



**Government of the People's Republic of Bangladesh
Ministry of Local Government, Rural Development & Cooperatives
Local Government Division**

**BHANGA PAURASHAVA
MASTER PLAN: 2011-2031**

January 2015



Government of the People's Republic of Bangladesh
Ministry of Local Government, Rural Development & Cooperatives
Local Government Division

BHANGA PAURASHAVA MASTER PLAN: 2011-2031

STRUCTURE PLAN

URBAN AREA PLAN:

- Landuse Plan
- Transportation & Traffic Management Plan
- Drainage & Environmental Management Plan

WARD ACTION PLAN

January 2015



BHANGA PAURASHAVA
BHANGA, FARIDPUR

BHANGA PAURASHAVA MASTER PLAN: 2011-2031

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BHANGA PAURASHAVA MASTER PLAN: 2011-2031

PREFACE

Bangladesh has been experiencing rapid urbanization in the last four decades where level of urbanization has reached from 7.6% to nearly 29% between 1970 and 2011. Multidimensional complex factors like; socio-economic, political, demographic and climatic are responsible for this higher growth of spatial transformation. The fast urbanization is putting pressure on the small towns' limited land, urban services and environment along with countries big cities. Whereas urbanization is also considered as an opportunity and an integral part of the development process. Proper development plans and guidelines with necessary legislative measures and appropriate institutional arrangement can help to achieve sustainable urban as well as rural development.

However, presently, the Paurashavas has the legal mandate to take initiatives of formulating development plans, providing infrastructure and other services and creating opportunities for people to initiate developments with sustainable and harmonic approach. In this regards, Bhanga paurashava had initiated steps to frame its' Master Plan (Physical Development Plan) by taking technical assistance from the Local Government Engineering Department (LGED). LGED under the Local Government Division of the Ministry of Local Government, Rural Development and Cooperatives initiated a project titled 'Upazila Towns Infrastructure Development Project (UTIDP)' providing all sorts of technical assistances to prepare long term physical development plan titled 'Master Plan' for Bhanga Paurashava.

Master Plan of Bhanga Paurashva has been prepared following the pre-requisite of the Local Government (Paurashva) Act, 2009. To prepare the Master Plan, LGED engaged consulting firm named Development Design Consultant Ltd. and set up a Project Management Office (PMO) deploying a Project Director, Deputy Project Director, experienced Urban Planners as Individual Consultant and support staffs. Regular monitoring, evaluation and feedback from PMO had also accelerate the pace and quality of the master plan preparation tasks. During formulation of the Master Plan, the Paurashava authority along with the project & the Consultant ensure people's opinion, observation and expectation in various ways: conducting sharing meetings, Public Hearing etc. At the end of the formulation process, the Paurashava completed all procedures necessary for its approval as per the related clauses and sub-clauses of the Local Government (Paurashava) Act, 2009. Pourashava Authority has submitted this Plan to the Local Government Division of the Ministry of Local Government, Rural Development and Cooperatives for final approval and gazette notification.

This Master Plan comprises of three tier of plan in a hierarchical order, these are: Structure Plan for 20 years, Urban Area Plan for 10 years and Ward Action Plan for 5 years. Urban Area Plan also comprises of three components namely; Land use plan, Traffic & Transportation Management plan and Drainage & Environmental Management Plan. This Master plan will serve as guidelines for the future infrastructure development of Bhanga Pourashava together with land use control and effective management of service facilities.

The Paurashva Authority acknowledges the full support and all out cooperation from the consultant team, the Project Management office of UTIDP, LGED, Local Government Division of the Local Government, Rural Development and Cooperatives Ministry, public representatives, other stakeholders and civil society with deepest gratitude for accomplishing this remarkable assignment.

Cooperation and participation from national to local authorities, all government institutions, private entities and people of Bhanga Paurashava will be necessary to implement this Master Plan successfully and make this Paurashava developed and livable. I hope Bhanga Paurashava will be a model Paurashava in Bangladesh through building itself green and sustainable by successful implementation of this Master Plan.

(.....)

Mayor,
Bhanga Paurahsava

EXECUTIVE SUMMARY

The term “Master Plan” is a guideline for future development. This guideline is being resulted on specific issues. The Government of Bangladesh has committed to prepare the Paurashava master Plan for ensuring the Paurashava environment livable. At present, development scenery of the Paurashava shows a very grave situation. Primary and secondary drains and natural streams are not functioning as an integrated drainage system due partly to silting up and unplanned and deficient construction and lack of maintenance. Encroachment on drainage reservations causes inundation to many areas, including houses and roads, during heavy storms. There is hardly any roadside drain and if any, the roadside drains are inadequate due to insufficient capacities and incorrect gradients.

Equally, traffic and transportation problems in the Paurashavas in Bangladesh are continuously increasing as the development and management of road network has not been commensurate with the increasing demand for its usage. Traffic congestion, delay, accidents, pedestrian and parking difficulties, air and noise pollution are among the problems. Traffic congestion is one of the most important and critical problems now being identified in the Paurashavas. The situation has been steadily deteriorating over time, over large areas and for longer periods of the day. If this unplanned construction goes on unabated it will make the environment of the Paurashava unsuitable and inhabitable. At present, there is no proper Master Plan for development of Paurashava to overcome those problems. In the absence of proper Master Plan construction of all types of infrastructure like houses, roads, drains, markets are going on unabated in an unplanned manner. This situation is creating an adverse milieu in the original landscape thereby creating environmental hazards.

It appears that planned development of Paurashava is very important. In view of this grave situation it has, therefore, been contemplated that preparation of Master Plan is being made with projection for a period of 20 years. Further, in support of the Master Plan there are separate plans named Landuse Plan, Drainage and Environmental Plan, Traffic Management Plan, Community Services Plan and Ward Action Plan to ensure operation and maintenance of the existing infrastructure along with those facilities proposed to be built up under the future investment program and above all, to suggest improvement of the management ability of the Paurashava Authority so that their revenue earning capability will be enhanced with a view to building up the Paurashava Authority as self-sustaining local government institution. The Master Plan will also suggest construction of roads and bridges / culverts, drainage facilities, streetlights, markets, bus stands, solid waste management, sanitation, water supply and other such infrastructure facilities.

This is the primary effort of planned development for the Bhanga Paurashava, guided by the LGED under Package-10 of the Upazila Towns Infrastructure Development Project (UTIDP). It is expected that the implementation of the plan will induce higher level of development, ensure planned life, good community and better future of the Paurashava inhabitants.

The Bhanga Paurashava was established in 1st March 1997 under the jurisdiction of Bhanga Upazila in Faridpur Zila, between 23°17' and 23°28' north latitudes and between 89°55' and 90°06' east longitudes. The Paurashava is bounded on the north by Faridpur Upazila, on the south by Rajoir, on the east by Shibchar Upazila and on the west by Bhanga Upazila.

The Paurashava is 'Kha' category. The concern Ministry uses this word for fund allocation and administrative arrangement) and consists with 9 Wards and 11 mouzas. The Paurashava is located at south central part of Bangladesh and about 60 km. (through Maowa) away from the Dhaka City.

The jurisdiction area of Bhanga Paurashava is 2560.90 acres (10.33 sq. km.) and in this plan about 1082.8 acre of land is proposed to extend in the eastern part of the Paurashava. So total planning area 3643.7 acres (14.75 sq.km.).

According to the Census Year 2011, 34150 populations are living in the planning area with gross density 13.3 persons per acre and it will be 50593 in 2031 with gross density 19.75 persons per acre.

In the Paurashava, agriculture occupies 1413.00 acres and residential and circulation network occupy 556.40 acres and 70.30 acres of land respectively. An area of 284.20 acres is covered with water bodies.

The Paurashava is a naturally developed area. Planning effort yet not been taken by the public authority. Therefore, a mixed landuse scenario is viewed all over the Paurashava. About 6 to 10 meter earth filling will be needed for every development activities in the Paurashava. So, bulk development should not be encouraged due to the huge cost involvement.

Almost all the Wards have no sewerage system and toilets are mostly consists of sock pits. Overall garbage disposal system is poor. Garbage Dumping Ground is not available and mostly disposes on open streets. Wastes collect by the NGOs but not well organized all over the planning area.

Bhanga Paurashava bears rural influences and agriculture is the major source of income. Average monthly income per household is Tk.8500. No substantial saving of the income is found.

The Upazila Towns Infrastructure Development Project (UTIDP) of LGED requires that one of its outputs is a comprehensive set of plans for Bhanga Paurashava. The proposed set of plans consists of Structure Plan, Urban Area Plan and Ward Action Plan.

The Structure Plan sets out a long-term strategy – covering the twenty years from 2011 to 2031 for urban development and the use of land in the Paurashava Town as a whole. It extends to the entire area demarcated by the Consultant. The document sets out a series of policies to be pursued, if the broad objectives set for development of the Paurashava to be achieved. In Structure Plan around 127.4 acre core area, 884.67 acre fringe area, 270.9 acre new urban area and 85.89 acre peripheral area have been proposed to ensure future policy guideline.

The Urban Area Plan elaborates policies of the Structure Plan as far as they affect the area where urban development activity will be concentrated. The plan, therefore, is limited to the existing urban area and its immediate surroundings. It is for a period of ten years, covering the period from 2011 to 2021. In providing more detailed guidance available in the Structure Plan, it gives greater precision to the spatial dimension of the Structure Plan policies. The Urban Area Plan includes landuse Plan (urban residential area 869.63 acre, circulation network 262.38 acre , education and research 58.65 acre, community facility 19.36 acre etc), Traffic and Transportation Plan (around 94.6 km proposed road , one bus and one truck terminal), Drainage and Environmental Management Plan (around 83.6 km proposed drain) and Plan for urban Services.

The Ward Action Plan provides guidance for areas where major change or action is expected in the short-term (5 years). According to the individual Ward of the Paurashava, this plan provide further the policies and proposals of both the Structure Plan and Urban Area Plan in more detailed and guidance for the control, promotion and coordination of development.

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LIST OF ABBREVIATIONS AND ACRONYMS

BBS	: Bangladesh Bureau of Statistics
BDT	: Bangladeshi Taka (Currency)
BM	: Bench Mark
BTCL	: Bangladesh Telecommunication Company Limited
BWDB	: Bangladesh Water Development Board
CBO	: Community Based organization
CS	: Cadastral Survey
DGPS	: Differential Global Positioning System
EMP	: Environmental Management Plan
EPA	: Environment Protection Authority
GCP	: Ground Control Points
GIS	: Geographic information System
Govt.	: Government
GPS	: Global Positioning System
H.Q.	: Head Quarter
H/hold	: Household
JICA	: Japan International Cooperative Agency
KM/ km	: Kilometer
LAN	: Local Area Network
LCC	: Lambert Conformal Conic
LGED	: Local Government Engineering Department
LPG	: Liquid Petroleum Gas
MV	: Motorized Vehicle
NGO	: Non-Government Organizations
NMV	: Non Motorized Vehicle
O-D	: Origin – Destination
Orgs.	: Organizations
PCU	: Passenger Car Unit
PD	: Project Director
PMO	: Project Management Office
R.F.	: Representative Fraction
RHD	: Roads and Highways Department
RoW	: Right of Way
RS	: Revenue Survey
RTK-GPS	: Real Time Kinematics Global Positioning System
SoB	: Survey of Bangladesh
SPSS	: Statistical Package for Social Science
TCP	: Temporary Control Point
TIN	: Triangulated Irregular Network
ToR	: Terms of Reference

CHAPTER 1

INTRODUCTION

1.1 Background of the Paurashava

As per the Local Government (Paurashava) Act 2009, the Paurashavas of Bangladesh categorize as A, B and C classes based on annual income of the Paurashava. Bhanga is a B category Paurashava with an area 2560.9 acres (10.33 sq.km.) includes 11 mouzas and 9 Wards.

The Bhanga Paurashava is located in the Bhanga Upazila under Faridpur Zila, between 23°17' and 23°28' north latitudes and between 89°55' and 90°06' east longitudes. The Paurashava is bounded on the north by Faridpur Upazila, on the south by Rajoir, on the east by Shibchar Upazila and on the west by Bhanga Upazila.

With the active participation of the Paurashava authority, the Consultant has identified the Paurashava existing jurisdiction 2560.9 acres (10.33 sq. km.) and 3643.7 acres (14.75 sq.km.) for planning area (extension area 1082.8 acre). Among the nine Wards, Ward No. 2 has occupied largest area (377.90 acres) and Ward No. 8 is the smallest (165.20 acres). Existing 10.66 sq. km. land is considered for the preparation of Structure Plan area and 10.33 sq. km. as planning area.

Bhanga Paurashava was established in 1st March 1997. Nothing is definitely known about the origin of the Upazila name. It is learnt that, in the past, the police station was established in Kumarganj Bazar. This Kumarganj Bazar was frequently shifted from one place to another by the local Zamindars due to river erosion. In consequence of repeated breaking (meaning Bhanga in Bengali) the name of this Bazar along with the name of the Thana was changed into Bhanga.

Physiographically, Bhanga Paurashava area is same as other Paurashavas (who are on floodplain land) in Bangladesh. It's southern and northern parts are covered by agriculture land. A branch of Padma River named Kumar River flows in the middle from northwestern to southeastern side. The Paurashava is consisted with 9 Wards. Ward No.2, 4 and 9 are developed than other Wards.

During demarcation of planning area for Structure Plan, the urban development along both sides of the major inter-district road network and around the market places was given importance. Development along the Dhaka to Barisal via Madaripur Road and Dhaka to Khulna via Bhatiapara Road are considered.

Due to the growth and potentiality of Bhanga Bus Stand planning area has been expanded towards the Charjanajat Ferry Ghat. In order to accommodate urban development along the inter-district roads, an area of 2660.90 (more 100 acres than the planning area) has delineated as the Structure Plan area. The area is under the jurisdiction of same mouzas (continuation of the mouzas under Paurashava boundary).

The Bhanga Intersection (about 500 meter away from the Bhanga town centre) is the entry point of the 17 districts located in the southern part of the country. In total, 42% people are engaged with large and small business. Those business activities are being transacted in most of those 17 districts. Local agriculture production is mostly transacted in those districts. The plan emphasizes on the linkages of Bhanga Paurashava with other

districts and at the same time business activities which will bring substantial economic benefit to the Paurashava dwellers.

Nature of the plan means that its contents should remain valid for the duration of the plan. However, in the rapidly changing circumstances of urban development in Bangladesh, it is prudent that the plan is reviewed at regular intervals, of say 5 years.

Table 1.1: Basic Information of the Planning Area

Location	Area (acre)	Area (sq.km.)	2011		2031	
			Population	Gross density / acre	Population	Gross density / acre
Bhanga Paurashava	2560.90	10.33	34150	13.33	50593	19.75
Planning Area (with extension)	3643.7	14.75	34150	9.3	50593	13.9

Source: Bangladesh Population Census, 2011 and Estimated by the Consultant.

1.2 Objectives of the Structure Plan

To guide long term growth within the Structure Plan Area by means of demarcation of the future growth areas and indication of potential locations of major development areas includes: a) indication of important physical infrastructure; and b) setting out policy recommendations for future development. According to the Terms of Reference, the objectives of Bhanga Paurashava Structure Plan are:

- Description of the Paurashava's administrative, economic, social, physical environmental growth, functional linkage and hierarchy in the national and regional context; catchment area; population; land use and urban services; agencies responsible for different sectoral activities, etc.
- Identification of urban growth area based on analysis of patterns and trends of development, and projection of population, land use and economic activities for next 20 years.
- Identification and description of physical and environmental problems of Bhanga Paurashava.
- Discussion of relevant policies to analyze and find out potential scopes for the use in the present exercise and also find out constraints and weakness of the existing policy to suggest appropriate measures for the development and management of Bhanga Paurashava.
- To provide land use development strategies.
- To provide strategies and policies for sectoral as well as socio-economic, infrastructural and environmental issues of development.
- To discuss about implementation issues including institutional capacity building and strengthening of Paurashava, resource mobilization etc.

1.3 Concepts, Content and Format of the Structure Plan Conceptualization

Structure Plan is a kind of guide plan, or framework plan, or an indicative plan that is presented with maps and explanatory texts in a broader planning perspective than other components of Master Plan. Structure Plan indicates the broad magnitudes and directions of urban growth, including infrastructure networks, the placement of major facilities such as hospitals and upazila complex. A Structure Plan is not intended to specify detailed plot by plot land use or local road configurations and development proposals.

Rather it identifies the areas where growth and change are such that more detailed local and action plans are needed. Structure Plan does not require excessive effort in gathering data and it is flexible and dynamic and can be changed to accommodate demanded changes. The present Structure Plan is an overall long term strategic plan for the Paurashava Shahar (Town), Bhanga.

Structure Plan is the 1st component of the Master Plan package. The other two lower level components are Urban Area Plan and Ward Action Plan. Structure Plan lays down the framework of the future plan including strategy and the sectoral policies. The Urban Area Plan and the Ward Action Plan detail out development proposals under the framework of Structure Plan. The extended area was selected in consultation with the Paurashava for possible extension of the Paurashava. But no development proposals are suggested for the extended part as existing Paurashava area is enough to accommodate population and services during Structure Plan period, that is, up to the year 2031.

Contents

The Master Plan is prepared based on the survey data. Most of the information provided in the Survey Report is the outcome of the surveys namely Topographical Survey, Physical feature survey, Landuse survey, Socio-economic survey, Transport survey and Drainage and Environment survey.

Landuse survey: Landuse survey basically records the use of land by its functional activity such as residential, industrial, commercial, health, cultural, etc. During the TS and DGPS based physical feature survey each feature was recorded with individual ID or code representing their use. At the same time, uses of lands without structures were coded on mouza plots. Later on landuse features was identified and classified using the recorded code and separated in different layers during data processing stage, from where the category-wise landuse map has prepared using the identification layers of each landuse features. The landuse map has prepared indicating the broad categories of landuse described in the ToR. The landuse map has prepared on RS Mouza map at scale 1"=165' (RF 1:1980).

Physical feature survey: Physical Features were surveyed using both Total Station (TS) and Differential Global Positioning System (DGPS) survey technique. All structures and installations were surveyed by TS and alignment and closed boundaries like Road, River, Khal, Marshland, Homestead, Large Water bodies etc. have surveyed by DGPS. Where DGPS survey was not possible for weak satellite signal due to obstruction, TS survey technique was applied for those particular areas.

Location and dimension of the physical feature has surveyed and stored using Real Time Kinematic Global Positioning System (RTK-GPS) supported TS and DGPS survey technique. Data was recorded in the TS and DGPS memory with separate ID or code number for each feature (as Line, Point and Polygon). Later on the TS and DGPS data was transferred directly to the Geographic Information System (GIS) database where the feature was kept in separate layer wise as per specified code or ID. Names of settlements, village, rivers, khals, lakes, roads, markets, etc. were recorded during physical feature survey. For supporting the TS Survey, huge numbers of Temporary Control Points (TCP) have established using RTK fast static survey technique and GEOID Model of the project. These TCPs were used by the TS groups as reference points (Station and Back Points) for physical feature, topographic and landuse survey.

Topographic survey: Topographic survey has performed using TS and DGPS. The TS survey groups / teams were responsible for measurement of spot levels (Northing, Easting, Elevation or RL) for contour generation. In general the spot levels on the land have taken at an interval that represents the topography of the land surface. The utility poles and alignment of utility lines have surveyed using DGPS. The established TCPs with RTK-GPS were used by the TS groups as reference (Station and Back Point). Contour map has prepared at scale suggested by LGED incorporating all physical features and infrastructures.

The Total Station (TS) survey groups were responsible for conducting topographic survey where Total Station (TS) is used for measurement of Land levels/spot levels (Northing, Easting, and Elevation in respect to mPWD datum) for contour generation at 0.3m intervals. In general the spot levels on the land were taken at not exceeding 50m intervals, closer spots were taken in case of rapid undulation. In addition to the Primary Bench Marks (BMs) established by RTK-GPS Static survey, 120 nos. of Secondary Bench Marks/Control Point (BMs/SCP) were established using RTK fast static and 1st order BM carry survey for supporting the TS survey. These SCPs as well as the primary BMs were used for Total Station survey as reference points (Station and Back Points) both for topographic and physical feature surveys. The spot levels/land levels were transferred to GIS database and later by processing Digital Elevation Model (DEM) as well as contour map at 0.3m interval contours were generated using TIN (Triangular Irregular Network) Method of GIS.

Transport survey: To perform transport survey, the team was mobilized on 27th May, 2009. An introduction meeting on 28th May, 2009 was held in Bhanga Paurashava in presence of the Mayor, Councilors, Engineers and other professional to set the date and time of survey as well as to identify the survey stations.

The Paurashava authority recommended 29-05-2009 as regular day and 1-06-2009 as local Hat day to conduct transport survey. With reference to their observations, survey time was set from 7:30 AM to 8:30 PM for those two days when traffic movements were frequent.

In order to get an accurate scenario about the study roads / links, detailed frequency of traffic movement was analyzed. This work was considered overall traffic volumes and the proportion of different traffic. Frequency analysis of traffic was performed using the collected data from traffic volume survey. This survey was included mode-wise travel frequency on the specific road. So, that information helps to explain the variation in using of different vehicles for different time and day of that road.

Drainage survey: Drainage channels were surveyed by Optical Level machine from the head of the channels to the outfall. A zero datum was chosen at the head of each channel. This zero height was then used to level the channel from the head to the toe or outfall. In areas where blockage or refuse was observed to accumulate in the bottom of the channel, the reason of such blockage was identified.

Environmental survey: Environmental survey was conducted following the standard methods and procedures to determine environmental pollutions. Elements of pollutions of environment are air, water, land and noise for the development of urban areas. The Consultants have taken necessary assistance and information from the Paurashava Mayor, Councilors, Engineers and other concerned officials as well as the general

inhabitants to determine pollution in air, water, land and noise. Based on the information and data collected from the field, detailed report has been prepared. Data collection format and questionnaire was approved by the PD of UTIDP, LGED.

Socio-economic survey: The Socio-economic survey has been conducted with the proposed methodology beginning from January '09 and ending in March '09. The Survey Team was composed with 6 field investigators assisted by Field Supervisor. The Supervisor has been seconded from Consultant's office. The survey took approximately two weeks to complete with a pre-determined set of questionnaire.

The Paurashava is consisted with 9 Wards. The Socio-economic survey covers all the Wards. Those Wards are identified and distributed as the Core and Potential Core areas. In total, 5% sample households are considered from above each category of area and then again distributed into Pucca, Semi-Pucca, Katcha / Thatched (Jhupri) households according to the respective Wards.

Format of the Structure Plan

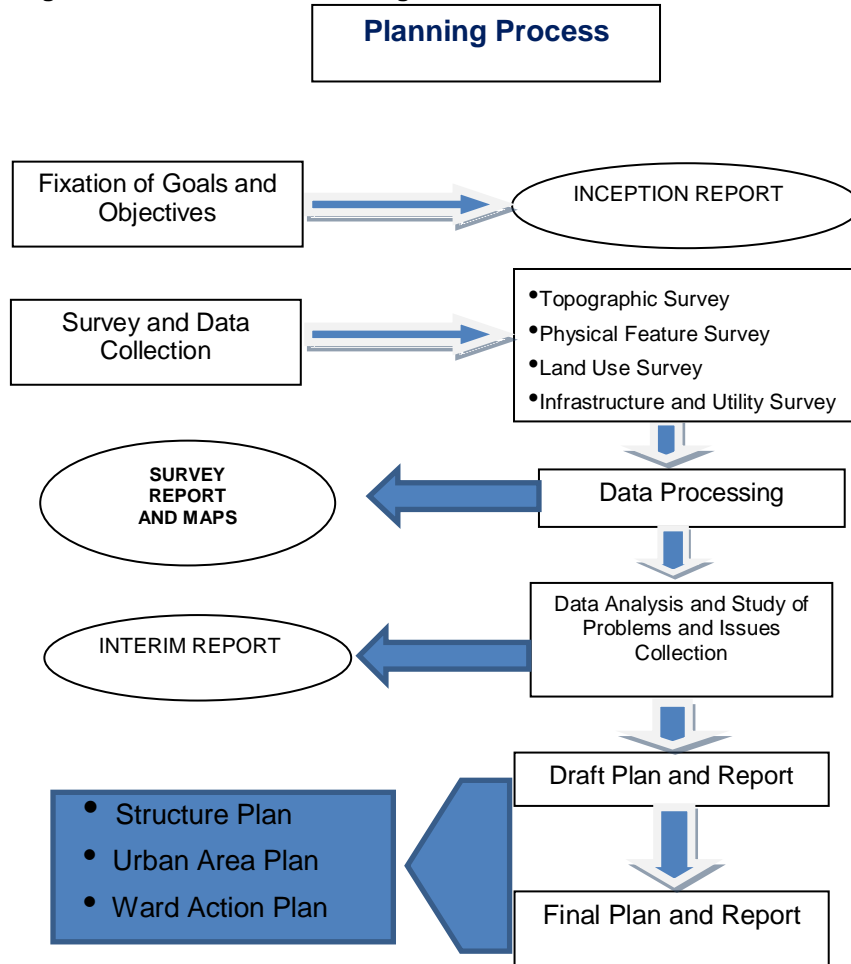
The Structure Plan is an indicative plan that gives a brief on the future development of an area with policy guidelines. It is a long-term plan with flexibility in the sense that it sets down a broad framework for future development, but not the details. The format of a Structure Plan comprises written document and indicative major development locations presented in maps and diagrams as parts of the report. The written text analyses the issues that are not possible to be presented as diagrams, drawings and maps. Therefore, the written document is as important as the physical plan and diagrams and should be read in conjunction with each other.

1.4 Approach and Methodology

The UTIDP Project is aimed for substantial development of infrastructure and services for the Paurashava with optimum provision of opportunities for Paurashava dwellers and making scope for extending services to surrounding areas.

The current project is preparing a Master plan of the Paurashava, where the existing condition and different problems are identified, studied and analyzed and the probable solutions are to be sought to ameliorate the same. The study moves through a process of data collection-analysis and fixation of objectives for planning. The approach is based on field survey for data collection and collection of information from secondary sources.

Figure 1-1: Flow Chart of Planning Process



The data is presented through maps, text and tabular form. Then the survey report and maps are prepared and submitted. Analysis of collected data is carried out to identify the nature and extent of problems prevailing in the Paurashava in order to fix the objectives of the actions to be undertaken in the form of planning and the interim report prepared and submitted. Through the process, involvement of the stakeholders has been ensured to make the planning as much sustainable as possible. For this purpose, continuous formal and informal discussions and meetings have been carried out throughout the project period using participatory approach. The discussions serve two purposes, first, a sense of belongingness develops within the minds of the stakeholders, particularly among the citizens, about the master plan to be prepared, and secondly, identification of problems and finding their solutions become easier with the participation of stakeholders, as the local stakeholders are more knowledgeable about local problems and possible solutions of those problems.

After doing all these jobs thoroughly the Master Plan had been done based on a prepared planning standard for Paurashava level town and formulating future strategies for the corresponding area. Again after final consultation with the stakeholders on the prepared plan the Final Master Plan has to be completed.

1.5 Scope of Work

The scope of work under this consultancy services covers all aspects related to the preparation of Master Plan, which includes Land Use Plan, Transportation and Traffic Management Plan, Drainage and Environmental Management Plan and Ward Action Plan for the proposed Paurashava. In order to prepare these plans, the activities contain but not limited to the following:

- 1) Visits have been made to the Paurashava at different stages of work of the preparation of Master Plan of Bhanga Paurashava.
- 2) Feasibility for preparation of Master Plan has been submitted to the office of the PD, UTIDP.
- 3) An Inception Seminar has been organized at the Paurashava level to inform the Paurashava about the scope and Terms of Reference for the preparation of Master Plan. A thorough investigation has been made based on potential scope and opportunities available in the Paurashava to develop a 20 year development vision for it linking the ideas and view of the Paurashava people.
- 4) Determination of the study area and planning area has been done based on existing condition, demand of the Paurashava and potential scope for future development. A detailed survey has been conducted on the existing conditions of socio-economic, demographic, transportation and traffic, physical features, topographic, and land use of the Paurashava area following the approved format and data have been collected from primary and secondary sources. Analysis of such data and information has been carried out to find out the possible area of intervention to forecast future population of the Paurashava (15-20 years), vis-a-vis assess their requirement for different services, such as physical infrastructure facilities, employment generation, housing, right of way and land requirement for the existing and proposed roads, drains, play-grounds, recreation centers and other environmental and social infrastructure. The following major tasks have been accomplished:
 - a. Identification and investigation of the existing natural and man-made drains, natural river system, the extent and frequency of floods, area of planning intervention have been done. Other works include study of the contour and topographic maps produced by the relevant agencies and review of any previous drainage Master Plan available for the Paurashava.
 - b. A comprehensive (storm water) Drainage Master Plan for a plan period of 20 years has been prepared considering all relevant issues including discharge calculation, catchments areas, design of main and secondary drains along with their sizes, types and gradients and retention areas with preliminary cost estimates for the proposed drainage system.
 - c. Recommendations have been made on planning, institutional and legal mechanisms to ensure provision of adequate land for the establishment of proper rights of way for (storm water) drainage system in the Paurashava.
 - d. Collection and assessment of the essential data relating to existing transport Land Use Plan, relevant regional and national highway development plans, accident statistics, number and type of vehicles registered for each Paurashava have been made.
 - e. Assessment has been made on the requirements of critical data and data have been collected through reconnaissance and traffic surveys, which should

estimate present traffic volume, forecast the future traffic growth, identification of travel patterns, areas of traffic conflicts and their underlying causes.

- f. Study has been conducted on the viability of different solutions for traffic management and development of a practical short term traffic management plan has been accomplished, including one way systems, restricted access for large vehicles, improved signal system, traffic islands, roundabouts, pedestrian crossings, deceleration lanes for turning traffic, suitable turning radius, parking policies and separation of pedestrians and rickshaws etc.
- g. Assessment has been done on the non-pedestrian traffic movements that are dominated by cycle rickshaw. Special recommendations should be made as to how best to utilize this form of transport without causing unnecessary delays to other vehicles. Proposals should also consider pedestrians and their safety, with special attention for the children.
- h. Assessment has been made on the current land use with regard to road transportation, bus & truck stations, railway stations etc, and recommendations to be provided on actions to optimize this land use.
- i. Preparation of a Road Network Plan based on topographic and base Map prepared under the Project. Recommendation has been made on the road development standards, which serve as a guide for the long and short term implementation of road. Also Traffic and Transportation Management Plan and traffic enforcement measure have been suggested.
- j. Preparation of the Master Plan with all suitable intervention, supported by appropriate strategic policy, outline framework, institutional arrangement and possible source of fund for effective implementation of the plan.
- k. Preparation of a plan has been set out proposed Master Plan at 3-levels namely Structural Plan, Urban Area Plan and Ward Action Plan.
- l. At the first level, policies and strategies have been worked out for the preparation of a Structure Plan for each Paurashava under the package. The Master Plan has been prepared consisting of Structural Plan, Land Use Plan, Transportation and Traffic Management Plan, Drainage and Environmental Management Plan and Ward Action Plan.
- m. A total list of primary and secondary roads, drains and other social infrastructures for each Paurashava for a plan period of next 20 years has been made. Examining and classifying according to the existing condition, long, medium and short term plans have been proposed and estimated cost for improvement of drain and road alignment and other infrastructures have been prepared.
- n. In line with the proposed Master Plan, a Ward Action Plan has been proposed with list of priority schemes for the development of roads, drains, traffic management and other social infrastructures for implementation during the first five years of plan period.
- o. With the help of concerned Paurashava, at least 2 public consultation meetings or seminars have been organized, one for discussion on Interim Report and the other on draft Final Report on the proposed Master Plan. Beneficiary's point of view has been integrated in the plan with utmost careful consideration.
- p. Preparation and submission of Master Plan and Report with required standards as per the TOR.

Map 1-1: Location of Bhanga Paurashava in context of Bangladesh

Map 1-2: Jurisdiction of Structure Plan Area

1.6 Organization of the Master Plan Report

The Master Plan Report is organized in three major parts with an introduction at the beginning. The three major parts contain various components of work under the UTIDP of LGED. The three major parts of the Master Plan of Bhanga Paurashava are as follows:

INTRODUCTION: It describes the ToR of the UTIDP, philosophy and objectives of the Master Plan, methodology and scope of the work and organization of the Master Plan Report.

PART–A: The Structure Plan sets the conceptual framework and strategies for planned development of the Paurashava based on its potentials for next 20 years up to 2031.

PART–B: Urban Area Plan includes i) Land Use Plan; ii) Transportation and Traffic Management Plan; iii) Drainage and Environmental Management Plan; and iv) Proposals for Urban Services.

PART–C: Ward Action Plan presents ward wise detailed proposals for implementation within first five years of the Master Plan period of 20 years.

CHAPTER 2

PAURASHAVA'S EXISTING TREND OF GROWTH

2.1 Social Development

Age-sex structure: Age and gender distribution indicates that population mostly increase naturally. The age-sex distribution implies that female population is less than male population in the Paurashava. From the male female ratio, it is observed that in all the Wards number of males are greater than the number of females. Highest population goes under the range of years 26 to 57 age group and lowest in the above 57 years. So, in all the Wards number of young and workable population is highest than any other aged-group population. In the year 2001, population was 28057. Highest number of children aged 0-6 years is found in the Ward No. 3 and lowest in Ward No. 8.

Household size: Family size ranges from 1-3, 4-6, 7-9, 10-12 and 12+ members, but most prevalent size is 4-6 members in the Paurashava and also in Bangladesh. There are both single and joint family systems in the Paurashava. Ward No. 3 is conceived highest percentage (69.6%) of 4-6 member family and Ward No. 1 is more joint-family system (58%) compared to other Wards. Most of the families in the Paurashava are single family (61%).

Lowest number of average family size in the Paurashava is 1.9%. Those families are living in the Ward No. 1, 4, 6 and 7. A good number of 10-12 family members in a family prevail in all the Wards except Ward No. 3 and highest percentage is found in the Ward No. 6 (15.4%). Single or nuclear family is the prominent family size in the Paurashava, confirming the urban character. Except the Ward No. 1 and 7, nuclear family is highest in other Wards than joint family. Highest percentage of nuclear family is found in the Ward No. 8 (84%) and lowest in the Ward No. 1 (42%).

Marital status: In the Paurashava, 10 years and over population for the purpose of marriage is 20999, among them male is 11040 and female 9959. Number of male married is higher than female married. Again, number of female divorce is higher than male divorce. The scenario proves family conflict generates due to the financial insolvency of the household head. The unmarried or never married data on male and female also proves that the male population is not encouraged to marry due to their minimum income ability.

Migration: The Paurashava is almost formed with permanent settlers (85%). All the people of the Wards are living in Paurashava for more than 14 years. Except Ward No. 1, more or less a percent of migrated people are in all the Wards and highest in the Ward No. 8. Migration status of the Paurashava is stable because only 15% resident of the Paurashava is migrated resident. Maximum migrated resident is in the Ward No. 4 (40%) and a good number in Ward No. 3, 6, 7 and 9 (30%, 19%, 19% and 19% respectively).

There are various reasons for migration like inadequacy of employment opportunity, economic backwardness, social persecution, politico-religious disturbances and ambition like better business opportunity. But mostly, migration in the Paurashava is occurred due to business purpose (57% of the total migration).

All migration has occurred after the year 2000. Basically, it was in migration in Ward No. 3 and 8. It is very clear that better earning opportunity influences the people to live in

urban area from other parts of the district or country. But, in this Paurashava all the opportunities is not sufficient and for this reason a little migration is occurred. Out migration has occurred in the urban area at household level but there is some students and service holders who migrate Dhaka or other large cities. Among the migrated resident of the Paurashava, 58% came from the same Upazila, 33% came from the other Upazilas of the district and rest 9% from other districts of the country.

Educational status: A large number of household heads are illiterate (39% in Ward No. 7, 38% in Ward No. 1, 30% in Ward No. 2, etc.). No illiterate people in the Ward No. 4 and minor in Ward No. 8 (2%). Reading between Classes-I to V is the highest educational achievement in the Paurashava (35%). SSC level (10%), HSC (5%) and Graduate (5%) is quite low. A large percentage of population in the study area is secondary level (25%) education. There are few masters degree holders (1%) and they are found only in the Ward No. 3 (9%), 5 (2%) and 6 (4%).

Religion: In the Paurashava, Muslims are major religious group (91%) followed by Hindus (9%). During the survey, no Buddhist and Christian households are identified. No Hindu religious population is in the Ward No. 1, 2 and 3. Again, more than 94% Muslims are found in the Ward No. 5, 6, 7 and 9. Highest number of Hindu religious population is in the Ward No. 8 (31%) and lowest in the Ward No. 6 (4%). In the Paurashava, Ward No. 4 is conceived 13% Hindu religious population and 6% each in the Ward No. 5, 7 and 9.

Occupational status

Primary occupation: Business (small business 26% and large business 16%) is the dominant occupation of the household heads in the Paurashava. Farming or agriculture (25%) is the second dominant occupation. Agriculture or farming includes crops, livestock and poultry and fish farming. Apart from this there are other occupations like public or private service, informal sector work, rickshaw / van puller, teaching, skilled and unskilled labour, handicrafts, etc. The scenario reveals that 10% as office workers both government and semi-government including employees in private offices. The transportation workers comprising rickshaw and van pullers accounts for 8% of the total occupation group in the study area. Agriculture with allied farming seems to be the second major occupation (25%).

In the Paurashava, small business is the dominant occupation in three Wards (Ward No. 2, 8 and 9). Farming / agricultural domination is in four Wards (Ward No. 1, 3, 6 and 7). Paurashava has numerous occupational groups who are helping the economic base to be sustained. Being predominantly in an agricultural region, the inhabitants of Paurashava are changing their major occupational involvement from agriculture to business.

It is apprehended that with the increasing urbanization, there will be increasing number of people taking non-farm occupations as their primary occupation. This will happen as a social process of deprivation in rural area leading to increased pauperization and forcing large number of people into urban centers as destitute who would have no option but to engage them in urban occupations.

Table 2-1: Occupational pattern (in %)

Main Occupation of the Household head	Ward Number									Paurashava As a whole
	1	2	3	4	5	6	7	8	9	
Govt. Officer	0	7	9	5	0	0	3	0	3	3
Other Govt. employee	4	9	0	8	2	0	0	2	3	4
Teaching	4	9	9	3	0	4	0	2	0	3
Farming/Agriculture	42	20	57	22	22	46	26	9	13	25
Housewife	0	4	0	5	4	0	0	0	0	2
Large Business	8	9	13	16	12	0	7	31	42	16
Small Business	29	24	9	22	22	23	19	44	32	26
Private Service	0	0	0	8	2	4	0	7	7	3
Handicrafts	8	4	0	0	2	0	3	0	0	2
Skilled Labour	0	4	0	0	2	4	10	2	0	3
Student	0	0	0	0	2	0	0	0	0	0
Unemployed/Retired	0	0	0	3	0	0	0	0	0	0
Beggar	0	0	4	3	8	4	10	2	0	4

Source: Socio-economic Survey, 2009.

Secondary occupation: A number of households are engaged with secondary occupation seasonally to raise their family income. Mostly the low-income groups are with secondary occupations during off-season when they do not have any regular jobs. Secondary jobs include, day labouring, hawkery, van / rickshaw pulling and similar other occupations.

Table 2-2: Secondary occupation (in %)

Secondary Occupation of the Household head	Ward Number									Paurashava As a whole
	1	2	3	4	5	6	7	8	9	
Day Labour	0	2	0	0	2	4	0	0	0	1
Rickshaw / Van driver	4	9	0	5	22	8	19	0	0	8

Source: Socio-economic Survey, 2009.

Income level: About 45% of the respondent's sources of income are business followed by 12% service, 39% agriculture, 3% house rent and rest by other activities. Most of the Paurashava residents depend on small business activities and some development has taken place because of government establishments, Bhanga Bus Stand is located about the middle of the Dhaka, Faridpur, Madaripur and Gopalganj. It is very interesting that agriculture as sources of income obtains a low percentage (39%). In Ward No. 6, agriculture (69%) is the highest source of income of the respondent and business as a highest source of income is found in Ward No. 8 (78%) and 9 (74%). In the Ward No. 4, 8 and 9, business is dominant as source of income. Therefore, Bhanga as a small Paurashava has a great potentiality to develop small industry which may facilitate small business and may create a better employment opportunity.

Present population distribution and growth including migration shows that the area is developing significantly in terms of trade and large business and trying to get out of agriculture based activity. Income ranges basically support this concept which is evident by the ranges of income earned by households. In Ward No. 9, 36% household earns Tk.9001-12000 compared to 48% within Tk.6001-9000 per month. There are good numbers of households who earn Tk.12000+ per month. Tk.6001-9000 income group is dominant income group in the Paurashava (31%). On the other hand, average monthly income per household is highest (Tk.15297) in Ward No. 4 and this is lowest (Tk.8083) in Ward No. 3.

Expenditure level: Since Bhanga Paurashava still has rural influences and agriculture is the second source of income and average monthly income remain small; food relatively stands higher in expenditure list; Tk. 6473 in Ward No. 4 and Tk. 5051 in Paurashava as a whole. There is lowest expenditure for water in all the Wards of the Paurashava. People of the Ward No. 4 save highest amount of money (Tk.5271). Lowest savings is found in the Ward No. 6, 7 and 9.

Land Value

Land value is an important determinant for any project related to the physical development because; the development depends on project cost and the cost on land value. In recent time, a rapid change of land value is found in the Paurashava premises. Wealthy people of the community are investing on land and became landlord because they consider it as a safe investment. As a result, land value curve is on upward. Value of land depends on location, accessibility, height and free of natural hazards.

Official Value: The official land value uses for calculation and collection of land revenue. In the physical planning aspects, study of land value is necessary for land acquisition. For the preparation of physical development project including cost involvement, an idea on land value is necessary. The value may be changed when development initiative will be undertaken. In this study, the official land value is being quoted from the actual value considers by the Sub-registry Office of the Bhanga Paurashava.

In this study, seven types of land in sixteen mouzas are being considered. In the natural land market, land for homestead / housing construction is higher than other type of land and this scenario is prevailing in the Paurashava also. Land value is low (Tk. 400 to Tk. 1200 per decimal) for Doba (ditch) and Pukur (Pond) type of land. Those two types of land are under the jurisdiction of agriculture land. For development activities, in case of land cost, those lands should be emphasized, though land development cost is higher than other type of lands.

Table 2-3: Mouza-wise land value in the Study Area, 2009

Mouza	Land value according to land type (Taka/Decimal)						
	Viti	Chala	Nal	Pukur	Doba	Tek	Bagan
Hoglakandi	30000	20000	14000	1200	1000	20000	20000
Kharakandi	25000	15000	12000	800	800	15000	15000
Kutibari	22000	13000	8000	500	500	13000	13000
Gazaria	18000	16000	6000	600	600	16000	16000
Hazarahati	15000	10000	5000	600	600	10000	10000
Nurpur	30000	20000	10000	1200	1000	20000	20000
Chandidasdi	28000	20000	1000	500	400	20000	20000
Dariar Math	20000	15000	7000	500	500	15000	15000
Sonakhola	30000	20000	10000	600	800	20000	20000
Ataddi	26000	14000	8000	400	300	14000	14000
Chowkighat	28000	15000	8000	400	500	15000	15000
Hasandia	30000	20000	10000	500	600	20000	20000
Seladar Char	20000	16000	9000	500	500	16000	16000
Kaidubi	18000	12000	6000	300	500	12000	12000
Roy Para	28000	15000	7000	500	600	15000	15000
Hogla Kanda	22000	16000	8000	500	600	16000	16000

Source: Sub-Registry Office, 2009.

Existing Practice / Unofficial Value: Land value increases with the height of land. It increases from low to medium high land but the maximum mean value is found for the habitable land (Tk.56229 per decimal) and lowest for the low land (Tk.1672 per decimal). Average land value in the Paurashava is Tk.20448 per decimal. In Ward-wise scenario,

land value is highest in Ward No. 5 (Tk.41234 per decimal) and Ward No. 4 (Tk.36322 per decimal) which implies the significance of core area. On the other hand, land value is lowest in Ward No. 7 (Tk.2085 per decimal) which implies that this Ward has abundant agricultural low land.

Habitable land in Ward No. 2 bears highest value (Tk.112283 per decimal) and low land in same Ward bears the lowest land value (Tk.1957 per decimal). Medium high land is found in most of the Wards and the average value is Tk.5000 per decimal.

Land Ownership Types and Patterns: Status of residence or ownership of dwelling units / land is a key socio-economic indicator. Residential status varies in the study area. The land ownership pattern often determines social power and position.

Low and medium high land ownership indicates most of the household's land property. Households almost in all the Wards own those two types of land (51%) and 21% respectively) and also a large quantity habitable land (27%) including other land area (1%). In Ward No. 7, 58% are habitable land owned by the households. In Ward No. 1, 2 and 4 only habitable land and low land ownership exists. Ward No. 3 and 5 have a combination of habitable, low and medium high land ownership. Since, the area is business based with considerable number of agricultural activities, presence of considerable ownership of low land and medium high land supports small business as main activity.

Residential ownership is a key socio-economic indicator. Different types of residential status are found in the study area. The katcha building ownership indicates most of the household's building property. Households almost all the Wards own katcha residential building (80%) followed by semi-pucca building (14%) and very small percent of pucca building (6%).

Over 90% of the respondents own the houses they live in. About 7% of the respondent households do not have their own houses in the study area. They live in various kinds of accommodation as rental basis. Those households are mostly service holder and are living in the Ward No. 8 and 9.

Living house types that exist in the Wards are highest in Tin-shed (56.1%) and almost every house owned by the household owner. For example, in Ward No. 9 there are 74.2% Tin-shed houses among which 80.2% houses are owned by them, 9.5% houses are rented and 10.3% ownership goes to other type. It is notable that pucca, semi-pucca or thatched houses are 100% owned by dweller itself. No pucca house is in the Ward No. 1 and 7. Other Wards have some pucca houses but very low in percentage. There is significant number of semi-pucca houses in all the Wards. Rented living house types are extremely low in percentage, which seems to imply that people in the households in this Paurashava are mostly permanent residents.

2.1.2 Economic Development

Two basic elements of economic development i.e. employment generation and increase of productivity are found in the cities and urban areas than the rural areas. This is a common phenomenon for the developed and developing countries. Employment opportunities act as a strong pull factor for influx of job seekers in the cities and urban areas, the centers of productivity. Special features of the study area are that it covers a vast rural area, besides a small urban center of Paurashava town. Two National Highways passes through the Paurashava and both the sides of the highway is occupied by huge

tracts of agriculture land and sporadic homesteads, at places showing the signs of development along with the hats, bazars indicating the dominant role of agriculture and fishery. This indicates general feature of the study area as a mixture of rural and semi-urban nature. These special socio-economic features of the study area have been taken into consideration in conducting the study of the prevailing economic situation.

Industry: In total, 27 industries with two categories (1 medium scale and 26 light industries) are prevalent in the study area. Among those establishments, agro-based industries account for about 73% and wood based industries 27% share of the total running industries. It reflects the general agrarian character of the study area. All of those enterprises are proprietorship units meaning that private sector dominates the industrial sector.

Most of the industries (except saw mill and agro-chemical industry) depend on raw materials available within the study area. The industrial output produces in the local market. It is also found that those establishments have problems and potentialities. Careful consideration will help to resolve those problems and adoption of necessary policy initiatives will help to flourish the existing units and draw more investors and entrepreneurs to set up new manufacturing industries, which will be based mainly on local raw materials.

Commerce: Commerce includes purchase and sale of various consumer and durable items performed by the business person. In the study area, such activities are wholesale and retail trade, hotel and restaurant business, transport, storage services, hat/bazar, etc. Major part of trade and commerce of the study area is conducted through hat / bazar where agriculture produces, consumer items, merchandise for household and other farm and non-farm items are transacted. The market / bazar performs significant role on the Paurashava economy. It is observed that market / bazar provide good number of employment and act as an economic centre for the area of influence of the market / bazar. This market / bazar remain open everyday from morning to evening. Along with the daily business transactions, two market places are also used as hat which sits three days in a week. On the hat days farmers, traders, businessmen and many other informal professionals gather in the hats and run trades and business till evening. Actually, the market is the key supplying center of all sorts of agro-products to the urban areas and other non-producing areas of the country. Similarly, this market is the major distribution center of industrial products to the vast majority of the rural people throughout the country at consumer levels. Importance of the market / bazar place can not be ignored, rather needs to be facilitated with provision of infrastructure facilities.

There are two locations with agglomeration of commercial activities at Hat / Bazar area in the Paurashava. That Hat / Bazar are taking place in the core part of the Paurashava along with the road; tin-shed semi-pucca structures with parcels of open lands. Saturday, Monday and Wednesday of a week are the local Hat days. Those hat / bazars are prominent due to its availability of agro-product and fish. People from different Upazilas, Zilas and Capital City accumulate in those hat / bazars as a buyer.

The Paurashava is composed with 1017 number of shops. The scenario proves that the area is identified as a rural-based commercial centre and dominating the surrounding Upazila and Zilas with its economic commodities. Daily gross economic turnover may be taka 10 lakhs to 12 lakhs (approx. one thousand taka per shop in average).

Services: The service sector consists of the hotel and restaurant business; transport and communication, storage / godown, financial intermediaries, real estate, rental activities, public administration, education, health, community service and social work including social and personal services. The service sector significantly contributes to the local economy. Most of the service structures are housed in permanent structures. There are some makeshift type structures also.

There are 7 different banking establishments and 6 NGOs working throughout the study area. Major investment by the banks are in the field of cash credit in the form of running capital and capital loan for setting up of business establishments, besides general banking facility. Some NGOs have also disbursed agricultural loan. The NGOs are rendering services in the fields of poverty alleviation programs, awareness building, health care, education, sanitation, micro-credit and training on income generating activities including skill development. NGOs provide services in the field of micro-credit; encourage social services, advance loan for poultry, fisheries, livestock, agriculture, house building, land purchase and capital loan for running business. NGOs also take part in various social activities like awareness building on environment, natural calamities, health and many other fields. A good number of people specially women and poverty-stricken has been getting various types of services from the NGOs for quite a long period.

Agriculture: Agriculture dominates the economy of this Paurashava. Among agricultural produces, important items besides paddy are vegetables, local fruits, sugarcane, jute and mustards. The agriculture products are consumed locally and a considerable percent (about 25%) are using by the inhabitants of adjacent Upazilas. The jute is using to the jute industries located at the Munshiganj and Narayanganj under Dhaka district (about 40km and 60km away from the Paurashava respectively).

Employment Pattern: In the Paurashava, population below 10 years of age is 20999. Among population of age 10 years and above, those recorded idle are 6456, looking for work 400, doing household work 6645 and employed the remaining. The employed people identified working in agriculture are 2016, industry 47, construction 355, transportation 468, business 2818, service 96 and others 1646. Economically active age-group (15-59 years age-group) stands 69% of the total population.

Table 2-4: Population 10 years and over by main activity (in number)

Ward	Total	NW	LW	HW	Agr.	Ind.	WEG	Con.	Tran.	H&R	Bus.	Ser.	Others
1	1597	495	13	551	244	3	1	48	20	6	137	2	77
2	3212	1049	66	1000	404	8	0	178	69	3	243	5	187
3	1805	525	57	592	192	5	1	12	39	2	141	2	237
4	2468	901	36	655	83	8	0	21	25	9	377	7	346
5	3426	1131	35	1046	395	15	5	14	205	11	316	2	251
6	1783	660	23	558	183	6	0	4	40	3	183	10	113
7	2017	458	17	793	285	2	0	71	49	1	252	0	83
8	2428	578	83	590	122	0	0	2	6	6	772	61	208
9	2263	659	70	860	108	0	0	5	15	4	397	1	144
Total	20999	6456	400	6645	2016	47	7	355	468	45	2818	96	1646

Source: Population Census 2001, Community Series, Faridpur Zila, Bangladesh Bureau of Statistics, December 2006, p.199.

Note: NW = Not Working, LW= Looking for Work, HW= Household Work, Agr.= Agriculture, Ind.= Industry, WEG= Water, electricity and gas; Con.= Construction, Tran.= Transport, H&R= Hotel and Restaurant, Bus= Business, Ser.= Service, Others.

Agro-based: In total, 27 industries are found in the Paurashava and among them 20 are agro-based industries. The industrial activities cover 8.7 acres and 0.3% land of the study area. Among the industries, 12 are poultry farms, 1 agro-chemical industry, 7 rice mills

and 7 saw mills. Local woods are being processed in the saw mills and locally produced paddy are using in the rice mill. Those industries have been established all over the Paurashava. Location of those industries will be rearranged and grouped in some selected areas. After construction of Padma Bridge at Maowa point, number of agro-based industries will be increased.

Table 2-5: Type of industries in the Bhanga Paurashava

Type of agro-based industry	Number
Poultry Farm	12
Agro-Chemical Industry	1
Rice Mill	7
Saw Mill	7
Total	27

Source: Physical feature survey, 2009.

Informal Economic Sectors: In the Paurashava, informal entrepreneurs mainly perform their business in the market / bazars and males are dominating this sector. Mostly 18-34 age-groups run the informal activities followed by 35-59 age-group. In total, 18 types of occupation grouped under two major categories of Trade and Services, adopted by the informal entrepreneurs in the Paurashava. Of the various occupations, trade includes sale of various food items, clothes, vegetables, meat, seed, medicines, etc. and service includes hair cutting, shoe repairing, umbrella repairing, mobile phone service, tailoring, etc. It is revealed that, major occupation is trade adopted by 42% and service is composed 3% of total informal entrepreneurs. Sources of the capital of the informal entrepreneurs are inheritance (8%), self-earned (88%), borrowing from friends / family members (3%) and loan from NGOs (1%).

It has been found that, 4% (including loan from NGO) of total entrepreneurs had to borrow money to form capital for their business. Rest of the respondents did not receive any loan to start their business. Recipients of loan of the informal sector have received varied amount of loans. Of the total loan recipients, 40% received loan ranging between Tk. 5000 to Tk. 8000, followed by 37% received between Tk. 8001 to Tk. 12000 and 23% between Tk. 12001 to Tk. 15000.

About 31% respondents monthly earning is in the range of Tk. 6000 to Tk. 9000 and 23% is Tk. 4000 to Tk. 6000. Only 10% respondents are in the very low income range of less than Tk. 4000 monthly. A considerable (18%) entrepreneur's monthly income is above Tk. 12000.

Informal entrepreneurs encounter many problems like dull business, unfavorable weather, fear of eviction, extortion, lack of permanent business location, exorbitant rate of interest, lack of credit facilities and unhygienic residential areas.

2.1.3 Physical Infrastructure Development

Physical growth of Bhanga Paurashava town generally depends on the road pattern of the Paurashava. Bhanga Paurashava is connected with Dhaka road and Faridpur road. So, linear development is the common feature of the Paurashava. The Bhanga Bus Stand is another important centre, which influences the dwellers to shift towards this bus stand. Education facilities also attract the people. There is a great scope of physical growth in Ward No. 4 towards the Dhaka road due to small business.

An intersection named Bhanga Intersection penetrates the Bhanga Paurashava. Vehicular movement about 17 districts passes this intersection. Once development trend of the

Bhanga was followed the river bank and as a result Ward No. 1, 3 and 4 have been developed linearly following the riverbank.

The Paurashava is mostly linear in shape. Dhaka – Barisal via Bhanga and Dhaka - Khulna via Bhanga National highways passes through the middle of the Paurashava from southeast to northwest. Settlements are formed linearly around the internal roads and the inter-district roads. Pattern of compact settlement is viewed in the Ward No. 3, 4 and 5. Those Wards are adjacent to the Bhanga Bus Stand. Ward No. 1, 2, 6, 7 and 9 is mostly agriculture dominated areas. Most of the commercial activities are being formed in the Ward No. 4, 8 and 9 because it is nearer to the Bhanga Bazar and Bhanga Bus Stand.

Road: In the Paurashava, about 42% roads are pucca (bituminous carpeted) and their total length is above 28 km. encompassing an area of 42.50 acres. Total length of semi-pucca road is 13.6 km accounts for 20.26% of the total roads in the Paurashava. In total, 11.50 acres of land are being used under semi-pucca road. Above 37% of the road is katcha or earthen accounting for 25.10 km. coursing 17.20 acres of land.

No transport terminal facility exists in the Paurashava. Buses and trucks as well as other vehicles generally park on adjacent roads. One bus stand is found on the Bhanga intersection, known as Bhanga Bus Stand. Two National Highways crosses the Bhanga Paurashava, one is Dhaka – Faridpur – Barisal and another is Dhaka – Maowa - Bhanga – Khulna. These two highways produce an intersection at Bhanga. All type of vehicles stand and park on this intersection. Bhanga intersection bus stand is a nationally known bus stand, but all vehicles park on highways. Besides this all the major intersections are the places where local passenger carrying vehicles await on roads with some stoppage time.

Waterway: No waterway is available in the Paurashava. There are altogether 15 bridges (RCC) and 27 culverts (RCC) in the Paurashava. Those bridges and culverts are located on the river and major canals. The study area is flood prone area. Water logging is common, dyke is an important issue, but there is no dyke or embankment in the Paurashava.

Railway: No railway facility is in the Paurashava.

Airway : No airway facility is in the Paurashava.

2.1.4 Environmental Growth

The plan has documented Bhanga Paurashava area's environmental conditions, determines potentiality for present and past site contamination (e.g. hazardous substances, petroleum products and derivatives) and identifies potential vulnerabilities (to include occupational and environmental health risks).

2.1.5 Population

According to the Census Year 2001, total population of the Paurashava is 28057. In the Paurashava, highest concentration of population is in the Ward No. 5 but highest density is in the Ward No. 2. Most of those concentrations are involved with the residential development. Lowest density of population is found in the Ward No. 3 and it reflects that the Ward is being developed as administrative and commercial centre.

Population density: In the Paurashava, average population density is 1996 persons per sq. km. according to the Population Census, 2001. Ward No. 4 seems highly population concentrated area and density of population in that Ward is 4623 persons per sq. km. Medium concentration of population are found in the Ward No. 3, 7 and 1. Population

density is below than 3000 persons per sq. km. in those three Wards. Ward No. 5 is lowest in the group i.e. 1177 persons per sq. km.

Population distribution: In total, 6259 households are living in the Paurashava according to the Population Census, 2001. Highest number (1013 households) of households and population concentration is found in the Ward No. 5 and 2. Ward No. 4, 8 and 9 are adjacent with the Ward No. 5 and 2, as a result next highest concentration of population is found in those Wards. Ward No. 1 and 3 are predominantly agriculture villages; population concentration is lower in those Wards than other Wards.

Table 2-6: Population according to the mouza and mahalla, 2001

Name of the mouza and mahalla	Total	Male	Female
Baiskhali	459	250	209
Hoglakandi	730	361	369
Kharakandi	292	141	151
Kutibari Char Kanda	786	372	414
Bhariatadanga (Noapara)	1578	758	820
Gazaria	704	345	359
Hazarahati	975	498	477
Nurpur	1161	612	549
Chandidasdi	1446	729	717
Dariar Math	833	452	381
Sonakhola	123	67	56
Banga Town	1902	1056	846
Paschim Hasandi	1200	593	607
Ataddi	1691	886	805
Chowkighata (hat)	04	04	0
Char kanda Ataddi	508	257	251
Purba Hasandia	2523	1341	1182
Dakshin Seladar Char	628	323	305
Purba Sadardi	623	332	291
Uttar Seladar Char	1198	650	548
Chowdhuri kanda	1638	835	803
Kaidubi Sadardi	554	287	267
Roy Para Sadardi	581	293	288
Bhanga Bazar	1959	1295	664
Hogla Kanda	992	502	490
Kapuria Sadardi	2969	1455	1514
Total	28057	14694	13363

Source: Population Census, 2001,

2.1.6 Institutional Capacity

The Paurashava is responsible for Paurashava administration and also responsible for providing services, slum upgrading, infrastructure development and licensing of non-motorized transport within its jurisdiction. To perform the responsibilities efficiently as prescribed in the Local Government (Paurashava) Act, 2009 existing capacity of the Bhanga Paurashava administration is not sufficient. The responsibility may be categorized as two broad heads named Revenue Collection including Budget Preparation and Delivery of Services. Three types of management system are involved with those two types of responsibilities and they are Top Management, Middle Management and Supervisory Management. A general scenario is found in those three category management system of the Paurashava i.e. lack of efficient manpower. Shortage of technical manpower in the Paurashava is also an administrative problem.

Allocated Manpower: Strength of the Paurashava can be assessed from its employment structure and budget. Employment structure indicate the weakness as some of the

important positions are lying vacant and development control function is unattended which is demonstrated in the absence of Town Planning Division. The manpower allocated for the Bhanga Paurashava by the Government except the Mayor and nine Counselors are as follows:

Table 2-7: Allocated manpower for Bhanga Paurashava

Positions under Divisions	Number of employees	Positions under Divisions	Number of employees
Administration	05	Health Division	07
Secretary	01	Health Assistant	02
Head Assistant	01	Conservancy Inspector	01
Store Keeper	01	Vaccination Supervisor	01
Higher Division Clerk	01	Vaccinator	02
Lower Division Clerk	01	MLSS	01
Accounts	05	Engineering Division	11
Accountant	01	Asstt. Engineer	01
Cashier	01	Sub Asstt. Engineer (Civil)	02
MLSS	03	Sub Asstt. Engineer (Power)	01
Tax Assessment	02	Lower Division Asstt.	01
Tax Assessor	01	Work Asstt.	01
Asstt. Tax Assessor	01	Street Light Inspector	01
Tax Collection and License Division	06	Line Man	01
Tax Collector	01	Driver	01
Asstt. Tax Collector	03	Night Guard	01
License Inspector	01	Power Asstt.	01
Asstt. License Inspector	01	Total	33

Source: Local Government Ministry of Bangladesh, 2009.

Existing Manpower: Existing manpower except the Mayor and Councilors in the Bhanga Paurashava presents in the Table-2.8. In total 13 employees as a permanent staffs are in the Bhanga Paurashava. Those employees are under the general administrative division and engineering division.

Among the allocated manpower, 5 employees for general administrative division, 3 employees designated as Secretary, Upper Division Clerk and Lower Division Clerk (MLSS). Accordingly, 5 persons are allocated for accounts division, 6 persons for tax collection and license division and 11 persons for engineering division. But, in fact, in the Paurashava, 1 employee for accounts division, 1 employee for tax collection and license division, 4 employees for engineering division and no employee for health division. Existing scenario deserves more involvement of employees, otherwise implementation of master plan will difficult with the help of present manpower of the Bhanga Paurashava authority.

Table 2-8: Existing manpower in the general and engineering division

Designation	No. of employees	Designation	No. of employees
Secretary	1	Work Asstt.	1
Asstt. Engineer	1	Jeep Driver	1
Accountant	1	Road Roller Driver	1
Asstt. Tax Surveyor	1	MLSS	2
Asstt. Tax Collector	1	Guard	2
Upper Division Clerk	1	Total	13

Source: Bhanga Paurashava, 2010.

Logistic Support: Logistic support and necessary equipment is limited for Bhanga Paurashava which should be a really big concern. One garbage truck, 8 vans and 10

sweepers (contact basis) are the only means of conservancy services. Except those truck, van and road roller, other equipments are using for Paurashava administration.

Table 2-9: Existing logistic support / equipment of the Paurashava

Name of the equipments	Total number	Name of the equipments	Total number
Road Roller	1	Computer	3
Pajero Jeep	1	Duplicating machine	1
Garbage truck	1	Fax machine	1
Motor cycle	1	Telephone set	1
Bicycle	2	Total	12

Source: Bhanga Paurashava, 2010.

Paurashava Office: An old building in densely populated area was the Paurashava office. In August 2010 the new Paurashava office building is constructed on the National Highway (from Dhaka to Khulna via Bhanga and Gopalganj). Single one-storied building with a proto-type design, designed by the PWD is using as the new administrative building of the Paurashava. The building is known as Paurashava Office. Surrounding lands are using for agriculture practices. Further provision for extension of the Paurashava office boundary is possible.

2.1.7 Urban Growth Area

Origin of Bhanga Paurashava occurred only thirteen years back (1997); the development trend do not took much momentum as it required. It is still in her infancy. The 1997 Gazette has declared Bhanga urban area as Paurashava composed of nine Wards where the adjoining areas are still rural in character; not having significant urban development trend.

The Paurashava is not an ideal township due to the agriculture domination. Agriculture based township should be encouraged in the preparation of Master Plan. Growth of population is the natural trend and at the sametime, expansion of non-agricultural use on agriculture land is also natural tendency of the people. This will be controlled through the Compact Township concept with the encouragement of vertical development. In case of government services, specific building may accommodate different type of offices.

Physical growth of Bhanga Paurashava town generally depends on the road pattern of the Paurashava. Bhanga Paurashava is connected with Dhaka road and Faridpur road. So, linear development is the common feature of the Paurashava. The Bhanga Bus Stand is another important centre, which influences the dwellers to shift towards this bus stand. Education facilities also attract the people.

A trend of urban growth is found around the Bhanga intersection and the road laying from Bhanga intersection to Gopalganj. A tremendous development trend will be generated around the Bhanga Paurashava after construction of Padma Bridge at Maowa point. A development wave from Dhaka to Bhanga will be found after construction of that bridge.

Once the area developed as a trade centre based on the river communication. The traders who bring their commodities through the river, the market of the Paurashava acted as a boat ghat after loading and unloading of commodities from the boat. From then, development activities have started along the riverside. This trend has been continued up to the recent years.

After the year of 1980, when Upazila system was imposed in consideration of the decentralization of administration, some internal roads were developed and trend of development followed those roads.

After the year of 1990, development activities start sparsely due to the presence of vast low lands. But, this type of development also followed the proximity of Upazila Headquarters and market areas.

Economic activities and residential establishment are in same premises in all over the Paurashava area. Those activities should not be disturbed if the land holding scenarios remain same by private owners. Further arrangement on economic activities including industrial establishment should be provided separately according to the type of economic commodities.

2.1.8 Catchment area

Catchment area of the Bhanga Paurashava is calculated according to the agriculture commodities and movement of dwellers for rendering services. From Bhanga Paurashava, agriculture commodities marketed to the Gopalganj Zila, Madaripur Zila, Faridpur Zila, Dhaka and Narayanganj Zila. Rice, jute and sugarcane are the major agriculture products marketed in those areas. Except agriculture production, fish and poultry production also distributes for marketing mostly in the Madaripur Zila and Dhaka City. The Paurashava dwellers for rendering their services go to the Gopalganj, Madaripur, Faridpur, Dhaka and Khulna City.

2.1.9 Landuse and Urban Services

Landuse

Existing landuses are categorized on the basis of functional activities perform by the dwellers. In this Paurashava agriculture occupies 1413 acres of total land. Residential and circulation network occupy 556.40 acres and 70.30 acres land respectively. An area of 284.20 acres is covered with water bodies.

In the Paurashava, agriculture occupies about 55% of total land. Residential and water body occupied 2nd and 3rd position respectively. Except commercial, circulation network and open space most of the other activities are less than 1%.

Table 2-10: Ward-wise landuse pattern of Bhanga Paurashava

Landuse category	Area according to the Wards (in acre)										Total (%)
	1	2	3	4	5	6	7	8	9	Total	
Residential	48.0	84.5	62.4	63.9	63.1	73.1	67.0	24.2	70.3	556.4	21.7
Commercial	1.3	6.4	1.8	13.0	2.6	2.3	5.1	11.0	10.0	53.5	2.1
Industrial	0.0	2.4	3.3	1.1	1.7				0.2	8.7	0.3
Educational Facility	0.7	2.1	4.4	5.9	0.9	0.3	1.4	2.9	1.1	19.7	0.8
Governmental Services			0.1	4.2	1.1			0.6	1.9	7.9	0.3
Non-Governmental Services				0.6						0.6	0.0
Mixed-Use			0.9	3.1				1.8		5.8	0.2
Community Service	0.2	11.0	0.7	1.8	4.1	1.7	1.2	0.7	1.7	23.1	0.9
Circulation Network	8.1	10.6	5.2	13.2	4.0	6.8	6.7	6.2	9.6	70.3	2.7
Recreational Facility				0.2						0.2	0.0
Open Space	2.9	17.2	7.7	17.8	24.1	3.1		2.8	15.2	90.8	3.5
Transport and Communication	0.4		0.8	2.8					2.0	5.9	0.2
Service Activity	0.4	0.2	2.3	8.5	0.2	0.8		1.3	7.1	20.7	0.8
Agricultural	200.4	215.1	110.3	76.5	81.6	191.8	250.7	100.5	186.1	1413.0	55.2
Water body	24.1	28.4	51.4	59.9	49.2	8.4	24.1	13.2	25.3	284.2	11.1

Landuse category	Area according to the Wards (in acre)										
	1	2	3	4	5	6	7	8	9	Total	Total (%)
Total	286.5	377.9	251.2	272.6	232.5	288.2	356.2	165.2	330.5	2560.9	100.0

Source: Landuse Survey, 2009.

According to the landuse, except Ward No. 4 and 5, large amount of agriculture land lying in other Wards. Those two Wards are conceived agriculture land below than hundred acres. Highest amount (250.70 acres) of agriculture land is in the Ward No. 7 and lowest (76.50 acres) in the Ward No. 4.

Residential: Residential landuse includes urban houses, rural homestead, flats or apartments, mess / boarding houses and informal housing (comprising thatch, katcha and semi-pucca structures) areas. In the Paurashava, most of the residential areas are informal type means that they are not developed in a planned manner.

Residential land is occupied 556.40 acres or about 22% of the Planning Area. Residential landuse category is the second major dominant landuse. As per Ward-wise statistics, Ward No. 2 occupied highest amount of land (84.50 acres) and Ward No. 8 is minimum (24.20 acres).

Commercial: Two hats / bazars in the Paurashava premises found in unorganized nature. They are developed naturally through generations. Those bazars are prominent due to availability of agro-product and fish. People from different Upazilas, Zilas and Capital City accumulate in those bazars as a buyer. A layout plan will be necessary for improvement of those bazars.

Landuse under this category are retail and wholesale shopping areas and all categories of ribbon commercial developments formed along the major roads. In the Paurashava, there are large numbers of retail shops, kitchen market, weekly hat and wholesale markets. Extent of commercial landuse depends on the size of consumers. Most of the commercial activities are agglomerated in Ward No. 4, 8 and 9 where 13, 11 and 10 acres of land are using for commercial purposes. All of those Wards are the core areas of Bhanga Paurashava. In total 53.50 acres or 2.1% of land is using for commercial purposes.

Industrial: Little amount of land (8.7 acres or 0.30%) of the Planning Area is covered by this category of landuse. This category includes husking mill, brickfield and Hatcheries. About 3.30 acres and 2.40 acres of land under industrial use are occupied by the Ward No. 3 and Ward No. 2 respectively. The industrial landuse is not prominent in other Wards as well as the Paurashava.

Poor industrial development prevails in the Paurashava. Industries may be developed with the use of agro-product as a raw material available in the surrounding areas of the Paurashava. Government initiatives will be necessary for such type of development. Those initiatives may be disbursement of capital with minimum interest; long turnover period, free training and use of khas land as a leasing system.

Agricultural: Agricultural landuse includes paddy field, cropland, grazing land, horticulture, orchard, etc. It constitutes 55.2% of total land of the Paurashava. Rural agricultural landuse spreads over the entire Planning Area. In the Ward No. 7 agricultural landuse occupied 250.70 acres out of the total land (1413 acres) under this category. At the same time, Ward No. 4 and 5 are occupied 76.50 acres and 81.60 acres respectively.

Education: The Paurashava is well developed with number of educational institutions like college, high school and primary school for improvement of educational activities. The students who likes to develop him with higher education shifts to the Dhaka or Zila Headquarters, but for general educational services available educational institutions are in the Paurashava premises. Three colleges and two non-government high schools are showing the demand of higher education. Six government primary schools and four kindergartens are identifying the demand of modern educational activities with roots. Total area under this use is 19.70 acres or 0.80% of the Planning Area wherein Ward No. 4 and 3 accounts 5.90 acres and 4.40 acres respectively. Ward No. 6 conceived minimum landuse under educational facilities (0.30 acres).

Public Land: This category includes all types of government offices like DC office, Zila Parishad, Upazila Parishad, LGED, DPHE, Fisheries, Social Welfare, Statistical Bureau, Health office, etc. Total land under this category is 7.90 acres (0.30%). The services are found in the Ward No. 3, 4, 5, 8 and 9. Among those Wards, Ward No. 4 conceived highest (4.2 acres) land and lowest (0.1 acres) in Ward No. 3.

Land under other Govt. Institutions: Such type of landuse dedicated for activities of public gathering which are mostly closed spaces. This category of use includes auditorium, town hall, all kinds of assembly hall, community centre, etc. This category constitutes 23.10 acres (0.9%) of land. Highest concentration of such land is found in the Ward No. 2 (11 acres) and lowest in the Ward No. 1 (0.2 acres).

This category also includes all types of financial institutions like bank, insurance company, mercantile and cooperative society, health, fire station, police station, electric sub-station, telephone office, etc. In total, 20.70 acres (0.8%) of land is found under this category. Highest concentration of those services is found in the Ward No. 4 (8.5 acres) and lowest in the Ward No. 2 and 5 (0.2 acres each).

Khas land: The Paurashava is not maintaining the khas land record. Upazila Nirbahi Officer is the custodian to maintain the khas land record and he has denied to supply any information on khas land of Bhanga Paurashava.

Other (Abandoned, etc.): In the Paurashava, 6 NGOs are with multi-disciplinary social development activities. Most of those offices are located in the residential areas and same compound in a residential building. The NGOs are separated from the residential buildings and established independently. Total areas under non-government services are 0.6 acres and those establishments are in the Ward No. 4.

Recreational: Recreational facilities like cinema hall, auditorium, amusement park, picnic spot, etc. are included in this category and it covers 0.20 acres land. Presence of the auditorium is located in the Ward No.4 proves that the area is historically developed in cultural activities. The auditorium also uses as community centre for different purposes. Ward No. 4 is dominating areas for recreational facilities in the Paurashava. In total, 10 clubs are in the Paurashava. Those clubs are the local recreational centers, sometimes also use for political purposes. Indoor recreational facilities are available in those clubs.

Water Bodies: This landuse is spread all over the Planning Area. Water bodies like river, pond and ditch encompass 284.20 acres or 11.1% area where 55.90 acres is in Ward No. 4, 51.40 acres in Ward No. 3 and 49.20 acres under Ward No. 5.

Mixed-use: Mixed-use areas are those where, either commerce is mixed up with residence or residence with commerce or residence with office or admixture of all the three. Sometimes small industrial enterprises are also found to co-exist with any one or all the above landuses. However, other admixture of diverse landuses is also found. Mixed landuse is a common character of all unplanned urban centers in Bangladesh. The degree of such admixture depends on the specific location of the area. If the area is closer to the urban centre than the more profitable landuse takes over the less profitable ones and co-existence of diverse landuses prevail for long till one fully takes over the other. In such areas usually commerce gradually takes over residential use.

