

Chapter-3

DEVELOPMENT PLAN PROPOSALS

Chapter - 3

DEVELOPMENT PLAN PROPOSALS

3.1 Abiding Policy Frameworks of Higher Level Plans

The study area (Group-A) comprises four SPZs (SPZ 14, SPZ 14.5, SPZ 15 and SPZ19) as defined in the Structure Plan. Different higher-level plans like Structure Plan, Urban Area Plan etc. provided several numbers of proposals (both short term and long term) for present and future development of the area. Considering new developments during the period, some recasting of DMDP proposals have to be made while setting the new policy framework for future development. Many new developments have substantially changed the existing landform and landuse character in many parts of the study area that was originally perceived by DMDP. The policies of DMDP relevant to this study area are given below.

SPZ 14 Tongi

DMDP Recommendation

- A Detailed Plan to manage and direct development to the right place in the area is required.
- Timely action is needed to realize retention areas as envisaged by FAP proposals and indicated on the UAP maps. Management Boards should be installed to guard the retention ponds for encroaching development
- All the on going projects to develop various utility services should be able to fulfill the need of the existing and future population.

SPZ 14.5 Tongi /Gazipur Fringe

DMDP Recommendation

- The authority should discourage development and keep its urban township/private development to the minimum.

SPZ 15 Gazipur

DMDP Recommendation

- Adequate measure to create commuter facility with Dhaka should be created.
- Gazipur should be promoted as a healthy location for further institutional development.
- Continuous efforts should be made to maintain the current delivery system of water supply to be able to meet the requirement even after densification.

SPZ 19 RAJUK East

DMDP Recommendation

- The area will remain predominantly rural for many years to come. As such, to supplement the existing rural economy the Jamdani Saree village should be developed as planned.
- Purbachal/ Yousufganj might be a good location for the third airport and/ or the relocation of the Dhaka Cantonment.

- Dhaka's main source of drinking water will be Sitalakkhya River. As such all developments in the upstream of the river should be regulated to save the river water from large scale pollution which will make treatment of raw water expensive.

Policy Guidelines for Transportation

a. The Dhaka Structure Plan (1995-2015)

Regarding Dhaka's transport system, following characteristics were identified by the Dhaka Structure Plan (1995-2015):

1. Dhaka's traffic conditions were characterized by a conflict in the use of available road space by different modes. The Dhaka Integrated Transport Studies (DITS) of 1994 concluded that traffic management is so ineffective that further road investments would be of limited value until there was a demonstrable improvement in enforcement
2. Road hierarchy was poorly established. As population was growing in the urban fringe areas and as car ownership and traffic densities were increasing, accessibility was deteriorating fast. Protecting Rights-of Ways (ROWs) for other infrastructure and services development should be the major priority of RAJUK and other concerned agencies.
3. Public transport system in Dhaka was poor and disorganized. To boost up the peripheral and satellite expansion and to ease transportation problems of the urbanized areas, the DMDP proposed infrastructure schemes for 20 years time frame.

Objectives of the DMDP Structure Plan's long-term road development strategy were to establish a primary road network which will effectively serve the needs of the growing urban population of Dhaka by providing improved access to the main urban area itself and linkages to areas with potential for growth. Some of the major strategies recommended by the DMDP Structure Plan to promote planned and guided development included, among others, the following:

Infrastructure Led Development Program

This program would require major public sector initiatives in the key areas of road development, flood protection and drainage and the protection of future Right-of-Way (ROW). In the new development areas, road development and flood protection measures would be the main instruments for the promotion of growth.

Incremental Network Development

In pursuance of the proposed long-term road transport network, the Government should seek to promote an incremental approach to its overall development, as a means of conserving resources and being responsive to proven demand for the service being offered. This policy would help to utilize limited resources in the most cost-effective manner over a sustained period of time.

To assist both property owners and controlling officers, in knowing physically where ROW exists, it was recommended by the Structure Plan that the ROWs of roads should be pegged out on the ground, once an alignment had been determined.

Major Road Development Programme

One of the most important road link recommended for construction was a limited access *Dhaka by-pass* (Eastern by-pass) linking the Chittagong Road at a point near Katchpur Bridge, in the south-east of the metropolitan area to the Tangail-Jamuna Bridge road in the north-west, to divert some of the long distance inter-district traffic, which would otherwise use the busy urban roads of the city that is already congested. Subsequently, Roads and Highways Department (RHD) started constructing a Dhaka by-pass but on a different alignment. The construction of the road

which is almost complete is a 2-lane road and not a limited access road, as was envisaged in the Dhaka Structure Plan. The proposed Dhaka by-pass goes through the centre of Group-A.

Link Road Development and Road widening Programme

The DMDP Structure Plan also included proposals for construction of 25.8 km. strategic links and 25 km. widening of existing roads. These roads were proposed to ease the intracity traffic movement and to reduce the traffic congestions. But in the area covered by the Group-A, no such link roads or roads for widening were proposed for development.

Commuter Rail Network

The DMDP, as part of its long term plan, recommended the development of a commuter rail network, to serve the high-density sections of the main urbanized area. It was anticipated that Dhaka, at the end of 2015, could have a population of around 1.5 million, as a result it would need a mass transit system capable of easing the pressures on the city road network.

A feasibility study of the commuter rail along Tongi-Narayanganj was undertaken as part of Dhaka Integrated Transport Study (DITS) in 1994 to identify a feasible alignment together with detailed cost-benefit analysis. Further feasibility for the remainder of the network was to follow. But unfortunately the issue did not receive any attention of the government during subsequent periods.

Circular Waterways for Dhaka

The DMDP Structure Plan recommended development of a circular waterway around Dhaka, utilizing the available natural waterways/rivers namely Buriganga, Turag, Tongi and Balu. The proposal included dredging of rivers, channels and canals around Dhaka and installation of landing ghats and provision of road links from major road network to these ghats. The navigability of the encircling waterways was expected to enhance and facilitate movement of goods and passengers to different parts of the city by water transport. These waterways could also encourage development of riverine recreational facilities and reduce congestion on existing roads of Dhaka. This recommendation was subsequently picked up by STP and it was included as part of its recommendations.

b. The Urban Area Plan (1995-2005)

In the area covered by Group-A, there are two urban areas namely Tongi and Gazipur. No major recommendations relating to transport were proposed by the Urban Area Plan for Gazipur and Tongi.

c. Strategic Transport Plan for Dhaka

Besides DMDP, one of the recent (2006) initiatives of the Government of Bangladesh (GOB) was to undertake a study on "Strategic Transport Plan (STP) for greater Dhaka". The

STP suggested a number of strategic transport networks for Dhaka. Major recommendations of DMDP with regard to road, rail and IWT which were subsumed by STP and were found relevant to the Detailed Area Plan (DAP) of the Group-A are indicated below (See Map 3.1)

Details of DMDP/STP Roads

1) Road from Progati Sarani to Balu River

A 2-lane road capable of carrying 500 pcus/hr. in 2024 was proposed for construction by the RAJUK for serving the ever-expanding eastern areas.

2) Road link from Eastern By-pass to Dhaka By-pass

This scheme is a continuation of another link, proposed by the STP, from Khilkhet to Eastern By-pass (6.5km.) and, with the construction of the link, it would complete the east-west highway connection between Khilkhet and the Dhaka By-pass (a total of 12.5 km). This road is expected to encourage the development of Purbachal Township. This link was proposed by the RHD as a dual carriageway road to be developed through stage construction. A Feasibility Study would be needed to determine the patterns of the stage construction.

3) Merul Badda-Golakandail

This link would provide a new connection to the Dhaka By-pass. It was proposed as an upgrading scheme under the control of the RHD. This link was brought forward in the program in order to provide a land-based link to the ferry terminal proposed for upgrading at Baurpur / Kayetpara. Traffic flows in 2024 would be 2,500 pcus/hr, which is within the capacity of a dual 2-lane highway. This road is also proposed for development through stage construction.

Railway – in context of city transport

The STP did not undertake detailed study of railway in context of its role in greater Dhaka. Meanwhile a study under the DFID assistance was initiated to prepare a “Master Plan for Bangladesh Railway”. The double track railway between Kamlapur and Tongi has recently been converted from meter-gauge (MG) into dual-gauge (DG). The MG single track between Tongi and Joydevpur has also been converted to dual-gauge (DG). Meanwhile, the single track between Tongi and Bhairab Bazar is also being expanded to double track, with provision of wider sleepers to facilitate conversion to dual-gauge at a later date. A flyover along regional highway (R-301) to cross rail line just north of Tongi Railway station is under construction to ease traffic congestion in that area.

Circular Waterways

The STP supported the recommendation made by the DMDP to develop circular waterways around Dhaka. The Bangladesh Inland Water Transport Authority (BIWTA) is already going ahead with the development of a Circular Waterways System around Dhaka, for the transport of people and goods. Turag River on the western side has already been dredged for this purpose. A number of road links were proposed by the STP to link the network of landing stations to other elements of the multi-modal transport system. Both Balu and Tongi rivers on eastern and northern side are also required to be dredged to establish the circular waterways system. To build landing stations on the eastern side, embankment on the western bank of Balu River needs to be in position. Government, therefore, needs to take initiative to complete the embankment along Balu River on priority basis.

Critical Planning Issue Identified by STP

The STP also identified a number of Critical Planning Issues which have been addressed, as part of the Detailed Area Plan (DAP). These issues are indicated below:

Traffic Management

Large sections of road network in Dhaka have been taken over by traders and others who use the road surface for purposes other than traffic use. Prominent among these inappropriate uses are – street traders who setup stalls on the pedestrian ways and also on the road themselves, bus tickets sale booths, solid waste buckets, building materials blocking the footpaths and roads, as well as haphazard and uncontrolled parking of rickshaws and other vehicles. Driver’s behaviors also adversely impact the traffic management.

In this context STP stressed the need for providing better driver’s education and adaptation of strict measures in the issuance of driver’s license, and strict enforcement of traffic management.

Parking

In order to address parking problems, emphasis was laid on development of off-street parking and strict enforcement of restriction in respect of on-street parking at certain hours of the day.

Pedestrian Facilities

Recognizing the fact that the pedestrian facilities in Dhaka are very much inadequate, the STP recommended that “Pedestrian first” policy be adopted, as part of its Urban Transport Policy for development of exclusive pedestrian facilities. These include among others, footpaths, zebra-crossing, foot over-bridges, traffic light supported pedestrian crossing at grade, which could be built at appropriate places to enhance pedestrian safety.

3.2 Planning Principles and Standards

3.2.1 Guiding Principles

In the Detailed Area Plan, recommendations have been made as to how expansion should proceed in the future to ensure best possible physical environment keeping in view the most economic use of land. Since these recommendations or proposals would affect both the natural and socio-economic environments, certain principles are specified in the Dhaka Metropolitan Development Plan (1995-2015) and those principles are considered here as a guiding principles for the preparation of Detailed Area Plan. These principles are as follows:

- Minimize spill-over effects where a landuse in one location imposes environmental or other costs on adjoining sites or the community as a whole.
- Increase efficiency by guiding development to preferred locations and uses.
- Allocate land for infrastructure and community services.
- Create an attractive urban environment.
- Improve distribution of land among different income groups and ensure that benefits accrue to the community.
- Improve living condition for all income groups.
- Effective drainage through minimum hindrance to Flood Flow and Sub-Flood Flow zones.
- Smooth and effective functioning of industries, specially export oriented industries.
- Develop to serve the surrounding hinterlands.
- Safe yet faster connectivity.

