, It is anticipated that the first line could be completed by the end of Phase 2 with testing and commissioning taking place early in Phase 3a. Opening is targeted at eleven years from commencement. For purposes of cost estimating, we have assumed that Line 5 will proceed first at a cost of US$50m per kilometre for 22 km.
	Metro Line-2:	Gulshan-Banani-	Metro Construction	In this phase, the first Metro Line is scheduled for opening and

Component	Project Name	Description	Activities Recommended	Comments
	The Brown Route (Elevated Circular)	Mirpur-Mohammadpur- Dhanmondi-Malibagh-Rampura-Gulshan		construction of the second Metro line will also be completed. This will therefore create a large part of the future mass rapid transit system for the city. It is also targeted to complete most of the third Metro line. It will be a very large capital intensive period with huge advances being made in the urban transport infrastructure. There is some concern that the necessary financing can be mobilised quickly enough, but the costs assume that this will be the case and the costs have been added for construction of 34 kilometres of line at US$75m per kilometre.
	Metro Line-3: The Purple Route (Underground)	Pallabi-National Assembly-Farmgate – Palashi-Gulistan-Saidabad	Metro Construction	**The schedule for the Metro construction shows that the only work to be completed in this phase is the testing and commissioning of the third Metro line. Costs have been included in Phase 3a.**
Interchange Development	Airport Road/Kamal Attaturk Intersection		Interchange design and Construction	The interchange will be one of the most important transfer place serve the BRT Line-3, MRT Line-1 and MRT Line-3 for mass transit and will also serve the east-west highway corridors connected by a tunnel underneath the cantonment golf club.
	Tejgaon Intersection		Interchange design and Construction	This interchange in Tejgaon will be the most important transfer place for all metro lines: MRT Line-1, Line-2 and Line-3 for mass transit and will also interface the east-west highway corridors connected by a via duct elevated road and Kazi Nazrul Islam Avenue, the most congested part of airport road.
	Gulistan Intersection		Interchange design and Construction	The interchange will be the heart of the city connecting old city and new areas and important transfer place serve the BRT Line-3, MRT Line-1 and MRT Line-3 for mass transit interfacing Jatrabari-Gulistant Flyover and Gulistan –Airport Express way. Could be assumed high density interchange.
	Saidabad Bus Terminal		Interchange design and Construction	The interchange will be the end point of all recommended transit system and most important transfer place

Component	Project Name	Description	Activities Recommended	Comments
				interfacing the BRT Line-3, BRT Line-2, MRT Line-1 and MRT Line-3 for mass transit. Will also serve the east-west and north-south highway corridors connecting eastern and southwestern Bangladesh.

3.7.4 Line-wise Description of Mass Transit: Bus Rapid Transit

MRT Line – 1: The Red Route [BRT]

This line is planned to serve the eastern corridor between Uttara and Saidabad Bus Terminal. The main route is based on Progati Sarani and DIT Road. Traffic flows by section are shown in the text box attached. Line -1 begins at Uttara where some 5,000 passengers per hour [pph] will wish to move through the links. Passing south of and serving the International Airport flows increase to 7,000 pph as far as Kuril where the line turns south-east.

Passenger Flows for BRT Line1
(Passengers/hr in 2024 and 2014)

From	To	2024	2014
Tongi	Uttara	5,000	3,000
Uttara	Kuril	7,000	4,000
Kuril	Badda	14,000	8,000
Badda	Rampura	16,000	10,000
Rampura	Malibag	16,000	10,000
Malibag	Kamalapur	15,000	9,000
Kamalapur	Saidabad	12,000	7,000

Note: 2014 flows are obtained by interpolation and rounded to the nearest 1,000.

Because these northern sections of Airport Road currently have very little congestion and, with 4 lanes available, Line-1 could run as an Express, Limited Stop service as far as the Progati Sarani Intersection. From this intersection as far as Badda, however, the flows increase to 14,000 pph [8,000 pph in 2014] and the BRT service will need to be provided with its own exclusive lanes. This will mean moving the service into two median lanes protected from other traffic and pedestrian movements. South of Badda, the flows stay fairly constant as far as Malibag rising to 16,000 pph in 2024 [10,000 pph in 2014]. In the ultimate plan, there is a metro line also in this corridor and the combined service will be able to serve the demand.

From Malibag, BRT Line-1 will move onto the Outer Ring Road as far as Kamalapur Station. Flows in 2024 will be 15,000 pph [9,000 pph in 2014] and then south and east to terminate at Saidabad Bus Terminal. Flows from Kamalapur to Saidabad are estimated as 12,000 pph [7,000 in 2014].