In the Planning Area, mixed-use is not prominent, only Paurashava town centre is being formed. Only 5.80 acres (0.2%) land is identified as mixed-use areas in the Paurashava. Ward No. 4 is highly (3.1 acres) concentrated as mixed-use area.

Urban services: The Paurashava is composed with the urban services like Post Office, Bank, Dakbanglow and Police Station. Highest number of those services is found in the Ward No. 4 and none in Ward No. 5, 6 and 7. Among 14 community services, 2 post office, 4 monuments and distributed in all the Wards. The schedule bank is in the Ward No. 1, 4 and 8. Among two police stations, 1 is located in the Ward No. 4 and another is in Ward No. 9. Two Dakbanglows are located in the Paurashava, one in the Ward No. 4 and another is in Ward No. 9. Ward No. 4 and 9 is the central area of the Paurashava and most of the community services are in those Wards.

2.1.10 Paurashava Functional Linkage with Regional and National network

Regional network: The project for “Preparation of Paurashava Town Structure Plan, Urban Area Plan and Ward Action Plan” covers the areas in the Bhanga Paurashava boundaries. The planning area covers 10.66 sq. km. (2660.90 acres) and road length is 67.2 km. The National Highways run through the Paurashava and links a number of Connector Roads and Access Roads. National Highways are the major arterial roads of the study area. It provides connection with Bhanga Paurashava and other 17 districts. There is one important road intersection named Bhanga Bus Stand providing linkages with other access roads. Those access roads are Bhanga Bus Stand to Nurpur, Bhanga Bus Stand to Siladhar Char, Bhanga Bus Stand to Eidgah and Bhanga Bus Stand to Roypara.

Motorized and non-motorized vehicles are operated in all the nodes of the study area. The non-motorized vehicles are mainly operated within short distance and meet the local needs. The motorized vehicles are mostly Nosimon and trucks; mainly carry agro-product

from the Bhanga Bazar towards Bhanga Bus Stand and Dhaka. Locally modified motorized transport vehicle named *Nosimon* also uses for short distance passenger and goods transportation.

Roads of the Paurashava belonging to number of agencies named Roads and Highways Department (RHD) is responsible for National Highway, Local Government Engineering Department (LGED) responsible for construction and maintenance of Upazila and Union roads and Bhanga Paurashava for construction and maintenance of roads within the Paurashava area. Existing transportation system is dominated by road network catering to the passenger service and goods transport towards Dhaka, Faridpur, Madaripur, Gopalganj, Khulna, etc.

The part of the National Highways passes through the Paurashava boundary will be congested (accessibility will be hampered) very soon like Savar in Dhaka with the increase of urban services in the Paurashava.

National network: The Paurashava is located at south central part of Bangladesh and about 60 km. (through Maowa) away from the Dhaka City. Sadar Upazila and Shibchar Upazila of Madaripur Zila is on the north of the Bhanga Paurashava, on the south Rajoir Upazila of Madaripur Zila and on the west Nagarkanda Upazila. National importance of the Bhanga Paurashava as well as Bhanga Upazila is governed with its agriculture production. Rice, jute and sugarcane are the major agriculture products. Those products distributes among the Upazilas lying at the boundary line of the Bhanga Upazila.

The Upazila is important due to its surplus agriculture production and fish resources. Those agricultural commodities and fishes are being distributed to other Upazilas and Capital City of the country.

Physical growth of Bhanga Paurashava town depends on the road pattern of the Paurashava. Bhanga Paurashava is connected with Dhaka to Khulna via Bhatipara Road and Dhaka to Barisal via Faridpur Road. Concentrated development is the common feature of the Paurashava. The Bhanga Bus Stand is another important centre, which influences the dwellers to shift towards this bus stand.

The road network provides access to various places within the study area and connects various parts of the country following bus routes. Major trips of vehicles are generated from, the Paurashava, Bhanga Bus Stand, Barisal, Madaripur, Takerhat, Faridpur, Gopalganj and Khulna.

Bhanga is a new Paurashava established along the National Highways and Kumar River. No urban facilities yet provided by the Paurashava authority. All urban facilities as a township development are necessary. Most of the urban services were developed when the Paurashava was formed as a growth centre.

2.1.11 Role of Agencies for Different Sectoral Activities

Agencies responsible for utility facilities and municipal services are an important component for an area. Utility services include water supply, gas supply, electric supply, sewerage and drainage system, telecommunication system, fire services, solid waste management, etc. The concerned departments / organizations responsible for planning and development of utility services are shown in the following table.

Table 2-11: Agencies responsible for sectoral activities

Sl. No.	Sectors	Responsible agencies
1.	Electricity Supply	Rural Electrification Board (REB)
2.	Water Supply	DPHE / Paurashava/ Private
3.	Telecommunication	BTCL / Mobile Phone Companies
4.	Sewerage and Sanitation	DPHE / Paurashava/ Private
5.	Solid Waste Disposal	Paurashava / Private
6.	Fire Service	Fire Services and Civil Defense
7.	Post office	Postal Department

Source: Physical Feature Survey, 2009.

The authorities (as presented in the Table-2.11) should perform other roles need to be carried out with the assistance and support of other relevant government agencies. Those roles are:

- Provide existing and future service areas with full complement of related services to ensure that they can function efficiently.
- Identify depressed areas in each of the Ward where no improvement is being made and provide services with ensuring benefits for the dwellers.
- Ensure that within specific time (may be project period or private sector involvement process and a guideline frame for them) services will be provided according to the demand of the Paurashava inhabitants.

Map 2.1: National/ Regional Road Network

CHAPTER 3

PROJECTION OF FUTURE GROWTH BY 2031

3.1 Introduction

The Chapter presents future growth of the Paurashava according to the population, economy and landuse. Projected period for those components has been considered for the year 2011 to 2031. In case of population and landuse, projection has been presented but in case of economy, opportunities have been considered. For the Bhanga Paurashava, government policy is the prime focus as economic opportunity but that is not considered here. Existing local economic strength considers as the basis of economic opportunity. Agriculture, fish, livestock and poultry, local fruits and availability of labour force considers as a basic components of the economic opportunities.

3.2 Projection of Population

No single factor is important for planning than the size and composition of a region's population and the way it will change in future. Estimating future population for a specific period for a particular area is one of the most difficult tasks in the planning process. For Bangladesh, population projection is a very difficult task as the required data are not available for particular area and same is the case for Bhanga.

On the other hand, difference of data from different secondary sources also makes the job more complex. The population figures collected from secondary sources especially for Paurashava were very much ambiguous. So, for the projection, several discussions were made with experts and BBS officials. Following is the annual growth rate for the planning area available from the 2011 Population Census, the projection up to the year 2031 with five years interval has been prepared.

To calculate the future population of the Paurashava, following formula is being used.

$$P_n = P_o (1 + r)^t$$

where

P_o = base year population
 P_n = projected year population
 t = time period
 r = annual growth rate

Table 3-1: Population growth trend analysis

Area	Population 2001	Population 2011	Growth Rate 2011 (%)
Faridpur District (urban area)	161,541	195,247	1.91
Bhanga Upazila (urban area)	28,057	34,148	1.98
Bhanga Paurashava	28057	34150	1.98

Source: BBS, 2011 and calculated by the Consultant.

The annual urban growth rate of Faridpur District is about 1.91 % and at the same time Bhanga Upazila urban area growth rate 1.98 %. Though the upazila urban population and Paurashava's population are same, so the growth rate also same. The growth rate 1.98% is more acceptable and it will continue upto 2031 (assumption).

Basis of population projection: The data collected from several sources is not reliable to be accepted because, as like different sources data is also different. When it is calculated

for the projection then the output shows separate result. It is the main deficiencies of data obtained from diverse sources.

Migration information is not available in the BBS Census, only considers natural growth rate. Actual population projection requires both natural growth rate and migration rate. For this unavailability of migration data, calculation of population projection becomes very difficult. To avoid this problem, population estimation presents as alternate of population projection.

Population projection is calculated using population data of BBS 2011 and growth rate is calculated using BBS 2001 and 2011. The projection shows that the population of the study area will be 37676 in 2016, 41566 in 2021, 45858 in 2026 and 50593 in 2031. The scenario proves that in next 20 years the Paurashava population will be increased and it may be double. The projection is showing normal increase of population. In special case, for construction of Padma Bridge at Maowa Point, government policy on relocation of industries from Dhaka City and community facilities provided by the Paurashava according to the Master Plan, the growth rate will be increased rather than the normal rate at present.

Table 3-2: Population projection (growth rate 1.98%)

Ward No.	Area in acre	Population 2001	Population 2011	Projected population			
				2016	2021	2026	2031
1	286.52	2267	3156	3482	3841	4238	4676
2	377.92	4418	4455	4915	5422	5982	6600
3	251.22	2402	3728	4113	4538	5006	5523
4	272.62	3102	4889	5394	5951	6565	7243
5	232.53	4726	4834	5333	5884	6491	7162
6	288.25	2449	2931	3234	3568	3936	4342
7	356.15	2773	3119	3441	3796	4188	4621
8	165.2	2951	2719	3000	3309	3651	4028
9	330.49	2969	4319	4765	5257	5800	6399
Total area	2560.9	28057	34150	37676	41566	45858	50593

Source: BBS, 2011 and calculated by the Consultant.

3.3 Identification of Future Economic Opportunities

Most of the entrepreneurs expressed their desire of implementing future development plan. A major portion mentioned that their development plan is the expansion of their enterprises (78%) and others intend to increase their production (22%). Expansion of existing industries and establishment of new industries will create more jobs and thus have multiplier effect in the overall economy leading to create more consumption capacity, investment opportunities in diversified economic fields and thus push the economy upward.

Some small-scale pisciculture is located in the Bhanga Paurashava area. About 78 households are involved with such pisciculture. The production mostly uses in the Dhaka City and Madaripur Zila. Investment in this field will bring huge prospects of the Paurashava. Other economic prospect summarizes in the following discussions:

- Availability of unskilled and cheap manpower.
- Availability of agriculture land. The land may be used for different agricultural production and those productions may be used as the input of agro-based industries.

- Due to the nearness of Dhaka City, the Paurashava may be developed as a fringe area of Dhaka City. This fringe area with its agriculture production will support to the Dhaka City where marketing for those productions are available.
- The Paurashava has been developed as a growth centre during generations. Some cluster development is found around this growth centre. Planned development through this master plan will initiate to arrange the growth component in a systematic manner. At the sametime, economic development parallel to the physical and social development will be encouraged.

3.4 Projection of Landuse

Landuse requirement: Landuse survey basically records the use of land by its functional activities such as residential, commercial, industrial, recreational, etc. In Bhanga Paurashava, major landuse is agriculture (55.2%). Residential landuse occupies second position (21.7%) of the category. Only 2.7% landuse is using for circulation network. Though, agriculture landuse dominates the Paurashava but, after the preparation of Master Plan, a radical change in physical development will proceed. In consideration of such concept, the master plan will be delighted in favour to save the agriculture land.

Determining factors of landuse change is the income of the people, government policy, new establishment like industry, higher-level educational institute, construction of road and embankment and availability of services. The Paurashava was developed as a growth centre long before, than a police station. In the year 1997, it is notified as Paurashava. Radical change of landuse in the Paurashava is not found. Before it known as Paurashava, agricultural domination was the key landuse. During last ten years, the landuse scenarios remain same. A stagnant character of landuse change still stand due to the existence of river named Kumar. Rapid change of landuse will be viewed after construction of Padma Bridge at Maowa point.

Future landuse is being calculated according to the development control for the masses. In case of public land, existing use and khas land have been emphasized. Willingness and participation of the people in development activities are the key factor for future landuse demarcation. Slow change of landuse emphasizes rather than rapid change. Let the people do whatever he likes on own land – such concept should not be considered for future projection of landuses. Three parts of the projection are landuse change, landuse control and landuse restriction is included in the Master Plan. In any case, river front areas should be restricted for human habitation. As a result, river water will safe from contamination.

Basis for Projection: The projection of landuse depends on the growth of population. After population projection it is found that, population of the Paurashava will be 50593 that belong to the Trend Line method in the year 2031. Projection on landuse also depends on present trend of migration.

Demand Analysis: In case of landuse change, the standard given by the LGED according to the projected population and area for the specific service are calculated. But, the agriculture land should be preserved from any type of physical development. It should not be decreased. The vertical expansion will be emphasized rather than horizontal. In case of road network planning, missing links are prescribed rather than new roads. For the development of pisciculture, all ponds and ditches may be preserved, in some exceptional cases; small number of ditches may be used for physical development

activities. Landuse control and landuse restriction will be imposed by the Paurashava according to the prescribed plan.

3.5 Housing

Housing areas in the Paurashava is the composition of an admixer of housing types. Mixed- residential, poor people dominates rural houses and semi-urban homesteads. Most of the housing areas are being developed in a spontaneous fashion. In the rural part of the Paurashava, with its rural-agricultural character, different housing type is found. The dwellings, comprising homesteads, encompass larger areas having low density. The highest gross population density in the Paurashava is only 11 persons per acre. Buildings in the Paurashava are dominated by katcha structure (78%). No building is found approved from Paurashava. However, owners of the buildings have been found violated the setback rule. Except labour charge there is very little variation in building construction cost between Dhaka and Bhanga Paurashava.

Problems relating to the housing are mostly concerned with the poor community. Due to their low level of income a vast number of poor are squatting in public land. They are not only deprived of minimum housing but also from the personal security that endanger their health and working efficiency. Regular income can solve most of their housing problems. Apart from dwelling, pure water and transportation are real problems for the inhabitants. Municipal services are highly inadequate. Drainage is major problem in rural part of the Paurashava. The Paurashava can not solve the problems due to scarcity of fund. In the Paurashava, over 98 percent housing structures are one-storied that includes semi-pucca, katcha and Jhupri type houses.

Basis of housing projection: Existing landuse is not the only basis for housing projection. Residential use has considered for the year 2010 as base year and projected housing area is calculated considering 65 persons per acre.

Demand analysis: It is estimated that housing demand stands at 722 acres at the end of project period 2031. The estimate is based on the assumption that the standard supplied by the LGED for housing estimation where density is declared around 100 to 150 persons per acre. But, for Bhanga Paurashava, it is not possible to follow the standard properly. Furthermore, existing density is 11 persons per acre. If it considers 100 persons per acre, after 20 years housing demand will be lower than the total existing residential area. In this situation 65 persons per acre is considered to calculated the future housing demand. Again, in the Paurashava horizontal development is taking part rather than the vertical expansion. Projected housing demand is shown in the following table.

Table 3-3: Ward-wise demand of housing areas (65% per acre)

Ward No.	Existing Housing Area (acre), 2010	Estimated housing demand (acre)			
		2016	2021	2026	2031
1	48.0	53.6	59.1	65.2	71.9
2	84.5	75.6	83.4	92.0	101.5
3	62.4	63.3	69.8	77.0	85.0
4	63.9	83.0	91.5	101.0	111.4
5	63.1	82.0	90.5	99.9	110.2
6	73.1	49.7	54.9	60.6	66.8
7	67.0	52.9	58.4	64.4	71.1
8	24.2	46.1	50.9	56.2	62.0
9	70.3	73.3	80.9	89.2	98.4
Total	556.4	579.6	639.5	705.5	778.4

Source: Landuse Survey, 2009 and calculated by the Consultant.

CHAPTER 4

DEVELOPMENT PROBLEMS OF THE PAURASHAVA

4.1 Physical Infrastructure

- -Most of the lands in the Paurashava are acting an important role on the supply of agriculture commodities in different Paurashavas and Zilas. All of those lands submerge in rainy season. On the other hand, development activities are reducing agriculture land rapidly. This trend should be controlled through the imposition of development control, but the contemporary regulations and their management is not enough to control such development activities.
- About 4 to 8 meter earth filling will be needed for every development activities in the Paurashava. So, bulk development could not be encouraged due to huge cost involvement. Poor soil condition is another problem for bulk development. Low lands are also providing natural drainage facilities in the area.
- The Paurashava is a natural developed area. Planning effort yet not been taken by the public authorities. Therefore, a mixed-landuse scenario is viewed all over the Paurashava. These unorganized landuses should be framed within a planning manner with the physical and financial involvement of public authority.
- All roads in the Paurashava town are narrow and irregular. Some of the roads submerge in rainy season. Widths of all semi-pucca and katcha roads are between 3 to 6 meters and somewhere they are using as footway. Those narrow and irregular roads will be widened and in regular shaped but not in all cases. Because some of the roads are in densely populated areas, pucca buildings and commercial establishments will be needed to demolish. Some roads did not preserve any scope for further improvement. Infrastructural facilities such as water supply and sanitation will not be possible to provide in those narrow roads.
- Bhanga is a new Paurashava. No urban facilities yet provided by the Paurashava authority. All urban facilities as a township development are necessary. Most of the urban services were developed when the Paurashava was formed as a growth centre. Inhabitants of the Paurashava make their opinion (during consultation meeting) in favour of Paurashava system.
- Problems will be generated to provide central water supply system and drainage system due to the presence of ditches and char lands (sandy soil, eroded every year), only the land along with the National Highways (Dhaka-Khulna via Gopalganj and Dhaka-Barisal via Faridpur) appropriate for those services.
- The Paurashava is mostly linear in shape. Dhaka – Barisal and Dhaka - Khulna inter-district highway passes through the middle of the Paurashava from southeast to northwest. Settlements are formed linearly around the internal roads and the inter-district roads. Pattern of compact settlement is viewed in the Ward No. 3, 4 and 5. Those Wards are adjacent to the Bhanga Bus Stand. Ward No. 1, 2, 6, 7 and 9 is mostly agriculture dominated areas. Most of the commercial activities are formed in the Ward No. 4, 8 and 9 because it is nearer to the Bhanga Bazar and Bhanga Bus Stand.
- An intersection named Bhanga Intersection penetrates the Bhanga Paurashava. Vehicular movement about 17 districts passes this intersection. Once development

trend of the Bhanga was followed the river bank and as a result Ward No. 1, 3 and 4 have been developed linearly following the riverbank.

4.2 Socio-economic

The Paurashava is quite poor in respect of basic utility services. Information collected through Socio-economic survey reveals basic utility facilities like piped water supply is very negligible. Gas, drainage and sewerage and solid waste are also in same condition. People use various types of fuel sources like cylinder gas, kerosene, wood, electric heater, cow dung, etc. For drinking water supply, deep tubewell, community tubewell uses, electricity supply for household lighting and for other purposes exists but with frequent load shedding.

Almost all the Wards are connected with electricity supply in moderate level. In spite of this, considerable number of households in all the Wards has no electricity facilities. Almost all the Wards have no sewerage system and toilets are mostly consists of sock pits. Overall garbage disposal system is poor. Garbage Dumping Ground is not available and mostly disposes on open streets. Waste collection is collected through NGOs but not well organized all over the study area. Ward-wise findings in table below highlight the situation in this respect.

Bhanga Paurashava bears rural influences and business is the major source of income. Average monthly income per household is Tk. 9457. Food relatively stands higher in expenditure list (Tk.5051 in Paurashava as a whole). The residents of the Paurashava saves a little money per month from their income (highest amount is Tk. 5271).

Drainage facility: Nearly non-existence, very shallow katcha in type is the major characteristics of drainage facilities in the Paurashava. There are katcha drains constructed along the access roads, but this is found rare. Those drains are not continuous and open and not facilitated all the Wards.

Toilet facility: Toilet system is mostly categorized as pucca. In spite of this, Paurashava has a modest development of pucca toilets in government zones. Sewerage system has not been introduced on a trial basis as to their popularity and acceptance. Ownership of toilets varies widely in most of the areas. Most of the households have their own toilets and at the same time there is joint toilets found in slum areas. Sanitary toilets are comparatively poor in Ward No. 1 (71%) and 2 (78%) compared to other Wards.

Water supply: Hand tube-well and ponds as water sources exists in most of the Wards. Ownership of hand tube-well goes to households own property (60.2%). This scenario is found in Ward No. 1, 2, 3, 4 and 5. Some residents of Ward No. 3, 4, 5, 7 and 8 share neighbour's tube-well. People of all the Wards use pond as a secondary source of water.

Sewerage facility: Almost all the Paurashava areas are devoid of sewerage facilities. There exists a minor process of development in certain selected Wards but limited to government quarter only. Regarding ownership of toilets it varies widely in most of the Paurashava areas.

4.3 Environmental

In Bhanga Paurashava, noise pollution occurred by three wheelers and sound generates from saw mills and rice husking mills. Water contamination is observed as "Arsenic" threat. Air pollution is caused by dust emitted from saw mill, rice husking mills and furniture shops. Flood water and water logging creates health hazards. Dysentery and

diarrhea diseases occur due to flood and water logging. Habitual inundations, especially in monsoon, due to external floods from canals are another threat to environment. Pragmatic planning / solution and Drainage Master Plan are very pertinent issues which is utmost importance in planning the Bhanga Paurashava.

However, implementation of activities like roads, drainage, bridge / culverts, housing and industrial establishments and bazars will radically change the natural topography and landuse pattern. The agricultural land will be converted into urban and semi-urban nature. Existing scenic beauty will disappear; water bodies will lost and general slope will be diminished for earth filling due to urbanization. Therefore, in the process of preparation Structure Plan, Urban Area Plan and Ward Action Plan, consideration of those factors will be made for keeping the natural environment livable.

To create a better living environment, environmental phenomenon (as discussed earlier) has been considered with the systematic planning principles and regulatory measures. With these views, people's awareness needed to be increased through different public activities about the fair living environment. Arrangement of landuses should be provisioned for all the public and private organizations as their necessities.

CHAPTER 5

PAURASHAVA DEVELOPMENT RELATED POLICIES, LAWS AND REGULATIONS

5.1 Indicative Prescription of Policy for Paurashava in the light of the Different Urban Policies, Laws, Regulations and Guidelines

The preparation of Structure Plan, Urban Area Plan and Ward Action Plan for the Bhanga Paurashava is highly depended on the policies and relevant contemporary rules and regulations prescribed by the government. In preparation of the above Plans, guidelines and strategies prescribed through the policies are considered carefully. Contemporary rules and regulations help to formulate the process and procedure for development control.

Urban Land Management Policy

It is necessary to impose control on the use and development of urban land. A range of urban planning tools including landuse planning, transportation planning and management, site planning, subdivision regulations and building regulations can be applied to minimize environmental impacts of urban development activities.

Policies

- Protect sensitive land resources by minimizing activities threatening environmentally sensitive areas.
- Manage hazard-prone lands through improvement of environmental management practices throughout the Paurashava.
- Conserve open space, as identified through a participatory planning process that will effectively preserve drainage system, provide greater opportunities for recreation and meet the minimum needs of aquifer recharge.
- Protect heritage structures and archaeological and cultural sites through appropriate schemes, projects and regulations.
- Control excessive urban sprawl and manage prime agricultural land through the implementation of regulatory reforms.
- Formulation of land information system, land market assessment regulations, efficient and transparent land record and registration system, etc.
- Increase the supply of land for the poor through reforming land transfer laws to counter trends towards land accumulation.
- Adoption of taxation policies that discourage speculative investments in land that is left undeveloped for extended periods of time.
- Implementation of land-banking and land-pooling programs that allow the government to increase its pool of land which can be exchanged for low-cost housing sites in the Paurashava;
- Undertaking land readjustment projects that include low-cost land and housing sites.
- Undertaking land-sharing schemes and tenancy reforms for establishing clear rights of tenants.
- Allocating khas land/acquired land for housing the poor.

- Allocating reasonable proportion of land in urban places for housing the poor.

Strategies

The strategies necessary to implement the policies of the urban land management is the use of planning tools in land management. Those planning tools may be structure planning, local planning and action planning. Second strategy is the land use zoning. This tool may be used to:

- Protect productive agricultural lands by limiting the intrusion of non-agricultural uses;
- Manage floodplains by controlling uses of land within hydrologically defined areas subject to floods of a designated frequency;
- Preserve wetlands by limiting permissible uses to those that do not entail significant surface disturbance or runoff and substantially restricting land-disturbing uses within the areas identified as wetland areas;
- Restore and conserve natural canals and ponds.
- Facilitate planned unit development by allowing flexible design and clustering of residential development with higher densities on one portion of a land parcel so as to allow agricultural development or to provide increased open space or natural cover elsewhere on the parcel;
- Preserve open space by designating land areas for a variety of purposes such as recreation, future use, green belt, etc.

Strategies of land development for the Paurashava according to the Urban Land Management Policy may be followed through some techniques such as land pooling / readjustment, guided land development, land sharing, sites and services schemes, etc.

Landuse Policy

Bangladesh Landuse Policy was prepared and notified in the year 2001. Major aim of the policy is to prevent indiscriminate conversion of agricultural land into non-agricultural use, because such conversion may be threatened for food security of the country. The expansion of residential, commercial, industrial and socio-economic uses will encourage the diminishing trend of agriculture land. Through the policy, government has encouraged Compact Township and vertical expansion of the different type of building rather than horizontal expansion.

Objectives

The objectives of the Landuse Policy are to:

- Prohibit the recent practice on conversion of agriculture land into non-agricultural use to ensure food security for the people.
- Impose zoning provision to control the better use of land according to the nature of land located in different regions.
- Rehabilitation of landless people on the alluvion lands alluviated from river, Haor or sea.
- Preserve khas land for future physical development activities.
- Confirm landuses in relation with the existing natural environment.
- Use of land in favour of job creation, landlessness and poverty alleviation.

- Control land pollution.
- Construction of multi-storied building with accommodation of various purposes in public and private sector for ensuring minimum land coverage.

About 55% land of the Bhanga Paurashava is under the agricultural practices. According to the Landuse Policy of 2001, those lands should be preserved as agriculture land. For such preservation, some guidelines prescribed in the Landuse Policy will be considered they are – in case of rehabilitation of the landless people, Khas land will be emphasized. Prevention of river erosion will be designed in the Drainage Plan.

Housing Policy

Housing, in the context of overall improvement of human settlements, is considered by the Government of Bangladesh as an integral part of culture and planning for economic development. The Global Strategy for Shelter by the year 2000 adopted by the United Nations in November, 1988 calls upon governments to take steps for formulating a National Housing Policy, 2004 in the light of "the enabling approach" for achieving the goals of the strategy.

The housing problem in the country is of serious magnitude. In addition to the large number of homeless households; the rapid growth of slums and unauthorized squatter settlement; the increasing cost of land and construction materials; rampant speculation and the phenomenal increase in house rent, the problem is compounded by non-availability of basic civic services, including water and sanitation to the bulk of the population and acute shortage of affordable and adequate shelter for the poor and vulnerable groups. The housing shortage was estimated in 1991 to be about 3.10 million units, composed of 2.15 million units in rural areas and 0.95 million units in urban areas; with the bulk of the backlog consisting of katcha un-serviced units. The housing shortage is likely to exceed 5 million units by the year 2000 A.D. The current housing stock is deteriorating fast due to aging, general neglect, poverty and civic apathy on the part of the dwellers.

Objectives

The objectives of the National Housing Policy are to:

- Make housing accessible to all strata of society and to accelerate housing production in urban and rural areas with major emphasis on needs of the low and middle-income groups, the high priority target groups will be the disadvantaged, the destitute and the shelterless poor.
- Make available suitably located land at affordable price for various target groups, especially the low and middle-income group.
- Develop effective strategies for reducing the need to seek shelter through formation of slums, unauthorized constructions, encroachments and shanty dwelling units and to improve the existing ones environmentally and, where possible, to relocate them in suitable places.
- Rehabilitate disaster affected households and houses affected by fire accidents.
- Mobilize resources for housing through personal savings and other financial input's and by developing suitable financial institutions.
- Make effective implementation of the housing programs, promote use of locally developed materials and construction techniques and increase production of forest-

based building materials such as timber, bamboo or grass. Attempts will be made to develop alternative and durable materials based on locally available raw material.

- Develop institutional and legal framework to facilitate housing.
- Improve and enhance the character, quality and environment of the existing residential areas.
- Develop new strategies and undertake revision of the policy from time to time to cope with the emerging housing needs and problems in the country.
- Undertake action-oriented research in all aspects related to housing and foster minimization of cost and rent.

Rural Homestead

Clause 5.9 of the Housing Policy describes about the rural housing. The Bhanga Paurashava is rural based urban area. Rural character is the dominating issue in the housing sector. In the Housing Policy, following measures are suggested to improve rural housing:

- Avoiding unnecessary displacement of rural settlements due to development projects and where unavoidable, makes proper rehabilitation of the households, with full community involvement.
- Encroachment on agricultural land by proliferation of homestead should be discouraged. Efforts should be made for planned densification of rural homesteads. Subject to availability of khas lands, programmes similar to 'Adarsha Gram' programme of the Ministry of land will be undertaken in rural areas.
- The coordinated provision of water supply, sanitation, electricity, roads and other basic infrastructure services to existing and new habitations.
- Providing assistance by way of providing credit, dissemination of appropriate technology and delivery system for promoting housing.
- Initiating schemes for increased employment opportunities and income generation by extending appropriate credits and advice, so that housing affordability is enhanced.
- Establishing suitable institutional structure including strengthening of existing organizations at district and local level, with the responsibility for planning, financing, implementation, supervision and monitoring of rural housing schemes, and with the full involvement of beneficiaries, NGOs and CBOs, giving special attention to the needs of the poorest segments, specially women and disadvantaged persons.
- Linking the development of housing sites and the upgradation of rural housing with the activities under the Bangladesh Rural Development Board (BRDB) and other programmes for the creation of rural assets and employment.

Slums and Squatter Settlements

Clause 5.10 of the Housing Policy describes about the slums and squatter settlements.

The poor environmental condition in slums and squatter settlements create health problems for their residents and those in the adjoining areas. Those areas may be Paurashava Town. Keeping in view the policies of planned growth of urbanization, income support and poverty alleviation and together with steps to arrest the growth of new slums in urban areas, the Government would take steps to:

- Encourage in-situ upgradation, slum renovation and progressive housing development with conferment of occupancy rights, wherever feasible, and to undertake relocation of the squatter settlements from the sites that need to be cleared in public interest.
- Expand provision of water supply, sanitation and other basic services in slum and other settlements occupied by the poor.
- Ensure proper maintenance of amenities in slums and squatter settlements through community involvement and decentralized institutional arrangements.
- Integrate the provision of physical amenities slums and squatter settlements with basic services including maternal and child welfare services and health care, structured on community participation and involvement of voluntary agencies and management by local bodies.
- Provide night shelters and pay and use public toilet for the footpath dwellers and the homeless.

Infrastructure

Clause 5.2 of the Housing Policy describes about the infrastructures related with the housing. Most of those infrastructures are needful for housing construction and preparation of master plan. Following measures are recommended for development and improvement of infrastructure for housing:

- Increase investment by national and local government agencies in order to meet the rapidly growing needs of serviced land and to improve the availability of services in different settlements.
- Promote a balanced pattern of urbanization through a policy of decentralization of investments and incentives for the growth of secondary, intermediate and small towns so as to reduce pressure on metropolitan cities and to control unregulated conversion of agricultural and forest land for the purpose of housing.
- Develop economically buoyant and socially attractive secondary and intermediate towns by strengthening their linkages with contiguous rural areas and market centres as part of the integrated and planned development of the region and to reduce migration to the larger cities.
- Make necessary investments to increase within a reasonable time, the coverage of entire rural and urban population for potable water supply and basic sanitation.
- Increase investments in public transport and traffic network to improve mobility of people, particularly that of the poor.
- Encourage the use of infrastructure construction technologies, which are cost effective, incrementally upgradable and environmentally appropriate.
- Provide government support for extension of infrastructure based on the participation of the people and private developers, NGOs, CBOs or on innovative systems of infrastructure leasing.
- Provide Government assistance to the local bodies for adequate cost recovery of investment on infrastructure, proper maintenance of services and upgradation of the capability of the personnel in local bodies and functional agencies.

- Provide opportunity for community participation and recognize people's initiative in the design, installation and the upkeep of services within the framework of the development programmes.

Strategies

The salient features of the housing strategy are:

- Housing will be given due priority in the national development plans treating it as a separate sector by itself.
- The role of the Government in housing will primarily be that of a facilitator or enabler in order to increase access to land, infrastructure, services and credit and to ensure availability of building materials at a reasonable price, specially for the low and middle-income groups and to create and promote housing finance institutions; whereas actual construction of housing will generally be left to the private sector developers, the people themselves, and the NGOs.
- Greater emphasis will be laid on affordability, personal savings, self-help and cost recovery. Efforts would be made to enhance affordability of the disadvantaged and low-income groups, through provision of credit for income generation and income enhancement, housing loans at especially low interest, access to space for running workshops or business and such other facilities.
- Improvements and rehabilitation of the existing housing stock will be given priority by the Government alongside new housing.
- Encroachments on public land and formation of unauthorized constructions will be discouraged.
- Austerity will be maintained in building houses and efforts will be made to economize housing costs, discourage extravagant construction, facilitate incremental house building and ensure wider application of low cost technology and optimum use of resources at the individual and national levels both in public and private sectors.
- Regeneration of forest-based building materials would be planned and environmental conservation given due consideration.
- Due attention would be given to construction, protection, replacement and rehabilitation of shelter in disaster affected and fire prone areas.
- Special care would be taken for the preservation of cultural heritage and promotion of vernacular architecture in new housing projects.
- Universities, research institutes and centres will be encouraged to conduct research on housing issues.
- The National Housing Policy will be co-ordinated with other development policies e.g. land, environment, population, employment, social welfare, fiscal and monetary policies at national and local levels.

Population Policy, 2004

Realizing the importance of population and development, the government prepared a Population Policy in the year 1976 and identified population problem as a national problem. Objectives of the Population Policy are to improve the status of family planning, maternal and child health including reproductive health services and to improve the living standard of the people making a desirable balance between population and development in the context of Millennium Development Goals (MDGs) and Interim

Poverty Reduction Strategy (IPRS). Economic growth, poverty reduction and social development has identified as national strategy through the Population Policy of 1976. In the Policy, urgent attention should be given on the gender equity and empowerment, welfare services for elderly and poor, control on rural to urban migration, human resource development through skilled workforce and participation on NGOs and private sector in the process to control the population growth.

Aims

- Aims of the Population Policy as presented are:
- Aware females about family planning to reduce Total Fertility Rate (TFR) and increase to use family planning devices among the fertile groups.
- Towards stable population within the year 2060 and the net growth rate not higher than 1% within the year 2010.
- Provide importance on mother's health to reduce maternal dead.
- To aware people about HIV / AIDS and to reduce it's chronological expansion.
- To help for providing gender equity and women empowerment in the society.
- To increase personal quality of the planners, administrators and service delivery agencies and to develop the information collection system, research and presentation.
- To control immigration from rural to urban and considers effective steps.
- Provisioning environmental sustainability including safe drinking water supply.

Agriculture Policy

Primary goal of the Agriculture Policy is to modernize and diversify the crop sector (including agricultural system) through initiation and implementation of a well-organized and well-coordinated Agriculture Development Plan. Overall objective of the Agriculture Policy is to make the nation self-sufficient in food increasing crop production (cereals also) and ensure a dependable food security system for all.

Aims

Clause 2 of the Agriculture Policy presents aims to increase crop production and maintain food security in the country. Some of those aims are:

- To increase income of the farmers and their buying capacity through stable and benefited agricultural development.
- To develop and preservation of productivity of the land.
- Removal of dependency on specific crop as a stable food.
- Introduces biological technologies, their use and expansion among the farmers.
- To encourage farmers for introducing irrigation from secondary sources during draught and introduces stable irrigation facilities for improving cropping intensity and crop production.
- Introduction of farming as an income generating sector through farming system and agro-forestry activities.
- To produce necessary agro-product for industrial use.

- To find out new opportunities for more export and minimum import of agriculture commodities.

Transportation Policy

For the country's economic and social development and for poverty alleviation, development of the road network is essential. For this reason the transport sector has been accepted as a priority sector. With the development of the economy the volume of vehicles, passengers and goods has been increasing. In the meantime a notification regarding classification, definition and responsible organizations for all roads was issued. In this context standardization and cost rationalization of the roads in the country, especially the Zila, Upazila, Union and village roads, have become very essential. For the development of Multimodal Transportation System (Road-Rail-River) such a standardization / cost rationalization of roads and bridges / culverts is a need of the hour. Standardization including cost rationalization will provide the basis of appraisal of road / bridge projects leading to optimal development of the transport system as a whole. At present there is no standard design and national unit cost for construction and maintenance of various roads and bridges and culverts. As a result substantial cost difference has been proposed by the agencies for same type of road / bridges for the same area.

Summary of Issues Covered

Following tasks of a road projects will be adopted:

- The Committee reviewed the design standards for the Union, Upazila, Zila Roads, and concluded that the key design criteria for all roads should be traffic and axle loads, and not the classification of the roads.
- The six design standards agreed by the Committee to form a logical progression in terms of road width and pavement thickness, all based on traffic considerations. They are not directly related to road classification.
- The agreed design standards are to be used by all road agencies. Road agencies will be required to use appropriate standards for roads according to traffic criteria.
- Reconstruction- full pavement reconstruction on an existing embankment
- New road Construction - completely new embankment and road pavement, including bridges, culverts and any necessary slope protection. This is likely to prove a rare category of road project in Bangladesh
- Widening- road widening and upgrading, including full re-construction of the existing pavement
- Strengthening- removing existing road surfacing and providing a new base layer of Base Type-1 and surfacing.

A passenger car is 1.0 pcu. Larger vehicles have higher values. Conversion factors for vehicles to pcu's are shown in the following table.

Table 5-1: Passenger Car Unit (pcu) Conversion factors for non-urban roads

Vehicle Type	PCU factor	Vehicle Type	PCU factor
Car	1.0	Bicycle	0.3
Bus	3.0	Rickshaw	1.0
Truck	3.0	Motor Cycle	0.3
Autorickshaw	0.5	Tempo	1.0
		Bullock Cart	4.0

Source: Transport Research Laboratory (UK) Overseas Road Note 13.

Road design will henceforth be based on traffic criteria, as opposed to road classification, then in theory a road could take any of considerations mean that the typical applications of the designs will be as listed in the following table.

Table 5-2: Design applications

Roads class	Typical design applications
Zila	Types 5,4,3*
Upazila	Types 6,5,4*
Union	Types 8,7

* Special type to be used under special circumstances.

The design lives, based on the pavement thicknesses for each existing design and each recommended design are set out in Table-5.3 in terms of the cumulative number of equivalent standard axles (ESA's). Given typical traffic levels and a growth rate of 5% per year the expected design life for each type of existing road is provided. For each of the recommended designs the forecast ESA's have been calculated from the traffic capacity in the design year, to allow the design life to be estimated. Again, traffic growth of 5% on all roads is assumed.

Table 5-3: Existing and Recommended design lives

Road Class	Existing Design		New Class	Recommended Design		
	Cumulative Million ESA's	Typical Expected Design Life (Years)		Design Type	Design Life (Million ESA's)	Expected Design Life (years)
Rural Road/ union Road	0.5	10	Union	8	1.0	10
				7	1.0	10
Feeder Road B/ Upazila Road	1.0	10	Upazila	6	1.0	10
				5	1.6	10
Feeder Road A/ Zila Road	1.0	10	Zila	4*	2.0	10
				5	1.6	10
				4	5.0	20
				3	6.5	20

** Overlaying of 25-40mm BC will be required after every 7-8 yrs. * Special type to used under special circumstances.

Environment Policy

Bangladesh National Environment Policy was approved and published in 1992. Key elements of the Policy are –

- Maintain ecological balance and overall physical development progress of the country through protection and development of different sectors. Protection from natural disaster is one of them.
- Identification and regulation all type of activities which pollutes and degrade the environment.
- Ensuring proper Environment Impact Assessment prior to undertaking of industrial and other development projects.
- Ensuring sustainable use of natural resources.

Proposed Sectors

For the fulfillment of every component of Environment Policy, it has divided in to 15 sectors. Those sectors are – Agriculture, Industry, Health, Energy, Water Development, Flood Control and Irrigation, Land, Forest including flora and fauna, Fish and Livestock, Food, Seashore and Maritime, Transport and Communication, Housing and Urbanization, Population, Literacy and awareness, Science, Technology and Research, Legal framework and Institutional framework.

Strategies

For the implementation of policies, a large number of strategies have been framed according to the sector. Some of those strategies are:

Agriculture: Conduct field survey for imposing sustainable farming system and increase soil fertility. Necessary steps should be taken based on that survey. Control on the use of chemical insecticides and pesticides and encourage farmers using bio-chemical fertilizer. Such strategy may be implemented by the Agriculture Ministry, Bangladesh Agriculture Research Council, Directorate of Agriculture Extension, Bangladesh Rice Research Institute, Jute Research Institute, Bangladesh Agriculture Research Institute, Bangladesh Sugar and Food Industries Corporation.

Industry: The industries identified by the Directorate of Environment in the group of polluting industries, measures should be taken against them as early as possible. The strategy should be imposed by the Agriculture Ministry, Directorate of Forest, Commerce Ministry, Controller of Export Import, Plant Protection Wing, Directorate of Agriculture Extension, Bangladesh Sugar and Food Industries Corporation.

Health: Pure drinking water supply and sanitary latrine in urban and rural areas should be introduced. Industrial and agricultural wastes which are harmful for the health should not be dumped in the river, pond, canal and ditches. This should be controlled through the imposition of appropriate regulations. Those strategies will be maintained by the Local Government Division, Directorate of Public Health Engineering, Paurashava Authority and Directorate of Environment.

Water Development, Flood Control and Irrigation: For the expansion of the project on Water Development, Flood Control and Irrigation, environmental audit is necessary. Based on that audit, environmental degradation areas will be identified and appropriate measures will be undertaken. Roads and Highways Department, Bangladesh Road Transport Authority, Directorate of Environment, Water Development, Flood Control and Irrigation Ministry and Bangladesh Water Development Board will responsible for implementation of those strategies.

Land: Landuse regulations should be prepared and their effective use will be confirmed for planned use of land. Land Ministry, Agriculture Ministry, Industrial and other relevant Ministries, Local Government Division, Works Ministry, Directorate of Forest and Zila Parishad will responsible for such strategies.

Industrial Policy

At first, in the year 1999, government of Bangladesh has approved and notified the Industrial Policy. Again, in the year 2005, Industrial Policy of Bangladesh was published by the government. Both the Policies are synonyms and foremost objective is to setup planned industries considering the domestic demand, prospect of exporting goods and discouraging unplanned industrial growth in the light of past experience.

Objectives

Objective of the industrial policy is –

- To expand the production base of the economy by accelerating the level of industrial investment.
- To promote the private sector to lead the growth of industrial production and investment.

- To focus the role of the government as a facilitator in creating an enabling environment for expanding private investment.
- To permit public undertaking only in those industrial activities where public sector involvement is essential to facilitate the growth of the private sector and / or where there are overriding social concerns to be accommodated.
- To attract foreign direct investment in both export and domestic market-oriented industries to make up for the deficient domestic investment resources and to acquire evolving technology and gain access to export markets.
- To ensure rapid growth of industrial employment by encouraging investment in labour intensive manufacturing industries including investment in efficient small and cottage industries.
- To generate female employment in higher skill categories through special emphasis on skill development.
- To raise industrial productivity and to move progressively to higher value added products through skill and technology up gradation.
- To enhance operational efficiency in all remaining public manufacturing enterprises through appropriate management restructuring and pursuit of market-oriented policies.
- To diversify and rapidly increase export of manufactures.

Strategies

All regulatory barriers will be removed within the quickest possible time to facilitate easy and rapid flow of domestic private and foreign direct investment. Appropriate legal framework will be put in place to protect both investor and consumer rights to ensure proper market operation and consequently, for lowering cost of doing business.

- There will be no discrimination between domestic and foreign investment. Due emphasis will be given to promotion of regional and sub-regional cooperation.
- Existing public sector enterprises will be progressively privatized and public industrial investment will be limited to only those cases where there is special need to complement private investment or where there is an overriding social and national objective to be achieved.
- The capital market will be developed and strengthened to mobilize domestic savings and to attract foreign investment.
- Development of the infrastructure including port facilities, energy, transport and communication and human resource development will receive high priority. Private investment including "Build, Operate and Own" (BOO) and "Build Operate and Transfer" (BOT) methods will be particularly encouraged in these sectors.
- Intensive industrial zones development will be undertaken together with balanced geographical dispersal of the zones in areas with growing potential to the utilization of local resources as more infrastructural and other facilities are put in place.
- Consistent with the charter of World Trade Organization (WTO), protection to domestic industries from external competition will be rationalized.

- To retain the competitive edge of domestic products, wage increases will be linked to productivity trends, and appropriate labour laws will be put in place to ensure congenial industrial relations.
- The industrial investment will be encouraged through tariff rationalization and (appropriate fiscal measures. The import and export policies will also be made supportive of and consistent with the Industrial Policy.

The Bhanga Paurashava is agro-based urban area. To reduce poverty and generate employment opportunities, more efforts are needed to establish agro-based industries in the light of Industrial Policy, 2005. This effort will ensure protection and fair price of agro-products and employment opportunities for unemployed people. In order to create further employment opportunities beyond the agricultural sector, initiatives should be taken to setup small, medium and large industries across the country. A well organized linking among those industries in case of raw materials and supply of labour will be needed. If these types of industries setup in a planned way, unemployment rate will decline and poverty alleviation will be accelerated.

Health Policy

National Health Policy was approved and published by the government in the year 2000.

Aim of the Health Policy is –

- To develop a system to ensure easy and availability of health services for the people living in urban and rural areas.
- To ensure optimum quality, acceptance and availability of primary health care including government medical services at the Upazila and Union level.
- To adopt satisfactory measures for ensuring improved maternal and child health at the Union level and install facilities for safe child delivery in each village.
- To improve overall reproductive health resources and services.
- To ensure the presence of full-time doctors, nurses and other officers / staffs, provide and maintain necessary equipment and supplies at each of the Upazila Health Complexes and Union Health and Family Welfare Centres.
- To formulate specific policies for medical colleges and private clinics, and to introduce appropriate laws and regulations for the control and management of such institutions including maintenance of service quality.
- To explore ways to make the family planning program more acceptable, easily available and effective among the extremely poor and low-income communities.
- To arrange special health services for mentally retarded, physical disabled and for elderly population.

Strategies

Some of the strategies of health policy are:

- The aim “health for all” will be implemented through awareness building strategies. Cost-effective procedures to deliver health services will be the prime consideration.
- A specific organization will perform responsibility for Epidemiological Surveillance to control the spread of epidemic diseases. Such concept will be included with different programs.

The services delivering by the health centers to the patient should be standard and a printed guideline on standard, monitoring and evaluation will be given to those health centers.

- A Health Services Reforms Body will be formed based on the Health and Population Sector Strategy. This Body will responsible for infrastructural reformation, employment, development planning and implementation of human resources relevant with the health activities and development of carrier of workforces.

National Urban Policy

National urban policy aims to strengthen the aspects of urbanization and at the same time effectively deal with its negative consequences in order to achieve sustainable urbanization. Diffusion of urbanization and rural-urban linkages is an important issue in this regard. There is need for decentralization of power from central to local government. The major objectives of national urban policy will aim to:

- Ensure regionally balanced urbanization through diffused development and hierarchically structured urban system.
- Facilitate economic development, employment generation, reduction of inequality and poverty eradication through appropriate regulatory frameworks and infrastructure provisions.
- Ensure optimum utilization of land resources and meet increased demand for housing and urban services through public-private partnerships.
- Protect, preserve and enhance urban environment, especially water bodies.
- Devolve authority at the local urban level and strengthen local governments through appropriate powers, resources and capabilities so that these can take effective responsibility for a wide range of planning, infrastructure provision, service delivery and regulatory functions.
- Involve all sectors of the community, in participatory decision-making and implementation processes.
- Ensure social justice and inclusion by measures designed to increase the security of poor people through their access to varied livelihood opportunities, secure tenure and basic affordable services.
- Take in to account, particular needs of women, men, children, youth, elderly and the disabled in developing policy responses and implementation.
- Assure health, safety and security of all citizens through multifaceted initiatives to reduce crime and violence.
- Protect, preserve and enhance the historical and cultural heritage of cities and enhance their aesthetic beauty.
- Develop and implement urban management strategies and governance arrangements for enhancing complementary roles of urban and rural areas in sustainable development.
- Ensure good governance by enhancing transparency and establishing accountability.

Rural Development Policy

From the year 1987 to 2011, government has framed and implemented different projects and programs for the betterment of rural people. Those projects and programs as mentioned in the Rural Development Policy of Bangladesh are:

- Food for Works Program (Lj-Sl çhçej-u MjçÉ LjÑp\$Q£)
- G.R Program (Gratuitous Relief Program)
- T.R Program (Test Relief Program)
- V.G.D Program (Vulnerable Group Development Program)
- V.G.F Program (Vulnerable Group Feeding Program)
- Single-House Single-Farm Program (HLçV hjs£ HLçV Mjjl LjÑp\$Q£)
- Back to home Program (O-l ®glj LjÑp\$Q£)
- Food for Education Program (Mj-cÉl çhçej-u çnrj LjÑp\$Q£)
- Rural Occupational Project (fõ£ S£çhLjue fËLÒf)
- Poverty Reduction Project (çjçlâ çh-jjQe fËLÒf)
- Self-employment Program for Women (jçqmj-cl BaË-LjÑpwøqje fËLÒf)
- Women Empowerment Program (jçqmj-cl pijjçSL rjaue fËLÒf)
- Coordinated Women Development Program (pjçeÄa jçqmj Eæue fËLÒf)
- Peace Home Program (njçç¹ çehjp LjÑp\$Q£)
- Shelter Support Program (BnËue LjÑp\$Q£)
- Educational Allowance Program (çnrj Efh^açš LjkÑH²)
- Aged-allowance Program (huØLiçaj LjkÑH²)
- Micro-credit Program (r¥âGZ LjÑp\$Q£)
- Allowances for Widowed, Poor and Husband-renouncement Women Program (çhdhj, çxøq J üjj£ fçlaËJ² jçqmj-cl SeË içaj fËcje LjÑp\$Q£)

Aims and objectives

Some of the aims and objectives of the Rural Development Policy is presented here.

- To increase the income and provision of jobs for the Villagers, especially for women and people under low-living standard in the rural areas.
- To confirm sustainable economic and social development through poverty reduction.
- To encourage self-employment opportunities in the rural areas.
- To emphasize for the development of rural wealth according to the equal distribution of economy and national development as prescribed in the Constitution of Bangladesh.
- To give confirmation to the rural people about infrastructural development, equal distribution of wealth and marketing of the agricultural production.
- To produce technologically efficient people about education, technical education and trainings in rural areas.

- Identification of demand and their fulfillment for socio-economic development of rural poor, persons involved with the production, especially small farmers and landless people.
- To reduce distances between towns and villages about services prevail through collective efforts and develop gradually.

Programs

Programs for the rural development may be framed on Involvement of people with the decision-making and development activities, Poverty reduction, Rural infrastructural development, Agro-based rural economy, Rural educational system, Village health service and development of foodstuffs, Village population control, Development of village settlement, Land use and development, Village industrial expansion, Increase of capital and financing, Women empowerment, Development of village child and youth, Development of village backward population, Area-based special development program, Self-employment for self-dependent, Cooperative system for rural development and Conservation of rural environment.

5.2 Laws and Regulations Related to-

5.2.1 Urban Development Control

The President of Bangladesh is empowered through the Constitution (called constitutional Wright) to establish, control and removal of any government office. This is a part of national administration. The President of Pakistan, in the year 1960 was enacted the Municipal Administration Ordinance, 1960. In the year 1977, some of the Municipalities were upgraded and re-named as Paurashava and administered through the Paurashava Ordinance, 1977. Again, in the year 2009, Paurashava Ordinance, 1977 is re-named as Local Government (Paurashava) Act, 2009 but the name remains same.

The Local Government (Paurashava) Act, 2009 (Ordinance No. XLXVIII of 2009) was enacted in 6th October 2009 and this is the only regulation executes by the Paurashava authority. The Paurashava authority may provide the functions as prescribed in the Ordinance, no provision is being outlined to control and manage those functions. The jurisdiction of this Ordinance on other regulations includes following Acts and Ordinances. The Paurashava may enforce those regulations according to their capacity.

- 1z A;çbÑL fËçau;je A;Ce, 1993 (1993 p-el 27 ew A;Ce)
- 2z AbÑ GZ A;ç;ma A;Ce, 2003 (2003 p-el 8ew A;Ce)
- 3z ÛÛ;e£u pL;l Lçjne AdÉ;-cn, 2008
- 4z h;wm;-cn nÉj A;Ce, 2006 (2006 p-el 42 ew A;Ce)
- 5z Cantonments Act, 1924 (Act No. II of 1924)
- 6z District Act, 1836 (Act No. I of 1836)
- 7z The Penal Code, 1890 (Act No. XLV of 1890);
- 8z Prevention of Corruption Act, 1947 (Act No. II of 1947)
- 9z hÉ;wL @L;Çf;e£ A;Ce, 1991 (1991 p-el 14 ew A;Ce)
- 10z The Bangladesh Shilpa Rin Sangstha Order, 1972 (P.O. No. 128 of 1972)
- 11z The Bangladesh Shilpa Bank Order, 1972 (P.O. No. 129 of 1972)
- 12z The Bangladesh House Building Finance Corporation Order, 1973 (P.O. No. 17 of 1973)
- 13z The Bangladesh Krishi Bank Order, 1973 (P.O. No. 27 of 1973)
- 14z The Investment Corporation of Bangladesh Ordinance, 1976 (Ordinance No. XL of 1976)
- 15z The Rajshahi Krishi Unnayan Bank Ordinance, 1986 (Ordinance No. LV III of 1986)

- 16z @LjÇfje£ A;Ce, 1994 (1994 p-el 18 ew A;Ce)
- 17z Local Government (Paurashava) Act, 2009 (Ordinance No. XLXVIII of 2009)
- 18z SeÈ J j³aÉ çehåe A;Ce, 2004 (2004 p-el 29 ew A;Ce) (see section 53(2)(Q))
- 19z Evidence Act, 1872 (Act No. I of 1872) (see section 131)
- 20z fö @ljN A;Ce, 2005

On the other hand, the Paurashava is empowered for delivery urban services, collection of taxes and tolls, preparation of budget, control development and other physical activities provide health and social services and electoral role. All of those activities are guided through this Ordinance. In case of regulatory involvement, the Ordinance is wide enough than other authorities. The Ordinance proves that the Paurashava is independent and self regulatory body, but due to the absence of necessary manpower, technological support and government initiative in financial matter, the Paurashava is dependent on central government.

Building Construction Rules, 1996

Building Construction: The Paurashava Authority is the custodian and enforcement authority of the Building Construction Act, 1952 and Building Construction Rules, 1996 for any construction in the Paurashava premises. Section 3(1) of the Act presents control on building construction in the country. Mostly approval system of the building plan prescribed in the Rules and punishment for the breach of regulation presented in the Act. But the approval system is lengthy and volume of punishment is poor.

Density Control: Section 12(1) of Building Construction Rules, 1996 sets a formula for building height determination based on the width of the front road. This rule imposes a limit on the building height as long as the front road is less than 75 ft. (22.87 meter). Indirectly this limits the number of family or the size of population in a building. Setback rule of the building and approval system of the building plan also prescribed in the Building Construction Rules.

Excavation of Tank: Section 3(2) of the Act presents control on the excavation of Tank in the urban area. Approval for such excavation will be needed from the concerned authority. The regulation mostly enforces by the Development Authority and the Deputy Commissioner enforces on the areas other than the jurisdiction of Development Authority.

Raging of Hill: Section 3(3) of the Act presents regulation on the raging of hill. In the Act it is prescribed that anybody is not authorized for raging of hill without approval from the concerned authority. Development Authority and Deputy Commissioner is the concerned authority.

National Reservoir Protection Act, 2000

Playfield, Open space, Garden and Natural Tank in Urban Areas Preservation Act, 2000 (Act No. XXXVI of 2000), enacted in 18th September 2000. In short, this Act may be called as National Reservoir Protection Act. The jurisdiction of this Act is covered Metropolitan City, Divisional and District level Cities and all urban areas including Paurashava area. Aim of the Act is to preserve play field, open space, park / garden and natural water reservoir. For the Paurashava premises, Paurashava Authority is empowered for enforcement of the said Act.

According to the section 5 of this Act, any area demarcated as Playfield, Open space, Garden and Natural Tank should not be changed with other use or it is prohibited for

rent, leasing or any other procedure followed by, or handover to anybody for such changes. Again, according to the section 6, approval from concerned authority through application within stipulated time will be needed for any change of the area identified as play field, open space and natural tank. Punishment for such changes without approval from concerned authority is presented in the section 8. For such unlawful activities, punishment may be 5 years imprisonment or Tk 50,000 as a penalty or both. For preservation of natural water bodies in the Paurashava, this Act will be the important tool of the Paurashava authority.

Acquisition and Requisition of Immovable Property Ordinance, 1982

For any physical development activities, acquisition of land is needed primarily. In the Paurashava premises, for acquisition of land, the Paurashava Authority will request to the Deputy Commissioner to acquire the land needed. It is said in the section 3 of the Acquisition and Requisition of Immovable Property Ordinance, 1982, whenever it appears to the Deputy Commissioner that any property in any locality is needed or is likely to be needed for any public purpose or in the public interest, he shall cause a notice to be published at convenient places on or near the property in the prescribed form and manner stating that the property is proposed to be acquired.

Conservation of Environment Act, 1995

Directorate of Environment is the enforcement authority of the Conservation of Environment Act, 1995. According to the Act, government can declare ecologically critical area through Gazette Notification (section 5(1)). Such critical environment may be created through human activities or climatic disturbances. Control on motorized vehicles who exhausts smoke dangerous for human health has prescribed in the section 6. Punishment for violation of any order presented in the Act may be 5 years imprisonment or fine with Tk. 1, 00, 000 or with both.

Rural Electrification Board Ordinance, 1977

Government of Bangladesh has enacted the Rural Electrification Board Ordinance on 29th October 1977. Section 8 of the Ordinance has presented functions of the Board and among them two functions are -

- a) To establish electricity generation transmission, transformation and distributionsystems in the rural areas of Bangladesh.
- b) To take measures for effective use of electricity to foster rural development with special emphasis on increase of use of electric power for economic pursuits such as development of agriculture and establishment of rural industries and assisting the advantaged sections of the community for augmenting their income and standard of living.

Brick Burning (Control) Ordinance, 1989

Chairman of the Upazila Parishad is the enforcement authority of the Brick Burning (Control) Ordinance, 1989. In this Ordinance, control imposes only on the brick burning and said that no person should use wood for such purposes (section 5). For the violation of this regulation, the accused person may be punished with 6 months imprisonment or punished with a fine Tk. 10,000 or with both.

Public Health (Emergency Provisions) Ordinance, 1944

Department of Public Health Engineering is the enforcement authority of the Public Health (Emergency Provisions) Ordinance, 1944. The Department is responsible for supply of drinking water also in the Paurashava premises. According to the section 7(1),

“a local authority may supply water to any local authority or to any other authority or person within or without its local area upon such terms as may be agreed, notwithstanding any provision prohibiting or restricting such supply contained in any other law.” Based on such regulation, the Department is performing his duty in the Paurashavas.

Land Development for Private Housing Project Act, 2004

The Act was enacted on 1st March 2004 to control land under private housing and develop accordingly. The authority who has prepared master plan, the Act will be enforced on those areas. It is said in the section 1(2) of this Act that, this Act will be enforced under the jurisdiction of the master plan areas prepared under the guidance of The Town Improvement Act, 1953 (E.B.Act XIII of 1953) and The Building Construction Act, 1952 (E.B.Act II of 1952).” According to the regulation prescribed above, the private housing construction in the Paurashava area may be controlled through this Act but, an amendment will be necessary to include the name of Local Government (Paurashava) Act, 2009 under which the Master Plan (Structure Plan, Urban Area Plan and Ward Action Plan) is being prepared.

5.2.2 Paurashava Development Management

After the independence (1971), all local government systems were abolished by the Presidential Order No. 7 in the year 1972 and appointed an administrator in each of the Municipality. After this Order, name of the Local Governments were changed as Town Panchayat instead of Union Committee, Shahar Committee instead of Town Committee and Paurashava instead of Municipal Committee. Shahar Committee was renamed as Paurashava in the year 1973 with a Presidential Order No. 22 and introduced election procedure for the Chairman and Vice-chairman. Thana Parishad Ordinance, 1976 (Ordinance No. XXXII of 1976) was enacted in 21st May 1976 to provide for the constitution of Thana Parishad. Paurashava Ordinance was enacted and notified in the year 1977. Nine Commissioner and selection of female Commissioner in every Paurashava was provisioned in the Ordinance. According to the Paurashava (amendment) Ordinance, 1998, re-distribution of Paurashava Wards was introduced and the Paurashava belongs with 3 Wards proposed for 9 Wards and 12 Wards instead of 4 Wards. One Commissioner for every Ward and one-third Ward of every Paurashava was reserved for female Commissioner who was elected by the general election of the country. Local Government (Paurashava) Ordinance, 2008 (Ordinance No. XVII of 2008) was provisioned 9 Wards, one Mayor and 3 female Councilors for every Paurashava. Mayor and Councilors will be elected through general election. The provision remains in the Local Government (Paurashava) Act, 2009.

From the year 1977 to 2009, Paurashava Ordinance, 1977 enforces by the Paurashava authority and the name of the statute was Paurashava Ordinance, 1977. After promulgation of the same statute, name of the Ordinance has changed as Local Government (Paurashava) Act, 2009. Generally, people call it Local Government (Paurashava) Act, 2009.

For the management of all physical development activities, a wide range of functions have been prescribed in the Second Schedule of the Ordinance. For efficient management of development, three major activities are prescribed and they are – Town Planning, Building Construction and Development. According to the Second Schedule, functions in brief are presented in the following table.

Table 5-4: Functions in brief prescribed in the Local Government (Paurashava) Act, 2009

Major activity	Specific functions	Functions in brief
Town planning	Master plan	The Paurashava shall draw up a master plan for the city which shall provide for a survey of the Paurashava including its history, statistics, public services and other prescribed particulars. Development, expansion and improvement of any area within the city; and restrictions; regulation and prohibitions to be imposed with regard to the development of sites, and the erection and re-erection of buildings within the Paurashava.
	Site development schemes	Where a master plan has been drawn up and approved by the government, no owner of lands exceeding such area as may be specified in this behalf in the master plan, shall develop the site or erect a building or any plot of land covered by the provisions of a site development scheme sanctioned to area in the prescribed manner. Among other matters, a site development scheme may provide for- (a) the division of the site into plots; (b) the street, drains and open spaces to be provided; (c) the land to be reserved for public purposes and to be transferred to the Paurashava; (d) the land to be acquired by the Paurashava; (e) the price of plots; (f) the works that shall be executed at the cost of the owner or owners of the site or sites; and (g) the period during which the area shall be developed.
	Execution of Site Development Schemes	If any area is developed or otherwise dealt with in contravention of the provisions of the sanctioned Site Development Scheme, the Paurashava may by notice require the owner of such area or the person who has contravened the provisions to make such alteration in the site may be specified in the notice as where such alteration is not made or for any reason cannot be carried out, the Paurashava may, in the prescribed manner require and enforce the demolition of the offending structure; and notwithstanding anything to the contrary contained in any law, no compensation shall be payable for such demolition.
Building construction	Building construction and re-construction	Without approval of the building site and plan by the Paurashava, nobody can construct, re-construct any building in the Paurashava area. The Paurashava will approve the plan within sixty days or refund it within that specified time frame; otherwise the plan will be considered as approved.
	Completion of construction and change, etc.	After completion of the approved building, the owner will notify to the Paurashava within 15 days. The Paurashava may inspect the building and if found any violation of the provision prescribed in the Master Plan or in the Site Development Scheme, the Paurashava may demolish the building and the demolishing cost may be incurred from

Major activity	Specific functions	Functions in brief
		the building owner.
	Building control	If any building or anything fixed thereon, be deemed by the Paurashava to be in a ruinous state or likely to fall or in any way dangerous to any inhabitant of such building or any neighboring building or to any occupier thereof or to passers-by, the Paurashava may be notice required the owner or occupier of such building to take such action in regard to the building as may be specified in the notice, and if there is default, the Paurashava may take the necessary steps itself and the cost incurred thereon by the Paurashava shall be deemed to be a tax levied on the owner or occupier of the building. If a building is in dangerous condition, or otherwise unfit for human habitation, the Paurashava may prohibit the occupation of such building till it has been suitable repaired to the satisfaction of the Paurashava.
Develop ment	Development plans	The Paurashava shall prepare and implement development plans for specific time. Such Plans shall provide for- (a) the promotion, improvement and development of such function or functions of the Paurashava as may be specified; (b) the manner in which the plans shall be financed, executed, implemented and supervised; (c) the agency through which the plans shall be executed and implemented; and (d) such other matters as may be necessary.
	Community Development Projects	The Paurashava may, sponsor or promote community development projects for the Paurashava or any part thereof and may in this behalf perform such functions as may be prescribed.
	Commercial schemes	The Paurashava may, with the previous sanction of the Government, promote, administer, execute and implement schemes for undertaking any commercial or business enterprise.
Street	Public streets	The Paurashava shall provide and maintain such public street and other means of public commutation as may be necessary for the comfort and convenience of the inhabitants of the Paurashava and of the visitors thereto.
	Streets	No new street shall be laid out except with the previous sanction of the Paurashava. The Paurashava may by notice required that any street may be paved, matted, drained, channeled, improved or lighted in such manner as may be specified in the notice, and in the event of default, the Paurashava may have the necessary work done through its agency, and the cost incurred thereon by the Paurashava shall be deemed to be a tax levied on the person concerned.
	General provisions	The Paurashava may assign names to streets and paint the names or fix the nameplates on or at conspicuous places at

Major activity	Specific functions	Functions in brief
	about streets	or near the end corner or entrance of the street. No person shall destroy, deface or in any way injure any street, name or name plate, or without the previous permission of the Paurashava, remove the same.
	Street lighting	The Paurashava shall take such measures as may be necessary for the proper lighting of the public streets and other public places vesting in the Paurashava.
	Street watering	The Paurashava shall take such measures as may be necessary for the watering of public streets for the comfort and convenience of the public, and for this purpose, maintain such vehicles, staff and other apparatus necessary.
	Traffic control	The Paurashava shall make such arrangements for the control and regulation of traffic necessary to prevent danger and ensure the safety, convenience and comfort of the public.
	Public vehicles	No person shall keep or let for hire or drive or propel within the limits of the Paurashava any public vehicle other than a motor vehicle except under a license granted by the Paurashava, and in conformity with the conditions of such license. No horse or other animal shall be used for drawing a public vehicle within the limits of the Paurashava except under a license granted by the Paurashava.
Water supply and drainage	Water supply	The Paurashava may provide supply of wholesome water sufficient for public and private purposes. Frame and execute water supply scheme for the construction and maintenance of such works for storage and distribution of water.
	Private sources of water supply	All private sources of water supply within the Paurashava shall be subject to control, regulation and inspection by the Paurashava. No new well, water pump or any other source of water for drinking purposes shall be dug, constructed or provided except with the sanction of the Paurashava.
	Drainage	The Paurashava shall provide an adequate system of public drains in the and all such drains shall be constructed, maintained, kept, cleared and emptied with due regard to the heal and convenience of the public. All private drains shall be subject to control, regulation and inspection by the Paurashava
	Drainage scheme	The Paurashava may prepare a drainage scheme in the prescribed manner of the construction of drains at public and private expense. The drainage scheme as approved by the government shall be executed and implemented within specified period.
	Bathing and washing place	The Paurashava may from time to time set a suitable place for use by the public for bathing, washing cloths, or for drying cloth. Specify the time at which and the sex of persons by whom such places may be used. No person shall establish, maintain or run a bath for public use except

Major activity	Specific functions	Functions in brief
		under a license granted by the Paurashava.
	Dhobi ghat and washer men	The Paurashava may provide dhobi ghats for the exercise of their calling by washer men, and may regulate the use of dhobi ghats and levy fees for their use.
	Public water-course	The Paurashava may declare any source of water, spring, river, tank, pond, or public stream, or any part thereof within the Paurashava, which is not private property, to be a public watercourse.
	Public ferries	The Paurashava may by by-laws provide for the licensing of boats and other vassals plying for hire in a public water-course to be a public ferry and may entrust the management thereof to the Paurashava, and there upon the Paurashava shall manage and operate the public ferry in such manner and levy such tolls as prescribed.
	Public fisheries	The Paurashava may declare any public watercourse as a public fishery, and there upon the right of fishing in such water course shall vest in the Paurashava which may exercise such right in such manner as may be prescribed.

5.3 Strength and Weaknesses of the Existing Policies

The Consultant has identified following weaknesses in the existing policies. These are – accommodation of future thrust of growth likely to arise after construction of the 1st Padma Bridge at Maowa point, supply of safe drinking water, providing safe and easy accessibility, use of agriculture production in income generating activities and create provision for further investment.

The primary motive is to exercise control over unorganized development and promotion of planned infrastructure development to accommodate future urban growth. The Paurashava will be developed as a self-contained town in rural environs.

Impact of construction of Padma Bridge at Maowa point is extremely difficult to make a growth projection with sufficient precision. Many factors are involved with this such as landuse change, increase of commuters, increase of vehicular movement, forward linkage of commodities and social changes of the Paurashava dwellers.

To increase the agro-product and use them in income generating activities, a vast agriculture land will be used and at the sametime, the existing agriculture land should be preserved. Further residential expansion should be controlled through the imposition of development control. In this context, concept of cluster development and compact township approach should be provisioned in the plan. Vertical development will be encouraged rather than horizontal to save the agriculture land.

CHAPTER 6

CRITICAL PLANNING ISSUES

6.1 Transport

Van and rickshaw are two major transport vehicles in the planning area. Bicycle is the main mode for private users. Movement of motorcycle is also identified as major private mode. Inadequacy of bus service found normal scenario in the study area. The peak hour traffic movement is found in morning from 9am to 10am and in the afternoon from 5pm to 6pm in general. Overall traffic congestion is low, let it should not be increased. The movements of Nosimon which is very risky need to restrict to keep the urban area risk free, clean and sound. Establishment of bus route within the study area is another prior demand of the people.

The hat / bazar in the study area serves by bituminous and brick soling roads. But the area is not served by well defined road hierarchy, nor is required now due to sparse use of roads by motorized vehicles. However, the induced activities due to the prospects of upward economic change may need to provide road network befitting with the need.

Highway traffic is comparatively low dominated by mixed-type of vehicles including non-motorized. Generally, surface of the highways excepting for a larger part is excellent. The road network is not facilitated by designated parking area, bus terminal and bus bay. As a result, sometimes congestions and chaotic situation occurs for a little while. In spite of this situation, present road network is functioning well. But it has to be upgraded to accommodate the future increase of traffic volume that is expected to increase due to the construction of 1st Padma Bridge at Maowa point.

6.2 Environment

In Bhanga Paurashava, noise pollution occurs by three wheelers and sound generated from saw mills and rice husking mills. Water contamination is observed as “Arsenic” threat. Air pollution is caused by dust emitted from saw mill, rice hushing mills and furniture shops. Also flood water and water-logging creates health hazards. Dysentery, diarrhea, etc. diseases occurs due to flood and Water-logging. Habitual inundations, especially in monsoon, due to external floods from canals are another threat to environment. Above causes are extremely important for the concern of the Paurashava. Pragmatic planning / solution and proper Drainage Master Plan are very pertinent issues in planning the Bhanga Paurashava.

In the Paurashava, water pollution and solid wastes are the major environmental problems. Pesticides use in agriculture land, chemicals and food use in pisciculture, poultry feed use in poultry farming and bathing and washing in river water are the causes of water pollution. Household garbages, kitchen market garbages and garbages produce by the pedestrians are producing solid waste problems. Systematic approaches will be needed to remove those problems.

However, implementations of activities like roads, drainage, bridge / culverts, housing, industrial establishments and bazars will radically change the natural topography and landuse pattern if natural development remains. Agriculture land will be converted into urban and semi-urban areas. Existing scenic beauty will disappear; water bodies will lost and general slope will be diminished for earth filling due to urbanization. Therefore, in the process of preparation of Structure Plan, Urban Area Plan and Ward Action Plan,

consideration of those factors have been made for keeping the natural environment livable.

For a better living environment all environmental phenomenon should be considered with the systematic planning principles and regulatory measures. With these views, people's awareness should be increased about the fair living environment through different public activities. Arrangement of landuses should be provisioned for all the public and private organizations as their necessities.

6.3 Landuse Control

Accommodation of future thrust of growth likely to arise after construction of the 1st Padma Bridge, supply of safe drinking water, providing safe and easy accessibility, use of agriculture production in income generating activities and create provision for further investment.

The primary motive is to exercise control over unorganized development and promotion of planned infrastructure development to accommodate future urban growth. The Paurashava should be developed as a self-contained town in rural environs.

Impact of construction of 1st Padma Bridge is extremely difficult to make a growth projection with sufficient precision. Many factors are involved with this. Those factors are rapid change of landuse from agriculture to non-agricultural activities, rural homesteads will change their character by the urban dwellers, land value will increase and the farmers will sold their farming land and shift elsewhere where low land value exists, spotted industrial development emerges and a mixed urbanization character will be formed, low lands adjacent to the communication network will be filled and will create drainage congestion.

To increase the agro-product and use them in income generating activities, a vast agriculture land will be needed and therefore, existing agriculture land should be preserved. Further residential expansion should be controlled through the imposition of development control. In this context, concept of cluster development and compact township approach should be provisioned in the plan. Vertical development should be encouraged rather than horizontal to save the agriculture land.

Major aim of the Landuse Policy 2001 was to prevent indiscriminate conversion of agricultural land in to non-agricultural use, because such conversion may be threatened for food security of the country. Such conversion should be prohibited with the multi-sectoral use of land. During implementation of Urban Area Plan / Ward Action Plan, necessary control should be imposed according to the following manner.

1. High value agriculture land should be preserved only for agriculture purposes. The land produces three crops in a year are under this category. Any physical development activities should be prohibited by the Paurashava authority. In the Paurashava, high value agriculture land is found in the Ward No. 2, 3 and 4.
2. Drainage congestion due to the indiscriminate development activities is another critical issue. With the increase of population and commercial activities, lands of the Paurashava town are being converted for habitation. Natural development of those settlements somewhere creates drainage congestions. Internal flood or water logging is experienced within the Ward No. 9, 8, 7, 6 and 5 during peak monsoon time with high rainfall for long duration.

3. Missing links in road transportation creates accessibility problem. In the intersections, lands are using by commercial activities including daily bazar and saw mill. Most of those are government lands. Vehicular accessibility became zero in those areas.
4. Easy accessibility with neighbouring Upazilas is needed. Those linkages will grave huge amount of agriculture land. The single crop land may be used for this purpose.

6.4 Disaster (if any)

Disaster is the tragedy of a natural or man-made hazard that negatively affects society or environment. Disaster can be classified into two categories: natural disaster and man-made disaster. Natural disaster is the effect of flood, volcanic eruption, earthquake or landslide, draught, epidemic, etc. that affects environment and leads to financial, environmental or human losses. Man-made disasters is resulting from human intent, negligence or error, or involving a failure of a man-made system.