3.2.2 Planning Standards

Many standards and codes for guiding and controlling development are found in Bangladesh National Building Code [BNBC], Building Construction Rules and Environmental Act. For ascertaining minimum space requirement for different physical features and functions Private Land Development Rules and for density control of an area Floor Area Ratio [FAR] are the two very important legal instruments. DMDP Structure Plan and Urban Area Plan also have fixed certain minimum standards for certain facilities. All those standards provided in various documents have been studied and then suitable standards for community services, roads etc. have been recommended in DAP. Different standards given in various documents are in following Table No. 3.1, 3.2, 3.3 & 3.4.

Table No. 3.1: Target Standards for Provision of Community Services

Type of Service	Population	Surface Area Needed Per Unit
Primary schools	15000	1 acre
Secondary schools	23000	2 acres
Colleges	---	---
Playgrounds	---	---
Parks	25000	4 acres
Graveyards	Ward basis	Minimum 5 acres
Neighbourhood centres	Ward basis	0.3 acre
Health post	Ward basis	---
Welfare centre	Ward basis	---
Hospital	---	---
Markets	Ward basis	0.3 acre
Police / fire station	---	---

Source: Urban Area Plan, DMDP.

Table-3.2: BNBC Guidelines for Development of Minimum Standard Housing

One Room Houses	Maximum Density	175 units per house
	Minimum Plot in metro area	30 m ²
	Minimum plot outside metro area	40 m ²
	Minimum plot in dense inner city	25 m ²
Two Room Houses	Minimum Plot in metro area	40 m ²
	Minimum plot outside metro area	60 m ²
	Minimum plot frontage	3.5 m ²
	Height limitation	6 storey, but 5 storey preferred

Source: BNBC.

Table-3.3: Road Standards

Road Type	Width of the Road
Main Road	24.0 metre (78 ft) ROW
Arterial Road	14.5 metre (47.5) ROW
Collector Road	13.0 metre (42.6) ROW
Access Road	9.0 metre (29.5) ROW
Access Road	6.0 metre (19.7) ROW
Non Motorized Road	4.0 metre (13.1) ROW
Footpath	2.5 metre (8.2) ROW

Source: Urban Area Plan, DMDP.

Table-3.4: By comparison, the Private Residential project (Plots) Rules 1991, calls for:

Road Type	Width of the Road
Main Road	60 ft
Secondary Road	30 ft
Access Road	20 ft

Source: Urban Area Plan, DMDP.

Planned development ensuring community's active participation is the key to successful transformation of today's Dhaka into tomorrow's adorned green Dhaka. Keeping that vision in mind, Consultants developed an optimum standard for the amenities and community facilities that the city dwellers deserve (Table No. 3.5).

Table-3.5: Facility Standard at Neighborhood Level

Sl.	Name of the Facility	Quantity		Area		
		Min.	Max.	Minimum for Unit Facility	Sub Class Total	Class Total
		(No.)	(No.)			(Acre)
1	Primary School(Public or private)	2	3	1 Acre		3
2	High School(Public or private)	1	2	1.5 Acre		3
3	Open space			10 Acre		12
	i)Park/children's park	1	2	0.3 Acre	1 Acre	
	ii)Water body/ Canal/Pond	As per Planner		1.5 Acre	6 Acre	
	iii)Play field	2	3	1 Acre	3 Acre	
	iv) Green/Vegetation/Water Front	As per Planner		0.5 Acre	2 Acre	
4	Mosque and Maktab/ Worship Places	2	3	0.2 Acre		0.6
5	Library (central)	1	1	0.1 Acre		0.2
6	Services			0.3 Acre		0.5
	i)Dentist/Doctor's Chamber	2	3	40 sq.m	120 sq.m	
	ii) Beauty Parlour	1	2	50 sq.m	100 sq.m	
	iii) Laundry	2	3	16 sq.m	50 sq.m	
	iv) Hair Dresser	2	3	12 sq.m	40 sq.m	
	v) Cyber Café/Internet service provider	1	2	50 sq.m	100 sq.m	
	vi) Photocopy / mobile / land phone / fax	2	2	12 sq.m	40 sq.m	
	vii) Computer based (word processing, printing etc) services	1	1	30 sq.m	30 sq.m	
	viii) Motor bike Repair, vulcanizing etc.(optional)	1	1	50 sq.m	50 sq.m	
	ix) NMT repair service (Rickshaw, bicycle etc)	1	2	30 sq.m	60 sq.m	
	x) Post Office / Courier Services	1	2	20 sq.m	40 sq.m	
	xi) Sports / Recreational facilities(games, indoor games etc)	1	2	50 sq.m	100 sq.m	
	xii) Rickshaw/Auto stand (General)	2	4	100 sq.m	400 sq.m	
	xiii) Restaurant, Tea bar, Fast food	2	4	10 sq.m	100 sq.m	
	xiv) Tailoring	1	2	20 sq.m	40 sq.m	
7	Solid waste transfer station (may also small scale processing)	1	1	0.5 Acre		1
8	Utility Facilities					1*
9	Neighborhood Co-operative Office Complex			0.33 Acre		0.5
	i) Offices	2	4	15 sq.m	60 sq.m	
	ii) Committee rooms	2	3	40 sq.m	120 sq.m	
	iv) Community Club including indoor games (male and female)	2	2	200 sq.m	400 sq.m	
	v) Cultural Facilities (Rehearsal, Music room etc)	1	2	30 sq.m	60 sq.m	
	vi) Community Police Barrack	1	1	40 sq.m	50 sq.m	
	vii) Technician Service (Electrical, Plumber, AC, Freeze etc.)	2	4	25 sq.m	100 sq.m	

Sl.	Name of the Facility	Quantity		Area		
		Min.	Max.	Minimum for Unit Facility	Sub Class Total	Class Total
		(No.)	(No.)			(Acre)
10	Community Hall	1	2	0.33 Acre		0.5
11	Shops			0.33 Acre		0.5
	i) General store	3	4	25 sq.m	100 sq.m	
	ii) Grocery	4	6	25 sq.m	150 sq.m	
	iii) Stationary	2	3	25 sq.m	150 sq.m	
	iv) Confectionary / Bakery	2	3	25 sq.m	80 sq.m	
	v) Departmental Store**	1	2	100 sq.m	200 sq.m	
	vi) Medicine Shop	2	3	25 sq.m	80 sq.m	
	vii) Sweet Meat Shop	2	3	25 sq.m	80 sq.m	
	viii) Book / Newspaper Stall	2	3	10 sq.m	30 sq.m	
	ix) Fresh Corner (Vegetable, fish, meat, egg, chicken etc.)	2	3	12 sq.m	40 sq.m	
	x) Fruit Shop	2	3	10 sq.m	30 sq.m	
	xi) Flower Stall	2	2	10 sq.m	30 sq.m	
	xii) Gift shop	1	2	10 sq.m	30 sq.m	
Total Area for the Neighborhood Facilities				22.8 Acres (approx.)		

* May be added as per decision of the Nagar Unnayan Committee under New use category

**Area under Departmental Store shall be calculated on the basis of the spaces allocated against one of the corresponding services in this table (cumulative area)

Recommended Road Standards

In order to promote development of all roads in a systematic manner, new road standards were recommended for both built up areas, as well as for less built-up areas (Table-3.6). These will replace the old standards, which were included in the DMDP. The standards, when adopted will facilitate earmarking the right of way (ROW) for all major roads.

RAJUK will be required to establish a road classification based on a specific study to identify the primary and the secondary as well as other existing roads based on the volume of traffic carried, and/or their likely importance keeping in view their role in the near future. In order to earmark the ROW for all new primary and secondary roads, road geometric design standards proposed in this Detailed Area Plan (DAP) should be adopted, and initiative taken to implement these strictly, including earmarking the ROWs, where no other typed of development other then roads should be allowed.

It is proposed that the RAJUK should initiate an exercise to carry out the task of "Road Classification" in close collaboration with the DCC, DTCB, RHD and LGED. In the context of City road network. "Road classification" should have at least 4 classes of roads which should follow a hierarchical pattern. For clarity, these roads could be termed as

:

- (a) Primary Roads
- (b) Secondary Roads
- (c) Tertiary Roads
- (d) Access Roads

Table-3.6: Geometric Design Standards

Sl. No.	Class of Roads	Standards recommended under DAP	
		Built-up Area	Less built-up Area
1	Primary Road	80 ft.	170 ft,130 ft,100 ft
2	Secondary Road	60 ft. 40 ft	80 ft,60 ft
3	Tertiary Road	40, 30 ft	40 ft
4	Access Road	24 ft, 20 ft	30ft, 24 ft

To provide further clarity about the quality of the various roads the following details are provided:

Primary Road Type-1: 170ft

This is a dual three lane major arterial road with provision of service lanes for local traffic, shoulder for emergency stop/space for service lines (utility services) and footpaths on both sides of roads. This road type will have limited access points for local traffic to mix with traffic in the main section and this type of road will be designed in such a way that for providing utility services or repairing utility lines, traffic flow will not be disturbed. Non-motorized transports will be strictly prohibited in the main section of this road (Fig-1). Provision of service lanes will keep the traffic in the main section free from local congestion and allow faster movement, thereby bring in efficiency. The space reserved for utility services will keep the road surface free from frequent cuttings, as this space will be covered by removable slab, and the surface could be used a shoulder for temporary parking.

Primary Road Type-2: 130ft

This is a dual two lane major arterial road with provision of service lanes for local traffic, shoulder for emergency stop/space for service lines (utility services) and footpaths on both sides of roads. This road type will also have limited access point for local traffic to mix with traffic in the main section, and will be designed in such a way that for providing utility services or for repairing utility lines, the traffic flow will not be disturbed. Non-motorized transport will be strictly prohibited in the main section of this road (Fig-2)

Primary Road Type-3: 100ft

This is also a dual two lane arterial road with provision of service lanes for local traffic, and provision for shoulder/ space for utility service and footpaths on both sides of roads. This road type will also have limited access point for local traffic to mix with traffic in the main section. Non-motorized transports are strictly prohibited in the main section of this road (Fig-3)

Secondary Road Type-1: 80ft

This is a dual two lane secondary arterial road with provision of shoulder/ space for utility services and footpath on both sides of roads. This road is allowed for movement of mix traffic (Motorized & non-motorized) and will have easy access of local traffic to mix with main traffic. (Fig-4)

Secondary Road Type-2: 60ft

This is a dual two lane secondary arterial road with provision of footpaths on both sides of the road. This road will allow movement of mixed traffic (Motorized & non-motorized), Fig-5.

Tertiary Road Type-1: 40ft

This is a two lane road with provision of footpaths on both sides of the road. It acts as a collector road. This type of road will allow movement of mix traffic (Motorized & non-motorized), Fig-6.

Tertiary Road Type-2: 30ft

This is also a two lane road with provision of footpath on both sides of roads and acts as a collector road. This type of road will allow movement of mixed traffic (Motorized & non-motorized), Fig-7.

Access Road Type-1: 24ft

This is a two lane road with provision of footpaths on both sides of the road. It gives direct access to the plots. This type of road will allow movement of mixed traffic (Motorized & non-motorized), Fig-8.

Access Road Type-2: 20ft

This is a 2-lane road with a 3 ft wide footpath on one side. (Fig-9)

Note: In areas where roads are required to be built on embankments, ROW should include acquisition of extra land, depending on embankment height, and side slope at least 1:1.5.