It is suggested that BRT Line-1 would be the first line to be made operational and could be introduced in stages with final opening within years 3 to 4. As demand is shown to increase, the line could be extended to Tongi and Gazipur in the north and to Demra and Narayanganj in the south. These extensions may not need to be segregated lines but simply running as limited stop services according to demand.

MRT Line -2: The Blue Route [BRT]

This line is planned to serve the western corridor and runs between Gabtali and Saidabad Bus Terminals. Primarily it is based on Mirpur Road and then crosses over to Zahir Raihan Sharani Road (old railway line). Transit flows approaching the main urban area from the west are quite large at 4,000 pph in 2014 rising to 6,000 pph in 2024. At the beginning, demand

Passenger Flows for BRT Line 2
(Passengers/hr in 2024 and 2014)

From	To	2024	2014
West	Gabtali	6,000	4,000
Gabtali	Technical	7,000	4,000
Technical	Shyamoli	14,000	8,000
Shyamoli	Dhanmondi	18,000	11,000
Dhanmondi	Fulbaria	34,000	21,000
Fulbaria	Saidabad	20,000	12,000

Note: 2014 flows are obtained by interpolation and rounded to the nearest 1.000.

could be handled without exclusive lanes but these lanes would be needed after 10 years.

To the east of Gabtali, flows on Line 2 increase to 7,000 pph [4,000 pph in 2014] and the service would need to move onto two protected median lanes as far as the beginning of Mirpur Road. From the beginning of Mirpur Road to Shyamoli there is a significant increase in flows to 14,000 pph in 2024 and reaching 8,000 pph in 2014. South of Shyamoli as far as Dhanmondi flows increase to 18,000 pph [11,000 pph in 2014]. At this point the line will cross over onto Zahir Rahan Sharani Road where flows are expected to be 34,000 pph [21,000 pph in 2014]. In the ultimate plan, there is a metro line also in this corridor and the combined service will be able to serve the demand. The alignment of the route between Mirpur Road and Kataban Road poses some difficulties and will need care to create a good link. After moving on to Zahir Rahan Sharani Road, Line 2 continues as far as Saidabad Bus Terminal where it will terminate. Flows on this last section are 20,000 pph [12,000 pph in 2014].

When the Gulshan-Jatrabari flyover is opened, it would be possible to run some services on the flyover to provide an express link by missing out the at-grade sections near Kaptan Bazaar and Bhanga Bhaban.

It is suggested that BRT Line 2 would be the second line to be made operational and could be introduced in stages with final opening at the end of year 4. As demand is shown to increase, the line could be extended to Savar in the west and to Demra and Narayanganj in the south.

MRT Line- 3: The Yellow Route [BRT]

This line is planned to serve the central corridor and runs between the International Airport and the Old City. Primarily it is based on Airport Road, Shaheed Tazuddin Road and the Ramna Area. Line-3 begins at the International Airport and can run as an Express, Limited Stop service as far as the Cantonment Area at the north of New Airport Road. Over part of this section it shares the route with BRT Line-1 (resulting on low flows of 2,000 pph) and eventually Metro Line- 4. In fact when Metro Line- 4 is opened, it would be possible and logical to remove either Line -1 or Line-3 over this section.

Passenger Flows for BRT Line 3
(Passengers/hr in 2024 and 2014)

From	To	2024	2014
Airport	Kuril	2,000	1,000
Kuril	Mohakhali	16,500	10,000
Mohakhali	Ramna	16,000	10,000
Ramna	Fulbaria	18,000	11,000
Old City	Loop	2,000	1,000

Note: 2014 flows are obtained by interpolation and rounded to the nearest 1,000

The BRT will then be moved into two protected median lanes in the centre of New Airport Road as far as Mohakhali. Flows over this section are estimated as 16,000 pph [10,000 pph in 2014]. At this point the line will divert from New Airport Road and pass Mohakhali Bus Terminal following Shaheed Tazuddin Road as far as Ramna. The line will continue in the central protected lanes with flows of 16,000 pph [10,000 pph in 2014]. The concept for BRT Line-3 is then to run the service in one direction in an anti-clockwise loop based on College Road, Phoenix Road and Nazrul Islam Sarani. Flows would be of the order of 18,000 pph [11,000 pph in 2014].

It is suggested that this would be the third line to be made operational and again could be introduced in stages. The loop may first of all be based on Phoenix Road until true access can be made into the Old City area. Later, the loop could be extended south to include Kazi Alauddin Road, Nawab Yusef Road, Islampur Road. Johnson Road, English Road and North South Road. Flows on the Old City Loop are estimated as being 2,000 pph [1,000 pph in 2014]. This will also provide a good interface between the transit system and the waterways system at Sadar Ghat. Final opening for the smaller loop based on Phoenix Road could be in year 5 or 6.