The Paurashava area including the Bhanga Upazila has affected by the several major natural disasters ranging from Cyclone, Flood to Water logging and Draughts, etc. The periods of those disasters are 1998, 2000, 2004, 2007 and 2008. Very scanty attempt has been made by the government to rehabilitate people after the natural disaster.

Urbanization is converting lands for residential use. Agricultural lands and water bodies are being chosen most frequently and the lands are being converted into urban settlement. In the Bhanga Paurashava, wet lands are being filled up and agricultural lands are being converted. This has been identified as the major man-made disaster accelerating the degree of conversion year to year. Use of poisonous insecticides on the agricultural land is another man-made disaster which will affect in the long-run.

6.5 Laws and Regulations

The regulations prescribed (mentioned in the Chapter-5.2.1, Sl. No. 1 to 20) in the Local Government (Paurashava) Act, 2009 are not directly related with the physical development activities and their control. The East Bengal Building Construction Act, 1952 is called the mother regulation to control all type of physical development but no instruction is being included in the Local Government (Paurashava) Act, 2009 regarding EBBC Act, 1952. The Paurashava authority approves the building plan and excavation of tank without any regulatory control.

The regulation prescribed in the Local Government (Paurashava) Act, 2009 on the preparation of master plan is called traditional regulation. In the modern world, the concept of master plan became obsolete. In this project, the so called master plan, as mentioned in the Local Government (Paurashava) Act, 2009 considered as a package and the plan included in this package named Structure Plan, Urban Area Plan and Ward Action Plan, though there is no regulation in the country on the preparation and implementation of those plans.

In the Paurashava, about 55% (except water bodies) land is under agriculture use. Most of those lands are private. Different type of help is necessary for the farmers involved with those agriculture lands. Section 13(1a) of the Agricultural Development Corporation Ordinance, 1961 prescribed regulation on the function of the Corporation and said that "the Corporation shall make suitable arrangements throughout East Pakistan, on a commercial basis, for the procurement, transport, storage and distribution to

agriculturists of essential supplies such as seed, fertilizers, plant protection equipment, pesticides and agricultural machinery and implements.” Where the Corporation is absent, how the farmers will get benefit prescribed in the section 13(1a)? To increase the agricultural commodities such type of help is necessary.

Except the Paurashava Town (Township development areas), other areas are rural. To generate rural-based township environment, those rural areas should be preserved. Rural development components as prescribed in the section 7(1a) of the Bangladesh Rural Development Board Ordinance, 1982 should be provisioned to control those rural areas. As prescribed in the section 7(1a), functions of the Board shall be “to promote village-based primary co-operative societies and Thana Central Cooperative Association (TCCA) with a view to enabling them to be autonomous, self-managed and financially viable vehicles for increasing production, employment generation and rural development.”

At present, two Bakbanglows are in the Paurashava. Zila Parishad is responsible for maintenance and allotment of those Dakbanglows according to the Local Government Ordinance, 1976. Number of Dakbanglows is showing the importance of the Paurashava and the importance is only for the presence of Court in the Paurashava. After construction of Padma Bridge at Maowa point, importance of the Paurashava will increase rapidly. More government rest houses will be needed at that time. Local Government Ordinance, 1976 is not enough for construction and maintenance of those rest houses and Dakbanglows. New regulations will be needed for this purpose or an amendment may be inserted in the Local Government Ordinance, 1976.

CHAPTER 7

LAND USE ZONING POLICY AND DEVELOPMENT STRATEGIES

7.1 Strategies for Optimum use of Urban Land Resources

Inhabitants of the Paurashava are not aware about the land level and slope direction of the Paurashava. Without knowing this information they are raising their land up to a mark and constructing permanent structure. As a result, water logging problem during rainy season is all over the residential areas.

Due to the absence of development control, the core area of the Paurashava is already developed as mixed-use area. Commercial, residential, administrative, educational uses are admixture in the core area. Zoning provision, landuse control should not be enforced in such type of the core area.

The Paurashava is a natural developed area. Rearrangement of the existing use is not possible. Land acquisition for expansion of road (to increase the width of road) will create socio-political hazards. As a result, the roads in the core area remain same as today.

For water supply network, construction of sewerage facilities and removal of fire hazards, at least 24 feet width road is necessary. In the Paurashava, except National Highways, such type of road is absent. New road will form new township on agriculture land. These processes will washout agriculture domination from the Paurashava. Compact Township and cluster development will be effective for new formation, not for the mixed-use areas where most of the roads are 8 to 10 feet width.

Prior to planning, strategies have been developed for issues like, utilities, circulation and drainage both for core urban areas and urban fringe areas. The steps of strategies for formulation master plan are based on the policy recommendations and standards suggested by the LGED. All those aspects are very vital for creating livability in Paurashava area.

Policies and Strategies

In relation to the landuses, the expected cluster development policies are:

Review the selected clusters and prepare guidelines for their development: In carrying out this task, Paurashava will pay particular attention to the scale of growth to be accommodated in each cluster. This will be influenced by the local pressures for growth and capacity of each cluster to absorb such growth. In relation to the tentative list of clusters identified in the Chapter-3, the following comments need to be made:

First priority clusters are the market areas (Bhanga Bazar in Ward No. 8 and 9 and Bhanga Town Bazar in Ward No. 4). Variations between the scales of growth to be accommodated in each of the markets will be found. Second priority clusters are located on the fringes of the existing Paurashava town centre. They are areas where pressure for growth is already strong. Their inclusion in the list is therefore almost inevitability. However, the long term costs associated with large scale development in all three of these clusters - Northwestern part of the Ward No. 2 around the intersection of Bhanga to Faridpur Highway, Southern part of the Ward No. 9 and Western part of the Ward No. 3 – suggest that the policy should be provided for growth whilst containing it as much as possible.

Those clusters are in rural character, objective of the Paurashava will be to ensure that the use of land is appropriate to this character.

Limit industrial use outside the existing town centre and the proposed extensions to the town centre: Location of manufacturing activity may have benefits to the local communities in which the manufacturing activity is located – through provision of direct or indirect employment and benefits to the entrepreneur in terms of reduced costs. However, it may also have disadvantages, say, for example, if the infrastructure is not available to deal with the effluent (whether it be air borne, water borne or in the form of solid waste) of the manufacturing processes being undertaken in these relatively remote locations.

Encourage the development of non-urban uses such as agriculture and forestry on land on the periphery of the Town centre which is unsuitable for urban development.

Optimization of the existing urban land resources

Jurisdiction of the Bhanga Paurashava is 2660.90 acres (10.66 sq. km.); population is 34150 with gross density 13.3 persons per acre. In the year 2031, the population will be 50593 with gross density 17 persons per acre if growth rate remain 1.02%.

At present, agriculture and water body includes 55.2% and 11.1% land respectively. Some important landuse determining factors like government policy, industrial establishment, construction of road including embankment and availability of services may change the agriculture domination in next 20 years. Question raises that how much this change will affect the present land resources?

During last ten years, the landuse scenarios remain same. A normal character of landuse change is found due to the construction of Bhanga – Khulna Highway via Bhatiapara. Rapid change of landuse will be viewed after construction of Padma Bridge at Maowa point. Except this, present population distribution and growth including migration shows that the area is developing significantly in terms of trade and large business and trying to get out of agriculture based activity.

After preparation and implementation of master plan / urban area plan changes in the physical character of the Paurashava will be viewed. These changes will be provided by the infrastructural and community services development. According to the Master Plan / Urban Area Plan and Ward Action Plan this change should not exceed 5% to 10% from the total land of the Paurashava for next 20 years. Conversion of agriculture land in to infrastructural development may be considerable only for construction of embankment and road.

Zoning Policies and Strategies

Zoning is an effective guideline for the preparation of landuse plan. According to this guideline, specific use should be in specific area; height of the building will be controlled for easy access of sunlight and wind flow and ensuring availability of open spaces in every lot with the controlling of building density. For the sake of zoning provision in the Paurashava, core area, fringe area, peripheral area and new urban area is being demarcated accordingly.

Core area

This area is also known as built-up area. This is defined as the area which has the highest concentration of services; it also has the highest population concentration and density. It will absorb most population growth during the Land use Plan (2011-2021) period.

Policies: Existing town centre will be defined as core area. Mostly mixed-use areas are the important characteristics of the core area. Size of the core area is 127.37 acres. With the increasing of density, this area will lost living environment. Further expansion of the core area will be discouraged in the plan.

Strategies: Let the core area remain up to the plan period. No physical development provision will be initiated by the Paurashava. Vertical and horizontal expansion of the structure or establishment may be approved by the Paurashava with high rate.

Table 7-1: Proposed zoning areas

Landuse Type	Area (acre)	%
Agriculture	1828.27	50.18
Core Area	127.37	3.50
Fringe Area	884.67	24.28
Major Circulation	252.85	6.94
New Urban Area	270.91	7.43
Peripheral Area	85.89	2.36
Waterbody	193.77	5.32
Total	3643.73	100.00

Fringe area

This zone is identified as developing areas which will take further decades to reach the population densities of the urban core area. Low initial densities in these areas do not justify supply of a 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 allowed by resources.

Policies: The area, adjacent with the core area, ideal for rapid urbanization is considered as fringe area. Total area is 884.67 acres. Important community facilities, utility services and residential development will be the basic components of the fringe area. Improved transportation and communication linkages, better water supply and drainage facilities including rain water reservoirs will be the planning components.

Strategies: The guidelines set in the policy may be implemented by the different public authorities. A close coordination among those authorities should be maintained during implementation of the planning component. Any change of the planning should instantly be resolved with the involvement of the Paurashava authority.

Peripheral area

This is the zone where a slow trend of urbanization is continuing in unplanned manner. The area identified in the Structure Plan as the likely choice for new urban development beyond the core area. Ideally, it might be reasonable to provide primary infrastructure networks in this area to foster development and encouraged to enable a more rapid urbanization in a planned way.

Policies: Agriculture domination will be the prime characteristic of the peripheral area. Rural homesteads, spotted important development like park, dumping ground, stadium and agro-industries are the important planning components of this area. Total area is 85.89 acres. Any contrast regarding the implementation of those planning components should not be encouraged.

Strategies: Phase-wise development will be encouraged. Individual authority may implement individual component. Coordination among the authorities is not mandatory. Locational change of the proposed components should be discouraged.

New Urban Area

This zone will be the required additional area for future planned urban development as per population projection. New facilities and services like road, drains, footpath, waste transfer station and other civic services will be provided. This area is being proposed to be developed within the year 2031.

Policies: Planned development will be the prime characteristic of the new urban area. Hosing with greeneries, important development like park, commercial centre, educational institute, improved health facilities, community centre, road with footpath including drainage facilities, water supply and fire service are the important planning components of this area. Total area is 270.91 acres. Any contrast regarding the implementation of those planning components should not be encouraged.

Strategies: Phase-wise development will be encouraged. Individual authority may implement individual component. Coordination among the authorities is not mandatory. Locational change of the proposed components should be discouraged.

Agriculture

Agricultural land (also agricultural area) denotes the land suitable for agricultural production, both crops and livestock. It is one of the main resources in agriculture. The land under annual crops, such as cereals, sugarcane, jute, vegetables and melons; also includes land left temporarily fallow; land under permanent crops (e.g., fruit plantations); areas for natural grasses and grazing of livestock.

Policies: Agricultural domination will be the prime characteristic of the Agriculture zone. Agricultural commodities as mentioned earlier are the important components of this area. Total area is 1828.27 acres. Any cropping combination may be encouraged.

Strategies: Any agricultural practice will be encouraged. Individual authority may supervise and subsidize agricultural inputs to the farmers for increasing the production. Coordination among the authorities is not mandatory. Any physical development should be controlled by the Pourashava (except bridge, culvert, drain and road).

Water body

Water body contains 193.73 acres including khal, pond, irrigation canal and river whose area more than 0.25 acre. It should be preserved under "Playfield, Open space, Park and Natural water reservoir Conservation Act 2000."

Policies: Rainwater harvesting and pisciculture will be the prime characteristic of the pond and river will be preserved for outfall of the drainage system including irrigation purposes and water ways. Any contrast regarding the implementation of those components should not be encouraged.

Strategies: Individual authority may control individual component such as pond by the Paurashava and river by the Water Development Board. Coordination among the authorities is not mandatory. Any change of the components should be discouraged.

Major Circulation

Major circulation contains major road network with regional and national settings.

Policies: Easy accessibility with national, regional and local will be the prime characteristic of the circulation network. All transportation infrastructures should be incorporated as the important planning components. Total area is 252.85 acres. Any encroachment or contrast regarding the implementation of those transportation infrastructures should not be encouraged.

Strategies: Phase-wise development will be encouraged. Individual authority may implement individual component. Coordination among the authorities is not mandatory. Locational change of the proposed components should be discouraged.

7.2 Plans for New Area Development

The Paurashava is not an ideal township due to the agriculture domination. Agriculture based township should be encouraged in the preparation of Master Plan / Urban Area Plan. Growth of population is the natural trend and at the sametime, expansion of non-agricultural use on agriculture land is also natural tendency of the people. This will be controlled through the Compact Township concept with the encouragement of vertical development. In case of government services, specific building may accommodate different type of offices.

Future landuse will be calculated according to the development control for the masses. In case of public land, existing use and khas land will be emphasized. Willingness and participation of the people in development activities will be the key factor for future landuse demarcation. Slow change of landuse will be emphasized rather than rapid change. Let the people do whatever he likes on own land – such concept should not be considered for future projection of landuses. Three parts of the projection are landuse change, landuse control and landuse restriction will be included in the Master Plan. In any case, river front areas should be restricted for human habitation. As a result, river water will safe from contamination.

The agriculture land should be preserved (according to the Agriculture Policy) from any type of physical development. It should not be decreased with the expansion of habitable area or formation of new settlement, may be increased with the formation of char lands. In case of road, embankment, drainage and new urban area, the agriculture land may be used but such use should be guided according to this plan. For the development of pisciculture, all ponds (not lower than 0.3 acres) and ditches may be preserved, in some exceptional cases; small number of ditches and ponds may be used for physical development activities.

People's willingness will be considered as important base for the projection because the Master Plan is for the inhabitants of the Paurashava. They will be the beneficiary group of that Master Plan. Their willingness in case of use and land allocation, location, expansion provision will be the important consideration. On the basis of fulfillment of their demand, they will like to involve them willingly in the implementation procedure of the Master Plan.

Policies and Strategies

A large number of constraints are involved with the development of new area. Following strategies are involved with the development of new areas:

- Low incomes;
- Difficulties associated with assembling parcels of land which are large enough to make viable development sites;

- Disputes over ownership;
- Absence of private sector land developers;
- Lack of access (capable of resolution often only by works on land under the control of others); and
- The need in most cases for land to be prepared in some way prior development either by filling where it is subject to flooding or by earth moving where it is too steep to develop. In both cases, drainage works have to form an essential part of the land preparation task.

The policies and strategies of the Paurashava related to new area development are –

Explore and Implement means of increasing the number and pace of public sector land development projects: This is one area where government can have a direct influence on accelerating the rate of conversion of non-urban to urban land.

Explore and Implement, with the private sector, means of increasing the number and pace of private sector land development projects: In moving towards realization of the objective of government supporting the private sector in its development role (i.e. acting as an enabler rather than a provider), the Paurashava will examine, with the private sector, the means of overcoming the constraints to new area development.

Realization of the above two strategies is likely to require changes in legislation and administrative procedures at the national level. The other strategies of the Paurashava relating to new area development are set out below.

Promote upgrading of the existing urban area: As densities within the existing Paurashava Town increase, there will be growing pressure for upgrading to ensure that infrastructure provision is adequate and that living conditions are acceptable.

Most of the parts of the Paurashava are in agriculture practice and few parts are in urban area will require no upgrading at all. Accordingly the Paurashava will set priorities throughout the study area and ensure, through its own efforts or the efforts of others, that upgrading projects are necessary. Obvious areas for early consideration will be slum and squatter settlements. Local community and NGOs may involve with the upgrading projects.

Assist the transition of areas on the fringes of the extension urban areas from non-urban to urban use: The main priority here seems to be space for adequate access and drainage. Once this space is available, the roads, drains and other services can be installed as and when the resources are available to provide them. But without this space, rational development of such areas is impossibility, environmental problems occur and the pace of development is often seriously impeded.

If the Paurashava has the resources and to achieve this by acquiring land (either through negotiation or compulsory purchase) and ensuring that it remains free from development until needed, then the Paurashava will purchase this as a policy. If not, then a potential alternative approach is to work with the local community, particularly the landowners, to see if the space can be made available by readjustment of existing ownerships. Given the importance of this task the Paurashava will pursue an active policy of assisting the rational development of the fringe areas, by whatever means proves workable.

Ensure that land is available for all income groups: In accordance with Government's commitment to poverty alleviation, as expressed in the Poverty Reduction Strategy and the objectives of the National Housing Policy, a further major task facing the Paurashava is to ensure that land is made available for all income groups.

Reconsider the role that development control plays in the planning and management of new area: Where development control is institutionally well-established (with adequate legislation, administrative resources and enforcement power) it can be a very effective 'tool' in restricting new area development where it is considered unsuitable; encouraging it in areas where it is considered suitable; and influencing the type of development that takes place in any particular location. It can attempt to strengthen development control institutionally to enable it to perform its role more adequately. On the other hand, it can consider restricting the role of development control to those functions which it considers critical such as ensuring that development does not take place in corridors required for new road construction or road widening, or ensuring that polluting industry takes place only in areas which are suitable for it.

Encourage the development of unused or underutilized land rather than new areas: The Paurashava is characterized by having much unused or underutilized land within the heart of the town. This land represents a wasting asset. If maximum use is to be made of the existing investment in infrastructure and if journey times are to be kept short, then fuller utilization of this land is essential. The Paurashava will examine the reasons why such land remains unused or underutilized and will endeavour to overcome the constraints to its development.

7.3 Areas for Conservation and Protection

Type of area and structure which will conserve and protect is presented here.

- Historical building, monument, sculpture or any other related articles.
- Park, important playfield or any other active recreational areas.
- Government buildings like Dakbanglow, Court Building, Circuit House, D.C office, Paurashava office and official residence of the Paurashava Mayor.
- Riverfront areas where people spent their leisure time.
- Any other public establishment like Zoo, Museum, Flood shelter, etc.
- BM Pillars.
- Rail station, Bus Terminal and Launch / boat ghat.

Policies and strategies

For the conservation and protection areas, following policies and strategies are considered:

Take environmental issues into account in all decisions related to the future development: By considering environmental issues in its entire decision making, the Paurashava aims to ensure that progress is made towards resolving the environmental problems exist and towards resisting the further deterioration of conditions beyond their present level.

The issue of polluting manufacturing processes is best dealt with by legislation at the national level. However, the Paurashava has a valid and important role to play in deciding the location of industry. It can confine polluting industry to a single or a limited number of locations, where prevailing winds will not carry airborne pollution over the Paurashava Town and where facilities for dealing with water borne effluent and solid waste disposal have a greater chance of being provided.

Impose restrictions on the location of new polluting manufacturing processes and identify suitable locations for their establishment: A long term program of controlling the emission of pollutants from existing industrial activities and removing chronic polluting industry from unsuitable locations can also be pursued in association with the appropriate authorities. To be effective, this will need the force of law. One case is break-making. It is of value to the economy but is understood to have adverse environmental consequences. This is carried out in two locations throughout the study area.

Monitor adverse environmental impacts of existing manufacturing processes and take measures to reduce such impacts to acceptable levels: The issues of the health hazard caused by current methods of solid waste disposal and sewage disposal can be addressed by improving the existing methods of providing these services.

Reduce noise levels from the worst noise nuisances: The issue of pollution from vehicles is unfortunately likely to get worse – as the rates of vehicle ownership and usage increase – before it gets better. Some relief may however be afforded by improvements in the quality of emissions, as older vehicles are replaced by newer ones, and as technological developments continue to be made in emission control.

Map 7-1: Structure Plan of Bhanga Paurashava

Identify and protect areas of ecological significance: It is important that such areas are protected before they are inadvertently destroyed. This policy will extend to areas of forest / bushes and areas of un-spoilt river line. Once the initial priority of protection is successfully achieved, measures can be taken to enhance the quality of these areas.

Conserve buildings and monuments of cultural, architectural and historic interest: Such buildings and monuments are an important legacy of the past, reflecting different historical, cultural and national influences. The Paurashava will arrange for such buildings and monuments to be identified and listed. Following this, it will be necessary to draw up a program for their conservation. This program will need to consider the scope for enhancing the settings of the buildings and monuments, as well as ensuring preservation of their fabrics.

Protect and enhance significant areas of open space within the Paurashava Town: The open spaces create character of Paurashava, distinguishing it from other Paurashavas in the country. Unless such spaces are protected, there is a strong likelihood that they will be gradually converted to urban uses and thus lost for the benefit of the community as a whole.

CHAPTER 8

STRATEGIES AND POLICIES FOR SECTORAL DEVELOPMENT OF THE PAURASHAVA

8.1 Socio-economic Sectors

8.1.1 Population

The policies in relation to population are set out below.

Expected growth of population and changes of socio-economic characteristics: The population projection will need to be reviewed time to time in the light of new evidence. At a minimum this will need to be done at ten years intervals, as the results of Censuses become available. The Paurashava authority will need to monitor the factors affecting population growth – namely fertility, mortality and net inward migration and the factors reflecting changes in its socio-economic characteristics.

Rational distribution of population within the Paurashava: One of the main purposes of a master plan/development plan is to provide for the rational distribution of population, in relation to other urban activities and suitability of land for urban purposes. The Paurashava will pursue the policies required to achieve the spatial development strategy. It will also monitor change, assess the effectiveness of the policies being pursued and review the strategy as and when necessary.

Ensure availability of land, services and facilities according to the needs of the population: As the body responsible for planning and managing urban development, the Paurashava will ensure that land, services and facilities reflect the build up of population and changes in its requirements. This is a task for which it will require the co-operation of many agencies involved in urban development in the Paurashava.

8.1.2 Economic Development

It is found from the study that the entrepreneurs of the study area generally suffer from the following common problems:

- Lack of cheap and dependable source of energy (gas supply).
- Unreliable electricity supply.
- Absence of better access facilities with the capital city.
- Absence of railway connection with the capital city and with surrounding Zilas.
- Insufficient communication infrastructure.
- Shortage of skilled manpower.
- Complex official procedures in setting up a new industry (cumbersome processes of getting infrastructural and utility services connections, lack of manufacturing-investment-friendly banking / credit system).
- Lack of government initiatives.

Once the area developed as a trade centre based on the river communication. The traders who bring their commodities through the river the market of the Paurashava acted as a boat ghat after the unloading of commodities from the boat. From then,

development activities started along the riverside. This trend has been continued up to the recent years. The prospect related to economic activities summarizes in the following discussions:

- Availability of unskilled and cheap manpower.
- Availability of agriculture land (55.2%). The land may be used for different agricultural production and those productions may be used for the input of agro-based industries.
- Due to the nearness of Dhaka City, the Paurashava may be developed as the fringe area of Dhaka City. This fringe area with its agriculture production will support to the Dhaka City where marketing for those productions are available.
- The Paurashava was developed as growth centre. Some cluster development is found around this growth centre. Planned development according to the master plan will initiate to arrange the growth component in a systematic manner. At the sametime, economic development parallel to the physical and social development will be encouraged.
- Economic activities and residential establishment are in same premises perhaps all over the Paurashava area. Those activities should not be disturbed if the land holding by private owners. Further arrangement on economic activities including industrial establishment (if any) should be provided separately according to the type of economic activities.
- The Upazila is renowned for jute cultivation. An industrial estate and trading centre based on those raw jutes may be established in the Paurashava area. Nearness of the Charjanajat Ferry Ghat (about 30 km. away from the Paurashava) for trading of those jutes and jute production will encourage to be flourished of those trading centers and industries.

Most of the entrepreneurs expressed their desire of implementing future development plan. A major portion mentioned that their development plan is the expansion of their enterprises (78%) and others intend to increase their production (22%). Expansion of existing industries and establishment of new industries will create more jobs and thus have multiplier effect in the overall economy leading to create more consumption capacity, investment opportunities in diversified economic fields and thus push the economy upward.

If the standard of living of the people of the Paurashava is not to deteriorate as the additional population discussed before, then the economy of the Paurashava must expand at least in step with the growth of population. For unless the population have the financial resources (through employment of business) to pay for the urban services and facilities they want, they will either have to rely on Government subsidy or they will go without.

Policies and Strategies

Given emphasize on the above situation following policies have been identified. These are all additional to the general requirement to ensure that land and infrastructure are available to support the wealth generating elements of urban development.

Encourage national business to locate in Bhanga Upazila / Faridpur Zila: If national business can be encouraged to locate in promoting Paurashava / Upazila / Zila, they will provide not only earning capacity for their locally recruited employees but the

opportunity for services to be provided to support the business. The Paurashava will, therefore, assist central government in promoting Paurashava as a potential location for inward investment of this type.

Encourage central government to decentralize facilities from Dhaka: Central Government has control over the location of many facilities which are currently located in Dhaka, such as Government departments, the headquarters of nationalized or Government banks and quasi Government bodies. The Paurashava will encourage Central Government to offset the current strong tendency towards centralization of facilities in the Capital by relocating some of these facilities to Paurashava / Upazila / Zila.

Improve industrial areas and ensure their full utilization: Conditions in the existing industrial areas of the Paurashava especially environmental ones associated with the disposal of effluent and waste are currently poor. It is the policy of the Paurashava to improve these conditions and to reduce pollution from the worst offenders to acceptable levels. In certain cases this may require cessation of an existing activity or removal to another location.

Within each of the existing industrial areas there are vacant and underutilized areas. It is the policy of the Paurashava to ensure that the spare capacity available within these is utilized to the full. In the short and medium term these represents a better use of resources than identify new areas.

Locations for new industrial areas: For the longer term it is expected that new industrial areas will be required. Given the fact that the Paurashava wishes to encourage inward investment to the Paurashava, it will identify suitable locations for such industrial areas, will reserve them for industrial use and will plan for provision of the required infrastructure.

Overcome the constraints on compatible landuse: Where established agricultural, industrial and commercial operations are compatible with the objectives of the Structure Plan, the Paurashava will work with these operations to overcome the constraints to their expansion. Where wealth generating activities are constrained in their desire for expansion by lack of land, access or infrastructure provision, the Paurashava will, in conjunction with the other relevant authorities, endeavor to overcome these constraints.

Provide assistance to small-scale industrial and commercial operations: Considerable potential for growth of the economy rests with small-scale industrial and commercial operations. The Paurashava will, in conjunction with other relevant authorities, provide assistance to such operations by promoting the establishment of estates specifically suited to their needs. These will probably need to be small in size and located within or close to residential areas.

The Paurashava will also consider the other needs of small-scale industrial and commercial operations and endeavor, through others, to ensure that these needs such as for credit are available.

8.1.3 Employment Generation

Two basic elements of economic development i.e. employment generation and increase of productivity are found in the cities and urban areas than the rural areas. This is a common phenomenon for the developed and developing countries. Employment opportunities act as a strong pull factor for influx of job seekers in the cities and urban

areas, the centers of productivity. Special features of the study area are that it covers a vast rural area, besides a small urban center of Paurashava town. Two National Highways passes through the middle of the Paurashava and both the sides of the highways are occupied by huge tracts of agriculture land and sporadic homesteads, at places showing the signs of development along with the hats, bazars indicating the dominant role of agriculture and fishery. This indicates general feature of the study area as a mixture of rural and semi-urban nature. These special socio-economic features of the study area have been taken into consideration in conducting the study of the prevailing economic situation.

It is found that the entrepreneurs of the study area generally suffer considerable problems as discussed above. By considering those problems, government initiatives should be the primer factor for rearranging and new industrial erection, which will generate more employment.

Policies and Strategies

Improve industrial areas and ensure their full utilization: Conditions in the existing industrial areas of the Paurashava especially environmental ones associated with the disposal of effluent and waste are currently poor. It is the policy of the Paurashava to improve these conditions and to reduce pollution from the worst offenders to acceptable levels. In certain cases this may require cessation of an existing activity or removal to another location.

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The Paurashava will also consider the other needs of small-scale industrial and commercial operations and endeavour, through others, to ensure that these needs such as for credit are available.

8.1.4 Housing and Slum Improvement

Housing is one of the vital components of urban life. It is a source of security, safety and everyday comfort. Rural housing components are prevailing in the Paurashava. In most cases, housing in growth centre is appropriate for the study of housing in the Paurashava.

Housing in rural environment (called rural homestead) according to the trend of primitive society is the suitable word for the identification of Paurashava housing.

Amalgamation of pucca, semi-pucca and katcha housing or semi-pucca and katcha housing in a house is viewed in most of the Wards.

Residential areas in Bhanga Paurashava have been developed sparsely following some degree of uniformity. According to the number of residential buildings Ward No. 4, 2, 9 and 5 dominate the highest number of residential buildings but according to the density Ward No. 2 and 5 is highly congested area. All pucca residential buildings are developed on and around the commercial hub of Ward No. 4, 2 and 9.

Data obtained from survey indicates, about 8.9% of the dwellings in the Paurashava are in good condition, 2.9% needed to be demolished due to their dilapidated conditions and 32.2% is new construction.

Problems concerning housing

Housing areas in the Paurashava is the composition of an admixer of housing types. Mixed residential, poor dominated rural houses and semi-urban homesteads are found. Most housing areas have developed in a spontaneous fashion. In the rural part of the Paurashava, with its rural-agricultural character, has a different housing type. The dwellings, comprising homesteads, encompass larger areas having low density. The highest gross population density in the Paurashava is only 11 persons per acre. Residential buildings in the Paurashava are dominated by katcha structure (80%). No building is found approved from Paurashava. However, owners of the buildings have been found violated the setback rule by the construction. Except labour charge there is very little variation in building construction cost between Dhaka and Bhanga Paurashava.

Problems relating to the housing are mostly concerned with the poor community. Due to their low level of income a vast number of poor are squatting in public land. They are not only deprived of minimum housing but also from the personal security that endanger their health and working efficiency. Regular income can solve most of their housing problems. Apart from dwelling, pure water and transportation are real problems for the inhabitants. Municipal services are highly inadequate. Drainage is major problem in rural part of the Paurashava. The Paurashava can not solve the problems due to scarcity of fund.

In the Paurashava, over 98 percent housing structures are one-storied that includes semi-pucca, katcha and Jhupri type houses.

Prospects concerning housing

In the planning area above 94 percent of the households became land owners through inheritance, while about 6 percent became owners by way of purchase.

Land value in the Paurashava is very low compared with Dhaka and Faridpur. In spontaneous housing areas of the core area, habitable land sells between Tk. 1, 12,000 to Tk. 1, 20,000 per decimal.

About 40% household in the Ward No. 8 and 10% in Ward No. 9 live in rental houses and pay Tk. 600 and less each month as house rent.

For effective promotion of housing the government should change its role to a facilitator instead of a provider. Government agencies should provide infrastructure and finance on soft terms and the rest should be left with the private sector. To realize the development and service costs of public sector infrastructure projects from the beneficiaries it is necessary to evolve new mechanism. If real estate developers encourage to come up

with housing projects the Paurashava should maintain some control over them to safeguard public interest. Public sector may take up innovative cost recovery housing programs for the rural poor.

Policies and Strategies

The National Housing Policy, 2004 could have a major impact on the quality of life for Paurashava inhabitants. In this context, the Paurashava will pursue the following four policies. These are all geared to lessening the gap between need and provision of housing.

Identification and development of sites for government housing schemes: Where, as part of National Housing Policy, the Government embarks on further housing schemes either for the construction of completed units or for the provision of serviced plots, the Paurashava will assist the relevant body with the identification and development of appropriate sites.

Identification and development of sites for private sector housing schemes: Where housing is to be provided by the private sector, the Paurashava will ensure that, either by its own efforts or by the efforts of others, the legal, technical and financial support required by the private sector is available – to enable it to assemble sites, to carry out the earthworks and drainage works needed for the development of the sites, to provide the necessary tertiary infrastructure, and to provide the units of accommodation required. The Paurashava would, in this instance, be acting as an enabler to the private sector.

Provision of sites and services schemes for the low and lowest income groups: In line with National Housing Policy, greater priority needs to be given to the low and lowest income groups. Accordingly, the Paurashava will, therefore promote, either by its own efforts or by the efforts of others, the provision of sites and services schemes for these income groups.

Upgrading of slum and squatter settlements: The most disadvantaged people, in terms of access to housing, live in slum and squatters. Modest investment in terms of provision of facilities such as water supply, drainage, sanitation facilities, electricity and dry accessways can make a considerable improvement to the living conditions of a large number of people. The Paurashava will, therefore promote, either by its own efforts or by the efforts of others, the upgrading of slum and squatter areas.

An important contribution that the Paurashava can make to meeting housing, as well as other urban needs, is in exploring ways by which the process of converting land from an unimproved agricultural state to an improved state on which individuals can build their homes – can be speeded up. Because, housing is such an important land use both in terms of the total area of land it occupies in urban and in terms of being a major determinant of the quality of life of its inhabitants, the Paurashava may pursue a further policy.

8.1.5 Social Amenities and Community Facilities

Due to the presence of Bhanga Bus Stand, the Paurashava exhibits high potential of socio-economic development. Two National Highway passes through the Paurashava is the destination of all south Bengal movements. The activities around the bus stand will generate employment in commercial sector. This effort will be faster with the commissioning of Padma Bridge at Maowa point. New investment will gear up in to Bhanga creating new jobs. This will enhance income of the local people and raise their standard of living. Investment and employment will take place in transport, industry,

construction, trade and service sectors. Besides, Bhanga is the gateway of south Bengal through road way. There is a large scope for agro-based development in Bhanga. This will generate new employment.

Policies and Strategies

A most important initial role of the Paurashava will be to appraise itself of the situation with regard to both the need for and supply of community facilities in the Paurashava. With this in mind, the Paurashava will pursue the following policies.

Monitoring the principal aspects of community facility provision in the Paurashava: The organizations responsible for the provision of community facilities in the Paurashava will co-operate with the Paurashava in supplying information needs to pursue the policy. At a later stage, according to the needs of the population, the Paurashava can extend this policy to include contributions to meeting the needs such as identifying areas where demand is higher, identifying appropriate targets for provision, identifying sites and assisting in ensuring that any obstacles to the development of a site can be overcome.

Until the Paurashava is in a position to devise policies which will make a positive contribution to ensuring that the supply of community facility provision is geared to the areas and the groups of the population most in need, it is recommended that the Paurashava pursue only two further policies, such as –

Assist with the identification and development of sites for public community facilities: Where needed, the Paurashava will work with the public agency responsible for the provision of community facilities to ensure that a suitable site is chosen and developed. In some instances the Paurashava will play the lead role in the establishment of a public community facility. As an example, establishment of wholesale or retail markets to serve local communities.

Assist with the identification and development of sites for private sector community facilities: Where a private sector sponsor is encountering difficulties in providing a community facility, the Paurashava will also work with the sponsor to ensure that a suitable site is chosen and developed.

8.1.6 Tourism and Recreation Facilities

Recreational facilities like Cinema Hall, Theater, Shishu Park, Picnic spot, etc. are included in this category. One auditorium and 10 clubs are the recreational facilities in the Paurashava. Policy for tourism and recreational facilities may follow the policies prescribed before on the social and community facilities including tourism policy of Bangladesh.

8.1.7 Safety and Security

Cantonment, however, is governed by its own Act, BDR, Police, etc. areas have to be safeguarded from any possible incompatible development. The key point installations including radio, television, water treatment and pump station and power station sites, Circuit House will have to be safeguarded from any possible undesirable development around these areas that can endanger their security.

8.2 Physical Infrastructure Sectors

8.2.1 Transport

Transportation infrastructure is a very important element to make an urban area livable. For transportation of agro-products efficient road network is also of prime importance.

The study area is a centre of agro-product and pisciculture, need good transportation linkages for their transportation in time. The potential economic activities due to agro-product oriented industry and 1st Padma Bridge need improved transport facilities with a substantial investment. The potential economic (including agriculture) development envisages improvement of the transportation network to facilitate development that can meet the demand on regional basis. The area is served by two National Highways which may become inadequate due to induced activities on completion of the 1st Padma Bridge. Several new roads will be needed for efficient movement of man and goods towards regional centres.

Policies and Strategies

Following strategies will be adopted to promote circulation network:

- A comprehensive road network will be prepared for the Paurashava using a hierarchy of road network.
- In case of local roads, a participatory approach will be developed to realize at least a part of the cost of development from the beneficiaries. This will also help to reduce delay and cost involved in land acquisition procedure.
- Proposed roads in those areas will be chosen for immediate developments that deserves growth potentiality.
- Incremental development approach will be adopted to get rid of unnecessary costs in development of roads (the road remain underutilized).
- Service roads will be created along with major roads to allow free flow of long distance traffic.
- A restricted buffer zone will be proposed along primary roads passing through agriculture and discourage roadside development.

Role of Bangladesh Inland Water Transport Authority

The Kumar River is flowing in the middle of the Paurashava. Bangladesh Inland Water Transport Authority (BIWTA) is responsible for maintaining its navigable character. Unauthorized encroachment in different locations of this river is performing by the dwellers. At present, the BIWTA is not performing any responsibilities regarding this river. Apparently no major problem found in the area on water transport services.

8.2.2 Utility services

Utility services found through topographic and physical feature indicates that the Paurashava is too poor in development of those services. With the development of physical condition of the Paurashava, substantial development will be needed for utility services. Drinking water supply, sewerage and sanitation facilities and dumping of solid wastes should be emphasized as primary consideration. All households are using hand tubewells as main source of drinking water and cooking purposes. Only 1.2% buildings are using water reservoir to maintain their daily needs. About 80% of the residents are using river and pond water for washing and bathing purposes. In the Paurashava, about 2200 hand tubewells are available. From a study made by Department of Public Health Engineering (DPHE) in 2006, 79% of the total tubewells are contaminated by arsenic. Ground water level during dry and wet seasons are 16ft and 4ft respectively. Absence of solid waste dumping ground creates health hazards. Absence of covered drain and sewerage system creates sanitation problem in the Paurashava. Those problems should be removed through the proper planning and design.

Policies

Presence of National Highways in the Paurashava is the prospect to control the flood water intrusion from south to north. In this case, National Highway stands as embankment for northern part of the Paurashava. Due to the Highway, land level of the northern part is about same as the level of Highway.

Average height of the Wards is 5.6 meter and differences among the Wards are 2 meter to 14 meter, but outside the Paurashava boundary lowest land level value is 1 meter. It means a steep slope from 1 meter to 14 meter prevails in the Paurashava and its surrounding areas. Such type of land level is ideal for construction of drain and sewerage facilities.

Due to the presence of vast agriculture land (about 55%), township should not be expanded on those lands because height of those lands are three to five meter lower than the habitable land and five to seven meter lower than the National Highway. Huge earth filling will be needed for construction activities on those agriculture lands.

Strategies

Based on the above understandings, following policies will be maintained for planning of utility services in the study area:

- Low cost development will be promoted in phases, based on comprehensive plan for the demarcated areas.
- Only those areas will be targeted as new urban areas where the urbanization is likely to be rapid and imminent.
- Except waste disposal, all other services will deliver concerned service giving agencies.
- Explore with the concerned agencies the scope for relating funding of individual services more closely to need.
- Develop multi-sectoral investment programming as a method of allocating resources.
- Use the trend projection of population and economic activity to guide the location of infrastructure services in the medium term.
- Emphasize the need for adequate budget and institutional arrangements to be made for the maintenance of existing infrastructure services.
- Work with the supplying agencies in identifying sites for their operational land.

8.2.3 Flood Control and Drainage

A wider scope for construction of a drainage system may be provisioned in the Paurashava. At least central areas are open for such development immediately and other areas may be followed for projected period as designed in the plan. The Paurashava is a barren field for imposing drainage system. The principles required for drainage plan are available in the area. Land slope, nearness of the natural drainage, sparse population density and soil condition are in favour of drainage construction.

Projection of Drains

Existing drains in the Paurashava have not formed any network; only household centered construction to drain out waste water. Existing canal is trying to manage the drainage requirements. The canal is not well linked with man-made drain and river. No pond / ditch have been found to be connected with existing drains / canals. Lack of drainage

network is causing water logging for 4 months in the Paurashava area when it rains. The entire drainage network is required to be developed with primary, secondary and tertiary drains to mitigate the current water logging problem.

Further development of drain will be followed the bulk density and establishment will be proposed in the Master Plan. Length, width and depth of the drain will be considered according to the density of population, road width and out falls. Slope of the drain will be maintained according to the slope of the area and the level of river water according to the seasons.

8.3 Environment Issues

8.3.1 Natural Resources

Specific natural resources is absent in the Paurashava. Furthermore, in long run, if question rises for the use and preservation of natural resources, policies prescribed here on the environmental issues will be followed. In special case, the Paurashava may frame new policies with the help of the government and particular department / authority relevant with the issue.

8.3.2 Sanitation

Almost all the areas in the Paurashava are devoid of sanitation facilities. There exists a minor process of development in certain selected Wards but limited to government quarter only. Regarding ownership of toilets it varies widely in most of the Paurashava area. Most of the households have their own toilets.

Poor sanitation facilities with pit latrine and open drain, katcha latrine are the general picture of sanitation facilities. Toilet system of the Paurashava is mostly categorized as semi-pucca. In spite of this, Paurashava has a modest development of pucca toilets in government zones. Sewerage system has not been introduced on a trial basis as to their popularity and acceptance. Ownership of toilets varies widely in most of the study areas. Most of the households have their own toilets and at the same time there is joint toilets found in slum areas. Good number of pucca toilets is found in all the Wards. In total, 90% of the households in the Paurashava use pucca latrines, 9% katcha and rest 1% have no latrine.

Policies

Policies regarding sanitation facilities are -

- The organization responsible for the provision of sanitation facilities in the Paurashava should co-operate with the Paurashava authority in supplying the information needs to pursue this policy.
- According to the priorities and needs of the population, the authority (including Paurashava) can extend this policy to include contributions to meeting the needs – such as identifying areas where demand is greatest, identifying appropriate targets for provision, identifying sites and assisting in ensuring that any obstacles to the development of a site can be overcome.
- Where needed, the Paurashava will work with the government agency responsible for the provision of sanitation facilities to ensure that a suitable plan have been prepared and implemented.

- Where a private sector sponsor is encountering difficulties in providing sanitation facilities, the Paurashava will work with the sponsor to ensure that a suitable plan have been prepared based on the population demand and implemented.

Strategies

Following strategies have been followed for designing sanitation plan:

- To protect drainage system most of the natural canals and water courses will be preserved.
- As a measure of protection from encroachment restrictive buffer zone will be created on both sides of natural canals, rivers and other watercourses. Road and plantation will be created on those buffer zones.
- Cost of primary drainage system development in housing estates by public sector agencies will be realized from the developers.

8.3.3 Hazards

A disaster is the tragedy of a natural or human-made hazard (a hazard is a situation which poses a level of threat to life, health, property or environment) that negatively affects society or environment. Disaster can be classified into two categories: natural disaster and man-made disaster. A natural disaster is the effect of a natural hazard (e.g. flood, volcanic eruption, earthquake or landslide) that affects the environment and leads to financial, environmental or human losses. Man-made disasters are disasters resulting from an element of human intent, negligence, or error, or involving a failure of a man-made system.

The Paurashava area including the Bhanga Upazila has affected by the several major natural disasters ranging from Cyclone, Flood to Water logging and Draughts, etc. The periods of those disasters are 1998, 2000, 2004, 2007 and 2008. Very scanty attempt has been made by government to rehabilitate people after the natural disaster.

Urbanization is taking the lands of other uses to residential use. For this purpose agricultural lands and water bodies are being chosen most frequently and the lands are being converted into urban settlement. In Bhanga Paurashava, wet lands are filled up and agricultural lands are converted. This has been identified as the major man-made disaster accelerating the degree of conversion year to year. Use of poisonous insecticides on the agricultural land is another manmade disaster which will affect in the long-run.

8.3.4 Environment Aspects

Three aspects named provision of dustbin, public toilet and solid waste produces by the hat / bazar are presented here. In the Paurashava, in total, there are 2 hat / bazar, no dustbin and public toilet in the Paurashava. Those 2 hats / bazar produce about 0.7 ton solid wastes daily (no dumping ground in the Paurashava). No dustbin and public toilet for 28057 populations. The scenario demands an effective solid waste management system for the Paurashava.

Policies on Solid waste Management: In order to improve the solid waste problem and to improve the environmental condition of the Paurashava, following Macro and Micro level policy measures will be needed:

- Formation of legislation regarding solid waste management.
- Formation of standards for collection and disposal of waste.

- Incentives for introduction of environmentally clean and efficient technology for waste disposal which would help to reduce the volume of waste and facilities more recycling.
- Construction of waste as an unutilized resource and assisting in recycling of waste for conservation of resources and protection of environment.
- Introduction of environmental education especially sanitary habits in school curriculum.

Environmental Issues in Agriculture Practice

The so-called Green Revolution package was introduced into Bangladesh agriculture system in mid 1960s. It promised to increase production of cereal crops, particularly rice by the introduction of HYV seeds, application of chemical fertilizer and pesticide and irrigation. HYVs rice has contributed significantly to the progress towards the food self sufficiency in Bangladesh on the contrary increased to the environmental degradation due to the intensive use of agrochemical and other modern technology. The use of pesticide has been increased 400% per acre and its cost increased 600% during the last couple of decades. Between 1985 and 1990 the sales of pesticide became double. At present, 84 pesticides active ingredients belonging to 242 trade names have been registered in Bangladesh. Out of the total pesticide use, over 80% are used in rice fields. The rapid increase of pesticide use is causing detrimental effect on environment and health of farm workers and consumers. Pesticides are contaminating ground and surface water, which is causing depletion of inland fishing resources and ecosystem.

Pesticide use in crop production has been suspected of being a major contribution to environmental pollution. There are widespread and growing concerns of pesticide over-use, relating to a number of dimensions such as contamination of ground water, surface water, soils and food and the consequent impacts on wildlife and human health. Farmers often spray hazardous insecticides like organophosphates and organochlorine insecticides (such as DDT, lindane and toxaphene) up to five to six times in one cropping season while only two applications may be sufficient. The usual practice of draining paddy water into irrigation canals may cause river and lake contamination. Residues carried by the water can be taken up by non-target flora and fauna, leach in to soil and possibly contaminate groundwater or potable water. A greater problem lies in the bioaccumulation of pesticides in beneficial organisms like fish.

Pesticide as agricultural input was introduced in Bangladesh in 1957 and mainly DDT and BHC was distributed by the Government to the farmers free of cost until 1973. The pesticides become very popular to the farmers for two reasons; firstly quick and visible effect on pest and secondly, no cost involvement. In 1974, the subsidy was reduced to 50% and in 1979 it was withdrawn completely. Currently, 14,340.40 metric tons of commercial pesticides are used annually, primarily in the cultivation of rice, tea, jute, sugarcane and vegetables. About 70% of pesticides are used on rice. Pesticides used on rice consist almost exclusively of insecticides, but fungicides are used occasionally. In 1989-90 almost 90% of pesticides were used on rice.

Increased use of pesticides leads to two primary concerns:

- Adverse effects on the health of farm workers as well as others exposed to the pesticides
- Polluted ground water and surface water, causing harm to the water users as well as inland fisheries and other aquatic animals.

Biodiversity is declining due to the effect of pesticide and fertilizer use. Population of native fish species is now endangered and the traditional rice-fish systems have disappeared. The bird and other small wild animals are in threat of wide spread because of the use of pesticides in rice and vegetables. Most of the rice farmers are dependent on insecticides for pest control.

Most of the farmers of Bangladesh are not capable of taking decisions on pest management and pesticide application. Often they apply pesticides when there is no real need or they use wrong chemicals at wrong doses, methods and times. As a result they kill the beneficial organisms easily and create pest resistance causing the greater problems and crop losses.

There is a suspicion that pesticide residues are common in surface water system, especially in irrigation drains, which ultimately pollute the pond and river water. There are many undocumented cases of chronic health effect of pesticides on farmers and other people. Several factors are supposed to be responsible for chronic health effect such as; improper handling, lack of protective measure, improper storage, use of obsolete pesticides, etc.

Chemical pesticides use in crop production

A total of 15 active ingredients with 21 trade names, farmers of Bangladesh uses in their winter rice crop. Among 15 ingredients, 3 are fungicides and 12 insecticides. Most of the insecticides use to kill the stem borer, green leafhopper and some of grasshopper and gall midge. The fungicide uses to control the sheath blight and blast diseases. The frequency of pesticide use is varied from 1 to 4 sprays per crop season. Rate of application is not so high. The rate varies from about 1 kg/liter to 10 kg or liter per hectare of land. They had the knowledge about rate and frequency of pesticide application from the dealer and also they had considered the cost of the pesticides.

The farmers use an equal number of Organophosphates and Carbonates pesticides and parathyroid. Fortunately no organochlorines have been found to be used by the farmers. Bangladeshi rice farmers used mostly category Ia, Ib and II pesticides that the WHO classifies, respectively extremely, highly and moderately hazardous. Almost all of the carbamate insecticides they used are of extremely or highly hazardous category having wide spectrum toxicity to the environment. The farmers used WHO category Insecticides named Stem borer, Agrifuran, Carbofuran, Leaf hopper, Biesterin, Defoliator, Sunfuran, Grass hopper, Furadan, Rice bug, Gall midge, Bashudin, Dioxathion, Plant hopper, Green leaf hopper, Karate, Cyhalothrin, Defoliators, Cymbush, Cypermethrin, Rice hispa, Ripcord, Diazinon, Diazinon Thrips, Nogozi, Leaf roller, Sumithion, Fenitrothion, Monotaf, Monocrotophos, Thrips, Malathion, Brown grass, Faifanon, Dimecron, Phosphamidon, Cartap, Fungicide, Blast, Hinosan, Edifenfos, Sheath blight, Carbendazim and Propiconazole.

Frequency of application in a crop season by the farmers is in 1st time = 11%, in 2nd time = 11%, in 3rd time = 59% and in 4th time = 19%.

The insecticide Bashudin 10G and Organophosphates was used by the largest proportion of the farmers (44%) followed by the Dimecron (34%) and Baycarb 500 EC (26%). Fungicide Knowin was used by 44% of farmers. Bashudin is an obsolete insecticide which had been used by the largest number of farmers of Bangladesh and the average application rate was also high among the pesticides used. Monocrotophos and DDVP are

also known as their wide spectrum toxicity. The mostly used fungicide Knowin 50 WP is a carbonate type and it is categorized as unlikely to present acute hazard in normal use.

Crop stage of pesticide use

Largest number of farmers used pesticides in the early tillering stage (30%) followed by the late tillering and booting stages. Vegetative growth stage is the most susceptible to the pest attack, that's why farmers applied mostly in early and late tillering stages than the booting, flowering and milky stages. Major insect pests such as stem borer, leaf hopper and plant hopper attacks are prevalent in these stages. Rice hispa is one of the major insect pests of rice attacks in the mature stage like soft dough. In Bangladesh, rice hispa infestation is common and more than 12% of farmers applied insecticides in the soft dough stage. Ten percent farmers applied insecticides at the nursery stage which is susceptible to thrip, defoliator, stem borer, green leaf hopper and plant hopper.

Application methods

About 57% farmers of Bangladesh use hand sprayer and 8% Knapsack sprayer to apply the pesticides on the crop field. Remaining 18% farmers use broadcast methods and 16% use other traditional methods. The sprayers they use are not in a good condition. The hand sprayer they use includes a container with broom and sprinkled the pesticide with broom. Most of the farmers don't have any sprayer of their own; they borrowed it from relatively richer farmers. They didn't have any training about the sprayer use and precaution. Therefore, the spray is always associated with high risk of exposure. The farmers broadcast the granular insecticide keeping in an open bowl or basket and broadcast by bare hands and feet. The traditional methods they used are very unscientific. For example they brush the crop field. In this method, usually the insecticide is mixed with water in an open bowl or a big can then date palm leaf is soaked in it and the standing crop plant is brushed. During the mixing and brushing the farmers as well as the environment are exposed to pollution. No farmers use any protective measure such as mask or gloves. According to the pesticide agent and leaflet provided by the Department of Agricultural Extension, the measuring unit is being used as spoonful, handful or lidful.

Alternative methods use for pest control

Because of late introduction of pesticide in Bangladesh agriculture the farmers are used to control pest using other traditional methods besides insecticide. In these cases they use indigenous knowledge to control pest not to avoid the hazard of pesticide, mainly to minimize the production cost. Among the other methods, 40% of the farmers use crop rotation as an alternative to chemical pesticides use, 19% use timely planting and 15% use resistant varieties. Only 2% of the farmers use Integrated Pest Management (IPM) technique to control pest of rice. Bio-controls mean that they use bird to feed the insect. Remaining 12% farmers use other methods such as, soap, kerosene oil, light and net trap to control insect. In certain extent they pull the insect larvae by hand also.

Ecological impact

- Many types of birds, fish and plant become extinct by the effect of highly toxic pesticide.
- Unbalance use of pesticide make the ecosystem worst.
- Many species of harbicious plant of medicinal value extinct by the continuous use of highly toxic pesticides.
- Many fishes are caused by diseases by the pesticidal effect.

Impact on soil

- Application of toxic chemicals in the crop field harms the earthworms, soil microbes which deteriorated soil fertility.
- Use of excessive pesticide accumulates in the soil which is responsible for soil toxicity.
- Many pesticides (such as, DDT, aldrin, heptachlor, dieldrin and chlordane) remain unchanged in the soil.

Impact on water

- Long-term and heavy use of pesticides may pollute the aquatic environment through the contamination of unused portions of pesticides.
- Through irrigation water pesticides runoff to the rivers, canals, etc. and many fishes have been extinct by the effect of pesticides used in the crop field.
- Ground water is being polluted by pesticide leaching from crop field.

Impact on air and health hazard

- It is very dangerous for the applicator to be affected by the poisonous pesticides if not properly handled.
- Several diseases may be observed to be caused by pesticide used.
- During the pesticide spray the air is being polluted by spray drift which causes health hazard to the applicator neighbours.
- The granular insecticide used in the paddy field exposed to the air and pollute the surroundings.

Policies and Strategies

According to 'The Pesticide Rules, 1985', all pesticide either manufactured or imported should be registered to the Authority. After submission for registration to the authority for approval, it is required to know by the authority about physical and chemical properties, efficacy data, toxicological data, residues and their fate in the environment. But in practice the assessment of environmental impacts or residue analysis is hardly undertaken due to the lack of expertise in the field as well as laboratory facilities.

In chapter II, section 8 of the Pesticide Rules, it is said that the certificate of registration may be cancelled but not mentioned when the certificate will be cancelled. Regarding import in chapter IV it is mentioned that 'No pesticide shall be imported through a route other than the recognized custom frontier stations of Bangladesh'. But huge amount of banned and highly toxic pesticides are being smuggled from India through the border. It has been reported by the Institute of Development Policy Analysis that the pesticide like Aldrin and Endrin are sold with different labels in Bangladesh. The suppliers continue to sell many chemical pesticides proscribed by the government, and 12 particularly controversial pesticides dubbed the 'dirty dozen' by activists campaigning worldwide to stop its manufacture.

There is a provision of licensing of the pesticide dealers for sale but it is not clearly stated what will be required for the qualification of the license holder, so anyone may get license. Therefore, it is found that the registered dealer also does not have any knowledge about the pesticide handling. The regulation said it could be duplicated and transferred to anybody. It is not said in the regulation that the sales dealer might have

training on pesticide. The main drawback of this regulation is in chapter VII section 33 sub-section I (a) which gives the provision to state the name of the manufacturer, formulate or repacked in the label even he/she is not the person in whose name the pesticide is registered. For this reason it is very difficult to identify the respective person for punishment. Therefore, taking the advantage of the weak point of regulation the illegal business of pesticide is going on and it is not uncommon that the violation of rules is taking place.

The environmental degradation linked to agriculture is the impact of toxicity from improper pesticide use. Pesticides are responsible for health hazard or food poisoning. Unjudicial use of pesticide makes the ecosystem vulnerable. It is not possible to produce crop without using pesticide in modern agriculture of competitive market. Therefore, crop pests can be controlled with the timely and balanced application of pesticides.

Considering the cropping intensity and toxicity of the pesticide, the environment and farmers health are at high risk under the pesticides contamination. Among the insecticides used by the farmers, Bashudin 10 G, Diazinon 60 EC, Sumithion 60 EC and Padan 50 SP have already been banned for use on rice in other developing countries. The use and availability of Bashudin, an obsolete pesticide indicates that existing pesticide laws and regulations are not strictly enforced in relation to import, formulation, repackaging, distribution, advertising and use of pesticides. Therefore, in Bangladesh the laws and regulations of pesticide should be enforced more strictly.

CHAPTER 9

IMPLEMENTATION ISSUES

This chapter deals with the issues of implementation of the Master Plan. Here, recommendations have been made about capacity building and resource mobilization for the implementation of the plan.

9.1 Institutional Capacity Building of the Paurashava

In the present context of spatial and legal jurisdiction of the Paurashava for planned development of its area, some recommendations are made here. Also, observing the financial and Institutional strength of individual stakeholders in relation to their liabilities and identifying their shortages and absence of any perfect coordinating body, some suggestions have been made as remedial measures as a whole.

All urban local governments including Upazila level Paurashavas must be given more independence and autonomy to perform their responsibilities. At the same time, their accountability to the government and people regarding their performance has to be ensured. For this purpose the legal framework of the urban local governments has to be reviewed and updated. The legal provisions have to be consolidated and simplified and make them compatible to changing circumstances. Opportunities must be created in the Act allowing scope for privatization of service providing activities.

To avoid duplication of development functions, there should be clear line of separation between central government and the urban local government.

A double entry cash accounting system has to be introduced to modernize the accounting system. For this purpose, massive training programme has to be arranged for the relevant municipal staff.

To improve revenue collection, the urban local governments should be given more power and responsibilities. Measures should be taken for strengthening the Paurashava administration for municipal development.

Section-50 of the Paurashava Act needs to be revised and more power should be given to the Executive Officer for appointment of employees.

It cannot be virtually function effectively as a Paurashava under such a stringent financial condition. To function, effectively, it must raise its revenue earning. But it is reported that the Paurashava cannot collect all its holding tax from the citizens. Holding tax is the most important source of its own revenue earning. It must take care to ensure 100% recovery of holding tax. The Paurashava cannot function effectively depending upon government grant only. The existing manpower position of the Engineering, Development control and Accounts should be substantially raised to handle future volume of work. Moreover, additional staff especially for the implementation of Master Plan will soon be required.

The present plan package imposes a large number of development projects on Bhanga Paurashava for implementation. Paurashava will not only be the custodian of the plan, it will also directly implement much of the development projects. Besides, it will also be responsible for monitoring and implementation of the development projects by other urban development and service giving agencies. This situation calls for strengthening of the existing capability of Paurashava.

9.1.1 Staffing and Training

As a traditional system of the Paurashava, engineer and secretary are appointed directly by the Ministry of Local Government and other staffs are appointed locally through the approval of the Ministry after the advertisement on the newspapers. In Bhanga Paurashava, the revenue income is too low. That's why it is not capable to pay the salary of all the officials and staffs. The salary is recovered from the government grant and BMDf allocation. This is the main reason for under staffing of the Paurashava.

There is no proper arrangement for staff training. As a result, the staffs are mostly unskilled. They can not deliver proper service to the citizens. Besides, most of them are not qualified enough to render proper services.

9.1.2 Lack of Automation

Most works in the Paurashava are done manually. Such practice delays works and deprives the citizens from services. This is also a source of mal-practice and corruption. Modern office and working equipment should be installed. Use of modern technology will increase efficiency in planning and record keeping, finally expedite decision making process.

9.1.3 Lack of Paurashava Town Planning Capacity

At present, the Paurashava has no town planning section or any appropriate manpower to prepare and implement the Master Plan. The Paurashava must strengthen its capacity to implement its Master Plan when it will be completed. It will otherwise be in trouble in the implementation, monitoring and updating the Master Plan.

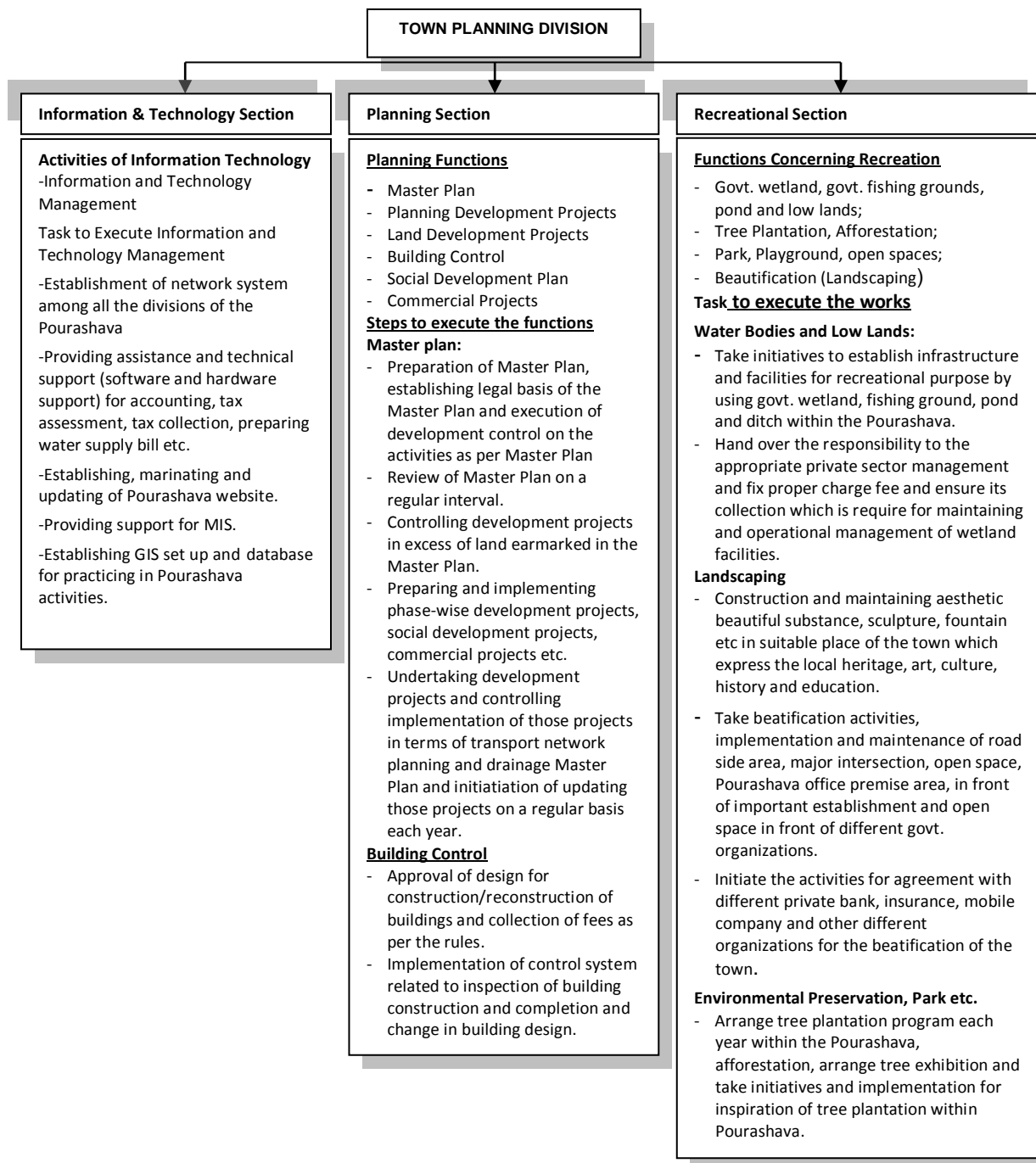
9.1.3.1 Institutional Framework

To rearrange the institutional framework for the Paurashavas recently the government has made a committee to reform the organogram of all the Paurashavas of Bangladesh. According to the clause no. 72-78 (Paurashava Officer & staff, provident fund etc) of Paurashava Act, 2009 and on the basis of the type and category of works, the committee suggested appropriate section/units/divisions within the Paurashava framework. Planning unit or division will be necessary to set sequentially as the authority can perform its mandatory responsibility 'town development and control' well and serve the inhabitants presently as well as in the future. The planning unit/division may have some sections that are as follows:

- Planning unit/Division:
- a) IT Section
 - b) Planning Section
 - c) Beautification and recreation Section

According to the division and its relevant sections, what so ever appropriate with the necessity and capacity over time, it is recommended to set up necessary manpower for each category of Paurashava. Possible scope of proposed planning unit/division is given below:

Figure 9.1: Scope of Work for Planning Division



9.1.3.2 Lack of Paurashava Town Planning Capacity

At present, the Paurashava has no town planning division or any appropriate manpower to prepare and implement the Master Plan. For proper implementation of the Master Plan in each Paurashava establishment of a separate planning division is indispensable. The Paurashava must strengthen its capacity to implement its Master Plan when it will be completed. It will otherwise be in trouble for implementation, monitoring and updating the Master Plan.

Bhanga is a 'B' class Paurashava. For the 'B' class Paurashava Government approved an organogram and required manpower. A comparison of the existing manpower with the approved organogram finds that there is a huge gap between the two. Many positions have been vacant since the inception of Paurashava. Paurashava authority supported with the line ministry should take necessary steps to set up planning unit and strengthen all units/division of the Paurashava for its better performance.

Support for Planned Urbanization

For creating planned urbanization, Paurashava may:

- Support for preparation of Computerized Infrastructure Database.
- Support for Preparation of Paurashava Base Map.
- Support for Preparation of Paurashava Infrastructure Development Plan.
- Orientation on preparation, use, update & implementation of Paurashava Master Plan.
- Assist preparation and execution of Community Development Plan by Community Based Organization (CBO).
- Introduce 3D-Modeling in Master Planning components.
- Beautification of Paurashava by 3D-Modeling.

Community Mobilization Program

Following are the community mobilization support activities:

- Support to establish Town Level Coordination Committee (TLCC) and make it functional
- Support to establish Ward Committee (WC) and make it functional.
- Support for preparation of Community Planning and implementation by forming Community Based Organization (CBO).
- Support to accelerate the Paurashava Standing Committee activities.

Urban Governance Improvement Action Programme (UGIAP)

- It is stipulated in the 6th 5 year plan 'the Key constraints to the effective functioning of the Paurashavas and City Corporations are unclear mandate and service responsibilities; lack of accountability; weak finances and financial autonomy; poor coordination and control among service agencies and weak management'.

- To overcome the challenges, the 6th Five year plan as well as Perspective Plan of Bangladesh, 2011-31 recommends the same issues mentioned below:
- the instructional reform and decentralization of responsibilities and resources to local authorities; participation of civil society including woman in the design, implementation and monitoring of local priorities; building capacity of all actors (Institutions, groups and individuals) to contribute fully to decision making an urban development process; and facilitate networking at all levels.
- It is already tested, proven and accordingly recognized in the 6th Five year plan that urban infrastructure improvements have been proved very successful introducing governance and performance-based approach adapted by UGIIP in selected ULBs in the country. Among other suggestions the 6th Five year plan also includes nature for Urban Governance Improvement Action Programme (UGIAP) and Capacity Building of Institutes at Municipality-level in particular.

Citizen Awareness and Participation

The Paurashava authority may initiate to buildup citizen awareness and to ensure peoples participation in plan initiation and implementation process. Initiatives may be as follows:

- Establishment of Civil Society Coordination Committee (CSCC) and make it functional
- Establishment of Ward Level Coordination Committee (WLCC) and make it functional
- Citizen Charter display at Poura Bhaban.
- Citizen Report Card Survey by the Paurashava.
- Establishment of Grievance Redress Cell and make it functional with specific TOR
- Establishment of Mass Communication Cell (MCC) and make it functional
- Establishment of Urban Development Coordination Unit with inclusion of other departments for inclusive development

Urban Planning and Environmental Improvement

- Master plan is a guideline and detail urban planning activities are being prescribed in the plan. To produce a livable environment in the Paurashava premises, following initiatives should be taken:
- Recruitment of staffs and establish Planning Department related to administrative structure, meeting and meeting minutes preparation.
- Master Plan, Base Map verification and update landuse plan preparation.
- Approval of building plan and development control.
- Introduction of environment and public health activities.

Urban Poverty Reduction

Following initiatives can be taken by the Paurashava for urban poverty reduction:

- Establishment of Slum Improvement Committee (SIC) in selected slums and scattered area.
- Preparation of poverty reduction action plan with guideline and necessary budget allocation.

Income Generating Activities

The income generating activities include:

- Tax assessment software use and capacity development for staffs of assessment section.
- Continue reassessment activities regularly at 5 years interval.
- Continue interim assessment regularly in whole year.
- Introduction of computerized tax system and bill preparation.
- Increase collection by more than 5% annually (up to 85% collection efficiency).
- Increase non-tax own revenue source atleast by inflation rate.
- Introduction of computerized trade license system and computer bill/license prepared and report produced.
- Introduction of computerized Water bill (Tariff) system.
- Introduction of Computerized non-motorized vehicle management system.
- Identification of new income sources for increasing income.

Transparency and Accountability

Functions and activities perform by the Paurashava authority should be transparent and the persons responsible for performing activities for betterment of the society should maintain accountability to the Paurashava people as well as central government. Following guidelines may be followed for such performances:

- Administrative Reformation of Paurashava.
- Set Vision, Mission and functions for each department / section of the Paurashava.
- Functions to be decentralized, transfer and coordination with other authorities.
- Establishment of Capacity Development Committee in Paurashava-level.
- Establishment of Urban Information Services Center at Paurashava premises.
- Meet the Mass people of Pura-Parishad.

9.1.4 Legal Aspects

The drive to establish strong urban local governance in the Paurashava is yet to be legalized. The governance programmes at present are operated project wise based on the formulated policies of the implementing agencies of the national government. The Laws that the country inherited are mostly prepared during the colonial rule to serve its own interests. Even after independence from the British, the issue of good governance was not infused into the new Acts formulated.

9.1.5 Good Governance in Legal Provisions

There is hardly any Act where the elements of good governance are clearly visible. The consultant has identified some Acts, where some elements of good governance can be traced.

The Paurashava/Municipal Act/Ordinances prepared at different times since 1960's have iterated for the preparation of Master Plan by the Paurashava/Municipality for its planned development. So far urban local government Ordinances/Acts made in 1967, 1977, 2008 and 2009, all suggested for planned development. The Paurashava Act 2009

has made the provision of having a Master Plan prepared by a Paurashava within five years of its inception. The function of the Paurashava also includes that it ensures planned development following the rules of the Ordinance. But there is no provision for public participation in the Paurashava Ordinance 2009. In all these legal documents, people's role has been ignored which is the violation of the norms of good governance.

The constitution of the Peoples' republic of Bangladesh clearly spells out that the Government should work to minimize the gap between urban and rural areas. A planned Paurashava development in that pursuit can provide necessary services to improve quality of life in both urban and rural areas within the Upazila.

9.1.6 Financial Issues

Governance in Bhanga Paurashava

Financial governance refers to transparency and accountability of financial matters. All financial matters must be transparent to all. People must know about the policies and programs of the Paurashava, how much revenue is collected each year and the amount of expenditure made on annual development. They must also be answerable to the people on how the public money is being spent and accounts being maintained.

Under different Government Projects computer and accessories are supplied for automation of the accounts system of Paurashavas within Bangladesh. Besides, trainings are also offered to the Paurashava account staffs for enabling introduction of automation in accounts system. But Bhanga Paurashava has not yet been enlisted under any kind of these projects.

Revenue Management

The Paurashava still follows a traditional management system in tax collection and revenue management. Assessment section is responsible to assess the tax of the Paurashava and tax collection, and license and bazar section are responsible to collect the tax of the Paurashava. Tax automation system is not established here yet. The public is mainly informed about tax collection during the presentation of annual budget. They may, however, get information from the councilors or Paurashava accounts office.

Paurashava's Financial Capacity and Plan Execution

The main focus of Paurashava financial governance is to establish automation in entire financial management. This includes computerization of accounts system, holding tax management, and billing of different service charges. Software for above functions will have been supplied and installed in the Paurashavas covered by different projects. The projects also provided training to the relevant staff for functioning of the systems. With the implementation of these projects people can now instantly know about the status of their tax payment, bill payment, and licensing. This has not only made the functions of the Paurashava easy, but also has freed the citizens for paying bribe, and experiencing hassle.

The size of annual budgets of the Paurashavas indicates the poor financial status of the Paurashavas. With low income, Bhanga Paurashava will have to depend substantially on the government funding for implementing the development projects. But the government has limitations of its resources. In such a situation, if the Paurashava cannot raise its own revenue adequately, it will not be able to execute much of the development projects under the Master Plan.

9.1.7 Monitoring, Evaluation and Updating

An important step for implementation of the Plan is land use clearance. Land use clearance will be needed for every physical component whether it may be public or private. The Paurashava will provide such clearance. To ensure the future development according to the proposals prescribed in the Urban Area Plan and Ward Action Plan, the Paurashava must maintain the following guidelines during the land use clearance.

Must ensure 20 ft. access road for any type of land use clearance

No permanent land use should be allowed in the area demarcated as urban reserve and the authority will follow the guideline provided to Annexure- A when the will provide land use clearance.

Must ensure that no land use clearance is issued on the lands indicated as road, drainage channel, water reservoir, educational institution, health services, open space, fruit garden / orchard in the Urban Area Plan.

Monitoring and evaluation is a very important part of plan implementation. Monitoring helps check if the plan is being implemented properly. It also measures the level of implementation of the plan. If the plan implementation is not on track, corrective measures can be taken to put execution on the track. After expiry of any plan, evaluation is made about the errors and omissions. Such evaluation helps take corrective measures in the next plan. Such monitoring and evaluation must be carried out from within the Paurashava. But Bhanga Paurashava is not equipped with qualified manpower to make such evaluation. Monitoring and evaluation of a plan is essentially, the responsibility of qualified and experienced planners. As there is no planner in the Paurashava, monitoring of plan implementation will be seriously affected. However, plan evaluation can be accomplished by means of out sourcing as and when it is required.

9.1.8 Periodic Review and Updating

The plan package needs to be updated regularly to make it respond to the spatial changes over time. But such updating would require relevant technical professionals and requisite fund that are highly lacking in Bhanga Paurashava. As there is no planner or planning section in the Paurashava, review and updating of the Master Plan will require service of senior level planners that Paurashava might not be able to provide. This service will have to be procured by out sourcing and the Paurashava is not even capable to accomplish this financially either. This will create problem when the plans or its components gets obsolete or need to be changed. Another problem would arise when the duration of plans ends. It is necessary that the entire plan document (including all planning and land use proposals) should be reviewed every 4th year of the plan period and will come into execution from the 5th year. The aim of the review will be to analyze the status of implementation of plan provisions, the changing physical growth pattern, infrastructure development, and the trend of public and private physical development including growth direction.