3.3 Preferred Development Strategies

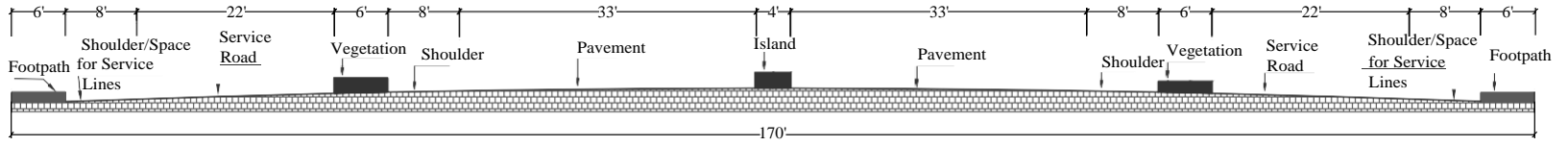
This section contains proposed strategies described for existing urban core area and urban fringe areas. The main focus of the strategies is on the spatial distribution of population. Recommended policies and proposals are those which will need to be adopted in order to achieve the targeted pattern of existing urban and fringe area.

Following key features have influenced the proposed development strategy outlined in the DMDP Structure Plan.

- The DMDP research and past planning studies have recognized the constraints imposed on Dhaka's urban land resources by flood risk. The DMDP further acknowledges the associated serious problem of water logging resulting from urban encroachment on natural depressions and khals.
- The options to reduce and minimize these major constraints rest with utilizing and optimizing naturally flood-free land and carrying out major flood protection works and protecting existing natural depressions and khals.
- Whilst previous plans opted for the former, there are now only minimal supplies of flood-free land south of the Tongi Khal, some 20 km. north of the city center.
- The flood protection projects now underway (FAP-8B), and expected developments related with the Eastern By-pass for FAP-8A, will result in a supply of flood-free land in strategically attractive locations much closer to the heart of the city and its support systems.
- In order to optimize the full potential of existing and potential new development land areas, the areas designated as retention ponds in natural depressions and the city's existing natural drainage system and khals must be protected at all costs.
- Potential sources of affordable flood-free land, with secure tenure in the areas referred to above, will take time before they can begin to accommodate significant proportions of Dhaka's predicted population growth; although the opened up near fringe in the DND triangle and South East may see faster development.
- Acknowledgement of the above facts, in the face of continuing high rates of population growth, the majority of whom will be poor, and development trends, which seek to capitalize on the advantages of centrality, leads to the key principle of the proposed strategy. That is, the adoption of an incremental approach towards achieving spatial change in the structure and pattern of Dhaka's urban development.

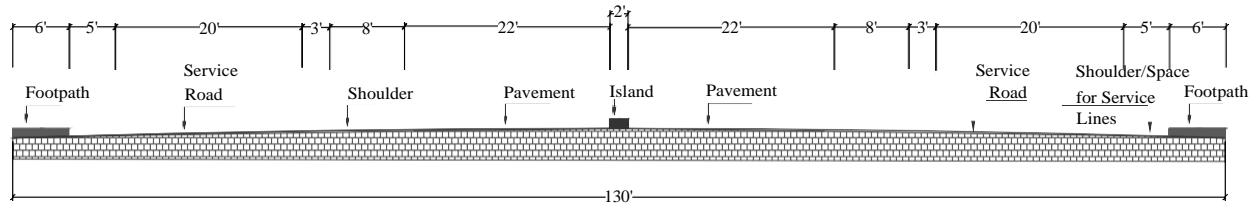
A. Primary Road

Figure:01



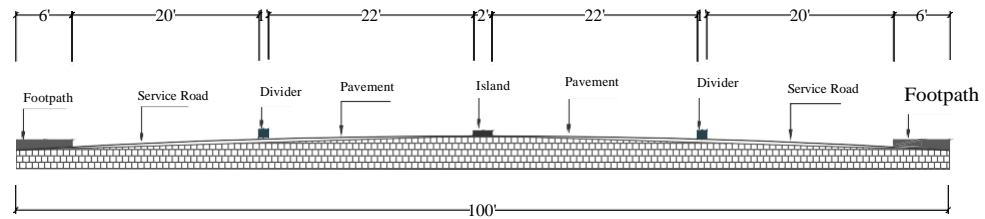
Type - 1 : 170 ft ROW

Figure:02



Type - 2 : 130 ft ROW

Figure:03



Type - 3 : 100 ft ROW

B. Secondary Roads

Figure:04

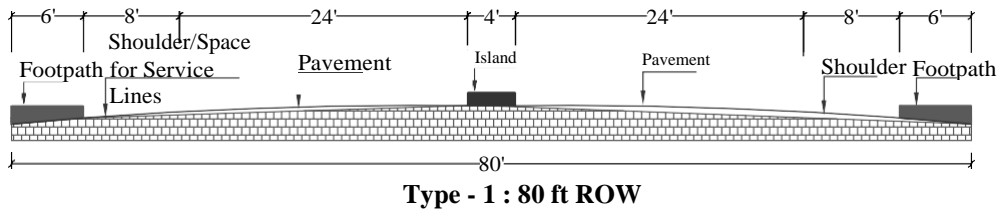
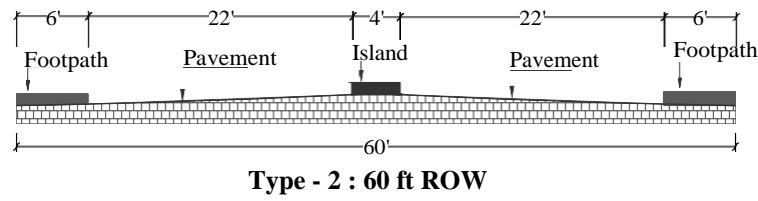
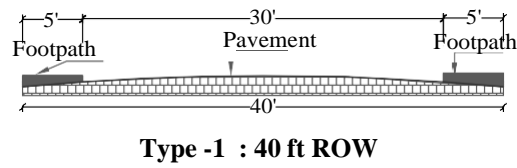


Figure:05



C. Tertiary Road

Figure:06



D. Access Road

Figure:07

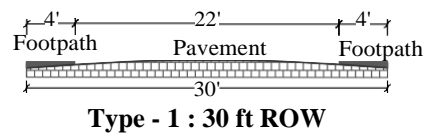


Figure:08

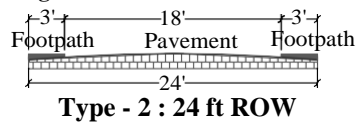
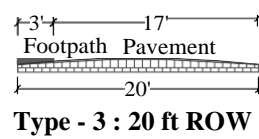


Figure:09



- Acknowledgement of the above facts, in the face of continuing high rates of population growth, the majority of whom will be poor, and development trends, which seek to capitalize on the advantages of centrality, leads to the key principle of the proposed strategy. That is, the adoption of an incremental approach towards achieving spatial change in the structure and pattern of Dhaka's urban development.

The area designated as urban in the DMDP Structure Plan is for strategic planning purposes subdivided into four broad categories and to summarize the impact of the Spatial Development Strategy on future population distribution, the urban sub-areas so defined are-

- Established (pre-1983) urban area;
- Recently (post-1983) urbanizing fringe;
- Proposed flood protected development areas; and
- Dispersed flood free development areas.

Urban Core Area: The designated urban core area of DMDP Urban Area Plan (within Group-A) is Gazipur and Tongi Pourashava. Urban designated core area covers 2,217.88 acres of land spread over about 955.361 acres of land in Gazipur Pourashava while 1,262.53 acres of land in Tongi Pourashava.

Acknowledging the forces of geographical inertia and the core area's important role in the city's economy, the DMDP Structure Plan adopts a strategy of selective and gradual change. The key elements of this strategy are:

- The improvement and upgrading of access to and within the area, with particular emphasis placed on traffic management as the main means of reducing congestion and adopting and optimizing limited and restricted road space.
- To promote comprehensive redevelopment as a means of upgrading existing infrastructure provision on an area basis, in partnership with the private sector where appropriate and feasible.
- To promote comprehensive community based rehabilitation of slum and squatter areas and areas poorly served with infrastructure and social and community services, through participatory and advocacy and planning initiatives involving the community, CBOs and NGOs.
- To limit piecemeal, site-specific site-by-site redevelopment to a scale commensurate with the capacity of existing public rights of way and levels of existing infrastructure services provision.

Tongi has developed as an industrial zone according to the Master Plan of 1959. Gazipur developed as an institutional and important government industrial zone. Dhaka Structure Plan also encourages existing development trend of those two areas. Kaliganj has been developed as a mixed zone. Rupganj is the industrial expansion of the Narayanganj industrial area. Detailed Area Plan encourages existing development trend of the area and considered as a growth centre.

Identification of proper strategies: Some Strategic Intervention of DMDP Urban Area Plan is described below:

- New land delivery and development mechanism coupled with flood land with secure tenure in accessible locations is encouraged.
- The targeted areas would be existing fringe areas, i.e., areas mainly at the periphery of the more established areas where conversion from rural land occurred during the year 1980s.
- Selected peripheral area is identified in the Structure Plan as the likely choice for few new urban developments beyond the realms of Dhaka, it might be reasonable to provide primary infrastructure networks in the designated area to foster development, thus it will enhance the urbanization with assistance of sectoral agencies.
- The designated locations are selected where urban development should be discouraged. This area is flood flow zone and totally rural areas, which should not be developed any way.

Some strategies further summarizes below in brief:

- All other utilities like water supply, sewerage, electricity, telephone and gas must follow their own strategies and policies laid down in the Structure Plan.

- For the municipal service facilities, the Pourashavas must follow their rules strictly. If necessary the law should be amended.
- In the new urban areas where urbanization is flourished rapidly planning principles and standards should be followed.
- Conserve the drainage channels and all other natural canals and watercourses.
- Encroachment should be prohibited in both side of rivers and canals.
- Primary, secondary and community drains should be maintained by private organization and NGOs and CBOs.

Infrastructure: Infrastructure standards are intended for use by sectoral agencies and in land development projects. These standards should be used by the RAJUK to check unwanted development while giving approval to private real estate companies. They can also be useful for RAJUK's own land development projects. DMDP expert's observed limited use of infrastructure standards and also that many aspects are missing in existing rules. They stressed infrastructure standards for different uses and income groups with the capability of incremental improvement. The DMDP made no separate standards for infrastructure, but quoted the Lands Study recommendations standards and put its own suggestions. DMDP felt that these standards require further considerations.

3.3.1 Drainage

Sluice gates, Regulators and Navigation locks: These types of structures are provided on the flood control embankments. Sluice gates are functioning to vent out water from the countryside to the river. Flap gates are generally installed in the riverside so that river water cannot enter into the main land. On the other hand whenever the river water level becomes low and countryside water level is high, countryside water drains out through sluice.

Regulators also serve the similar purpose as sluice gates; however the size of regulators is much bigger than sluice gates. Regulators may have control gates in the countryside and in the riverside. Drainage of water to the river or flashing of water into countryside are possible by operating simultaneously countryside and riverside mechanical gates. Navigation lock sometimes is provided on the flood embankment to allow boat and ferry passages from the river and from the countryside. It is a simple structure with bigger chamber and large lift gates both at riverside and countryside. By operating these gates, boats and river crafts can be transferred from the river to countryside and vice versa.

Drainage sluices, pipe sluices and siphons: Drainage sluices, pipe sluices and siphons are provided on the embankments. Embankments protect the area from floods coming from outside rivers and make the study area free from flood.

However, storm water from rainfall-runoff within the area causes localized flood, drainage congestion and submergence. Rainfall is the source of storm drainage water irrespective of urban or rural catchments. Average annual rainfall in Dhaka is about 2200mm. After infiltration, deep percolation and evaporation is about 50% of this rainfall water takes the form of drainage water for semi-urban and urban areas.