In the Feasibility Study, it would be of value to consider elevating the loop in Old Dhaka due to the narrow and congested areas prevalent there.

As demand is shown to increase, the line could be extended to Uttara, Tongi and Gazipur in the north. It will be necessary to engage in further dialogue with the designers of the Mogh Bazar elevated highway since this construction will impact upon the BRT route at that intersection. One possible solution is to have stops north and south of the flyover and run the BRT in normal traffic over the flyover itself. Further planning will be necessary for this location.

MRT Line- 4: The Green Route [Metro]

Metro Line- 4 is planned to serve the central corridor connecting the north, Tongi, Uttara and the International Airport with Saidabad Bus Terminal. It is based on the use of the existing railway corridor which is currently under study for a possible diversion or curtailment in the north. However, if the decision were made to modernize the inter-city services and continue to run the line through the city, the feasibility study planned for phase 1 would need to identify other alignments for this route.

Passenger Flows for Metro Line 4
(Passengers/hr in 2024 and 2014)

From	To	2024	2014
Uttara	Kuril	20,000	12,000
Kuril	Mohakhali	43,000	26,000
Mohakhali	Tejgaon	55,000	33,000
Tejgaon	Kamalapur	55,000	33,000
Kamalapur	Saidabad	34,000	20,000

Note: 2014 flows are obtained by interpolation and rounded to the nearest 1,000

Metro Line- 4 begins at Uttara, would serve the International Airport and could run at-grade possibly as far as the Cantonment Area at the north of New Airport Road. Flows over this section would start at 14,000 pph rising to 27,000 at Kuril. BRT Lines -1 and 3 share the corridor and the Feasibility Study should ascertain how these three lines can be best integrated. When the Metro line is opened, it would be possible and logical to remove one of the BRT Lines over this section. In fact Metro Line - 4 could easily supersede BRT Line-3 as far as Mohakhali thereby releasing a lane of New Airport Road for vehicular traffic. After the Cantonment Station, Metro Line- 4 will then go underground serving Mohakhali, Tejgaon, Mogh Bazar, Khilgaon and Kamalapur Station terminating at Saidabad Bus Station. Flows over this section start at 35,000 pph rising to 44,000 pph at Mohakhali and 56,000 pph near Tejgaon. The section between Tejgaon and Kamalapur reaches 62,000 pph before dropping to 30,000 pph near Saidabad.

It is suggested that this could be planned and the alignment agreed in Phase 1, the contractual arrangements, financing and design accepted in Phase 2 and construction could begin in Phase 2 with opening in year 11. This central corridor is also a prime target for an elevated expressway connecting to the Gulistan-Jatrabari flyover and continuing north as far as Kuril. It is likely, although further study will be needed, that the viaduct will be constructed on the alignment of Airport Road and New Airport Road. It is anticipated that with the removal of the BRT Line-3 and the construction of the Metro Line-4 on the railway alignment, there will be freedom to construct the viaduct on the road alignment.

MRT Line- 5: The Brown Route [Metro Circular]

Metro Line 5 is planned as a continuous loop serving the high density residential areas of Gulshan, Dhanmondi and Mirpur and the developing areas to the west of the Cantonment Area. In addition it is planned to provide two good east-west connections across the city spaced some 4 kilometres apart. The alignment is also planned to connect other elements of the transit system and interfaces

Passenger Flows for Metro Line 5
(Passengers/hr in 2024 and 2014)

From	To	2024	2014
Gulshan	Kakoli	10,000	6,000
Kakoli	Mirpur	31,000	19,000
Mirpur	Moh'adpur	15,000	10,000
Moh'adpur	Malibagh	40,000	24,000
Malibagh	Rampura	11,000	7,000
Rampura	Gulshan	9,000	6,000

Note: 2014 flows are obtained by interpolation and rounded to the nearest 1,000

with BRT Lines 1, 2 and 3 and Metro Lines 4 and 6.

It is believed that this Metro line could be constructed with advantage above ground. If it were to be decided that elevating the line is advantageous, the line could probably be implemented more quickly than the underground lines and could speed up the process of the Metro construction. It is suggested that this could be planned and the alignment agreed in the middle of Phase 1, the contractual arrangements, financing and design accepted early in Phase 2 and construction could begin at the end of Phase 2 with final opening around year 10 or 12.