A new set of plans will have to be prepared replacing the old ones. This problem, however, can be overcome by undertaking another planning project by LGED. So, for regular updating and changes, and plan implementation monitoring, the Paurashava should immediately set up a planning section with a number of planners and other staff. The section will not only look after planning, but will also be responsible for development control, estate management, and project preparation. Since the planners would be qualified and skilled in computer operation, they can also help achieving automation of the Paurashava functions.

9.2 Resource Mobilization

Resource mobilization will be one of the most challenging tasks in implementing the current plan package. Though the development proposals are said to be executed by a large number of development agencies, but it is beyond doubt that the heaviest burdens will have to be shouldered by the Paurashava. As a local government agency, it suffers from resource constraint due to low level of urbanization and investment by both public and private sectors. The land value will maintain perpetually low growth rate in the town. Therefore, prospect of mobilization of substantial resource from sale of serviced land is extremely meager. For the same reason, revenue earning from betterment fee, planning permission and other sources may also remain low. Paurashava is heavily dependent on the government for executing its development projects as it is unable to collect sufficient revenue from its tax and non-tax sources. Therefore, it is clear that execution of development projects under the current plan will depend heavily on the government response to supply adequate fund. This situation calls for increasing revenue earning by generating new revenue sources.

9.3 Concluding Remarks

From the past experience, it has been observed that plans are prepared for organized development, but development control has been subject to negligence. In most cases, execution has been piece-meal. It is unfortunate that town planning has not yet become a part of our urban development culture. Individuals develop lands and construct buildings with a little respect for planned development, and the concerned authority is also unable to exercise full control on development. Some strict measures are necessary to make stakeholders follow up plans and development rules. Awareness is to be built among the people to follow the Master Plan provisions and plan. Government agencies must be compelled to follow plans. Existing laws in this regard must be updated incorporating provisions of plan execution.

PART B

URBAN AREA PLAN

Urban Area Plan is aimed to guide physical development of Bhanga Paurashava including its economic and social activities. The plan adhere policy directives spelled out in the Structure Plan. The Urban Area Plan is akin to the traditional Master Plan approach prevalent in the country that designates plot-to-plot use of land apart from infrastructure development proposals. Thus it will also serve as a development control mechanism/instrument. Preparing landuse plan on a cadastral map, the Urban Area Plan considers more rigid. Once the plan on a cadastral map is drawn and accepted by the government and formalized, it gains a formal status and thus becomes a binding for all concerned.

The Terms of Reference (TOR) specify (Pg. 6. Article 4) that the Urban Area Plan (UAP) / Multi-sector Investment Plan (MSIP) will consist of the following plans:

- Landuse Plan
- Transportation and Traffic Management Plan
- Drainage and Environmental Management Plan
- Plan for Urban Services

The Urban Area Plan is presented in both, map and textual format. The plan map is presented in 1:1980 scale, super imposed on latest cadastral/revenue map having plot boundaries within mouzas. The plan is accompanied by an explanatory report supported by necessary figures, maps and data.

Urban area plan is broadly divided into two parts, plan map and explanatory report. The plan map depicts future landuse zoning, infrastructure development and other development proposals. Report elaborates all proposals proposed in the plan, including rules, regulations and recommendations for implementation of the plan.

The outline of the Urban Area Plan gives guidance to the Paurashava as to how it can develop the roles i.e. to promote development, to co-ordinate development and to control development.

The Urban Area Plan has been divided into four main parts. These are preceded by four introductory chapters which explain the scope of the report and provide background to the Urban Area Plan including its relationship with the Structure Plan.

The Landuse Plan identifies approaches of planning, existing and projected landuse and proposed landuse. Requirement of land for different purposes, landuse zoning and plan implementation strategies are also included here.

The Transportation and Traffic Management Plan includes existing conditions of transportation facilities, intensity of traffic volume, degree of traffic congestion and delay, analysis of existing deficiencies, travel demand forecasting for next 20 years, future traffic volume and level of services and transportation development plan. Moreover, transportation system management strategy and plan implementation strategies are also presented in this plan.

Drainage and Environmental Management Plan is the third chapter of the Urban Area Plan. The chapter again subdivided into two parts – drainage part and environment part. Existing drainage network, land level and topographic contour, plan for drainage management and flood control and plan implementation strategies are the components of the drainage part. Existing environmental condition, solid waste and garbage disposal, environment pollution, water-logging, natural calamities and localized hazards, plan for environmental management and pollution control and plan implementation strategies are the key issues of the environment part.

Fourth part of this report is Plan for Urban Services. Existing condition and demand of the services, projection on existing and proposed urban services, proposals for urban services and implementation, monitoring and evaluation of the Urban Services Plan are the key issues of this part.

Urban Area Plan of the Bhanga Paurashava covers an area of 2560.90 acres (10.33 sq km.). The reason behind choosing such area lies in fact that this is the most urbanized part of the Paurashava, where there is still scope and possibility of urban development in near future. Paurashava operates all parts where it provides basic urban services and facilities. Considering future urbanization trend and potential development projected population is assumed 50593 for 2031.

The Urban Area Plan covers nine Ward Action Plans also.

CHAPTER 10

LAND USE PLAN

10.1 Introduction

Landuse Plan is one of the four components of the Urban Area Plan. Landuse Plan is the first element of the Bhanga Paurashava Urban Area Plan. The Landuse Plan is being prepared for managing and promoting development over medium-term on the basis of the strategies set by the longer-term Structure Plan. Basically the Landuse Plan is an interpretation of the Urban Area Plan over the medium-term (10 years). The coverage of the Landuse Plan considers existing urban areas and their immediate surroundings with the purpose of providing development guidance in the areas where most of the urban development activities are expected to take place over the next 10 years. Delineation of the Landuse Plan area is based on the urban growth area identified as the planning area. It contains more details about specific programs and policies that require to be implemented over the medium-term.

10.2 Existing and Projected Landuse

10.2.1 Existing Landuse

Details of landuse include structures and uses of land in multi-dimensions. Every individual structure and its details were surveyed during the survey period and find out the uses of land. Most of the landuse information was collected through physical feature survey. Later on, landuse map is prepared showing different use categories.

In Bhanga Paurashava, major landuse is agriculture (55.2%). Residential landuse occupies second position (21.7%) of the category. Only 2.7% land is using for circulation network. Though, agriculture landuse dominates the Paurashava but, after preparation of the Master Plan, a radical change in physical development will proceed.

Table 10.1 Existing Land use in Bhanga Paurashava

Landuse category	Area according to the Wards (in acre)										
	1	2	3	4	5	6	7	8	9	Total	Total (%)
Residential	48.0	84.5	62.4	63.9	63.1	73.1	67.0	24.2	70.3	556.4	21.7
Commercial	1.3	6.4	1.8	13.0	2.6	2.3	5.1	11.0	10.0	53.5	2.1
Industrial	0.0	2.4	3.3	1.1	1.7				0.2	8.7	0.3
Educational Facility	0.7	2.1	4.4	5.9	0.9	0.3	1.4	2.9	1.1	19.7	0.8
Governmental Services			0.1	4.2	1.1			0.6	1.9	7.9	0.3
Non-Governmental Services				0.6						0.6	0.0
Mixed-Use			0.9	3.1				1.8		5.8	0.2
Community Service	0.2	11.0	0.7	1.8	4.1	1.7	1.2	0.7	1.7	23.1	0.9
Circulation Network	8.1	10.6	5.2	13.2	4.0	6.8	6.7	6.2	9.6	70.3	2.7
Recreational Facility				0.2						0.2	0.0
Open Space	2.9	17.2	7.7	17.8	24.1	3.1		2.8	15.2	90.8	3.5
Transport and Communication	0.4		0.8	2.8					2.0	5.9	0.2
Service Activity	0.4	0.2	2.3	8.5	0.2	0.8		1.3	7.1	20.7	0.8
Agricultural	200.4	215.1	110.3	76.5	81.6	191.8	250.7	100.5	186.1	1413.0	55.2
Water body	24.1	28.4	51.4	59.9	49.2	8.4	24.1	13.2	25.3	284.2	11.1
Total	286.5	377.9	251.2	272.6	232.5	288.2	356.2	165.2	330.5	2560.9	100.0

Source: Landuse Survey, 2009.

Determining factors of landuse change is the income of the people, government policy, new establishment like industry, higher level educational institute, construction of road

and embankment and availability of services. The Paurashava was developed as a growth centre long before, than a police station. In the year 1997 it is notified as Paurashava. Radical change of landuse in the Paurashava is not found. Before it known as Paurashava, agricultural domination was the key landuse. During last ten years, the landuse scenarios remain same. A stagnant character of landuse change still stand due to the existence of river named Kumar. Rapid change of landuse will be viewed after construction of the Padma Bridge at Maowa point.

10.2.2 An Estimate on the Requirement of Land

The Paurashava is not an ideal township due to the agriculture domination. Agriculture based township should be encouraged in the preparation of Master Plan. Growth of population is the natural trend and at the sametime, expansion of non-agricultural use on agriculture land is also natural tendency of the people. This will be controlled through the Compact Township concept with the encouragement of vertical development. In case of government services, specific building may accommodate different type of offices.

The projection of landuse depends on the growth of population. After population projection it is found that, population of this Paurashava will be 50593 in the year 2031 and 41566 in the year 2021.

In case of landuse change, the standard given by the LGED according to the projected population and area for the specific service is being calculated. Minimum use of agriculture land for physical development is emphasized in the plan. The vertical expansion will be emphasized rather than horizontal. In case of road network planning, missing links will get priority rather than new roads. For the development of pisciculture, most of the ponds and ditches may be preserved, in some exceptional cases; small number of ditches may be used for physical development activities. Landuse control and landuse restriction will be imposed by the Paurashava according to the prescribed plan.

The standards presented in the Table-10.2 are fairly generous and considered for the Paurashava. Adjustments have to be made in the core areas and a time line may be set to gradually achieve these standards over a five, ten and twenty years period.

Commerce

In total, 53.50 acres commercial land is in the Paurashava.

Determination of Standard: According to the standard on wholesale market/bazar, 1 acre land is to be provided for every 10,000 populations and 1 acre land for every 1000 population for retail sale market. Again, 0.25 acre of land is being standardized for per corner shop, 1 acre per neighbourhood market, 1.5 to 2.5 acre per super market and 1 acre per 25,000 populations for bank, hotel, garage and godown. The consultant has considered 50593 populations for the study area up to the year 2031. For this population, total number of required wholesale market / bazar stands at $(50593 / 10,000)$; means 5.05 acres land is being needed up to the year 2031 and 50.59 acres for retail sale market. The planning area already has 1 retail sale market including wholesale market / bazar, livestock hat with an area of 5.06 acres. No new wholesale market or bazar is required.

Recommendation / Forecast: The consultant recommends expansion of present wholesale market / bazar on earmarking land. Necessary planning permission and design criteria will be provided by the Paurashava. The lands may be used for other commercial purposes like bank, hotel and godown.

Map 10.1: Existing Landuse

Industry

In the Paurashava, 8.7 acres land is under industrial development.

Determination of Standard: According to the standard, land is being allocated as 1.5 acres for every 1000 populations in case of small-scale industry, 5 acres per 10000 populations for heavy industry and service industry and 1 acre per 1000 population for cottage / agro-based industry. The study team has estimated 50593 populations for the planning area up to the year 2031. For this population total required land for industry stands at $(50593 / 1,000)$, means 75.89 acres land for small-scale industry and 50.59 acres for heavy industry and service industry (including agro-based industry), up to the year 2031.

Recommendation / Forecast: The Consultant recommends earmarking land for small-scale / agro-based industry within the Paurashava. Necessary planning permission will be followed by the Paurashava. The lands, however, should not be allowed to use other than industry. The industries which are located dispersely should be accommodated within the prescribed industrial areas.

Primary School

Determination of Standard: According to the standard on primary school, 1 school with 2 acres of land is to be provided for every 5,000 population. The Consultant has estimated 32386 populations for the planning area up to the year 2031. For this population total number of required primary school stands at $(50593 / 5,000)$, means 10 schools with 20.24 acres of land is being needed up to the year 2031. The planning area already has 12 primary schools with an area of 4.62 acres. No new primary school is required.

Recommendation / Forecast: According to the standard several numbers of new primary schools are needed. The study team suggests vertical expansion of primary schools according to the enrollment in future.

Secondary School

There are 6 secondary schools in the planning area covering together 6.4 acres land. Average area of a secondary school is 1.06 acre.

Determination of Standard: According to standard, 5 acres land may be provided for every 20,000 population for one secondary school. The projected population of the planning area is 50593 persons up to the year 2021. Therefore, as per standard the planning area needs $(50593 / 20,000)$, means no secondary school is being needed up to the year 2031 but, at least 3 acres land will be needed. At present, there are 6 secondary schools with 6.40 acres land in the planning area. Number of schools already exceeds the requirement.

Forecast / Recommendation: As per above standard, one more secondary school is needed but the existing areas of the school may be expanded.

College / Higher Secondary School

There are two colleges in the planning area, covered 6.83 acres land.

Determination of Standard: The standard for college is 10 acres per 20000 populations.

Recommendation / Forecast: The planning area already has two degree-level college apart from higher secondary-level education is in several high schools. Still one more colleges are needed and expansion of the existing college may be required.

Vocational Training Centre

An important component for the rural masses is vocational training. Multi-dimensional training may be offered through the centre. People are being benefited directly and prepare him as a technical person enjoying training from vocational centre. At present, no vocational training centre in the Paurashava. According to the standard, 6.0 acres land may be provisioned for a vocational training centre.

Determination of Standard: The prescribed standard for vocational training centre is 5 to 10 acres for Upazila.

Recommendation / Forecast: The study team recommends a vocational training centre on 6.0 acres land. Necessary planning permission will be offered by the Paurashava. The lands, however, should not be allowed to use other than vocational training centre.

Health Facilities

At present, six health establishments are in the Paurashava. Four hospitals, one diagnostic centre and one clinic are those establishments. The health facilities covered 20.70 acres land.

Determination of Standard: The prescribed standard for health facilities are 10 to 20 acres for Upazila Hospital and 1 acre per 5000 population for Health centre / Maternity clinic. According to the standard, up to the year 2031, (50593 / 5000) 10.12 acres land will be needed for Health centre / Maternity clinic.

Recommendation / Forecast: The study team recommends expansion of present Upazila Hospital on earmarking land and some health services where the land owners will develop such services. Necessary planning permission will be offered by the Paurashava. The lands, however, should not be allowed to use other than health services.

Open Space

At present, 90.80 acres land is covered by the open spaces in the Paurashava.

Determination of Standard: The standard recommends 3 acres per 20000 populations for playground, 1 acre per 1000 population for park and 1 acre per 1000 population for Neighbourhood Park.

Recommendation / Forecast: The study team recommended a play field. At least two parks are being recommended with an area 10.00 acres depending on availability of open land. Park with restaurant may be established on the land situated on the riverbank. Community forest and tourism development also prescribed without considering any standard. Amount of land for those components have been considered through discussion with the stakeholders.

Community Facilities

Community facilities include Community centre, Graveyard / Burial ground, Electric sub-station, Water supply pump, Post office, T&T office, Public library, Eidgah, Mosque/Church/Temple, Police station, Police box/outpost, Fire service station, Waste disposal site, club, etc. Existing land under community facilities is 16.15 acres.

Determination of Standard: The standard suggests 1 acre per 20000 for the community centre, Graveyard / Burial ground and Eidgah. Again, 0.5 acre per 20,000 populations prescribed for Mosque/Church/Temple, Post office and T&T, 1 acre per 20,000 populations for Fire service station and 3–5 acres per Upazila Headquarters and police station.

Recommendation / Forecast: The study team recommends a new community centre on 0.14 acres land. Areas for Mosque/Church/Temple, Post office, Fire service station and T&T remain with existing areas.

Government Offices

In the Paurashava, 7.90 acres land is under administrative use.

Determination of Standard: According to the standard for administrative land, 15 acres of land is to be provided for every Upazila Complex, 3 to 5 acres per Paurashava office, 0.10 acres per Union Parishad office and 10 acres for jail / sub-jail. Total required land for administration stands at 48 acres. The planning area has 7.9 acres land under administrative use. New administrative land will be needed and it is being proposed.

Recommendation / Forecast: The planning area already has one Upazila office, one Paurashava office and other govt. offices. Some new administrative area is recommendation and expansion of the existing Paurashava office is required.

Recreation

Only 0.20 acres land is covered with recreational facility in the Paurashava.

Determination of Standard: According to the standard for recreational facilities, 1 acre land is to be provided for every 20,000 population for cinema / theatre, 5 to 10 acres land for stadium / sports complex and 1.75 acres land per 10,000 populations for a shishu park. The study team has estimated 32386 populations for the study area up to the year 2031. For this population total land required for cinema / theatre stands at (50593 / 20,000), means 2.5 acres land is being needed up to the year 2031.

Recommendation / Forecast: The study team recommends a stadium / sports complex on 6 acres land, 0.50 acres land for cinema / theatre and a shishu park on 5.0 acres land.

Residential

Existing residential areas of the Paurashava is 778.3 acres. All type of residential lands is included with such amount of land. About 63.32 acre land belongs with the rural homestead. Therefore, rural environment will be considered for creating better living areas.

Determination of Standard: The standard recommends in Table-10.2 is 65 persons per acre (gross) for residential development. Again, it is recommended 200 persons per acre for real estate or housing areas both for public and private. No standard is being recommended housing for low-income group.

Recommendation / Forecast: According to the standard (65 persons per acre), 778 acres land will be needed for residential development up to the year 2031. Existing residential area is 556.40 acres. About 222 acres land has being proposed for residential development. The Consultant recommends one row housing area for flood victims as housing for low-income people. The row houses may be constructed outside the eastern part of the Paurashava boundary. Mostly khas land will be preferred for such

development and it should not be above 10 acres. Rural environment should be confirmed in the row housing areas.

Conservation and harvesting of rain water in Government Blocks, Commercial Buildings and Institutional Buildings. They should prove required facilities and infrastructure for conservation and harvesting of rain water available to them.

The paved surface around the building shall have percolation pits of 4'x4' covering at least 30% of such areas. Such pits shall be filled with small pebbles or such absorbing materials or river sand and covered with perforated concrete slabs.

Following requirements are optional and should be provided in residences depending on site conditions and as per case to case basis.

Terrace Water Collection: The terrace shall be connected to a sump or well through filtering tank by PVC pipes. A valve system shall be incorporated to enable the first part of the rain water collected to be discharged to the soil if it is dirty and make arrangements to collect subsequent discharge.

Open Ground: Whenever there is open ground a portion of top soil should be removed and replaced with sand to allow percolation of rain water.

Table 10.2: Existing and proposed landuses including standard

Types of Land Uses	Recommended Standard Provision unit)	Existing (acre)	Estimated (acre) (2016)	Estimated (acre) (2021)	Estimated (acre) (2026)	Estimated (acre) (2031)
Residential		556.4				
General residential	100 persons/1 acre		37676	41566	45858	50593
Real Estate – Public/Private	200 population/ 1 acre					
Considered	65 persons /acre		579.6	639.5	705.5	778.4
Roads		70.30	100	150	200	241.2
-Paurashava primary roads	60-200 feet					
-Paurashava secondary roads	40 feet					
Paurashava local roads	20 - 30 feet					
Education		19.70	52.1	56.96	62.32	68.25
-Nursery	0.5 acre/10,000 population		3.77	4.16	4.59	5.06
-Primary School/ kindergarten	2.00 acres/5000 population		15.07	16.63	18.34	20.24
-Secondary/High School	5.00 acres / 20,000 population		9.42	10.39	11.46	12.65
-College	10.00 acres/ 20,000 population		18.84	20.78	22.93	25.30
-Vocational Training Centre	5 - 10 acres / Upazila		5.00	5.00	5.00	5.00
Open Space		90.80	87.89	96.45	105.89	116.30
-Play field/ground	3.00 acres/ 20,000 population		5.65	6.23	6.88	7.59
-Park	1.00 acre / 1000 population		37.68	41.57	45.86	50.59
-Neighborhood park	1.00 acre / 1000 population		37.68	41.57	45.86	50.59
-Stadium/sports	5 – 10 acres/Upazila HQ		5.00	5.00	5.00	5.00

Types of Land Uses	Recommended Standard Provision unit)	Existing (acre)	Estimated (acre) (2016)	Estimated (acre) (2021)	Estimated (acre) (2026)	Estimated (acre) (2031)
complex						
-Cinema/ Theatre	1.0 acre / 20,000 population		1.88	2.08	2.29	2.53
Health		5.1	17.54	18.31	19.17	20.12
-Upazila health complex/ hospital	10 -20 acres/Upazila HQ		10	10	10	10
-health centre/Maternity clinic	1.00 acre/ 5,000 population		7.54	8.31	9.17	10.12
Community Facilities		18.10	9.4	10.4	11.46	12.64
- Mosque/Church/Temple	0.5 acre /20,000 population		0.94	1.04	1.15	1.26
-Eidgah/	1.0 acre/20,000 population		1.88	2.08	2.29	2.53
-Graveyard	1.00 acre /20,000 population		1.88	2.08	2.29	2.53
-Community centre	1.00 acre /20,000 population		1.88	2.08	2.29	2.53
-Fire Station	1.00 acre/ 20,000 population		1.88	2.08	2.29	2.53
Post office	0.5 acre /20,000 population		0.94	1.04	1.15	1.26
Commerce and Shopping		53.50	45.19	49.47	54.19	59.40
-Wholesale market	1.0 acres/ 10000 population		3.77	4.16	4.59	5.06
-Retail sale market	1.0 acres/ 1000 population		37.68	41.57	45.86	50.59
-Corner shops	0.25 acre/per corner shop		0.25	0.25	0.25	0.25
-Neighborhood market	1.00 acre/per neighborhood market		1.00	1.00	1.00	1.00
-Super Market	1.50-2.50 acres/per super market		2.50	2.50	2.50	2.50
Industry		8.70	94.19	103.92	114.64	126.48
-Small scale	1.50 acres /1000 population		56.51	62.35	68.79	75.89
-Cottage/agro-based	1.00 acres /1000 population		37.68	41.57	45.86	50.59
Utilities		0	17.79	18.56	19.42	20.37
Drainage	As per local requirement					
Water supply	1.00 acre /20,000 population		1.88	2.08	2.29	2.53
Gas	1.00 acre /20,000 population		1.88	2.08	2.29	2.53
Solid waste disposal site	5– 10 acres/Upazila HQ		10.00	10.00	10.00	10.00
Waste transfer station	0.25 acres/per waste transfer station		0.25	0.25	0.25	0.25
Electric sub-station	1.00 acre/20,000 population		1.88	2.08	2.29	2.53
Telephone exchange	0.5 acre/20,000 population		0.94	1.04	1.15	1.26
Fuel Station	0.5 acre/20,000 population		0.94	1.04	1.15	1.26
Transportation		5.90	3.57	3.87	4.19	4.54
-Bus terminal	1.0 acre /20,000 population		1.88	2.08	2.29	2.53
-Truck terminal	0.50 acre /20,000 population		0.94	1.04	1.15	1.26
-Baby taxi/tempo stand	0.25 acre /one baby taxi/tempo stand		0.25	0.25	0.25	0.25

Types of Land Uses	Recommended Standard Provision unit)	Existing (acre)	Estimated (acre) (2016)	Estimated (acre) (2021)	Estimated (acre) (2026)	Estimated (acre) (2031)
-Rickshaw/van stand	0.25 acre /one baby taxi/tempo stand		0.25	0.25	0.25	0.25
-Passenger Shed	0.25 acre /one baby taxi/tempo stand		0.25	0.25	0.25	0.25
Administration		7.90	18.00	18.00	18.00	18.00
-Upazila complex	15.00 acres		15.00	15.00	15.00	15.00
-Paurashava office	3-5 acres		3.00	3.00	3.00	3.00
Agri-extension Farm	10 acres/Upazila HQ		10	10	10	10
Urban Deferred	10 percent of the total build up area		69	76	83	92

10.3 Landuse Proposals

Basically, landuse proposal involves with the existing conflicting landuses. Those conflicts may be raised due to different causes. Inhabitants of the Paurashava are not aware about the land level and slope direction of the Paurashava. Without knowing this information they are raising their land up to a mark and constructing permanent structure. As a result, water logging problem during rainy season is all over the residential areas.

Due to the absence of development control, the core area of the Paurashava is already developed as mixed-use area. Commercial, residential, administrative, educational uses are admixture in the core area. Zoning provision, landuse control should not be enforced in such type of the core area.

At present, the Paurashava is a natural developed area. Rearrangement of the existing use is not possible. Land acquisition for expansion of road (to increase the width of road) will create socio-political hazards. As a result, the roads in the core area will remain as today.

For water supply network, construction of sewerage facilities and removal of fire hazards, at least 24 feet width road is necessary. In the Paurashava, except National Highway, such type of road is absent. New road will form new township on agriculture land. These processes will washout agriculture domination from the Paurashava. Compact Township will be effective for new formation, not for the mixed-use areas where most of the roads are 8 to 10 feet width.

10.3.1 Designation of Future Landuse

- **Identification and development of sites for government housing.** After preparation and implementation of the master plan, different types of government activities will be increased. Residential accommodation will be needed for those government employees. A site for government housing should be reserved. National Housing Authority is appropriate for performing this responsibility.
- **Encourage central government to decentralize industrial development from Dhaka.** Those facilities may be relevant with specific agro-product such as jute for jute industry, cane and bamboo for handicrafts, poultry and horticulture farming, export-oriented vegetation, etc. Different authorities such as Agriculture Development Corporation, Small and Cottage Industries Corporation, Directorate of Livestock and Poultry may be the responsible authority.

- **Provision of sites and services schemes for the low and lowest income groups.** The Paurashava authority and Schedule Bank may be appropriate for performing these responsibilities. Housing for low-income group, distribution of khas land among the lowest-income group and loan with low-interest for house construction may be the appropriate schemes.
- **Upgrading of slum and squatter settlements.** Mostly, the vulnerable groups are affected by river erosion, form slum and squatters on public land. If possible, those formations should be upgraded providing basic utility services. It is better, in Paurashava context, the people are living in the slum and squatters, rehabilitate them with the provisioning of housing for lowest-income group. The Paurashava and NGOs can perform such role.
- **Monitoring the principal aspects of community facility provision in the Paurashava.** Wholesale or retail market, specialized clinic, etc. are under this community facility. When any difficulties will be encountered in case of suitable site selection considering demand of the inhabitants, the Paurashava will perform the lead role.
- **Location for new industrial development.** The industrial area prescribed in the Landuse Plan will be developed provisioning all utility services. The authorities relevant with those utility services will perform the responsibilities. At first, the polluting industries (water and noise) from their original location should shift to the new location. Imposition of taxes, tax holiday and subsidized taxes may be imposed by the Paurashava for such rearrangement.

10.3.2 Landuse Zoning

Zoning is a classification of landuses that limits what activities can or cannot take place on a parcel of land by establishing a range of development options. Zoning has been defined as an action through legislation provided to a development authority / Paurashava to control a) heights to which buildings may be erected; b) the area of lots that must be left un-built upon; and c) the uses to which buildings may be constructed.

Area / Use Zoning

The objective of area zoning is to specify which types of landuse are considered appropriate for different areas or 'zones', and it therefore indicates the planning control objectives of the authority or municipality for its administrative area. The authority is obliged under the planning acts to designate in its development plan objectives for the use solely and primarily of particular areas for particular purposes.

According to the landuse table, area zoning is divided as agriculture, residential, commercial, industrial, administrative and institutional. The zone has further segmented and detailed in the Ward Action Plan. A detailed scenario as plot-to-plot basis is also presented with the calculation of covered area in the landuse plan.

Density / Bulk Zoning

Aim of the density zoning is to provide an acceptable density which is related to the designed facilities and amenities especially for the residential areas. This will ensure a healthy community and enjoyable community life. In a particular area, how much number of buildings will be permitted and constructed, the decision is under the density zoning. Provisioning of setback rule and percent of land uses for different purposes is the prime consideration of density zoning. The proposed percentage mentioned in the landuse table is the only tool to control building density in the Paurashava.

Height Zoning

This zoning provides height limits for structures and objects of natural growth and standards for use of an area which encourage and promote the proper and sound development of areas. It is also applicable to height restrictions for flight safety around airports or other similar purposes.

For effective development control, in addition land use zoning individual facility and the structures therein is complied certain regulations imposed to ensure desirable end. Relation between ground cover of buildings and the land parcel that house it, minimum setback of building from the adjoining plot boundaries and the maximum floor area that can be constructed in relation to plot size and the connecting road among many other details, are controlled by Building Construction Rules, 1996. Besides, Bangladesh National Building Code focuses on the appropriate materials, construction method, building safety and associated issues. In absence of Paurashava Master Plan the above rules did not have scope for area specific rules and hence were common for the whole development process.

According to the Building Construction Rule, 1996, minimum permissible road width for obtaining plan permission is to shown, construction is allowed on plots connected by narrow roads provided the plot owner leaves formally half of the addition area needed to make the road 6 meter for widening the road to the permitted minimum. Perhaps the intension behind this was that gradually the whole road would rise up to 6m in short time and it is true for new areas. But congested unplanned area represents an alarming picture. In commercial area, most of the plots are occupied almost entirely by pucca structures covering the property line connected by the narrow pathways. Those owners did not bother for Paurashava's plan permission and a handful of those who obtained plan permission did not care to follow them. It is suggested that existing rules need to be modified to tackle the environmental problems created by illegal building construction.

10.3.3 Classification of Land Use Zoning

After a detailed consultation with the LGED counter-part, the land use classification for the Paurashava Master Plan is being finalized as shown in the Table-10.3. Map 10.2 and Appendix -2 shows the Land Use Plan of the Bhanga Paurashava.

Table 10.3: Land Use Plan of Bhanga Paurashava

SL.	Land use Category	Remarks	Area (acre)	%
1	Urban Residential Zone	Urban Residential area is a land use in which housing predominates. These include single family housing , multi-family residential , or mobile homes . Zoning for residential use may permit some services or work opportunities or may totally exclude business and industry. It may permit high density land use .	869.63	23.87
2	Rural Settlement	Rural settlement includes the low dense residential area which is scattered and rural in nature. It may permit only low density uses. Aiming to control the growth in this zone, less service and facilities will be provided.	84.10	2.31
3	Commercial Zone	The land used for commercial activities is considered as commercial land use. These activities include the buying and selling of goods and services in retail businesses, wholesale buying and selling, financial establishments , and wide variety of services that are broadly classified as "business". Even though these commercial activities use only a small amount of land, they are extremely important to a community's economy . Commercial land includes established markets and areas earmarked for	20.74	0.57

SL.	Land use Category	Remarks	Area (acre)	%
		markets.		
4	Mixed Use Zone	Mixed land use refers to the area without a dominant land use (Residential, commercial, industrial etc.).	58.82	1.61
5	General Industrial Zone	Green and Orange A categories as per The Environment Conservation Rules, 1997	50.71	1.39
6	Heavy Industrial Zone	Other toxic and pollutions Industries (Orange B and Red categories as per The Environment Conservation Rules, 1997)	52.34	1.44
7	Government Services	All Government Offices except large scale service based offices as Civil Surgeon Office, DC Office, Police Box, Police Fari, Police Station, LGED Office, Paurashava Office, Settlement Office, Union Parishad Office, Upazila Headquarter, BADC Office, Fisheries Office, Ansar/VDP Office, Agriculture Office, Zila Parishad Office, Post Office, Telephone Exchange Office and Other Government Offices.	19.44	0.53
8	Education & Research Zone	All kinds of educational institutes like Primary / secondary / other Schools / Colleges etc are mentioned to calculate the land use for education and research purpose.	58.65	1.61
9	Agricultural Zone	Agricultural land denotes the land suitable for agricultural production , both crops and livestock . It is one of the main resources in agriculture . It includes productive land (single, double and triple cropped), seed bed, fisheries, poultry farm, dairy farm, nursery, horticulture etc.	1828.73	50.19
10	Water body	Equal or More than 0.25 acre and justification by the consultant and wet land will merge with water body	191.12	5.25
11	Open Space	Playground, Botanical Garden, Stadium, Zoo etc. (Facilities without or with minimum building structure)	103.15	2.83
12	Recreational Facilities*	Facilities other than those mentioned to Open Space and indoor based facilities with designated building structure i.e. Cinema Hall, Theater Hall etc.	0	0
13	Circulation Network	Road and Rail communication	262.38	7.20
14	Transportation Facilities	Under transport and communication land use both transport and communication services are considered. This category includes airport, bus terminal/stand, ferry ghat, filling station, garage, launch terminal, post office, passenger shed, telephone exchange, ticket counter, transport office etc.	5.24	0.14
15	Utility Services	Utility services include Overhead Tank, Power Office/Control Room, Public Toilet, Sewerage Office, Waste Disposal, Fire Service, Water Pump House, Water Reservoir, Water Treatment Plant, etc.	4.77	0.13
16	Health Services	This land will be used to provide health facility.	9.87	0.27
17	Community Facilities	All community facilities including funeral places and other religious uses.	19.36	0.53
18	Historical and Heritage Site	The entire mentionable historical and heritage site.	4.67	0.13
19	Restricted Area	A Restricted Area is an area where no one but certain people can enter. Here the areas which are not accessible for the general public except some high ranked personnel are considered as restricted area.	Not applicable	
20	Overlay Zone	If the consultant justify any area that should not be defined as other given definitions but the facility(s) may not be avoidable, they may use this category.	Not applicable	
21	Urban Deferred	Optional depending on the Paurashava and the Consultant's judgment	0	0
22	Forest	Designated Forest Area.	Not applicable	
23	Beach	Sea Beach	Not	

SL.	Land use Category	Remarks	Area (acre)	%
			applicable	
24	Miscellaneous	Any other categories which are not related to above 23 categories.	Not applicable	
Total			3643.7	100.0

In the paragraphs below, the general definition of the use and description of associated permitted and conditionally permitted uses under each land use zone have been provided. The uses that are not listed here in any of the categories shall be treated as Restricted Use for the corresponding land use category and shall not be permitted only except unanimously decided otherwise by the appropriate authority. In such situations, the use shall get permission in the category of New Use. The following is a short description of recommended land use zones.

Urban Residential Zone

Urban residential zone refers to all categories of urban residential areas, including exiting and proposed residential land. In total, this zone covers 869.63 (23.87%) acres of land delineated up to the year 2031, considering standard provided by LGED. Urban residential zone refers to all categories of urban residential areas, including exiting ones and the residential land use proposed under the present Master Plan. Potential area for high dense residential area near to urban core area (influences of close proximity to commercial hub, administrative, educational facilities, road way network, service facilities and flood free suitable land for development) and large portion area both side of Dhaka-Gopalganj via Bhanga area demarcated as such kind of use.

Rural Settlement

Bhanga Paurashava includes some rural characteristics. The Land use category supplied by LGED for identification of residential settlements in the agricultural belt is categorized as rural settlements. These settlements usually constructed with temporary building materials. Bhanga Paurashava is mostly rural in character. About 55% existing land is under agriculture practice and most of the settlement situated surrounding or within the agricultural land. In planning consideration, to save agriculture land according to the Agriculture Policy of Bangladesh, a portion of land declares as rural settlement. This settlement occupies 84.10 acres of land (2.31% of the total land). The areas of rural settlement have some restrictions for non-agricultural development. Annexure-B shows the permitted land use of rural settlement.

Commercial Zone

The commercial zone is intended to provide locations, where commercial activities including retail and wholesale can be set up and function without creating hazards to surrounding land uses. This zone comprises with an area of 20.74 acres (0.57%) designated up to 2031 and zone will allow commercial uses as listed in Annexure- B.

Mixed-Use Zone

Mixed-use zone is recommended to allow some flexibility in development. In a small urban area like Bhanga, as the trend shows, an exclusive commercial land use is unlikely to function. Admixture of land uses will allow flexibility of development, instead of restricting development. Total proposed area for mixed-use is 58.82 acres (1.61% of total area) including existing and proposed use. This zone will allow residential structures together with commercial uses as listed in Annexure-B.

Ward center will treat as the hub of local civic functions and it will provide the following facilities as per the requirements of the locality:

- Counselor office
- Community Center
- Community Clinic
- Post Box
- Small shops
- Club
- Office of Utility Services

Heavy Industrial Zone

Industrial/Manufacturing/Processing Zone intends to provide locations, where Orange B and Red categories (as per Environmental Conservation Rule, 1997) industrial, manufacturing and processing.

Due to the availability of gas facilities and well road connection by Dhaka-Gopalganj via Bhanga highway and availability of land creates scope industrial development in the Paurashava. Since there is no industrial agglomeration in the Paurashava, the industrial zone will mean for new industries. In this zone, a complex line of industrial and supporting non-industrial land uses will be permitted as per Annexure- B.

Government Services

Administrative zone covers all kinds of government and non-government offices. Permitted uses in this zone is presented in Annexure-B. Total area under this use has been estimated as 19.44 acres that include existing and proposed land uses. This land will be used for established Paurashava office and other administrative uses as prescribed in the plan.

Education and Research Zone

Education and Research zone refers to mainly education, health and other social service facilities as listed in Annexure-B. Total area under this use has been estimated as 58.65 acres. See Table 10.4.

Table 10. 4: Development Proposal

Facility	Ward No	Landuse	Mouza Name	Plot No	Area (acre)	Phasing
Proposed Dumping Site	Out of Paurashava	Utility	Atadi (076_00)	378-388	2.63	1st Phase
Proposed Waste Transfer Station 01	Ward No. 09	Utility	Sadardi (055_01)	1067	0.085	2 nd Phase
Proposed Waste Transfer Station 02	Ward No. 04	Utility	Hasamdia (037_01)	551	0.223	
				Total	2.93	
Proposed Park 01	Out of Paurashava	Open	Jhalkhali (073_00)	316-337,384-399	11.74	1st Phase
Proposed Park 02	Out of Paurashava	Open	Sadardi (055_03)	6085-6113	10.16	2nd Phase
Proposed Play Field	Ward No. 07	Open	Sadardi (055_03)	3535	0.17	1st Phase
Proposed Heritage Site	Ward No. 07	Open	Sadardi (055_03)	3602	4.43	3rd Phase
Proposed Stadium	Ward No. 07	Open	Sadardi (055_02)	2708-17,2805-21	6.8	2nd Phase
Proposed Tourism Spot	Ward No. 06	Open	Chhilar Char (075_01)	190-203,222-225	4.46	1st Phase
				Total	41.7	
Proposed Micro Bus	Ward No. 04	Transportation	Hasamdia	128	0.31	1st Phase

Facility	Ward No	Landuse	Mouza Name	Plot No	Area (acre)	Phasing
Terminal			(037_01)			
Proposed Bus Terminal	Ward No. 04	Transportation	Hasamdia (037_02)	3186, 3189-203, 3215	2.86	3rd Phase
Proposed Truck Terminal	Ward No. 04	Transportation	Hasamdia (037_02)	3675	1.78	2nd Phase
Proposed Auto Stand	Ward No. 04	Transportation	Hasamdia (037_01)	8183	0.25	2nd Phase
				Total	5.2	
Proposed Commercial Area	Out of Paurashava	Commercial	Maligram (106_02)	2134-2161	9.33	2nd Phase
Proposed Food Godown	Ward No. 04	Commercial	Hasamdia (037_02)	3173-75,3178	1.37	3rd Phase
				Total	11.7	
Proposed Govt. Quater	Ward No. 09	Residential	Sadardi (055_01)	1689-1705,1759-1787,1817-1824	15.64	3rd Phase
Proposed Housing Estate	Out of Paurashava	Residential	Hasamdia (037_01)	20-24,33-41, 67-70,267-276	11.29	3rd Phase
				Total	26.93	
Proposed Community Center	Ward No. 02	Community Facility	Hasamdia (037_01)	367	0.14	2nd Phase
Proposed Eidgha	Ward No. 09	Community Facility	Sadardi (055_01)	410,411,430	0.12	1st Phase
Proposed Graveyard	Out of Paurashava	Community Facility	Atadi (076_00)	579-608	2.70	1st Phase
Proposed Ward Center 02	Ward No. 02	Community Facility	Noapara (028_02)	2988, 2991	1.80	3rd Phase
Proposed Ward Center 01	Ward No. 01	Community Facility	Hoglakandi (033_00)	793-94	0.84	1st Phase
Proposed Ward Center 03	Ward No. 03	Community Facility	Chandidasdi (038_04)	3621-3624	0.29	2nd Phase
Proposed Ward Center 05	Ward No. 05	Community Facility	Atadi (076_00)	532	0.83	3rd Phase
Proposed Ward Center 06	Ward No. 06	Community Facility	Chhilar Char (075_02)	378,380	0.62	1st Phase
Proposed Ward Center 07	Ward No. 07	Community Facility	Sadardi (055_03)	3514-3515	0.64	3rd Phase
Proposed Ward Center 09	Ward No. 09	Community Facility	Sadardi (055_01)	1734-36	0.92	1st Phase
				Total	8.9	
Proposed Primary School 01	Ward No. 05	Educaton	Hasamdia (037_02)	4440-42	0.88	3rd Phase
Proposed Primary School 04	Out of Paurashava	Educaton	Atadi (076_00)	280	0.32	3rd Phase
Proposed Primary School 02	Ward No. 08	Educaton	Chhilar Char (075_01)	3799-3801, 3804-05	0.55	1st Phase
Proposed High School 02	Ward No. 07	Educaton	Sadardi (055_03)	689-91,709-10	3.24	3rd Phase
Proposed Primary School 03	Ward No. 03	Educaton	Chandidasdi (038_03)	5418,5743,5749	1.05	1st Phase
Proposed High School	Ward No. 02	Educaton	Noapara (028_03)	7543-7551, 7810,7812	4.29	2nd Phase
Proposed College 01	Ward No. 02	Educaton	Noapara (028_03)	7649-56	3.50	1st Phase
Proposed College 02	Ward No. 05	Educaton	Atadi (076_00)	3245-46,3505-09, 15202,15204	3.18	2nd Phase
Proposed Women College	Ward No. 08	Educaton	Sadardi (055_01)	3143-51, 3152-58	2.06	1st Phase
Proposed University	Ward No. 01	Educaton	Nurpur (036_00)	5626-49,5887-99	15.47	3rd Phase
Vocational Training Institute	Ward No. 02	Educaton	Nurpur (036_00)	6296-300, 6335-37,6342-44, 6541-6551	7.24	3rd Phase
				Total	41.78	
Proposed Hospital	Ward No. 02	Health	Noapara (028_03)	7627-7640	3.50	3rd Phase
				Total	3.50	
Proposed Jail Khana	Ward No. 04	Restricted	Hasamdia (037_01)	6066-67,6268-71, 6283-84	4.71	1st Phase
				Total	4.7	
				Gross Total	147.60	

Map 10.2: Landuse Plan of Bhanga Paurashava

Map 10.3: Development Proposal

Agricultural Zone

The Paurashava has a vast area of agricultural land that demands formation of a separate zone like agriculture. Agriculture zone primarily mean for agriculture and agriculture-related functions. Detail land uses is presented in the Annexure-B. Total area under this use has been estimated as 1828.73 acres that include existing and proposed uses.

Water Body and Retention Area

Total 191.12 acres water body (5.25% of total land) is in the Paurashava whose area more than 0.25 acre. The proposed water body will be preserved under "Playfield, Open space, Park and Natural water reservoir Conservation Act 2000". The plan suggests preserving most of those water bodies for two purposes, first, to serve as source of water, second, to serve as water retention area during monsoon. The ponds with an area equal to or more than 0.25 acres will be preserved as the water retention ponds. There will be permitted uses in this zone as stated in Annexure-B.

Open Space

This zone has been provided to meet the active and passive recreational facility needs of the people and at the same time, conserve the natural resources. Total area estimated for this zone is 103.7 acres (4.01%). Details of permitted and conditional permits have been presented in Annexure-B.

Recreational Facilities

This zone has been provided to meet the active and passive recreational needs of the people. Details of permitted and conditional permits have been presented in Annexure-B. Cinema hall, auditorium, gymnasium, etc. is being considered as recreational facilities.

Circulation Network

The road network is considered as circulation network. National highway, regional highway, local road whether pucca/semi-pucca/katcha, footpath, flyover, over-bridge, underpass, bridge, culvert, etc. are being included in circulation network. In total, 252.87 acres land covers (6.93% of total planning area) as circulation network. Details are given in Chapter 11, Part B of this report. At present, 70.30 acres land is under circulation network.

Transportation Facilities

Transportation facilities incorporate transport and communication services. For an example airport, bus terminal/stand, ferry ghat, filling station, garage, launch terminal, passenger shed, ticket counter, transport office, etc. In total, 5.50 acres land (0.15% of the planning area) is being proposed for this purpose. See Table 10.4.

Utility Services

It incorporated all utilities and service facilities except health services. Utility services include water treatment plant, water reservoir, water pump house, public toilet, fire service, waste disposal centre, sewerage facilities including office, electricity supply including office or control room and over head water tank. In survey stage this type of landuse was defined as service activity. In total, 4.44 acres land (0.1% of the planning area) including existing is being proposed for utility services.

Health Services

This land will be used to provide health facilities. In total, 9.91 acres land (0.27% of the planning area) is being proposed for this purpose. A community based health centre will be provided at Ward Councillor's Office. Ward Councillor's Office is under in mixed-use category in land use plan proposal. See Table 10.4.

Community Facilities

Community services include community centre, club house, fire service, civic centre, family planning facilities, religious centres, etc. In additionally all funeral places and other religious uses incorporated in this category. In total, 19.01 acres land (0.52% of the planning area) will be used for this purpose. See Table 10.4.

Overlay Zone

The overlay land uses refer to those uses that are not compatible to the surrounding land uses but, anyhow, they need to stay there and therefore will not be removed. Those uses are only identified as sites, not zones. They have local, regional or national importance, though they do not conform to surrounding land uses. No other use except the use of overlay site will be permitted in this zone. There is no scope for permitting or conditionally permitting the functions or uses as the zone itself is an overlay. Present and proposed use of the zone will continue until the next zoning regulation is imposed on those specific parcels of land.

A variety of overlay zones are in the Paurashava. Some of the important types of overlay sites are listed below including the purpose of retaining them.

Urban Deferred

The Urban Deferred refers to lands lying outside the urban growth area and identified as Urban Reserve. Following are permitted uses within the Urban Reserve Zone:

- Agriculture, Livestock based
- Agriculture, Vegetation based (mushroom farms shall not be permitted)
- Existing facilities up to the date of gazette notification of the Master Plan. Condition is that, no further extension will be permitted.

10.4 Plan Implementation Strategy

10.4.1 Land Development Regulations to Implement the Landuse Plan

Effective implementation of a plan is the most important part of the planning process. The process of Implementation needs to be carried out with care and efficiency in order to produce best outcomes. This chapter highlights various measures needed to be taken in order to implement the landuse plan proposals.

Implementation of the Landuse Plan depends on successful pursuit of the policies specified in the Structure Plan. Those policies represent a significant challenge face with the responsibility of planning and managing the development of the Paurashava area. However, at present no authority is responsible for planning and managing physical development activities in the Paurashava and no regulation except Local Government (Paurashava) Act, 2009 for controlling physical development. This poses a serious constraint to the implementation of the Landuse Plan and in fact any other form of development plans.

The factors that have been taken into account in deciding the priority include such things as – the importance of the issue that the policy addresses, its potential impact on the lives of the population, the ease with which it can be implemented, its urgency and its interdependence with other policies.

Prior to introduction of the regulations to implement the landuse plan, legislative involvement is recommended here.

1. Impose control on all type of buildings in the Paurashava according to the setback rule prescribed in the Building Construction (Amendment) Rules, 1996 (Notification No. S. R. O. No. 112-L/96). Building permission for extended areas shall be according to the landuse provision prescribed in the plan. Any permission for building construction, front road width shall not be less than 16 ft. and the construction must follow the Building Construction (Amendment) Rules, 1996.
2. To control the air, water, noise and soil pollution, Conservation of Environment and Pollution Control Act, 1995 (Act No. I of 1995) was enacted. In the Paurashava, there is no authority for enforcing the provisions prescribed in the said Act. The pollution related with the implementation of landuse component may be controlled with this Act.
3. Haphazard development of commercial activities is the general scenario of the Paurashava. It is necessary to impose control on commercial activities provisioned in the Shops and Establishments Act, 1965 (Act No. VII of 1965).
4. In case of man-made canal, regulations prescribed in the Canal and Drainage Act, 1873 (Act No. VIII of 1873) is the best weapon. For the linking of canal with others and river considering drainage facilities the Act may be enforced.
5. For the conservation of archeological monuments or structures or historical development the Ancient Monuments Preservation Act, 1904 (Act No. VII of 1904) may be enforced. Archeological Department of Bangladesh and Paurashava authority through a partnership process may preserve such type of development.
6. To control air pollution due to brick burning with the establishment of brick field, Brick Burning Control Ordinance, 1989 (Ordinance No. VIII of 1989) is the appropriate regulation. The Paurashava authority may enforce this Ordinance with the authorization given by the government to him.
7. To control the medical practitioner, establishment of private clinics and pathological laboratories, the statute named Medical Practice, Private Clinics and Laboratories (Regulation) Ordinance, 1982 (Ordinance No. IV of 1982) was enacted. For efficient enforcement of the Ordinance, the Paurashava authority may execute the Ordinance with the authorization of government.
8. The Paurashava will have to exercise strictly Playfield, Open space, Garden and Natural Tank in Urban Areas Preservation Act, 2000 (Act No. XXXVI of 2000) to some specially important areas like, riverfront and water bodies, drainage channels, low land below certain level, designated open space, etc. Development restrictions are needed around security and key point installations. The provision of restriction will strengthen the power of the plan to safeguard its development proposals and landuse provisions.
9. The government is authorized for establishment of hat and bazar with the acquisition of land through the statute named Hat and Bazar (Establishment and Acquisition) Ordinance, 1959 (No. XIX of 1959). In case of private hat and bazar, a management body is being empowered through the Bangladesh Hats and Bazars (Management) Order, 1973 (P.O. 73/72). The Paurashava authority is also empowered establishing hat and bazar in his jurisdiction through the Local Government (Paurashava) Act, 2009. Coordination may be framed among the government (Upazila Parishad), Paurashava and private owner for the establishment, development and management of the hat and bazar located in the Paurashava premises.

10. In the Paurashava premises, industrial development is controlled by the Bangladesh Cottage Industries Corporation through Bangladesh Cottage Industries Corporation Act, 1973 (Act No. XXVIII of 1973), Industrial Development Corporation through East Pakistan Industrial Development Corporation Rules, 1965 (No. EPIDC / 2A-2/63/354) and Factory Inspector through Factories Act, 1965 (Act No. IV of 1965). Locational aspects and issuing of trade license is controlled by the Paurashava authority. A joint coordination cell among those four authorities may control the establishment of factories and industries in the Paurashava.
11. In the Paurashava, for rain water harvesting, some specific ponds / tanks will needed to be preserved. A number of derelict tanks may be improved through tank improvement project and in this case Tanks Improvement Act, 1939 (Act No. XV of 1939) will support the Paurashava is regulatory aspects.
12. Except Khas land, a considerable amount of public land in the Paurashava may be identified as fallow land or unproductive land. In regulatory term those lands are considered as culturable waste land and those lands are being fallow during five consecutive years. Those lands may be utilized under the guidance of Culturable Waste Land (Utilization) Ordinance, 1959 (Ordinance No. E.P. XIII of 1959).
13. The Paurashava should raise its efforts on the imposition and realization of betterment fees to raise its income. In this case, East Bengal Betterment Fees Act, 1953 may be enforced.

10.4.2 Implementation, Monitoring and Evaluation of the Landuse Plan

Implementation through Multi-Sectoral Investment Programme: Major infrastructure development works such as primary roads, water supply, drainage, etc., will largely be controlled by Government. Public works requires efficient co-ordination through the Multi-Sectoral Investment Programme (MSIP).

Objective of a Multi-Sectoral Investment Programme (MSIP) will match a list of the development projects with the funding stream necessary to implement them. There are two basic activities that would determine the contents of MSIP. One activity would be to prioritize and schedule the investment projects of all public agencies so they will collectively help to achieve the development goals and objectives of the Landuse Plan. Second activity would be to analyze the source and availability of fund for the prioritized list of development projects.

Implementation through Action Plans and Projects: Action Plans and Projects will be the implementation plans to solve problems at the local level. Action plans will take a direct approach toward plan implementation with a minimum of research, reports or elaborate planning methods. These projects will be easily identifiable and will require minimum resource.

Implementation through Development Control: Landuse zoning is one of several methods of plan implementation to be considered. In all cases where some form of development, landuse control may be applied; careful consideration requires the following ideologies:

- the purpose to be achieved by the development controls;
- where controls should be applied;
- what aspect of development needs to be controlled;
- what type of development controls are required;

- what degree or level of development control is required;
- who will be affected by the required control;
- who will be affected by the controls and in what manner;
- when the controls should be applied;
- what will be the likely impact of the controls;
- how and by whom will the controls be administered and enforced.

Development control as an instrument of plan implementation may be selectively applied within the Landuse Plan. Development controls would also be varied in intensity and detail to suit the particular circumstances. It is important that they should be clear and easily understood by all parties concerned. Since the entire Paurashava Master Plan 'package' has become statutory, development controls associated with its component plans would also be statutory.

Implementation by Facilitating Private Investment: Another approach that would be taken by government toward plan implementation will be to guide and facilitate investments made by the private sector. Government can achieve this with relative ease and at very low cost by setting up a legal and operational framework, coupled with suitable incentives, to facilitate land consolidation, plot boundary readjustment, efficient layout of plots and provision of local infrastructure by the private sector. The benefits of this approach would be:

- increased efficiency of the urban land market would make more private land available to urban households;
- would pass much of the development costs for local infrastructure to the private sector and land market mechanisms;
- would increase in land for development without large cash outlays by government to purchase land for development schemes; and
- would keep provision of land for community facilities virtually no cost to government.

Plan Monitoring

The Landuse Plan would simply be tools for guiding and encouraging the growth and development of the Paurashava in a preferred manner. In a rapidly changing urban environment, the Landuse Plan would require to keep up to date. If this is not done, within a few years it will be obsolete. Therefore, it is imperative that the requirement for regular updating of the Landuse Plan be made a legal requirement.

For implementation of the various programme components of the Landuse Plan appropriate administrative measures will have to be undertaken. This will essentially include project preparation and monitoring of their execution and evaluation. For carrying out all these activities appropriate institutional measures are also needed.

Evaluation

Monitoring and evaluation of ongoing and implemented projects is essential to keep the future course of action on the right track. An ongoing project should be regularly monitored and handicaps identified to enable taking appropriate measures at the right time.

Post implementation evaluation is also needed to take appropriate measures correcting past errors-from project preparation to implementation.

The top level supervision has to be done by a high level supervisory committee headed by Paurashava Mayor, LGED representative and Local Government Ministry. Other members of the committee will be local Ward Councilors, local community leader/social workers and the Town Planner of the Paurashava. The committee will supervise implementation works regularly and issue necessary instructions to expedite the works of implementation.

Co-ordination

A Planning Section of Paurashava should have close interaction with the citizen of Paurashava at large in order to make people aware of the benefits of a good plan and, therefore, their social responsibility to promote plan implementation in one hand and also resist contraventions on the other. A specific interactive cell is recommended to operate in this regard with following responsibilities:

- Provide pre-application advice to residents, consultants and developers about landuse management issues and application procedures for the submission of development applications.
- Enforce planning and landuse management related legislation and zoning scheme regulations.
- Issue of property zoning certificates.
- Investigate and resolve landuse management complaints, illegal landuse and prosecuting contraventions.

Such interactive windows may be opened in various convenient locations to ensure ease of the answers to commonly asked questions may be shown in the internet. Besides, those may be shown in the print and electronic media time to time.

In spontaneous areas, while all out people's co-operation is needed for project implementation; there will also be some elements of negotiation. Negotiation will be particularly needed in case of road widening projects. It will be a crucial task for Paurashava to convince the affected people to give up their land for road use. Efforts should be made to convince the land owners on the ground of enhancement of property value due to road widening. In case people refuse to offer land free of cost necessary arrangements may have to be made for payment of compensation. This process of negotiation will be very critical, cumbersome and time consuming, and therefore, has to be handled with utmost care and patience. The best results can be accrued only by winning people's confidence. In case the authority fails to get peoples co-operation they should exercise power of compulsory acquisition of land. Attempts may be made to engage NGOs / CBOs to work as catalysts in negotiation.

CHAPTER 11

TRANSPORTATION AND TRAFFIC MANAGEMENT PLAN

11.1 Introduction

Transportation system directs the urban development pattern. Performance of the transportation system largely influences the economy and social progress of an area. It provides mobility of people, goods and services to their destination. It has linkages with other sections of development and for a sustainable development of any area, its traffic and transportation system should be adequately addressed. This chapter of the report is on Transportation and Traffic Management Plan covering scope of improvement of the existing network and system and plan proposals for new development, the proposals on improvement and new development are made for the planning area up to 2031. The report also provides the purpose and the rule of Transportation and Traffic Management Plan and its relation with Structure Plan and Land Use Plan.

11.2 Approach and Methodology

In order to identify the major causes of the congestion and the nature of the problem on transportation networks, a number of tasks were undertaken. Those tasks included traffic volume counting at both directions, speed and delay studies, Origin - Destination (O-D) survey at major traffic generating intersections and consultation with the stakeholders regarding the generated problems. The volume and movement pattern of people and goods within the planning area were collected through a series of volume survey and O-D survey.

In addition to collect information on volume and pattern of traffic movement by traffic survey, the Consultant accommodates certain important questions regarding people's attitude and preferences.

Five intersections are situated in the center of Bhanga Paurashava have been selected for traffic count survey. These locations can be considered as the key locations of Bhanga Paurashava. Those intersections are Paurashava Mor, Court road Mor, Bus stand Mor, Eidgah Mor and Helipad Mor.

11.2 Existing Conditions of Transportation Facilities

This section describes existing transportation facilities namely roadway characteristics, modal share of vehicular traffic, level of service which incorporate degree of traffic congestion and delay analysis and existing deficiencies in transport sector of Bhanga Paurashava.

11.2.1 Roadway Characteristics and Functional Classification

The Planning area covers 10.37 sq. km. (2560.9 acres) and road length is 67.2 km. Two National Highways runs through the Paurashava and links a number of Connector Roads and Access Roads. National Highways are the major arterial road of the study area. It provides connection with Bhanga Paurashava to the south Bengal and Dhaka. There are five important road intersections named Paurashava Mor, Court Road Mor, Bus Stand Mor, Eidgah Mor and Helipad Mor providing linkages with other access roads. Those access roads are Highway to Nurpur, Court Road to Highway, Highway to Siladhar Char, Eidgah Mor to Highway and Highway to Roypara.

The roads of the Paurashava belonging to number of agencies named Roads and Highways Department (RHD) responsible for National Highways, Local Government Engineering Department (LGED) responsible for construction and maintenance of Upazila and Union roads and Bhanga Paurashava responsible for construction and maintenance of roads within the Paurashava area.

The road network provides access to various places within the study area and connects various parts of the country following bus routes. Major trips of vehicles are generated from, within the Paurashava, Bhanga Bazar, Bhanga Bridge, Court, Kapuria Sadardi, Bhanga, Nurpur, Roypara, Siladhar Char, Faridpur, Madaripur, Kawrakandi Ferry Ghat and Dhaka. All inter district vehicles towards and from south Bengal runs through the two National Highways, one from Dhaka to Khulna via Maowa and another from Dhaka to Barisal via Goalanda Ferry Ghat.

Table 11.1: Road network of the Bhanga Paurashava

Type	Length		Area	
	KM	%	Acres	%
Pucca	28.5	42.4	42.5	66.4
Semi-pucca	13.6	20.2	11.5	18.0
Katcha	25.1	37.4	17.2	15.6
Total	67.2	100.0	71.1	100.0

Source: Topographic Survey, 2009.

Motorized and non-motorized vehicles are operated in all the nodes of the study area. The non-motorized vehicles are mainly operated within short distance and meet the local needs. The motorized vehicles are mostly intercity passenger buses and trucks, mainly carry agro product from the Bhanga Bazar towards Dhaka. Locally modified motorized transport vehicle named *Nosimon* also uses for short distance passenger and goods transportation.

11.2.2 Mode of Transport

Road is the only mode of transport in the Paurashava. The road is using for efficient movement and multi-dimensional purposes. As a result, transportation survey includes only the road transportation and the outcome of the survey is presented in the following paragraphs.

11.2.3 Intensity of Traffic Volume

Traffic volume studies are conducted to determine the number, movements and classifications of roadway vehicles at a given location. These data help to identify critical flow time periods and determine the influence of large vehicles on vehicular traffic flow, or document traffic volume trends. Traffic volume survey shows that average traffic movement through the intersections per hour is 392 at hat day and 210 at non-hat day. Among the total traffic, 48% MV and 52% NMV both in hat day and non-hat day.

11.2.4 Level of Service: Degree of Traffic Congestion and Delay

11.2.4.1 Traffic Congestion

Traffic conflict is common and frequent in the planning area, where there is combination of transport vehicles-slow and fast-on the streets. Major conflict and congestions occur in the places, where intensity of traffic movement is high, on street parking is made and on street loading or unloading of goods are taken place. The consultant surveyed the traffic movement all over the Paurashava and has identified three main points, where the traffic congestion is the highest. Those areas are bus stand intersection, Paurashava intersection

and bazar intersection. At these points, the slow moving vehicles like, rickshaws and vans come in conflict with motorized vehicles, creating traffic congestion, as the number of slow moving vehicles is higher and the conflicts are usually frequent.

11.2.4.2 Delay

The traffic delays in Bhanga Paurashava is caused by the interaction of various factors, such as congestion, inadequacy of carriageway widths, mixed traffic conditions, parked vehicles and heavy pedestrian flow and such delays are called congestion delays or operational delays are difficult to measure precisely. It is observed that peak hour period takes on an average 6%-10% excess time than off-peak hour period due to congestion, narrow road and improper design of intersections.

11.2.5 Facilities for Pedestrians

During field survey, it was observed that people move in both directions, going in and out of the both sides of the roads. It is noted that the planning area is without any footpath for pedestrian movement. Pedestrian movements take place mostly on carriageway and right of way of the roads.

11.2.6 Analysis of Existing Deficiencies

11.2.6.1 Roadway Capacity Deficiencies

As like other small towns in Bangladesh, Bhanga has also its own road and transportation deficiencies. The physical feature survey and traffic survey of major intersections revealed that none of roads and transportation facilities is properly designed. Traffic level is far behind the actual capacity of the intersections. Congestion is created by large number of slow moving vehicles waiting for passengers at the intersections.

Narrow Road Width

Narrow width of roads and poor maintenance of roads has been mentioned by most respondents as the major road problems in the Paurashava. About 57% of the respondents have pointed out the misery of road movement during monsoon when unpaved roads get muddy. Narrow width of roads is likely to become a major problem of traffic movement when the Paurashava will expand and density of population will increase in future with consequent increase of road traffic. The field survey shows, 90% of the households reported that the road widths in front of their houses are 8 ft. or less. This is alarming as this condition will become a source of traffic problem, when road traffic will increase. At present, no traffic problem regarding road width is in the Paurashava. Specific example on road width for creating traffic problem is presented below:

Primary Road (National Road): The Dhaka – Barisal Highway via Paturia Ferry Ghat and Dhaka - Khulna Highway via Maowa Ferry Ghat is known as primary road, length is 4.4 km. and 3.4 km. respectively. Width of those two roads is 22 meter and 24.7 meter respectively. Road standard (ROW) recommends in the Table-11.3 is 100 feet to 150 feet, proves that the standard (ROW) of the existing primary road in the Paurashava is lower than the standard (ROW) recommended. Moreover, in hat day and non-hat day, highest volume of traffic flows on the primary road and it is about 392 to 210 PCU/hour. No deficiencies regarding the capacity of the primary road exits.

Local Road: In the Paurashava, 14 local roads have been identified and they are Bishkhali Road, Bridge Road, College Road, Dc Kazi Abu Road, Dakbanglow Road, Futi Bari Char

kandi Road, Godown Road, Kharkandi Gram bot tala Road, Madrasha Road, Mattabor Bari Road, Munshi Bari Road, Talukder Bari Road, Upazila Road and Women College Road.

Tortuous Road and Missing Link

A major characteristic of spontaneously developed roads is that they are tortuous in their shapes. This is because land owners allow roads to follow the alignment of the edges of the tortuous plot boundaries. Another problem of community initiated roads is that they are not in a well linked network. Sometimes links to nearby roads are missing. This causes people to travel comparatively longer distances to reach a nearby destination. In the Paurashava, though, such type of problems is not in scenarios but with the increase of physical growth this type of problem will specific.

11.2.6.2 Operational, Safety, Signal and Other Deficiencies

- Traffic management system is absent in the Paurashava. No operational system yet being imposed on traffic movement.
- Due to the minimum PCU/hr. both in hat and non-hat day, availability of non-motorized vehicles and absent of available built-up area, road safety exists naturally in the Paurashava.
- Traffic signaling system is totally absent in the Paurashava. Generally, traffic signaling system will not be needed up to the limit of the planning period. On some specific point of primary and secondary roads, traffic signaling will be needed.

11.2.7 Condition of Other Mode of Transport (Rail/Water/Air)

No railway, water way and air way faculties in the Paurashava.

11.3 Future Projections

This section presents future projection on transportation requirement of Bhanga Paurashava up to the year 2031. The chapter also provides information on transport network and future traffic volume and level of service.

11.3.1 Travel Demand Forecasting for Next 20 Years

Existing road network is quite enough for accommodating present volume of traffic. The study area is rural in nature. Most of the roads are katcha and needs to be constructed as pucca or at least semi-pucca.

Map 11.1: Existing Roads of Bhanga Paurashava

Katcha roads become clayey in the rainy season and bring immense sufferings for the users. As a result, social, cultural and economic activities are disrupted significantly at that time. A very limited uses of small boats are found for transportation of goods within the short distance particularly on hat day. Due to the absence of effective alternatives, passengers and goods movement of the planning area is largely dependent on road transportation. This dependency will be calculated according to the increase of accessibility, consideration of the missing links, volume of traffic movement, bulk density of the area and economic importance of the area. Growth direction is also a considerable component for the demand analysis of the road.

Present population of the Paurashava is 34150 (2011) and after 20 years it will be 50593(2031). Highest PCU/hr. at hat day is 392 and non-hat day is 210. The scenario proves that traffic congestion is not alarming. At the sametime, highest road width at present is 28 meter (ROW) and it will be saturated with the traffic if the PCU/hr. increases above 1000.

It is expected that gradual implementation of the components prescribed in the Master Plan will increase traffic volume. The Mausoleum of the father of nation at Bhanga Paurashava will generate a large portion of this volume because, all vehicles from north, east and western part of the country will flow on the Bhanga Paurashava as the gateway of south Bengal. But, those traffics are temporary and will not follow hat or non-hat day. This may be sudden-traffic.

About 31% people's income of the Paurashava is between Tk. 6000 to Tk. 9000. On the other hand, 45% are involved with small business and 39% with agriculture. Housing condition is 14% semi-pucca and 80% katcha structures. The scenario proves that the Paurashava dwellers have no capability to increase traffic volume provisioning motorized vehicles. They will increase non-motorized vehicles and Nosimon.

After construction of road cum embankment, a large amount of single-crop land will turn into double-crop land. As a result, agro-product will be increased. With the increase of agriculture production, non-motorized vehicles will be increased for marketing those agro-products.

After construction of railway station (provisioning with the Padma Bridge), motorized and non-motorized vehicles and volume of traffic will be increased. If railway station established near to the Bhanga Paurashava, a number of motorized and non-motorized vehicles will be generated and increases traffic volume.

With the expansion of administrative services, motorized public vehicles will be increased and at the sametime, traffic volume also.

At present, about 98% traffic is under the private sector and 70% of them are enjoying by the non-motorized vehicles. It is expecting that the scenario remain stable till next 20 years.

Table 11.2: Geometric Design Standards of Roads Proposed by LGED

Class of Roads	Standards recommended
Primary roads	150-100 ft.
Secondary roads	100-60 ft.
Local roads	40-20 ft.

Source: UTIDP, LGED, 2010.

11.3.2 Transportation Network Considered

The physical feature survey has identified a number of problems constraining the development of the Paurashava, such as:

- Lack of a hierarchy of roads within the Paurashava with many of the roads unable to fulfill their intended functions adequately;
- Scarcity of reserves of land for future roads; and
- A tradition of encroachment in those areas where road reserves have been made.

To establish a rational hierarchy of roads in the Paurashava, it will be needed to use development control to ensure that reserves of land, once established are maintained.

In the Transportation Plan, north, south, east and west direction links with the Paurashava have been considered. To maintain an effective linkage, the plan proposes one primary road and others are secondary and tertiary roads.

11.4 Transportation Development Plan

11.4.1 Plan for Road Network Development

The standards are meant for use by UTIDP, LGED and other planning and development agencies. The standards have been adopted by the consultants to draw up the transportation development plan. Following are the suggested planning standards (Table 11.3) for road network development. These road hierarchies are proposed based on the functional linkage of the road of Bhanga Paurashava.

Table 11-3: Proposal for Road Standard in the Project area

Class of Roads	Standards recommended
Paurashava Primary roads	Row 60 ft. above
Paurashava Secondary roads	Row 40 ft.
Tertiary Road	Row 30 ft.
Local roads/ Access Road	Row 20 ft.

Source: Consultant

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 :

- Primary Roads
- Secondary Roads
- Tertiary Roads
- Access Roads

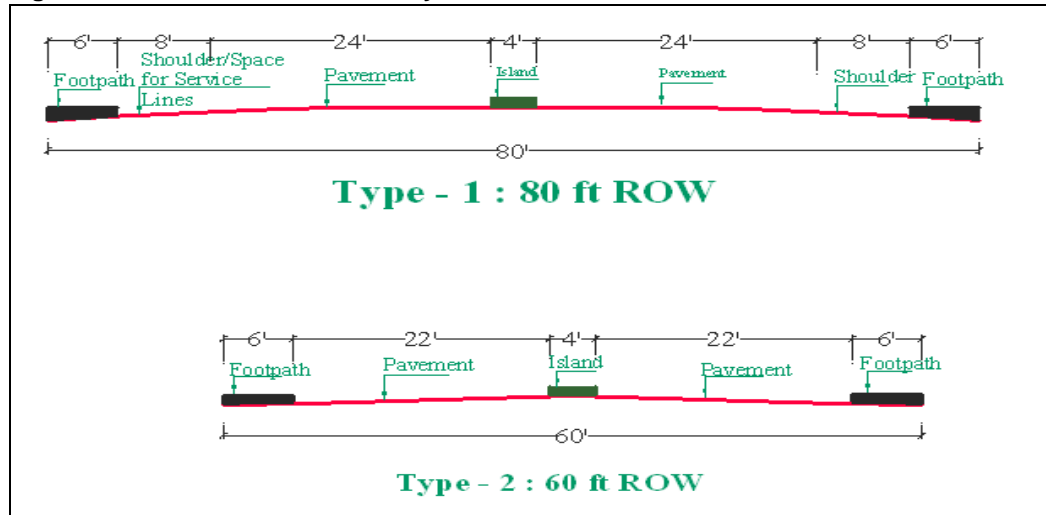
To provide further clarity about the quality of the various roads the following details are provided:

Primary Road: 60ft above

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-11.1)

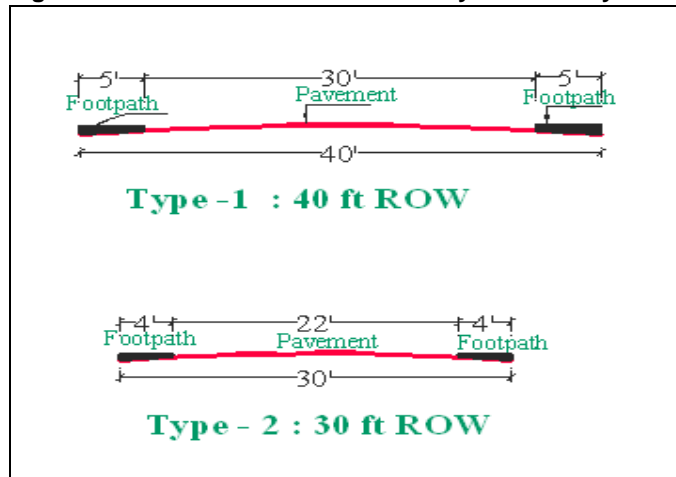
Figure 11.1: Cross-section of Primary Road



Secondary Road: 40ft

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-11.2)

Figure 11.2: Cross Section of Secondary and Tertiary Road



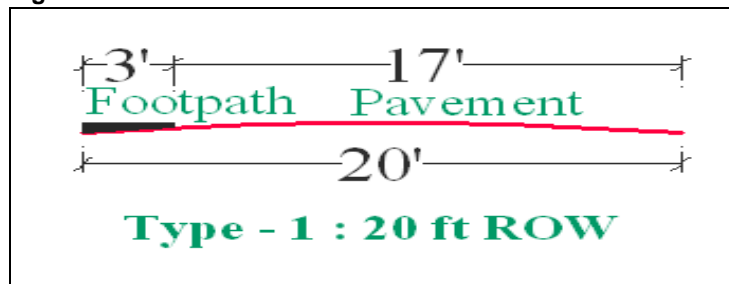
Tertiary Road: 30ft

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) See Fig-11.2.

Access Road: 20ft

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) See Fig-11.3.

Figure 11. 3: Cross Section of Local/Access Road



Functions of Road

Each category of road has its particular function to perform. Access road carries traffic from buildings to the collector road and collector road carries traffic to the major road and vice versa. In reality, however, it is almost impossible to maintain this hierarchical use of roads except in an entirely planned area. However, functions will not be dependent on the road width, rather on the location of the road, surrounding land use and the link it is providing or the volume of traffic it is carrying. Thus a 40 feet wide secondary road can become a major road due to its strategic location and the purpose it is serving.

Northern Link Road

The Northern Link Road will connect the Bhanga to Faridpur Highway and Bhanga to Khulna Highway between the Ward No. 2 and 1. An important intersection among the local road and Bhanga to Faridpur Highway is found in the Paurashava. This intersection may be the focal point of the Northern Link Road and another point may be the western boundary line of the Bhanga to Khulna Highway. All local roads in northwestern side will connect this link road. Two local roads in the Ward No. 1 may be proposed to connect the Bhanga to Khulna Highway. The proposed Northern Link Road will serve both Paurashava and regional traffic and will reduce traffic congestion on the inter district road. It will help in distributing traffic around the Bhanga Bus Stand area and thereby reduce traffic congestion. The missing links of this link road naturally deserve priority in terms of resource allocation and emphasis on their early implementation.

Southern Link Road

This link road will connect the Bhanga to Maowa Highway and Bhanga to Barisal Highway through the Ward No. 6 and 9. Vehicles from Barisal region to Dhaka through Maowa may use this link road. This will be the shortest distance to reach Dhaka from Barisal.