Bridges, Culverts and Box culverts: These structures are provided at places wherever roads cross the drainage network system. Such structures are built on the roads to free passage of drainage water and sometimes to provide navigation / boat passages. Consequently, conflict between drainage and road networks is mitigated.

Physical features survey on river, khal / drainage, etc. were conducted and base map prepared. Details of the bridges, culverts and box-culverts are available in the mouza maps. Database is also prepared showing dimensions and existing conditions of those structures.

Drainage Khals and Waterways: Khals and waterways are natural channels and act as drainage elements. In every mouza more or less such natural channel, khals and waterways carry the excess storm water to the connecting river lying further in the down stream. Sometimes old and silted-up khals are re-excavated to improve drainage efficiency and is termed as Katakhal. Most of the natural khals carry the local storm water particularly runoff from the

Mouza/ Mouzas it passes through. Khals are narrow and deep in cross-sections; on the other hand waterways are shallow and wider.

3.3.2 Residential Development

- Subdivide Residential Landuse Zone based on the potentiality, trend and opportunity.
- Adopt Neighbourhood concept for new residential developments and for need assessment of community facilities.
- Minimize thorough traffic and heavy vehicles within the neighborhoods.
- Provide adequate safe and easy to move and un-interrupted footpaths.
- Ensure community facilities and services of appropriate scale at neighborhood level.

3.3.3 Industrial Development

- Ensure provision of central effluent treatment plant in case of industrial clusters.
- Ensure own treatment plant in case of individual facilities.
- Prohibit high hazard industries within the area.
- Relocate industries from predominantly residential zones in phases.
- Provide essential support facilities for effective functioning of the industries.

3.3.4 Mixed Use Development

- Relocate Noxious and heavy industries to Heavy Industrial Zone within as soon as practicable.
- Allow the red industries to maintain their status under strict abiding conditions until shifting.
- Ensure adequate safety and security of the people especially of the families residing in such mixed zones.
- Provide sufficient quantity of wide, easy to use and safe footpaths.
- Provide zebra crossing at road crossings instead of foot overpass to ease the lives of major portion of low income workers likely to traverse on foot to reach their likely abode in the busy areas.
- Ensure adequate utility services to ensure uninterrupted production.

3.3.5 Transport and Connectivity

In order to develop an integrated and efficient transport system for the area covered by Group-A, the following vision was adopted:

- Development of an efficient, environmentally sound and integrated transport system.
- Public transport to receive priority.
- Providing a role for non-motorized transport (NMT) in urban areas.
- Road hierarchy to be properly established and a new set of road design standards be adopted to meet future requirements.
- All new primary roads to have service lanes.
- Reserve space for service lines on main roads (Primary Roads).
- Complete missing links, both arterial and local, on priority and widen some tertiary roads to make networks for efficient circulation.
- Reserve ROW for all major roads and encourage incremental development of network to ensure cost-effectiveness.

- Provide adequate pedestrian facilities, and off-street parking wherever needed.
- Strengthen traffic management in all sections of urban area.

Future Development of Transport System

Within the framework of existing major national and regional road networks and other transport infrastructures, as well as those road networks proposed by both DMDP and STP which have been adopted as per higher level guidance, a number of new primary and secondary road networks were proposed as part of the Detailed Area Plan for development of less developed areas, keeping in view the existing and futuristic land uses. Before proceeding further with the actual planning of the future transport system, it was necessary to address the critical planning issues identified earlier.

a. Addressing the Critical Issues

In this section, an attempt has been made to suggest certain solutions and strategies to address the various critical issues which were identified earlier in Chapter:-2 of this plan document. The various strategies suggested for addressing those issues are indicated below:

Traffic Management

In order to ensure that road space of the city and the pedestrian facilities are available for the road traffic and pedestrians respectively, it is crucial that traffic management is strictly enforced. The city should have adequate number of transport planners and engineers, as well as qualified and trained police personnel in adequate numbers. These officials should be supported by proper equipments, tools and vehicles as required.

Road Hierarchy and Earmarking Right of Way (ROW)

It is highly important that a proper "Road Classification" be adapted for the city of Dhaka, to facilitate the development of various roads in an organized manner. A revised "Geometric Design Standard" has already been suggested as part of the Detailed Area Plan (DAP). The road classification needs to be completed soonest so that the city roads could be improved/ developed in line with the new geometric design standards. Once the "Road classification" has been completed and the revised "Geometric Design Standard" has been adopted, ROW should be strictly earmarked permanently on the ground for all new roads.

More East-West road links needed

The major road network of Dhaka has a number of North-South corridors. But due to limited number of East-West links, congestion builds up easily in different parts of the network. The STP has suggested a large number of east-west links to provide a grid-iron pattern of road network for the city. The DAP has adopted that strategy and it is recommended that the authorities concerned take appropriated steps to build those east-west links which form part of different Development Planning Zones (DPZ).

Pedestrian Facilities

During the preparation of the Urban Transport Policy for Dhaka, as part of the Strategic Transport Plan (STP) for Dhaka, it was observed that the pedestrian facilities in Dhaka, compared to the requirements, are grossly inadequate. The Detailed Area Plan (DAP) has therefore, laid special emphasis to provide footpaths and other pedestrian facilities in all the areas proposed for development. Widths of footpaths, however, may vary depending on the category of the road.

Parking

Considering the fact that available parking space is grossly inadequate in entire city of Dhaka, special care was taken to identify spaces which were earmarked for development of off-street parking. In congested urban areas, on-street

parking may have to be restricted at least during the park hours to avoid congestion. In this context, strict enforcement of the restriction in respect of on-street parking needs to be considered.

Non-motorized Transport (NMT)

Since most of the road networks in Dhaka are narrow, the public transport in the form of buses can not provide services to all areas of the city. Again the availability of footpath being very limited, pedestrians have very little opportunity to walk safely along most of the roads in the city. As a result, NMTs, particularly the rickshaws, are providing a very important service to the city dwellers who are living in inner dense areas of the city. Such a role, as a feeder service to the residential areas, is the most suitable role that NMTs, particularly rickshaws, should continue to play. The DAP has reserved such a feeder service role for rickshaws. It has been proposed that rickshaws should not play on major roads, which should be available for faster movement of motorized traffic.

Public Transport

In order to better utilize the limited circulation space available for traffic movement, it is crucial, among others, to reform the public transport system of Dhaka. In parallel with the initiatives to introduce Bus Rapid Transit (BRT) and Mass Rapid Transit (MRT), there is a need to reorganize the bus transport operation in Dhaka. To bring in efficiency, it is highly important to reorganize fragmented bus owners (more than 1000 in number) into co-operatives to facilitate introduction of bus route franchising system. This would bring in discipline in bus transport operation and release some of the road spaces which the buses forcefully and wrongly use. The franchised bus company will be responsible to maintain the bus stops, provide bus-bays wherever possible and provide organized ticket booths.

b. Development of the Road Network

In order to provide opportunities for infrastructure led development, it is necessary to promote an arterial system having North-South and East-West corridors following the guidelines provided by RAJUK. Depending on the landuse proposed for a particular area, strategic road networks were proposed at an interval of around 1500-2000m in the North-South direction and 2000-3000m in the East-West direction. In terms of road classification, these strategic corridors could be termed as primary. These strategic roads were proposed in such a way that a Grid-iron pattern is developed so that several alternative routes are available for movement in East-West and North-South directions.

In case of residential areas and areas where mixed landuses are proposed, primary roads were proposed in line with the guidelines indicated above, so that no one is required to walk for more than 10 minutes to reach up to a primary road where buses / public transport are expected to run. In proposing these strategic corridors, adequate attention has been given to the existing major National and Regional highways as well as those proposed in the DMDP and STP, so that an integrated network is developed.

In order to propose secondary road networks, emphasize was given on the existing and future requirements of land. In case of residential areas and mixed landuses, secondary road networks were proposed at 500m to 1000m distances so that mobility within the area is facilitated. Within the area covered by secondary networks, tertiary and access roads were proposed to enhance circulation and access to properties, as shown in the Development Planning Zone (DPZ) maps.

In deciding the alignment of new primary, secondary and tertiary roads, adequate care was taken to avoid such alignment where road widening will call for demolishing large number of structures already built, although many of these were built without RAJUK's permission.

In built-up areas, it was recommended to complete some of the missing links, and widen some of the narrow sections to form a network of minor roads which could facilitate easy circulation of Non-motorized Transport (NMT) and provide better accessibility of the residents to major networks of the city.

Most of the major road networks were proposed to be kept free from Non-motorized Transport (NMT). The narrow roads were proposed for widening to at least 20 ft. if not 24 ft. to facilitate movement of "Fire Engines" in case of fire hazards.

In the areas which are still less developed and of mostly agricultural, emphasis was laid to earmark the strategic road networks and not to allow any development within the right of way (ROW) of those networks.

To facilitate earmarking the right of way (ROW), necessary for different classes of roads, some standards were worked out and recommended for both built-up and less built-up areas, as shown in the next section.

3.3.6 Flood Flow Zones

In the Structure Plan, two types of flood zones were earmarked namely Main Flood Flow Zone and Sub-flood Flow Zone. Any type of development except agriculture and in some cases roads and drainage, no other development was permitted. But in reality, controlling Sub-flood Flow Zone is being very difficult because of existence of some flexibility in using this zone mentioned in the Structure Plan. Therefore, in order to provide stricter measures to safeguard flood plain areas, in the current detailed Area Plan, these two types of zone have been merged and named Flood Flow Zone

It is already mentioned in Chapter-2 that Land development within the designated flood plain areas requires control to avoid obstruction to flood flow, which might otherwise result in adverse hydraulic effects like rise of flood water levels and change in flow direction. Development activities on those lands would be suicidal. The Detailed Area Plan has also preserved those flood flow lands as prescribed in the Structure Plan but in one gross category namely Flood Flow Zone. In some cases, where road and drainage construction is necessary, proposals have been given in such a way that it never disturbs the natural water flow on flood flow lands.

3.3.7 Non-urban Areas

Non-urban areas are considered as urban fringe area and defined as the area which was developed in post 1983 era. They will take some more decades to reach the population densities of the urban core. Low initial densities in these areas do not justify supply of full range of services as they will initially be underused. However, it is essential that planning and reservation of rights of way, at least for primary networks, be undertaken soon to enable provision when justified by increased density levels and aptly allowed by resources. In line with the spatial strategy of gradual change, major investment in satellite or new towns is accorded very low priority in the timeframe of the DMDP Structure Plan. This development option capitalizes least on existing and presently committed urban infrastructure investments, and fails to address the shelter needs and priorities of the urban majority, including the urban poor, and the existing low mobility levels of this group and its need for close proximity to employment opportunities.

In the longer term, north of the DMDP area at Tongi / Gazipur and in the north-west and at Savar/Dhamsona, are conditioned sufficiently propitious to enable public sector investment in new town development. The DMDP Structure Plan's strategy for dispersal is that priority locations in metropolitan Dhaka are those, which benefit from elements, optimize resource expenditure, minimizes development costs, most importantly, acts as a catalyst for appropriate and affordable development. The key elements of this strategy are:

- Relatively high, flood-free land;
- Minimal conflict with high quality/yield agricultural land;
- Existing transport links to Dhaka city and between the location and other regional centers;
- An existing core settlement or settlements;
- The vesting of an existing urban economic base;
- Existing institutions of government;
- Ease of infrastructure provision, particularly water and electricity;
- Relatively low land costs affording secure tenure rights;
- Impetus of current development trends.