Commencing in Gulshan at Pragati Sarani, the route follows Madani Avenue and Kamal Attaturk across New Airport Road. Flows on this section are 10,000 pph [6,000 pph in 2014]. On the western side of New Airport Road, the line serves Kafrul, Mirpur, and turns south towards Mohammadpur and Dhanmondi. Flows in these sections are 31,000 pph in 2024 [19,000 pph in 2014]. Metro Line 5 then turns east to serve Tejgaon (Farmgate and Sonargaon Hotel area) where flows are predicted to be 40,000 pph in 2024 [24,000 pph in 2014]. It continues eastwards to Rampura with flows of 11,000 pph before turning north to Badda and Gulshan. Flows in this corridor are 9,000 pph [6,000 pph in 2014]. These flows are actually lower than BRT Line 1 which shares the corridor and there could be transfers between the systems.

One interesting design feature will be to ensure that if constructed above ground and if the planned elevated expressway is constructed on New Airport Road, Metro Line 5 will need to pass over the expressway viaduct.

MRT Line- 6: The Purple Route [Metro]

This line is planned to provide a connection between the developing areas to the west of the Cantonment Area and the central area and Saidabad Bus Terminus. The alignment is based on Begum Rokeya Sarani, Sonargaon Road and Zahir Raihan Sharani. Commencing in Pallabi, there is a section where flows are predicted to be 62,000 pph which is the highest flow in the city. The alignment follows Begum Rokeya Sarani where flows are 44,000 pph [26,000 pph in 2014] and turns eastwards to Farmgate [30,000 pph] where it again turns south to follow the alignment of Airport Road as far as the Sonargaon Hotel.

Passenger Flows for Metro Line 6
(Passengers/hr in 2024 and 2014)

From	To	2024	2014
Pallabi	Mirpur	62,000	37,000
Mirpur	Assembly	44,000	26,000
Assembly	Farmgate	30,000	18,000
Farmgate	Palashi	26,000	16,000
Palashi	Gulistan & Saidabad	16,000	10,000

Note: 2014 flows are obtained by interpolation and rounded to the nearest 1,000

At this point the line follows Sonargaon Road where flows amount to 26,000 as far as Zahir Raihan Sharani. Metro Line 6 continues eastwards with flows of 16,000 pph [10,000 pph in 2014] terminating at Saidabad Bus Terminal. It is possible that some of the northern section as far as Sher–e-Bangla could be above ground thereby accelerating the process of implementation. It is suggested that this could be planned and the alignment agreed in the middle of Phase 1, the contractual arrangements and design accepted in Phase 2 and construction could begin towards the end of Phase 3A with final opening around year 15 to 17. An option has been considered to move the alignment to pass through part of the Old City area. Although a detail of alignment planning and feasibility, it is show on **Exhibit 9-3** for illustration purposes.

Another aspect of planning for Metro Line 6 would be to extend it to the north and thereby loop into Uttara and possibly the International Airport where it could form a loop with Metro Line- 4 and BRT Lines -1 and Line- 3.

As more detailed planning begins in Phase 1 of the Action Plan, and operational issues are considered, it is recommended that the planners consider linking Metro Line- 4 with Metro Line- 6 at Saidabad. This would then in effect create a downtown loop with interfaces at Tejgaon between the two lines and also with the overhead Metro Line- 5. One way to proceed with construction would be to favour investment in Line 6 as far as Saidabad and then link this directly to the lower part of Line -4 up to Tejgaon, in effect providing a loop in the downtown area before the full Line- 4 Metro is constructed. These and other operational concepts will be an important part of the Feasibility Studies planned for Phase1.

3.7.5 Regional Highway Improvements:

The STP main study work is concentrated in the urbanized area of Dhaka. However, the Consultants were asked to investigate the needs for the provision of transport links to the surrounding communities and potential locations for satellite communities. The recommendations for regional highway provision are shown in **Exhibit 6-2 (STP Exhibit 9-2) and Table 6-2.** The recommendations are primarily for improvements to existing highways with minimal creation of new alignments. The exceptions to this are the Dhaka By-pass currently under construction to the east of the city and east of the Balu River, the Eastern Bypass and the Western Bypass serving the newly developing areas on the fringe of the existing built-up areas. The projections for future traffic are all within the capacity provided by well engineered 2-lane highways. Although, there is no urgent need to consider highways in excess of this width, it is essential that all of the regional routes are investigated in detail and a rolling program of upgrading should be implemented. This program of upgrading should include the following:

- Highway Safety Audit. All roads should be subject to a Safety Audit by an independent reviewer, who should investigate, amongst other aspects – sight lines, horizontal and vertical curvatures, signs both on road or at the roadside, surface quality, frontage properties, pedestrian activities, school and market areas etc. The Safety Audit should be presented to the Ministry of Communications for the necessary action.