The other road links which deserve priority attention and could contribute a lot in reducing pressure on the inner roads of Paurashava are as follows:

- A link road linking the Bhanga to Maowa Highway in Ward No. 8 with the Bhanga to Barisal Highway parallel to the southern link road in Ward No. 8. This link road will increase accessibility of all internal roads in the southern part of Bhanga Paurashava.
2. Widening and improvement of local road from Bhanga to Barisal Highway between Ward No. 9.
3. Widening and improvement of local road from northern link road up to Paurashava Office between Ward No. 2.

4. Widening and improvement of link road from inter-district road up to link roads within Ward No. 1, 2, 9, 8 and 5.
5. More 4 bridges will be needed on the Kumar River in different locations.

An initiative should be taken to develop an effective and efficient arterial road network, which could provide a gridiron system with lots of alternative links for movement in different directions.

11.4.2 Proposal for Improvement of the Existing Road Networks

Use of road reserve is the initial stage for improvement of existing **primary road**. The maximum recommended reserve width for a primary road that will be adopted and maintained is 48 meters; with an initial basis the extremities of the reserve being 24 meters on either side of the road centre line. This may vary, especially on existing roads, due to localized circumstances.

Alternative cross-sections for the primary road is –

- a primary road with no collector roads (22 meters);
- a primary road with a collector road on one side only (32 or 35 meter);
- a primary road with collector roads on both sides (42, 45 or 48 meters).

Regardless of which option is required, initially the full 48 meter reserve will be applied, although not necessarily purchased in the first instance, until such time as more detailed site investigations have been undertaken.

For new road, the 48 meter reserve will be adopted in the short-term to prevent development encroaching in to it before construction of the road.

Within the established reserve, no further non-road related development will be permitted, with the exception of utility networks. The utilities should not fall under the main carriageways due to the disruption to traffic flows when the system requires repair or maintenance. Localized drainage channels should, where possible, also fall within the road reserve, preferably under the footpath or hard shoulder to reduce land requirements. If, however, this is not possible an additional reserve to cover the drainage channel will be required, increasing the overall width of the reserve.

Permanent structures that currently fall within the reserve should be permitted to remain until such time as they are redeveloped. Redevelopment of existing properties should fall wholly outside the reserve. Temporary structures should not be permitted even on a short-term basis. Existing structures should be removed as and when feasible.

For new roads, where reserves have been identified but implementation is unlikely to commence for a number of years, agricultural use of the land within the reserve should be permitted until such time as the land is required for construction. No structures, of whatever materials, will be permitted within the road reserve.

No direct access should be allowed onto the main carriageways (of primary road). Access should be gained only at controlled junctions—roundabouts or traffic-lights. The number of junctions or intersections should be minimized with desired spacing being not less than 500 meters.

Primary road with secondary roads should be provided in areas where there is considerable roadside development. These should generally be two-way service roads and will be used by non-motorized vehicles like rickshaw, van, pushcart and bullock carts including pedestrians. Controlled parking will be permitted where necessary.

Where secondary roads will not be required either immediately or in the long-term, the full reserve should be maintained (for utilities, etc.) unless there is clear reason why these reserves should be decreased.

Functions of the **secondary roads** is to act as –

- Links between the Paurashava and primary roads;
- Links between various important nodes of activity within the Paurashava.

The secondary roads are also intended to be high capacity routes, although their design speed will be significantly less than primary roads due to their being a far higher percentage local, inter-Paurashava traffic movements rather than intra-Paurashava. On many occasions within the Paurashava, existing routes will require the provision of tertiary roads to provide access to shop frontages and on-street parking for those shops. The tertiary roads also serve to collect traffic which currently enters at random from side streets.

The maximum recommended reserve that will be adopted and maintained for secondary road is 48 meters, preferably with the extremities of the reserve being 24 meters either side of the road centre line, although this may vary especially on existing roads due to localized circumstances.

Regardless of which option is required ultimately, initially the full 48 meter reserve should be applied until such time as a more detailed site investigation has been undertaken and the actual reserve required has been defined.

Map 11.2: Proposed Circulation Network for Bhanga Paurashava

No non-road related development will be permitted within the road reserve. For new roads which will not be constructed in the foreseeable future, agricultural use of the reserve will be permitted until such times as the road is constructed. No permanent or temporary structure will be permitted.

In general, no direct access will be permitted onto the main carriageways (of secondary roads) with access gained only at controlled junctions. Occasionally, due to existing situations, access from a side road may be entertained. The number of junctions should be minimized with desired spacing being at 200 meter intervals.

Limited direct access will be allowed from major traffic generators such as Paurashava Office complexes, factories and shopping centres where no other alternative access arrangement is feasible. Car parking arrangements for those large landuses must be provided on off-street.

Functions of the **tertiary road** are:

- collect and distribute traffic to and from access roads from predominantly residential areas to other parts of the hierarchy;
- provide direct access to roadside landuses.

The recommended reserve for tertiary road is 18 meters, 9 meters either side of the centre line. On-street parking may be permitted.

No development will be permitted within the 18 meter reserve.

Direct access will be permitted although major generators should be required to have off-street parking areas. Junctions should be a minimum of 150 meters apart.

Access roads provide access to residential areas and properties therein. On-street parking is permitted providing that this will not block the access road.

Recommended reserve for access is 10 meter, although in existing situations, a minimum reserve of 6 meter will be entertained.

Junctions and access roads should be a minimum of 50 meters apart, although deviation to this will need to be accommodated in existing areas.

Direct access from residential properties will be permitted.

The process that the Paurashava/RHD can undertake to establish new road reserves for each of the proposed roads shown on the Transportation and Traffic Management Plan is described below:

- Initial step will be to determine two points between which the new road will be required. In certain instances, the precise intersection or connection point will be obvious, whilst in other cases only a generalized location is identifiable in the first instance. Determination of the exact connection points can only be made once further steps in the process have been undertaken.
- Having identified two connection points (either known or vague), next step will be to conduct a search of a wide area to identify a number of alternative routes. Width of the area subjected to this search will vary according to individual circumstances, with

the area being relatively narrow in dense Paurashava locations (say 80 to 100 meters), but wider in more rural settings (say 200 to 300 meters).

- The number of alternative alignments to be identified will also vary, but as a general rule, a maximum of five alignments will be chosen. When identifying each of the different alignments, care will be taken to ensure that they are realistic and capable of accommodating the width of reserve required for the standard of road envisaged.

During this stage of the process, number of buildings, other structures or natural environment affected by the proposal should be seen as a constraint, but not yet as a major constraint. That being said, following the rule for realism stated above, the alignments will need to respect as much existing permanent development as possible, aiming instead, in dense situations, to target gaps between developments rather than through them. Only where the avoidance of specific buildings or groups of buildings is unavoidable, to produce a worthwhile alignment, should their removal be seen as part of that alternative's cost.

Similarly, in rural locations or in areas of high natural environmental quality, extreme care should be exercised when choosing the alternatives to respect the natural environment and choose options that are going to minimize the visual impact of a new road or avoid destruction of areas of the highest environmental quality.

Having established the alternative alignments, these will now be assessed, against set criteria to enable the Paurashava to choose a preferred option. The criteria that must be taken into account during this exercise include:

The impact of the alternative on existing properties: whether these are permanent or temporary and the type of development that is being affected. This, in part, will identify the general scale of compensation that will accrue with each of the alignments and therefore the viability of a route to be chosen as the preferred option.

The impact that each alignment will have on the general and natural environment: routes which have a high visual impact in an area of natural beauty will, for example, score badly on this criteria.

Amount of vacant public land available along each route: more land the government owns, the easier the project will be to implement and equally the lower the cost of an option, as the need to compensate landowners will be reduced.

The ease of construction: each alignment will need to be considered with again easier solutions not requiring major development items – bridges – for example, being preferred to more difficult proposals which will increase the cost of construction.

The severance of landuses and communities: need to be assessed, with preference been given to those routes that minimize severance.

Other more localized criteria may be included at the time of assessment.

The result of this assessment exercise will identify for the Paurashava the route that should be considered as its preferred alignment. The reserve for this alignment will then become the area within which no development, other than for agricultural use, will be permitted.

A number of new roads including improvement of existing roads are presented in the following table. In the Paurashava, two primary roads from Bhanga to Faridpur and Bhanga to Khulna (as a national highway) lying with length 1.1 km and 2.8 km respectively under the Paurashava jurisdiction.

All the roads may be constructed under the road development scheme approved by the government for the authorities named RHD, LGED and Paurashava. In total, 71000 meter existing roads and 75.82 km. roads have been proposed for efficient accessibility of the Paurashava.

11.4.3 List of Proposed Roads (both widening and new)

A number of new roads including improvement of existing roads are presented in the following table. In the Paurashava, one primary road called Dhaka-Khulna and Faridpur-Barishal Highway is being proposed for double carriageway with service road around the existing bus stand.

All the roads may be constructed under the road development scheme approved by the government for the authorities named RHD, LGED and Paurashava. In total, 67200 meter existing roads and 94697 meter roads have been proposed for efficient accessibility of the Paurashava.

Table 11.4: Proposed New Road

Road Id	Width (ft)	Type	Length (m)	Phase
TR12	30	Tertiary	2440.76	3rd phasing
TR23	30	Tertiary	994.30	3rd phasing
TR28	30	Tertiary	779.06	2nd Phasing
TR35	30	Tertiary	462.54	3rd phasing
TR45	30	Tertiary	589.76	3rd phasing
TR58	30	Tertiary	1420.55	3rd phasing
TR67	30	Tertiary	444.21	2nd Phasing
TR75	30	Tertiary	434.13	3rd phasing
TR77	30	Tertiary	856.86	2nd Phasing
TR79	30	Tertiary	492.46	3rd phasing
TR81	30	Tertiary	872.46	3rd phasing
		Total	9787.09	
AR21	20	Access	2243.45	3rd phasing
AR22	20	Access	3377.64	3rd phasing
AR29	20	Access	183.35	3rd phasing
AR30	20	Access	247.52	3rd phasing
AR36	20	Access	349.48	3rd phasing
AR37	20	Access	312.23	2nd Phasing
AR39	20	Access	212.24	1st Phasing
AR40	20	Access	75.95	3rd phasing
AR43	20	Access	208.31	2nd Phasing
AR44	20	Access	429.28	3rd phasing
AR51	20	Access	537.40	3rd phasing
AR52	20	Access	204.79	3rd phasing
AR53	20	Access	325.33	2nd Phasing
AR54	20	Access	274.06	3rd phasing
AR59	20	Access	243.40	3rd phasing
AR65	20	Access	196.14	3rd phasing
AR70	20	Access	785.94	3rd phasing
AR73	20	Access	73.65	3rd phasing

Road Id	Width (ft)	Type	Length (m)	Phase
AR76	20	Access	162.07	3rd phasing
AR78	20	Access	210.50	3rd phasing
AR83	20	Access	499.67	3rd phasing
		Total	11152.39	
		Gross Total	20939.49	

Table 11.5: Proposed Widening Road

Road Id	Width (ft)	Type	Length (m)	Phase
PR1	80	Primary	6366.75	3rd phasing
PR86	80	Primary	9312.17	3rd phasing
PR89	60	Primary	2246.02	3rd phasing
		Total	17924.94	
SR6	40	Secondary	3505.89	3rd phasing
SR7	40	Secondary	2465.34	3rd phasing
SR8	40	Secondary	510.40	2nd Phasing
		Total	6481.63	
TR2	30	Tertiary	530.89	3rd phasing
TR3	30	Tertiary	468.27	1st Phasing
TR4	30	Tertiary	518.09	3rd phasing
TR5	30	Tertiary	580.42	3rd phasing
TR9	30	Tertiary	506.86	3rd phasing
TR10	30	Tertiary	358.10	3rd phasing
TR11	30	Tertiary	744.93	3rd phasing
TR13	30	Tertiary	1763.12	3rd phasing
TR16	30	Tertiary	615.10	3rd phasing
TR20	30	Tertiary	370.85	3rd phasing
TR24	30	Tertiary	2919.60	3rd phasing
TR26	30	Tertiary	1072.64	3rd phasing
TR56	30	Tertiary	628.65	2nd Phasing
TR57	30	Tertiary	1274.39	1st Phasing
TR64	30	Tertiary	239.46	3rd phasing
TR66	30	Tertiary	720.75	3rd phasing
TR69	30	Tertiary	677.24	2nd Phasing
TR74	30	Tertiary	424.04	3rd phasing
		Total	14413.36	
AR14	20	Access	532.08	3rd phasing
AR15	20	Access	306.26	1st Phasing
AR17	20	Access	246.05	3rd phasing
AR18	20	Access	248.02	3rd phasing
AR19	20	Access	692.40	2nd Phasing
AR25	20	Access	459.16	3rd phasing
AR27	20	Access	428.88	1st Phasing
AR31	20	Access	319.54	3rd phasing
AR32	20	Access	276.84	3rd phasing
AR33	20	Access	446.08	1st Phasing
AR34	20	Access	241.48	2nd Phasing
AR38	20	Access	346.56	3rd phasing
AR41	20	Access	137.18	3rd phasing
AR42	20	Access	335.91	3rd phasing
AR46	20	Access	2026.72	3rd phasing
AR47	20	Access	372.90	1st Phasing
AR48	20	Access	238.96	3rd phasing
AR49	20	Access	126.13	3rd phasing
AR50	20	Access	113.87	3rd phasing

Road Id	Width (ft)	Type	Length (m)	Phase
AR55	20	Access	143.26	3rd phasing
AR60	20	Access	667.00	3rd phasing
AR61	20	Access	132.18	2nd Phasing
AR62	20	Access	211.05	3rd phasing
AR63	20	Access	105.45	1st Phasing
AR68	20	Access	261.34	3rd phasing
AR71	20	Access	210.52	3rd phasing
AR72	20	Access	250.41	1st Phasing
AR80	20	Access	205.95	2nd Phasing
AR82	20	Access	229.42	3rd phasing
AR84	20	Access	6321.99	1st Phasing
AR85	20	Access	6318.43	3rd phasing
AR87	20	Access	5995.47	2nd Phasing
AR88	20	Access	5990.87	3rd phasing
		Total	34938.37	
		Gross Total	73758.29	

The process that the Paurashava/RHD can undertake to establish new road reserves for each of the proposed roads shown on the Transportation and Traffic Management Plan is described below:

Initial step will be to determine two points between which the new road will be required. In certain instances, the precise intersection or connection point will be obvious, whilst in other cases only a generalized location is identifiable in the first instance. Determination of the exact connection points can only be made once further steps in the process have been undertaken.

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The number of alternative alignments to be identified will also vary, but as a general rule, a maximum of five alignments will be chosen. When identifying each of the different alignments, care will be taken to ensure that they are realistic and capable of accommodating the width of reserve required for the standard of road envisaged.

During this stage of the process, number of buildings, other structures or natural environment affected by the proposal should be seen as a constraint, but not yet as a major constraint. That being said, following the rule for realism stated above, the alignments will need to respect as much existing permanent development as possible, aiming instead, in dense situations, to target gaps between developments rather than through them. Only where the avoidance of specific buildings or groups of buildings is unavoidable, to produce a worthwhile alignment, should their removal be seen as part of that alternative's cost.

Similarly, in rural locations or in areas of high natural environmental quality, extreme care should be exercised when choosing the alternatives to respect the natural environment and choose options that are going to minimize the visual impact of a new road or avoid destruction of areas of the highest environmental quality.

Having established the alternative alignments, these will now be assessed, against set criteria to enable the Paurashava to choose a preferred option. The criteria that must be taken into account during this exercise include:

The impact of the alternative on existing properties: whether these are permanent or temporary and the type of development that is being affected. This, in part, will identify the general scale of compensation that will accrue with each of the alignments and therefore the viability of a route to be chosen as the preferred option.

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The ease of construction: each alignment will need to be considered with again easier solutions not requiring major development items – bridges – for example, being preferred to more difficult proposals which will increase the cost of construction.

The severance of landuses and communities: need to be assessed, with preference been given to those routes that minimize severance.

Other more localized criteria may be included at the time of assessment.

- The result of this assessment exercise will identify for the Paurashava the route that should be considered as its preferred alignment. The reserve for this alignment will then become the area within which no development, other than for agricultural use, will be permitted.

11.4.2 Plan for Transportation Facilities

11.4.2.1 Transportation Facilities Plan

Bus Terminal / Truck Terminal

There is no terminal in this area. A bus terminal and a truck terminal has been proposed in hasamdia mouza whose area about 2.86 and 1.78 acre respectively acres. See Table 11.3.

Bus Stand

The only informal bus stand is known as Bhanga bus stand, presently land beside Dhaka-Khulna Highway is using as bus stand. Most of the bus uses on-street parking. So, a bus terminal has been proposed on 2.86 acres of land under Ward No. 4 and a truck terminal on 1.78 acres of land in same Ward.

Table 11. 6: Proposed Transport Services

Facility	Ward No	Mouza Name	Plot No	Area (acre)	Phasing
Proposed Micro Bus Terminal	Ward No. 04	Hasamdia (037_01)	128	0.31	1st Phase
Proposed Bus Terminal	Ward No. 04	Hasamdia (037_02)	3186,3189-203,3215	2.86	3rd Phase
Proposed Truck Terminal	Ward No. 04	Hasamdia (037_02)	3675	1.78	2nd Phase
Proposed Auto Stand	Ward No. 04	Hasamdia (037_01)	8183	0.25	2nd Phase

Tempo Stand/ Powerbike Stand

Tempo is now a major and a cheaper mode of transport in small urban area and perform important role in commuter transportation. No formal tempo stands in Bhanga. The Bhanga intersection use as a stand and that is on-street parking. The consultant proposed a tempo stand near the Bhanga intersection.

11.4.2.2 Development of Facilities for Pedestrian, Bicycle and Rickshaw

During field survey, it was observed that people move in both directions, going in and out using both sides of the roads. It is noted that no footpath is available in this Paurashava for pedestrian movement. Pedestrians mostly use carriageway and right of way of the roads. In most cases, pedestrians use road shoulders for walking but they are being obstructed by the informal business men. Separate provision for bicycle and rickshaw is not needed.

From Traffic volume survey it is gathered that following roads carry extreme pedestrian due to eminent commercial activities in the heart of Paurashava. Following table shows roads carrying most of the pedestrians and recommendation there.

11.4.2.3 Other Transportation Facilities

Other transportation facilities includes launch/boat ghat. If water ways will be provisioned in the Kumar River, 3 boat ghats should be constructed. Those ghats may be designed considering water-based tourism.

11.4.3 Waterway Development/Improvement Options

One large River named Kumar and four major canals are available in the Paurashava. But no waterway is found in the Paurashava under the jurisdiction of Paurashava authority or BIWTA. The Kumar River is linked with the Padma River. From northwestern part to southeastern part of the Paurashava, through Kumar to Padma River, about 34 km. water way and among them 6.61 km. is in the Paurashava. This 6.61 km. river may be developed as water ways. This water ways will provide links with Shibchar, Madaripur and Maowa.

11.4.3.1 Proposal for Improvement of the Existing Waterway

The existing Kumar River should be re-excavated to improve the waterway throughout the year.

11.4.3.2 Proposal for New Waterway Development

- Encourage private sector to involve with the construction of water ways. BOT (Build Operate and Transfer to the Government) system for private sector will appropriate.
- The Paurashava may, in collaboration with the Inland Water Transport Authority (IWTA), develop the water ways using the Kumar River.

11.4.4 Railway Development Options

No railway development is in the Bhanga Paurashava.

11.5 Transportation System Management Strategy (TSMS)

11.5.1 Strategies for Facility Operations

Following strategies will be adopted to operate the facilities related with the provisioning of suitable transportation system.

- An improved traffic management system should be imposed. All facilities involved with this system should be provisioned.
- The land uses at the intersections should be controlled with the provisioning of passenger shade, public toilet, ticket counter, tea stall and other necessary facilities.
-
- Parking facilities for motorized and non-motorized vehicles should be provisioned during construction of roads.

Map 11.3: Proposed Transport Infrastructure of Bhanga Paurashava

11.5.2 Strategies for Traffic Flow and Safety

Following strategies will be adopted to implement circulation network in the planning area:

- A comprehensive road network plan has been prepared for the Paurashava using a hierarchy of road network. Implementation will also be followed following this hierarchy.
- In case of local roads a participatory approach will be developed to realize at least a part of the development cost bears by the beneficiaries. This will also help to reduce delay and cost involved in land acquisition for road construction.
- Proposed roads in those areas will be chosen for immediate construction that is needed to promote growth in that area.
- Incremental Road Construction Approach will be adopted to get rid of unnecessary construction costs, where roads remain underutilized.
- Service roads will be constructed along with the major roads to allow free flow of long distance traffic.
- A restricted buffer zone will be created along primary roads passing through agriculture to discourage roadside development.

11.5.3 Strategies for Traffic Management

- Linking the missing links of primary, secondary and tertiary roads on priority, and widen some tertiary roads to make networks for efficient circulation.
- Provide adequate pedestrian facilities and off-street parking wherever needed.
- Not to allow any development within the right of way (ROW).
- Separate lane for non-motorized vehicles should be provisioned on the primary and secondary roads.

11.6 Plan Implementation Strategies

11.6.1 Regulations to Implement the Transportation Plan

Following regulations will be needed for implementation of the plan.

Public Roads Act, 2004: Objectives of the Public Roads Act, 2004 is prescribed in the section 2. Those objectives are to:

- a) establish ownership and responsibilities for roads;
- b) establish the framework for managing the road network;
- c) establish general principles for road management;
- d) provide for general design and planning principles for roads;
- e) confer powers and responsibilities on road authorities;
- f) commit road authorities to provide and maintain safe roads, and to do so using resources efficiently;
- g) provide for the establishment and classification of public roads;
- h) provide for data bases of public roads, and public access to them;

- i) set out rights and duties of road users;
- j) control activities on roads;
- k) make special provision for restriction on access to roads;
- l) identify characteristics of new road types;
- m) provide a legal framework for private sector participation in road construction, operation and maintenance, including tolling of roads;
- n) establish defenses for civil liabilities; and
- o) create offences and provide for penalties.

Section 5 has defined public roads as-

- 1) The Government may declare a public road.
- 2) The declaration may be made in relation to land, whether or not it is currently used for passage by members of the public.
- 3) In the declaration, the Government shall classify the public road as:
 - a) A national road
 - b) A regional road
 - c) A Zila road
 - d) An urban road
 - e) An Upazila road
 - f) A union road
 - g) A village road.

Motor Vehicles Ordinance, 1983 (Ordinance No. LV of 1983) was enacted in 22nd September, 1983: The Ordinance will be needed mostly for the registration of motor vehicles and issuing of driving license.

Stage Carriages Act, 1861 (Act No. XVI of 1861) was enacted in 7th July 1861. Section 1 of the Act has defined the term Stage Carriage and said, “every carriage drawn by one or more horses which shall ordinarily be used for the purpose of conveying passengers for hire to or from any place in Bangladesh shall, without regard to the form or construction of such carriage, be deemed to be a Stage Carriages within the meaning of this Act.” Again, according to the section 2, no carriage shall be used as a Stage Carriage unless licensed by a Magistrate.

The Paurashava may, in communication with the RHD and LGED and with the prime approval from the Government may enforce the regulations as mentioned above. Again, some of the relevant regulations of developed countries may be enforced by the appropriate authority for the betterment of accessibility, road safety and road management. In connection with this concept, **Highways Act of England and Wales** may be followed.

According to the section 70(1a) of the **Highways Act of England and Wales**, the owner or occupier of any structure and the owner or occupier of any land on which a structure is situated shall take all reasonable steps to ensure that the structure or the use of the structure is not a hazard or potential hazard to persons using a public road and that it

does not obstruct or interfere with the safe use of a public road or the maintenance of a public road.

(b) Where a structure or the use of a structure is a hazard or potential hazard to persons using a public road or where it obstructs or interferes with the safe use of a public road or with the maintenance of a public road, a road authority may serve a notice in writing on the owner or occupier of the structure or on the owner or occupier of any land on which the structure is situated to remove, modify or carry out specified works in relation to the structure within the period stated in the notice.

(2a) The owner or occupier of land shall take all reasonable steps to ensure that a tree, shrub, hedge or other vegetation on the land is not a hazard or potential hazard to persons using a public road and that it does not obstruct or interfere with the safe use of a public road or the maintenance of a public road.

(b) Where a tree, shrub, hedge or other vegetation is a hazard or potential hazard to persons using a public road or where it obstructs or interferes with the safe use of a public road or with the maintenance of a public road, a road authority may serve a notice in writing on the owner or occupier of the land on which such tree, shrub, hedge or other vegetation is situated requiring the preservation, felling, cutting, lopping, trimming or removal of such tree, shrub, hedge or other vegetation within the period stated in the notice.

Again, section 71(1a) said that, any person who, without lawful authority or the consent of a road authority-

- erects, places or retains a sign on a public road, or
- erects, places or retains on a public road any caravan, vehicle or other structure or thing (whether on wheels or not) used for the purposes of advertising, the sale of goods, the provision of services or other similar purpose, shall be guilty of an offence.

Section 76(1) of the **Highways Act of England and Wales** have provisioned regulations for a road authority and said, a road authority may-

- construct and maintain drains in, on, under, through or to any land for the purpose of draining water from, or preventing water flowing onto, a public road,
- use any land for the temporary storage or the preparation of any gravel, stone, sand, earth or other material required for the construction or maintenance of a public road.

11.6.2 Implementation, Monitoring, Evaluation and Coordination of the Plan

Implementation through Multi-Sectoral Investment Programme: Major infrastructure development works such as primary roads, secondary roads, transportation facilities etc., will largely be controlled by Government. Public works requires efficient co-ordination through the Multi-Sectoral Investment Programme (MSIP).

Objective of a Multi-Sectoral Investment Programme (MSIP) will match a list of the development projects with the funding stream necessary to implement them. There are two basic activities that would determine the contents of MSIP. One activity would be to prioritize and schedule the investment projects of all public agencies so they will collectively help to achieve the development goals and objectives of the Transportation

and Traffic Management Plan. Second activity would be to analyze the source and availability of fund for the prioritized list of development projects.

Implementation through Action Plans and Projects: Action Plans and Projects will be the implementation plans to solve problems at the local level. Action plans will take a direct approach toward plan implementation with a minimum of research, reports or elaborate planning methods. These projects will be easily identifiable and will require minimum resource.

Implementation through Development Control: Landuse zoning is one of several methods of plan implementation to be considered. In all cases where some form of development, landuse control may be applied; careful consideration requires the following ideologies:

- the purpose to be achieved by the development controls;
- where controls should be applied;
- what aspect of development needs to be controlled;
- what type of development controls are required;
- what degree or level of development control is required;
- who will be affected by the required control;
- who will be affected by the controls and in what manner;
- when the controls should be applied;
- what will be the likely impact of the controls;
- how and by whom will the controls be administered and enforced.

Development control as an instrument of plan implementation may be selectively applied within the Urban Area Plans. Development controls would also be varied in intensity and detail to suit the particular circumstances. It is important that they should be clear and easily understood by all parties concerned. Since the entire Paurashava Master Plan 'package' has become statutory, development controls associated with its component plans would also be statutory.

Implementation by Facilitating Private Investment: Another approach that would be taken by government toward plan implementation will be to guide and facilitate investments made by the private sector. Government can achieve this with relative ease and at very low cost by setting up a legal and operational framework, coupled with suitable incentives, to facilitate land consolidation, plot boundary readjustment, efficient lay out of plots and provision of local infrastructure by the private sector. The benefits of this approach would be:

- Increased efficiency of the urban land market would make more private land available to urban households;
- Would pass much of the development costs for local infrastructure to the private sector and land market mechanisms;
- Would increase in land for development without large cash outlays by government to purchase land for development schemes; and

- Would keep provision of land for community facilities virtually no cost to government.

Plan Monitoring

The Transportation and Traffic Management Plan would simply be tools for guiding and encouraging the growth and development of an urban area in a preferred manner. In a rapidly changing urban environment, the Transportation and Traffic Management Plan would require to keep up to date. If this is not done, within a few years it will be obsolete. Therefore, it is imperative that the requirement for regular updating of the Transportation and Traffic Management Plan be made a legal requirement.

For implementation of the various programme components of the Transportation and Traffic Management Plan appropriate administrative measures will have to be undertaken. This will essentially include project preparation and monitoring of their execution and evaluation. For carrying out all these activities appropriate institutional measures are also be needed.

Evaluation

Monitoring and evaluation of ongoing and implemented projects is essential to keep the future course of action on the right track. An ongoing project should be regularly monitored and handicaps identified to enable taking appropriate measures at the right time.

Post implementation evaluation is also needed to take appropriate measures correcting past errors-from project preparation to implementation.

The top level supervision has to be done by a high level supervisory committee headed by the Paurashava Mayor, LGED representative, RHD and Local Government Ministry. Other members of the committee will be local Ward Councilors, local community leader/social workers and the Town Planner of the Paurashava. The committee will supervise implementation works regularly and issue necessary instructions to expedite the works of implementation.

Co-ordination

A Planning Section of Paurashava should have close interaction with the citizen of Paurashava at large in order to make people aware of the benefits of a good plan and, therefore, their social responsibility to promote plan implementation in one hand and also resist contraventions on the other. A specific interactive cell is recommended to operate in this regard with following responsibilities:

- Provide pre-application advice to residents, consultants and developers about landuse management issues and application procedures for the submission of development applications.
- Enforce planning and landuse management related legislation and zoning scheme regulations.
- Issue of property zoning certificates.
- Investigate and resolve landuse management complaints, illegal landuse and prosecuting contraventions.

Such interactive windows may be opened in various convenient locations to ensure ease of the answers to commonly asked questions may be shown in the internet. Besides, those may be shown in the print and electronic media time to time.

In spontaneous areas, while all out people's co-operation is needed for project implementation; there will also be some elements of negotiation. Negotiation will be particularly needed in case of road widening projects. It will be a crucial task for Paurashava to convince the affected people to give up their land for road use. Efforts should be made to convince the land owners on the ground of enhancement of property value due to road widening. In case people refuse to offer land free of cost necessary arrangements may have to be made for payment of compensation. This process of negotiation will be very critical, cumbersome and time consuming, and therefore, has to be handled with utmost care and patience. The best results can be accrued only by winning people's confidence. In case the authority fails to get peoples co-operation they should exercise power of compulsory acquisition of land through Acquisition of Requisition of Immovable Property Ordinance, 1982. Attempts may be made to engage NGOs / CBOs / RHD / LGED to work as catalysts in negotiation.

CHAPTER 12

DRAINAGE AND ENVIRONMENTAL MANAGEMENT PLAN

12.1 Drainage Management Plan

The consultant has made an extensive drainage network study in Bhanga Paurashava to improve the living standard of urban dwellers. Major activities of drainage study include:

- Survey for the alignment of drains/drainage channels by using DGPS, Data Logger and Path Finder software;
- Survey for the cross sections of drains by using optical level;
- Survey for the bottom level and area of local depressions;
- Identification of outfalls and drainage structures with their conditions;
- Development of Maps showing drains (with drainage direction).

The study has conducted with the concern of Paurashava Mayor, Councilors and other Paurashava representatives as well as PMO, LGED as per ToR in concentrating on following major issues:

- Information regarding type of man-made drains.
- Alignment and crest level of embankments, dykes and other drainage divides.
- Identification of missing links.
- Direction, depth of flow, maximum and minimum tidal level of river, flooding condition, condition of river side settlements during high tide and flood.
- Location, number and condition of pump station, sluice gates, drainage structures.
- Location and area of outfalls, ponds, tanks, ditches; condition in dry and wet season.

12.1.1 Goals and Objectives

Objective of Drainage Plan is to find out the present functions of main and secondary drains and natural streams within the Bhanga Paurashava. Secondly, to find out level of encroachment over drainage reservations responsible for flooding, water logging of neighborhoods during heavy rains. Thirdly, to find out, the existing roadside drainage pattern including capacities and collected gradients. Since planned development of Paurashava is very much desirable, Drainage Master Plan is necessary to ensure operation and maintenance of the present facilities including new proposal for future. For this, both short and long term project improvement plan involving area based drainage master plan is necessary to ensure proper drainage of the Paurashava.

12.1.2 Methodology and Approach to Planning

In implementing various infrastructural developments, drainage is generally given less priority and is normally considered to be the last or final steps for development. Such scenario is particularly true for Bangladesh; although different types of drainage infrastructures are among others by far the heaviest impact on physical infrastructure network. As a result, physical environment, health, hygiene and standard of living suffer seriously. In development projects, Government, Semi-government and Public sector allocated funds are mostly spend on buildings, roads and other more visible infrastructures and drainage comes as the last item of development. By the time,

drainage development begins to start, there appears shortage of fund, consequently as a matter of policy-do little or do-nothing situation appears and as eyewash very little is done for drainage development. In case of urban development, if drainage is not given priority, sufferings of the inhabitants will continuously increase with the passage of time.

Drainage development for urbanization should start with drains. Drains can be classified as Plot drains, Block drains, Tertiary drains, Secondary drains and Primary drains. Other natural drainage infrastructure is lowland, outfall areas, khals and rivers. Man-made drains are Plot, Block, Tertiary, Secondary and Primary drains and others are natural drainage infrastructures. In planning for drainage network, care has given on road network in terms of conflict of drainage and waterways with roads. Drainage and environmental survey was followed the proto-type questionnaire supplied and suggested by the LGED.

12.2 Existing Drainage Network

12.2.1 Natural Drainage System

The natural drainage network composed of 1 river and important 3 khals/canals plying within the Paurashava area. Generally those khals are flowing towards north-south. Those natural canals (11 canals are in the Paurashava) have in total 12.09 km length and covers 23.06 acres of land.

There are natural drainage systems along roadside and the linkage between natural and man-made drainage system in somewhere. The Kumar River and the canal provide opportunity of natural drainage system.

There are linkages between natural and man-made drainage system. But how much effective and active the linkage is with the poorly maintained man-made drains is a question. Almost half of the depth of the man-made drain is filled with solid garbages; as a result, the channel is not properly functioning.

Table 12.1: Existing natural drainage of the Bhanga Paurashava

SL. No.	Type	Name	Length (KM)	Width (F)	Area in acres	Direction
1.	River	Kumar Rivar	9.72	279	159.55	East-West
2.	Khal	Abdar Khal	1.71	55.77		East-West
3.	Khal		1.74	10.17		East-West
4.	Khal		3.35	52.49		East-West
5.	Ditch		263 (nos.)		29.04	
6.	Pond		355 (nos.)		78.20	
7.	Other 8 canals		5.29			
Toal			21.81		289.85	

Source: Topographic Survey, 2010.

12.2.2 Man-made Drains

In the Paurashava, 6 man-made drains were identified covering different parts in different Wards. Total length of those drains is 3.79 km. covering an area of 0.67 acres land. All the drains are pucca with one meter average width. Uncovered drains are mostly in existence with poor condition.

Man-made drain is found in the Ward No. 2, 3, 4, 7, 8 and 9. Highest part of the drain is in Ward No. 4 (0.77 km). All drains in the Paurashava are privately constructed. Status of the drains is covered and uncovered. About 26% drain is covered and rest 74% is uncovered. Covered drain is located in the Ward No. 4 and uncovered drain is in the Ward No. 2, 3, 7, 8 and 9. All drains are in average condition. The drains in Ward No. 5

and 9 are wider than the drains are in Ward No. 7 and 8. The average or poor drains have usually damaged side walls, surfaces with obstructions, debris, solid waste, irregular water way, etc.

Table 12. 2: Existing man-made drains in Bhanga Paurashava

Ward No.	Type	Length (KM)	Area (Acre)	Quality	Status
2	Drain Pucca	0.38	0.04	Average	Uncovered
3	Drain Pucca	0.26	0.04	Average	Uncovered
4	Drain Pucca	0.77	0.15	Average	Covered
7	Drain Pucca	0.53	0.28	Average	Uncovered
8	Drain Pucca	0.28	0.05	Average	Uncovered
9	Drain Pucca	0.57	0.11	Average	Uncovered
Total		3.79	0.67		

Source: Drainage Survey, 2010.

Uncovered drains are common feature and the result of uncovering is ultimately filling and losing the drain. Necessity of covering the drains are not only from environmental and safety perspective but also it is a local need. Adjacent river is using as a part of natural drainage system.

12.2.3 Analysis on Land Level Topographic Contour

The planning area of Bhanga Paurashava has been surveyed with RTK-GPS/DGPS and Total Station as per specification for spot interval given in the ToR. For this 8360 spot values were collected for the study area. A contour line/contour joins points of equal elevation (height) above mean sea level. A contour map is a map illustrated with contour lines which shows valleys and hills, and the steepness of slopes. The contour interval of a contour map is the difference in elevation between successive contour lines. The lowest spot height is 1.00 m PWD and the highest spot height is 9.66 m PWD. Around 80% of the spot heights are between 4m to 8 m and average height of land of the surveyed area is 5.7 m PWD.

Table 12.3: Spot Interval and Frequency

Ward No.	Frequencies of observation	Minimum Height (Meter)	Maximum Height (Meter)	Average Height (Meter)
1	10	3.65	8.537	5.45
2	22	4.27	8.537	5.94
3	12	2.67	5.6	4.94
4	113	3.65	13.39	6.79
5	14	3.71	8.53	6.22
6	12	2.43	8.537	5.47
7	6	2.43	8.21	4.21
8	17	2.74	11.33	6.16
9	44	2.29	11.08	4.98
Total	250			
Average	27.8	3.1	9.3	5.6

Source: Topographic Survey, 2010.

A total of 250 measurements have taken in the Paurashava area to ascertain the topographic condition. According to the survey findings, the lowest land elevation has found in Ward No. 07 and highest elevation in Ward No.04.

Table 12.4: Spot Value and their Unit (Number of Spot (Z) Value and their Statistics)

Sl No	Spot Unit	Value
1.	Total Spot Number	250
2.	Mean (Meter)	5.6

SI No	Spot Unit	Value
3.	Maximum Height (Meter)	6.69
4.	Minimum (Meter)	4.21
5.	Standard Deviation	1.09

Source: Topographic Survey, 2010.

A branch of Padma River named Kumar River is adjacent to the northern boundary of the Paurashava and flowing through east to west. A sharp meandering is viewed at the middle of the northern boundary and produces V-shaped topography on the Ward No. 3, 6 and 7. The land elevation of those Wards varies within 0.5 meter to 6 meter. Steep slope (about 80° angle) of the side wall of the river adjacent with the Wards No. 3 and 7 are prominent. Alignment of khals and natural channels are in somewhere 1 meter to 2 meter high than the normal river water.

Analysis of Peak Hour Run off Discharge and Identification of Drainage Outfalls

Bhanga Paurashava lies in the tropical monsoon climatic region and more specially, represents the climate of Dhaka district. It has a normal rainfall of 325.4 mm in the month of June which is highest among all other months. In September, it falls to 232.5 mm; again falling to 145.8 mm in October. The rainy season begins with April/May and usually ends in the end of October. The highest number of normal rainy day is in July, which is the highest rainfall month. About 14 rainy days at an average in July, followed by 15 rainy days in August, 14 in June, 11 in May and September has been the characteristics of rainy day as the data reveals.

No peak hour run off storm water discharge is found. During rainy season, rain water is being drained through the man-made drains. All pucca drains are linked with the natural water bodies like canal and river as an outfall. As a result, waters of the river and canals are polluting through those discharging elements. The Dhelishwari River is the outfall of all natural and man-made drained water.

12.2.4.1 Method Used

Storm and used water: The drains are designed to collect excess rainfall that comes as surface runoff from urban area, convey the runoff and finally discharge them to outfalls. The design of drains involves hydrological computations of rainfall intensity, its frequency of occurrence, duration etc., and the total run off of a particular area.

The modified rational method shall be used for calculation of peak runoff for a definite frequency and duration from particular drainage basin. One limitation of this method is that it cannot be used for catchment area greater than 320 acres. The Natural Resources Conservation Service (NRCS) method formerly the US Soil Conservation Service (SCS) method shall be used. In Modified Rational Method, the overall watershed is divided into zones that contribute to hydraulically significant points of concentration. The boundary of the zones is established based upon local topographic boundaries such as streets, existing drainage systems, etc., using good engineering practice. The design flow rate by Modified Rational Formula is:-

$$Q = C_s C_r I A$$

Where:

- Q = Design runoff flow rate (cfs)
- I = Rainfall intensity (in/hr)
- C_s = Storage coefficient
- C_r = Runoff coefficient
- A = Drainage area (acres)

Map 12.1: Existing Drainage Network of Bhanga Paurashava

Map 12. 2: Land Level of Bhanga Paurashava

Rainfall Intensity (I): The rainfall intensity is the average rainfall rate for a particular drainage basin or sub-basin. The intensity is selected on the basis of the design rainfall duration and return period. The return period is established by design standards as a design parameter. Rainfall intensity with 5 years return period is generally employed for design of primary drains and canal improvement. Rainfall intensity with 3 years return period is employed for design of secondary drains. The design duration is equal to the time of concentration for the drainage area under consideration. Time of concentration is a critical parameter both for the Modified Rational Equation and SCS method. Time of concentration is generally defined as the longest runoff travel time for contributing flow to reach the outlet or design point, or other point of interest. It is frequently calculated along the longest flow path physically.

Estimating the time of concentration involves identification of an appropriate flow path or paths and estimating runoff travel times along the flow paths. Where post-development conditions include significant pervious surfaces, the time of concentration for just impervious portions of the basin may be required to calculate and compare peak flow response for the basin as a whole against that of the more rapidly-draining impervious surfaces alone. The Time of Concentration composed of the Initial Time of Concentration, sometimes referred to as the Inlet Time or Time of Entry and the Travel Time. Initial Time of Concentration is that time required for runoff to travel from the most remote point in the drainage area to the first point of concentration. This can be determined using the Kirpitch equation. The Initial Time of Concentration must be five minutes or longer. In instances where Initial Times of Concentration are estimated to be shorter than five minutes, five minutes shall be applied.

The second part of the Time of Concentration is the Travel Time that takes the flow to travel along the drain. Channel flow occurs in channels carrying integrated flows, pipes (flowing partially), and streams. Where storage is not significant, Travel Times can be estimated by applying Manning's Equation, and using estimates of channel characteristics and appropriate roughness values for pipe, channel, or stream features as tabulated in Table-12.5.

$$V = [1.49/n] [R^{2/3}] [S^{1/2}]$$

Where

- V = Velocity of flow, feet/second
- N = Manning's roughness coefficient for channel flow
- S = Slope, feet/foot
- R = Hydraulic radius, feet

And

$$T_t = V / (60L)$$

Where

- T_t = Travel time, minutes
- V = Velocity, feet/second
- L = Length, feet

Manning's roughness coefficient for channel flow is listed in Table-12.5.

Table 12.5: Manning's "N" Values for Channel Flow

Conduit Material	Manning's "n"	Conduit Material	Manning's "n"
Closed conduits		Pipes	0.011-0.015
Asbestos-cement pipe	0.011-0.015	Liner plates	0.013-0.017
Brick	0.013-0.017	Open Channels	
Cement-lined & seal coated	0.011-0.015	Lined channels	
Concrete pipe	0.011-0.015	a. Asphalt	0.013-0.017

Conduit Material	Manning's "n"	Conduit Material	Manning's "n"
Helically corrugated metal pipe (12" – 48")	0.013-0.023	b. Brick	0.012-0.018
Plain annular	0.022-0.027	c. Concrete	0.011-0.020
Plan helical	0.011-0.023	d. Rubble or riprap	0.020-0.035
Paved invert	0.018-0.022	e. Vegetation	0.030-0.400
Spun asphalt lined	0.011-0.015	Earth, straight and uniform	0.020-0.030
Spiral metal pipe (smooth)	0.012-0.015	Earth, winding, fairly uniform	0.025-0.040
3 – 8 in. diameter	0.014-0.016	Rock	0.030-0.045
10 – 12 in. diameter	0.016-0.018	Un maintained	0.050-0.140
Larger than 12 in. diameter	0.019-0.021	Fairly regular section	0.030-0.070
Plastic pipe (smooth interior)	0.01-0.015	Irregular section with pools	0.040-0.100

Source: Municipality of Anchorage. Drainage Design Guideline, March 2007 ver.4.08 pp-62.

Storage Coefficient (C_s): Due to very flat topography of Bangladesh, the runoff is significantly slow. The rainfall after evaporation and infiltration accumulates first in the depressions, until these have been reached their capacity and then runoff. To take these effects a storage coefficient is used. The value of the storage coefficient is based on average ground slope and the nature of the ground surface. Some of the storage coefficients are listed in Table-12.6.

Table 12. 6: Storage Coefficients for flat land

Characteristics of surface	Storage Coefficient		
	Slope < 1: 1000	Slope < 1: 500	Slope < 1: 500
Residential urban	0.70	0.80	0.90
Commercial	0.80	0.90	1.00
Industrial	0.70	0.80	0.90
Residential Rural nature	0.60	0.70	0.80
Agricultural	0.50	0.60	0.70
Forest/woodland	0.30	0.40	0.50
Aquatic land	0.30	0.40	0.50
Paved area/road	0.80	0.90	1.00

Source: Countywide Comprehensive Plan (Master Drainage Plan) Exhibit-VIII.

Runoff Coefficient (C_r): The runoff coefficient (C_r) values shall be assigned to the various land use zoning classifications. The runoff coefficient values are based on the slope of the land surface, degree of imperviousness and the infiltration capacity of the land surface. The type of land use can greatly affect the amount of runoff. The quantity of runoff and peak flow rates are increased when the land is developed because the impervious surface area increases with the addition of roads, driveways, roofs, etc. The values of the runoff coefficient (C_r) for each land use classification are listed in Table-12.7.

Catchment Area: The size and shape of the catchment or sub-catchment for each drain shall be determined by plan metering topographic maps and by field survey. In determining the total runoff of a catchment area the following assumptions to be made:

- The peak rate of runoff at any point is a direct function of the average rainfall for the time of concentration to that point.
- The recurrence interval of the peak discharge is same as the recurrence interval of the average rainfall intensity.
- The Time of Concentration is the time required for the runoff to become established and flow from the most distant point of the drainage area to the point of discharge.

Table 12.7: Modified Rational Method Runoff Coefficients

Land use designation	Runoff Coefficient C_r
Residential rural	0.30
Residential semi urban	0.40
Residential urban	0.50~0.60
Apartment professional	0.70
Neighborhood Commercial	0.85
Community Commercial	0.85
Industrial	0.70~0.75
Slum area	0.50~0.55
Agricultural exclusive	0.25
Forest and watershed	0.20~0.25
Public facilities	0.3~0.60
Forest/ woodland	0.25
Paved area/road	0.99

Source: Countywide Comprehensive Plan (Master Drainage Plan) Exhibit-VIII.

12.3 Plan for Drainage Management and Flood Control

12.3.1 Plan for Drain Network Development

Drain Network Plan

The activity for the relevant authority will be assisted by the preparation of the drainage master plan for the Paurashava which details the necessary corridors, plot sizes and generalized locations for:

- Primary canal/khal (new and improved).
- Secondary and tertiary canal / khal (new and improved).
- Storage ponds.
- Silt traps.
- River embankment.

Initially, the Paurashava will encourage implementation of the first phase recommendation of the drainage master plan. A brief summary of the proposals to be undertaken in Phase-1 is given below. Reference should be made to the Map for identification of the drainage areas referred in the text.

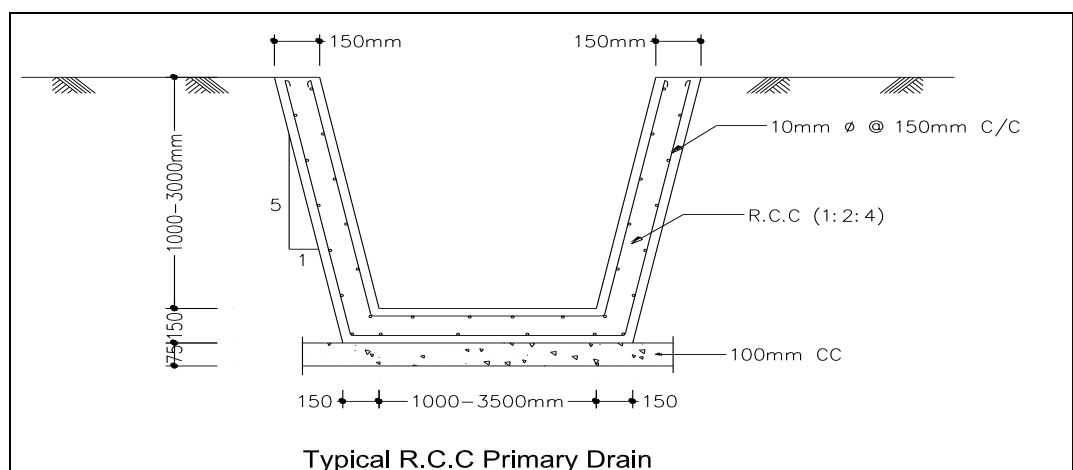
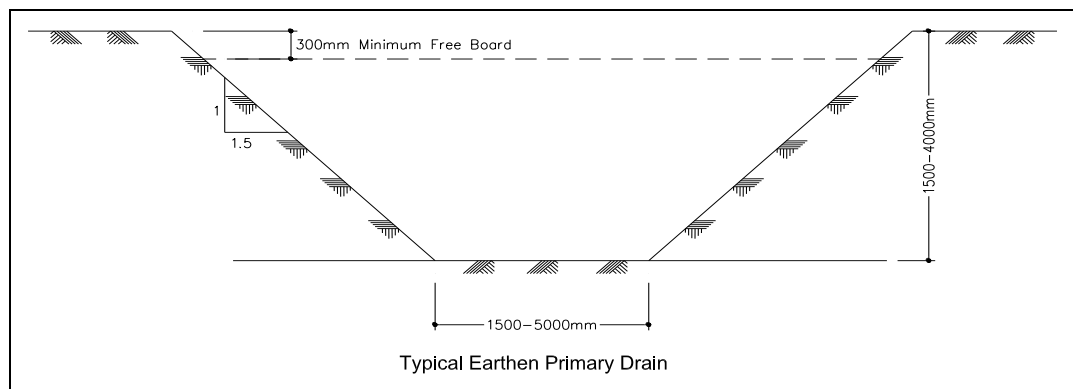
Phase-1 (Storm water drainage)

- Local improvements and the removal of obstacles from existing canals in drainage areas. Works to include:
 - Redesign of hydraulically inefficient bends, entrances and exists.
 - Rising and / or widening of bridges and culverts to give unobstructed flows.
 - Returning the channels to a uniform cross-section by removal of encroaching properties and structures.
 - Raising crossings over roadside channels to adjacent properties above the flood level of the waterway.

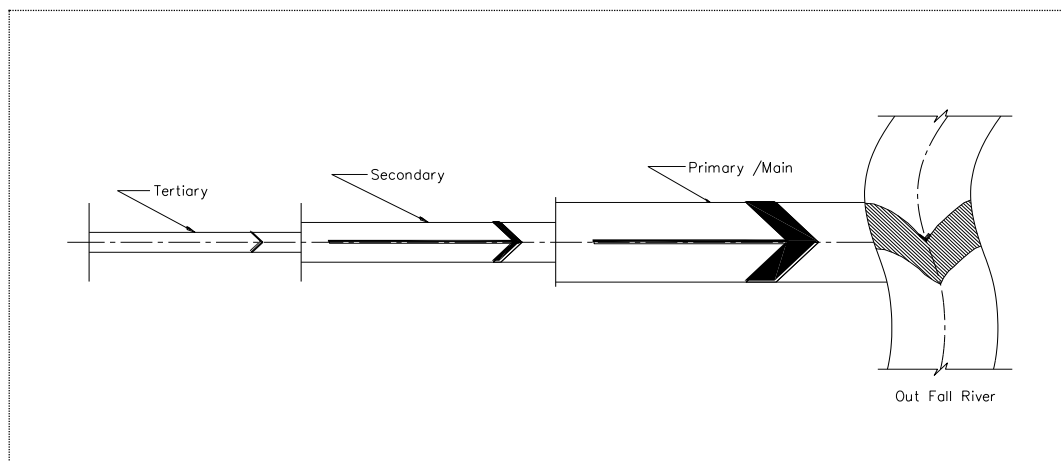
Phase-2 (Rain water and household drainage)

- Construction of surface drain linked with the residences, may be covered or uncovered.
- Provide linkages with secondary and tertiary drains.
- Out-fall of such drains may be nearby canals and low-lands.
- For discharging of rainwater from commercial areas, covered surface drain may be constructed and they will be linked with the secondary and tertiary canals.

Primary Drain: Primary drains are also called main drains. Primary drains cover larger storm drainage area than tertiary and secondary drains. Sometimes primary drain bears local name. In ascending order its position is third. Its cross-section is larger than other types; carrying capacity is high and is constructed of brick, cement concrete and sometimes reinforced concrete. Primary drains may be of earthen structure provided sufficient land is available and land value is low. Contributing drainage water comes from tertiary and secondary drains. Primary drains discharge its drainage water to outfall, natural khal, river or large lowland area / Beels. Sketch below shows the typical cross-section of the primary drain.

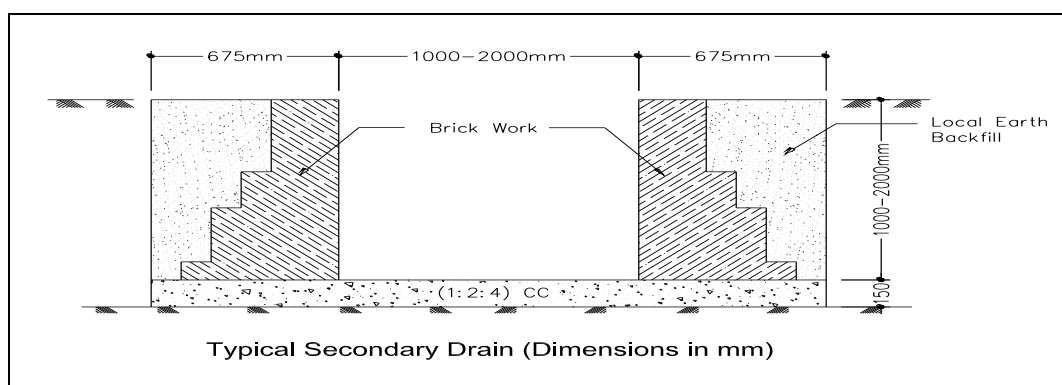


A schematic diagram showing the origin of Tertiary, Secondary and Primary drains and their destinations to the outfall river, presented above, are also presented here.

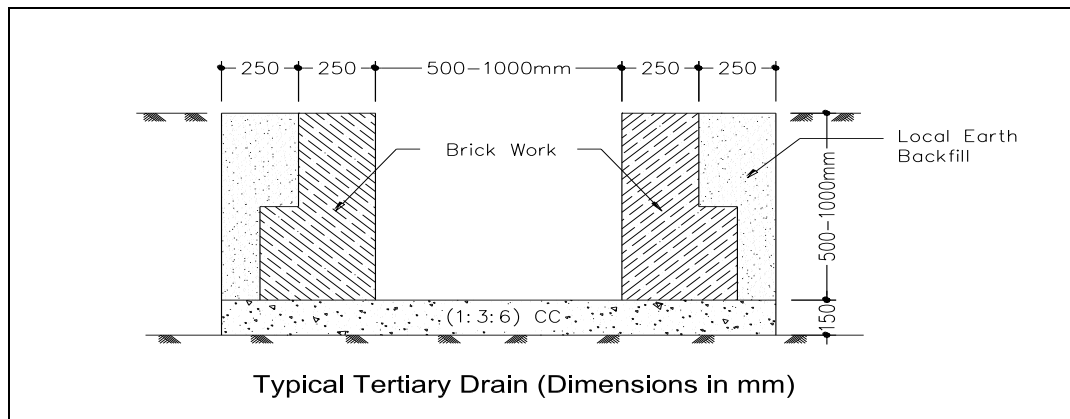


Schematic diagram of Tertiary, Secondary and Primary drains

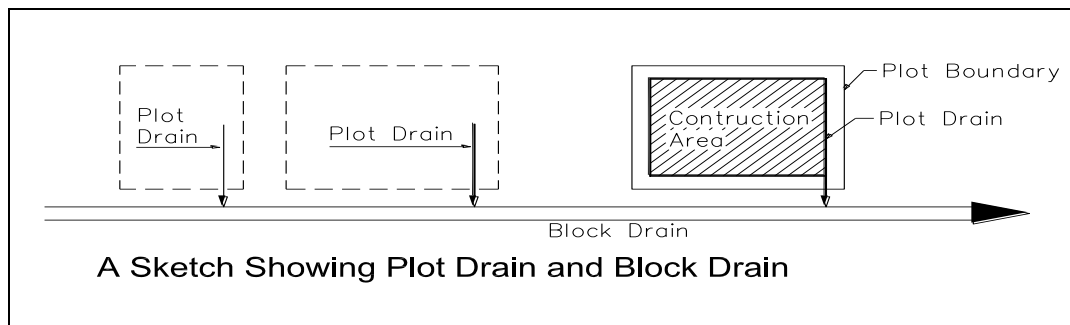
Secondary Drain: Secondary drains collect discharge from tertiary drains. One secondary drain may receive drainage discharges from several tertiary drains in its course. Size and capacity of secondary drain is much bigger than tertiary drains; its catchment area is much bigger than tertiary drain. Like tertiary drain, it may run parallel to bigger roads. Secondary drains may run along and through the middle of its storm water contributing area. The typical cross-section, size and shape, and its construction material are shown below.



Tertiary Drain: Tertiary drain carry run-off or storm water received from the above mentioned plot drains and block or Mohallah drains. Their catchment area or storm water contributing area is bigger than Mohallah drains. In most Paurashava areas it is difficult to find such naming or classifications. However, such classifications can be seen in references. Tertiary drains generally are the under jurisdiction of Paurashava. Those drains or drainage networks are constructed and maintained directly by the Paurashava. These drains are constructed by bricks, cement concrete and sometimes by excavating earth in their alignments. These drains may run parallel to road or across the catchments area. Sometimes borrow pits of the road serves as drains provided borrow pits are uniformly and continuously excavated. Borrow pits that serve as drains may be lined or channeled by brick works. Tertiary drains deliver its discharge usually to secondary drains. A typical tertiary drain is shown below.



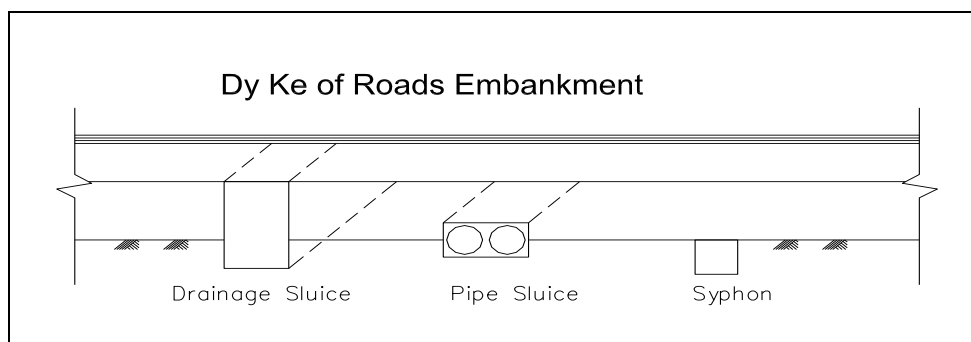
Plot Drains: Plot drains are provided around a building on a plot. In most cases, the drain is made of bricks and is rectangular in shape that can carry storm water generated in the plot and from the building. Plot drain is connected to the Block or Mohallah drain. The sketch below gives an impression of plot drain usually constructed in a plot and block drains that follow plot drain.



Block Drain: Block drain is provided at the outside of a block that accommodates several buildings of the block. The block drains are made of bricks like plot drains but bigger in size so that it can serve the storm water generated within the block and the buildings and open areas within the block. Sometimes the block drain may serve few neighboring blocks or Mohallahs. Block drains carry storm water coming from the plot drains. Shape of the block drain is also rectangular, bigger than plot drains and its bottom is lower than plot drain. Sketch of the plot drain also shows the block or Mohallah drain under plot drain.

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. Sketch below shows a few of such structures. A schematic view of drainage sluice, pipe sluice and siphon on embankment, which relieve drainage congestion presents below.



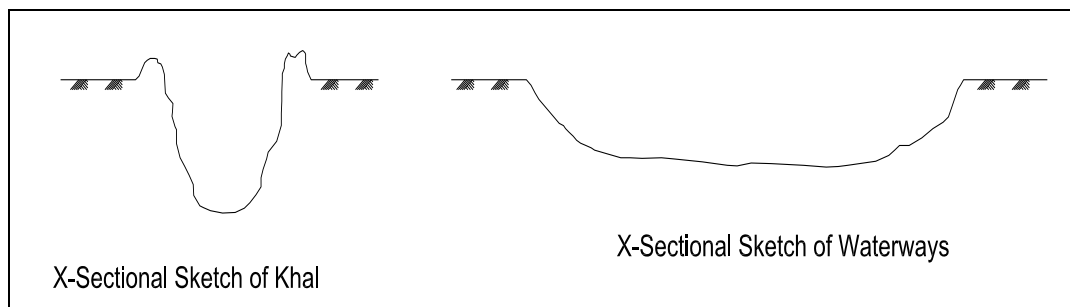
Rainfall is the source of storm drainage water irrespective of urban or rural catchments. Average annual rainfall in Bhanga is about 2000mm. After infiltration, deep percolation and evaporation is about 50% of this rainfall water takes the form of drainage water for semi-urban and urban areas.

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.

Reservoirs: Large tanks, ponds, Dighis, lakes, etc. serve as immediate detention areas for storm water. Those structures are man-made and also natural; may be privately owned or government-owned or khas land. These structures function as drainage relief and source of water for emergency use, fisheries, duckeries, environment and nature preservation. For every mouza such reservoir is available. Physical feature survey maps and field survey maps (tank, pond and reservoir) show the existence of reservoirs and database shows their dimensions. Those structures should not be disturbed or removed by physical interventions by fillings or other means rather should be properly maintained and preserved.

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. Most of the natural khals carry the local storm water particularly runoff from the Mouza / Mouzas those it passes through. Khals are narrow and deep in cross-sections; on the other hand waterways are shallow and wider. Physical feature survey maps, field survey maps (river, khal / drainage) show the drainage khals and waterways and their database shows the dimensions. The sketches below show the sectional view of khals and waterways.



12.3.2 Proposal for Improvement of the Existing Drain Networks

A wider scope for construction of a drainage system may be provisioned in the Paurashava. At least central areas are open for such development immediately and other areas may be followed for projected period as designed in the plan. The Paurashava is a barren field for imposing drainage system. The principles required for drainage plan are available in the area. Land slope, nearness of the natural drainage, sparse population density and soil condition are in favour of drainage construction.

Drainage corridors: If a drainage network has to be installed, the drainage originating throughout the Paurashava would be carried by means of surface drains and culverts. These should be accommodated within road reserves.

General location required: For sewerage treatment plant, large plot will be needed, preferably on outskirts of the Paurashava. For sewerage pumping station, small plots throughout the Paurashava will be needed and a system should be introduced.

Maintaining of land slope: Important component of the drainage network is land slope, which was not maintained during the construction of existing drains. The slope of the Paurashava is found towards east and southeast. Slope of all drains should maintain this direction.

12.3.3.1 List of Proposed New Drains

For the removal of existing drainage congestion and provisioning of effective drainage system, a number of new drains have been prescribed. Those drains are a part of drainage system and another part is the natural canals and river. In the Paurashava, existing length of the drain is 3.79 km. and more 75085.2 meter drain is being added as a proposal. At present, no drain is found in the Ward No. 1, 5 and 6. To develop a network, all Wards have been considered and in some places emphasize has given providing on missing links rather than new.

Table 12. 8: List of proposed drains

Drain Id	Type	Width (m)	Phase	Length (m)
PD3	Primary	Above 3m	1st Phase	6206.67
PD4	Primary	Above 3m	2nd Phase	3104.14
PD5	Primary	Above 3m	3rd Phase	3094.49
PD63	Primary	Above 3m	3rd Phase	532.63
PD92	Primary	Above 3m	1st Phase	1102.09
PD93	Primary	Above 3m	2nd Phase	1492.47
PD94	Primary	Above 3m	3rd Phase	2707.82
PD95	Primary	Above 3m	3rd Phase	3290.56
PD96	Primary	Above 3m	1st Phase	2170.06

PD97	Primary	Above 3m	3rd Phase	2199.51
PD98	Primary	Above 3m	3rd Phase	3261.19
			Total	29161.63
SD6	Secondary	Within 1.5 to 3m	3rd Phase	1801.12
SD7	Secondary	Within 1.5 to 3m	1st Phase	521.26
SD28	Secondary	Within 1.5 to 3m	2nd Phase	816.31
SD31	Secondary	Within 1.5 to 3m	3rd Phase	1348.83
SD32	Secondary	Within 1.5 to 3m	1st Phase	1009.37
SD33	Secondary	Within 1.5 to 3m	2nd Phase	2193.82
SD40	Secondary	Within 1.5 to 3m	3rd Phase	796.11
TD47	Secondary	Less 1.5m	3rd Phase	544.23
SD73	Secondary	Within 1.5 to 3m	2nd Phase	650.40
TD82	Secondary	Less 1.5m	3rd Phase	645.25
TD84	Secondary	Less 1.5m	3rd Phase	440.01
TD86	Secondary	Less 1.5m	3rd Phase	471.66
			Total	11238.37
TD1	Tertiary	Less 1.5m	3rd Phase	503.20
TD8	Tertiary	Less 1.5m	3rd Phase	706.06
TD9	Tertiary	Less 1.5m	1st Phase	537.73
TD10	Tertiary	Less 1.5m	2nd Phase	138.13
TD11	Tertiary	Less 1.5m	2nd Phase	332.85
TD12	Tertiary	Less 1.5m	2nd Phase	237.67
TD13	Tertiary	Less 1.5m	2nd Phase	1767.87
TD14	Tertiary	Less 1.5m	2nd Phase	2281.75
TD15	Tertiary	Less 1.5m	3rd Phase	510.86
TD16	Tertiary	Less 1.5m	3rd Phase	192.10
TD17	Tertiary	Less 1.5m	1st Phase	210.73
TD18	Tertiary	Less 1.5m	2nd Phase	260.23
TD19	Tertiary	Less 1.5m	3rd Phase	667.62
TD20	Tertiary	Less 1.5m	1st Phase	623.17
TD21	Tertiary	Less 1.5m	3rd Phase	261.58
TD22	Tertiary	Less 1.5m	3rd Phase	508.43
TD23	Tertiary	Less 1.5m	3rd Phase	648.27
TD24	Tertiary	Less 1.5m	3rd Phase	241.73
TD25	Tertiary	Less 1.5m	2nd Phase	334.45
TD26	Tertiary	Less 1.5m	1st Phase	1454.94
TD27	Tertiary	Less 1.5m	3rd Phase	129.83
TD29	Tertiary	Less 1.5m	2nd Phase	240.12
TD30	Tertiary	Less 1.5m	3rd Phase	632.27
TD34	Tertiary	Less 1.5m	3rd Phase	258.17
TD35	Tertiary	Less 1.5m	1st Phase	2028.69
TD36	Tertiary	Less 1.5m	3rd Phase	105.85
TD37	Tertiary	Less 1.5m	2nd Phase	2975.72
TD38	Tertiary	Less 1.5m	3rd Phase	215.67
TD39	Tertiary	Less 1.5m	3rd Phase	603.26
TD41	Tertiary	Less 1.5m	2nd Phase	117.52
TD42	Tertiary	Less 1.5m	3rd Phase	374.53
TD43	Tertiary	Less 1.5m	3rd Phase	302.51
TD44	Tertiary	Less 1.5m	3rd Phase	359.60
TD45	Tertiary	Less 1.5m	3rd Phase	250.08
TD48	Tertiary	Less 1.5m	3rd Phase	369.39
TD49	Tertiary	Less 1.5m	2nd Phase	486.75
TD50	Tertiary	Less 1.5m	3rd Phase	288.35
TD51	Tertiary	Less 1.5m	1st Phase	554.98
TD52	Tertiary	Less 1.5m	3rd Phase	327.49
TD53	Tertiary	Less 1.5m	3rd Phase	355.99
TD54	Tertiary	Less 1.5m	3rd Phase	149.82
TD55	Tertiary	Less 1.5m	3rd Phase	205.28
TD56	Tertiary	Less 1.5m	2nd Phase	470.92
TD57	Tertiary	Less 1.5m	3rd Phase	405.10

TD58	Tertiary	Less 1.5m	2nd Phase	77.48
TD59	Tertiary	Less 1.5m	1st Phase	326.83
TD60	Tertiary	Less 1.5m	3rd Phase	230.88
TD61	Tertiary	Less 1.5m	1st Phase	254.73
TD62	Tertiary	Less 1.5m	3rd Phase	330.43
TD64	Tertiary	Less 1.5m	1st Phase	261.41
TD65	Tertiary	Less 1.5m	3rd Phase	725.76
TD66	Tertiary	Less 1.5m	3rd Phase	454.09
TD67	Tertiary	Less 1.5m	2nd Phase	628.38
TD68	Tertiary	Less 1.5m	2nd Phase	506.15
TD69	Tertiary	Less 1.5m	1st Phase	198.62
TD70	Tertiary	Less 1.5m	3rd Phase	489.68
TD71	Tertiary	Less 1.5m	3rd Phase	421.51
TD72	Tertiary	Less 1.5m	2nd Phase	253.26
TD74	Tertiary	Less 1.5m	2nd Phase	445.88
TD75	Tertiary	Less 1.5m	1st Phase	90.20
TD76	Tertiary	Less 1.5m	3rd Phase	433.71
TD77	Tertiary	Less 1.5m	2nd Phase	171.51
TD78	Tertiary	Less 1.5m	3rd Phase	341.15
TD79	Tertiary	Less 1.5m	1st Phase	202.65
TD80	Tertiary	Less 1.5m	3rd Phase	212.74
TD81	Tertiary	Less 1.5m	2nd Phase	235.99
TD83	Tertiary	Less 1.5m	2nd Phase	444.42
TD85	Tertiary	Less 1.5m	1st Phase	148.02
TD87	Tertiary	Less 1.5m	2nd Phase	206.07
TD88	Tertiary	Less 1.5m	3rd Phase	446.96
TD89	Tertiary	Less 1.5m	1st Phase	445.84
TD90	Tertiary	Less 1.5m	3rd Phase	217.11
TD91	Tertiary	Less 1.5m	3rd Phase	318.07
TD91	Tertiary	Less 1.5m	3rd Phase	139.61
TD88	Tertiary	Less 1.5m	3rd Phase	398.85
			Total	34685.21
			Gross Total	75085.21

12.3.3.2 List of Infrastructure Measures for Drainage and Flood Control Network

There are altogether 17 bridges (RCC) and 31 culverts (RCC) in the Paurashava. Those bridges and culverts are located on the canals and drainage channels.

Except the above infrastructure, more 5 bridges will be needed on different proposed roads as presented in the map. Two covert have been proposed to control intrusion of river water through the canals. About 3.1 km. road cum embankment will be needed on the southern part of the Dhaleswari Branch River for prohibiting flood water intrusion from eastern part to the western part.

Table 12. 9: List of existing and proposed infrastructures for drainage and flood control

Name of infrastructure	Existing	Proposed (No.)
Bridge	17	4
Culvert	31	2
Sluice Gate	0	
Flood Wall	0	
Road cum Embankment	0	
Flood Embankment	0	

12.4 Plan Implementation Strategies

12.4.1 Regulations to Implement the Drainage and Flood Plan

The regulations which will be needed for the implement of drainage and flood plan are:

1. Section 3 of the **Acquisition and Requisition of Immovable Property Ordinance, 1982** is needed for acquisition of land in view to construct drainage and flood control components. The Water Development Board, according to the demand, will apply to the Deputy Commissioner for such acquisition.
2. **Water Development Board Ordinance, 1976** delegate power to the Water Development Board for construction of embankment. To control intrusion of flood water and improvement of drainage facilities, the Board is empowered to take necessary actions according to the regulations prescribed in the Ordinance.
3. **Irrigation Act, 1876** has prescribed regulations for the improvement of irrigation facilities through the improvement of drainage facilities in view to increase agriculture production. Deputy Commissioner may enforce any regulations prescribed in the Act necessary for irrigation facilities.
4. **Canal and Drainage Act, 1872** has enacted for excavation of canal and removal of drainage congestion from agriculture land. The Deputy Commissioner may authorize any person, through a written approval, for excavation of canal in view to improve irrigation facilities for agriculture practices.
5. **Public Health (Emergency Provision) Ordinance, 1944** has enacted for the improvement of drainage and sanitation facilities. Department of Public Health Engineering (DPHE) is authorized to enforce the regulations prescribed in the Ordinance. The government approves project for DPHE mostly for the improvement of drainage and sanitation facilities in urban areas.

12.4.2 Implementation, Monitoring, Evaluation and Coordination of the Plan

Implementation through Multi-Sectoral Investment Programme: Major infrastructure development works such as primary roads, water supply, drainage, etc., will largely be controlled by Government. Public works requires efficient co-ordination through the Multi-Sectoral Investment Programme (MSIP).

Objective of a Multi-Sectoral Investment Programme (MSIP) will match a list of the development projects with the funding stream necessary to implement them. There are two basic activities that would determine the contents of MSIP. One activity would be to prioritize and schedule the investment projects of all public agencies so they will collectively help to achieve the development goals and objectives of the Urban Area Plan. Second activity would be to analyze the source and availability of fund for the prioritized list of development projects.

Implementation through Action Plans and Projects: Action Plans and Projects will be the implementation plans to solve problems at the local level. Action plans will take a direct approach toward plan implementation with a minimum of research, reports or elaborate planning methods. These projects will be easily identifiable and will require minimum resource.

Implementation through Development Control: Landuse zoning is one of several methods of plan implementation to be considered. In all cases where some form of

development, landuse control may be applied; careful consideration requires the following ideologies:

- the purpose to be achieved by the development controls;
- where controls should be applied;
- what aspect of development needs to be controlled;
- what type of development controls are required;
- what degree or level of development control is required;
- who will be affected by the required control;
- who will be affected by the controls and in what manner;
- when the controls should be applied;
- what will be the likely impact of the controls;
- how and by whom will the controls be administered and enforced.

Development control as an instrument of plan implementation may be selectively applied within the Urban Area Plans. Development controls would also be varied in intensity and detail to suit the particular circumstances. It is important that they should be clear and easily understood by all parties concerned. Since the entire Paurashava Master Plan 'package' has become statutory, development controls associated with its component plans would also be statutory.

Implementation by Facilitating Private Investment: Another approach that would be taken by government toward plan implementation will be to guide and facilitate investments made by the private sector. Government can achieve this with relative ease and at very low cost by setting up a legal and operational framework, coupled with suitable incentives, to facilitate land consolidation, plot boundary readjustment, efficient layout of plots and provision of local infrastructure by the private sector. The benefits of this approach would be:

- increased efficiency of the urban land market would make, more private land available to urban households;
- would pass much of the development costs for local infrastructure to the private sector and land market mechanisms;
- would increase in land for development without large cash outlays by government to purchase land for development schemes; and
- would keep provision of land for community facilities virtually no cost to government.