On the basis of these criteria, there are only two locations in the DMDP Structure Plan area for consideration in the planned period upto year 2015. The designated area which falls under Group-A is the area of Tongi and northwards to Gazipur.

Large areas under Group-A have been demarkated as urban fringe area including peripheral area in the DMDP Urban Area Plan. Urban peripheral designated areas covered 11386.847 acres land spread over in Gacha , Pubail , Baria of Gazipur Thana, Bakterpur (part), Nagori (part), Tumulia (part), Kaliganj (part) of Kaliganj Thana, Daudpur (part), Rugganj (part), Kayetpara, Murapara, Golakandail, Kanchan (p), Tarabo , Bholta of Rugganj Thana, and Sadipur, Jampur (part), Kanchpur (part) of Sonargoan Thana. The development trend, both of appropriate road network and basic infrastructure and services, is comparatively slow in the above-designated fringe areas. As predicted by higher-level plans, some of the fringe areas has been transformed into core area and peripheral area into fringe or core area.

3.3.8 Water Body and Open Spaces

Large tanks, ponds, Dighis, lakes, etc. serve as immediate retention areas for storm water. Those structures are man-made and also natural; may be privately owned or government owned or khas land. These water bodies function as drainage relief and source of water for emergency use, fisheries, duckeries, environment and nature/ecological preservation. In every mouza such reservoirs are available. Physical feature survey maps and field survey maps show the existence of tank, pond and reservoirs and database shows their dimensions. In the Detailed Area Plan those water body and open spaces have been suggested to be preserved and not to be disturbed by any development.

3.3.9 Amenities and Community Facilities

- Consider neighborhood concept of residential development for estimating community facilities and amenities requirement.
- Prohibit construction of religious structure unless built on its own land.
- Relocate unauthorized religious structures from road right of way to safeguard greater interest of the people specially the city dwellers.
- Evacuate unauthorized structures and uses from road right of way to safeguard greater interest of the people specially the city dwellers.
- Close/relocate existing schools with highly inadequate class rooms, play field and essential facilities and gradually replace with standard one, one unit per 12000 population per acre.

3.3.10 Solid Waste Management

- Provision of dumping ground in a suitable location.
- Recycling plant near the dumping ground.
- Door to door collection of solid waste.
- Involvement of Local Govt. Authority and NGOs with the collection and management procedure.

3.3.11 Water Supply

- Safe and available drinking water for the inhabitants.
- Extraction of ground water as minimum as possible.
- Involvement of Local Govt. Authority or DPHE for extraction and distribution of water.

3.3.12 Electricity

- Connection of electricity with all households in the study area.
- Involvement of DESA/REB with the electricity distribution system.
- No system loss encouraged in the plan.

3.3.13 Gas Supply

- Encourages increasing and expanding natural gas supply network where necessary.
- Titas Gas Transmission and Distribution Authority may be responsible for this.

3.3.14 Conservation of Monument and Heritage

- Encourage conservation of monuments in their original form, colour and structure.
- Encourage conservation of existing heritage sites and proposed new heritage sites where necessary.
- Discourages unauthorized occupation and administrative use in the monumental buildings.

3.3.15 Environmental Management

The major environmental issues and parameters that may be affected by the implementation of the proposed project components, as well as an assessment of the current status of these issues and parameters have been discussed in Chapter-2. Mitigation measures are essential to be considered for all potential impacts during construction and operational phase on the natural environment, which comprises of the physio-chemical and ecological aspects. Mitigation measures on social environment will include human interest, quality of life, resettlement issues, etc. The mitigation measures are described below:

Mitigation Measures

For Controlling Change in Climate & Topography

- Careful planning to minimize the change of topography.
- Avoid water bodies during planning of roads, housing and industrial estates.
- Practice good architectural / engineering design during planning of housing estates, buildings and the intersections of main roads.
- Enhancement of plantation and gardening to increase the scenic beauty of the city.
- Preserve the Beels, khals as lakes with clear demarcation of buffer distance.

For Controlling Landuse Change

- Careful planning to reduce change of agricultural landuse and rural setup.
- Keep water bodies and productive agricultural land free from urban development as far as possible. Vertical development may be encouraged rather than horizontal.
- Economical use of land.

For Controlling Drainage Congestion

- Re-excavate the Tongi and Chelai Khal, Hyderabad Khal and Vadam Khal and all primary khals, and renovate the secondary and tertiary drains.
- Make proper drainage network in new area considering the slope and local topographical condition.
- Remove all unauthorized structures, which has been developed on drainage structures.
- Prohibit the people from dumping of rubbish and solid waste in drain.
- Regular cleaning and maintenance by the concerned authorities.
- Demarcation of water bodies, which can act as retention pond to avoid waterlogging from heavy rainfall.
- Demarcation of Right of Way to preserve the natural channels.

For Controlling Surface Water Pollution

- Suggestions are given for implementation of proper effluent control from polluting sources on both sides of Balu and Sitalakkhya Rivers and other small canals.
- Create underground sewerage system for the existing urban area.
- Use pucca latrine with septic tank and soak well.
- Prohibit indiscriminate dumping of medical and solid waste in drainage, khals, beels and rivers.
- Improve sanitation condition of slaughterhouse, fish market and katcha bazars.
- Prohibit the direct discharge of wastewater to any khals, beels and rivers.
- Establish wastewater and sewerage treatment plant.

For Controlling Groundwater Table Declination

- Introduce rainwater harvesting system and use in the study area.
- Stop land filling of ponds and water bodies to maintain the groundwater level through recharge and leaching process.

For Controlling Groundwater Pollution

- Use surface water of Sitalakkhya River for water supply system.
- Introduce rainwater-harvesting system.
- Reduce dependency on groundwater.
- Preserve surface water in ponds, khals, Beels, ditches and rivers for irrigation.

For Controlling Loss of Wetlands

- Cutting of drainage outlets to the beels and ponds.
- Stop housing estate, industries and other development work on wetlands.
- Stop earth filling of ponds in the study area through creation of public awareness.
- Strict implementation of Wetland Conversation Act, 2000.

For Controlling Noise Pollution

- Stop using hydraulic horn in buses, trucks and other motor vehicles.
- Declare some areas like hospitals, schools, parks, etc. as designated silent zone.
- Special type of silencer may be attached with the noise-making machines to reduce noise.
- Welding and blacksmith workshops can be fenced with glasses to protect the passersby from possible pollution effects.

For Controlling Air Pollution

- Use catalytic converter in buses, trucks, taxis, cars and tempos.
- Use CNG instead of petrol.
- Set up 120 ft. high stack in brickfields and use filter to reduce the CO, SO₂ and NO_x gases in atmosphere.
- Stop operation of brickfields near the homesteads, bazars and growth centers.
- Impose ban on movement of sand carrying trucks and conservancy vehicles during office period.

For Controlling Loss of Habitat

- Careful planning to avoid the sensitive ecosystem.

- Minimum use of land for urbanization.
- Preservation of water bodies, Khals and Beels.
- Initiate people to avoid felling of trees and clearing of vegetation.

For Controlling Loss of Biodiversity

- Avoid critical ecological area from development activities.
- Create aware among people for keeping some fruit trees and bushes around the homesteads.
- Increase tree plantation in roadsides and homesteads.
- Preserve the Beels for aquatic birds and fishes and some bush areas as wildlife preservation sites.
- Ban on hunting of birds and wildlife.

For Controlling Loss of Capture Fisheries

- Stop direct drainage outfall to rivers, khals and Beels.
- Set up sewerage and wastewater treatment plant. Several waste treatment plants have been proposed in Gazipur and Tongi Pourashava.
- At the early monsoon, keep open the gates of sluices and regulators during spawning period of fish.
- Strict regulation on land filling of Beels, khals and rivers.

For Controlling Loss of Ponds and Fisheries Culture

- Execute the Tanks Improvement Act, 1932 to stop land filling of ponds.
- Create public awareness about the importance of ponds and its role in culture fisheries, bathing and water reservoir for surface run-off during monsoon.
- The area of ponds which are equal or more than one acre cannot be filled up and must be preserved.

For Controlling Loss of Productive Agriculture Land

The EIA Guidelines given by the DOE should be emphasized in avoiding productive (high value) agricultural land during any development project. The urban expansion and land acquisition should be based on the growth rate of urban population.

For Solid Waste Management

- Formation of legislation regarding solid waste management
- Incentive for introduction of environmentally clean and efficient technology for waste disposal, which would help reduce the volume of waste and facilitate more recycling of urban waste.
- Development of separate collection and disposal system of different types of wastes such as domestic, industrial and clinical.
- Maintenance of adequate data regarding waste generation, composition and characteristic.
- There is tremendous possibility of involving NGO's and CBO's in solving solid waste problem. NGOs can act as intermediaries between government, municipal authority and CBOs. It can serve as linkage between government, local level and community. For these reasons, more NGOs and CBOs involvement should be enhanced in the solid waste disposal system; at present NGO's like BASA, Practical Action and World Vision in Gazipur Pourashava are carrying out similar job.
- For efficient management of solid waste activities vehicles maintenance and cleaners (sweepers) should be under one Division for better coordination and control.
- Introduction of new taxation system for conservancy operation.

For Water Supply

- About 13 more numbers of DTWs are to be installed for proper supply of water for the area.
- Water supply distribution pipeline is to be expanded for giving new house connection by installing required number of additional DTWs.
- Perform regular repair and maintenance work of existing water supply line in study area periodically.
- Expand the water supply pipelines in all areas.
- Set up more water treatment plants to treat the hardness, manganese, iron and arsenic of groundwater.
- Rainwater harvesting program may be taken for the supply of pure drinking water.

For Controlling Traffic Congestion

- Restrict licensing of new rickshaws.
- Move central bus terminal to its new location near Upazila road of Gazipur Pourashava.
- Strict implementation of traffic rules to improve traffic management.
- Relocation of Truck Terminal to avoid traffic congestion in Dhirassram near ICD of Gazipur Pourashava and beside Tongi Bishwa Estema for Tongi Pourashava area.

For Controlling Fire Hazard

- Set up more new fire stations. Several fire service stations have been proposed in Gazipur and Tongi Paurashava area.
- Collect modern fire fighting devices.
- Refrain people from using low quality electrical wire in buildings and industries.
- Ensure periodical checking of electric lines.
- Create awareness of people about fire hazards.
- Ensure fire-fighting devices in new industries, high-rise buildings and markets.
- Ensure sufficient width of road for access of fire-fighting vehicles.

3.3.16 Supporting the Surrounding Hinterland

- Easy accessibility from the surrounding hinterlands, especially growth centers.
- Ensure facilities such as cold storage, wholesale/retail market facilities for needful commodities (fertilizer, insecticide, agro-machineries etc.) and shopping centers of regional standards to support population living in the surrounding hinterlands.

3.4 Major Infrastructure Proposals

Infrastructure standards are intended for use by sectoral agencies and in land development projects. These standards should be used by RAJUK to control undesired development while giving approval to private real estate companies. They can also be useful for RAJUK's own land development projects. DMDP expert's observed that limited use is made of infrastructure standards and also that many aspects are missing in existing rules.

In the detailed area plan recommendations have been made as to how expansion should proceed in the future to ensure best possible physical environment keeping in view the most economic use of land. Since these recommendations or proposals would affect both the natural and socio-economic environments, certain principles were specified in the Dhaka Metropolitan Development Plan (1995-2015), as follows; which were adopted by DAP.

- Minimize the spill-over effects where a landuse in one location imposes environmental or other costs on adjoining sites or the community as a whole.