- Inventory. All roads should be subject to a detailed highway inventory or a review of the existing inventory where one has been performed. This should include as a minimum – width, surface quality and type, horizontal and vertical alignments, lighting, markings and signing, bridges and culvert conditions. In particular, the alignments should be reviewed for all-weather use taking account of the likely flood levels.
- All roads should be upgraded to the required standards for a two-lane national highway based on the inventory and to include the necessary improvements to sight lines, signing, pavement markings and surface treatment. The object here is to create an arterial system with a two-way capacity of 2,400 pcu/hour.

- All bridges and culverts should be reviewed for strength and foundations and improvement implemented where necessary.

Although the demand is seen to be within the capacity requirements of 2-lane roads (2,400 pcus/hr), it is suggested that the Government considers a regular program of obtaining increased rights-of-way so that the widening in the future to dual 2-lane roads can be achieved when the demand is shown. In fact, this process has already started with the road to Gazipur already Dual 2-lanes and the Chittagong Road similarly widened. This initiative should continue as funds become available. A right-of-way of 50m should be acquired.

3.7.6 Elevated Expressway Elements:

Strategy 2b contains the package referred to as Roads++ containing 50 highway projects (some of them are already completed). The Preferred Strategy, which is a modification of 2b strategy

adds three significant elevated expressways. These projects were included as given either for further study or because the government had decided to proceed with them after feasibility study and signing concession agreement. In effect it moves the selected strategy to a point between strategies 2b and 3b. The three viaducts included in the selected strategy are as follows: -

- Gulistan – Jatrabari Flyover. This is a project being developed by DCC and is referred to in Exhibit 10-1 as project #52. Recent announcements have revealed that this will be financed as a PPP project and will be put in operation as a Tolled Highway of dual 2-lane width. DCC have provided a cost estimate of US$117 millions for a 7 kilometre section. Flows are shown to be between 1,500 pcus/hr and 2,500 pcus/hr in the year 2024 which can be accommodated within the capacity of the proposed cross section. It has not been possible to review the designs for this project but it is understood that the tolls will be collected on the ramps. It is assumed that the project will be designed to link indirectly with the second project listed below since both projects have an end point at Gulistan.

- The Elevated Expressway. This is a project being developed by RHD and is referred to in Exhibit 10-1 as project #44. It is conceived in two phases; one from Gulistan to Mohakhali Flyover and the second from Mohakhali Flyover to the north. Cost estimates provided by RHD show US$333 for the 20 kilometres. The cross-section is for a dual 2-lane facility, which will have a capacity of just under 4,000 pcus/hr. At this width, there will not be sufficient capacity over much of the viaduct to accommodate the flows projected for the year 2024. The southern section from Gulistan to Paribag shows flows of 1,500 pcus/hr which is within the capacity of the proposed dual 2-lanes. There is logic in retaining this cross-section since it will link in to the previous project which is also dual 2-lanes. North of Paribag however, as far as Mohakhali Flyover, the flows increase to over 5,000 pcus/hr, which requires that the viaduct be constructed at dual 3-lanes. North of Mohakhali Flyover flows are predicted to be 4,500 pcus/hr by 2024 again exceeding the capacity of a dual 2-lane viaduct and requiring it to be dual 3-lanes. Flows drop to 3,000 pcus/hr north of Kuril. Thus the designs proposed should be reviewed in the light of these comments with a view to widening the viaduct to dual 3-lanes north of Paribag. This need for a wider cross-section is reinforced by the comments contained below for the third expressway project which should be connected into the Elevated Expressway somewhere in the area of Paribag and Bangla Motors.

- Mogh Bazar and Mouchak Flyovers. This is a project being developed by LGED under finance from the Kuwait Fund and is referred to in Exhibit 10-1 as project #64. It will construct flyovers over Eskaton Road. It appears from reviews of the designs that there is no connection to the Elevated Expressway project noted above. It is suggested that this connection be investigated at a location somewhere in the area of Paribag and Bangla Motors before the plans are finalized for this project.

3.7.7 Major City Highway Corridors:

Besides the descriptions of the mass rapid transit system in previous sections and the proposed elevated expressway system, the component lists the major highway corridors in the city are presented in **Table - 6.2.** This includes some of the salient features of each highway projects with brief comments leading to the conclusions and interfacing with the integrated multi-modal transport network system. The highways are divided into North-South and East-West corridors, regional highways development and internal corridor improvements. The **Exhibits 9-5 and 9-6** presented below show the route maps of complete strategic road network system recommended under phased development.