Plan Monitoring

The Urban Area Plan would simply be tools for guiding and encouraging the growth and development of an urban area in a preferred manner. In a rapidly changing urban environment, the Urban Area Plan would require to keep up to date. If this is not done, within a few years it will be obsolete. Therefore, it is imperative that the requirement for regular updating of the Urban Area Plan be made a legal requirement.

Map 12.3: Proposed Drainage and Flood Control Components

For implementation of the various programme components of the Urban Area Plan appropriate administrative measures will have to be undertaken. This will essentially include project preparation and monitoring of their execution and evaluation. For carrying out all these activities appropriate institutional measures are also be needed.

Evaluation

Monitoring and evaluation of ongoing and implemented projects is essential to keep the future course of action on the right track. An ongoing project should be regularly monitored and handicaps identified to enable taking appropriate measures at the right time.

Post implementation evaluation is also needed to take appropriate measures correcting past errors-from project preparation to implementation.

The top level supervision has to be done by a high level supervisory committee headed by Paurashava Mayor, LGED representative and Local Government Ministry. Other members of the committee will be local Ward Councilors, local community leader/social workers and the Town Planner of the Paurashava. The committee will supervise implementation works regularly and issue necessary instructions to expedite the works of implementation.

Co-ordination

A Planning Section of Paurashava should have close interaction with the citizen of Paurashava at large in order to make people aware of the benefits of a good plan and, therefore, their social responsibility to promote plan implementation in one hand and also resist contraventions on the other. A specific interactive cell is recommended to operate in this regard with following responsibilities:

- Provide pre-application advice to residents, consultants and developers about landuse management issues and application procedures for the submission of development applications.
- Enforce planning and landuse management related legislation and zoning scheme regulations.
- Issue of property zoning certificates.
- Investigate and resolve landuse management complaints, illegal landuse and prosecuting contraventions.

Such interactive windows may be opened in various convenient locations to ensure ease of the answers to commonly asked questions may be shown in the internet. Besides, those may be shown in the print and electronic media time to time.

In spontaneous areas, while all out people's co-operation is needed for project implementation; there will also be some elements of negotiation. Negotiation will be particularly needed in case of road widening projects. It will be a crucial task for Paurashava to convince the affected people to give up their land for road use. Efforts should be made to convince the land owners on the ground of enhancement of property value due to road widening. In case people refuse to offer land free of cost necessary arrangements may have to be made for payment of compensation. This process of negotiation will be very critical, cumbersome and time consuming, and therefore, has to be handled with utmost care and patience. The best results can be accrued only by wining people's confidence. In case the authority fails to get peoples co-operation they

should exercise power of compulsory acquisition of land. Attempts may be made to engage NGOs / CBOs to work as catalysts in negotiation.

12.5 Environmental Management Part

The plan has documented Bhanga Paurashava area's environmental conditions, determines potentiality for present and past site contamination (e.g., hazardous substances, petroleum products and derivatives) and identifies potential vulnerabilities (to include occupational and environmental health risks).

12.5.1 Goals and Objectives

Based on the information and data on the air, water, noise, soil, drainage congestion, river erosion, garbage disposal and industrial and clinical wastes an effective and action oriented plan is required as prescribed in the ToR. Preparation of environmental management plan is the ultimate goal of this study.

12.5.2 Methodology and Approach to Planning

Environmental survey has conducted following the standard methods and procedures to determine environmental pollutions. Elements of pollutions of environment are air, water, land and noise for the development of urban areas. The Consultants have taken necessary assistance and information from the Paurashava Mayor, Councilors, Engineers and other concerned officials as well as the general inhabitants to determine pollution in air, water, land and noise. Based on the information and data collected from the field and secondary sources, detailed report has been prepared. Data collection format and questionnaire was approved by the PD of UTIDP, LGED. The data collection procedure incorporates discussion meeting with the Paurashava Mayor, Councilors and other Paurashava representatives. Discussions were also made with other GOs like DPHE, BADC, etc. and NGOs representatives working in the Paurashava.

12.6.1 Existing Environmental Condition

The Paurashava is a part of greater Faridpur district. Some information has collected from secondary materials and they are on geology, soil and sub-soil condition, climate, temperature, humidity, rainfall, wind direction and hydrology. Other relevant information is being collected from field survey and they are mostly on the environment pollution. Those information presents sequentially in the following paragraphs.

12.6.2 Geo-morphology

Geology, Soil and Sub-soil Conditions: Soil of the Zila is mainly formed by the very young Ganges meander flood plain and the mixed young and the older Ganges meander flood plain. The northern and eastern parts of the Zila are covered by grey silty clay of the active and very young Ganges meander flood plain. Central and southern parts of the Zila are mainly formed of brown silty clay of the mixed young and the older Ganges flood plain. Northern part of the Zila is less productive and is mainly used for Aus paddy.

In the Paurashava, sub-soils are being eroded naturally and the soil varies from place to place and composed of clay to fine sand from 0-40 ft depth, fine sand to very fine sand 40-160 ft, fine sand to medium sand 160-260 ft. Medium sand to coarse sand is available from 260 ft to 380 ft depth and in rest of the depth are hard clay, fine sand and coarse sand formed entirely by the deltaic action of the Ganges, which brought mud and limestone from Himalayas.

To a great extent, soil of the Paurashava is uniform in character. Only variation observed is in greater or smaller admixture of sand, silt and clay in grayish and dark gray colours.

Along the riversides, it is found that the percentage of sand is higher and in the areas where deltaic action has ceased is lower. The load bearing capacity of this soil is very poor.

Soil types, strength and density characteristics based on Standard Penetration Test Values (N) have been mentioned for the different types of deposits at various depths.

Cohesive silt and clay layers having N-values less than 4 are very soft to soft and are not considered suitable to support any civil engineering structures without ground improvement. There are only a few areas near the waterfronts with such low N-values in the surface underlain by comparatively strong clay and sand soil strata. Sand layers with variable quantities of silt/clay having N-values less than 10 are considered very loose to loose. In a few locations such weak sandy layers occurred. They occurred usually in the surface layers.

The natural clay soils of investigated area can be divided into two major groups distinguished by their colours as under:

Red clay: Light brown to brick red and massive, containing ferruginous and calcareous nodules.

Mottled clay: Earthy grey with patches of orange, brown colour, massive and contains ferruginous and calcareous nodules.

For plastic silts and clays consistency terms like very soft, soft, medium stiff, stiff, very stiff and hard indicate the following approximate allowable bearing capacity of the different soil strata estimated on the basis of SPT N-values.

For cohesion less soil deposits (non-plastic silts and sands) relative density has been described with terms like very loose, loose, medium dense, dense and very dense on the basis of SPT N-values measured in the different cohesion less soils strata encountered within the explored depth of 15m. These relative density terms give the following approximate strength characteristics based on SPT N-values.

Table 12.10: SPT N-Values

	SPT N-value	Allowable bearing Capacity (kPa)
Very soft	0–2	< 25
Soft	2–4	25–50
Medium	4–8	50–100
Stiff	4–15	100–200
Very stiff	15–30	200–400
Hard	> 30	> 400

Table 12.11: Strength Characteristics

Relative Density	SPT N-Value	Estimated Shearing Angles	Strength Characteristics
Very loose	> 4	28°	Very poor
Loose	4–10	30°	Poor to fair
Medium dense	10–30	32°	Fair to good
Dense and Very dense	> 30	34°	Good to excellent

Climate: The climate regime of the study area is that of Faridpur which is similar to that of the remainder of the country. The cool and dry winter of December – February is followed by hot and showery pre-monsoon period of March – May and then a relatively cooler but very wet monsoon season prevails during June – September. Again, a transitional humid and showery period follows up to the beginning of winter. From mid November the weather begins to be dry and relatively cool.

Temperature: Average maximum temperature varies between 24.5° C and 36.3° C and minimum temperature varies between 12.1° C (January) and 25.9° C (August). The hottest months are March, April, May, June, July and August. From December to February, Paurashava experiences cool periods when minimum temperature varies from 12.1° C (January) to 14.6° C (February).

Humidity: The planning area is situated in the tropical zone. Heavy rains are experienced during June – September with the movement of moist monsoon wind (April to October). Almost 80 percent of the total rainfall is recorded during June – October. Average annual rainfall of the area is about 1547 mm. Rainfall in the area is very much influenced by the southwestern monsoon. Due to northwestern effect substantial rainfalls are also recorded during March to May period. Winter is generally dry with little rainfall in the months of December and January.

The weather is hot and wet from March to May with occasional storms locally known as *Kalbaishaki* (Tropical Cyclone). During October and November the weather is generally fine with some wet and stormy days. The characteristic feature of the climate of the study area is the salt laden air throughout the year, especially when it blows from the sea at regular intervals as a result of diurnal change.

Rainfall: The Bhanga Paurashava has on an average, normal rainfall 325.4 mm in the month of June which is highest among all other months. In September, it falls to 232.5 mm; again falling to 142.8 mm in October. From November to March, this rainfall varies between 6.0 mm to 45.2 mm. The rainy season begins in April / May and usually ends in the end of October. The highest number of normal rainy day is in July, called highest rainfall month. About 14 rainy days at an average in July, followed by 15 rainy days in August, 14 in June, 12 in May and September has been the characteristics of rainy day as the data reveals.

Wind Directions: In Gopalganj district, general direction of the wind is same as Gangetic delta, south-west, changing to east towards the head of the valley for the greater part of the year, with a north and north-west direction during the month of April and May. It is observed that winds are stronger in summer in the months of April and May (3 to 6.5 knots) than in winter in the month of November and December (1.5 to 3.0 knots).

Hydrology: River, Canal/Khal and pond are the hydrological components of the Paurashava. Those components are occupying 6.97% (289.85 acres) land of the Paurashava. The canals are linked with the adjacent Kumar River. In dry season, most of those canals are using as agriculture land and in the rainy season they submerges lowlands of the Paurashava. The ponds are spottedly located around the Paurashava. Small numbers of them are larger than one acre. In dry season, ponds water are using for bathing and washing purposes. Canal water generally uses for irrigation purposes.

12.6.3 Solid Waste and Garbage disposal

12.6.3.1 Household Waste

Dustbin is the only system for solid waste disposal from residence of the Paurashava. But no dustbin is in the Paurashava. People throw their household wastes on the adjacent low lands.

12.6.3.2 Industrial waste

No industrial waste available in the Paurashava.

12.6.3.3 Kitchen market waste

Kitchen market waste is being dumped on the low lands available around the market.

12.6.3.4 Clinical/Hospital waste

Existing health facilities are poor in number. There are 5 numbers of health facilities in the Paurashava (one govt. hospital, three private clinics and one diagnostic centre). Ward No. 3 is rich in number in case of health services because, two clinics and the diagnostic centre are located in that Ward. The hospital is in the Ward No. 6.

There is no arrangement for clinical waste management in the Paurashava. The clinics and hospital used to dump solid wastes here and there or nearby ditches. This activity may bring serious health hazard to the inhabitants specially the nearby dwellers.

12.6.3.5 Waste Management System

Solid waste collection and disposal in Bhanga Paurashava is the responsibility of Paurashava authority. The logistics for collection and disposal of solid wastes include 15 sweepers for collection and 1 garbage truck for transportation. Solid waste from the point of generation to the final disposal can be grouped into three functioned elements -

- Waste generation and storage
- Collection
- Final disposal

Waste Generation and storage: Households within the area are producing 2.0 tons of domestic solid wastes per day.

Collection: The waste collection is done in the following three stages:

- The residents themselves take domestic refuses from households to the intermediate dumping points.
- Street and drain wastes are collected and dumped at intermediate disposal points by the municipal sweepers and cleaners.
- Final collection from the intermediate points and its disposal to the dumping yard by the conservancy worker.

Final disposal: The authority used to dump in low lands on the basis of land owner's interest or nearest ditches.

Policies on Solid waste Management: In order to improve the solid waste problem and to improve the environmental condition of the Paurashava, following Macro and Micro level policy measures will be needed:

- Formation of legislation regarding solid waste management.
- Formation of standards for collection and disposal of waste.
- Incentives for introduction of environmentally clean and efficient technology for waste disposal which would help to reduce the volume of waste and facilities more recycling.
- Construction of waste as an unutilized resource and assisting in recycling of waste for conservation of resources and protection of environment.
- Introduction of environmental education especially sanitary habits in school curriculum.

12.6.3.6 Latrine

Toilet system of the study area is mostly categorized as pucca and katcha. In spite of this, Paurashava has a modest development of pucca toilets in government zones. Sewerage system has not been introduced on a trial basis as to their popularity and acceptance. Ownership of toilets varies widely in most of the Wards. Most of the households have their own toilets and at the same time there is joint toilets found in slum areas. Sanitary toilets or pucca toilets are comparatively good in all the Wards. Only 9% katcha toilet is found in the Paurashava and owner of those toilets are poor people.

12.6.3.7 Industry

A number of light industrial agglomerations are found in the Paurashava. Industries are located in the different Wards and those are of different types like bakery, engineering workshop, ice cream factory, welding workshop, rice mill and saw mill. Total number of industries is 17. All of those industries are light industries and are located in different Wards.

Most of the industries in the study area depend on raw materials available within the study area. The industrial output produces in the local market. It is also found that those establishments have problems and potentialities. Careful consideration will help to resolve those problems and adoption of necessary policy initiatives will help to flourish the existing units and draw more investors and entrepreneurs to set up new manufacturing industries, which will be based mainly on local agro-products.

12.6.4 Brick Field

No brickfield is in the Paurashava premises.

12.6.5 Fertilizer and Other Chemical Use

The fertilizer and chemical uses in the agriculture field for increasing agriculture production are Urea, Potash, Gypsum and Nitrogen Sulphate, Bashudin, Diazinon, Sumithion and Padan. Those chemicals are being contaminated with the surface water and create water pollution. Those chemicals and insecticides are creating water pollution of the Kumar River. For more details Chapter-8 of the Structure Plan (Environmental Issues in Agriculture Practice).

12.6.6 Pollutions

12.6.6.1 Water

Water is considered polluted when it is altered from the natural state in its physical condition, and chemical and microbiological composition, so that it becomes unsuitable or less suitable for any safe and beneficial consumption. The used water of a community is called wastewater or sewage. If it is not treated before being discharged into waterways, serious pollution is the result. Water pollution also occurs when rain water runoff from urban and industrial areas and from agricultural land and mining operations makes its way back to receiving waters (river, canal or pond) and into the ground.

In Bhanga Paurashava, there are 355 ponds, 263 ditches and 11 canals as sources of surface water. Surface water pollution has found in the study area originating from the use of insecticide and chemical fertilizers in crop fields. Wash out by rain water from crop fields to nearest water sources with chemicals is causing water pollution. Cattle bathing and flow of waste water from domestic use discharge into the ponds, khals and river have also identified as reasons for surface water contamination. The Paurashava authority has yet not taken any initiatives to control surface water pollution.

Ground water pollution also exists in the Bhanga Paurashava. Presence of iron and arsenic as pollutants in ground water are the reasons for such pollution. Not any initiative has been made by any local authority/ GOs/ NGOs to reduce arsenic problem.

There are no mentionable industries located in this Paurashava, therefore there is no scopes of industrial wastes mix with water and create water pollution. The Paurashava have a few number of drains that are not sufficient to serve the whole area. In Ward No. 6 and 9, the drainage problem that creates water logging as well as water pollution. Bhanga Paurashava has no sufficient number of waste bins and dumping place for garbage management so this creates severe air and water pollution. Wash out by rainwater from crop fields to nearest water sources with chemicals is causing water pollution. Cattle bathing and flow of waste water from domestic use and rain off into the khals and ponds have also identified as reasons for surface water contamination.

12.6.6.2 Air

Air pollution is the introduction of chemicals, particulate matter, or biological materials that cause harm or discomfort to humans or other living organisms, or damages the natural environment, into the atmosphere.

Operations of shallow engine driven vehicles (Nochiman/ Kariman) that are unfriendly to the environment are responsible for air pollution. Those vehicles use diesel as fuel. Diesel particulate matter (DPM) includes diesel soot and aerosols such as ash particulates, metallic abrasion particles, sulfates, and silicates. The small size inhaled particles may easily penetrate deep into the lungs with acute short-term symptoms such as headache, dizziness, light-headedness, nausea, coughing, difficult or labored breathing, tightness of chest, and irritation of the eyes and nose and throat. Long-term exposures can lead to chronic, more serious health problems such as cardiovascular disease, cardiopulmonary disease, and lung cancer.

There are 3 rice mills, 4 saw mills and furniture manufacturing shops in the Paurashava. Saw mills release wooden dust as effluent into the air and polluting the surroundings. The rice husking mills used to boil them before husking. The mills use wood, rice husks or

sawdust as fuel in boiling burners. Smoke and hot gases releasing through chimney create massive air pollution. During husking time, the mills release dust husks into the air and polluting the nearby environment. Those mills have not installed any treatment plant. The Paurashava authority has not yet taken any initiatives to install treatment plant in those industries.

Air pollution also occurs by the odor from the open municipal garbage. There is no dustbin in the Paurashava and people are not aware to dispose their solid garbages in to specific place rather than open ground. As a result open garbage disposal is common and it creates serious odor which ultimately affects the surrounding air.

12.6.6.3 Sound

Noise pollution is basically consists of unpleasant displeasing human, animal or machine created sound that disrupts the activity or balance of human or animal life. A common form of noise pollution is from transportation, principally motor vehicles. Other sources are car alarms, office equipment, factory machinery, construction work, audio entertainment systems, loudspeakers and noisy people.

In the Paurashava, shallow engine driven vehicles like Nochimon/Kariman are playing on roads as a mean of local transport. They are making above 250 trips throughout the Paurashava in a day. Engine generated sounds in their operational time on roads is a matter of nuisance as well as a source of noise pollution. The Paurashava authority has already noticed them to restrict their movements. Generated sounds from industry at their operational time are also a source of sound pollution existing in Bhanga Paurashava.

12.6.6.4 Land Pollution

Soil pollution is basically about contaminating the land surface of the earth through dumping urban wastages indiscriminately, dumping of industrial waste, mineral exploitation and misusing the soil by harmful agricultural practices.

Soil pollution is occurring from extensive use of fertilizer in the agriculture lands and water logging. Extensive use of fertilizer is changing the bio-chemical composition and the lands are loosing their productivity day by day. At the same way, water logging for four months in a year is settling non decomposable materials on lands and the lands are being polluted. Water-logging, over time leads to the soaking of soils, impeding agricultural production. The water applied in excess as a stock pollutant accumulates in the underground hydrological system and causes damage to production.

12.6.6.5 Arsenic

Ground water quality in the planning area is influenced by arsenic and iron. Water in most shallow aquifer is arsenic and all are contaminated with iron, not suitable for drinking purposes. Water collects from river and ponds for irrigation purposes. The lower deep aquifer is found at a depth of 220 m to 350 m. Deep aquifers with fresh water in the Paurashava are exploited to meet the demand of water for inhabitants but that is small.

12.6.6.6 Other Pollution

In the planning area, sub-soils are being eroded naturally and the soil varies from place to place and composed of clay to fine sand from 0-40 ft depth, fine sand to very fine sand 40-160 ft, fine sand to medium sand 160-260 ft. Medium sand to coarse sand is available from 260 ft to 380 ft depth and in rest of the depth are hard clay, fine sand and coarse

sand formed entirely by the deltaic action of the Ganges, which brought mud and limestone from Himalayas.

12.6.7 Natural Calamities and Localized Hazards

12.6.7.1 Cyclone

A disaster is the tragedy of a natural or human-made hazard (a hazard is a situation which poses a level of threat to life, health, property or environment) that negatively affects society or environment. Disaster can be classified into two categories: natural disaster and man-made disaster. A natural disaster is the effect of a natural hazard (e.g. flood, volcanic eruption, earthquake or landslide) that affects the environment and leads to financial, environmental or human losses. Man-made disasters are disasters resulting from an element of human intent, negligence, or error, or involving a failure of a man-made system.

The Paurashava area including the Bhanga Upazila has affected by the several major natural disasters ranging from Cyclone, Flood to Water-logging and Draughts, etc. The periods of those disasters are 1998, 2000, 2004, 2007 and 2008. Very scanty attempt has been made by government to rehabilitate people after the natural disaster.

Urbanization is taking the lands of other uses to residential use. For this purpose agricultural lands and water bodies are being chosen most frequently and the lands are being converted into urban settlement. In Bhanga Paurashava, wet lands are filled up and agricultural lands are converted. This has been identified as the major man-made disaster accelerating the degree of conversion year to year. Use of poisonous insecticides on the agricultural land is another man-made disaster which will affect in the long run.

12.6.7.2 River Erosion

The main rivers flowing through the Zila are the Padma, the Jamuna, the Garai and the Kumar. The Padma and the Jamuna are navigable throughout the year. These rivers are non-tidal. In Soil formation of the study area is influenced by its river system through sedimentation. Upper layer of the soil is mainly clay, silty and alluvial type. Those soils are being eroded daily in the eastern and southeastern part of the Paurashava.

The Kumar River sides are erosion prone caused by seepage of water from countryside towards the river along the banks during post-monsoon period and during high flood period. Water waves created during the storm surge, cyclone and heavy rainfall are causes of erosion. The seepage of water may create unbalanced pore pressure producing severe bank scouring in loose sandy riverbank resulting river erosion.

12.6.7.3 Flood

Inundation has been measured within Paurashava on plinth and above plinth level. In this Paurashava flood (2007) reached plinth level. Moreover, it was not harmful for household of the Paurashava.

12.6.7.4 Earth Quake

The Paurashava is not in earth quake zone.

12.6.7.5 Water-Logging

Inundation within Paurashava areas is experienced in the months of Srabon to Ashwin. Due to influences of rainfall during monsoon, usually most of the Wards suffer with water-logging. Rainy season is the season when problems of water logging begin. Generally, during rainy season, the water overflows on the both sides of the canals up to 2.5 feet. In the months of Srabon to Ashwin, the water rises with a height of 3-4 feet. This internal flood or water-logging is experienced within the above Ward No. 2, 3, 5, 6 and 9 during peak monsoon time with high rainfall for long-duration. The water-logged areas are found along roads, ditches and ponds within Paurashava. In the Ward No. 2 the location is Pravakardi. In Ward No. 3 the water-logged area is Nagar Sundardi. In Ward No. 5, it is in Gopinathpur. In Ward No. 6, it is in Tengrakhola. In Ward No. 9, water-logging occurs in Golabaria and Chotabahara. Water-logging situation is a major issue for this Paurashava which requires be resolved immediately through Paurashava Master Plan.

12.6.7.6 Fire Hazard

No fire hazard record is found in the Bhanga Paurashava. With the increase of population, chances of fire incidence may increase for offices, institutions, market places and industries. Electric short-circuit is mainly responsible for fire hazards in urban area. Human error may also cause incidence of fire hazard sometimes.

12.6.7.7 Other Hazards

Urbanization is taking the lands of other uses to residential use. For this purpose agricultural lands and water bodies are being chosen most frequently and the lands are being converted into urban settlement. In Bhanga Paurashava wet lands are filled up and agricultural land is converted. This has been identified as the major man made disaster which is accelerating the degree of conversion year to year. Use of poisonous insecticides on the agricultural land is another man-made disaster which will affect in the long-run.

12.7 Plan for Environmental Management and Pollution Control

12.7.1 Proposals for Environmental Issues

In Bhanga Paurashava, noise pollution is occurring by three wheelers and sound generated from saw mills and rice husking mills. Water contamination is observed as "Arsenic" threat. Air pollution is caused by dust emitted from saw mill, rice hushing mills and furniture shops. Also flood water and water-logging are creating health hazards. Dysentery, diarrhea, etc. diseases occurs due to flood and Water-logging. Habitual inundations, especially in monsoon, due to external floods from canals are another threat to environment. These above varies are extremely important uses of concern for the Paurashava. Pragmatic planning / solution and proper Drainage Master Plan are very pertinent issues which will be of utmost importance in planning the Bhanga Paurashava.

However, implementation of activities like roads, drainage, bridge / culverts, housing and industrial establishments and bazars will radically change the natural topography and landuse pattern. The agricultural land will be converted into urban and semi-urban area. Existing scenic beauty will disappear; water bodies will lost and general slope will be diminished for earth filling due to urbanization. Therefore, in the process of preparation of Master Plan, Structure Plan and Ward Action Plan, consideration of those factors will be made for keeping the natural environment.

For a better living environment above environmental phenomenon should be considered with the systematic planning principles and regulatory measures. With these views, people's awareness should be increased about the fair living environment through different public activities. Arrangement of landuses should be provisioned for all the public and private organizations as their necessities.

12.7.1.1 Solid Waste Management Plan

Solid waste management is a crucial problem for the Paurashava. The Bhanga Paurashava does not have the sufficient capability to handle the huge waste generated by the residents due to narrowness of roads, lack of local collection sites stand as impediments to waste management. Particularly in informal/spontaneous areas due to existence of narrow roads the garbage trucks can not enter for removal and transshipment of the garbage. In most places there is no road side open space for locating garbage bins. Garbage is often found to be disposed off on low lands. As a result rotten garbage spoils the local environment of the area posing health hazard of the local residents. No dustbin is in the Paurashava whereas the daily waste produced is about 2.0 tons.

For an efficient solid waste management system, it is recommended to engage, CBOs, NGOs and micro enterprises on contract basis for collection and disposal of solid waste and street sweeping.

Table 12.12: Environmental Management Plan

Facility	Ward No	Mouza Name	Plot No	Area (acre)	Phasing
Proposed Dumping Site	Out of Paurashava	Atadi (076_00)	378-388	2.63	1st Phase
Proposed Waste Transfer Station 01	Ward No. 09	Sadardi (055_01)	1067	0.085	2 nd Phase
Proposed Waste Transfer Station 02	Ward No. 04	Hasamdia (037_01)	551	0.223	1st Phase
			Total	2.93	

12.7.1.2 Open space, Wet-land and Relevant Features Protection Plan

- The authority named Bangladesh Sports Council in collaboration with the Paurashava authority may construct the stadium. The stadium should use regularly with various programs.
- The land prescribed for tourism development, Bangladesh Parjatan Corporation should be the responsible authority to implement those tourism components. Domestic tourists should be emphasized rather than international in considering establishment of tourism components. Rainwater harvesting will be the major component of this tourism site. This sector can improve economic capability of the Paurashava dwellers rapidly.
- The embankment cum road proposed along the western part of the Kumar River and two sluice gates will control flood water intrusion. As a result, single-crop land (remain wet land in nine months of a year) available in the southern part of the Paurashava will be turned into triple-crop land.

12.7.1.3 Pollution Protection Proposals

12.7.1.3.1 Industrial / Brickfield

In total, 17 industries are in the Paurashava and among them 9 are agro-based industries. One engineering workshop, one ice cream factory, three welding workshops and three bakeries are different then agro-based industries. Ward No. 1 is prominent for industrial

location. A significant percent of air pollution is caused by those industrial establishments. The steps will be taken to protect pollution through industries are:

- All the industries are in mixed-use areas. Some of them will be re-arranged and shifted to the proposed industrial site.
- A green buffer will create around the proposed industrial site; it will separate the area from adjacent landuses and at the same time, environment will be livable.
- In future, the proposed industrial site will also be identified as a site for polluting industry (as identified by the Directorate of Environment). In that, provision of recycling plant should be attached with the individual industry.
- Any brickfield should not be allowed in the Paurashava jurisdiction.

12.7.1.3.2 Air / Water / Land / Sound

For a better living environment above environmental phenomenon should be considered with the systematic planning principles and regulatory measures. With these views, people's awareness should be increased about the fair living environment through different public activities. Arrangement of landuses should be provisioned for all the public and private organizations as their necessities.

The Paurashava is rural based urban area. River, canal and pond water are still below the danger level of pollution. Let it should not be increased. Still people awareness is possible for reducing contamination of ground water. People may aware about the use of pesticides in agriculture field, solid waste disposal in a systematic manner and improved sanitation facilities.

12.7.1.3.3 Other Pollution

At present, control of urbanization and dumping of clinical wastes are the major concern of environment pollution of the Paurashava. Controlled urbanization according to this plan may remove the pollution through urbanization. Control on area / use density, height density and bulk density are the means of pollution protection through urbanization. A specific site within the compound of health services should be provisioned, thus pollution through clinical wastes will be controlled.

12.8 Natural Calamities and Regular Hazard Mitigation Proposals

12.8.1 Protection Plans Addressing Natural Calamities

Change in Topography and Mitigation: The main ground slope of the study area is southeast and southwest direction. Natural topography of the Paurashava has already been changed for urbanization. Implementation of Master Plan activities like roads, drainage, bridge/culvert, housing and industrial estates, bazars and growth centers will radically change the natural topography and landuse pattern of the study area. Agricultural area will be converted into urban and semi-urban area. Present green scenic beauty will disappear, water bodies will be lost and general slope will be diminished for earth filling due to urbanization.

- Careful planning will be needed 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 Paurashava.
- Preserve the Beels, khals as lakes with demarking buffer distance.

Landuse Change and Mitigation: Major portion of the study area is rural setup, with predominance of agricultural landuse. However, urban and semi-urban landuses are observed in the Paurashava and its surrounding areas. With implementation of the Master Plan, rural setup and agricultural landuse pattern will be changed radically into urban landuse type.

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

Drainage Congestion and Mitigation: Drainage congestion may increase further with urban sprawl development. Faulty design, solid waste and rubbish dumping, encroachment and un-authorized structures, siltation, lack of renovation and re-excavation are the main causes of drainage congestion. Drainage system that exists in the study area is not well enough to carry the surface run-off properly. The outlets of these drainage networks are mostly connected with the natural channels or khals. These khals will be silted due to siltation; as a result, drainage congestion generates. And thus many areas are subjected to water-logging during the heavy rainfall causing inconvenience to the people of the area.

- Make proper drainage network in new area considering the slope and local topographical condition.
- Remove all unauthorized structures, which developed on drainage structures.
- Prohibit the people in 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 water logging from heavy rainfall.
- Demarcation of Right of Way to preserve the natural channels.

Groundwater Table Declination and Mitigation: Fall of groundwater table is a common phenomenon in the study area during dry period (February-May). With expansion of urbanization and industrialization through the Ward Action Plan, the groundwater table may further fall if present tradition of using groundwater is continued.

- 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.

Groundwater Pollution and Mitigation: Groundwater pollution due to manganese, iron and hardness is a major problem of the study area. With expansion of urban area, more dependency on groundwater sources may increase the pollution level of sub-surface water.

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

Noise Pollution and Mitigation: Although there is no data available on noise pollution of the study area, however, it seems that present noise level does not exceed the Bangladesh Standard. More noisy area may be the Bus Terminal area and Industrial and Market area. Hydraulic horn of buses and rickshaw bells are the main noise sources in the study area. However, some noises also generate during piling and construction works. Besides, welding workshops, saw mills, musical instruments and blacksmiths are also common sources of noise pollution in urban areas. With expansion of urban area, the noise pollution will be increased for increasing number of motor vehicles, market places, industries, etc.

- Stop using hydraulic horn in buses, trucks and other motor vehicles.
- Declare some areas like hospitals, schools, parks, etc. as silent zone.
- Control abnormally high noise from saw mill, old machines should be repaired or replaced.
- Foundation of machines should be specially prepared to reduce noise.
- Special type of silencer may be attached with the machines to reduce noise.
- Welding and blacksmith workshops can be fenced with glasses to protect the passersby from possible pollution effects.
- People constantly working in welding and blacksmith workshops should wear earplugs and glasses. Regular medical checkups can be carried out to identify possible health problems.

Air Pollution and Mitigation: Present climatic condition of the study area is sub-tropical monsoon. With the implementation of Master Plan this climatic condition is expected to continue if further global climatic change does not occur. However, rainfall may slightly decrease in the study area for cutting of trees and diminishing of green vegetation for urban development. Trees and green vegetation keep environment cool and enhance precipitation and rainfall. Temperature may remain same as present. Urban development keeping vegetation, plants, water bodies and new social forestation in homesteads, educational organizations, roads, embankment and parks will help maintain the climatic condition same as present.

Air-pollution is not a serious problem in the study area. Vehicular emission is also insignificant in the area. Industries are the main sources of air pollution. However, the air pollution will be increased in near future with increase of motor vehicles and industries. With the implementation of Master Plan more industrial zones will be developed which will also induce air pollution in the study area.

- Use catalytic converter in buses, trucks, taxis and tempos.
- Use CNG instead of petrol and diesel.
- Impose ban on movement of sand carrying trucks and conservancy vehicles during office period.

Loss of Biodiversity and Mitigation: Urbanization like roads, infrastructure development, housing, commercial places, industrialization, etc. will replace the existing natural green environment to manmade environment. Trees will be cut down, water bodies will be filled up and polluted; sugarcane, paddy, banana, papaya and vegetable production will be reduced and mango garden and bush will disappear for urban expansion in new area. Wild animals, birds and fishes will lose their habitats and as a result a big loss of biodiversity will happen for urban expansion.

- Avoid critical ecological area and refugee sites from development activities.
- Aware people for keeping some 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.

Parasitic Diseases and Mitigation: Parasitic diseases like dengue, malaria and filaria are not common in the project area. However, with the expansion of urban area, the prevalence of these diseases may increase in the project area. During last 3 to 4 years, the country faces dengue problem although this problem was negligible. This problem may happen also in the Paurashava for increasing urbanization and industrialization.

- Regular mosquito eradication program in the project area.
- Dengue carrying mosquitoes live in fresh water of tire, cans, bottles and flower tubs. Segregation of old tires; cans and bottles are required before dumping.
- Remove additional water of flower-tubs and refrigerator cans regularly.
- Improve drainage system and remove waterlogged areas in the project.
- Regular cleaning of drain and removal of water hyacinth and other aquatic plants are required from ponds, ditches, khals and Beels.
- Use mosquito net during sleeping at both night and daytime.
- Increase people's awareness on parasitic diseases and mosquito control.

12.8.2 Protection Plan Addressing Regular Hazards

- Most of the natural canals and water courses will be preserved and maintained. The ponds larger than 0.25 acres should be preserved as a water reservoir.
- To protect northern and southern part from annual flood, a road cum embankment including two sluice gates will be needed and these will be controlled by the Water Development Board.
- For the removal of drainage congestion, sufficient number of bridges and culverts should be provisioned during construction of roads.
- Indiscriminate land filling for expansion and construction of residential areas and buildings should be controlled with the imposition of agriculture policy.

12.8.3 Protection Plan Addressing Encroachment and Other Relevant Issues

- As a measure of protection from encroachment restrictive buffer zone will be created on both sides of natural canals, rivers and other watercourses (if necessary). Walkways and plantation will be needed for the protection of those buffer zones.
- Formation of appropriate legislation on solid waste management will be necessary. People encroaches canal and river through dumping of solid wastes. Encroachment

on road, canal and river should be removed as early as possible with the formation of joined collaboration committee. This committee may be formed with the members from Paurashava, LGED, RHD and WDB.

- Using of waste as an unutilized resource and assisting in recycling of waste for conservation of resources and protection of environment.
- Introduces environmental education especially sanitary habits in school curriculum.

12.9 Plan Implementation Strategies

12.9.1 Regulations to Implement the Drainage and Flood Plan

The regulations which will be needed for the implement of drainage and flood plan are:

1. Section 3 of the **Acquisition and Requisition of Immovable Property Ordinance, 1982** is needed for acquisition of land in view to construct environmental components. The authority, according to the demand, will apply to the Deputy Commissioner for such acquisition.
2. Section 4 of the **Conservation of Environment Act, 1995** have prescribed duties and responsibilities of the Director. Most of those responsibilities are on the control of pollution.
3. Section 28 (1, 2 and 3) of the **Forest Act, 1927** has prescribed regulations on village forest, which is necessary for the formation of village / Paurashava forest.
4. Section 5 of the **Playfield, Open space, Garden and Natural Tank in Urban Areas Preservation Act, 2000** will be needed for the preservation of playfield, garden, open space and natural tank of the Paurashava.
5. **Water Hyacinth Act, 1936** was enacted for preventing the spread of water hyacinth in Bangladesh and for its destruction. It is said in the section 5 that, no person shall grow or cultivate water hyacinth in any garden or in any ornamental water or receptacle. Again, according to the section 8(1) said, with a view to facilitating the discovery or destruction of water hyacinth, an Authorized Officer may, subject to any rules made under this Act, by a notice served in the prescribed manner, direct an occupier of any land, premises or water within a notified area to cause-
 - a) Any branches of trees or shrubs on any such land or premises which overhang the edge of any river, stream, waterway, ditch, marsh, bil, lake, tank, pond, pool or pit to be cut back and any undergrowth or jungle thereon to be removed from such edge, within a distance specified in the notice, or
 - b) Any vegetation appearing above the surface of any such water to be removed from the water, within such period as may be specified in the notice.
6. Section 7 of the **Water Resources Planning Ordinance, 1992** will be needed for the development of water resources available in the Paurashava.

12.9.2 Implementation, Monitoring, Evaluation and Coordination of the Plan

Implementation through Multi-Sectoral Investment Programme: Major infrastructure development works such as primary roads, water supply, drainage, etc., will largely be controlled by the Government. Public works requires efficient co-ordination through the Multi-Sectoral Investment Programme (MSIP).

Objective of a Multi-Sectoral Investment Programme (MSIP) will match a list of the development projects with the funding stream necessary to implement them. There are

two basic activities that would determine the contents of MSIP. One activity would be to prioritize and schedule the investment projects of all public agencies so they will collectively help to achieve the development goals and objectives of the Urban Area Plan. Second activity would be to analyze the source and availability of fund for the prioritized list of development projects.

Implementation through Action Plans and Projects: Action Plans and Projects will be the implementation plans to solve problems at the local level. Action plans will take a direct approach toward plan implementation with a minimum of research, reports or elaborate planning methods. These projects will be easily identifiable and will require minimum resource.

Implementation through Development Control: Landuse zoning is one of several methods of plan implementation to be considered. In all cases where some form of development, landuse control may be applied; careful consideration requires the following ideologies:

- the purpose to be achieved by the development controls;
- where controls should be applied;
- what aspect of development needs to be controlled;
- what type of development controls are required;
- what degree or level of development control is required;
- who will be affected by the required control;
- who will be affected by the controls and in what manner;
- when the controls should be applied;
- what will be the likely impact of the controls;
- how and by whom will the controls be administered and enforced.

Development control as an instrument of plan implementation may be selectively applied within the Urban Area Plans. Development controls would also be varied in intensity and detail to suit the particular circumstances. It is important that they should be clear and easily understood by all parties concerned. Since the entire Paurashava Master Plan 'package' has become statutory, development controls associated with its component plans would also be statutory.

Implementation by Facilitating Private Investment: Another approach that would be taken by government toward plan implementation will be to guide and facilitate investments made by the private sector. Government can achieve this with relative ease and at very low cost by setting up a legal and operational framework, coupled with suitable incentives, to facilitate land consolidation, plot boundary readjustment, efficient lay out of plots and provision of local infrastructure by the private sector. The benefits of this approach would be:

- increased efficiency of the urban land market would make, more private land available to urban households;
- would pass much of the development costs for local infrastructure to the private sector and land market mechanisms;

- would increase in land for development without large cash outlays by government to purchase land for development schemes; and
- would keep provision of land for community facilities virtually no cost to government.

Plan Monitoring

The Urban Area Plan would simply be tools for guiding and encouraging the growth and development of an urban area in a preferred manner. In a rapidly changing urban environment, the Urban Area Plan would require to keep up to date. If this is not done, within a few years it will be obsolete. Therefore, it is imperative that the requirement for regular updating of the Urban Area Plan be made a legal requirement.

For implementation of the various programme components of the Urban Area Plan appropriate administrative measures will have to be undertaken. This will essentially include project preparation and monitoring of their execution and evaluation. For carrying out all these activities appropriate institutional measures are also be needed.

Evaluation

Monitoring and evaluation of ongoing and implemented projects is essential to keep the future course of action on the right track. An ongoing project should be regularly monitored and handicaps identified to enable taking appropriate measures at the right time.

Post implementation evaluation is also needed to take appropriate measures correcting past errors-from project preparation to implementation.

The top level supervision has to be done by a high level supervisory committee headed by Paurashava Mayor, LGED representative and Local Government Ministry. Other members of the committee will be local Ward Councilors, local community leader/social workers and the Town Planner of the Paurashava. The committee will supervise implementation works regularly and issue necessary instructions to expedite the works of implementation.

Co-ordination

A Planning Section of Paurashava should have close interaction with the citizen of Paurashava at large in order to make people aware of the benefits of a good plan and, therefore, their social responsibility to promote plan implementation in one hand and also resist contraventions on the other. A specific interactive cell is recommended to operate in this regard with following responsibilities:

- Provide pre-application advice to residents, consultants and developers about landuse management issues and application procedures for the submission of development applications.
- Enforce planning and landuse management related legislation and zoning scheme regulations.
- Issue of property zoning certificates.
- Investigate and resolve landuse management complaints, illegal landuse and prosecuting contraventions.

Such interactive windows may be opened in various convenient locations to ensure ease of the answers to commonly asked questions may be shown in the internet. Besides, those may be shown in the print and electronic media time to time.

In spontaneous areas, while all out people's co-operation is needed for project implementation; there will also be some elements of negotiation. Negotiation will be particularly needed in case of road widening projects. It will be a crucial task for Paurashava to convince the affected people to give up their land for road use. Efforts should be made to convince the land owners on the ground of enhancement of property value due to road widening. In case people refuse to offer land free of cost necessary arrangements may have to be made for payment of compensation. This process of negotiation will be very critical, cumbersome and time consuming, and therefore, has to be handled with utmost care and patience. The best results can be accrued only by winning people's confidence. In case the authority fails to get peoples co-operation they should exercise power of compulsory acquisition of land. Attempts may be made to engage NGOs / CBOs to work as catalysts in negotiation.

CHAPTER 13

PLAN FOR URBAN SERVICES

13.1 Introduction

Sensible urban planning is critical to the healthy growth of cities. Unplanned growth leads a number of problems, creating misery for urban dwellers and making remedying of those difficulties. Yet flawed urban planning is little better, or perhaps worse, than no urban planning at all. It is thus important, when taking on such an enormous task as the drafting of an Urban Area Plan for a Paurashava, to ensure that the plan is well considered and likely to be conducive to good health and well-being of the urban dwellers.

During the year 1984 to 2003, Urban Development Directorate (UDD) was prepared a series of Landuse/Master Plans for Upazila and Zila Shahars of Bangladesh as a part of decentralization effort of the government. Under that project, the Bhanga Upazila Shahar was planned but the project area considered in the plan was far away from the planning area considered in the Paurashava Town Infrastructure Development Project.

13.2 Analysis of Existing Condition and Demand of the Services

The Paurashava is too poor in development of urban services. With the development of physical condition of the Paurashava, substantial development will be needed for those services. Drinking water supply, sewerage and sanitation facilities and dumping of solid wastes should be emphasized as primary consideration. All the people (except 0.5%) are dependent on hand tubewell for drinking water. In the Paurashava there are 218 tubewells and most of them are contaminated with iron and arsenic. In spite of this, there are 4 deep tubewells in the Paurashava, supplying water 0.5% population. Absence of solid waste dumping ground creates health hazards. Absence of covered drain and sewerage system creates sanitation problem in the Paurashava. Those problems should be removed through the proper planning and design.

Water Supply: Almost all households are using tubewell water as main source of drinking water and cooking purposes. At least 90% households are using tubewell water to maintain their daily needs. And rest of the residents is using, river and pond water for washing and bathing purposes. Ground water levels during dry and wet seasons vary between 12ft to 5ft respectively.

Electricity: The Rural Electrification Board (REB) at present is providing electricity facility within Paurashava area. There is no existing substation within the Paurashava. Electricity poles of different sizes exist in the study area to carry power. They cover almost every ward in the study area. High voltage towers are distributed evenly and transformers are used to transform the high voltage to low voltage for distributing to the clients. High voltage line (33KV) passed beside the highway in Ward No. 9. There are HT/LT transformer stations which step down high voltages into low voltages which reach various Mohallah and Community areas through this electric supply line.

Telecommunication: There is no telephone exchange maintained by Bangladesh Telecommunication Company Limited (BTCL) in the Paurashava area. At present there are many land telephone users in the area. There are also mobile phone networks of Grameenphone, Aktel, Citycell, Banglalink and Teletalk which cover the entire study area.

Gas supply: Gas supply is not available in the Paurashava area.

Projection

The projection of utility service depends on the growth of population and the need assessment of the Paurashava inhabitants. After population projection it is found that, population of this area will be 23059 in the year 2031 and 21319 in the year 2021. Projection on utility services also depends on present condition urban services and facilities and future demand of those services.

Demand analysis: Existing utility facilities of the Paurashava are not sufficient and established without following any standard. Therefore, Team Leaders of all packages and urban planners from Project Management Office (PMO) have worked out and prepared different standards for projection of future facilities as per the requirement of Paurashava. Following of those standards have considered for the future demand with ensuring the quality and quantity of utility facilities.

Table 13.1: Standard of utility facilities and future need

Facility	Standard	Existing Facility (acre)	Estimated (acre) (2021)
Drainage	1.00 acre /20,000 population	0.67	1.02
Water supply	1.00 acre /20,000 population	0	1.02
Gas	1.00 acre /20,000 population	0	1.02
Solid waste disposal site	4–10 acres/Upazila HQ	0	10.00
Waste transfer station	0.25 acres/waste transfer station	0	0.25
Electric sub-station	1.00 acre/20,000 population	0	1.02
Telephone exchange	0.5 acre/20,000 population	0	0.51
Fuel Station	0.5 acre/20,000 population	0	0.51

13.3 Proposals for Addressing Urban Services and Implementation Strategies

Water supply: Location of **water treatment plant** may be on a large plot (on 1.02 acres land) with good access, close to source of water. It should be located upstream of any polluting development. **Desalination plant** may be located on large plot close to the river, upstream from any polluting activities. **Water reservation tanks** may be constructed on medium size plot in key locations throughout the Paurashava, preferably in an elevated positioning relation to the area it is intended to serve, so as to maintain/increase pressure.

All water is carried by underground pipes of various diameters. The closer they are to the original source of treated water, the larger the pipe and therefore, trench to accommodate it must be. These pipes should be contained within road reserves.

Sewerage facilities: Location of **sewerage treatment plant** may be on large plot (on 1.02 acres land), preferably on outskirts of the Paurashava. Sewerage pumping station may be located on small plots throughout the Paurashava and a system should be introduced.

If a sewerage network were to be installed, the sewerage originating throughout the Paurashava would be carried by means of underground pipes and culverts. These should be accommodated within road reserves.

Electricity: **Electricity power station** may be located on a large plot out of Paurashava with good accessibility. About **132/33KV switching station** may be established on a

large plot (on 1.02 acres land) on the edge of the Paurashava with good accessibility. About **33/11KV switching stations** may be established on medium sized plots in a small number of key locations throughout the Paurashava. **Electricity sub-station** may be constructed on small plots throughout the Paurashava. These can be accommodated on the plots they serve (industries) or in road corridors.

Primary networks; principally 132KV, pylon supported power lines from the existing power stations which will enter the Paurashava at purpose built switching stations. The switching stations will usually be located at the fringe of the Paurashava. **Secondary networks;** 33KV or 11KV pole mounted power lines, although in cases the 33KV lines can also be pylon mounted. The 33KV lines will originate at the above mentioned switching station and supply power around the Paurashava to smaller switching stations at key locations around the Paurashava where they will be down-sized to 11KV. These, in turn, will supply power to more localized electricity sub-stations. The pole mounted lines can be located within principle road corridors (primary and district distributors). Pylon mounted lines should be allocated their own reserve. **Tertiary networks;** at the localized sub-stations, the 11KV power will be down-sized for distribution to individual premises. Power leaving these sub-stations is usually carried by 415V pole mounted lines. These can be accommodated within road corridors.

Telephone: An additional **telephone exchange** is unnecessary for the Paurashava. If required, it will need a medium-size plot (on 0.51 acres land), unless it also has to accommodate a transmission/reception tower, in which case it will require a fairly large plot. Medium sized plot will be needed for **local exchange**, central to its catchment area. **Street exchange** may be located on small plot in road corridor.

Telephone exchange lines can be either overhead, pole mounted or underground using newer Optical Fiber Cables. Both of these are carried to localized exchanges and then onto small roadside exchanges. From these connections are carried on poles to individual premises. All networks can be accommodated within road reserves.

Gas supply: In the Paurashava, gas supply is not provisioned. If, in future (within 10 years), gas is being supplied by the government to the Paurashava, some necessary steps should be considered by the authority. They are, in case of **gas manifold station**, may be located on small to medium-sized plot (on 1.02 acres land) on the main ring, at the fringe of the Paurashava. **Upazila regulator station** may be located on small plots throughout the Paurashava. These will be located at the break-off point on the main line, where smaller diameter spurs extend into the area that the gas will serve.

13.4 Regulations to Address the Proposals

Local Government (Paurashava) Act, 2009 (Ordinance No. XLXVIII of 2009) was enacted in 6th October 2009. According to the 2nd Schedule, Sl. No. 10, the Paurashava may provide supply of wholesome water sufficient for public and private purposes. Frame and execute water supply scheme for the construction and maintenance of such works for storage and distribution of water. In case of private sources of water supply, it is said that, all private sources of water supply within the Paurashava shall be subject to control, regulation and inspection by the Paurashava. No new well, water pump or any other source of water for drinking purposes shall be dug, constructed or provided except with the sanction of the Paurashava.

The regulations, as discussed above, will be needed for provisioning of drinking water supply both Paurashava and private sources in the Paurashava.

The sewerage facilities may be provided by the Paurashava and Directorate of Public Health Engineering (DPHE). According to the 2nd Schedule, Sl. No. 12, of the Local Government (Paurashava) Act, 2009, Paurashava may provide an adequate system of public drains and all such drains shall be constructed, maintained, kept, cleared and emptied with due regard to the health and convenience of the public. All private drains shall be subject to control, regulation and inspection by the Paurashava.

Public Health (Emergency Provisions) Ordinance, 1944 (Ordinance No. XXI of 1944) was enacted in 20th May 1944. According to the section 2(e) “public health services” and “public health establishment” include respectively sanitary, water-supply, vaccination, sewage disposal, drainage and conservancy services and establishment maintained for the purposes of such services, and any other service or establishment of a local authority which the Government may by notification in the Official Gazette declare to be a public health service or public health establishment for any purpose of this Ordinance.

Based on the regulation, the Directorate of Public Health Engineering (DPHE) is performing activities for drinking water supply. If DPHE likes to render their service according to the water supply network as presented in this plan, the regulation will be the safeguard for them.

East Pakistan Water and Power Development Authority Rules, 1965 (No. 4-1(E)) was prepared and notified in 12th July 1965. The Power Development Board (PDB) is empowered for power generation under the guidance of Electricity Act, 1910. At present, PDB and Rural Electrification Board (under the Rural Electrification Board Ordinance, 1977) is performing the role relevant with the electrification of the Paurashava. The existing authorities will be needed for electrification of the Paurashava according to the guidelines presented in the plan.

Telegraph and Telephone Board Ordinance, 1975 (Ordinance No. XLVII of 1975) was enacted in 30th August 1975. A Telegraph and Telephone Board (T&T Board) was composed through this Ordinance. Section 6(1) of the Ordinance has prescribed the functions of the Board and said, it shall be the function of the Board to provide efficient telegraph and telephone services and to do all acts and things necessary for the development of telegraphs and telephones. In the Paurashava, at present, a T & T Board is performing the functions prescribed in the section 6(1). T & T Board is the sole authority for performing the same and it will be continued in future also. But, the Mobile telephone system generates a revolution in the society. Most of the people are depended on the Mobile phone system. The plan does not consider this system.

13.5 Implementation, Monitoring and Evaluation of the Urban Services Plan

Implementation through Multi-Sectoral Investment Programme: Major infrastructure development works such as primary roads, water supply, drainage, etc., will largely be controlled by Government. Public works requires efficient co-ordination through the Multi-Sectoral Investment Programme (MSIP).

Objective of a Multi-Sectoral Investment Programme (MSIP) will match a list of the development projects with the funding stream necessary to implement them. There are two basic activities that would determine the contents of MSIP. One activity would be to prioritize and schedule the investment projects of all public agencies so they will collectively help to achieve the development goals and objectives of the Urban Services Plan. Second activity would be to analyze the source and availability of fund for the prioritized list of development projects.

Implementation through Action Plans and Projects: Action Plans and Projects will be the implementation plans to solve problems at the local level. Action plans will take a direct approach toward plan implementation with a minimum of research, reports or elaborate planning methods. These projects will be easily identifiable and will require minimum resource.

Implementation through Development Control: Landuse zoning is one of several methods of plan implementation to be considered. In all cases where some form of development, landuse control may be applied; careful consideration requires the following ideologies:

- the purpose to be achieved by the development controls;
- where controls should be applied;
- what aspect of development needs to be controlled;
- what type of development controls are required;
- what degree or level of development control is required;
- who will be affected by the required control;
- who will be affected by the controls and in what manner;
- when the controls should be applied;
- what will be the likely impact of the controls;
- how and by whom will the controls be administered and enforced.

Development control as an instrument of plan implementation may be selectively applied within the Urban Services Plans. Development controls would also be varied in intensity and detail to suit the particular circumstances. It is important that they should be clear and easily understood by all parties concerned. Since the entire Paurashava Master Plan 'package' has become statutory, development controls associated with its component plans would also be statutory.

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investments made by the private sector. Government can achieve this with relative ease and at very low cost by setting up a legal and operational framework, coupled with suitable incentives, to facilitate land consolidation, plot boundary readjustment, efficient layout of plots and provision of local infrastructure by the private sector. The benefits of this approach would be:

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Plan Monitoring

The Urban Services Plan would simply be tools for guiding and encouraging the growth and development of an urban area in a preferred manner. In a rapidly changing urban environment, the Urban Services Plan would require to keep up to date. If this is not done, within a few years it will be obsolete. Therefore, it is imperative that the requirement for regular updating of the Urban Services Plan be made a legal requirement.

For implementation of the various programme components of the Urban Services Plan appropriate administrative measures will have to be undertaken. This will essentially include project preparation and monitoring of their execution and evaluation. For carrying out all these activities appropriate institutional measures are also be needed.

Evaluation

Monitoring and evaluation of ongoing and implemented projects is essential to keep the future course of action on the right track. An ongoing project should be regularly monitored and handicaps identified to enable taking appropriate measures at the right time.

Post implementation evaluation is also needed to take appropriate measures correcting past errors-from project preparation to implementation.

The top level supervision has to be done by a high level supervisory committee headed by the Paurashava Mayor, representatives of the service giving agencies and Local Government Ministry. Other members of the committee will be local Ward Councilors, local community leader/social workers and the Town Planner of the Paurashava. The committee will supervise implementation works regularly and issue necessary instructions to expedite the works of implementation.

Map 13.1: Proposed Utility Services

CHAPTER 14

WARD ACTION PLAN

14.1 Introduction

This chapter presents Part-C of the report which contains Ward Action Plan of each individual ward. First, the issues prevailing in different wards have been briefly described followed by description of Development Proposals in first ward action plan (1st to 5th year of planning period for each ward.

14.1.1 Background

There are several patches of land in the Paurashava area where planned development can be achieved through use of different land development techniques. One of those techniques is Land Readjustment Technique, may be practiced for the development of Ward as a Ward Action Plan. The plan prepared for designated areas in conforming to the land development techniques is known as Action Area Plan.

It is also expected that following successful implementation of the Ward Action Plan in one side, management would be more efficient in handling projects and in another people residing in unplanned areas would feel the benefit of such Action Plan ensuring more effective community participation.

14.1.2 Content and Form of Ward Action Plan

The report has been divided in to five main parts. These are preceded by introductory chapters which explain the approach of the report and provide background with the linkage of Structure Plan and Urban Area Plan. Part two of the report identifies strategies and policies prescribed in the Structure Plan and Urban Area Plan and their uses for the preparation of Ward Action Plan. The chapter also covers prioritization in case of development needs and Ward-wise Action Plan for next five years. Ward-wise Action Plan is being presented in the next part of the report. Proposal, priority tasks and financial involvement with the infrastructural development as a priority basis are the outcome of this part. Implementation guidelines are the key issues of part four. Comparative Advantage of Master Plan and proposals for mitigation of identified issues are the components of last part of this report.

14.1.3 Linkage with the Structure and Urban Area Plan

The Ward Action Plan for the Paurashava has been prepared on the basis of following principles relevant with the Structure Plan and Urban Area Plan:

- Environment friendly sustainable development of the area.
- Town functions to develop as per major landuse zones.
- Effective drainage system through minimum hindrance to Flood Flow zones.
- Safe residential areas at proximity to place of work or major communication routes.
- Smooth and effective functioning of industries, specially agro-based industries.
- Safe yet faster connectivity.
- Develop to serve the surrounding hinterlands.

14.1.4 Approach and Methodology

For the preparation of Ward Action Plan the planning area has been sub-divided into Nine Planning Zones according to the individual Ward. Immediate necessary action will be required for Ward Action Plan and this is the key outcome of Ward Action Plan. Where, what type of action will be required and how the action will be performed prescribed in the plan.

Pro-people Urban Planning

The Ward Action Planning approach utilizes in the Paurashava Master Plan concentrating mainly on the building of infrastructure and roads to facilitate the movements of vehicles. In this scenario, Paurashava society would become steadily more privatized with private homes, offices and commercial activities, while all-important public component of urban life is likely to slowly disappear.

The landuse and transport interaction for a modern city should be directed toward “Planning for people, not for vehicles, roads or buildings”. Given the problems of alienation, crime, fear of strangers and the breakdown of civic life, it is increasingly important to make cities inviting so that people can meet their fellow citizens face-to-face and experience human contact with those unknown to and different from them directly through their senses. Public life in high quality public spaces is an important part of a democratic society and full life.

Evidence-based vs. Arbitrary Planning Approach

In the era of globalization, where information on any number of issues and about any number of places is readily accessible, there is no need for localities to continue making the same mistakes as they did when operating in an information and experience vacuum. While urban planning is of course a complicated process, it is also true that some universals exist in terms of what works and what does not. The experiences of urban areas adopting commercial-based and people-based approaches make clear the effects of either method, and many guides are now available on implementing planning approaches that are good for the natural environment and for urban dwellers.

Given the widespread availability of such information, it is highly regrettable that important landuse and transport policy-decisions should adopt either any knowledge-based or scientific analysis. Instead, arbitrary or so-called “common sense” approaches should not be utilized which may favour the rich, including bureaucrats and developers with little concern for the betterment of society overall.

Although, it is a demanding task to represent the complex dynamics of urban landuse changes that are consistent with observable data, significant progress has been made in recent years in the country in forecasting and evaluating landuse change on the basis of dynamic and causal relationships between such factors as transport and landuse, and built environment and socio-economic processes.

With the advance of the knowledge-base and technology-base, detailed and extensive urban form and function data is becoming increasingly available, with great potential to provide new insights for sustainable urban planning which preserves the eco-system and maintains or even increases social equity.

Yet no attempt was made in the preparation of Upazila Master Plan / Landuse Plan (in 1980s) to conduct any analytical or empirical analysis using data related to interactions between the built environment, transport, landuse and other socio-economic processes.

Again, in Paurashava Master Plan, the Geographic Information System (GIS)-based technology is mainly used for mapping and visual displays, which are limited to static displays of past and current data sets. That is, the displays only portray the current state of the system, with neither the reasons given for its condition nor possible alternate futures provided. As a result, policymakers and planners are now facing tremendous difficulties, lacking as they do any insight into future urban growth and the potential impacts of various models.

Hypothetical Planning Approach under Upazila Master Plan/Landuse Plan, no comprehensive data collection exercise was undertaken to estimate landuse requirements for the Paurashava. As a result, all the landuse proposals of that plan were hypothetical in nature, providing no insight into how the actual landuse demand for various purposes will meet in future.

Yet it is not logical to develop a Ward Action Plan, which represents the lowest tier of the planning hierarchy, without providing precise landuse allocations for different functional purposes.

Furthermore, in the Paurashava Plan, a significant portion of existing open space and agriculture land have been allocated for private developers required as per the 2031 population projection. This excess land for property developers is likely not only to create landuse speculation but also indiscipline in future landuse development. More importantly, the preservation of land for open space and agriculture is vital for the health and viability of the Paurashava and its inhabitants.

14.2 Derivation of Ward Action Plan

14.2.1 Revisit Structure Plan

All the studies carried out at varying point of time converged to the same conclusion that the vital contribution of the Paurashava areas are bounded by Moinakata River as main flood flow zone allowing excess flood water to pass over it during rainy season, must not be obstructed by any development. Despite this unanimous expert cautions, the area will experience a tremendous development pressure. The Consultant has tried to work out an effective strategy to address the later with acceptably low obstruction to the flood water to pass through. The strategies are as follows under some basic heads:

Drainage

- Non-continuous smaller rural settlements above flood level surrounded by ample low lying areas (agriculture, sub-flood flow, main flood flow, etc.) allowing uninterrupted flow of water to pass through.
- Minimize obstruction of flood water as is practicable.
- Appropriate connectivity by roads having sufficient openings to ensure needful flow of water across them as well as uninterrupted traditional water-based connectivity by keeping appropriate navigation clearance at the bridges. This would help to maintain the biodiversity of the area and contribute to sustainable environment in turn.

Residential Development

- Residential Landuse Zone is based on the potentiality, trend and opportunity.
- Adaptation of neighbourhood concept for new residential developments and for need assessment of community facilities.

- Prohibition of through traffic and heavy vehicles within the neighbourhoods.
- Provide adequate safe and easy to move footpaths.
- Ensure community facilities and services of appropriate scale at neighbourhood level.

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 residential area.
- Relocate industries from predominantly residential zones in phases.
- Provide essential support facilities for effective functioning of the industries.

Mixed-Use Development

- Relocate noxious and heavy industries [red category as per DoE] to Heavy Industrial Area within as soon as practicable.
- Ensure adequate utility services to ensure uninterrupted production.
- 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-areas.
- Provide sufficient quantity of wide, easy to use and safe footpaths.
- Provide Zebra Crossing at road crossings to ease the lives of major portion of low-income workers likely to traverse on foot to reach their likely abode in the busy area.

Transport and Communication

- Provide safe, adequate and comfortable pedestrian ways.
- Provide appropriate and effective public transport routes with sufficient number of quality public transport to carry passenger.
- Grade separation of National and Regional Highways from the local roads, latter being at grade and other two above grades.

Flood Flow Zones

- Strictly preserve the riverfront area as per the area demarcated by the Water Development Board.
- Promote agricultural and passive recreational use of the area during dry season.

Non-urban Areas

- Promote traditional waterways (if any) in the low-lying areas by constructing submerged road for dry season connectivity.
- Strictly preserve agriculture land from conversion into non-agricultural use.
- Promote rural characteristics in the isolated homesteads keeping mandatory buffer to make way for the flood water intrusion.

Water body and Open Spaces

- Strictly protect canal networks providing the missing links.

- Make provision for open spaces and water body at the neighbourhood level.
- Strictly protect the river fronts and open it for the dwellers as a passive recreation.
- Make town-scale open space with easy accessibility especially for people of densely populated areas with meager scope for open space.

Amenities and Community Facilities

- Consider neighbourhood 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 Paurashava dwellers.
- Close/relocate existing schools with highly inadequate class rooms, play field and essential facilities and gradually replace with standard considered in the Urban Area Plan.
- Evacuate unauthorized structures and uses from road's Right of Way to safeguard greater interest of the people specially the Paurashava dwellers.

Solid Waste Management

- No more conventional disposal through dumping.
- Solid Waste Processing to ensure recycling.
- Conversion of traditional solid waste in to fertilizer.
- Door to door collection instead of road side bin disposal.
- Disposal of hospital and other hazardous waste in the proposed disposal site.

Water Supply

- Harness surface water source instead of ground water.
- Explore possibility of processing Padma River water.
- Continuous monitoring of tubewell water to check arsenic contamination.
- Create scope of rain water harvesting.

Electricity

- Priority for supplying electricity will be given to industry and irrigation pumps.
- Gradually coverage of the whole Paurashava with the increase of power generation.
- Gradually electricity network will be concealed through underground system.
- Explore the possibility of using renewable energy source in order to minimize cost of distribution network.
- Introduce solar energy in every establishment.

Environmental Management

- Grouping of hazardous industries.
- Establishment of Common Effluent Treatment Plant.
- Adoption of neighbourhood concepts for new residential development.
- Generate waste water treatment plant.

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.

Conservation of Monument and Heritage

- Identify and record all historical sites and monuments.
- Conserve and restore with standard procedure all historical sites and monuments.
- Evict illegal occupants of the historical sites.

Gas Supply

- Explore possibility of use of gas in cylinder for domestic purposes.

14.2.2 Prioritization

The prioritization of project proposals in Ward wise Action Plan are made on the basis of urgency for development depending on the needs of people and the town's requirement for infrastructure development.

14.3 Ward-wise Action Plan for Next Five Years

The Ward Action Plan is prepared for each of the nine Wards and is presented in order of their serial number. The Ward Action Plans are a series of detailed spatial development plans of different use and facilities. The plans comprise maps of appropriate scale supported by explanatory report. The Ward Action Plans have been formulated for execution within a period of 5 years. They do not initially cover the entire Structure Plan Area. While all sub-areas will eventually require Ward Action Plan, only priority areas are to be dealt with initially. The aim of a Ward Action Plan is to prevent haphazard urban development and livable environment.

14.3.1 Action Plan for Ward No. 01

Demography

Action Plan for Ward No. 1 consists of the mouza named Baiskhali, Hoglekandi, Kharakandi and Kutibari Char Kanda. It is situated on the western part of the Pourashava. Ward No. 2 including national highway from Dhaka to Khulna via Bhanga is on the north, Ward No. 3 including Kumar River on the south, Ward No. 4 on the east and Alphasdanga Upazila on the west of this ward. A part of the national highway from Char Janazat Ferry Ghat to Khulna via Bhanga passes on the western part of the Ward. Two east-west and three north-south local roads serve this Ward. This Ward is characterized by agriculture development and linear development of rural homesteads.

Table 14.1: Population Statistic of Ward No. 01

Type	Population 2011	Projected population			
		2016	2021	2026	2031
Population	3156	3482	3841	4238	4676
Area	286.52	286.52	286.52	286.52	286.52
Density	11	12	13	15	16

Source: BBS 2011.

Present population of the Ward is 3156 (2011) and it will be 3482 in the year 2016, 3841 in 2021, 4238 in 2026 and 4676 in 2031. Density of population is 11 persons per acre and it will be 16 in 2031.

Proposals and Plans for Ward No. 01

Landuse Proposal

Ward No. 1 is important for educational institutions, rural homesteads, agriculture land and nearness of the national highway. Total planning area of the Ward is 286.5 acres. In the total planning area, 154.59 acres is under agriculture use, 29.3 acres for urban residential and 8.31 acres water body. Other uses are below than one acre.

Table 14.2: Proposed Landuse

Landuse Type	Area (acre)	%
Agricultural Zone	154.59	53.94
Circulation Network	21.12	7.37
Commercial Zone	0.58	0.20
Community Facilities	1.10	0.38
Education & Research Zone	16.15	5.63
General Industrial Zone	25.79	9.00
Government Office	0.00	0.00
Health Services	0.00	0.00
Heavy Industrial Zone	0.00	0.00
Historical & Heritage Site	0.00	0.00
Mixed Use Zone	0.40	0.14
Open Space	9.06	3.16
Rural Settlement	20.21	7.05
Transport & Communication	0.00	0.00
Urban Residential Zone	29.30	10.22
Utility Services	0.00	0.00
Water Body	8.31	2.90
Total	286.598	100.00

Proposed Circulation Network

One 80 feet, one 40 feet, four 30 feet and two 20 feet roads have been proposed for this Ward. Total length of the proposed road is 6922.8 meter.

Table 14.3: Proposed road in the Ward No. 1

Road Id	Width (ft)	Type	Length (m)	Phase
TR3	30	Tertiary	436.4	1st Phasing
TR4	30	Tertiary	518.1	3rd phasing
TR5	30	Tertiary	580.4	3rd phasing
SR7	40	Secondary	1745.5	3rd phasing
TR35	30	Tertiary	11.9	3rd phasing
PR86	80	Primary	942.0	3rd phasing
AR87	20	Access	1862.7	2nd Phasing
AR88	20	Access	825.9	3rd phasing
		Total	6922.8	

Proposed Drain

No drain is in this Ward. About 6.1 km drain has been proposed in this ward.

Table 14.4: Proposed Drainage

Drain id	Type	Width (m)	Length (m)	Phase
PD4	Primary	Above 3m	1861.1	2nd Phase
PD5	Primary	Above 3m	786.5	3rd Phase
TD48	Tertiary	Less 1.5m	6.5	3rd Phase
TD49	Tertiary	Less 1.5m	468.7	2nd Phase
TD56	Tertiary	Less 1.5m	16.3	2nd Phase
PD63	Primary	Above 3m	519.0	3rd Phase
TD67	Tertiary	Less 1.5m	574.9	2nd Phase
PD92	Primary	Above 3m	1041.3	1st Phase
PD93	Primary	Above 3m	864.6	2nd Phase
		Total	6138.8	

Development proposal

Though the Ward is undeveloped and it will take time to develop properly. So, one dumping site is being located outside the Paurashava with 2.3 acres of land. One university with 15.46 acres of land is being proposed on the mouza named Nurpur Char of this Ward.

Table 14.5: Development Proposal

Facility	Ward No	Mouza Name	Plot No	Area (acre)	Phasing
Proposed Ward Center 01	Ward No. 01	Hoglakandi (033_00)	793-94	0.84	1st Phase
Proposed University	Ward No. 01	Nurpur (036_00)	5626-49,5887-99	15.47	3rd Phase

Map 14.1: Landuse Plan for Ward No 01

Map 14.2: Road and Drainage Plan for Ward No 01

14.3.2 Action Plan for Ward No. 02

Demography

Action Plan for Ward No. 2 consists of four mouzas named Bhariadanga (Noapara), Gazaria, Hazarahati and Nurpur. It is situated on the northern part of the Pourashava. Bhanga Upazila area is on the north, National highway from Dhaka to Khulna on the south, Bhanga Upazila area on the east and Alphadanga Upazila on the west of this Ward. Four east-west and four north-south local roads serve the area. This area is characterized by rural homesteads and agriculture land.

Table 14.6: Population Statistic of Ward No. 02

Type	Population 2011	Projected population			
		2016	2021	2026	2031
Population	4455	4915	5422	5982	6600
Area	377.92	377.92	377.92	377.92	377.92
Density	12	13	14	16	17

Source: BBS 2011.

Present population of the Ward is 4455 (2011) and it will be 4915 in the year 2016, 5422 in 2021, 5982 in 2026 and 6600 in 2031. Density of population is 12 persons per acre in the year 2011 and it will be 17 persons per acre in the year 2031.

Proposals and Plans for Ward No. 02

Landuse Proposal

Ward No. 2 is important for educational institutions, agriculture land and a part of national highway. Total planning area of the Ward is 377.9 acres. In the total area, agriculture use is 151.6 acres; urban residential 134.5 acres and water body 10.86 acres. Other uses are negligible.

Table 14.7: Proposed Landuse

Landuse Type	Area (acre)	%
Agricultural Zone	151.61	40.08
Circulation Network	38.38	10.15
Commercial Zone	1.08	0.29
Community Facilities	2.38	0.63
Education & Research Zone	16.24	4.29
General Industrial Zone	0.02	0.01
Government Office	0.00	0.00
Health Services	3.51	0.93
Heavy Industrial Zone	0.00	0.00
Historical & Heritage Site	0.00	0.00
Mixed Use Zone	10.84	2.87
Open Space	5.84	1.54
Rural Settlement	2.97	0.79
Transport & Communication	0.00	0.00
Urban Residential Zone	134.51	35.56
Utility Services	0.00	0.00
Water Body	10.86	2.87
Total	377.94	100.00

Proposed Circulation Network

Three primary road, eight tertiary road and twelve access road has been proposed in this ward. Total length of the proposed road is 13604 meter.

Table 14.8: Proposed road in the Ward No. 02

Road Id	Width (ft)	Type	Length (m)	Phase
PR1	80	Primary	827.3	3rd phasing
TR26	30	Tertiary	1072.6	3rd phasing
TR66	30	Tertiary	720.7	3rd phasing
TR67	30	Tertiary	444.2	2nd Phasing
AR68	20	Access	261.3	3rd phasing
TR69	30	Tertiary	612.3	2nd Phasing
AR70	20	Access	680.7	3rd phasing
AR71	20	Access	210.5	3rd phasing
AR72	20	Access	250.4	1st Phasing
AR73	20	Access	73.6	3rd phasing
TR74	30	Tertiary	424.0	3rd phasing
TR75	30	Tertiary	407.4	3rd phasing
AR76	20	Access	162.1	3rd phasing
TR77	30	Tertiary	856.9	2nd Phasing
AR78	20	Access	210.5	3rd phasing
TR79	30	Tertiary	492.5	3rd phasing
AR80	20	Access	205.9	2nd Phasing
AR84	20	Access	825.5	1st Phasing
AR85	20	Access	801.2	3rd phasing
PR86	80	Primary	915.7	3rd phasing
AR88	20	Access	1076.8	3rd phasing
PR89	60	Primary	2072.6	3rd phasing
		Total	13604.9	

Proposed Drain

In total, 0.38 km. pucca drain is in this Ward. Two primary drain, two secondary drain and others tertiary drain has been proposed whose length 11.9 km.

Table 14.9: Proposed Drainage

Drain id	Type	Width (m)	Length (m)	Phase
TD1	Tertiary	Less 1.5m	503.2	3rd Phase
PD5	Primary	Above 3m	1073.9	3rd Phase
SD6	Secondary	Within 1.5 to 3m	1624.8	3rd Phase
TD64	Tertiary	Less 1.5m	261.4	1st Phase
TD65	Tertiary	Less 1.5m	725.8	3rd Phase
TD66	Tertiary	Less 1.5m	439.8	3rd Phase
TD68	Tertiary	Less 1.5m	506.2	2nd Phase
TD69	Tertiary	Less 1.5m	197.4	1st Phase
TD70	Tertiary	Less 1.5m	417.4	3rd Phase
TD71	Tertiary	Less 1.5m	421.5	3rd Phase
TD72	Tertiary	Less 1.5m	253.3	2nd Phase
SD73	Secondary	Within 1.5 to 3m	651.5	2nd Phase
TD74	Tertiary	Less 1.5m	269.8	2nd Phase
TD75	Tertiary	Less 1.5m	90.2	1st Phase
TD76	Tertiary	Less 1.5m	433.7	3rd Phase
TD77	Tertiary	Less 1.5m	171.5	2nd Phase
TD78	Tertiary	Less 1.5m	322.3	3rd Phase
TD79	Tertiary	Less 1.5m	202.6	1st Phase
TD80	Tertiary	Less 1.5m	212.7	3rd Phase
TD87	Tertiary	Less 1.5m	192.1	2nd Phase
TD88	Tertiary	Less 1.5m	860.3	3rd Phase
TD91	Tertiary	Less 1.5m	486.5	3rd Phase
PD95	Primary	Above 3m	809.7	3rd Phase
PD98	Primary	Above 3m	829.9	3rd Phase
		Total	11957.4	

Map 14.3: Landuse Plan for Ward No 02

Map 14.4: Road and Drainage Plan for Ward No 02

Development Proposal

A hospital, a vocational training center, a college, a high school, a community center and a ward center has been proposed in this ward.