- Increase efficiency by guiding development to preferred locations and uses.
- Allocate land for infrastructure and community services.
- Create an attractive urban environment.
- Improve distribution of land among different income groups, and ensure that benefits accrue to the community.
- Improve living condition for all income groups.

3.4.1 Transport

Planning of Transport Network

To facilitate planning of local land use and transport system at the local level, the study area of Group-A has been divided into a total of ten DPZs. A detailed write-up has been developed for each of those DPZs and presented along with the proposed road networks. (Ref. Section 3.6). The following Table-3.7 & Table-3.8 show the major road proposals of Group-A. (Map-3.2)

Table-3.7: Proposed Road Network

ROAD_ID	PROPOSALS	PROPOSED ROAD WIDTH (FEET)	LENGTH (M)	AREA (ACRE)
EW-P-1	Road Widen up	80	4686	28.106
EW-P-2	Newly Proposed Road	80	2636	15.769
EW-P-3	Newly Proposed Road	80	5632	33.819
NS-P-1	Road Widen up	80	4339	26.011
NS-P-2	Road Widen up	130	11201	100.968
EW-P-4	Road Widen up	130	21389	193.072
EW-P-5	Newly Proposed Road	130	6613	59.505
NS-P-3	Road Widen up	130	9379	84.508
EW-P-6	Newly Proposed Road	130	9716	95.567
EW-P-7	Road Widen up	100	3303	24.694
NS-P-4	Newly Proposed Road	100	8986	75.393
NS-P-5	Newly Proposed Road	100	2226	16.584
NS-P-6	Newly Proposed Road	80	925	5.436
EW-P-8	Road Widen up	80	4178	25.041
NS-P-7	Road Widen up	130	23	0.001
EW-P-9	Newly Proposed Road	80	2291	13.669
NS-P-8	Road Widen up	130	24678	182.785
NS-P-9	Road Widen up	100	92	0.066
NS-P-10	Road Widen up	100	9669	72.563
NS-P-11	Road Widen up	100	5884	44.147
EW-P-10	Newly Proposed Road	80	8221	49.421
NS-P-12	Road Widen up	80	12040	72.436
EW-P-11	Road Widen up	80	10623	63.898
EW-P-12	Newly Proposed Road	100	8515	63.954
EW-P-13	Road Widen up	80	4692	28.154
NS-P-13	Road Widen up	10	8	2.00
NS-P-14	Road Widen up	80	6969	41.742
EW-P-14	Road Widen up	80	2971	17.768
EW-P-15	Newly Proposed Road	80	1910	11.389
EW-P-16	Road Widen up	80	1461	8.688

ROAD_ID	PROPOSALS	PROPOSED ROAD WIDTH (FEET)	LENGTH (M)	AREA (ACRE)
NS-P-15	Road Widen up	170	7922	100.982
EW-P-17	Road Widen up	170	14746	188.418
NS-P-16	Road Widen up	170	4479	56.984
NS-P-17	Road Widen up	170	23428	299.453
EW-P-18	Newly Proposed Road	120	9911	89.318
NS-P-18	Newly Proposed Road	100	4652	34.805
NS-P-19	Newly Proposed Road	80	3579	21.435
EW-P-19	Newly Proposed Road	80	10079	60.598
NS-P-20	Newly Proposed Road	130	1866	16.569
EW-P-20	Road Widen up	100	10575	79.467
NS-S-29	Newly proposed road	60	806	3.575
EW-S-59	Proposed widening	60	2496	11.218
EW-S-62	Proposed widening	60	6919	31.202
EW-S-13	Newly proposed road	60	4345	19.571
NS-S-78	Proposed widening	60	4541	20.459
NS-S-82	Proposed widening	60	8719	39.340
NS-S-54	Proposed widening	60	1812	8.125
EW-S-40	Proposed widening	60	388	1.688
NS-S-26	Newly proposed road	60	687	3.032
EW-S-74	Proposed widening	60	1440	6.441
EW-S-72	Proposed widening	60	2692	12.099
NS-S-76	Proposed widening	60	590	2.601
EW-S-73	Proposed widening	60	976	4.346
NS-S-77	Proposed widening	60	603	2.659
NS-S-72	Proposed widening	60	1244	5.558
NS-S-74	Proposed widening	60	1168	5.213
EW-S-71	Proposed widening	60	2319	10.416
EW-S-16	Newly proposed road	60	816	3.622
EW-S-89	Proposed widening	60	884	3.932
EW-S-18	Newly proposed road	60	498	2.184
NS-S-49	Proposed widening	60	973	4.330
EW-S-37	Proposed widening	60	735	3.254
NS-S-43	Proposed widening	60	935	4.159
NS-S-42	Proposed widening	60	1113	4.965
NS-S-85	Proposed widening	60	1235	5.514
NS-S-44	Proposed widening	60	960	4.273
EW-S-80	Proposed widening	60	807	3.580
NS-S-83	Proposed widening	60	469	2.054
NS-S-84	Proposed widening	60	636	2.807
EW-S-15	Newly proposed road	60	802	3.551
EW-S-36	Newly proposed road	60	853	3.788
EW-S-17	Newly proposed road	60	888	3.949
NS-S-45	Proposed widening	60	650	2.872
EW-S-49	Proposed widening	60	1205	5.383
EW-S-50	Proposed widening	60	1179	5.261
NS-S-56	Proposed widening	60	1326	5.925
EW-S-41	Proposed widening	60	266	1.138

ROAD_ID	PROPOSALS	PROPOSED ROAD WIDTH (FEET)	LENGTH (M)	AREA (ACRE)
EW-S-42	Proposed widening	60	339	1.465
EW-S-47	Proposed widening	60	1181	5.274
EW-S-48	Proposed widening	60	825	3.665
NS-S-20	Newly proposed road	60	2400	10.782
EW-S-20	Newly proposed road	60	1696	7.598
NS-S-51	Proposed widening	60	938	4.176
EW-S-38	Proposed widening	60	1031	4.381
EW-S-39	Proposed widening	60	455	1.990
NS-S-52	Proposed widening	60	486	2.129
NS-S-71	Proposed widening	60	1873	8.398
NS-S-68	Proposed widening	60	1651	7.387
NS-S-23	Newly proposed road	60	2508	11.268
EW-S-19	Newly proposed road	60	2583	11.608
NS-S-22	Newly proposed road	60	390	1.695
NS-S-34	Newly proposed road	60	8720	39.332
NS-S-46	Proposed widening	60	2031	9.064
NS-S-41	Newly proposed road	60	3285	14.782
EW-S-81	Proposed widening	60	2600	11.685
EW-S-51	Proposed widening	60	1440	6.353
NS-S-25	Newly proposed road	60	959	4.270
EW-S-67	Proposed widening	60	1514	6.776
NS-S-35	Newly proposed road	60	744	3.295
EW-S-29	Newly proposed road	60	812	3.618
NS-S-27	Newly proposed road	60	2840	12.768
EW-S-54	Proposed widening	60	2400	10.780
NS-S-59	Proposed widening	60	2799	12.576
NS-S-36	Newly proposed road	60	5534	24.943
NS-S-65	Proposed widening	60	3497	15.739
NS-S-37	Newly proposed road	60	1002	4.465
NS-S-53	Proposed widening	60	1102	4.916
EW-S-56	Proposed widening	60	2625	11.795
NS-S-64	Proposed widening	40	741	2.192
NS-S-32	Newly proposed road	40	785	2.335
NS-S-73	Proposed widening	40	1217	3.638
EW-S-88	Proposed widening	40	604	1.791
NS-S-81	Proposed widening	40	339	0.991
NS-S-80	Proposed widening	40	814	2.424
EW-S-77	Proposed widening	40	292	0.849
EW-S-76	Proposed widening	40	211	0.608
NS-S-55	Proposed widening	40	293	0.853
EW-S-35	Newly proposed road	40	245	0.710
EW-S-75	Proposed widening	40	380	1.115
NS-S-79	Proposed widening	40	103	0.281
NS-S-47	Proposed widening	40	949	2.831
NS-S-48	Proposed widening	40	575	1.703
NS-S-19	Newly proposed road	40	596	1.767
EW-S-44	Proposed widening	40	807	2.402

ROAD_ID	PROPOSALS	PROPOSED ROAD WIDTH (FEET)	LENGTH (M)	AREA (ACRE)
EW-S-46	Proposed widening	40	899	2.680
EW-S-45	Proposed widening	40	992	2.960
NS-S-57	Proposed widening	40	212	0.610
NS-S-58	Proposed widening	40	428	1.259
EW-S-68	Proposed widening	40	1044	3.116
EW-S-32	Newly proposed road	40	620	1.838
EW-S-69	Proposed widening	40	896	2.670
EW-S-43	Proposed widening	40	328	0.960
EW-S-64	Proposed widening	40	1503	4.498
NS-S-62	Proposed widening	40	1248	3.730
NS-S-75	Proposed widening	40	551	1.631
EW-S-21	Newly proposed road	40	722	2.146
EW-S-34	Newly proposed road	40	1004	2.996
EW-S-70	Proposed widening	40	1777	5.325
NS-S-69	Proposed widening	40	1464	4.381
EW-S-66	Proposed widening	40	1239	3.705
EW-S-30	Newly proposed road	40	691	2.053
EW-S-61	Proposed widening	40	771	2.301
NS-S-31	Newly proposed road	40	279	0.812
NS-S-63	Proposed widening	40	309	0.901
EW-S-27	Newly proposed road	40	2201	6.605
EW-S-28	Newly proposed road	40	515	1.523
NS-S-33	Newly proposed road	40	589	1.745
EW-S-65	Proposed widening	40	1316	3.712
NS-S-66	Proposed widening	40	1712	5.089
NS-S-40	Newly proposed road	40	815	2.454
NS-S-70	Proposed widening	40	790	2.350
NS-S-61	Proposed widening	60	2230	10.014
EW-S-58	Proposed widening	60	1527	6.825
EW-S-26	Newly proposed road	60	1766	7.904
NS-S-24	Newly proposed road	60	3014	13.547
EW-S-52	Proposed widening	60	1161	5.182
EW-S-53	Proposed widening	60	14	0.000
NS-S-50	Proposed widening	60	651	2.861
EW-S-14	Newly proposed road	60	593	2.605
EW-S-91	Proposed widening	60	3762	16.855
EW-S-63	Proposed widening	40	1998	5.987
NS-S-39	Newly proposed road	40	1350	3.989
EW-S-24	Newly proposed road	60	2839	12.840
EW-S-92	Proposed widening	40	1445	4.324
EW-S-31	Newly proposed road	60	408	1.770
NS-S-67	Proposed widening	60	357	1.537
EW-S-33	Newly proposed road	40	613	1.815
NS-S-0	Proposed widening	60	740	3.277
NS-S-28	Proposed widening	60	2419	10.862
NS-S-60	Proposed widening	60	2459	11.048
NS-S-9	Proposed widening	40	1730	5.185

ROAD_ID	PROPOSALS	PROPOSED ROAD WIDTH (FEET)	LENGTH (M)	AREA (ACRE)
EW-S-9	Proposed widening	40	1768	5.299
NS-S-14	Proposed widening	40	601	1.782
EW-S-60	Proposed widening	40	1943	5.879
EW-S-22	Newly proposed road	40	2872	8.598
NS-S-1	Roads and Highway	60	7810	35.229
NS-S-30	Newly proposed road	60	4354	19.602
NS-S-3	Newly proposed road	40	1477	4.420
EW-S-55	Proposed widening	60	1817	8.126
EW-S-95	Proposed widening	30	1542	3.469
EW-S-4	Newly proposed road	60	5289	23.837
NS-S-2	Proposed widening	40	1614	4.835
NS-S-4	Newly proposed road	40	691	2.053
NS-S-12	Proposed widening	40	2478	7.436
NS-S-6	Newly proposed road	30	1018	2.283
NS-S-18	Newly proposed road	40	1733	5.193
EW-S-12	Newly proposed road	40	2017	6.048
NS-S-10	Newly proposed road	40	2143	9.618
EW-S-1	Newly proposed road	60	2140	9.605
EW-S-10	Newly proposed road	30	920	2.063
NS-S-13	Newly proposed road	40	1133	3.383
NS-S-15	Newly proposed road	40	1650	4.948
EW-S-7	Newly proposed road	40	671	1.992
EW-S-6	Newly proposed road	40	847	2.523
NS-S-16	Newly proposed road	60	588	2.590
NS-S-17	Proposed widening	40	553	1.638
EW-S-2	Proposed widening	40	991	2.957
EW-S-3	Newly proposed road	60	2126	9.542
NS-S-21	Newly proposed road	60	4293	19.279
EW-S-25	Newly proposed road	60	1768	7.916
EW-S-57	Proposed widening	60	2125	9.528
EW-S-94	Proposed widening	30	2068	6.209
EW-S-8	Newly proposed road	40	1151	3.439
NS-S-11	Newly proposed road	60	3980	17.922
EW-S-11	Newly proposed road	40	660	1.959
NS-S-8	Newly proposed road	40	430	1.265
NS-S-5	Newly proposed road	40	677	2.012
EW-S-23	Newly proposed road	60	5298	23.876
NS-S-0	Newly proposed road	40	4666	14.031
EW-S-90	Newly proposed road	40	853	2.541
NS-S-	Newly proposed road	40	1360	4.067
NS-S-7	Newly proposed road	40	7514	22.610
EW-S-93	Proposed widening	60	3609	16.246
EW-S-5	Proposed widening	40	1638	4.887
NS-S-38	Newly proposed road	40	3007	8.985

3.4.2 Drainage

Drainage of the Group-A study area comprises of Tongi Pourashava, Gazipur Pourashava, Pubail, Kaliganj, Rupganj and part of Sonargaon and Narayanganj Thana. A small part of Tongi and Joydevpur Thana lying west of Dhaka-Mymensingh highway within Group-A drains to Tongi khal towards southwest into Turag River. Rest of Tongi Pourashava storm water is drained towards southeast to Tongi khal to Balu River drainage system.

In Gazipur Pourashava, Joydevpur, Pubail area, storm water is drained by Chelaikhal Khal, Sitalakkhya River and Balu River and its flow direction is from south and southeast before it cross Pubail Railway Bridge. Sutikhal and Gazipur khal, both tributaries of the Balu River, serve drainage function of Baria Union and Kaliganj area. The Balu River, further down of Balu Bridge to Demra, collects drainage water of Tumulia, Nagori, Rupganj Unions and discharges into Sitalakkhya.

In the southernmost tip of the study area; old Brahmaputra from Sonargaon to Dhaleswari River serves the drainage function of Sonargaon, Kanchpur and Jampur Union of the area. There is a khal originating from northern part of Kanchpur Union and passes through Dhaka-Chittagong highway at Madanpur and Uttar Chandpur. All the rivers and their tributaries and distributaries serve as drainage arteries of the study area.

In terms of flood protection, the DMDP recommended the FAP protection strategies to be strictly followed. These are embankments and associated works, and flood ponds. Essential components of drainage system are Retention Pond and Pumps to drain out excess water. Retention pond may be defined as an open body of water accumulating in a naturally occurring low area for collection and temporary storage of storm water falling in a peak rainfall period for later discharge into receiving bodies of water through natural drainage or by pumping. People's participation or involvements are necessary to secure the land for retention ponds, because four indicative locations of proposed retention pond by the DMDP Structure Plan are mostly private land. Presently those lands are used mostly for agricultural purposes while a small part of this land is covered by low laying areas or water bodies. To store and discharge the excess storm water by pumping and to ease the drainage system, immediate implementation of retention pond is of utmost importance. To reduce the extensive pressure on man made drainage system, implementation of retention pond at any cost is very essential and at the same time it would also save the natural channel.

The Sitalakkhya River is the main river passing through the Group-A Study area. Kaliganj Railway Bridge is the starting point of Sitalakkhya River and its ending point is the Kanchpur Union of Sonargaon Thana. There are several tributaries of Sitalakkhya River that serve different parts of the study area. These are Tumulia khal, Purbachal khal, Kanchan khal, Baniadi khal and Turki khal. The Metropolitan area becomes subject to flooding whenever these rivers are flowing over the banks. During unprecedented flood of 1988 about 80% of the metropolitan area was submerged. Flood Action Plan (FAP) committee recommended for protection of Dhaka City from severe floods under FAP-8. FAP-8 has two components FAP-8A and FAP-8B. The embankment proposed in the FAP-8B can protect mainly DCC area and FAP-8A embankment will protect Dhaka east area. FAP-8A embankment will start from Tongi Bridge and will follow Tongi khal, the Balu River and will end at Demra near the confluence of the Balu and Sitalakkhya Rivers.

Flood protection by embankment creates special situation for providing internal drainage from storm water. Drainage problems may be solved by special drainage related structures such as network of drains and khals, culverts, sluice gates, regulators, reservoirs, retention ponds, pump stations, etc.

Group-A planning area is just adjacent and outside the FAP-8A proposed flood embankment. Implementation of FAP-8A embankment will promote adverse hydraulic effects in the Balu and Sitalakkhya Rivers. Flood flow, water levels and flood flow zone will increase and erosion, sedimentation and flood frequency will also increase. In planning Group-A area, these issues have carefully been examined and addressed and necessary structural measures have been considered. The unprotected side of the Balu River, Tongi khal and both sides of the Sitalakkhya River within the study area may require embankments to keep the proposed planning area flood free.

Drainage would be developed in accordance with the proposed FAP proposals. For land development, main concerns are to collect street drainage and minor run-off, and to direct the storm water into the main watercourses. For street drainage, covered box drains are recommended for the built up areas and open drains for the outer areas.

Devastating effect of 1988 flood is still evident in the study area. In Ghorasal and Palash thanas, about 30 people died and many livestock were killed, house and properties were lost. The Rajuk East Rugganj areas were also affected. In Detailed Area Plan, careful attention has been given on flood protection embankment and floodwalls. In existing situation, there are flood embankments and walls along Sitalakkhya River between Kanchpur Bridge to Kanchan Bridge and also in Tumulia in Kaliganj. Physical infrastructure survey and field survey have covered these items and the maps prepared from survey and database so prepared represent detailed information.

No embankment is proposed along the remaining boundary in the North, West and south of the study area, because entire area is flood free area except few scattered area bordering the project. This scattered area has got no drainage problem. The northern part of the additional area is being drained through the drainage channel (J3).

The southern part is drained through the tributaries of Hyderabad khal. This additional area is a high land and no embankment will be required. If required, one village road from Kunia on the Tongi-Mymensingh Road, towards east meeting Railway Road just south of Gazipur Pourashava, may be upgraded. The length of this road is about 2.75 km. crossing the Hyderabad khal. The Consultants propose one Pump-cum-Regulator at the junction point of above-mentioned road and Hyderabad khal.

Flood Protection Proposal: Tongi Area

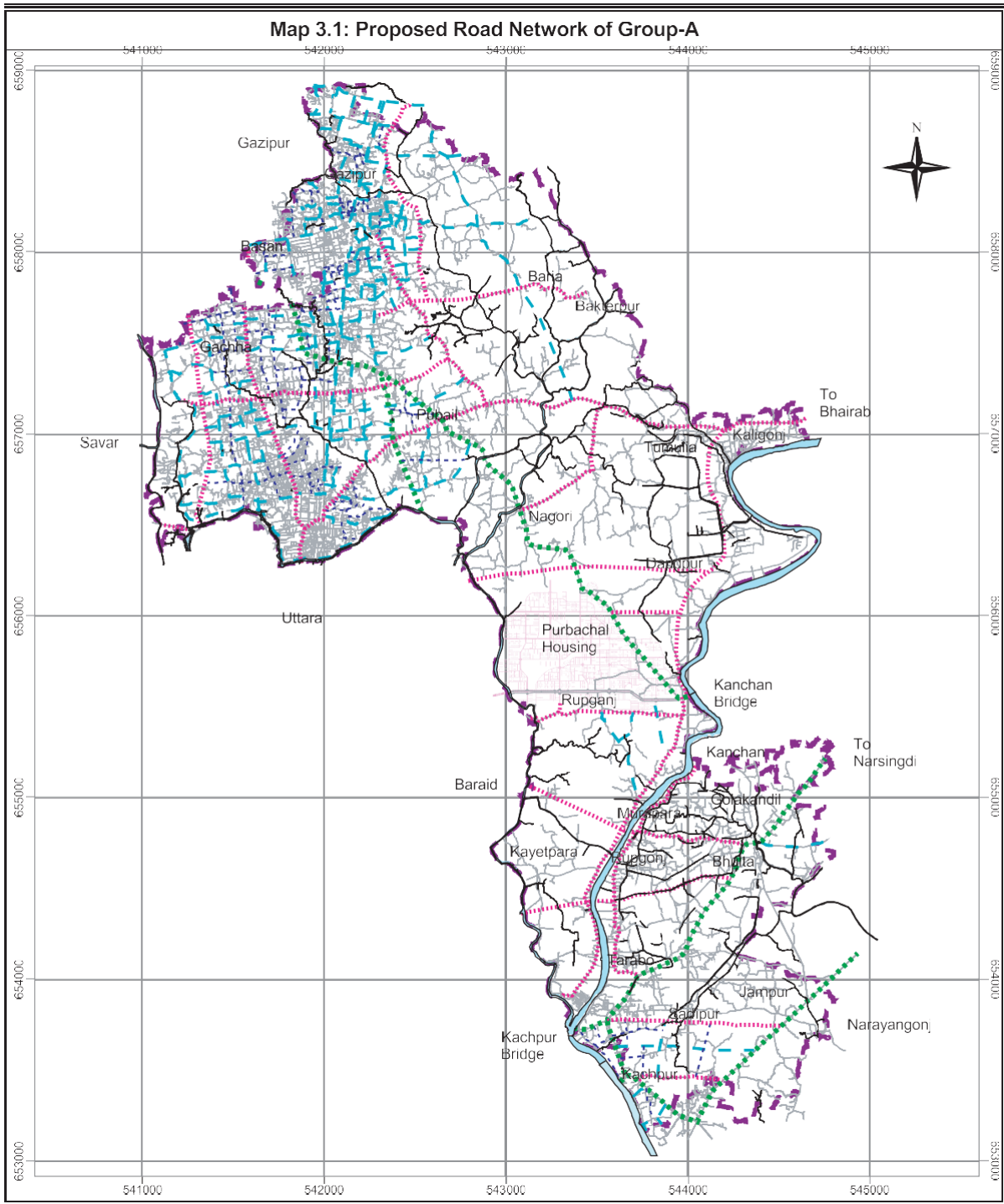
Tongi area is flooded by excess storm water flow and over flow of khal and backwater flows from Tongi Khal. Cent percent flood proofing is not feasible at the development stage. However, to reduce the impact of external flood, an embankment from north-west corner of the study area is proposed along the bank of Bangsi and Tongi River keeping sufficient set back distance for flood flow and sub-flood flow zones in Bangsi and Tongi Khal till reaches Harbaid and continues as shown in planning map. The length of embankment-cum-road would be approximately 17 kilometers.