Table 14. 10: Development Proposal

Facility	Ward No	Mouza Name	Plot No	Area (acre)	Phasing
Proposed Community Center	Ward No. 02	Hasamdia (037_01)	367	0.14	2nd Phase
Proposed Ward Center 02	Ward No. 02	Noapara (028_02)	29,882,991	1.8	3rd Phase
Proposed High School	Ward No. 02	Noapara (028_03)	7543-7551,7810,7812	4.29	2nd Phase
Proposed College 01	Ward No. 02	Noapara (028_03)	7649-56	3.5	1st Phase
Vocational Training Institute	Ward No. 02	Nurpur (036_00)	6296-300,6335-37, 6342-44,6541-6551	7.24	3rd Phase
Proposed Hospital	Ward No. 02	Noapara (028_03)	7627-7640	3.5	3rd Phase

14.3.3 Action Plan for Ward No. 03

Demography

Action Plan for Ward No. 3 consists of three mouzas named Chandidasdi, Dariar Math and Sonakhola. The Ward is situated on the south-western part of the Pourashava. Ward No. 1 including Kumar River is on the north, Muksudpur Upazila on the south, Ward No. 4 and 9 on the east and Alphadanga Upazila on the western part of this Ward. Three east-west and four north-south local roads serve the area. This area is characterized by rural homesteads and agriculture land.

Table 14.11: Population Statistic of Ward No. 03

Type	Population 2011	Projected population			
		2016	2021	2026	2031
Population	3728	4113	4538	5006	5523
Area	251.22	251.22	251.22	251.22	251.22
Density	15	16	18	20	22

Present population of the Ward is 3728 (2011) and it will be 4113 in the year 2016, 4538 in 2021, 5006 in 2026 and 5523 in 2031. Density of population is 15 persons per acre and it will remain 22 up to 2031.

Proposals and Plans for Ward No. 03

Landuse Proposal

Total planning area of the Ward is 251.2 acres. In the total area, agriculture use is 57 acres and urban residential 107.68 acres. Except these, 19.52 acres open spaces and 38.5 acres water body is in the Ward. Other uses are below than one acre.

Table 14.12: Proposed Landuse

Landuse Type	Area (acre)	%
Agricultural Zone	57.00	22.68
Circulation Network	16.18	6.44
Commercial Zone	0.01	0.01
Community Facilities	0.45	0.18
Education & Research Zone	6.20	2.47
General Industrial Zone	0.62	0.25
Government Office	0.27	0.11
Health Services	0.00	0.00
Heavy Industrial Zone	0.00	0.00
Historical & Heritage Site	0.00	0.00
Mixed Use Zone	4.40	1.75

Landuse Type	Area (acre)	%
Open Space	19.52	7.77
Rural Settlement	0.00	0.00
Transport & Communication	0.51	0.20
Urban Residential Zone	107.68	42.84
Utility Services	0.00	0.00
Water Body	38.51	15.32
Total	251.2	100.00

Proposed Circulation Network

One secondary, three tertiary and others access road has been proposed in this ward whose length 7427 meter.

Table 14.13: Proposed road in the Ward No. 03

Road Id	Width (ft)	Type	Length (m)	Phase
TR3	30	Tertiary	5.3	1st Phasing
SR7	40	Secondary	87.1	3rd phasing
TR12	30	Tertiary	2333.2	3rd phasing
TR13	30	Tertiary	1712.3	3rd phasing
AR14	20	Access	531.9	3rd phasing
AR29	20	Access	183.3	3rd phasing
AR30	20	Access	247.5	3rd phasing
AR31	20	Access	319.5	3rd phasing
AR32	20	Access	276.8	3rd phasing
AR65	20	Access	196.1	3rd phasing
TR81	30	Tertiary	805.4	3rd phasing
AR82	20	Access	229.4	3rd phasing
AR83	20	Access	499.7	3rd phasing
		Total	7427.7	

Proposed Drain

In total, 0.26 km. pucca drain is in this Ward. About 40 meter and 7426 meter tertiary drain has been proposed in this ward.

Table 14.14: Proposed Drainage

Drain id	Type	Width (m)	Length (m)	Phase
TD9	Tertiary	Less 1.5m	534.0	1st Phase
TD11	Tertiary	Less 1.5m	282.9	2nd Phase
TD12	Tertiary	Less 1.5m	237.7	2nd Phase
TD13	Tertiary	Less 1.5m	1767.1	2nd Phase
TD14	Tertiary	Less 1.5m	2335.5	2nd Phase
TD15	Tertiary	Less 1.5m	508.9	3rd Phase
TD16	Tertiary	Less 1.5m	184.4	3rd Phase
TD17	Tertiary	Less 1.5m	197.0	1st Phase
TD18	Tertiary	Less 1.5m	256.1	2nd Phase
TD23	Tertiary	Less 1.5m	566.3	3rd Phase
TD24	Tertiary	Less 1.5m	235.9	3rd Phase
TD25	Tertiary	Less 1.5m	320.4	2nd Phase
PD93	Primary	Above 3m	40.1	2nd Phase
		Total	7466.3	

Map 14.5: Landuse Plan for Ward No 03

Map 14.6: Road and Drainage Plan for Ward No 03

Development Proposal

A primary school and a ward center has been proposed in this ward.

Table 14.15: Development Proposal

Facility	Ward No	Mouza Name	Plot No	Area (acre)	Phasing
Proposed Ward Center 03	Ward No. 03	Chandidasdi (038_04)	3621-3624	0.29	2nd Phase
Proposed Primary School 03	Ward No. 03	Chandidasdi (038_03)	541,857,435,749	1.05	1st Phase

14.3.4 Action Plan for Ward No. 04

Demography

Action Plan for Ward No. 4 consists of one mouza named Paschim Hasandi. It is situated on the middle of the Pourashava. Ward No. 2 including national highway from Char Janazat Ferry Ghat to Khulna via Bhanga is on the north, Kumar River on the south, Ward No. 5 on the east and Ward No. 2 on the western part of this Ward. An important road inter-section known as Bhanga Inter-section formed by the two national highways is located in this Ward. Five east-west and four north-south local roads serve the Ward. This area is characterized by old Pourashava office, college including other educational institutions, Upazila headquarters and commercial establishments.

Table 14.16: Population Statistic of Ward No. 04

Type	Population 2011	Projected population			
		2016	2021	2026	2031
Population	4889	5394	5951	6565	7243
Area	272.62	272.62	272.62	272.62	272.62
Density	18	20	22	24	27

Present population of the Ward is 4889 (2011) and it will be 5394 in the year 2016, 5951 in 2021, 6565 in 2026 and 7243 in 2031. Density of population is 18 persons per acre and will increase 27 persons per acre from the year 2011 to 2031.

Proposals and Plans for Ward No. 04

Land use Proposal

Ward No. 4 is important for government office and rural homesteads. Total planning area of the Ward is 272.6 acres. In the total area, agriculture use is 46.19 acres; urban residential 89.92 acres, commercial activity 5.82 acres, education and research 4.42 acres, government services 14.57 acres, mixed-use 14.51 acres, open space 14.44 acres and water body 42.88 acres. Other uses are below than one acre.

Table 14.17: Proposed Land use

Landuse Type	Area (acre)	%
Agricultural Zone	46.19	16.91
Circulation Network	35.26	12.91
Commercial Zone	5.82	2.13
Community Facilities	4.54	1.66
Education & Research Zone	4.42	1.62
General Industrial Zone	0.00	0.00
Government Office	14.57	5.34
Health Services	0.53	0.19
Heavy Industrial Zone	0.00	0.00
Historical & Heritage Site	0.00	0.00
Mixed Use Zone	14.51	5.31
Open Space	14.44	5.29

Landuse Type	Area (acre)	%
Rural Settlement	0.00	0.00
Transport & Communication	0.03	0.01
Urban Residential Zone	89.92	32.93
Utility Services	0.00	0.00
Water Body	42.88	15.70
Total	272.62	100.00

Proposed Circulation Network

Three primary, three secondary, four tertiary and several number of access road has been proposed in this ward. Total length of the proposed road is 13443 meter.

Table 14.18: Proposed road in the Ward No. 04

Road Id	Width (ft)	Type	Length (m)	Phase
PR1	80	Primary	816.7	3rd phasing
TR2	30	Tertiary	530.9	3rd phasing
TR3	30	Tertiary	26.5	1st Phasing
SR6	40	Secondary	236.0	3rd phasing
SR7	40	Secondary	438.7	3rd phasing
SR8	40	Secondary	510.4	2nd Phasing
TR20	30	Tertiary	370.8	3rd phasing
AR21	20	Access	361.3	3rd phasing
AR22	20	Access	351.7	3rd phasing
TR35	30	Tertiary	450.7	3rd phasing
AR36	20	Access	349.0	3rd phasing
AR37	20	Access	312.2	2nd Phasing
AR38	20	Access	346.6	3rd phasing
AR39	20	Access	212.2	1st Phasing
AR40	20	Access	76.0	3rd phasing
AR41	20	Access	137.2	3rd phasing
AR42	20	Access	335.9	3rd phasing
AR43	20	Access	208.3	2nd Phasing
AR48	20	Access	239.0	3rd phasing
AR51	20	Access	467.0	3rd phasing
AR52	20	Access	204.8	3rd phasing
AR53	20	Access	325.3	2nd Phasing
AR54	20	Access	274.1	3rd phasing
AR55	20	Access	143.3	3rd phasing
AR62	20	Access	10.2	3rd phasing
AR84	20	Access	779.5	1st Phasing
AR85	20	Access	792.8	3rd phasing
PR86	80	Primary	1330.6	3rd phasing
AR87	20	Access	1329.6	2nd Phasing
AR88	20	Access	1330.1	3rd phasing
PR89	60	Primary	146.3	3rd phasing
		Total	13443.8	

Proposed Drain

In total, 0.77 km. pucca drain is in this Ward. About 11.2 km drain has been proposed in this ward.

Map 14.7: Landuse Plan for Ward No 04

Map 14.8: Road and Drainage Plan for Ward No 04

Table 14.19: Proposed Drainage

Drain id	Type	Width (m)	Length (m)	Phase
PD2	Primary	Above 3m	368.0	2nd Phase
PD3	Primary	Above 3m	355.1	1st Phase
PD4	Primary	Above 3m	987.6	2nd Phase
PD5	Primary	Above 3m	975.2	3rd Phase
SD6	Secondary	Within 1.5 to 3m	149.2	3rd Phase
SD7	Secondary	Within 1.5 to 3m	521.3	1st Phase
SD33	Secondary	Within 1.5 to 3m	359.3	2nd Phase
TD38	Tertiary	Less 1.5m	7.3	3rd Phase
PD46	Primary	Above 3m	366.6	2nd Phase
TD47	Tertiary	Less 1.5m	544.2	3rd Phase
TD48	Tertiary	Less 1.5m	341.9	3rd Phase
TD50	Tertiary	Less 1.5m	288.4	3rd Phase
TD51	Tertiary	Less 1.5m	476.1	1st Phase
TD52	Tertiary	Less 1.5m	309.4	3rd Phase
TD53	Tertiary	Less 1.5m	356.0	3rd Phase
TD54	Tertiary	Less 1.5m	149.8	3rd Phase
TD55	Tertiary	Less 1.5m	205.3	3rd Phase
TD56	Tertiary	Less 1.5m	445.1	2nd Phase
TD57	Tertiary	Less 1.5m	405.1	3rd Phase
TD58	Tertiary	Less 1.5m	77.5	2nd Phase
TD59	Tertiary	Less 1.5m	316.6	1st Phase
TD60	Tertiary	Less 1.5m	230.9	3rd Phase
TD61	Tertiary	Less 1.5m	254.7	1st Phase
TD62	Tertiary	Less 1.5m	330.4	3rd Phase
TD85	Tertiary	Less 1.5m	142.6	1st Phase
TD90	Tertiary	Less 1.5m	217.1	3rd Phase
PD93	Primary	Above 3m	589.2	2nd Phase
PD94	Primary	Above 3m	17.8	3rd Phase
PD95	Primary	Above 3m	738.7	3rd Phase
PD96	Primary	Above 3m	10.4	1st Phase
PD97	Primary	Above 3m	10.2	3rd Phase
PD98	Primary	Above 3m	728.9	3rd Phase
		Total	11276.1	

Development Proposal

A waste transfer station, a micro bus stand, a truck terminal, a bus terminal, a food godown and a jail khana has been proposed in this ward.

Table 14.20: Development Proposal

Facility	Ward No	Mouza Name	Plot No	Area (acre)	Phasing
Proposed Waste Transfer Station 02	Ward No. 04	Hasamdial (037_01)	551	0.223	1st Phase
Proposed Micro Bus Terminal	Ward No. 04	Hasamdial (037_01)	128	0.31	1st Phase
Proposed Bus Terminal	Ward No. 04	Hasamdial (037_02)	3186,3189-203,3215	2.86	3rd Phase
Proposed Truck Terminal	Ward No. 04	Hasamdial (037_02)	3675	1.78	2nd Phase
Proposed Auto Stand	Ward No. 04	Hasamdial (037_01)	8183	0.25	2nd Phase
Proposed Food Godown	Ward No. 04	Hasamdial (037_02)	3173-75,3178	1.37	3rd Phase
Proposed Jail Khana	Ward No. 04	Hasamdial (037_01)	6066-67,6268-71,6283-84	4.71	1st Phase

14.3.5 Action Plan for Ward No. 05

Demography

Action Plan for Ward No. 5 consists of four mouzas named Ataddi, Chowkighat (hat), Char kanda and Purba Hasandia. Ward No. 5 is located on the eastern part of the Pourashava. Dhaka to Khulna via Bhanga national highway is on the north, Ward No. 6 including Kumar River on the south, Bhanga Upazila area on the east and Ward No. 4 on the western part of this Ward. Eight east-west and seven north-south local roads serve the area. This area is characterized by beel areas, fish farming and rural homesteads.

Present population of the Ward is 4834 (2011) and it will be 5333 in the year 2016, 5884 in 2021, 6491 in 2026 and 7162 in 2031. Density of population is 21 persons per acre and it will increase up to 31 persons per acre from the year 2011 to 2031.

Table 14.21: Population Statistic of Ward No. 05

Type	Population 2011	Projected population			
		2016	2021	2026	2031
Population	4834	5333	5884	6491	7162
Area	232.53	232.53	232.53	232.53	232.53
Density	21	23	25	28	31

Proposals and Plans for Ward No. 05

Land use Proposal

Total planning area of the Ward is 232.5 acres. In the total area, agriculture use is 37.54 acres and urban residential 84.67 acres. Area under open space is 5.62 acres, circulation network 12.74 acres, community services 3.23 acres, education and research 4.7 acres, government services 0.87 acres, mixed-use 0.82 acres and water body 57.52 acres.

Table 14.22: Proposed Landuse

Landuse Type	Area (acre)	%
Agricultural Zone	37.54	16.14
Circulation Network	12.74	5.48
Commercial Zone	1.16	0.50
Community Facilities	3.23	1.39
Education & Research Zone	4.70	2.02
General Industrial Zone	21.55	9.27
Government Office	0.87	0.37
Health Services	0.00	0.00
Heavy Industrial Zone	0.00	0.00
Historical & Heritage Site	0.00	0.00
Mixed Use Zone	0.82	0.35
Open Space	5.62	2.42
Rural Settlement	2.15	0.92
Transport & Communication	0.00	0.00
Urban Residential Zone	84.68	36.41
Utility Services	0.00	0.00
Water Body	57.52	24.73
Total	232.53	100.00

Proposed Circulation Network

One 80 feet, two 30 feet and nine 20 feet roads have been proposed for this Ward. Total length of the proposed road is 5864.3 meter.

Map 14.9: Landuse Plan for Ward No 05

Map 14.10: Road and Drainage Plan for Ward No 05

Table 14.23: Proposed road in the Ward No.05

Road Id	Width (ft)	Type	Length (m)	Phase
AR21	20	Access	1882.2	3rd phasing
AR22	20	Access	1365.4	3rd phasing
AR25	20	Access	459.2	3rd phasing
AR27	20	Access	264.0	1st Phasing
TR28	30	Tertiary	11.0	2nd Phasing
AR44	20	Access	356.9	3rd phasing
TR45	30	Tertiary	12.3	3rd phasing
AR47	20	Access	7.3	1st Phasing
AR51	20	Access	70.4	3rd phasing
TR56	30	Tertiary	544.7	2nd Phasing
PR86	80	Primary	291.6	3rd phasing
AR87	20	Access	315.5	2nd Phasing
AR88	20	Access	283.8	3rd phasing
		Total	5864.3	

Proposed Drain

No drain is in this Ward. Two primary drains, one secondary drain and nine tertiary drains have been proposed along the 120 feet, 60 feet, 40 feet and 30 feet roads.

Table 14.24: Proposed Drainage

Drain id	Type	Width (m)	Length (m)	Phase
PD2	Primary	Above 3m	282.6	2nd Phase
PD3	Primary	Above 3m	315.4	1st Phase
SD33	Secondary	Within 1.5 to 3m	1227.4	2nd Phase
TD39	Tertiary	Less 1.5m	12.2	3rd Phase
SD40	Secondary	Within 1.5 to 3m	10.2	3rd Phase
TD42	Tertiary	Less 1.5m	6.4	3rd Phase
PD46	Primary	Above 3m	1860.7	2nd Phase
TD51	Tertiary	Less 1.5m	78.8	1st Phase
TD82	Tertiary	Less 1.5m	546.6	3rd Phase
TD83	Tertiary	Less 1.5m	357.9	2nd Phase
TD84	Tertiary	Less 1.5m	249.9	3rd Phase
TD86	Tertiary	Less 1.5m	465.0	3rd Phase
		Total	5413.2	

Proposed Services

A college and a ward center have been proposed in this Ward. Existing services should be developed to make it useable.

Table 14.25: Development Proposal

Facility	Ward No	Mouza Name	Plot No	Area (acre)	Phasing
Proposed Ward Center 05	Ward No. 05	Atadi (076_00)	532	0.83	3rd Phase
Proposed Primary School 01	Ward No. 05	Hasamdia (037_02)	4440-42	0.88	3rd Phase
Proposed College 02	Ward No. 05	Atadi (076_00)	3245-46,3505-09, 15202,15204	3.18	2nd Phase

14.3.6 Action Plan for Ward No. 06

Demography

Action Plan for Ward No. 6 consists of one mouza named Seladar Char (south part), Sadardi (eastern part) and Seladar Char (northern part). It is situated on the eastern part of the Pourashava. Ward No. 5 including Kumar River is on the north, Ward No. 8 on the south, Ward No. 4 on the west and Bhanga Upazila area on the eastern part of this Ward. Six east-west and one north-south local roads serve the area. This area is characterized by fish farming, agriculture development and rural homesteads.

Table 14. 26: Population Statistic of Ward No. 06

Type	Population 2011	Projected population			
		2016	2021	2026	2031
Population	2931	3234	3568	3936	4342
Area	288.25	288.25	288.25	288.25	288.25
Density	10	11	12	14	15

Present population of the Ward is 2931 (2011) and it will be 3234 in the year 2016, 3568 in 2021, 3936 in 2026 and 4342 in 2031. Density of population is 10 persons per acre and it will increase 15 in 2031.

Proposals and Plans for Ward No. 06

Land use Proposal

Ward No. 6 is important for hospital and rural homesteads. Total area of the Ward is 288.2 acres. Among the total area, agriculture use is 175.9 acres, circulation network 14.7, urban residential 70.1 acres, community activities 0.6 acres, education and research 0.9acres, mixed-use 0.5 acres, open spaces 4.5 acres and water body 6.6 acres.

Table 14. 27: Proposed Landuse

Landuse Type	Area (acre)	%
Agricultural Zone	114.51	39.71
Circulation Network	14.81	5.14
Commercial Zone	1.43	0.50
Community Facilities	1.26	0.44
Education & Research Zone	1.25	0.43
General Industrial Zone	0.00	0.00
Government Office	0.00	0.00
Health Services	0.00	0.00
Heavy Industrial Zone	48.80	16.92
Historical & Heritage Site	0.00	0.00
Mixed Use Zone	0.54	0.19
Open Space	4.42	1.53
Rural Settlement	11.27	3.91
Transport & Communication	0.00	0.00
Urban Residential Zone	87.47	30.34
Utility Services	0.00	0.00
Water Body	2.59	0.90
Total	288.25	100.00

Proposed Circulation Network

One primary road, four tertiary road and seven access road has been proposed in this ward. Total length of the proposed road is 6506.0 meter.

Map 14.11: Landuse Plan for Ward No 06

Map 14.12: Road and Drainage Plan for Ward No 06

Table 14.28: Proposed road in the Ward No. 6

Road Id	Width (ft)	Type	Length (m)	Phase
PR1	80	Primary	481.1	3rd phasing
AR22	20	Access	1305.3	3rd phasing
TR23	30	Tertiary	408.7	3rd phasing
TR24	30	Tertiary	596.2	3rd phasing
TR28	30	Tertiary	267.0	2nd Phasing
TR45	30	Tertiary	158.9	3rd phasing
AR46	20	Access	1978.5	3rd phasing
AR47	20	Access	283.5	1st Phasing
AR50	20	Access	113.9	3rd phasing
AR62	20	Access	200.9	3rd phasing
AR63	20	Access	83.6	1st Phasing
AR85	20	Access	628.4	3rd phasing
		Total	6506.0	

Proposed Drain

No drain is in this Ward. Three secondary and eight tertiary drains have been proposed in this ward.

Table 14. 29: Proposed Drainage

Drain id	Type	Width (m)	Length (m)	Phase
TD30	Tertiary	Less 1.5m	584.1	3rd Phase
SD32	Secondary	Within 1.5 to 3m	408.6	1st Phase
SD33	Secondary	Within 1.5 to 3m	611.7	2nd Phase
TD35	Tertiary	Less 1.5m	1983.5	1st Phase
TD36	Tertiary	Less 1.5m	91.2	3rd Phase
TD37	Tertiary	Less 1.5m	587.8	2nd Phase
TD38	Tertiary	Less 1.5m	194.2	3rd Phase
TD39	Tertiary	Less 1.5m	158.2	3rd Phase
SD40	Secondary	Within 1.5 to 3m	266.0	3rd Phase
TD41	Tertiary	Less 1.5m	108.1	2nd Phase
TD42	Tertiary	Less 1.5m	283.7	3rd Phase
		Total	5277.2	

Proposed Services

A tourism spot and a ward center have been proposed. Existing services should be developed to make it useable.

Table 14.30: Development Proposal

Facility	Ward No	Mouza Name	Plot No	Area (acre)	Phasing
Proposed Tourism Spot	Ward No. 06	Chhilar Char (075_01)	190-203,222-225	4.46	1st Phase
Proposed Ward Center 06	Ward No. 06	Chhilar Char (075_02)	378,380	0.62	1st Phase

14.3.7 Action Plan for Ward No. 07

Demography

Action Plan for Ward No. 7 consists of three mouzas named Chowdhuri kanda, Kaidubi and Roy Para. It is situated on the southern part of the Pourashava. A part of national highway from Barisal to Faridpur via Bhanga passes through the Ward. Ward No. 6, 8 and 9 is on the north, Ward No. 6 on the east, Alphadanga Upazila on the west and Bhanga Upazila area on the south of this Ward. Six east-west and three north-south local roads serve the area. This area is characterized by fish farming, agriculture land and rural homesteads.

Table 14.31: Population Statistic of Ward No. 07

Type	Population 2011	Projected population			
		2016	2021	2026	2031
Population	3119	3441	3796	4188	4621
Area	356.15	356.15	356.15	356.15	356.15
Density	9	10	11	12	13

Present population of the Ward is 3119 (2011) and it will be 3441 in the year 2016, 3796 in 2021, 4188 in 2026 and 4621 in 2031. Density of population is 9 persons per acre and it will increase 12 persons per acre from the year 2016 to 2026 and again will increase up to 13 persons per acre in the year 2031.

Proposals and Plans for Ward No. 07

Land use Proposal

Ward No. 7 is important for agricultural development. Total area of the Ward is 356 acres. Among the total area, agriculture use is 218.3 acres, urban residential 53.4 acres; circulation network 20.86 acres and water body 4.78 acres. Other uses are negligible.

Table 14.32: Proposed Land use

Landuse Type	Area (acre)	%
Agricultural Zone	218.32	61.25
Circulation Network	20.85	5.85
Commercial Zone	0.72	0.20
Community Facilities	1.15	0.32
Education & Research Zone	4.47	1.25
General Industrial Zone	0.00	0.00
Government Office	0.00	0.00
Health Services	0.00	0.00
Heavy Industrial Zone	3.34	0.94
Historical & Heritage Site	4.67	1.31
Mixed Use Zone	0.00	0.00
Open Space	13.64	3.83
Rural Settlement	31.04	8.71
Transport & Communication	0.00	0.00
Urban Residential Zone	53.43	14.99
Utility Services	0.00	0.00
Water Body	4.78	1.34
Total	356.15	100.00

Proposed Circulation Network

One primary road, one secondary road, four tertiary roads and four access roads has been proposed in this Ward. Total length of the proposed road is 7613.3 meter.

Table 14. 33: Proposed road in the Ward No. 07

Road Id	Width (ft)	Type	Length (m)	Phase
PR1	80	Primary	550.8	3rd phasing
SR6	40	Secondary	1132.1	3rd phasing
TR23	30	Tertiary	585.6	3rd phasing
TR24	30	Tertiary	1274.3	3rd phasing
AR47	20	Access	82.1	1st Phasing
TR57	30	Tertiary	1274.4	1st Phasing
TR58	30	Tertiary	1027.3	3rd phasing
AR59	20	Access	243.4	3rd phasing
AR84	20	Access	1036.4	1st Phasing
AR85	20	Access	406.9	3rd phasing
		Total	7613.3	

Map 14.13: Landuse Plan for Ward No 07

Map 14.14: Road and Drainage Plan for Ward No 07

Proposed Drain

Three primary road, two secondary road and four tertiary road has been proposed in this ward. Total length of proposed drain is about 6274.6 meter.

Table 14. 34: Proposed Drainage

Drain id	Type	Width (m)	Length (m)	Phase
TD26	Tertiary	Less 1.5m	1014.6	1st Phase
SD31	Secondary	Within 1.5 to 3m	1282.2	3rd Phase
SD32	Secondary	Within 1.5 to 3m	590.7	1st Phase
TD37	Tertiary	Less 1.5m	1274.2	2nd Phase
TD42	Tertiary	Less 1.5m	75.5	3rd Phase
TD81	Tertiary	Less 1.5m	236.0	2nd Phase
PD94	Primary	Above 3m	1132.1	3rd Phase
PD96	Primary	Above 3m	333.3	1st Phase
PD97	Primary	Above 3m	335.9	3rd Phase
Total			6274.6	

Development Proposal

A play field, a heritage site, a stadium, a high school and a ward center has been proposed in this Ward. Existing services should be developed to make it useable.

Table 14. 35: Development Proposal

Facility	Ward No	Mouza Name	Plot No	Area (acre)	Phasing
Proposed Play Field	Ward No. 07	Sardari (055_03)	3535	0.17	1st Phase
Proposed Heritage Site	Ward No. 07	Sardari (055_03)	3602	4.43	3rd Phase
Proposed Stadium	Ward No. 07	Sardari (055_02)	2708-17,2805-21	6.8	2nd Phase
Proposed Ward Center 07	Ward No. 07	Sardari (055_03)	3514-3515	0.64	3rd Phase
Proposed High School 02	Ward No. 07	Sardari (055_03)	689-91,709-10	3.24	3rd Phase

14.3.8 Action Plan for Ward No. 08

Demography

Action Plan for Ward No. 8 consists of the mouza named Hogla Kanda. It is situated on the middle part of the Pourashava. Ward No. 6 is on the north and east, Ward No. 9 including national highway on the south and western part of this Ward. Two east-west and two north-south local roads serve the area. This area is characterized by agriculture land and rural homesteads.

Table 14. 36: Population Statistic of Ward No. 08

Type	Population 2011	Projected population			
		2016	2021	2026	2031
Population	2719	3000	3309	3651	4028
Area	165.2	165.2	165.2	165.2	165.2
Density	16	18	20	22	24

Present population of the Ward is 2719 (2011) and it will be 3000 in the year 2016, 3309 in 2021, 3651 in 2026 and 4028 in 2031. Density of population is 16 persons per acre and it will increase 22 persons per acre in the year 2016 and 24 persons per acre in 2031.

Proposals and Plans for Ward No. 08

Land use Proposal

Ward No. 8 is important for agriculture land and rural settlements. Total planning area of the Ward is 165.2 acres. In the total area, agriculture use is 77.16 acres; urban residential 35.8 acres, circulation network 16.8 acres and water body 7.12 acres. Other uses are below than one acre.

Table 14.37: Proposed Land use

Landuse Type	Area (acre)	%
Agricultural Zone	77.16	46.67
Circulation Network	16.67	10.08
Commercial Zone	0.06	0.04
Community Facilities	0.19	0.11
Education & Research Zone	3.52	2.13
General Industrial Zone	0.00	0.00
Government Office	0.87	0.53
Health Services	0.00	0.00
Heavy Industrial Zone	0.00	0.00
Historical & Heritage Site	0.00	0.00
Mixed Use Zone	18.96	11.46
Open Space	4.97	3.01
Rural Settlement	0.00	0.00
Transport & Communication	0.00	0.00
Urban Residential Zone	35.83	21.67
Utility Services	0.00	0.00
Water Body	7.12	4.31
Total	165.2	100.00

Proposed Circulation Network

One primary road, one secondary road ,five tertiary road and seven access road has been proposed in this ward. Total length of the proposed road is 6110.5 meter.

Table 14.38: Proposed road in the Ward No. 08

Road Id	Width (ft)	Type	Length (m)	Phase
PR1	80	Primary	1036.1	3rd phasing
SR6	40	Secondary	180.3	3rd phasing
TR12	30	Tertiary	85.7	3rd phasing
AR19	20	Access	51.2	2nd Phasing
TR24	30	Tertiary	1049.1	3rd phasing
TR28	30	Tertiary	501.0	2nd Phasing
AR33	20	Access	346.2	1st Phasing
AR34	20	Access	241.5	2nd Phasing
TR45	30	Tertiary	418.6	3rd phasing
AR46	20	Access	48.2	3rd phasing
AR63	20	Access	21.8	1st Phasing
TR64	30	Tertiary	239.5	3rd phasing
AR84	20	Access	80.2	1st Phasing
AR85	20	Access	1811.2	3rd phasing
		Total	6110.5	

Proposed Drain

Three primary, one secondary and nine tertiary drains have been proposed along the proposed roads. Total length of those drains is 5.1 km. About 4.5 km. water supply line is being proposed for this Ward.

Map 14.15: Landuse Plan for Ward No 08

Map 14.16: Road and Drainage Plan for Ward No 08

Table 14.39: Proposed Drainage

Drain id	Type	Width (m)	Length (m)	Phase
TD8	Tertiary	Less 1.5m	54.7	3rd Phase
TD14	Tertiary	Less 1.5m	81.1	2nd Phase
TD34	Tertiary	Less 1.5m	258.2	3rd Phase
TD35	Tertiary	Less 1.5m	45.2	1st Phase
TD36	Tertiary	Less 1.5m	14.6	3rd Phase
TD37	Tertiary	Less 1.5m	1057.9	2nd Phase
TD39	Tertiary	Less 1.5m	424.0	3rd Phase
SD40	Secondary	Within 1.5 to 3m	508.9	3rd Phase
TD45	Tertiary	Less 1.5m	250.1	3rd Phase
TD89	Tertiary	Less 1.5m	351.1	1st Phase
PD94	Primary	Above 3m	184.1	3rd Phase
PD96	Primary	Above 3m	1823.9	1st Phase
PD97	Primary	Above 3m	95.3	3rd Phase
		Total	5149.0	

Development Proposal

A primary school and a women college has been proposed in this ward. Existing services should be developed to make it useable.

Table 14. 40: Development Proposal

Facility	Ward No	Mouza Name	Plot No	Area (acre)	Phasing
Proposed Primary School 02	Ward No. 08	Chhilar Char (075_01)	3799-3801,3804-05	0.55	1st Phase
Proposed Women College	Ward No. 08	Sadardi (055_01)	3143-51,3152-58	2.06	1st Phase

14.3.9 Action Plan for Ward No. 09

Demography

Action Plan for Ward No. 9 consists of the mouza named Kapuria Sadardi. It is situated on the southwestern part of the Pourashava. Ward No. 4 and 8 including national highway is on the north, Bhanga Upazila area on the south, Alphadanga Upazila on the west and Ward No. 7 and 8 on the eastern part of this Ward. Six east-west and four north-south local roads serve the area. This area is characterized by agriculture land and rural homesteads.

Table 14. 41: Population Statistic of Ward No. 09

Type	Population 2011	Projected population			
		2016	2021	2026	2031
Population	4319	4765	5257	5800	6399
Area	330.49	330.49	330.49	330.49	330.49
Density	13	14	16	18	19

Present population of the Ward is 4319 (2011) and it will be 4765 in the year 2016, 5257 in 2021, 5800 in 2026 and 6399 in 2031. Density of population is 13 persons per acre and it will remain 19 up to 2031.

Proposals and Plans for Ward No. 09

Land use Proposal

This area is characterized by agriculture practice and rural homesteads. Development pressure is high along the local roads. Total area of the Ward is 330.5 acres. Among the total area, agriculture use is 135.42 acres, Urban residential 111.34 acres, education and research 0.3 acres, circulation network 24.07 acres and water body 21.35 acres.

Table 14.42: Proposed Landuse

Landuse Type	Area (acre)	%
Agricultural Zone	135.42	40.95
Circulation Network	24.07	7.28
Commercial Zone	0.10	0.03
Community Facilities	2.01	0.61
Education & Research Zone	0.32	0.10
General Industrial Zone	0.00	0.00
Government Office	2.87	0.87
Health Services	5.86	1.77
Heavy Industrial Zone	0.00	0.00
Historical & Heritage Site	0.00	0.00
Mixed Use Zone	11.68	3.53
Open Space	13.89	4.20
Rural Settlement	0.00	0.00
Transport & Communication	0.00	0.00
Urban Residential Zone	111.34	33.67
Utility Services	1.81	0.55
Water Body	21.35	6.46
Total	330.49	100.00

Proposed Circulation Network

One primary road, one secondary road, six tertiary roads and nine access roads have been proposed for this Ward. Total length of the proposed road is 9271.9 meter.

Table 14.43: Proposed road in the Ward No. 09

Road Id	Width (ft)	Type	Length (m)	Phase
PR1	80	Primary	799.9	3rd phasing
SR6	40	Secondary	1763.8	3rd phasing
TR9	30	Tertiary	506.9	3rd phasing
TR10	30	Tertiary	358.1	3rd phasing
TR11	30	Tertiary	744.9	3rd phasing
TR12	30	Tertiary	17.8	3rd phasing
AR15	20	Access	306.3	1st Phasing
TR16	30	Tertiary	615.1	3rd phasing
AR17	20	Access	246.0	3rd phasing
AR18	20	Access	248.0	3rd phasing
AR19	20	Access	611.9	2nd Phasing
AR33	20	Access	99.9	1st Phasing
AR49	20	Access	126.1	3rd phasing
TR58	30	Tertiary	253.4	3rd phasing
AR60	20	Access	667.0	3rd phasing
AR61	20	Access	132.2	2nd Phasing
AR84	20	Access	1774.6	1st Phasing
		Total	9271.9	

Proposed Drain and Water Supply Line

Two primary, one secondary and nine tertiary drains have been proposed along the 80 feet, 40 feet, 30 feet and 20 feet width roads. Total length of those drains is 8.5 km. About 6.2 km. water supply line is being proposed for this Ward.

Map 14.17: Landuse Plan for Ward No 09

Map 14.18: Road and Drainage Plan for Ward No 09

Table 14. 44: Proposed Drainage

Drain id	Type	Width (m)	Length (m)	Phase
TD8	Tertiary	Less 1.5m	606.8	3rd Phase
TD10	Tertiary	Less 1.5m	124.9	2nd Phase
TD14	Tertiary	Less 1.5m	13.2	2nd Phase
TD19	Tertiary	Less 1.5m	667.6	3rd Phase
TD20	Tertiary	Less 1.5m	623.2	1st Phase
TD21	Tertiary	Less 1.5m	261.6	3rd Phase
TD22	Tertiary	Less 1.5m	508.4	3rd Phase
TD26	Tertiary	Less 1.5m	257.4	1st Phase
TD27	Tertiary	Less 1.5m	129.8	3rd Phase
SD28	Secondary	Within 1.5 to 3m	747.4	2nd Phase
TD29	Tertiary	Less 1.5m	240.1	2nd Phase
TD43	Tertiary	Less 1.5m	302.5	3rd Phase
TD44	Tertiary	Less 1.5m	359.6	3rd Phase
TD89	Tertiary	Less 1.5m	94.7	1st Phase
PD94	Primary	Above 3m	1762.8	3rd Phase
PD97	Primary	Above 3m	1752.8	3rd Phase
		Total	8452.7	

Development Proposal

A govt. quarter, an eidgha and a ward center has been proposed in this ward.

Table 14. 45: Development Proposal

Facility	Ward No	Mouza Name	Plot No	Area (acre)	Phasing
Proposed Govt. Quater	Ward No. 09	Sadardi (055_01)	1689-1705,1759-1787, 1817-1824	15.64	3rd Phase
Proposed Eidgha	Ward No. 09	Sadardi (055_01)	410,411,430	0.12	1st Phase
Proposed Ward Center 09	Ward No. 09	Sadardi (055_01)	1734-36	0.92	1st Phase

Table 14.46: Development Proposal (extension area)

Facility	Ward No	Mouza Name	Plot No	Area (acre)	Phasing
Proposed Dumping Site	Out of Paurashava	Atadi (076_00)	378-388	2.63	1st Phase
Proposed Park 01	Out of Paurashava	Jhalkhali (073_00)	316-337,384-399	11.74	1st Phase
Proposed Park 02	Out of Paurashava	Sadardi (055_03)	6085-6113	10.16	2nd Phase
Proposed Commercial Area	Out of Paurashava	Maligram (106_02)	2134-2161	9.33	2nd Phase
Proposed Housing Estate	Out of Paurashava	Hasamdia (037_01)	20-24,33-41,67-70, 267-276	11.29	3rd Phase
Proposed Graveyard	Out of Paurashava	Atadi (076_00)	579-608	2.7	1st Phase
Proposed Primary School 04	Out of Paurashava	Atadi (076_00)	280	0.32	3rd Phase

14.4 Implementation Guidelines

Implementation of the Ward Action Plan should follow the development control procedures for determining planning applications by use of the simple and standard planning application procedures. A simple application will be assessed quickly against a given set of criteria, essentially consisting of the following:

1. The proposed development confirms all respects mentioned in the policies of the Structure Plan and Urban Area Plan.
2. The usage identified in the application is being considered appropriate for inclusion in an area demarcated in the Ward Action Plan. An indicative list of uses considered appropriate is below:

- buildings are a maximum of four-storied;
- no single building or related group of buildings is 1000 sq. m. of gross floor area; and
- access and utility corridors are not impinged.

Provided that the planning application meets above criteria and the application will be approved and planning permission is given.

Planning applications that do not meet the above criteria or are considered marginal cases (to be known as an invalid simple application) will be subjected to a more detailed examination in considering standard procedure.

Following development and landuses are indicative of those appropriate in the Ward Action Plan:

- Residential development up to four-storied.
- Small-scale shops.
- Primary schools / kindergartens.
- Mosques (or other religious facilities) servicing a local area plus small graveyard if required.
- Recreational development.
- Local health facilities (clinics rather than hospital).
- Small-scale office (may be public or private) development.
- Workshops (small-scale workshops with operations only) in daylight hours and low traffic generators.
- Open space (playgrounds, parks, etc.)
- Access roads.

When considering a standard planning application within areas zoned for Ward Action Plan, the Paurashava will need to undertake a two-stage process. **First**, before considering site specific issues, the Paurashava will need, on receipt of the planning application, to consider the wider context and determine issues relating to the overall area into which the application falls. The Paurashava will need to:

- Determine the boundaries of the wider area. These will usually be formed by some distinctive natural or man-made feature, for example a khal, river or road which provides access into the area. Such areas will vary in shape and size.
- Identify and assess the existing access and circulation arrangements of the area. Preferably, the area should be served by 10 meter access roads which run through the entire area providing access to all Wards. These access roads should be linked to local roads. If this is not the case and access roads of sufficient width, are not available, the Paurashava shall consider whether or not further development is appropriate. New development may result in increased vehicular congestion and increased demand for utility services, where this could be difficult to supply.

- Identify the existing landuses within these boundaries. In Ward Action Plan, the predominant use will be residential but other uses will present in the vicinity of the application.

In these instances, the Paurashava will consider refusal of application or at least a delay until access and utility provision can be made. This may require acquisition of land.

- Identify the need for community facilities (schools, clinics, religious facilities, open spaces, etc.) or plots for utility services. Do sufficient already exist or should more land be sought for increased provision to the existing population? In this latter instance, the Paurashava will again need to consider acquisition of land including the land, either in part or in full, under consideration for development.
- Consider areas of high landscape quality in the locality which should be preserved and the potential impact of the proposed development on those areas.

If there is doubt in the mind of the Paurashava as to the answers to the above questions, the planning application will require a more detailed assessment.

Secondly, the Paurashava will need to consider issues relating to the individual site and application. These can only be determined once the overall context of the area has been established. The questions the Paurashava will need to ask are:

- Can be proposed use of land be considered a “good neighbour”, defined in this situation as a use which can be carried out in any residential area without detriment to the amenities of the area by reason of noise, vibration, smell, fumes, smoke, soot, ash, dust or grit?
 - Is the use likely to generate excessive volumes of traffic which either cannot be accommodated on the existing road system or which are likely to disturb, its neighbours?
 - Will the working hours of the use (if non-residential) cause a disturbance to residential neighbours (with working late in to the evening or night or 24-hours operations likely to cause a nuisance and therefore not being permitted)?
 - If yes to any of the above, the application should be rejected and directed to a more suitable location.
- Is the use in conformity with the surrounding uses or with those that are compatible with a site in a predominantly residential area?
- Does the proposed boundary of the application impinge upon a road corridor, utility reserve or drainage channel reserve? If it does, it should be relocated outside such a reserve, even if this constitutes a reduction in the overall size of the plot. If excessive land will be lost as a result, implying that the development can no longer proceed, the application will need to be rejected.
- Does the application provide for adequate site access from, preferably as minimum, a 6 meter access road? Does it have sufficient on-site or off-site parking facilities to cater for the potential demand? If it does not, the plans should be amended or the application refused.

- Will the development destroy landscape unique to the location? If it does, its design will need to be altered to protect the landscape, or the application will need to be refused.
- Is the scale of development proposed in keeping with its neighbours? If too large, it should be reduced. Does it impinge up on the privacy of others? If it does, the design / layout / size should be changed. If it can not be appropriately modified, it should be refused.
- Will the proposed development negatively impact upon utility provision in the area i.e. will it overload the system for some reason (like high electricity demand or high water consumption)? Will pollution from the proposed activities cause a problem in the neighbourhood? If this is likely to occur, the application should be refused.

If the application is for a major development, have the utility authorities being contacted to give their assessment and approval for the infrastructure works that will be required?

Given the existing situation in some of the Ward Action Plan, where for example, access is already poor or there is insufficient space available to provide adequate infrastructure, the Paurashava will aim to ensure that its decision will not make the situation worse.

The Paurashava will need to process each application within one month, at the end of which time they will either need to:

- approve the application unconditionally;
- approve the application subject to a number of conditions; or
- refuse the application.

14.5 Concluding Remarks

14.5.1 Introduction

The Master Plan is prepared for managing and promoting development over medium terms following the broad guidelines set by the longer term Structure Plan. It shows the structure of sub-system in space over the medium term and identifies broad programs of direct action especially related to infrastructural development, institutional issues as well as broad financing strategies. The plan also outlines more specific Ward-wise development policies to guide development over the medium terms. One major objective of preparing Master Plan is the consolidation of development activities by various agencies in areas that have strongest potential for growth in the medium term and can accommodate anticipated volume of growth. Other purpose of preparing Master Plan is to facilitate the development control function. It shows the broad landuse zones on a more detailed scale of maps as derived from Structure Plan. The plan provides details of landuse zoning and building controls, the development control function becomes easier to implement with a Master Plan. It also shows land reservations required for essential uses and major infrastructure development.

14.5.2 Comparative Advantage of Master Plan

Comparative advantages of Master Plan rather than Ward Action Plan are:

- The term Master Plan deserves wider sense than the term Ward Action Plan. Policies and strategies are being prescribed in the Master Plan based on the existing trend of

development and growth potentiality. The Ward Action Plan only emphasizes on those components immediate action is being necessary.

- The Master Plan is for the Paurashava as a whole but the Ward Action Plan is only for individual Ward. All studies relevant and guided by the ToR is being followed for the preparation of Master Plan at first and based on those studies and findings the Ward Action Plan is being designed.
- The Ward Action Plan is mostly relevant with the implementation criteria; it is called the implementation of Master Plan. The micro-component which is going to be implemented according to the Ward Action Plan is guided by the Master Plan. Therefore, any problem arises during the implementation phase of Ward Action Plan will be resolved through the guideline prescribed in the Master Plan.

14.5.3 Addressing Proposals for Mitigation of Identified Issues

- For improvement, construction and re-construction of local roads, bridge and culvert and box culvert, a close coordination among the authorities named Paurashava, LGED, PDB, REB and WDB will be maintained. This coordination is necessary from the preparation of budget to implementation of the component.
- In plan implementation phase, people's participation will be encouraged. The process as prescribed in the Structure Plan will be initiated for this purpose.
- A buffer will be needed for every important development especially for housing area, stadium and Bus terminal.

In preparing the proposed construction program priorities have been assigned to the works mostly in the various drainage areas taking the following factors into account:

- the severity of flooding in terms of depth, duration and frequency;
- the views of Paurashava officials on the relative needs of different areas;
- The engineering relationship of the proposed phase of construction to the preceding and subsequent phases;
- the estimated time required to execute the proposed works having regard to the capacity and capability of contractors and the availability of materials;
- the estimated amount of the capital investment required.

In general, aim should be to implement the Master Plan at a continuous steady rate throughout the 20 years period and based upon the above considerations, the works have been grouped broadly into four main stages:

- The first stage accords priority to improve the Traffic Management and alleviation of flooding in the central area of the Paurashava.
- The second stage in general covers less densely developed areas with the improvement of transport services.
- The third stage covers drainage congestion areas for improvement.
- The fourth stage will be the rain water harvesting for supplying drinking water to the Paurashava dwellers when scarcity will be generated.

14.5.4 Conclusion

To ensure that the procedures are being followed, the Paurashava will need to monitor the situation. This monitoring is required to ensure that:

- no illegal development is taking place i.e. no-one is attempting to develop without submitting an application; and
- approved developments are built in accordance with the approved plans.
- development will take places according to the Master Plan.

ANNEXURE A: Paurashava Gazette

ANNEXURE B: Proposed Land Use Categories and Permitted Use

a. Urban Residential Land Use

Land Use Permitted

The following uses in the tables are proposed to be applicable for this zone only.

Table B.1: Land Use Permitted

Permitted Urban Residential Uses
Artisan's Shop
Assisted Living or Elderly Home
Confectionery Shop
Barber Shop
Child Daycare \ Preschool
Cleaning \ Laundry Shop
Communication Service Facilities
Communication Tower Within Permitted Height
Condominium or Apartment
Cottage
Cyber Café
Daycare Center (Commercial or Nonprofit)
Drug Store or Pharmacy
Employee Housing (Guards \ Drivers) \ Ancillary Use
General Store
Grocery Store
High School
Household Appliance and Furniture Repair Service (No Outside Storage)
Housing For Seasonal Firm Labor
Landscape and Horticultural Services
Mosque, Place Of Worship
Newspaper Stand
Nursery School
Orphanage
Eidgah
Photocopying and Duplicating Services (No Outside Storage)
Pipelines and Utility Lines
Playing Field
Primary School
Private Garages (Ancillary Use)
Project Identification Signs
Property Management Signs
Public Transport Facility
Satellite Dish Antenna
Shelter (Passers By)
Shoe Repair or Shoeshine Shop (Small)
CBO Office
Special Dwelling

Permitted Urban Residential Uses
Temporary Tent
Temporary tent for Permitted Function
Newspaper Stand
Specialized School: Dance, Art, Music, Physically Challenged & Others
Transmission Lines
Urban-Nature Reserve
Utility Lines
Woodlot
Children's Park (Must Have Parking)
ATM Booth
Water Pump \ Reservoir
Monument (Neighborhood Scale)
Bill Payment Booth
Boarding and Rooming House
Dormitory
Memorial Structure (Ancillary)
Neighborhood Center* (Where Neighborhood Center exists)
Permitted
Community Center
Doctor \ Dentist Chamber
Cultural Exhibits and Libraries
Fast Food Establishment \ Food Kiosk
Flowers, Nursery Stock and Florist Supplies
Fitness Centre
Gaming Clubs
Departmental Stores
Retail Shops \ Facilities

Source: Compiled by the Consultants

*Permission of Neighborhood Center Facilities in absence of formal neighborhood should be subject to Landuse Permit Committee

Land Use Conditionally Permitted

The following uses may be permitted or disallowed in this zone after review and approval by the authority/committee following appropriate procedure while the application meets the criteria mentioned in the requirement.

Table B.2: Land Use Conditionally Permitted

Conditionally Permitted Urban Residential Uses
Addiction Treatment Center
Amusement and Recreation (Indoors)
Funeral Services
Art Gallery, Art Studio \ Workshop
Automobile Driving Academy
Beauty and Body Service
Billiard Parlor \ Pool Hall
Book or Stationery Store or Newsstand
Building Maintenance \ Cleaning Services, No Outside Storage
Bus Passenger Shelter

Conditionally Permitted Urban Residential Uses
Graveyard \ Cemetery
Coffee Shop \ Tea Stall
Correctional Institution
Courier Service
Crematorium
Plantation (Except Narcotic Plant)
Furniture & Variety Stores
Emergency Shelter
Energy Installation
Garages
Garden Center or Retail Nursery
Fire Brigade Station
Police Station
Temporary Rescue Shed
Guest House
Slaughter House
Static Transformer Stations
Tourist Home or Resort
Market (Bazar)
Optical Goods Sales
Outdoor Café
Outdoor Fruit and Vegetable Markets
Community Hall
Neighborhood Co-Operative Office
Overhead Water Storage Tanks
Row House
Paints and Varnishes Store
Parking Lot
Patio Homes
Photofinishing Laboratory
Post Office
Postal Facilities
Sports and Recreation Club
Tennis Club
Flood Management Structure
Telephone Sub Station
Electrical Sub Station

Source: Compiled by the Consultants

Restricted Uses

All uses except permitted and conditionally permitted uses are restricted in this zone.

b. General Industry

Land use Permitted

General Industry land use category approve only Green and Orange-A category industry mentioned in The Environmental Conservation Rule, 1997. The following uses in the tables are proposed to be applicable for this zone only.

Table B.3: Land Use Permitted

Permitted General Industrial Activities
Confectionery Shop
Bank & Financial Institution
Bicycle Assembly, Parts and Accessories
Blacksmith
Bus Passenger Shelter
Communication Tower Within Permitted Height
Freight Transport Facility
Police Box \ Barrack
Fire \ Rescue Station
Grocery Store
Household Appliance and Furniture Repair Service
Machine Sheds
Meat and Poultry (Packing & Processing)
Mosque, Place Of Worship
Newspaper Stand
Photocopying and Duplicating Services
Pipelines and Utility Lines
Printing, Publishing and Distributing
Public Transport Facility
Restaurant
Retail Shops \ Facilities
Salvage Processing
Salvage Yards
Satellite Dish Antenna
Sawmill, Chipping and Pallet Mill
Shelter (Passers By)
Television, Radio or Electronics Repair (No Outside Storage)
Transmission Lines
Truck Stop & Washing or Freight Terminal
Utility Lines
Wood Products
Woodlot
ATM Booth
Water Pump \ Reservoir
Effluent Treatment Plant
Social Forestry

Source: Compiled by the Consultants

Land Use Conditionally Permitted

The following uses may be permitted or denied in this zone after review and approval by the authority/committee following appropriate procedure.

Table B.4: Land Use Conditionally Permitted

Conditionally Permitted General Industrial Land Uses
Amusement and Recreation (Indoors)

Conditionally Permitted General Industrial Land Uses
Appliance Store
Plantation (Except Narcotic Plant)
Cyber Café
Daycare Center (Commercial or Nonprofit)
Doctor \ Dentist Chamber
Electrical and Electronic Equipment and Instruments Sales
Employee Housing
Energy Installation
Fast Food Establishment \ Food Kiosk
Garages
Grain & Feed Mills
Incineration Facility
Super Store
Lithographic or Print Shop
Motor Vehicle Fuelling Station \ Gas Station
Motorcycle Sales Outlet
Outdoor Fruit and Vegetable Markets
Outside Bulk Storage
Overhead Water Storage Tanks
Painting and Wallpaper Sales
Paints and Varnishes
Parking Lot
Parking Lot (Commercial)
Private Garages
Retail Shops Ancillary To Studio \ Workshop
Jute Mill

Source: Compiled by the Consultants

Restricted Uses

All other uses; except the permitted and conditionally permitted uses.

c. Commercial Zone

Land Use Permitted

Commercial zone is mainly intended for supporting the office and business works. There are several functions that are permitted in this zone.

Table B.5: Land Use Permitted

Permitted Commercial Activity
Accounting, Auditing or Bookkeeping Services
Billboards, Advertisements & Advertising Structure
Agri-Business
Agricultural Sales and Services
Ambulance Service
Antique Shop
Appliance Store
Auction Market
Auditorium, Coliseum, Meeting Halls, and Conference Facilities, Convention
Auto Leasing or Rental Office
Auto Paint Shop

Permitted Commercial Activity
Auto Parts and Accessory Sales (Indoors)
Auto Repair Shop (With Garage)
Automobile Wash
Automobile Sales
Confectionery Shop
Bakery or Confectionery Retail
Bank & Financial Institution
Bar (Licensed)
Barber Shop
Beauty and Body Service
Bicycle Shop
Billiard Parlor \ Pool Hall
Book or Stationery Store or Newsstand
Building Material Sales or Storage (Indoors)
Bulk Mail and Packaging
Bus Passenger Shelter
Cinema Hall
Communication Service Facilities
Communication Tower Within Permitted Height
Computer Maintenance and Repair
Computer Sales & Services
Conference Center
Construction Company
Courier Service
Cyber Café
Daycare Center (Commercial or Nonprofit)
Department Stores, Furniture & Variety Stores
Doctor \ Dentist Chamber
Drug Store or Pharmacy
Electrical and Electronic Equipment and Instruments Sales
Fast Food Establishment \ Food Kiosk
Freight Handling, Storage & Distribution
Freight Transport Facility
Freight Yard
General Store
Grocery Store
Guest House
Hotel or Motel
Inter-City Bus Terminal
Jewelry and Silverware Sales
Junk \ Salvage Yard
Super Store
Market (Bazar)
Mosque, Place Of Worship
Motorcycle Sales Outlet
Multi-Storey Car Park
Newspaper Stand
Outdoor Fruit and Vegetable Markets
Outdoor Recreation, Commercial

Permitted Commercial Activity
Parking Lot (Commercial)
Pet Store
Photocopying and Duplicating Services
Photofinishing Laboratory & Studio
Pipelines and Utility Lines
Post Office
Preserved Fruits and Vegetables Facility \ Cold Storage
Printing, Publishing and Distributing
Project Identification Signs
Property Management Signs
Public Transport Facility
Refrigerator or Large Appliance Repair
Resort
Restaurant
Retail Shops \ Facilities
Salvage Processing
Salvage Yards
Satellite Dish Antenna
Sawmill, Chipping and Pallet Mill
Shelter (Passers By)
Shopping Mall \ Plaza
Slaughter House
Software Development
Sporting Goods and Toys Sales
Taxi Stand
Telephone Exchanges
Television, Radio or Electronics Repair (No Outside Storage)
Theater (Indoor)
Transmission Lines
Utility Lines
Vehicle Sales & Service, Leasing or Rental
Veterinarian Clinics, Animal Hospitals, Kennels and Boarding Facilities
Warehousing
Wood Products
Woodlot
ATM Booth
Water Pump \ Reservoir
Agro-Based Industry (Rice Mill, Saw Mill, Cold Storage)
Social Forestry

Source: Compiled by the Consultants

Land Use Conditionally Permitted

Some functions are permitted with some condition in this zone.

Table B.6: Land Use Conditionally Permitted

Conditionally permitted commercial activities
Amusement and Recreation (Indoors)
Bicycle Assembly, Parts and Accessories

Conditionally permitted commercial activities
Broadcast Studio \ Recording Studio (No Audience)
Coffee Shop \ Tea Stall
Concert Hall, Stage Shows
Construction, Survey, Soil Testing Firms
Trade Shows
Craft Workshop
Plantation (Except Narcotic Plant)
Energy Installation
Firm Equipment Sales & Service
Agricultural Chemicals, Pesticides or Fertilizers Shop
Fitness Centre
Flowers, Nursery Stock and Florist Supplies
Forest Products Sales
Fuel and Ice Dealers
Garages
Garden Center or Retail Nursery
Police Box \ Barrack
Fire \ Rescue Station
Grain & Feed Mills
Household Appliance and Furniture Repair Service
Incineration Facility
Indoor Amusement Centers, Game Arcades
Indoor Theatre
Lithographic or Print Shop
Motor Vehicle Fuelling Station \ Gas Station
Musical Instrument Sales or Repair
Optical Goods Sales
Painting and Wallpaper Sales
Paints and Varnishes
Parking Lot
Patio Homes
Postal Facilities
Poultry
Private Garages
Professional Office
Retail Shops Ancillary To Studio \ Workshop
Stone \ Cut Stone Products Sales

Source: Compiled by the Consultants

Restricted Uses

All other uses except, the permitted and conditionally permitted uses.

d. Rural Settlement

Land Use Permitted

The following uses in the tables are proposed to be applicable for this zone only.

Table B.7: Land Use Permitted

Permitted Rural Settlement

Permitted Rural Settlement
Agricultural Dwellings
Animal Husbandry
Animal Shelter
Graveyard \ Cemetery
Child Daycare \ Preschool
Primary School
Communication Tower Within Permitted Height
Cottage
Crematorium
Dairy Farming
General Store
Grocery Store
Handloom (Cottage Industry)
Housing For Seasonal Firm Labor
Mosque, Place Of Worship
Newspaper Stand
Nursery School
orphanage
Outdoor Religious Events (Eidgah)
Playing Field
Satellite Dish Antenna
NGO \ CBO Facilities
Special Dwelling (E.G. Dorm For Physically Challenged Etc.)
Temporary Shed \ Tent
Specialized School: Dance, Art, Music, Physically Challenged & Others
Static Electrical Sub Stations
Transmission Lines
Utility Lines
Woodlot
Plantation (Except Narcotic Plant)
Social Forestry
Memorial Structure

Source: Compiled by the Consultants

Land Use Conditionally Permitted

The following uses may be permitted or disallowed in this zone after review and approval by the authority/committee following appropriate procedure while the application meets the criteria mentioned in the requirement.

Table No. B.8: Land Use Conditionally Permitted

Conditionally permitted uses under Rural Settlement
Artisan's Shop (Potter, Blacksmith, and Goldsmith Etc.)
Research organization (Agriculture \ Fisheries)
Energy Installation
Fish Hatchery
Garden Center or Retail Nursery
Emergency Shelter
Sports and Recreation Club, Firing Range: Indoor

Source: Compiled by the Consultants

Restricted Uses

All uses except permitted and conditionally permitted uses are restricted in this zone.

e. Mixed use zone

Land Use Permitted

The following uses in the tables are proposed to be applicable for this zone only.

Table B.11: Land Use Permitted

Permitted uses in Mixed Use Zone
Accounting, Auditing or Bookkeeping Services
Addiction Treatment Center
Billboards, Advertisements & Advertising Structure
Agricultural Sales and Services
Antique Store
Appliance Store
Art Gallery, Art Studio \ Workshop
Artisan's Shop
Assisted Living or Elderly Home
Auditorium, Coliseum, Meeting Halls, and Conference Facilities, Convention
Auto Leasing or Rental Office
Automobile Wash
Automobile Driving Academy
Confectionery Shop
Bakery or Confectionery Retail
Bank & Financial Institution
Barber Shop
Bicycle Shop
Billiard Parlor \ Pool Hall
Blacksmith
Boarding and Rooming House
Book or Stationery Store or Newsstand
Bus Passenger Shelter
Child Daycare \ Preschool
Cleaning \ Laundry Shop
Commercial Recreational Buildings
Communication Service Facilities
Communication Tower Within Permitted Height
Community Center
Condominium or Apartment
Correctional Institution
Courier Service
Cyber Café
Daycare Center (Commercial or Nonprofit)
Doctor \ Dentist Chamber
Employee Housing
Fabric Store
Fast Food Establishment \ Food Kiosk
Funeral Services
General Store
Grocery Store

Permitted uses in Mixed Use Zone
Guest House
Hospital
Jewelry and Silverware Sales
Landscape and Horticultural Services
Mosque, Place Of Worship
Newspaper Stand
Nursery School
Photocopying and Duplicating Services
Pipelines and Utility Lines
Primary School
Project Identification Signs
Property Management Signs
Public Transport Facility
Resort
Satellite Dish Antenna
Shelter (Passers By)
Shoe Repair or Shoeshine Shop (Small)
Slaughter House
Social organization
Software Development
Special Dwelling
Toys and Hobby Goods Processing and Supplies
Training Centre
Transmission Lines
Utility Lines
Vehicle Sales & Service, Leasing or Rental
Warehousing
Woodlot
Children's Park
ATM Booth
Water Pump \ Reservoir
Social Forestry
Dormitory
Rickshaw \ Auto Rickshaw Stand

Source: Compiled by the Consultants

Land Use Conditionally Permitted

The following uses may be permitted or disallowed in this zone after review and approval by the authority/committee.

Table B.12: Land Use Conditionally Permitted

Conditionally permitted uses in Mixed Use Zone
Agricultural Chemicals, Pesticides or Fertilizers Shop
Amusement and Recreation (Indoors)
Beauty and Body Service
Broadcast Studio \ Recording Studio (No Audience)
Building Maintenance \ Cleaning Services, No Outside Storage
Building Material Sales or Storage (Indoors)
Graveyard \ Cemetery

Conditionally permitted uses in Mixed Use Zone
Coffee Shop \ Tea Stall
Computer Maintenance and Repair
Computer Sales & Services
Concert Hall, Stage Shows
Conference Center
Construction Company
Construction, Survey, Soil Testing Firms
Cottage
Counseling Services
Craft Workshop
Crematorium
Plantation (Except Narcotic Plant)
Cultural Exhibits and Libraries
Department Stores, Furniture & Variety Stores
Drug Store or Pharmacy
Energy Installation
Fitness Centre
Flowers, Nursery Stock and Florist Supplies
Freight Handling, Storage & Distribution
Freight Transport Facility
Gaming Clubs
Garages
Garden Center or Retail Nursery
Commercial Office
Project Office
Government Office
Hotel or Motel
Household Appliance and Furniture Repair Service
Indoor Amusement Centers, Game Arcades
Indoor Theatre
Lithographic or Print Shop
Market (Bazar)
Health Office, Dental Laboratory, Clinic or Lab
Musical Instrument Sales or Repair
Optical Goods Sales
Outdoor Café
Outdoor Fruit and Vegetable Markets
Painting and Wallpaper Sales
Paints and Varnishes
Patio Homes
Photofinishing Laboratory & Studio
Poultry
Printing, Publishing and Distributing
Psychiatric Hospital
Retail Shops Ancillary To Studio \ Workshop
Radio \ Television or T&T Station With Transmitter Tower
Refrigerator or Large Appliance Repair
Restaurant
Retail Shops \ Facilities
Sporting Goods and Toys Sales
Sports and Recreation Club, Firing Range: Indoor
Telephone Exchanges
Television, Radio or Electronics Repair (No Outside Storage)

Source: Compiled by the Consultants

Restricted Uses

All uses except permitted and conditionally permitted uses are restricted in this zone.

f. Education and Research Area

Land Use Permitted

The following uses in the tables are proposed to be applicable for this zone only.

Table B.13: Land Use Permitted

■ Permitted uses under Education & Research Zone
Addiction Treatment Center
Billboards, Advertisements & Advertising Structure
Art Gallery, Art Studio \ Workshop
Automobile Driving Academy
Confectionery Shop
Bus Passenger Shelter
Child Daycare \ Preschool
College, University, Technical Institute
Communication Service Facilities
Communication Tower Within Permitted Height
Conference Center
Correctional Institution
Cultural Exhibits and Libraries
Cyber Café
Freight Transport Facility
General Store
Grocery Store
High School
Hospital
Lithographic or Print Shop
Mosque, Place Of Worship
Multi-Storey Car Park
Newspaper Stand
Nursery School
Outdoor Religious Events
Photocopying and Duplicating Services
Post Office
Primary School
Professional Office
Project Identification Signs
Property Management Signs
Public Transport Facility
Satellite Dish Antenna
School (Retarded)
Scientific Research Establishment
Shelter (Passers By)
Specialized School: Dance, Art, Music & Others
Training Centre
Transmission Lines
Utility Lines
Vocational, Business, Secretarial School
Woodlot
ATM Booth
Water Pump \ Reservoir
Social Forestry
Dormitory
Veterinary School \ College and Hospital

Source: Compiled by the Consultants

Land Use Conditionally Permitted

The following uses may be permitted or denied in this zone after review and approval by the authority/committee.

Table B.14: Land Use Conditionally Permitted

Conditionally permitted uses under Education and Research Zone
Auditorium, Coliseum, Meeting Halls, and Conference Facilities, Convention
Bank & Financial Institution
Barber Shop
Boarding and Rooming House
Book or Stationery Store or Newsstand
Coffee Shop \ Tea Stall
Counseling Services
Courier Service
Plantation (Except Narcotic Plant)
Daycare Center (Commercial or Nonprofit)
Doctor \ Dentist Chamber
Drug Store or Pharmacy
Fast Food Establishment \ Food Kiosk
Flowers, Nursery Stock and Florist Supplies
Gallery \ Museum
Garages
Indoor Theatre
orphanage
Outdoor Café
Parking Lot
Pipelines and Utility Lines
Postal Facilities
Psychiatric Hospital

Source: Compiled by the Consultants

Restricted Uses

All uses except permitted and conditionally permitted uses are restricted in this zone.

g. Government Office

Land Use Permitted

The following uses in the tables are proposed to be applicable for this zone only.

Table B.15: Land Use Permitted

Permitted uses under Government Office Zone
Accounting, Auditing or Bookkeeping Services
Billboards, Advertisements & Advertising Structure
Confectionery Shop
Bus Passenger Shelter
Civic Administration
Communication Service Facilities
Communication Tower Within Permitted Height
Construction, Survey, Soil Testing Firms

Permitted uses under Government Office Zone
Cultural Exhibits and Libraries
Cyber Café
Emergency Shelter
Freight Transport Facility
General Store
Project Office
Government Office
Grocery Store
Guest House
Multi-Storey Car Park
Newspaper Stand
Outdoor Religious Events
Photocopying and Duplicating Services
Post Office
Professional Office
Public Transport Facility
Satellite Dish Antenna
Scientific Research Establishment
Shelter (Passers By)
Training Centre
Transmission Lines
Utility Lines
Woodlot
ATM Booth
Water Pump \ Reservoir
Social Forestry

Source: Compiled by the Consultants

Land Use Conditionally Permitted

The following uses may be permitted or denied in this zone after review and approval by the authority/committee.

Table B.16: Land Use Conditionally Permitted

Conditionally permitted uses under Government office
Amusement and Recreation (Indoors)
Auditorium, Coliseum, Meeting Halls, and Conference Facilities, Convention
Bank & Financial Institution
Boarding and Rooming House
Book or Stationery Store or Newsstand
Coffee Shop \ Tea Stall
Conference Center
Courier Service
Plantation (Except Narcotic Plant)
Daycare Center (Commercial or Nonprofit)
Detention Facilities
Doctor \ Dentist Chamber
Energy Installation
Fast Food Establishment \ Food Kiosk
Flowers, Nursery Stock and Florist Supplies

Conditionally permitted uses under Government office
Freight Handling, Storage & Distribution
Freight Yard
Gallery \ Museum
Garages
Police Box \ Barrack
Fire \ Rescue Station
Lithographic or Print Shop
Mosque, Place Of Worship
Outdoor Café
Parking Lot
Parking Lot (Commercial)
Pipelines and Utility Lines
Postal Facilities

Source: Compiled by the Consultants

Restricted Uses

All uses except permitted and conditionally permitted uses are restricted in this zone.

h. Agricultural Zone

Land Use Permitted

The following uses in the tables are proposed to be applicable for this zone only.

Table B.17: Land Use Permitted

Permitted uses under Agricultural Zone
Food Grain Cultivation
Vegetable Cultivation
Cash Crop Cultivation
Horticulture
Arboriculture
Dairy Farming
Deep Tube Well
Shallow Tube Well
Irrigation Facilities (Irrigation Canal, Culvert, Flood Wall etc)
Temporary Structure (Agricultural)
Animal Shelter
Duckery
Aquatic Recreation Facility (Without Structure)
Tree Plantation (Except Narcotic Plant)
Aquaculture
Static Transformer Stations
Transmission Lines
Utility Lines
Woodlot
Social Forestry

Source: Compiled by the Consultants

Land Use Conditionally Permitted

Table B.18: Land Use Conditionally Permitted

Conditionally permitted uses under Agricultural Zone
Graveyard \ Cemetery

Conditionally permitted uses under Agricultural Zone
Communication Tower Within Permitted Height
Crematorium
Fish Hatchery
Garden Center or Retail Nursery
Poultry

Source: Compiled by the Consultants

Restricted Uses

All uses except permitted and conditionally permitted uses are restricted in this zone.

j. Open Space

Land Use Permitted

The following uses in the tables are proposed to be applicable for this zone only.

Table B.19: Land Use Permitted

Permitted uses under Open Space
Botanical Garden & Arboretum
Bus Passenger Shelter
Caravan Park \ Camping Ground
Carnivals and Fairs
Circus
Plantation (Except Narcotic Plant)
Landscape and Horticultural Services
Open Theater
Park and Recreation Facilities (General)
Pipelines and Utility Lines
Playing Field
Special Function Tent
Tennis Club
Transmission Lines
Urban-Nature Reserve
Utility Lines
Woodlot
Zoo
Roadside Parking
Social Forestry
Memorial Structure

Source: Compiled by the Consultants

Landuse Conditionally Permitted

Table B.20: Land Use Conditionally Permitted

Conditionally permitted uses under open space
Communication Tower Within Permitted Height
Trade Shows
Fitness Centre
Flowers, Nursery Stock and Florist Supplies
Golf Course
Motorized Recreation
Outdoor Recreation Facilities

Outdoor Recreation, Commercial
Outdoor Sports and Recreation
Park Maintenance Facility
Retreat Center
Sports and Recreation Club, Firing Range: Indoor

Source: Compiled by the Consultants

Restricted Uses

All uses except permitted and conditionally permitted uses are restricted.

k. Water Body

Retaining water is the main purpose of this type of Landuse.

Land Use Permitted

The following uses in the tables are proposed to be applicable for this zone only.

Table B.21: Land Use Permitted

Permitted uses under Water Body
Aquatic Recreation Facility (Without Structure)
Fishing Club
Utility Lines
Water Parks
Memorial Structure

Source: Compiled by the Consultants

Land Use Conditionally Permitted

The following uses may be permitted or denied in this zone after review and approval by the authority/committee.