Drainage Proposal: Tongi Area

It is proposed that a network of Plot, Mahalla and Main drains should be developed and implemented by the Pourashava authority and the main drains are to be connected with Guchutia Khal at west and Haidrabad Khal at east. Sluices will be provided at the outfall of both Guchutia Khal and Haidrabad Khal on the embankment-cum-road. However, no pump stations are provided (pump station is necessary) it may cause temporary drainage congestion during high water levels in Bangsi River and Tongi Khal.

Flood protection proposal: Gazipur to Demra area

It is not possible to provide 100 percent flood proofing or flood control for such a large area, as such limited flood mitigation measures are proposed to reduce the impact of flooding. The Sitalakkhya River flows on its own course from the origin to junction of Chilai khal, but Chilai khal from study area boundary to its outfall at Balu River will be provided with road-cum-embankment on both sides to restrict spreading of floodwater. At down stream, the road embankments at both sides will be wider to control flood depth. Similarly, the Gazipur khal and Suti Khal is proposed to have embankment starting from the study area boundary to the Junction of Nagda River, Ulokhola and Balu River in Pipulia. Still downstream, both Nagda River and Ulokhola River will be embanked by roads on both sides of the rivers. The road to road distance will be adequately maintained to accommodate discharges of these rivers within wider flood flow and sub-flood areas. The Jamuna Bridge linking Dhaka by-pass will cross these rivers with bridges on Nagda River and Ulokhola River.



<p>CONSULTANT Development Design Consultants Ltd. 17 Mirsharifi C/A, Dhaka 1212, Bangladesh Divine Associates Limited</p>	<p>Detailed Area Plan for DMDP Area, Group-A</p>	<p>CLIENT Government of the People's Republic of Bangladesh Ministry of Housing and Public Works Rajdhani Unnayan Karttripakkha (RAJUK)</p>																			
<p>INDEX MAP DMDP AREA</p>	<p>LEGEND</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;"> <ul style="list-style-type: none"> Project Boundary Existing Road Proposed Road (Feet) 12 15 20 24 </td> <td style="width: 33%;"> <ul style="list-style-type: none"> 30 40 50 60 64 80 86 88 </td> <td style="width: 33%;"> <ul style="list-style-type: none"> 100 120 130 160 170 272 300 </td> </tr> </table>	<ul style="list-style-type: none"> Project Boundary Existing Road Proposed Road (Feet) 12 15 20 24 	<ul style="list-style-type: none"> 30 40 50 60 64 80 86 88 	<ul style="list-style-type: none"> 100 120 130 160 170 272 300 	<p>NOTES</p> <p>Data Source GPS & Total Station based advanced topographic physical feature and landuse survey conducted by Development Design Consultants Ltd.</p> <p>Reference Bench Mark (BM) + SDB 542-0101 and SDB 542-0102 for Latitude (Northing) & Longitude (Easting) + SDB 542 and SDB 6039 for Reduced Level (RL) measurement</p> <p>Projection Parameters</p> <table style="width: 100%; border: none;"> <tr> <td>Projection System</td> <td>Bangladesh Transverse Mercator (BTM)</td> </tr> <tr> <td>Spheroid</td> <td>Everest 1830</td> </tr> <tr> <td>Scale Factor</td> <td>0.9999</td> </tr> <tr> <td>Central Meridian</td> <td>90 degree East</td> </tr> <tr> <td>False Easting</td> <td>500,000 Meter</td> </tr> <tr> <td>False Northing</td> <td>+2000,000 Meter</td> </tr> <tr> <td>Latitude of Origin</td> <td>0 degree (Equator)</td> </tr> <tr> <td>Seven parameters for User Defined Datum</td> <td>283.726, 735.942, 261.143, 0.0, 0.0, 0.0, 1.0</td> </tr> </table>	Projection System	Bangladesh Transverse Mercator (BTM)	Spheroid	Everest 1830	Scale Factor	0.9999	Central Meridian	90 degree East	False Easting	500,000 Meter	False Northing	+2000,000 Meter	Latitude of Origin	0 degree (Equator)	Seven parameters for User Defined Datum	283.726, 735.942, 261.143, 0.0, 0.0, 0.0, 1.0
<ul style="list-style-type: none"> Project Boundary Existing Road Proposed Road (Feet) 12 15 20 24 	<ul style="list-style-type: none"> 30 40 50 60 64 80 86 88 	<ul style="list-style-type: none"> 100 120 130 160 170 272 300 																			
Projection System	Bangladesh Transverse Mercator (BTM)																				
Spheroid	Everest 1830																				
Scale Factor	0.9999																				
Central Meridian	90 degree East																				
False Easting	500,000 Meter																				
False Northing	+2000,000 Meter																				
Latitude of Origin	0 degree (Equator)																				
Seven parameters for User Defined Datum	283.726, 735.942, 261.143, 0.0, 0.0, 0.0, 1.0																				

Tongi Khal embankment-cum-road will cross both Nagda and Ulokhola River. Nagda River will be cross-dammed by Road. However, Ulokhola will be kept open and may be bridged.

Tongi Khal embankment will continue to run down-stream and will meet Purbachal flood protection embankment. Again, the Tongi Khal embankment-cum-road will emerge from Isapura Bazar and will terminate at proposed secondary road as shown in the planning map.

There exists an irrigation and drainage project in Tumulia, Daudpur and Nagari Union Parishads. Name of this project is North Rugganj Water Conservation Project. Area of this project is 3000 Ha or 7500 acres. It has flood protection embankment from Tumulia along Sitalakkhya River to Putina. This is a self-content area with road, embankment, pump station and embankment-cum-road. The area is shown in the plan maps and conversion of the area for use other than agricultural is restricted by the Government of Bangladesh.

A 100 feet wide road-cum-embankment from Dhaka Kaliganj regional road is proposed that will follow the route as shown in the plan map. This will meet with the existing Narayanganj-Kaliganj road about 500m before the bridge over Balu River. This road-cum-bridge will allow sufficient flood flow zone along the Sitalakkhya River. As far as possible no opening will be allowed for flow of Sitalakkhya floodwater in this part of the study area. The Sitalakkhya floodwater will be able to flow into the area only from the meeting point of the Sitalakkhya and the Balu River near Demra. This will reduce up-rush of the backwater flood flow into Balu River that involves lower rate of flooding and less inundation.

The area between Demra to Naora is kept as flood flow area for storing more water for supply to Saidabad water treatment plant in order to maintain quality control of water pumped from Sitalakkhya River. The approximate area for flood flow zone in this triangle is about 3000 acres.

Drainage proposal: Gazipur to Demra Area

Gazipur Pourashava area is covered by tertiary, secondary and main drains and these need regular cleaning and maintenance. Where the drain sections are inadequate and narrow, these should be widened and deepened. Intersections of the drains should be made sufficiently wide and free from deposition of silt and debris. Two important khals, Chilia Khal and Chetalkha Nadi needs to be re-excavated and un-authorized occupation be removed. Lowlands in this course should not be filled up for land development. Chilai khal meets with Gazaria khal and Suti Khal at the upper reach at Pubail Bridge. Gazipur Khal and Suti Khal traverse through Bilbelat, Baria, Khoyer, etc. Related mouzas are involved with very low land areas and should not be considered for land filling rather it should be kept at natural state as water retention for flood flow areas. Agriculture and fisheries should be encouraged in those areas. Nagda River should be cutoff at its origin at Tongi Khal and it should be re-excavated from origin to its outfall with Ulokhola River. There are two bridges in the mid reach of both Nagda River and Ulokhola River on the Dhaka-by-pass and should be kept sufficiently wide and open.

North Rugganj Water Conservation Project with an area of about 7500 acres in Tumulia, Daudpur and Nagari Upazila exists and further attention for drainage improvement within the project is not required. Local drainage issues in the vast study area may not be fully addressed at present but be considered during design and implementation of the relevant issues should solved as required.

As proposed in the plan, the Sitalakkhya River water will not be allowed to enter in this area through road-cum-embankment. As such the existing khals such Naora Khal, Harina River and Kayetpara Khal are to be improved. The Naora Khal is to be re-excavation starting from off-take to outfall at Balu River. The Harina River needs closing near the Sitalakkhya River at the proposed road-cum-embankment point and excavation to proceed toward the Balu River meeting point. The Kayetpara Khal like Naora khal should be re-excavated from its off-take to outfall at the Balu River.

The Sitalakkhya River from Demra to Dhaleswari is observed to become narrow by encroachment and this may cause drainage problem. Remedial measures to be taken as prescribed in the DMDP. Proper River training program and dredging program of the Sitalakkhya River may solve the issue.

Flood Protection Proposal: RAJUK East Rupganj Area

RAJUK East Rupganj Area has already been covered in flooding and drainage proposal as above. It is within Rupganj and Baidyer Bazar Thanas of Narayanganj district. The area is about 23,200 acres. There are two FCDI Project here. NNIP Demonstration unit covers 1300 hectares or 3250 acres and NNIP-Block A-I covers c3000 hectares or 7500 acres. Besides these protected areas, remaining study area which unprotected from flood, amounts to about 12,450 acres. These two projects are FCDI type; they have all infrastructures required for development. Moreover, there is specific landuses within the projects that cannot be changed or converted for other purposes. Conversion will require specific permission from relevant Ministries. Keeping these issues in view, the area that needs protection from flood is the area outside the Block-AI and DU of NNIP at east side from Gausia Petrol pump towards Sylhet along both sides of the highway. This area covers less than 3000 acres and predominantly is a lowlying area. Proposal for any flood protection on these areas is deemed not to be cost effective and rather be avoided.

The area south of DU is about 9000 acres and is protected already by DU embankment at north, Dhaka-Chittagong and Dhaka-Sylhet road at west, Madanpur-Narsingdi road at south and newly built Dhaka by-pass at east. In order to make the area flood protected, two existing bridges on Dhaka by-pass between Nuapur and DU embankment need to be gated. The portion south of MN road may be omitted from flood embankment proposal for the time being.

Drainage Proposal: RAJUK East Rupganj area

For similar reasons as above, FCDI projects have drainage sluices and one pump station at Jatramura for DU and another at Baniadi. The facilities are good enough for drainage of total 10750 acres. The south of DU area between MN road and DU drains to old Brahmaputra through two bridge openings on Dhaka by-pass.

Two small parcels of land outside the area do not have artificial flood protection and drainage system. Local people request improvement of drainage within FCDI protection, which is to be addressed by Bangladesh Water Development Board.

3.4.1 Utility Services

Water supply: The DMDP conceived the future basic water supply system to be piped water, which extracts water from ground sources and warned that excessive water extraction from underground might deplete the reserve. As such advised to impose control on private extractions. Private developers should be encouraged to connect to the municipal system where possible. The outlined standards cover the basic requirements for water supply including main distribution lines and shared community supply, including public standpipes. The DMDP also viewed that the present extraction of water by existing pipe might endanger healthy supply. The report recommended introduction of specific one-way meters to solve the problem and that system has also been encouraged in the Detailed Area Plan. The consultants recommend that both surface and ground water sources should be exploited with major emphasis on surface water.

Electricity Supply: Regarding supply of electricity, the DMDP raised such issues as:

- Location of power lines;
- Adequate line clearances;
- Locations for transformers; and
- Street lighting arrangements.

Communal arrangements are suggested for the low-income neighborhoods.

The consultant recommends the supply of electricity in accordance to the above issues in the DPZs under this plan.