Table B.22: Land Use Conditionally Permitted

Conditionally permitted uses under water body
Plantation (Except Narcotic Plant)
Marina \ Boating Facility
Motorized Recreation

Source: Compiled by the Consultants

Restricted Uses

All uses except perm

**ANNEXURE C:
Resolution of Final Consultation Meeting and Attendance List.**

ANNEXURE D: Detailed of Road Network Proposal

Proposed New Road

Road Id	Width (ft)	Type	Length (m)	Phase
TR12	30	Tertiary	2440.76	3rd phasing
TR23	30	Tertiary	994.30	3rd phasing
TR28	30	Tertiary	779.06	2nd Phasing
TR35	30	Tertiary	462.54	3rd phasing
TR45	30	Tertiary	589.76	3rd phasing
TR58	30	Tertiary	1420.55	3rd phasing
TR67	30	Tertiary	444.21	2nd Phasing
TR75	30	Tertiary	434.13	3rd phasing
TR77	30	Tertiary	856.86	2nd Phasing
TR79	30	Tertiary	492.46	3rd phasing
TR81	30	Tertiary	872.46	3rd phasing
		Total	9787.09	
AR21	20	Access	2243.45	3rd phasing
AR22	20	Access	3377.64	3rd phasing
AR29	20	Access	183.35	3rd phasing
AR30	20	Access	247.52	3rd phasing
AR36	20	Access	349.48	3rd phasing
AR37	20	Access	312.23	2nd Phasing
AR39	20	Access	212.24	1st Phasing
AR40	20	Access	75.95	3rd phasing
AR43	20	Access	208.31	2nd Phasing
AR44	20	Access	429.28	3rd phasing
AR51	20	Access	537.40	3rd phasing
AR52	20	Access	204.79	3rd phasing
AR53	20	Access	325.33	2nd Phasing
AR54	20	Access	274.06	3rd phasing
AR59	20	Access	243.40	3rd phasing
AR65	20	Access	196.14	3rd phasing
AR70	20	Access	785.94	3rd phasing
AR73	20	Access	73.65	3rd phasing
AR76	20	Access	162.07	3rd phasing
AR78	20	Access	210.50	3rd phasing
AR83	20	Access	499.67	3rd phasing
		Total	11152.39	
		Gross Total	20939.49	

Proposed Widening Road

Road Id	Width (ft)	Type	Length (m)	Phase
PR1	80	Primary	6366.75	3rd phasing
PR86	80	Primary	9312.17	3rd phasing
PR89	60	Primary	2246.02	3rd phasing
		Total	17924.94	
SR6	40	Secondary	3505.89	3rd phasing
SR7	40	Secondary	2465.34	3rd phasing
SR8	40	Secondary	510.40	2nd Phasing
		Total	6481.63	
TR2	30	Tertiary	530.89	3rd phasing
TR3	30	Tertiary	468.27	1st Phasing
TR4	30	Tertiary	518.09	3rd phasing
TR5	30	Tertiary	580.42	3rd phasing
TR9	30	Tertiary	506.86	3rd phasing
TR10	30	Tertiary	358.10	3rd phasing
TR11	30	Tertiary	744.93	3rd phasing
TR13	30	Tertiary	1763.12	3rd phasing

Road Id	Width (ft)	Type	Length (m)	Phase
TR16	30	Tertiary	615.10	3rd phasing
TR20	30	Tertiary	370.85	3rd phasing
TR24	30	Tertiary	2919.60	3rd phasing
TR26	30	Tertiary	1072.64	3rd phasing
TR56	30	Tertiary	628.65	2nd Phasing
TR57	30	Tertiary	1274.39	1st Phasing
TR64	30	Tertiary	239.46	3rd phasing
TR66	30	Tertiary	720.75	3rd phasing
TR69	30	Tertiary	677.24	2nd Phasing
TR74	30	Tertiary	424.04	3rd phasing
		Total	14413.36	
AR14	20	Access	532.08	3rd phasing
AR15	20	Access	306.26	1st Phasing
AR17	20	Access	246.05	3rd phasing
AR18	20	Access	248.02	3rd phasing
AR19	20	Access	692.40	2nd Phasing
AR25	20	Access	459.16	3rd phasing
AR27	20	Access	428.88	1st Phasing
AR31	20	Access	319.54	3rd phasing
AR32	20	Access	276.84	3rd phasing
AR33	20	Access	446.08	1st Phasing
AR34	20	Access	241.48	2nd Phasing
AR38	20	Access	346.56	3rd phasing
AR41	20	Access	137.18	3rd phasing
AR42	20	Access	335.91	3rd phasing
AR46	20	Access	2026.72	3rd phasing
AR47	20	Access	372.90	1st Phasing
AR48	20	Access	238.96	3rd phasing
AR49	20	Access	126.13	3rd phasing
AR50	20	Access	113.87	3rd phasing
AR55	20	Access	143.26	3rd phasing
AR60	20	Access	667.00	3rd phasing
AR61	20	Access	132.18	2nd Phasing
AR62	20	Access	211.05	3rd phasing
AR63	20	Access	105.45	1st Phasing
AR68	20	Access	261.34	3rd phasing
AR71	20	Access	210.52	3rd phasing
AR72	20	Access	250.41	1st Phasing
AR80	20	Access	205.95	2nd Phasing
AR82	20	Access	229.42	3rd phasing
AR84	20	Access	6321.99	1st Phasing
AR85	20	Access	6318.43	3rd phasing
AR87	20	Access	5995.47	2nd Phasing
AR88	20	Access	5990.87	3rd phasing
		Total	34938.37	
		Gross Total	73758.29	

ANNEXURE E: Details of Drainage Network Proposal

Drain Id	Type	Width (m)	Phase	Length (m)
PD3	Primary	Above 3m	1st Phase	6206.67
PD4	Primary	Above 3m	2nd Phase	3104.14
PD5	Primary	Above 3m	3rd Phase	3094.49
PD63	Primary	Above 3m	3rd Phase	532.63
PD92	Primary	Above 3m	1st Phase	1102.09
PD93	Primary	Above 3m	2nd Phase	1492.47
PD94	Primary	Above 3m	3rd Phase	2707.82
PD95	Primary	Above 3m	3rd Phase	3290.56
PD96	Primary	Above 3m	1st Phase	2170.06
PD97	Primary	Above 3m	3rd Phase	2199.51
PD98	Primary	Above 3m	3rd Phase	3261.19
			Total	29161.63
SD6	Secondary	Within 1.5 to 3m	3rd Phase	1801.12
SD7	Secondary	Within 1.5 to 3m	1st Phase	521.26
SD28	Secondary	Within 1.5 to 3m	2nd Phase	816.31
SD31	Secondary	Within 1.5 to 3m	3rd Phase	1348.83
SD32	Secondary	Within 1.5 to 3m	1st Phase	1009.37
SD33	Secondary	Within 1.5 to 3m	2nd Phase	2193.82
SD40	Secondary	Within 1.5 to 3m	3rd Phase	796.11
TD47	Secondary	Less 1.5m	3rd Phase	544.23
SD73	Secondary	Within 1.5 to 3m	2nd Phase	650.40
TD82	Secondary	Less 1.5m	3rd Phase	645.25
TD84	Secondary	Less 1.5m	3rd Phase	440.01
TD86	Secondary	Less 1.5m	3rd Phase	471.66
			Total	11238.37
TD1	Tertiary	Less 1.5m	3rd Phase	503.20
TD8	Tertiary	Less 1.5m	3rd Phase	706.06
TD9	Tertiary	Less 1.5m	1st Phase	537.73
TD10	Tertiary	Less 1.5m	2nd Phase	138.13
TD11	Tertiary	Less 1.5m	2nd Phase	332.85
TD12	Tertiary	Less 1.5m	2nd Phase	237.67
TD13	Tertiary	Less 1.5m	2nd Phase	1767.87
TD14	Tertiary	Less 1.5m	2nd Phase	2281.75
TD15	Tertiary	Less 1.5m	3rd Phase	510.86
TD16	Tertiary	Less 1.5m	3rd Phase	192.10
TD17	Tertiary	Less 1.5m	1st Phase	210.73
TD18	Tertiary	Less 1.5m	2nd Phase	260.23
TD19	Tertiary	Less 1.5m	3rd Phase	667.62
TD20	Tertiary	Less 1.5m	1st Phase	623.17
TD21	Tertiary	Less 1.5m	3rd Phase	261.58
TD22	Tertiary	Less 1.5m	3rd Phase	508.43
TD23	Tertiary	Less 1.5m	3rd Phase	648.27
TD24	Tertiary	Less 1.5m	3rd Phase	241.73
TD25	Tertiary	Less 1.5m	2nd Phase	334.45
TD26	Tertiary	Less 1.5m	1st Phase	1454.94
TD27	Tertiary	Less 1.5m	3rd Phase	129.83
TD29	Tertiary	Less 1.5m	2nd Phase	240.12
TD30	Tertiary	Less 1.5m	3rd Phase	632.27
TD34	Tertiary	Less 1.5m	3rd Phase	258.17
TD35	Tertiary	Less 1.5m	1st Phase	2028.69
TD36	Tertiary	Less 1.5m	3rd Phase	105.85
TD37	Tertiary	Less 1.5m	2nd Phase	2975.72
TD38	Tertiary	Less 1.5m	3rd Phase	215.67
TD39	Tertiary	Less 1.5m	3rd Phase	603.26
TD41	Tertiary	Less 1.5m	2nd Phase	117.52
TD42	Tertiary	Less 1.5m	3rd Phase	374.53

TD43	Tertiary	Less 1.5m	3rd Phase	302.51
TD44	Tertiary	Less 1.5m	3rd Phase	359.60
TD45	Tertiary	Less 1.5m	3rd Phase	250.08
TD48	Tertiary	Less 1.5m	3rd Phase	369.39
TD49	Tertiary	Less 1.5m	2nd Phase	486.75
TD50	Tertiary	Less 1.5m	3rd Phase	288.35
TD51	Tertiary	Less 1.5m	1st Phase	554.98
TD52	Tertiary	Less 1.5m	3rd Phase	327.49
TD53	Tertiary	Less 1.5m	3rd Phase	355.99
TD54	Tertiary	Less 1.5m	3rd Phase	149.82
TD55	Tertiary	Less 1.5m	3rd Phase	205.28
TD56	Tertiary	Less 1.5m	2nd Phase	470.92
TD57	Tertiary	Less 1.5m	3rd Phase	405.10
TD58	Tertiary	Less 1.5m	2nd Phase	77.48
TD59	Tertiary	Less 1.5m	1st Phase	326.83
TD60	Tertiary	Less 1.5m	3rd Phase	230.88
TD61	Tertiary	Less 1.5m	1st Phase	254.73
TD62	Tertiary	Less 1.5m	3rd Phase	330.43
TD64	Tertiary	Less 1.5m	1st Phase	261.41
TD65	Tertiary	Less 1.5m	3rd Phase	725.76
TD66	Tertiary	Less 1.5m	3rd Phase	454.09
TD67	Tertiary	Less 1.5m	2nd Phase	628.38
TD68	Tertiary	Less 1.5m	2nd Phase	506.15
TD69	Tertiary	Less 1.5m	1st Phase	198.62
TD70	Tertiary	Less 1.5m	3rd Phase	489.68
TD71	Tertiary	Less 1.5m	3rd Phase	421.51
TD72	Tertiary	Less 1.5m	2nd Phase	253.26
TD74	Tertiary	Less 1.5m	2nd Phase	445.88
TD75	Tertiary	Less 1.5m	1st Phase	90.20
TD76	Tertiary	Less 1.5m	3rd Phase	433.71
TD77	Tertiary	Less 1.5m	2nd Phase	171.51
TD78	Tertiary	Less 1.5m	3rd Phase	341.15
TD79	Tertiary	Less 1.5m	1st Phase	202.65
TD80	Tertiary	Less 1.5m	3rd Phase	212.74
TD81	Tertiary	Less 1.5m	2nd Phase	235.99
TD83	Tertiary	Less 1.5m	2nd Phase	444.42
TD85	Tertiary	Less 1.5m	1st Phase	148.02
TD87	Tertiary	Less 1.5m	2nd Phase	206.07
TD88	Tertiary	Less 1.5m	3rd Phase	446.96
TD89	Tertiary	Less 1.5m	1st Phase	445.84
TD90	Tertiary	Less 1.5m	3rd Phase	217.11
TD91	Tertiary	Less 1.5m	3rd Phase	318.07
TD91	Tertiary	Less 1.5m	3rd Phase	139.61
TD88	Tertiary	Less 1.5m	3rd Phase	398.85
			Total	34685.21
			Gross Total	75085.21

ANNEXURE F: Mouza Schedule of Development Proposal

Facility	Ward No	Mouza Name	Plot No	Area (acre)	Phasing
Proposed Dumping Site	Out of Paurashava	Atadi (076_00)	378-388	2.63	1st Phase
Proposed Waste Transfer Station 01	Ward No. 09	Sadardi (055_01)	1067	0.085	2 nd Phase
Proposed Waste Transfer Station 02	Ward No. 04	Hasamdial (037_01)	551	0.223	
			Total	2.93	
Proposed Park 01	Out of Paurashava	Jhalkhali (073_00)	316-337,384-399	11.74	1st Phase
Proposed Park 02	Out of Paurashava	Sadardi (055_03)	6085-6113	10.16	2nd Phase
Proposed Play Field	Ward No. 07	Sadardi (055_03)	3535	0.17	1st Phase
Proposed Heritage Site	Ward No. 07	Sadardi (055_03)	3602	4.43	3rd Phase
Proposed Stadium	Ward No. 07	Sadardi (055_02)	2708-17,2805-21	6.8	2nd Phase
Proposed Tourism Spot	Ward No. 06	Chhilar Char (075_01)	190-203,222-225	4.46	1st Phase
			Total	41.7	
Proposed Micro Bus Terminal	Ward No. 04	Hasamdial (037_01)	128	0.31	1st Phase
Proposed Bus Terminal	Ward No. 04	Hasamdial (037_02)	3186,3189-203,3215	2.86	3rd Phase
Proposed Truck Terminal	Ward No. 04	Hasamdial (037_02)	3675	1.78	2nd Phase
Proposed Auto Stand	Ward No. 04	Hasamdial (037_01)	8183	0.25	2nd Phase
			Total	5.2	
Proposed Commercial Area	Out of Paurashava	Maligram (106_02)	2134-2161	9.33	2nd Phase
			Total	9.3	
Proposed Food Godown	Ward No. 04	Hasamdial (037_02)	3173-75,3178	1.37	3rd Phase
			Total	1.37	
Proposed Govt. Quater	Ward No. 09	Sadardi (055_01)	1689-1705,1759-1787,1817-1824	15.64	3rd Phase
			Total	15.64	
Proposed Housing Estate	Out of Paurashava	Hasamdial (037_01)	20-24,33-41,67-70, 267-276	11.29	3rd Phase
			Total	11.29	
Proposed Community Center	Ward No. 02	Hasamdial (037_01)	367	0.14	2nd Phase
Proposed Eidgha	Ward No. 09	Sadardi (055_01)	410,411,430	0.12	1st Phase
Proposed Graveyard	Out of Paurashava	Atadi (076_00)	579-608	2.70	1st Phase
Proposed Ward Center 02	Ward No. 02	Noapara (028_02)	2988,2991	1.80	3rd Phase
Proposed Ward Center 01	Ward No. 01	Hoglakandi (033_00)	793-94	0.84	1st Phase
Proposed Ward Center 03	Ward No. 03	Chandidasdi (038_04)	3621-3624	0.29	2nd Phase
Proposed Ward Center 05	Ward No. 05	Atadi (076_00)	532	0.83	3rd Phase
Proposed Ward Center 06	Ward No. 06	Chhilar Char (075_02)	378,380	0.62	1st Phase
Proposed Ward Center 07	Ward No. 07	Sadardi (055_03)	3514-3515	0.64	3rd Phase
Proposed Ward Center 09	Ward No. 09	Sadardi (055_01)	1734-36	0.92	1st Phase
			Total	8.9	
Proposed Primary School 01	Ward No. 05	Hasamdial (037_02)	4440-42	0.88	3rd Phase
Proposed Primary School 04	Out of Paurashava	Atadi (076_00)	280	0.32	3rd Phase
Proposed Primary School 02	Ward No. 08	Chhilar Char (075_01)	3799-3801,3804-05	0.55	1st Phase
Proposed High School 02	Ward No. 07	Sadardi (055_03)	689-91,709-10	3.24	3rd Phase
Proposed Primary School 03	Ward No. 03	Chandidasdi (038_03)	5418,5743,5749	1.05	1st Phase
Proposed High School	Ward No. 02	Noapara (028_03)	7543-	4.29	2nd Phase

Facility	Ward No	Mouza Name	Plot No	Area (acre)	Phasing
			7551,7810,7812		
Proposed College 01	Ward No. 02	Noapara (028_03)	7649-56	3.50	1st Phase
Proposed College 02	Ward No. 05	Atadi (076_00)	3245-46,3505-09,15202,15204	3.18	2nd Phase
Proposed Women College	Ward No. 08	Sadardi (055_01)	3143-51,3152-58	2.06	1st Phase
Proposed University	Ward No. 01	Nurpur (036_00)	5626-49,5887-99	15.47	3rd Phase
Vocational Training Institute	Ward No. 02	Nurpur (036_00)	6296-300,6335-37,6342-44,6541-6551	7.24	3rd Phase
			Total	41.78	
Proposed Hospital	Ward No. 02	Noapara (028_03)	7627-7640	3.50	3rd Phase
			Total	3.50	
Proposed Jail Khana	Ward No. 04	Hasamdia (037_01)	6066-67,6268-71,6283-84	4.71	1st Phase
			Total	4.7	
			Gross Total	147.60	

ANNEXURE G: Proposed Water body Land Schedule

Id	Mouza	Plot
PR1	Sadardi (055_03)	3580
	Sadardi (055_03)	3602
PR2	Sadardi (055_03)	3185
PR3	Sadardi (055_03)	3020
PR4	Sadardi (055_03)	3568
PR5	Sadardi (055_03)	3119
PR6	Sadardi (055_02)	2733
PR7	Sadardi (055_02)	2727
PR8	Sadardi (055_02)	2965
PR9	Sadardi (055_02)	4147
PR10	Atadi (076_00)	289
PR11	Hasamdial (037_02)	3531
	Hasamdial (037_02)	3530
	Hasamdial (037_02)	3530
	Hasamdial (037_02)	3529
	Hasamdial (037_02)	3528
	Hasamdial (037_02)	3524
	Hasamdial (037_02)	3523
	Hasamdial (037_02)	3522
	Hasamdial (037_02)	3521
	Hasamdial (037_02)	3516
	Hasamdial (037_02)	3514
	Hasamdial (037_02)	3345
	Hasamdial (037_02)	3344
	Hasamdial (037_02)	3342
	Hasamdial (037_02)	3341
	Hasamdial (037_02)	3338
	Hasamdial (037_02)	3337
	Hasamdial (037_02)	3299
	Hasamdial (037_02)	3515
	Hasamdial (037_02)	3514
	Hasamdial (037_02)	3348
	Hasamdial (037_02)	3348
	Hasamdial (037_02)	3347
	Hasamdial (037_02)	3346
	Hasamdial (037_02)	3515
	Hasamdial (037_02)	3347
	Hasamdial (037_02)	3346
	Hasamdial (037_02)	3343
PR12	Atadi (076_00)	279
	Hasamdial (037_02)	3502
PR13	Hazrahati (035_00)	560
	Hazrahati (035_00)	560
	Hazrahati (035_00)	559
	Hazrahati (035_00)	557
	Hazrahati (035_00)	547
	Hazrahati (035_00)	545
PR14	Nurpur (036_00)	253
	Nurpur (036_00)	252
	Nurpur (036_00)	252

Id	Mouza	Plot
	Nurpur (036_00)	252
	Nurpur (036_00)	252
	Nurpur (036_00)	254
	Nurpur (036_00)	251
PR15	Nurpur (036_00)	256
	Nurpur (036_00)	255
	Nurpur (036_00)	255
	Nurpur (036_00)	257
	Nurpur (036_00)	257
	Nurpur (036_00)	257
	Nurpur (036_00)	310
	Nurpur (036_00)	257
PR16	Hasamdial (037_01)	598
	Hasamdial (037_01)	598
	Hasamdial (037_01)	584
	Hasamdial (037_01)	583
	Hasamdial (037_01)	582
	Hasamdial (037_01)	573
	Hasamdial (037_01)	572
	Hasamdial (037_01)	572
	Hasamdial (037_01)	571
	Hasamdial (037_01)	570
	Hasamdial (037_01)	569
	Hasamdial (037_01)	568
	Hasamdial (037_01)	567
	Hasamdial (037_01)	567
	Hasamdial (037_01)	566
	Hasamdial (037_01)	191
PR17	Hasamdial (037_01)	575
	Hasamdial (037_01)	575
	Hasamdial (037_01)	723
	Hasamdial (037_01)	723
	Hasamdial (037_01)	723
	Hasamdial (037_01)	722
	Hasamdial (037_01)	722
	Hasamdial (037_01)	721
	Hasamdial (037_01)	721
	Hasamdial (037_01)	721
	Hasamdial (037_01)	721
	Hasamdial (037_01)	575
PR18	Atadi (076_00)	279
	Hasamdial (037_02)	3502
PR19	Atadi (076_00)	408
	Atadi (076_00)	279
PR20	Atadi (076_00)	421
	Atadi (076_00)	279
PR21	Atadi (076_00)	279
	Atadi (076_00)	716

Id	Mouza	Plot
PR22	Atadi (076_00)	279
PR23	Atadi (076_00)	872
	Atadi (076_00)	279
PR24	Atadi (076_00)	872
	Atadi (076_00)	279
	Atadi (076_00)	771
PR25	Atadi (076_00)	279
		2059
PR26	Atadi (076_00)	279
PR27	Atadi (076_00)	279
PR28	Hasamdial (037_02)	3574
	Hasamdial (037_02)	3573
	Hasamdial (037_02)	3572
PR29	Hasamdial (037_02)	3657
	Hasamdial (037_02)	3656
	Hasamdial (037_02)	3656
	Hasamdial (037_02)	3655
PR30	Sadardial (055_01)	1115
	Sadardial (055_01)	1113
	Sadardial (055_01)	1112
	Sadardial (055_01)	1110
	Sadardial (055_01)	1109
	Sadardial (055_01)	1108
	Sadardial (055_01)	1106
	Sadardial (055_01)	1105
	Sadardial (055_01)	1094
	Sadardial (055_01)	1093
	Sadardial (055_01)	1093
	Sadardial (055_01)	1091
	Sadardial (055_01)	1090
	Sadardial (055_01)	1089
	Sadardial (055_01)	1088
	Sadardial (055_01)	1087
	Sadardial (055_01)	1084
	Sadardial (055_01)	1083
	Sadardial (055_01)	1081
	Sadardial (055_01)	1080
	Sadardial (055_01)	1079
	Sadardial (055_01)	1078
	Sadardial (055_01)	1077
	Sadardial (055_01)	1076
	Sadardial (055_01)	1075
	Sadardial (055_01)	1074
PR31	Sadardial (055_01)	1027
	Sadardial (055_01)	1026
	Sadardial (055_01)	1025
	Sadardial (055_01)	1021
	Sadardial (055_01)	1021
	Sadardial (055_01)	1021
	Sadardial (055_01)	1020
PR32	Sadardial (055_01)	1056
	Sadardial (055_01)	1055
	Sadardial (055_01)	1055

Id	Mouza	Plot
	Sadardial (055_01)	1054
	Sadardial (055_01)	1052
	Sadardial (055_01)	1051
	Sadardial (055_01)	1051
	Sadardial (055_01)	1050
	Sadardial (055_01)	1048
	Sadardial (055_01)	1047
	Sadardial (055_01)	1046
PR33	Sadardial (055_01)	5
	Sadardial (055_01)	4
PR34	Sadardial (055_01)	1128
	Sadardial (055_01)	1127
	Sadardial (055_01)	1126
	Sadardial (055_01)	1124
	Sadardial (055_01)	1123
	Sadardial (055_01)	1122
	Sadardial (055_01)	1122
	Sadardial (055_01)	254
PR35	Sadardial (055_01)	1132
	Sadardial (055_01)	1132
	Sadardial (055_01)	1131
	Sadardial (055_01)	1131
	Sadardial (055_01)	1131
PR36	Sadardial (055_01)	1830
	Sadardial (055_01)	1828
	Sadardial (055_01)	1831
	Sadardial (055_01)	1830
	Sadardial (055_01)	1829
	Sadardial (055_01)	1829
	Sadardial (055_01)	1830
	Sadardial (055_01)	1829
PR37	Hasamdial (037_01)	731
	Hasamdial (037_01)	730
	Hasamdial (037_01)	730
	Hasamdial (037_01)	228
	Hasamdial (037_01)	228
	Hasamdial (037_01)	225
	Hasamdial (037_01)	225
	Hasamdial (037_01)	224
	Hasamdial (037_01)	223
	Hasamdial (037_01)	223
	Hasamdial (037_01)	223
	Hasamdial (037_01)	222
	Hasamdial (037_01)	221
	Hasamdial (037_01)	221
	Hasamdial (037_01)	221
	Hasamdial (037_01)	216
PR38	Hasamdial (037_01)	216
	Hasamdial (037_01)	228
	Hasamdial (037_01)	192
	Hasamdial (037_01)	217

Id	Mouza	Plot
	Hasamdia (037_01)	192
	Hasamdia (037_01)	192
	Hasamdia (037_01)	217
	Hasamdia (037_01)	217
	Hasamdia (037_01)	217
	Hasamdia (037_01)	192
	Hasamdia (037_01)	192
PR39	Hasamdia (037_01)	673
	Hasamdia (037_01)	672
PR40	Hasamdia (037_01)	726
	Hasamdia (037_01)	187
	Hasamdia (037_01)	726
	Hasamdia (037_01)	187
	Hasamdia (037_01)	187
	Hasamdia (037_01)	183
	Hasamdia (037_01)	726
	Hasamdia (037_01)	726
PR41	Hasamdia (037_01)	205
	Hasamdia (037_01)	196
	Hasamdia (037_01)	196
	Hasamdia (037_01)	196
	Hasamdia (037_01)	726
	Noapara (028_03)	4209
	Hasamdia (037_01)	741
	Hasamdia (037_01)	198
	Hasamdia (037_01)	196
	Noapara (028_03)	4207
PR42	Noapara (028_03)	3932
	Hasamdia (037_01)	185
	Hasamdia (037_01)	184
	Hasamdia (037_01)	183
	Hasamdia (037_01)	182
	Hasamdia (037_01)	188
	Hasamdia (037_01)	186
	Hasamdia (037_01)	186
	Hasamdia (037_01)	183
	Hasamdia (037_01)	188
PR43	Noapara (028_03)	4209
	Noapara (028_03)	3933
PR44	Atadi (076_00)	279
PR45	Atadi (076_00)	279
PR46	Hasamdia (037_02)	3311
PR47	Choukighata (074_00)	50
	Choukighata (074_00)	49
	Choukighata (074_00)	49
	Choukighata (074_00)	23
PR48	Hoglakandi (033_00)	289
PR49	Hoglakandi (033_00)	640
	Hoglakandi (033_00)	289
PR50	Hoglakandi (033_00)	641
	Hoglakandi (033_00)	640

Id	Mouza	Plot
PR51	Hoglakandi (033_00)	279
	Hoglakandi (033_00)	278
	Hoglakandi (033_00)	278
PR52	Hoglakandi (033_00)	280
	Hoglakandi (033_00)	277
	Hoglakandi (033_00)	270
	Hoglakandi (033_00)	270
PR53	Hoglakandi (033_00)	972
	Hoglakandi (033_00)	916
	Hoglakandi (033_00)	916
	Hoglakandi (033_00)	915
	Hoglakandi (033_00)	914
PR54	Hoglakandi (033_00)	913
	Hoglakandi (033_00)	976
	Hoglakandi (033_00)	975
	Hoglakandi (033_00)	974
	Hoglakandi (033_00)	973
	Hoglakandi (033_00)	972
PR55	Hoglakandi (033_00)	971
	Hoglakandi (033_00)	978
	Hoglakandi (033_00)	977
PR56	Hoglakandi (033_00)	977
	Nurpur (036_00)	250
	Nurpur (036_00)	250
	Nurpur (036_00)	250
	Nurpur (036_00)	218
	Nurpur (036_00)	250
	Nurpur (036_00)	250
	Nurpur (036_00)	250
PR57	Nurpur (036_00)	250
	Nurpur (036_00)	473
	Nurpur (036_00)	472
	Nurpur (036_00)	471
	Nurpur (036_00)	470
	Nurpur (036_00)	469
	Nurpur (036_00)	467
	Nurpur (036_00)	463
	Nurpur (036_00)	463
	Nurpur (036_00)	462
PR58	Chandidasdi (038_04)	3116
	Chandidasdi (038_04)	3115
	Chandidasdi (038_04)	3114
	Chandidasdi (038_04)	3112
	Chandidasdi (038_04)	3111
	Chandidasdi (038_04)	3111
PR59	Chandidasdi (038_04)	3185
	Chandidasdi (038_04)	3184
	Chandidasdi (038_04)	3183
	Chandidasdi (038_04)	3182
	Chandidasdi (038_04)	3182
PR60	Chandidasdi (038_04)	3194
	Chandidasdi (038_04)	3191
	Chandidasdi (038_04)	3190

Id	Mouza	Plot
PR61	Chandidasdi (038_04)	3225
	Chandidasdi (038_04)	3225
	Chandidasdi (038_04)	3224
	Chandidasdi (038_04)	3224
	Chandidasdi (038_04)	3224
	Chandidasdi (038_04)	3223
	Chandidasdi (038_04)	3222
	Chandidasdi (038_04)	3221
	Chandidasdi (038_04)	3220
	Chandidasdi (038_04)	3220
	Chandidasdi (038_04)	3203
	Chandidasdi (038_04)	3203
	Chandidasdi (038_04)	3190
PR62	Sadardi (055_01)	453
	Sadardi (055_01)	453
PR63	Sadardi (055_01)	413
	Sadardi (055_01)	411
	Sadardi (055_01)	409
	Sadardi (055_01)	409
	Sadardi (055_01)	408
	Sadardi (055_01)	407
	Sadardi (055_01)	406
	Sadardi (055_01)	406
PR64	Sadardi (055_01)	400
	Sadardi (055_01)	395
	Sadardi (055_01)	392
	Sadardi (055_01)	359
	Sadardi (055_01)	358
	Sadardi (055_01)	358
	Sadardi (055_01)	357
	Sadardi (055_01)	357
	Sadardi (055_01)	356
	Sadardi (055_01)	354
	Sadardi (055_01)	353
PR65	Sadardi (055_01)	2264
	Sadardi (055_01)	2264
	Sadardi (055_01)	2264
	Sadardi (055_01)	1644
	Sadardi (055_01)	1644
PR66	Sadardi (055_01)	1180
	Sadardi (055_01)	1179
	Sadardi (055_01)	1179
	Sadardi (055_01)	1178
	Sadardi (055_01)	1177
	Sadardi (055_01)	1121
	Sadardi (055_01)	1121
	Sadardi (055_01)	1120
	Sadardi (055_01)	1119
	Sadardi (055_01)	1119
	Sadardi (055_01)	1102
	Sadardi (055_01)	1102
PR67	Sadardi (055_01)	1159
	Sadardi (055_01)	1159

Id	Mouza	Plot
	Sadardi (055_01)	1159
	Sadardi (055_01)	1176
	Sadardi (055_01)	1176
	Sadardi (055_01)	1142
	Sadardi (055_01)	1141
	Sadardi (055_01)	1140
	Sadardi (055_01)	1140
	Sadardi (055_01)	1140
	Sadardi (055_01)	1136
	Sadardi (055_01)	1135
	Sadardi (055_01)	1134
	Sadardi (055_01)	1134
PR68	Chhilar Char (075_01)	11
	Sadardi (055_01)	446
	Sadardi (055_01)	444
	Sadardi (055_01)	444
	Sadardi (055_01)	439
PR69	Sadardi (055_01)	439
	Hasamdial (037_02)	3252
	Hasamdial (037_02)	3251
	Hasamdial (037_02)	3250
PR70	Hasamdial (037_02)	3249
		3214
		3214
	Hasamdial (037_02)	3213
	Hasamdial (037_02)	3209
	Hasamdial (037_02)	3308
	Hasamdial (037_02)	3308
	Hasamdial (037_02)	3308
	Hasamdial (037_02)	3308
	Hasamdial (037_02)	3307
	Hasamdial (037_02)	3207
	Hasamdial (037_02)	3204
	Hasamdial (037_02)	3195
	Hasamdial (037_02)	3195
	Hasamdial (037_02)	3194
	Hasamdial (037_02)	3194
	Hasamdial (037_02)	3186
	Hasamdial (037_02)	3186
	Hasamdial (037_02)	3195
	Hasamdial (037_02)	3194
	Hasamdial (037_02)	3674
	Hasamdial (037_02)	3203
PR71	Hasamdial (037_02)	3267
	Hasamdial (037_02)	3265
	Hasamdial (037_02)	3264
PR72	Sadardi (055_02)	2864
PR73	Sadardi (055_01)	374
	Sadardi (055_01)	373
	Sadardi (055_01)	373
	Sadardi (055_01)	373
PR74	Hasamdial (037_01)	459
	Hasamdial (037_01)	458

Id	Mouza	Plot
	Hasamdia (037_01)	458
	Hasamdia (037_01)	456
	Hasamdia (037_01)	455
	Hasamdia (037_01)	454
	Hasamdia (037_01)	453
	Hasamdia (037_01)	451
	Hasamdia (037_01)	429
	Hasamdia (037_01)	428
	Hasamdia (037_01)	427
PR75	Hasamdia (037_02)	3668
	Hasamdia (037_02)	3667
	Hasamdia (037_02)	3624
	Hasamdia (037_02)	3623
	Hasamdia (037_02)	3623
	Hasamdia (037_02)	3612
	Hasamdia (037_02)	3612
	Hasamdia (037_02)	3307
	Hasamdia (037_02)	3306
	Hasamdia (037_02)	3304
	Hasamdia (037_02)	3303
	Hasamdia (037_02)	3300
	Hasamdia (037_02)	3298
	Hasamdia (037_02)	3297
	Hasamdia (037_02)	3296
	Hasamdia (037_02)	3296
	Hasamdia (037_02)	3296
	Hasamdia (037_02)	3295
	Hasamdia (037_02)	3291
	Hasamdia (037_02)	3290
	Hasamdia (037_02)	3284
	Hasamdia (037_02)	3284
	Hasamdia (037_02)	3283
	Hasamdia (037_02)	3238
	Hasamdia (037_02)	3237
	Hasamdia (037_02)	3305
	Hasamdia (037_02)	3304
	Hasamdia (037_02)	3304
	Hasamdia (037_02)	3292
	Hasamdia (037_02)	3624
	Hasamdia (037_02)	3313
	Hasamdia (037_02)	3624
	Hasamdia (037_02)	3313
	Hasamdia (037_02)	3313
	Hasamdia (037_02)	3294
	Hasamdia (037_02)	3293
PR76	Sadardi (055_02)	2919
	Sadardi (055_02)	2918
	Sadardi (055_02)	2915
	Sadardi (055_02)	2914
	Sadardi (055_02)	2914
	Sadardi (055_02)	2913
	Sadardi (055_02)	2913
	Sadardi (055_02)	2912

Id	Mouza	Plot
	Sadardi (055_02)	2912
	Sadardi (055_02)	2838
	Sadardi (055_02)	2826
	Sadardi (055_02)	2824
	Sadardi (055_02)	2698
	Sadardi (055_02)	2551
	Sadardi (055_02)	2514
	Sadardi (055_02)	2503
	Sadardi (055_02)	2501
	Sadardi (055_02)	2501
	Sadardi (055_02)	2500
	Sadardi (055_02)	2500
	Sadardi (055_01)	1675
	Sadardi (055_01)	1472
	Sadardi (055_01)	1219
	Sadardi (055_01)	1199
	Sadardi (055_02)	2918
	Sadardi (055_02)	2918
	Sadardi (055_02)	2918
	Sadardi (055_02)	2918
	Sadardi (055_02)	2914
	Sadardi (055_02)	2914
	Sadardi (055_02)	2913
	Sadardi (055_02)	2913
	Sadardi (055_02)	2913
	Sadardi (055_02)	2912
	Sadardi (055_02)	2912
	Sadardi (055_02)	2912
	Sadardi (055_02)	2912
	Sadardi (055_02)	2891
	Sadardi (055_02)	2891
	Sadardi (055_02)	2891
	Sadardi (055_02)	2891
	Sadardi (055_02)	2890
	Sadardi (055_02)	2890
	Sadardi (055_02)	2890
	Sadardi (055_02)	2880
	Sadardi (055_02)	2880
	Sadardi (055_02)	2841
	Sadardi (055_02)	2841
	Sadardi (055_02)	2840
	Sadardi (055_02)	2840
	Sadardi (055_02)	2839
	Sadardi (055_02)	2839
	Sadardi (055_02)	2839
	Sadardi (055_02)	2826
	Sadardi (055_02)	2825
	Sadardi (055_02)	2825
	Sadardi (055_02)	2825
	Sadardi (055_02)	2824
	Sadardi (055_02)	2823
	Sadardi (055_02)	2823
	Sadardi (055_02)	2822

Id	Mouza	Plot
	Sardari (055_02)	2700
	Sardari (055_02)	2700
	Sardari (055_02)	2699
	Sardari (055_02)	2699
	Sardari (055_02)	2550
	Sardari (055_02)	2549
	Sardari (055_02)	2549
	Sardari (055_02)	2548
	Sardari (055_02)	2548
	Sardari (055_02)	2540
	Sardari (055_02)	2540
	Sardari (055_02)	2518
	Sardari (055_02)	2518
	Sardari (055_02)	2517
	Sardari (055_02)	2517
	Sardari (055_02)	2515
	Sardari (055_02)	2515
	Sardari (055_02)	2515
	Sardari (055_02)	2515
	Sardari (055_02)	2501
	Sardari (055_01)	1835
	Sardari (055_01)	1835
	Sardari (055_01)	1834
	Sardari (055_01)	1834
	Sardari (055_01)	1834
	Sardari (055_01)	1834
	Sardari (055_01)	1832
	Sardari (055_01)	1832
	Sardari (055_01)	1832
	Sardari (055_01)	1831
	Sardari (055_01)	1831
	Sardari (055_01)	1706
	Sardari (055_01)	1706
	Sardari (055_01)	1686
	Sardari (055_01)	1684
	Sardari (055_01)	1684
	Sardari (055_01)	1684
	Sardari (055_01)	1684
	Sardari (055_01)	1683
		1680
	Sardari (055_01)	1679
	Sardari (055_01)	1679
	Sardari (055_01)	1679
	Sardari (055_01)	1679
	Sardari (055_01)	1674
	Sardari (055_01)	1674
	Sardari (055_01)	1674
	Sardari (055_01)	1674
	Sardari (055_01)	1674
	Sardari (055_01)	1674
	Sardari (055_01)	1650
	Sardari (055_01)	1650
	Sardari (055_01)	1650

Id	Mouza	Plot
	Sardari (055_01)	1646
	Sardari (055_01)	1646
	Sardari (055_01)	1639
	Sardari (055_01)	1638
	Sardari (055_01)	1638
	Sardari (055_01)	1637
	Sardari (055_01)	1637
	Sardari (055_01)	4307
	Sardari (055_01)	1493
	Sardari (055_01)	1493
	Sardari (055_01)	1493
	Sardari (055_01)	1492
	Sardari (055_01)	1492
	Sardari (055_01)	1492
	Sardari (055_01)	1492
	Sardari (055_01)	1492
	Sardari (055_01)	1487
	Sardari (055_01)	1487
	Sardari (055_01)	1487
	Sardari (055_01)	1481
	Sardari (055_01)	1481
	Sardari (055_01)	1481
	Sardari (055_01)	1481
	Sardari (055_01)	1477
	Sardari (055_01)	1477
	Sardari (055_01)	1477
	Sardari (055_01)	1475
	Sardari (055_01)	1474
	Sardari (055_01)	1474
	Sardari (055_01)	1473
	Sardari (055_01)	1471
	Sardari (055_01)	1471
	Sardari (055_01)	1470
	Sardari (055_01)	1470
	Sardari (055_01)	1435
	Sardari (055_01)	1434
	Sardari (055_01)	1434
	Sardari (055_01)	1432
	Sardari (055_01)	1432
	Sardari (055_01)	1432
	Sardari (055_01)	1219
	Sardari (055_01)	1219
	Sardari (055_01)	1218
	Sardari (055_01)	1218
	Sardari (055_01)	1217
	Sardari (055_01)	1217
	Sardari (055_01)	1214
	Sardari (055_01)	1213
	Sardari (055_01)	1213
	Sardari (055_01)	1211
	Sardari (055_01)	1211
	Sardari (055_01)	1199
	Sardari (055_01)	1199
	Sardari (055_01)	1199

Id	Mouza	Plot
	Sardari (055_01)	1199
	Sardari (055_01)	1098
	Sardari (055_01)	1023
	Sardari (055_01)	1023
	Sardari (055_01)	1023
	Sardari (055_02)	2700
	Sardari (055_02)	2699
	Sardari (055_02)	2699
	Sardari (055_01)	1686
	Sardari (055_01)	1686
	Sardari (055_01)	1210
	Sardari (055_01)	1210
	Sardari (055_02)	2918
	Sardari (055_02)	2918
	Sardari (055_02)	2912
	Sardari (055_02)	2891
	Sardari (055_02)	2891
	Sardari (055_02)	2891
	Sardari (055_02)	2890
	Sardari (055_02)	2890
	Sardari (055_02)	2880
	Sardari (055_02)	2840
	Sardari (055_02)	2839
	Sardari (055_02)	2839
	Sardari (055_02)	2839
	Sardari (055_02)	2826
	Sardari (055_02)	2825
	Sardari (055_02)	2825
	Sardari (055_02)	2823
	Sardari (055_02)	2823
	Sardari (055_02)	2700
	Sardari (055_02)	2700
	Sardari (055_02)	2699
	Sardari (055_02)	2551
	Sardari (055_02)	2549
	Sardari (055_02)	2548
	Sardari (055_02)	2540
	Sardari (055_02)	2540
	Sardari (055_02)	2518
	Sardari (055_02)	2518
	Sardari (055_02)	2517
	Sardari (055_02)	2515
	Sardari (055_02)	2515
	Sardari (055_01)	1834
	Sardari (055_01)	1833
	Sardari (055_01)	1832
	Sardari (055_01)	1832
	Sardari (055_01)	1832
	Sardari (055_01)	1706
	Sardari (055_01)	1686
	Sardari (055_01)	1684
	Sardari (055_01)	1684
	Sardari (055_01)	1683

Id	Mouza	Plot
	Sardari (055_01)	1679
	Sardari (055_01)	1679
	Sardari (055_01)	1679
	Sardari (055_01)	1674
	Sardari (055_01)	1674
	Sardari (055_01)	1669
	Sardari (055_01)	1669
	Sardari (055_01)	1650
	Sardari (055_01)	1650
	Sardari (055_01)	1650
	Sardari (055_01)	1650
	Sardari (055_01)	1646
	Sardari (055_01)	1638
	Sardari (055_01)	1637
	Sardari (055_01)	1637
	Sardari (055_01)	4307
	Sardari (055_01)	1493
	Sardari (055_01)	1493
	Sardari (055_01)	1487
	Sardari (055_01)	1487
	Sardari (055_01)	1487
	Sardari (055_01)	1481
	Sardari (055_01)	1477
	Sardari (055_01)	1477
	Sardari (055_01)	1477
	Sardari (055_01)	1475
	Sardari (055_01)	1473
	Sardari (055_01)	1472
	Sardari (055_01)	1471
	Sardari (055_01)	1435
	Sardari (055_01)	1435
	Sardari (055_01)	1432
	Sardari (055_01)	1219
	Sardari (055_01)	1218
	Sardari (055_01)	1217
	Sardari (055_01)	1217
	Sardari (055_01)	1216
	Sardari (055_01)	1214
	Sardari (055_01)	1211
	Sardari (055_01)	1199
	Sardari (055_01)	1199
	Sardari (055_01)	1023
	Sardari (055_01)	1022
	Sardari (055_01)	1022
	Sardari (055_02)	2700
	Sardari (055_01)	1686
	Sardari (055_01)	1686
	Sardari (055_01)	1210
	Sardari (055_01)	1208
	Sardari (055_01)	1436
	Sardari (055_01)	1435
	Sardari (055_01)	1434
	Sardari (055_01)	1432

Id	Mouza	Plot
PR77	Chhilar Char (075_01)	44
	Chhilar Char (075_01)	44
	Chhilar Char (075_01)	44
	Chhilar Char (075_01)	18
	Sadardi (055_01)	480
	Sadardi (055_01)	480
	Sadardi (055_01)	479
	Sadardi (055_01)	478
	Sadardi (055_01)	478
	Sadardi (055_01)	477
	Sadardi (055_01)	476
	Sadardi (055_01)	475
	Sadardi (055_01)	475
	Sadardi (055_01)	480
PR78	Hazrahati (035_00)	521
	Hazrahati (035_00)	521
PR79	Hazrahati (035_00)	520
PR80	Hasamdial (037_01)	358
	Hasamdial (037_01)	357
	Hasamdial (037_01)	356
	Hasamdial (037_01)	355
	Hasamdial (037_01)	354
	Hasamdial (037_01)	353
	Hasamdial (037_01)	352
	Hasamdial (037_01)	351
	Hasamdial (037_01)	350
	Hasamdial (037_01)	347
	Hasamdial (037_01)	346
	Hasamdial (037_01)	343
	Hasamdial (037_01)	342
	Hasamdial (037_01)	336
	Hasamdial (037_01)	335
	Hasamdial (037_01)	334
	Hasamdial (037_01)	324
	Hasamdial (037_01)	313
	Hasamdial (037_01)	309
	Hasamdial (037_01)	748
	Hasamdial (037_01)	744
	Hasamdial (037_01)	355
	Hasamdial (037_01)	747
	Hasamdial (037_01)	747
	Hasamdial (037_01)	747
	Hasamdial (037_01)	747
	Hasamdial (037_01)	747
	Hasamdial (037_01)	345
	Hasamdial (037_01)	344
	Hasamdial (037_01)	341
	Hasamdial (037_01)	341
	Hasamdial (037_01)	341
	Hasamdial (037_01)	340
	Hasamdial (037_01)	340
	Hasamdial (037_01)	333
	Hasamdial (037_01)	333

Id	Mouza	Plot
	Hasamdial (037_01)	333
	Hasamdial (037_01)	327
	Hasamdial (037_01)	323
	Hasamdial (037_01)	323
	Hasamdial (037_01)	323
	Hasamdial (037_01)	314
	Hasamdial (037_01)	314
	Hasamdial (037_01)	227
	Hasamdial (037_01)	227
	Hasamdial (037_01)	345
	Hasamdial (037_01)	344
	Hasamdial (037_01)	337
	Hasamdial (037_01)	333
	Hasamdial (037_01)	327
	Hasamdial (037_01)	326
	Hasamdial (037_01)	325
	Hasamdial (037_01)	323
	Hasamdial (037_01)	323
	Hasamdial (037_01)	313
	Hasamdial (037_01)	227
PR81	Hasamdial (037_02)	3241
	Hasamdial (037_02)	3241
PR82	Nurpur (036_00)	293
	Nurpur (036_00)	292
	Nurpur (036_00)	292
	Nurpur (036_00)	292
	Nurpur (036_00)	285
PR83	Nurpur (036_00)	284
	Nurpur (036_00)	308
	Nurpur (036_00)	308
	Nurpur (036_00)	309
	Nurpur (036_00)	309
	Nurpur (036_00)	310
	Nurpur (036_00)	309
	Nurpur (036_00)	307
	Nurpur (036_00)	307
	Nurpur (036_00)	306
PR84	Nurpur (036_00)	250
	Nurpur (036_00)	220
	Nurpur (036_00)	219
	Nurpur (036_00)	202
	Nurpur (036_00)	199
	Nurpur (036_00)	199
	Nurpur (036_00)	196
	Nurpur (036_00)	195
	Nurpur (036_00)	220
	Nurpur (036_00)	219
PR85	Hazrahati (035_00)	323
	Hazrahati (035_00)	299
PR86	Hoglakandi (033_00)	180
PR87	Sadardi (055_01)	438
	Sadardi (055_01)	436
	Sadardi (055_01)	432

Id	Mouza	Plot
	Sardari (055_01)	431
	Sardari (055_01)	438
	Sardari (055_01)	432
PR88	Sardari (055_01)	1008
PR89	Sardari (055_01)	1031
	Sardari (055_01)	1045
	Sardari (055_01)	1045
	Sardari (055_01)	1045
	Sardari (055_01)	1045
	Sardari (055_01)	1045
	Sardari (055_01)	466
PR90	Atadi (076_00)	279
PR91	Choukighata (074_00)	135
PR92	Atadi (076_00)	444
	Atadi (076_00)	449
	Atadi (076_00)	448
	Atadi (076_00)	447
PR93	Chandidasdi (038_04)	3134
	Chandidasdi (038_04)	3131
	Chandidasdi (038_04)	3130
	Chandidasdi (038_04)	3130
	Chandidasdi (038_04)	3128
	Chandidasdi (038_04)	3128
	Chandidasdi (038_04)	3124
	Chandidasdi (038_04)	3124
	Chandidasdi (038_04)	3124
	Chandidasdi (038_04)	3123
	Chandidasdi (038_04)	3121
	Chandidasdi (038_04)	3120
PR94	Chandidasdi (038_04)	3455
PR95	Chandidasdi (038_04)	3343
PR96	Chandidasdi (038_03)	1752
PR97	Sardari (055_01)	360
PR98	Hoglakandi (033_00)	980
	Hoglakandi (033_00)	979
	Hazrahati (035_00)	608
	Hazrahati (035_00)	608
	Hazrahati (035_00)	607
	Hazrahati (035_00)	606
	Hazrahati (035_00)	605
	Hazrahati (035_00)	605
	Hazrahati (035_00)	603
	Hazrahati (035_00)	602
	Hazrahati (035_00)	601
	Hoglakandi (033_00)	980
	Hazrahati (035_00)	608
PR99	Hasamdias (037_02)	3583
PR100	Hazrahati (035_00)	385
PR101	Hoglakandi (033_00)	709
	Hoglakandi (033_00)	709
	Hoglakandi (033_00)	708
PR102	Hazrahati (035_00)	515
	Hazrahati (035_00)	504

Id	Mouza	Plot
	Hazrahati (035_00)	502
	Hazrahati (035_00)	428
	Hazrahati (035_00)	515
PR103	Hasamdias (037_01)	558
	Hasamdias (037_01)	219
	Hasamdias (037_01)	219
	Hasamdias (037_01)	219
PR104	Hasamdias (037_01)	618
	Hasamdias (037_01)	617
	Hasamdias (037_01)	616
	Hasamdias (037_01)	616
	Hasamdias (037_01)	528
	Hasamdias (037_01)	527
PR105	Chandidasdi (038_04)	3307
	Chandidasdi (038_04)	3307
	Chandidasdi (038_04)	3304
PR106	Sardari (055_06)	684
PR107	Hoglakandi (033_00)	734
	Hoglakandi (033_00)	698
	Hoglakandi (033_00)	697
	Hoglakandi (033_00)	696
	Hoglakandi (033_00)	696
	Hoglakandi (033_00)	694
	Hoglakandi (033_00)	734
	Hoglakandi (033_00)	699
	Hoglakandi (033_00)	699
	Hoglakandi (033_00)	699
	Hoglakandi (033_00)	699
	Hoglakandi (033_00)	699
PR108	Sardari (055_01)	415
	Sardari (055_01)	387
	Sardari (055_01)	387
	Sardari (055_01)	387
PR109	Sardari (055_01)	1045
	Sardari (055_01)	1045
	Sardari (055_01)	463
	Sardari (055_01)	463
	Sardari (055_01)	1047
	Sardari (055_01)	463
PR110	Chhilar Char (075_01)	43
PR111	Nurpur (036_00)	187
PR112	Sardari (055_06)	704
	Sardari (055_06)	704
	Sardari (055_06)	703
	Sardari (055_06)	697
PR113	Sardari (055_06)	696
	Hasamdias (037_01)	330
	Hasamdias (037_01)	330
PR114	Nurpur (036_00)	300
	Nurpur (036_00)	299
	Nurpur (036_00)	298
	Nurpur (036_00)	301
	Nurpur (036_00)	299
	Hasamdias (037_01)	367

Id	Mouza	Plot
PR115	Hasamdias (037_01)	377
	Hasamdias (037_01)	374
	Hasamdias (037_01)	377
	Hasamdias (037_01)	375
	Hasamdias (037_01)	375
	Hasamdias (037_01)	374
PR116	Nurpur (036_00)	183
	Nurpur (036_00)	18
	Nurpur (036_00)	17
	Nurpur (036_00)	184
	Nurpur (036_00)	183
	Nurpur (036_00)	18
PR117	Hasamdias (037_02)	3225
	Hasamdias (037_02)	3224
	Hasamdias (037_02)	3224
	Hasamdias (037_02)	3224
	Hasamdias (037_02)	3223
	Hasamdias (037_02)	3223
	Hasamdias (037_02)	3217
	Hasamdias (037_02)	3225
	Hasamdias (037_02)	3223
	Hasamdias (037_02)	3224
PR118	Hasamdias (037_01)	545
	Hasamdias (037_01)	540
	Hasamdias (037_01)	540
	Hasamdias (037_01)	539
	Hasamdias (037_01)	539
	Hasamdias (037_01)	317
	Hasamdias (037_01)	317
	Hasamdias (037_01)	317
PR119	Noapara (028_02)	2997
	Noapara (028_02)	2996
	Noapara (028_02)	2994
	Noapara (028_02)	2993
	Noapara (028_02)	2995
	Noapara (028_02)	2994
PR120	Noapara (028_03)	3996
	Noapara (028_03)	3996
PR121	Noapara (028_03)	3966
	Noapara (028_03)	3965
PR122	Noapara (028_03)	3729
	Noapara (028_03)	3965
PR123	Noapara (028_03)	3736
PR124	Chandidasdi (038_03)	2031
PR125	Chandidasdi (038_03)	1812
	Chandidasdi (038_03)	1841
	Chandidasdi (038_03)	1775
	Chandidasdi (038_04)	3455
	Chandidasdi (038_03)	1820
	Chandidasdi (038_03)	1756
	Chandidasdi (038_03)	1822

Id	Mouza	Plot
PR126	Chandidasdi (038_03)	1675
PR127	Chandidasdi (038_03)	1675
PR128	Chandidasdi (038_03)	1675
PR129	Hasamdias (037_01)	485
	Hasamdias (037_01)	319
PR130	Sadardi (055_01)	485
	Sadardi (055_01)	484
	Sadardi (055_01)	484
	Sadardi (055_01)	483
PR131	Noapara (028_03)	3974
	Noapara (028_03)	3711
	Noapara (028_03)	3974
PR132	Noapara (028_03)	3757
	Noapara (028_03)	3757
	Hazrahati (035_00)	468
	Noapara (028_03)	3760
	Hazrahati (035_00)	468
PR133	Sadardi (055_02)	2602
PR134	Sadardi (055_03)	3541
	Sadardi (055_03)	3529
	Sadardi (055_03)	3495
	Sadardi (055_03)	3615
	Sadardi (055_03)	3540
	Sadardi (055_03)	3529
	Sadardi (055_03)	3521
	Sadardi (055_03)	3502
	Sadardi (055_03)	3490
	Sadardi (055_03)	3210
	Sadardi (055_03)	3069
	Sadardi (055_03)	3502
	Sadardi (055_03)	3518
	Sadardi (055_03)	3215
PR135	Sadardi (055_03)	3529
	Sadardi (055_03)	3558
	Sadardi (055_03)	3557
	Sadardi (055_03)	3554
PR136	Sadardi (055_03)	3552
	Sadardi (055_03)	3495
	Sadardi (055_03)	4059
	Sadardi (055_03)	3074
PR137	Sadardi (055_03)	4060
	Sadardi (055_03)	3573
PR138	Sadardi (055_03)	3544
	Sadardi (055_03)	3529
PR139	Sadardi (055_01)	297
	Sadardi (055_01)	298
PR140	Chandidasdi (038_04)	3095
	Chandidasdi (038_04)	3094
	Chandidasdi (038_04)	3334
	Chandidasdi (038_04)	3094
PR140	Chandidasdi (038_03)	1841
	Chandidasdi (038_03)	1846
	Chandidasdi (038_03)	1860

Id	Mouza	Plot
	Chandidasdi (038_03)	1866
PR141	Chandidasdi (038_03)	1663
	Chandidasdi (038_03)	1663
	Chandidasdi (038_03)	1742
	Chandidasdi (038_03)	1682
	Chandidasdi (038_03)	1663
PR142	Sadardi (055_01)	130
	Sadardi (055_01)	217
PR143	Nurpur (036_00)	317
	Nurpur (036_00)	301
	Hasamdia (037_01)	763
	Nurpur (036_00)	317
	Hasamdia (037_01)	763
PR144	Hasamdia (037_01)	404
	Hasamdia (037_02)	3583
	Hasamdia (037_02)	3634
	Atadi (076_00)	279
PR145	Sadardi (055_02)	2522
	Sadardi (055_01)	1826
	Sadardi (055_01)	1697
	Sadardi (055_01)	1697
	Sadardi (055_01)	1694
	Sadardi (055_01)	1689
	Sadardi (055_01)	1689
	Sadardi (055_01)	1649
	Sadardi (055_01)	1649
	Sadardi (055_01)	1648
	Sadardi (055_01)	1640
	Sadardi (055_01)	1640
	Sadardi (055_02)	2550
	Sadardi (055_02)	2550
	Sadardi (055_02)	2516
	Sadardi (055_02)	2550
	Sadardi (055_02)	2550
	Sadardi (055_02)	2539
	Sadardi (055_02)	2539
	Sadardi (055_02)	2539
	Sadardi (055_02)	2539
	Sadardi (055_02)	2539
	Sadardi (055_02)	2519
	Sadardi (055_02)	2519
	Sadardi (055_02)	2517
	Sadardi (055_02)	2517
	Sadardi (055_02)	2516
	Sadardi (055_01)	1706
	Sadardi (055_01)	1706
	Sadardi (055_01)	1706
	Sadardi (055_01)	1706
	Sadardi (055_01)	1706
	Sadardi (055_01)	1696
	Sadardi (055_01)	1696
Sadardi (055_01)	1696	
Sadardi (055_01)	1695	

Id	Mouza	Plot
	Sadardi (055_01)	1695
	Sadardi (055_01)	1694
	Sadardi (055_01)	1687
	Sadardi (055_01)	1687
	Sadardi (055_01)	1687
	Sadardi (055_01)	1686
	Sadardi (055_01)	1684
	Sadardi (055_01)	1684
	Sadardi (055_01)	1684
	Sadardi (055_01)	1684
	Sadardi (055_01)	1684
		1680
	Sadardi (055_01)	1674
	Sadardi (055_01)	1674
	Sadardi (055_01)	1649
	Sadardi (055_01)	1649
	Sadardi (055_01)	1649
	Sadardi (055_01)	1646
	Sadardi (055_01)	1644
	Sadardi (055_01)	1639
	Sadardi (055_01)	1639
	Sadardi (055_01)	1637
	Sadardi (055_02)	2539
	Sadardi (055_02)	2538
	Sadardi (055_02)	2536
	Sadardi (055_02)	2535
	Sadardi (055_02)	2534
	Sadardi (055_02)	2519
	Sadardi (055_02)	2519
	Sadardi (055_02)	2517
	Sadardi (055_02)	2517
	Sadardi (055_02)	2516
	Sadardi (055_02)	2516
	Sadardi (055_01)	1826
	Sadardi (055_01)	1706
	Sadardi (055_01)	1706
	Sadardi (055_01)	1706
	Sadardi (055_01)	1705
	Sadardi (055_01)	1697
	Sadardi (055_01)	1696
	Sadardi (055_01)	1696
	Sadardi (055_01)	1695
	Sadardi (055_01)	1694
	Sadardi (055_01)	1688
	Sadardi (055_01)	1687
	Sadardi (055_01)	1684
	Sadardi (055_01)	1649
	Sadardi (055_01)	1649
	Sadardi (055_01)	1649
	Sadardi (055_01)	1649
	Sadardi (055_01)	1648
	Sadardi (055_01)	1644
	Sadardi (055_01)	1640

Id	Mouza	Plot
	Sadardi (055_01)	1639
	Sadardi (055_01)	1687
PR146	Hazrahati (035_00)	597
	Hazrahati (035_00)	596
	Hazrahati (035_00)	587
	Hazrahati (035_00)	587
	Hazrahati (035_00)	586
	Hazrahati (035_00)	580
	Hazrahati (035_00)	580
	Hazrahati (035_00)	580
	Hazrahati (035_00)	579
	Hazrahati (035_00)	579
	Hazrahati (035_00)	578
	Hazrahati (035_00)	577
	Hazrahati (035_00)	576
	Hazrahati (035_00)	576
	Hazrahati (035_00)	575
	Hazrahati (035_00)	575
	Hazrahati (035_00)	574
	Hazrahati (035_00)	574
	Nurpur (036_00)	331
	Nurpur (036_00)	330
	Nurpur (036_00)	330
	Nurpur (036_00)	330
	Nurpur (036_00)	329
	Nurpur (036_00)	329
	Nurpur (036_00)	312
	Nurpur (036_00)	312
	Nurpur (036_00)	311
	Nurpur (036_00)	311
	Nurpur (036_00)	311
	Nurpur (036_00)	304
	Nurpur (036_00)	303
	Nurpur (036_00)	303
	Nurpur (036_00)	302
	Nurpur (036_00)	302
	Nurpur (036_00)	302
	Nurpur (036_00)	302
	Hazrahati (035_00)	596
	Hazrahati (035_00)	587
	Hazrahati (035_00)	587
	Hazrahati (035_00)	597
	Hazrahati (035_00)	596
	Hazrahati (035_00)	581
	Nurpur (036_00)	311
PR147	Hasamdial (037_01)	587
	Hasamdial (037_01)	593
PR148	Hasamdial (037_01)	374
	Hasamdial (037_01)	378
	Hasamdial (037_01)	377
PR149	Hasamdial (037_01)	370
	Hazrahati (035_00)	484
	Hasamdial (037_01)	370

Id	Mouza	Plot
	Hasamdial (037_01)	369
	Nurpur (036_00)	19
	Hazrahati (035_00)	468
	Hasamdial (037_01)	370
	Nurpur (036_00)	181
	Nurpur (036_00)	164
	Nurpur (036_00)	19
	Hasamdial (037_01)	370
	Noapara (028_03)	4209
PR150	Nurpur (036_00)	293
	Nurpur (036_00)	294
PR151	Hasamdial (037_01)	372
	Hasamdial (037_01)	372
	Hasamdial (037_01)	372
	Hasamdial (037_01)	372
PR152	Nurpur (036_00)	267
	Nurpur (036_00)	267
	Nurpur (036_00)	264
	Nurpur (036_00)	263
	Nurpur (036_00)	263
	Nurpur (036_00)	242
	Nurpur (036_00)	242
PR153	Nurpur (036_00)	241
	Nurpur (036_00)	486
PR154	Sadardi (055_01)	1373
	Sadardi (055_01)	1369
	Sadardi (055_01)	1365
	Sadardi (055_01)	1350
PR155	Hasamdial (037_02)	3311
	Hasamdial (037_02)	3312
	Hasamdial (037_02)	3312
	Hasamdial (037_02)	3312
	Hasamdial (037_02)	3309
	Atadi (076_00)	279
PR156	Hasamdial (037_02)	3311
	Atadi (076_00)	279
PR157	Atadi (076_00)	279
PR158	Hoglakandi (033_00)	732
	Hoglakandi (033_00)	733
	Hoglakandi (033_00)	733
	Hoglakandi (033_00)	733
	Hoglakandi (033_00)	733
	Hoglakandi (033_00)	733
	Hoglakandi (033_00)	733
	Hoglakandi (033_00)	717
	Hoglakandi (033_00)	717
	Hoglakandi (033_00)	715
	Hoglakandi (033_00)	715
	Hoglakandi (033_00)	715

Id	Mouza	Plot
	Hoglakandi (033_00)	715
	Hoglakandi (033_00)	712
	Hoglakandi (033_00)	712
	Hoglakandi (033_00)	712
	Hoglakandi (033_00)	712
	Hoglakandi (033_00)	712
	Hoglakandi (033_00)	712
	Hoglakandi (033_00)	917
	Hoglakandi (033_00)	717
PR159	Hoglakandi (033_00)	737
	Hoglakandi (033_00)	668
	Hoglakandi (033_00)	668
	Hoglakandi (033_00)	669
PR160	Hoglakandi (033_00)	964
	Hoglakandi (033_00)	969
	Hoglakandi (033_00)	968
	Hoglakandi (033_00)	968
	Hoglakandi (033_00)	968
	Hoglakandi (033_00)	967
	Hoglakandi (033_00)	968
PR161	Hasamdial (037_01)	486
	Hasamdial (037_01)	486
PR162	Hasamdial (037_01)	490
	Hasamdial (037_01)	489
	Hasamdial (037_01)	488
	Hasamdial (037_01)	487
PR163	Sadardi (055_01)	1892
PR164	Sadardi (055_01)	1919
	Sadardi (055_01)	1902
	Sadardi (055_01)	1896
	Sadardi (055_01)	1890
	Sadardi (055_01)	192
	Sadardi (055_01)	172
	Sadardi (055_01)	144
	Sadardi (055_01)	1918
	Sadardi (055_01)	1883
	Sadardi (055_01)	192
	Sadardi (055_01)	172
	Sadardi (055_01)	146
	Sadardi (055_01)	192
	Sadardi (055_01)	192
PR165	Hasamdial (037_02)	3216
	Hasamdial (037_02)	3248
	Hasamdial (037_02)	3226
	Hasamdial (037_02)	3226
	Hasamdial (037_02)	3268
PR166	Nurpur (036_00)	12
	Hazrahati (035_00)	491
	Nurpur (036_00)	18
	Hazrahati (035_00)	493
	Nurpur (036_00)	18
PR167	Sadardi (055_03)	3433
PR168	Noapara (028_02)	2981
PR169	Noapara (028_02)	2943

Id	Mouza	Plot
	Noapara (028_02)	2943
	Noapara (028_02)	2943
	Noapara (028_02)	2956
PR170	Noapara (028_02)	2955
	Noapara (028_02)	2955
	Noapara (028_02)	2953
	Noapara (028_02)	2948
PR171	Noapara (028_02)	2978
	Noapara (028_02)	2967
PR172	Noapara (028_02)	2966
	Noapara (028_02)	2965
	Noapara (028_02)	2964
PR173	Chhilar Char (075_01)	62
	Chhilar Char (075_01)	62
	Chhilar Char (075_01)	34
	Chhilar Char (075_01)	34
	Chhilar Char (075_01)	34
PR174	Sadardi (055_03)	3586
PR175	Hoglakandi (033_00)	615
	Hoglakandi (033_00)	613
	Hoglakandi (033_00)	1050
	Hoglakandi (033_00)	796
	Hoglakandi (033_00)	614
PR176	Noapara (028_03)	3748
	Hazrahati (035_00)	694
	Hazrahati (035_00)	534
	Hazrahati (035_00)	422
	Hazrahati (035_00)	237
	Hazrahati (035_00)	232
	Hazrahati (035_00)	216
	Hazrahati (035_00)	72
	Hazrahati (035_00)	694
	Hazrahati (035_00)	669
	Hazrahati (035_00)	669
	Hazrahati (035_00)	652
	Hazrahati (035_00)	599
	Hazrahati (035_00)	524
	Hazrahati (035_00)	75
	Hazrahati (035_00)	694
	Hazrahati (035_00)	694
	Hazrahati (035_00)	216
PR177	Sadardi (055_06)	667
	Sadardi (055_06)	667
	Chandidasdi (038_04)	3746
	Chandidasdi (038_04)	3746
	Chandidasdi (038_04)	3745
	Sadardi (055_01)	16
	Sadardi (055_01)	8
	Sadardi (055_01)	7
	Sadardi (055_01)	6
	Sadardi (055_02)	1
	Sadardi (055_02)	1

Id	Mouza	Plot
	Sardari (055_06)	667
	Sardari (055_06)	667
	Chandidasdi (038_04)	3745
	Sardari (055_01)	16
	Sardari (055_06)	680
	Sardari (055_06)	680
	Sardari (055_06)	680
	Sardari (055_06)	680
PR178	Sardari (055_03)	3492
	Sardari (055_03)	3213
	Sardari (055_03)	3212
	Sardari (055_03)	3209
	Sardari (055_03)	3208
	Sardari (055_03)	3205
	Sardari (055_03)	3204
	Sardari (055_03)	3201
	Sardari (055_03)	3200
	Sardari (055_03)	3067
	Sardari (055_03)	3066
	Sardari (055_03)	3063
	Sardari (055_03)	3061
	Sardari (055_03)	3060
	Sardari (055_03)	3056
	Sardari (055_03)	3056
	Sardari (055_03)	3055
	Sardari (055_03)	3052
	Sardari (055_03)	3051
	Sardari (055_03)	3004
PR179	Sardari (055_06)	667
	Choukighata (074_00)	140
	Choukighata (074_00)	138
	Choukighata (074_00)	138
	Choukighata (074_00)	109
	Choukighata (074_00)	109
	Choukighata (074_00)	105
	Chhilar Char (075_01)	211
	Chhilar Char (075_01)	211
	Chhilar Char (075_01)	211
	Chhilar Char (075_01)	209
	Chhilar Char (075_02)	332
	Chhilar Char (075_02)	326
	Chhilar Char (075_02)	325
	Chhilar Char (075_02)	325
	Chhilar Char (075_02)	325
	Atadi (076_00)	859
	Atadi (076_00)	524
	Atadi (076_00)	524
	Atadi (076_00)	524
	Atadi (076_00)	523
	Atadi (076_00)	522
	Atadi (076_00)	522
	Atadi (076_00)	521
	Atadi (076_00)	518

Id	Mouza	Plot
	Atadi (076_00)	517
	Atadi (076_00)	517
	Atadi (076_00)	517
	Atadi (076_00)	474
	Atadi (076_00)	471
	Atadi (076_00)	470
	Atadi (076_00)	470
	Atadi (076_00)	470
	Atadi (076_00)	470
	Atadi (076_00)	466
	Atadi (076_00)	466
	Atadi (076_00)	466
	Atadi (076_00)	466
	Atadi (076_00)	458
	Atadi (076_00)	458
	Atadi (076_00)	458
	Atadi (076_00)	458
	Atadi (076_00)	455
	Atadi (076_00)	455
	Atadi (076_00)	455
	Atadi (076_00)	455
	Atadi (076_00)	331
	Atadi (076_00)	331
	Atadi (076_00)	330
	Atadi (076_00)	307
	Atadi (076_00)	307
	Atadi (076_00)	306
		1034
		1034
		1033
		1033
	Hoglakandi (033_00)	1026
	Hoglakandi (033_00)	1025
	Hoglakandi (033_00)	1018
	Hoglakandi (033_00)	1018
	Hoglakandi (033_00)	1016
	Hoglakandi (033_00)	1015
	Hoglakandi (033_00)	854
	Hoglakandi (033_00)	854
	Hoglakandi (033_00)	853
	Hoglakandi (033_00)	853
	Hoglakandi (033_00)	850
	Hoglakandi (033_00)	850
	Hoglakandi (033_00)	849
	Hoglakandi (033_00)	845
	Hoglakandi (033_00)	845
	Hoglakandi (033_00)	844
	Hoglakandi (033_00)	844
	Hoglakandi (033_00)	840
	Hoglakandi (033_00)	840
	Hoglakandi (033_00)	839
	Hoglakandi (033_00)	839

Id	Mouza	Plot
	Hoglakandi (033_00)	836
	Hoglakandi (033_00)	836
	Hoglakandi (033_00)	836
	Hoglakandi (033_00)	835
	Hoglakandi (033_00)	835
	Hoglakandi (033_00)	832
	Hoglakandi (033_00)	831
	Hoglakandi (033_00)	831
	Hoglakandi (033_00)	831
	Hoglakandi (033_00)	829
	Hoglakandi (033_00)	826
	Hoglakandi (033_00)	825
	Hazrahati (035_00)	701
	Hazrahati (035_00)	701
		3649
	Hasamdial (037_02)	3634
	Hasamdial (037_02)	3624
	Hasamdial (037_02)	3293
	Hasamdial (037_02)	3293
	Hasamdial (037_02)	3293
	Hasamdial (037_02)	3288
	Hasamdial (037_02)	3279
	Hasamdial (037_02)	3277
	Hasamdial (037_02)	3277
	Hasamdial (037_02)	3277
	Hasamdial (037_02)	3277
	Hasamdial (037_02)	3277
	Hasamdial (037_02)	3277
	Hasamdial (037_02)	3277
	Hasamdial (037_02)	3271
	Hasamdial (037_02)	3271
	Hasamdial (037_02)	3271
	Hasamdial (037_02)	3271
	Hasamdial (037_02)	3266
	Hasamdial (037_02)	3266
	Hasamdial (037_02)	3266
	Hasamdial (037_02)	3265
	Hasamdial (037_02)	3263
	Chandidasdi (038_03)	2767
	Chandidasdi (038_03)	2756
	Chandidasdi (038_04)	3143
	Chandidasdi (038_04)	3143
	Chandidasdi (038_04)	3143
	Chandidasdi (038_04)	3141
	Chandidasdi (038_04)	3140
	Chandidasdi (038_04)	3140
	Chandidasdi (038_04)	3137
	Chandidasdi (038_04)	3137
	Chandidasdi (038_04)	3136
	Chandidasdi (038_04)	3133
	Chandidasdi (038_04)	3132
	Chandidasdi (038_04)	3129
	Chandidasdi (038_04)	3129

Id	Mouza	Plot
	Chandidasdi (038_04)	3126
	Chandidasdi (038_04)	3126
	Chandidasdi (038_04)	3125
	Chandidasdi (038_04)	3122
	Chandidasdi (038_04)	3121
	Chandidasdi (038_04)	3119
	Chandidasdi (038_04)	3119
	Chandidasdi (038_04)	3115
	Chandidasdi (038_04)	3114
	Chandidasdi (038_04)	3113
	Chandidasdi (038_04)	3108
	Chandidasdi (038_04)	3107
	Chandidasdi (038_04)	3103
	Chandidasdi (038_04)	3098
	Chandidasdi (038_04)	4348
	Sadardi (055_01)	435
	Sadardi (055_01)	435
	Sadardi (055_01)	435
	Sadardi (055_06)	667
	Sadardi (055_06)	667
	Chhilar Char (075_02)	352
	Atadi (076_00)	328
	Atadi (076_00)	316
	Atadi (076_00)	311
	Atadi (076_00)	307
		713
	Sadardi (055_01)	435
	Atadi (076_00)	306
	Nurpur (036_00)	475
	Hasamdial (037_01)	499
	Hasamdial (037_02)	3647
	Hasamdial (037_02)	3647
	Sadardi (055_06)	501
	Hasamdial (037_02)	3263
	Sadardi (055_01)	436
	Sadardi (055_06)	501
	Sadardi (055_06)	501
	Hasamdial (037_01)	644
	Hasamdial (037_02)	3265
	Hasamdial (037_02)	3265
	Hasamdial (037_02)	3265
	Hasamdial (037_02)	3263
	Hasamdial (037_02)	3263
	Sadardi (055_01)	436
	Hasamdial (037_02)	3266
	Hasamdial (037_02)	3265
	Hasamdial (037_02)	3263
	Hasamdial (037_02)	3259
	Sadardi (055_02)	2889
	Sadardi (055_02)	2889
	Sadardi (055_02)	2889
	Sadardi (055_02)	2887
	Sadardi (055_02)	2887

Id	Mouza	Plot
	Sardari (055_02)	2884
	Sardari (055_02)	2883
	Sardari (055_02)	2883
	Sardari (055_02)	2882
	Sardari (055_02)	2882
	Sardari (055_02)	2881
	Sardari (055_02)	2879
	Sardari (055_02)	2879
	Sardari (055_02)	2877
	Sardari (055_02)	2844
	Sardari (055_02)	2841
	Sardari (055_02)	2841
	Sardari (055_02)	2840
	Sardari (055_02)	2840
	Sardari (055_02)	2840
	Sardari (055_02)	2822
	Sardari (055_02)	2822
	Sardari (055_02)	2820
	Sardari (055_02)	2820
	Sardari (055_02)	2708
	Sardari (055_02)	2707
	Sardari (055_02)	2707
	Sardari (055_02)	2707
	Sardari (055_02)	2706
	Sardari (055_02)	2706
	Sardari (055_02)	2701
	Sardari (055_02)	2884
	Sardari (055_02)	2841
	Sardari (055_02)	2518

Id	Mouza	Plot
	Sardari (055_02)	2518
	Sardari (055_02)	2518
	Sardari (055_02)	2518
	Sardari (055_02)	2517
	Sardari (055_02)	2517
	Sardari (055_02)	2518
	Sardari (055_02)	2518
	Sardari (055_02)	2518
	Sardari (055_02)	2518
	Sardari (055_02)	2517
	Sardari (055_02)	2517
	Sardari (055_03)	3506
	Sardari (055_03)	3506
	Sardari (055_03)	3506
	Sardari (055_03)	3506
	Sardari (055_03)	3060
	Sardari (055_03)	3060
	Sardari (055_03)	3060
	Sardari (055_03)	3060
	Sardari (055_03)	3060
	Sardari (055_03)	3060
	Sardari (055_03)	3060
	Sardari (055_06)	667
	Sardari (055_06)	667
	Sardari (055_06)	667
	Sardari (055_06)	667